

The Confluence of Mental, Physical, Social, and Academic Difficulties in Middle Childhood. I: Exploring the “Headwaters” of Early Life Morbidities

W. THOMAS BOYCE, M.D., MARILYN J. ESSEX, Ph.D., HERMI ROJAHN WOODWARD,
JEFFREY R. MEASELLE, Ph.D., JENNIFER C. ABLOW, Ph.D., DAVID J. KUPFER, M.D.,
AND THE MACARTHUR ASSESSMENT BATTERY WORKING GROUP

ABSTRACT

Objective: To present the conceptual and methodological backgrounds for development of the MacArthur Assessment Battery for Middle Childhood and one of its constituent instruments, the MacArthur Health and Behavior Questionnaire (HBQ).

Method: As a component of HBQ development, research addressing “developmental psychopathology” as a nosological category of human disorder was reviewed. Such research bears, as its conceptual legacy, the strengths and frailties of the nosology from which the category was derived. **Results:** Defining developmental psychopathology has done much to foster psychiatric and medical awareness of the particular dilemmas and problems intrinsic to childhood psychopathology. On the other hand, its delineation has obscured the tendency for psychiatric morbidities to emerge gradually along trajectories of development, to involve interactions among organismic and contextual factors, and to represent “confluences” of childhood difficulties suggesting common, less distinctive origins among psychiatric and biomedical disorders. The recognizable psychopathology of adolescence is most often preceded by protean manifestations of early difficulties resulting from the conjoint operation of child-specific vulnerabilities and context-derived risk factors. Co-occurrences of mental, physical, social, and academic difficulties in children’s lives are more frequently the rule than the exception, and isolated, singular psychopathology is less common in childhood than the prevailing diagnostic nosology may imply.

Conclusions: The MacArthur Assessment Battery represents an effort to assemble, in a single set of instruments, measures of child, context, and health risk factors for the prevalent morbidities of middle childhood. The HBQ, a component of the Battery, is a parent- and teacher-report instrument that assesses mental health, physical health, social, and school adaptation in 4- to 8-year-old children. *J. Am. Acad. Child Adolesc. Psychiatry*, 2002, 41(5):000–000. **Key Words:** developmental psychopathology, behavior problems, pediatric morbidities, middle childhood, risk assessment.

Accepted December 3, 2001.

Dr. Boyce is with the Institute of Human Development and the School of Public Health, University of California, Berkeley; Dr. Essex is based in the Department of Psychiatry, University of Wisconsin, Madison; Ms. Woodward is with the MacArthur Foundation Research Network on Psychopathology and Development; Drs. Measelle and Ablow are members of the psychology faculty at the University of Oregon; and Dr. Kupfer is with the University of Pittsburgh’s Western Psychiatric Institute and Clinic.

The research on which this paper was based was supported by the John D. and Catherine T. MacArthur Foundation’s Research Network on Psychopathology and Development and by NIMH grant R01-MH44340. The MacArthur Assessment Battery Working Group comprises Jennifer C. Ablow, Abbey Alkon, Jeffrey M. Armstrong, W. Thomas Boyce, Marilyn J. Essex, Lauren H. Goldstein, Richard Harrington, Helena C. Kraemer, David J. Kupfer, Jeffrey R. Measelle, Charles A. Nelson, Jodi Quas, Nancy A. Smider, and Laurence Steinberg.

Correspondence to Dr. Boyce, School of Public Health, 570 University Hall, University of California, Berkeley, CA 94720-1190; e-mail: boyce@socrates.berkeley.edu.

0890-8567/02/4105-0000©2002 by the American Academy of Child and Adolescent Psychiatry.

Methodological approaches for studying disorders of health in childhood have lagged substantively behind emerging perspectives on the conceptualization and ordering of more global difficulties in children’s lives. While the *DSM-IV* nosology has dramatically advanced epidemiological investigation, the formal categorization of symptoms has also reified discrete “diagnostic entities” that often fail to capture how psychopathology “unfolds” as longitudinal iterative stories within individual lives (Tucker, 1998). This fundamental shortfall in current approaches to conceptualizing, recognizing, and studying psychopathology in early life has at least three important parts. First, extant strategies for investigating the origins of childhood disorders often ignore their developmental character, that is, the manner in which psychological morbidity emerges more or less gradually over

time, influenced in both form and intensity by concurrent developmental events and processes. It is, for example, during periods of rapid or dramatic developmental transition, such as primary school entry, that individual predispositions to behavioral and emotional difficulties become most visible and pronounced (Boyce et al., 1995a, 1998a). Developmentally normative expectations at home or school may also predispose to the expression of symptoms. The emergence of attentional deficits in the third or fourth grade, for example, is concurrent with new pedagogical expectations for the acquisition of formal cognitive operations. Maladaptive emotional development and deficits in emotion regulatory capacity may play prominent roles in the onset of both internalizing and externalizing disorders of early behavior (Zeanah et al., 1997). Biological development may similarly underlie the expression of psychiatric disturbances, as in the acceleration of depressive symptoms that occurs among pubertal girls (Cyranowski et al., 2000). The onset, course, and character of childhood psychopathology are thus inextricably bound, in a variety of ways, to the course and character of developmental processes.

