

Competence and Resilience in Development

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ABSTRACT: The first three waves of research on resilience in development, largely behavioral in focus, contributed a compelling set of concepts and methods, a surprisingly consistent body of findings, provocative issues and controversies, and clues to promising areas for the next wave of resilience research linking biology and neuroscience to behavioral adaptation in development. Behavioral investigators honed the definitions and assessments of risk, adversity, competence, developmental tasks, protective factors, and other key aspects of resilience, as they sought to understand how some children overcome adversity to do well in life. Their findings implicate fundamental adaptive systems, which in turn suggest hot spots for the rising fourth wave of integrative research on resilience in children, focused on processes studied at multiple levels of analysis and across species.

KEYWORDS: development; risk; biobehavioral processes; resilience

INTRODUCTION

This volume of the *Annals* heralds a new era in research on resilience and its applications, bringing together scientists and disciplines to chart the course toward a fully integrated, multilevel understanding of resilience in development. The conference on which it is based, *Resilience in Children*, held in February 2006, marked the rise of the fourth wave of research on developmental resilience. In this article, contributions from the first three waves of behavioral research on resilience in children are highlighted, with an eye toward informing the goals and strategies of the fourth wave.

The first three waves of research on resilience in development were behavioral in focus.^{1,2} The origins of research on resilience have deep roots in the history of medicine, psychology, and education.^{3,4} It was around 1970, however, that the systematic study of resilience emerged within the broader context

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Ann. N.Y. Acad. Sci. 1094: 13–27 (2006). © 2006 New York Academy of Sciences.
doi: 10.1196/annals.1376.003

of *developmental psychopathology*, the study of behavioral health and adaptation from a developmental perspective.^{5,6} In the first wave of work, pioneering behavioral scientists in search of knowledge about the etiology of serious mental disorders recognized the significance of children who appeared to develop well under risky conditions. These pioneers set out to identify the correlates and markers of good adaptation among young people expected to struggle because of their genetic or environmental risk. The initial work was largely descriptive, but ambitious in ultimate objective: to ascertain what makes a difference in the lives of such children, in order to guide efforts to improve the life chances of children at risk for problems due to hazardous experiences and vulnerabilities. A “short list” of potential assets or protective factors associated with resilience in children and youth emerged from the first wave and this list continues to be corroborated in diverse studies.^{1,6,7} The second wave of resilience research has been focused on uncovering the processes and regulatory systems that account for the short list, a formidable agenda that is still under way.^{6,8} The third wave, characterized by efforts to promote resilience through prevention, intervention, and policy, rose from a sense of urgency for the welfare of children growing up with adversities and vulnerabilities, who could not wait for a complete elucidation of resilience. Resilience intervention efforts were spurred by the concomitant rise of prevention science, which underscored the importance of promoting competence as a strategy for preventing or ameliorating behavioral and emotional problems.^{4,9,10} The initial waves of resilience research, largely led by scientists in clinical psychology, psychiatry, and human development, have contributed a compelling set of concepts and methods, and a surprisingly consistent body of findings, as well as issues, controversies, and cautionary notes. These contributions provide intriguing clues to “hot spots” for integrating research across levels of analysis and also pitfalls to avoid in the excitement of a fourth wave of research.

THEORY AND CONCEPTS: COMPETENCE, RISK, AND RESILIENCE IN DEVELOPMENTAL CONTEXT

Resilience is a broad conceptual umbrella, covering many concepts related to positive patterns of adaptation in the context of adversity. The conceptual family of resilience encompasses a class of phenomena where the adaptation of a system has been threatened by experiences capable of disrupting or destroying the successful operations of the system. The idea of resilience can be applied to any functional system, but in developmental science it has been applied most frequently to individuals as living systems and less often to higher level social systems, including families,¹¹ classrooms,¹² and schools.¹³ Resilience is quintessentially inferential: to judge the resilience of a system requires criteria for identifying whether the system is doing whatever it is supposed to be doing, and also whether there is or has been a potential threat to the system. Thus, if one identifies a child as resilient, two judgments have been made: this child

meets expectations for positive adaptation and there has been a significant threat to the adaptation of the child.^{4,8}

