

Rethinking the Definition of Evidence-Based Interventions to Promote Early Childhood Development

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Half a century of research has documented that early childhood interventions can produce positive outcomes in multiple domains, but impacts are typically small to moderate, and few programs have been scaled effectively. Peacock-Chambers et al¹ have reviewed the past 2 decades of pediatric-based interventions between birth and age 3, and in their findings they underscore 2 challenges facing the early childhood field: the urgent need for new strategies that produce larger, scalable impacts on important dimensions of child development, and the equally compelling need to revisit the criteria for defining a program as “evidence-based.”

The conventional definition, which simply requires a statistically significant difference between a treatment and comparison group on any of a wide range of child and/or parent outcomes, is highly problematic. When interventions are not linked to specific impacts based on explicit causal hypotheses, the variability of effects on multiple measures at different points in time is impossible to interpret and is rarely replicated. A focus on average effects also obscures what may be working exceptionally well for some (which should trigger targeted replication and scaling) and poorly for others (which should prompt a search for new or complementary strategies). Perhaps most importantly, preferential attention to statistical significance over magnitude of impact (with the latter

generally not reported in the Peacock-Chambers article) has contributed to a level of complacency rather than a sense of urgency about the relatively flat trajectory of the average effect sizes (0.2–0.3) produced by early childhood programs more broadly over the past 5 decades.²

Fifty years of early childhood policies and services have resulted in the achievement of 2 important objectives: (1) proof of concept that developmental outcomes can be enhanced by selected interventions and (2) documented returns on investment from model programs for children facing adversity. Yet, over this same time period, advances in biomedical research have resulted in dramatic improvements in treatment outcomes for children with cancer, cystic fibrosis, HIV/AIDS, and other serious illnesses, while population-level progress in reducing social class and racial disparities in developmental outcomes has been far more difficult to accomplish.³

Breakthroughs in the treatment of disease have been enabled by advances in basic science. The comparatively limited extent to which new discoveries in neuroscience, molecular biology, and epigenetics have been leveraged to address the social determinants of development is no longer defensible. The biology of adversity, for example, suggests that healthy brain development requires protection from excessive stress, not just enrichment in a stimulating environment.³ Researchers in

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epigenetics are illuminating how environmental influences affect genetic predispositions and explain variation in sensitivity to adversity, underscoring the importance of understanding differential responses to interventions rather than simply reporting mean effects.⁴ New insights about neuroplasticity and critical periods in development could be catalyzing fresh thinking about the timing and nature of interventions across the life cycle.⁵ Valid measures of biological and behavioral effects of significant stress in young children that are acceptable to parents and modifiable by interventions would have game-changing implications.⁶

In 2012, the American Academy of Pediatrics issued a technical report and policy statement endorsing a leadership role for the pediatric community “to inform the development of innovative strategies to reduce the precipitants of toxic stress in young children and to mitigate their negative effects on the course of development and health across the life span.”^{7,8} In the multisectoral world of early childhood policy and practice, pediatricians bring a uniquely qualified, science-informed voice. That voice could play a more powerful role in translating new scientific knowledge into the design and testing of more effective interventions, particularly for the most vulnerable children at the earliest ages.

The studies reviewed by Peacock-Chambers et al¹ illustrate the compelling need for a new era in pediatrics: a future in which advances in biology that are driving “precision medicine” in the treatment of disease will be applied to the promotion of healthy development.^{3,6,9} In this new era, statistically significant program

effects without causal explanations will have limited value. With greater focus on mediating variables that are amenable to intervention (eg, self-regulation in children and the interactional skills of parents), researchers could fuel more productive, adaptable strategies that result in greater benefits for different groups of children and families and could catalyze new approaches for those who are not benefitting from existing services. Interventions matched to key moderators (eg, family strengths and cultural values) are also likely to be more effective than categorical thinking based on race, ethnicity, maternal education, or family income.

Greater impacts at scale for young children and families with diverse assets and needs will be achieved when we leverage scientific knowledge, on-the-ground experience, and authentic parent engagement to learn as much as possible about whether, how, for whom, and in what context specific interventions achieve explicitly intended effects. Better outcomes will remain elusive if we continue to compile variable outcome data in the absence of clearly defined causal models, simply to earn generic designation as an evidence-based intervention.

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REFERENCES

1. Peacock-Chambers E, Ivy K, Bair-Merritt M. Primary care interventions for early childhood development: a systematic review. *Pediatrics*. 2017;140(6):e20171661

2. Duncan GJ, Magnuson K. Investing in preschool programs. *J Econ Perspect*. 2013;27(2):109–132
3. Center on the Developing Child, Harvard University. From best practices to breakthrough impacts: a science-based approach to building a more promising future for young children and families. 2016. Available at: <https://developingchild.harvard.edu/resources/from-best-practices-to-breakthrough-impacts/>. Accessed October 24, 2017
4. Boyce WT. Differential susceptibility of the developing brain to contextual adversity and stress. *Neuropsychopharmacology*. 2016;41(1):142–162
5. Takesian AE, Hensch TK. Balancing plasticity/stability across brain development. *Prog Brain Res*. 2013;207:3–34
6. Shonkoff JP. Capitalizing on advances in science to reduce the health consequences of early childhood adversity. *JAMA Pediatr*. 2016;170(10):1003–1007
7. Garner AS, Shonkoff JP; Committee on Psychosocial Aspects of Child and Family Health; Committee on Early Childhood, Adoption, and Dependent Care; Section on Developmental and Behavioral Pediatrics. Early childhood adversity, toxic stress, and the role of the pediatrician: translating developmental science into lifelong health. *Pediatrics*. 2012;129(1). Available at: www.pediatrics.org/cgi/content/full/129/1/e224
8. Shonkoff JP, Garner AS; Committee on Psychosocial Aspects of Child and Family Health; Committee on Early Childhood, Adoption, and Dependent Care; Section on Developmental and Behavioral Pediatrics. The lifelong effects of early childhood adversity and toxic stress. *Pediatrics*. 2012;129(1). Available at: www.pediatrics.org/cgi/content/full/129/1/e232
9. Shonkoff JP, Fisher PA. Rethinking evidence-based practice and two-generation programs to create the future of early childhood policy. *Dev Psychopathol*. 2013;25(4 pt 2):1635–1653

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