Second, contemporary views of developmental psychopathology often overlook the breadth of contributing factors and the ways in which such factors work together to determine the advent of disordered behavior. While different sets of investigators have examined organismic and contextual influences on developmental psychopathology, remarkably few have set about the challenging task of addressing child-by-context interactions as predictors of childhood psychological morbidities. On the one hand, much has been learned in recent years of the neural and genetic substrates of disordered development and early psychopathology (see, for example, Nelson and Bloom, 1997; Plomin and Rutter, 1998). On the other hand, researchers interested in social environmental contributions have produced a broad, rich literature documenting contextual influences on early mental disorder (see, for example, Repetti et al., in press; Steinberg and Avenevoli, 2000). Largely missing from both literatures, however, are studies that concurrently examine genetically regulated differences in biological susceptibility, social contextual factors generating psychopathological risk, and biology $\times$ context interactions that may arguably play the most compelling etiological roles. Where such interactions have been addressed, there is strongly suggestive evidence that many, if not most, childhood morbidities are the outcomes of dynamic interactions between

biological and contextual determinants. Boyce and colleagues have found, for example, that interactions between psychobiological reactivity and naturally occurring environmental adversities are more predictive of biomedical outcomes, such as injury and infectious illness incidences, than either variety of risk factor in isolation (Boyce, 1996; Boyce et al., 1995b, 1998b). A cross-sectional study by Gannon et al. (1989) showed that students with exaggerated heart rate responses to stressors showed higher rates of depressive symptoms under stressful circumstances. Similarly, longitudinal analyses from the Wisconsin Study of Families and Work (M. Essex, personal communication, 2000) have demonstrated that first graders with high autonomic reactivity to standardized challenges showed higher rates of internalizing symptoms, but only when such children had been exposed during infancy to mothers with major depression. Such findings suggest that both pediatric and child psychiatric disorders may often be the product of interactive etiologies and may require some form of both individual vulnerability and contextual risk for onset to occur.

Third, although "comorbidity" is now part of the standard lexicon of child psychiatry and pediatric medicine (Biederman et al., 1994; Weiland et al., 1992), conventional examples are largely co-occurrences of diseases within, rather than across, taxonomic categories. Examples to the contrary occur in the work of investigators such as Cadman et al. (1987, 1991) and Pine (Cohen et al., 1998; Pine et al., 1997), but the familiar comorbidities are those describing the coupling of disorders such as substance abuse and affective disorder (Merikangas et al., 1988), asthma and chronic allergic symptoms (Robinson et al., 1992), or shyness and victimization (Olweus, 1993). In each such pairing, the "comorbid" disorders could as easily be viewed as two facets of the same constellation of symptoms. Similarly, while concurrent diagnoses of two or more mental disorders occur in more than half of children with mental illness (Offord et al., in press), follow-up studies have generally reported on *homotypic* continuities, i.e., the persistence of similar phenotypic attributes over time, without addressing nosologically *heterotypic* outcomes.

Despite persuasive calls for a more dynamic, interactive view of pathogenesis (see, for example, Bronfenbrenner and Morris, 1998), discourse and research on etiology remain mired in the "either/or" language of biogenetic versus psychosocial causation, symptoms versus impairment, and biomedical versus psychiatric disorder. Such dualisms tend to obscure an underlying reality in which mental,

physical, social, and academic difficulties are not only mutually determinative, but often inseparable. The theory upon which current research is based increasingly pays homage to a more complex, interactive vision of disease and disorder in childhood, but available design and measurement approaches often disallow commensurate methodological strategies. In short, the methods, design, and construction of current child mental health research are often insufficiently reflective of conceptual change occurring in the field of developmental psychopathology and of the degree to which developmental science has moved into fresh and uncharted territories of investigation.