Lois Murphy¹⁴ noted long ago that the adaptive quality of a living system has two aspects: adapting to the environment, what she called Coping I, and maintaining internal integration, termed Coping II. In the lives of children, there have been many criteria for external adaptation, ranging from school achievement to getting along with peers; and also criteria for internal adaptation, such as psychological well-being or physical health.

One of the most important contributions of the early resilience researchers in behavioral sciences was their attention to the criteria for judging positive adaptation. The Project Competence group, initially led by Norman Garmezy and later by the first author, focused on competence criteria for positive adaptation in their studies of resilience and particularly on competence in age-salient developmental tasks.¹⁵ These investigators built an evolving conceptual framework for defining positive adaptation in children that focused on manifestly effective behavior expected for children in multiple domains of achievement; these expectations varied over the course of development, as well as across cultural and historical contexts.^{1,9} This *developmental task* approach focused on external adaptation from a developmental perspective, rather than internal well-being. This group did not ignore emotional health, which they studied in relation to competence in developmental tasks. However, resilience was operationally defined in terms of successful adaptation to the environment in age-salient developmental tasks, rather than happiness or symptoms related to internal well-being. Other investigators of resilience chose to include emotional health in their defining criteria.⁸

Developmental task theory, which emerged in the mid 20th century, has been refined as a result of this recent attention, and a number of its propositions put to empirical test.^{9,16} Among the conclusions supported by this body of research are the following:

1. Adaptation is multidimensional and developmental in nature.
2. Success in salient tasks of particular developmental periods forecast success in future age-salient tasks, even in new domains.
3. Competence and symptoms are related within and across time for multiple reasons, including: (a) symptoms undermining competence; (b) failures (or perceived failures) in competence increasing symptoms in various ways; (c) a common cause contributing both to competence problems and symptoms; and, (d) transactional or sequential combinations of these reasons.
4. Success or failure in multiple developmental task domains can have cascading consequences that lead to problems in other domains of adaptation, both internal and external.
5. Interventions to promote success in these tasks have preventive effects on behavioral and emotional problems.

Defining resilience also required judgments about the nature of threats to a system's adaptation. A wide range of risk factors and challenges have been the focus of study, including cumulative life events (tallies of negative experiences over time) and specific experiences (e.g., divorce, bereavement, war, natural disasters, etc.), acute trauma and chronic adversities, and well-established "risk factors" that statistically forecast later developmental difficulties in the general population, such as low birth weight.

MODELS AND METHODS: OPERATIONALIZING RESEARCH ON RESILIENCE

Testing concepts of competence and resilience required the development of models and methods, including new measures and strategies of analysis. Before the pioneers motivated the first wave of research on resilience, little attention was given to models or measures incorporating positive predictors or outcomes. It was necessary for the early investigators to develop strategies of assessment and analysis of competence, assets, resources, promotive, and protective factors, and the diagnosis of resilience in addition to psychopathology, risks, vulnerabilities, and stressors.¹⁷ Investigators pursued variable-focused as well as person-focused approaches to resilience.¹⁸

Variable-focused models and analyses, using multivariate statistics with increasing sophistication, were well-suited to testing hypotheses about the multidimensional nature of adaptation within and across time, how positive aspects of adjustment are related to problems and symptoms over time, and the cumulative effects of co-occurring risks as manifested in "risk gradients." Interaction findings (adversity X a moderating variable) highlighted the striking exception of individuals with high adversity scores whose adaptive success appeared to be "off the gradient" (better than predicted by their level of risk; see FIG. 1). Multivariate findings hinted at the potential role of combined predictors, mediators, and moderators of good outcomes in the context of risk or adversity. Multidimensional models of competence were corroborated,¹⁹ and later investigators began to test more complex cascade and transactional models linking distinct domains of behavior across time, where one domain of adjustment predicts changes in another domain over time.^{9,20} Rarely, however, have these multidimensional models tested for interactions across multiple levels of analysis, as proposed by developmental theorists.²¹

Although it was rare for resilience investigators to study linkages extending from the level of genetic or neural activity to behavior or family levels of functioning, they did test for the effects of parenting quality or parent-child relationships as mediators and moderators of adversity, capturing individual and family dynamics to a limited degree.²² Intervention studies in the third wave of work provide some of the most compelling evidence for the power of the family environment for individual resilience. These include quasi-experimental

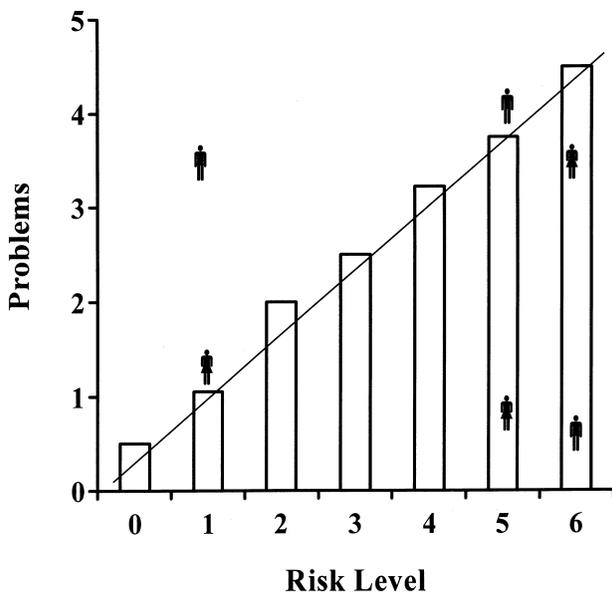


FIGURE 1. A risk gradient illustrating how average levels of problems rise as a function of rising risk level, and also showing how individuals can be “on” (near the average predicted level) or “off-gradient” (doing much worse or much better than predicted for a given level of risk).

interventions to dramatically improve the rearing environment and randomized clinical trials of interventions to promote child adaptation by helping parents function more effectively during difficult times. An example of the former is provided by the studies of Romanian orphans adopted internationally after regime change in the early 1990s, where marked improvements have been observed in many of the children moved from severe privation to adequate families, particularly for children adopted prior to 6 months of age.^{23,24} Examples of the latter are prevention experiments showing that interventions targeting parent functioning resulted in better adjusted children in families following divorce.^{25,26}

Recent developments in multivariate research signify that the fourth wave is under way. For example, recent gene–environment interaction studies²⁷ suggest that measurable genetic polymorphisms (e.g., 5-HTTLPR) moderate the association of adverse experiences (e.g., maltreatment) with behavioral outcomes. At a more intermediate level of multilevel interaction and analysis, spanning individual differences in temperament or personality traits, there is growing interest in altering self-regulation to promote better adaptation among children growing up in stress-laden environments.²⁸

Person-focused studies also have a long history in resilience research, beginning with compelling single-case portraits of resilience, and now moving