MIDDLE CHILDHOOD

A research territory in particular need of new methodological approaches is the period of "middle childhood," that is, the several years between the psychosocial transition to primary school at age 5 years and the biological transition to puberty that begins variably from 8 to 14 years of age. Much developmental research has focused on infancy and the first 3 years of life, during which critical events in brain development and human relationships occur (Nelson and Bosquet, 1999), and on adolescence, when biobehavioral transformations into adulthood are dramatically engaged (Steinberg et al., 1995). By contrast, the middle childhood years have received less intensive or sustained study, particularly by researchers interested in the developmental antecedents of psychopathological morbidities. Developmental neuroscience, however, has recently challenged the assumption that only modest neural reorganizations are possible beyond infancy (Cicchetti and Cannon, 1999), and it is now clear that cognitive systems (e.g., language) are capable of experience-driven functional changes into middle childhood and beyond (Merzenich, 1998; Tallal et al., 1996).

Furthermore, while psychodynamic theory has regarded middle childhood as a time of "latency" with regard to psychosexual development, the period is anything but latent with respect to developmental and biological processes. The transition to school is marked, for example, by a profusion of adaptive challenges requiring accommodations to new physical surroundings and social groups, to academic and behavioral expectations, and to the need for relocating the "self" against a backdrop of peer capabilities, values, and characteristics. Such challenges are capable of activating adrenocortical and other stress response systems with powerful regulatory influences on

biological and homeostatic functions (Boyce et al., 1995a). While middle childhood lies anterior in time to the surge of gonadotropins that signals the onset of puberty, the advent of *adrenal* steroid production, or adrenarche, occurs much earlier, at 6 to 7 years of age (McClintock and Herdt, 1996). Little is presently known of how individual differences in the timing of adrenarche affect trajectories of subsequent development, normative or pathological. Piagetian observations also locate within middle childhood the transition in cognitive development from preoperational to formal operational thought, that is, from the primitive capacity for concrete manipulation of cognitive representations to a more advanced ability to conduct abstract, propositional, and syllogistic thought. Finally, while fully expressed, severe psychopathology can emerge even in early childhood; it is often during the period of middle childhood that the undifferentiated, presyndromal behaviors suggesting early risk for psychopathology first consolidate into the recognizable patterns of "crystallized" adult mental disorders. Thus, far from a period of dormant psychobiological inactivity, the middle childhood years are replete with psychosocial challenges, biological turning points, and cognitive and behavioral transitions.

CONTINUITIES FROM EARLY CHILDHOOD

Given these challenges and transitions, it is not surprising that longitudinal studies of children with preschool behavioral disorders have increasingly documented prospective continuities of such disorders into primary school and beyond. Campbell and Ewing (1990), for example, found that young children with significant externalizing problems at 3 years of age were more likely than control children to show difficulties in behavioral control during middle childhood in both the home and school settings. These findings are consistent with those of more recent epidemiological studies, indicating that the majority of hard-to-manage preschool children will have ongoing adjustment difficulties, such as overactivity, peer problems, and noncompliance (Bennett et al., 1998, 1999). Such studies have also suggested that family adversities, such as chronic stressors, maternal depression, marital discord, punitive child-rearing practices, and poor parent-child relationships, may be responsible in part for observed continuities in behavioral difficulties.

Less straightforward associations have been found between earlier and later internalizing symptoms (e.g.,

Campbell and Ewing, 1990; Fischer et al., 1984). Differences in the consistency or strength of such findings may be due to a relative neglect of early behaviors, such as social withdrawal, that constitute less differentiated or visible signs of vulnerability to anxiety or depression. Hymel et al. (1990) found, for example, that social withdrawal in second grade was predictive, 3 years later, of negative self-regard, one of the major components of internalizing psychopathology. Epidemiologically, evidence indicates that nearly 20% of children entering school are already experiencing behavioral and emotional problems worthy of intervention (Alexander et al., 1993; Sameroff and Haith, 1996). Many other children develop more subtle and ill-defined forms of impairment that go largely unrecognized in both schools and health care settings (Costello et al., 1988; Kazdin et al., 1993). What is missing from such epidemiological observations, however, is a clearer vision of the interactive, developmental processes by which early behavior problems become rooted in the ongoing experience of the child and are transformed into the frank, syndromal psychopathology of adolescence and early adulthood.

MACARTHUR ASSESSMENT BATTERY

To generate and examine hypotheses that might reflect such a vision, researchers in the MacArthur Research Network on Psychopathology and Development are assembling an integrated assessment battery, based on a dynamic, multidimensional model of developmental psychopathology and addressing biological, neurological, psychosocial, and contextual aspects of middle childhood development. Rooted in the work of investigators such as Hamburg et al. (1974), Sameroff and Chandler (1975), and Bronfenbrenner (1979), we have embraced a developmental perspective on health and disorder in which the growing child interacts with the environment in an evolving, dynamic, and bidirectional "dance." Figure 1 attempts to invoke this conceptualization of development visually as it is reflected in the writings of contemporary theorists (Bronfenbrenner and Morris, 1998; Cicchetti and Toth, 1998; Elder, 1998; Haggerty et al., 1994; Rutter et al., 1997). The figure depicts child, context, and health as three elemental components of human development, each in continuous, omni-directional interaction with the other two over the course of development and temporal change. The preservation of health and well-being, or the individual's devolution into various

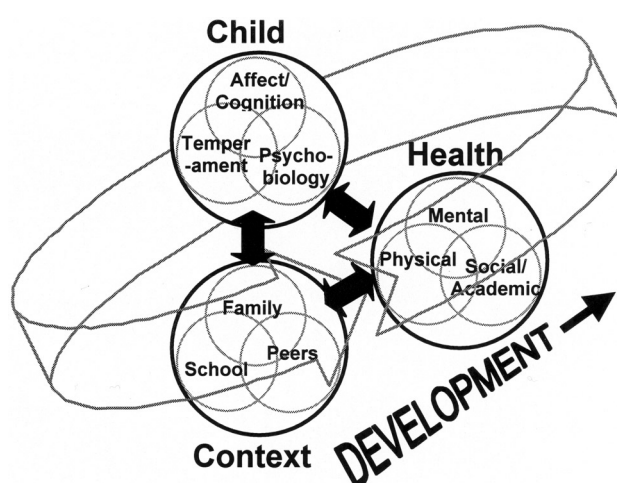


Fig. 1 Conceptual model of interactions among child, context, and health factors in developmental psychopathology.

forms of morbidity, are conceived as derivatives of these ongoing transactions among organismic qualities, environmental characteristics, and the fluctuating conditions of health and disorder. What is central within such a perspective is neither the model's components in isolation nor the state of such components at particular points in time, but rather the character and outcomes of continuous child–environment interactions occurring over time. The model's principal focus becomes the question of how children's vulnerabilities and contextual risk factors work together over developmental time to set trajectories toward complex, cross-categorical pathologies.

As is also suggested in Figure 1, the MacArthur Assessment Battery for Middle Childhood has been developed as a constellation of measures addressing several domains and focusing on early precursors of psychopathology, heightened vulnerability to dysfunctional processes, and protective factors facilitating healthy developmental trajectories. Three mutually interactive and conceptually overlapping domains are contained within each of the three broad conceptual arenas of child, context, and health. The child domains comprise measures of affective regulation and cognition, temperament, and psychobiological responses to environmental conditions. Contextual domains include family, school, and peer relationships, while health outcomes encompass mental, physical, and social and academic functioning. While the Battery explicitly makes no claim to exhaustively encompass all risk and protective factors implicated in developmental pathogenesis, a careful, multidisciplinary attempt has been made to assess a representative and promising array of

factors involved in brain–behavior–context interactions. It is such interactions that we believe figure prominently and etiologically in the health outcomes and disorders of middle childhood.

Figure 2 is an overview of domains within the health component of the MacArthur Assessment Battery, the informants used, and the specific instruments used for each of the domain-by-informant cells of the health assessment. Health outcome measures comprise evaluations of four health domains—mental, physical, social, and academic—reported by child, parent, and teacher informants. Of the resulting 12 assessment cells, 3 are addressed by the Berkeley Puppet Interview (BPI) (Measelle et al., 1998), a semi-structured interview format designed to assess 4- to 8-year-old children's perceptions of themselves and their environments. These assessments are presented elsewhere in detail (Ablow et al., 1999). The remaining eight cells are covered by the parent or teacher version of the MacArthur Health and Behavior Questionnaire (HBQ-P and HBQ-T, respectively). One cell, children's reports on their own physical health, has been omitted in light of concerns over the reliability of self-reports on physical health in the middle childhood age group. The BPI, HBQ-P, and HBQ-T scales were developed together to allow for direct, construct-by-construct comparisons between assessments by the child and multiple adult respondents. This cross-informant, cross-construct format achieves a central aspiration of the HBQ design: the elicitation of multiple and varied perspectives on the most important domains of health and disorder in middle childhood (for an in-depth analysis of the multi-

informant approach taken, see Kraemer et al., in press). A previous case-control study examined the reliability and validity of the BPI and HBQ symptomatology scales alone, i.e., those represented by the first column (mental health) in Figure 2 (Ablow et al., 1999). The present articles focus on the addition of the HBQ physical health scales and their integration within the eight shaded cells of Figure 2, i.e., the parent and teacher reports on children's mental, physical, social, and academic well-being. More detailed information on the HBQ and BPI instruments can be obtained from the authors or on the Web site of the MacArthur Foundation Research Network on Psychopathology and Development (<http://www.mackids.org>).

The overarching scientific goals of the MacArthur Assessment Battery project were first, to identify children at risk by tracing developmental pathways leading to psychopathology; second, to ascertain risk and protective factors associated with disordered outcomes; and third, to generate hypotheses about the etiology and course of psychopathological development. Each of these goals was paralleled by a set of practical objectives enabling scientists to use the MacArthur Assessment Battery measures in empirically credible and clinically meaningful ways. Among such practical objectives were those of assembling a collection of readily exportable measures, ensuring equal applicability in both laboratory and field settings, and providing cost-efficient and logistically feasible measurement strategies. At the core of our aspirations for the assessment battery was the goal of producing reliable and valid measures of constructs that are theoretically important to understanding trajectories across middle childhood development and that are derived with age-appropriate measurement paradigms.

CONCLUSION

We conclude with a summing up of our theoretical positions regarding the assessment and study of developmental psychopathology and with an introduction to the empirical and methodological results that follow. Contrary to widely held beliefs that young children generally “out-grow” behavioral and emotional difficulties, more than half of those with psychiatric disorders in the preschool years continue to show evidence of mental illness well into middle childhood and beyond (Lavigne et al., 1998a,b). Because problem behaviors often progress into longer-term psychiatric disorders, there are urgent clinical and public health needs for more effective and comprehensive

	Domains of Health			
	Mental	Physical	Social/Academic	
Child	BPI-S		BPI-SOC	BPI-A
Parent	HBQ-P	HBQ-P	HBQ-P	HBQ-P
Teacher	HBQ-T	HBQ-T	HBQ-T	HBQ-T

Fig. 2 Domains of health assessed by MacArthur Assessment Battery for Middle Childhood, by informants and assessment instruments (shaded cells refer to components addressed in this article). BPI-S, BPI-SOC, and BPI-A = Berkeley Puppet Interview Symptom, Social Relations, and Academic scales. HBQ-P and HBQ-T = MacArthur Health and Behavior Questionnaire parent and teacher versions.

means of early detection and intervention. The two studies presented in the article that follows, carried out among 4- to 8-year-old children in multiple sites, found strong psychometric properties for the HBQ, a new instrument designed to elicit parent- and teacher-reported problems in four core areas of child health and functional status. Furthermore, the studies identify substantial convergences among morbidities in middle childhood stemming from mental, physical, social, and academic difficulties.

As detailed in the companion article, the HBQ includes a number of distinctive and potentially useful features. First, the questionnaire addresses multiple, rather than singular, morbidities. As Roberts et al. (1998) have observed, "comorbidity is increasingly recognized as a key phenomenological feature of psychiatric disorders among children and adults...yet there are basically no community-based epidemiological data on the prevalence, incidence, and natural history of comorbid disorders in children." Second, the HBQ provides a measure of impairment, not just symptomatology, a property increasingly regarded as important in epidemiological studies as additional means of ascertaining "case" status (Roberts et al., 1998). Third, the HBQ may offer a stronger sense of the severity of symptoms, functional impairment, and the need for treatment. Available data suggest that a sizable proportion of individuals meeting criteria for *DSM* diagnoses are functioning adequately in their everyday lives, and may thus not be appropriately included in counts or studies of development psychopathology. Fourth, HBQ items were specifically selected to address, in a single instrument, the problems of children spanning the 4- to 8-year-old age range, a developmental period often divided observationally by the use of multiple measures of the same or similar constructs. Finally, the HBQ is an integrated component of a larger MacArthur Assessment Battery, which is attempting to understand broader developmental and interactive factors in the etiology of childhood mental illness. As also noted by Roberts et al. (1998), better and more complete knowledge of the pathogenesis of childhood disorders will almost certainly require studies that incorporate assessments of biological, psychological, and multiple contextual factors into longitudinal studies of children. A particular strength of the HBQ is its linkage, within the MacArthur Assessment Battery, to methods for young children's reports on the same outcome constructs.

It is our hope that the HBQ will prove useful to investigators addressing some of the more fundamental prob-

lems surrounding the identification, treatment, and prevention of childhood psychopathologies. Such problems may likely include difficulties reconciling multiple informants' views of a child's behavior and symptoms, questions about the degree of coupling between symptoms and impairment over the developmental trajectories of middle childhood, issues regarding gender differences in the emergence and course of troubled behavior, and both practical and theoretical dilemmas over the nosological ordering of childhood difficulties. How do either clinicians or researchers confront dissonances among children's, teachers', and parents' perspectives on the same behavioral and emotional endpoints? Indeed, is there a common underlying reality to which all these perspectives refer? How loosely or tightly are symptoms of disorder and functional impairments linked in middle childhood? Does the closeness of such linkages vary by developmental stage and across life transitions? How, if at all, are 4- to 8-year-old boys and girls different in their patterns of mental, physical, social, and academic difficulties? What are the implications of substantial confluences found among heretofore-disaggregated categories of disorder? What are we to make of these natural "violations" of conventional biomedical taxonomies? Questions such as these not only are provoked by the provisional findings presented in these two introductory papers but also are answerable in future work with the HBQ and other psychometric instrumentations.

The finding of confluences among the four categories of morbidity, documented in the companion article, will again raise important questions about the reality and utility of such distinctions within the natural world of childhood and, perhaps, human experience. Are the traditional separations of morbidities into categories, such as "psychiatric" versus "biomedical," reflections of an underlying pathological reality, or do they simply mirror conventional divisions in the training and deployment of physicians and research funds? What new insights and interventions might be spawned by closer collaborations among those who monitor and care for the well-being of children, i.e., child and adolescent psychiatrists, pediatricians, psychologists, teachers, coaches, counselors, and parents? There are clearly both clinical and research implications of a more inclusive, recombinant approach to the conceptualization of childhood morbidities. For example, physical health problems are known to hinder recovery from mental disorder, and treating behavior problems can play a role in interrupting causal pathways toward

chronic medical disease (Bardone et al., 1998). Comorbidity within mental disorders is also associated with a more chronic course, poorer prognosis, diminished responsiveness to treatment, and a per capita medical expenditure 50% higher than for persons with one condition alone (Newman et al., 1998). Thus a community's general approach to childhood mental disorders, from the design of epidemiological research to the devising of new clinical and public health interventions, might be enhanced by a more comprehensive nosological approach.

A speculative, but credible, interpretation of the findings revealed in the companion article is that while professionals may be served by existing categories of childhood disorder, children may be better served by a system of "care" that acknowledges a more conjunctive taxonomy and that embodies the broader mandate of that word. Effective "caring" for the well-being of children may demand approaches to thinking about and acting upon childhood disorders that will ultimately urge dissolution of accepted pathological categories. There may indeed be little external reality to the designation of mental, physical, social, and academic problems, and tangible benefits for children could be derived from a broader consideration of the origins and "headwaters" of childhood morbidities.

REFERENCES

- Ablow JC, Measelle JR, Kraemer HC et al. (1999), The MacArthur Three-City Outcome Study: evaluating multi-informant measures of young children's symptomatology. *J Am Acad Child Adolesc Psychiatry* 38:1580-1590
- Alexander KL, Entwistle DR, Dauber SL (1993), First-grade classroom behavior: its short- and long-term consequences for school performance. *Child Dev* 64:801-814
- Bardone AM, Moffitt TE, Caspi A, Dickson N, Stanton WR, Silva PA (1998), Adult physical health outcomes of adolescent girls with conduct disorder, depression, and anxiety. *J Am Acad Child Adolesc Psychiatry* 37:594-601
- Bennett KJ, Lipman EL, Brown S, Racine Y, Boyle MH, Offord DR (1999), Predicting conduct problems: can high-risk children be identified in kindergarten and grade 1? *J Consult Clin Psychol* 67:470-480
- Bennett KJ, Lipman EL, Racine Y, Offord DR (1998), Do measures of externalizing behaviour in normal populations predict later outcome? Implications for targeted interventions to prevent conduct disorder. *J Child Psychol Psychiatry* 39:1059-1070
- Biederman J, Milberger S, Faraone SV, Guite J, Warburton R (1994), Associations between childhood asthma and ADHD: issues of psychiatric comorbidity and familiarity. *J Am Acad Child Adolesc Psychiatry* 33:842-848
- Boyce WT (1996), Biobehavioral reactivity and injuries in children and adolescents. In: *Child Development and Behavioral Pediatrics: Toward Understanding Children and Health*, Bornstein MH, Genevro J, eds. Mahwah, NJ: Erlbaum pp 35-58
- Boyce WT, Adams S, Tschann JM, Cohen F, Wara D, Gunnar MR (1995a), Adrenocortical and behavioral predictors of immune responses to starting school. *Pediatr Res* 38:1009-1017
- Boyce WT, Chesney M, Alkon-Leonard A et al. (1995b), Psychobiologic reactivity to stress and childhood respiratory illnesses: results of two prospective studies. *Psychosom Med* 57:411-422
- Boyce WT, Frank E, Jensen PS, Kessler RC, Nelson CA, Steinberg L (1998a), Social context in developmental psychopathology: recommendations from the MacArthur Network on Psychopathology and Development. *Dev Psychopathol* 10:143-164
- Boyce WT, O'Neill-Wagner P, Price CS, Haines M, Suomi SJ (1998b), Crowding stress and violent injuries among behaviorally inhibited rhesus macaques. *Health Psychol* 17:285-289
- Bronfenbrenner U (1979), *The Ecology of Human Development: Experiments by Nature and Design*. Cambridge, MA: Harvard University Press
- Bronfenbrenner U, Morris PA (1998), The ecology of developmental processes. In: *Handbook of Child Psychology*, 5th ed, Damon W, Lerner RM, eds. New York: Wiley
- Cadman D, Boyle M, Szatmari P, Offord DR (1987), Chronic illness, disability, and mental and social well-being: findings of the Ontario Child Health Study. *Pediatrics* 79:805-813
- Cadman D, Rosenbaum P, Boyle M, Offord DR (1991), Children with chronic illness: family and parent demographic characteristics and psychosocial adjustment. *Pediatrics* 87:884-889
- Campbell SB, Ewing LJ (1990), Follow-up of hard-to-manage preschoolers: adjustment at age 9 and predictors of continuing symptoms. *J Child Psychol Psychiatry* 31:871-889
- Cicchetti D, Cannon TD (1999), Neurodevelopmental processes in the ontogenesis and epigenesis of psychopathology. *Dev Psychopathol* 11:375-393
- Cicchetti D, Toth SL (1998), The development of depression in children and adolescents. *Am Psychol* 53:221-241
- Cohen P, Pine DS, Must A, Kasen S, Brook J (1998), Prospective associations between somatic illness and mental illness from childhood to adulthood. *Am J Epidemiol* 147:232-239
- Costello EJ, Edelbrock CS, Costello AJ, Dulcan MK, Burns BJ, Brent D (1988), Psychopathology in pediatric primary care. *Pediatrics* 82:415-424
- Cyranski JM, Frank E, Young E, Shear MK (2000), Adolescent onset of the gender difference in lifetime rates of major depression: a theoretical model. *Arch Gen Psychiatry* 57:21-27
- Elder GH (1998), The life course as developmental theory. *Child Dev* 69:1-12
- Fischer M, Rolf J, Hasazi J, Cummings L (1984), Follow-up of a preschool epidemiological sample: cross-age continuities and predictions of later adjustment with internalizing and externalizing dimensions of behavior. *Child Dev* 55:137-150
- Gannon L, Banks J, Shelton D, Luchetta T (1989), The mediating effects of psychophysiological reactivity and recovery on the relationship between environmental stress and illness. *J Psychosom Res* 33:167-175
- Haggerty RJ, Sherrod LR, Garmezy N, Rutter M (1994), *Stress, Risk, and Resilience in Children and Adolescents: Processes, Mechanisms, and Interventions*. Cambridge, England: Cambridge University Press
- Hamburg DA, Coelho GV, Adams JE (1974), Coping and adaptation: steps toward a synthesis of biological and social perspectives. In: *Coping and Adaptation*, Coelho GV, Hamburg DA, Adams JE, eds. New York: Basic Books
- Hymel S, Rubin KH, Rowden L, LeMare L (1990), Children's peer relationships: longitudinal prediction of internalizing and externalizing problems from middle to late childhood. *Child Dev* 61:2004-2021
- Kazdin AE, Mazurick JL, Bass D (1993), Risk for attrition in treatment of antisocial children and families. *J Clin Child Psychol* 22:2-16
- Kraemer H, Measelle JR, Ablow JC, Essex MJ, Boyce WT, Kupfer DJ (in press), A new approach to multiple informants: mixing and matching context and perspective.
- Lavigne JV, Arend R, Rosenbaum D, Binns HJ, Christoffel KK, Gibbons RD (1998a), Psychiatric disorders with onset in the preschool years, I: stability of diagnoses. *J Am Acad Child Adolesc Psychiatry* 37:1246-1254
- Lavigne JV, Arend R, Rosenbaum D, Binns HJ, Christoffel KK, Gibbons RD (1998b), Psychiatric disorders with onset in the preschool years, II: correlates and predictors of stable case status. *J Am Acad Child Adolesc Psychiatry* 37:1255-1261
- McClintock MK, Herdt G (1996), Rethinking puberty: the development of sexual attraction. *Curr Dir Psychol Sci* 5:178-183
- Measelle JR, Ablow JC, Cowan PA, Cowan CP (1998), Assessing young children's views of their academic, social, and emotional lives: an evaluation

Au. query 1

- of the self-perception scales of the Berkeley Puppet Interview. *Child Dev* 69:1556–1576
- Merikangas KR, Prusoff BA, Weissman MM (1988), Parental concordance for affective disorders: psychopathology in offspring. *J Affective Disord* 15:279
- Merzenich M (1998), Long-term change of mind (comment). *Science* 282:1062–1063
- Nelson C, Bloom F (1997), Child development and neuroscience. *Child Dev* 68:970–987
- Nelson CA, Bosquet M (1999), Neurobiology of fetal and infant development: implications for infant mental health. In: *Handbook of Infant Mental Health*, 2nd ed, Zeanah CH, ed. New York: Guilford
- Newman DL, Moffitt TE, Caspi A, Silva PA (1998), Comorbid mental disorders: implications for treatment and sample selection. *J Abnorm Psychol* 107:305–311
- Au. query 2 Offord DR, Lipman EL, Duku EK (in press), *Epidemiology of Problem Behavior*. Hamilton, Ontario: Canadian Centre for Studies of Children at Risk
- Olweus D (1993), Victimization by peers: antecedents and long-term outcomes. In: *Social Withdrawal, Inhibition, and Shyness in Childhood*, Rubin KH, Asendorpf JB, eds. Hillsdale, NJ: Erlbaum, pp 315–341
- Pine DS, Cohen P, Brook J, Coplan JD (1997), Psychiatric symptoms in adolescence as predictors of obesity in early adulthood: a longitudinal study. *Am J Public Health* 87:1303–1310
- Plomin R, Rutter M (1998), Child development, molecular genetics, and what to do with genes once they are found. *Child Dev* 69:1223–1242
- Au. query 3 Repetti RL, Taylor SE, Seeman TE (in press), *Risky families: family social environments and the mental and physical health of offspring*.
- Roberts RE, Attkisson CC, Rosenblatt A (1998), Prevalence of psychopathology in children and adolescents. *Am J Psychiatry* 155:715–725
- Robinson DS, Hamid Q, Ying S et al. (1992), Predominant TH2-like bronchoalveolar T-lymphocyte population in atopic asthma. *N Engl J Med* 326:298–304
- Rutter M, Dunn J, Plomin R et al. (1997), Integrating nature and nurture: implications of person–environment correlations and interactions for developmental psychopathology. *Dev Psychopathol* 9:335–364
- Sameroff AJ, Chandler MJ (1975), Reproductive risk and the continuum of caretaking casualty. In: *Review of Child Development Research*, Vol 4, Horowitz FD, Hetherington M, Scarr-Salapatek S, Siegel G, eds. Chicago: University of Chicago Press, pp 187–243
- Sameroff AJ, Haith MM, eds (1996), *The Five to Seven Year Shift: The Age of Reason and Responsibility*. Chicago: University of Chicago Press
- Steinberg L, Avenevoli S (2000), The role of context in the development of psychopathology: a conceptual framework and some speculative propositions. *Child Dev* 71:66–74
- Steinberg L, Darling N, Fletcher A, Brown B, Dornbusch S (1995), Authoritative parenting and adolescent adjustment: an ecological journey. In: *Linking Lives and Contexts: Perspectives on the Ecology of Human Development*, Moen P, Elder G Jr, Luscher K, eds. Washington, DC: American Psychological Association, pp 423–466
- Tallal P, Miller SL, Bedi G et al. (1996), Language comprehension in language-learning impaired children improved with acoustically modified speech. *Science* 271:81–84
- Tucker GJ (1998), Putting *DSM-IV* in perspective. *Am J Psychiatry* 155:159–161
- Weiland SK, Pless IB, Roghmann KJ (1992), Chronic illness and mental health problems in pediatric practice: results from a survey of primary care providers. *Pediatrics* 89:445–449
- Zeanah CH, Boris NW, Scheeringa MS (1997), Psychopathology in infancy. *J Child Psychol Psychiatry* 38:81–99

JAACAP — Query Form

Query #	Query
?AQ1	Please update this reference. If it has not been accepted for publication (or presented at a meeting), it will be deleted from reference list, per journal style. We will then list it in text as “unpublished” - please provide year of preparation. Also, the sentence in which it is cited will need to be rewritten, as an unpublished work will not be accessible to the reader. Maybe note that it is “available from the authors upon request”??
?AQ2	Offord et al - Please update if possible.
?AQ3	Repetti et al - Please supply name of journal and update if possible. Must have name of journal to list as “in press.”