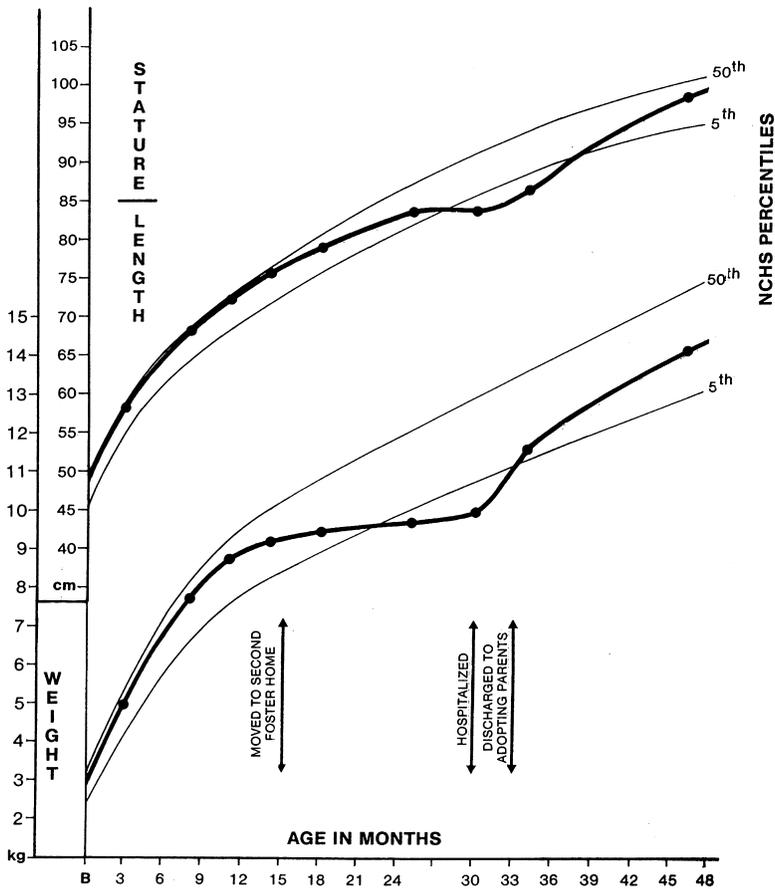


FIGURE 2. Growth chart from the case study of “Sara,” illustrating a dramatic slowing of growth rate after catastrophic loss of caregivers shortly after 12 months of age, and dramatic recovery to normative growth following hospitalization and adoption by a loving family around 30 months of age. Originally appearing in the case report by Masten & O’Connor²⁹ in the *Journal of the American Academy of Child and Adolescent Psychiatry* (1989, 28 [2], p. 276), and reproduced with permission of LIPPINCOTT WILLIAMS & WILKINS.

rapidly toward very sophisticated statistical models of growth and developmental trajectories. Single case studies can serve as powerful heuristic and communication tools, illustrating dramatic turning points in development. The growth chart of “Sara” shown in FIGURE 2 (from the case report by Masten & O’Connor²⁹) is illustrative: Sara’s growth rate (as well as her social development) plummeted following a catastrophic loss of caregiving and recovered following adoption into a loving and well-matched family environment. Such cases, compelling as they may be, rarely can be generalized to other cases

because of their unique features. Therefore, person-focused work moved toward case aggregation and the detection of repeated life patterns in more representative samples of children. Classic studies of resilience often identified a large risk group and then compared a subgroup of individuals doing well across multiple criteria of positive adaptation to another subgroup in the sample that shares similar high-risk levels but is doing poorly in multiple ways.³⁰ This approach has been extended to include cases of low-risk individuals who are doing well (meet competence criteria but have low exposure to risk or adversity), along with resilient cases (competent + high risk), and maladaptive or impaired competence cases (failing to meet competence criteria in multiple domains + high risk). Comparisons of this nature often find strong similarities in the high competence groups, despite divergent adversity exposure, and striking differences between the resilient and maladaptive groups, despite shared risks or adversity exposure, as illustrated in FIGURE 3 (see Masten *et al.*^{31,32}). As levels of adversity levels increase, the differences in the resources of resilient versus maladaptive individual can be even greater, as illustrated by the stars in FIGURE 3, which show the means for the subset of children within each high adversity group who have histories of catastrophic level lifetime adversity.³³ There is also a notably “empty cell” effect in such studies, suggesting that cases of low risk and poor adaptation (suggesting great vulnerability or a non-normal organism) are much less common than cases

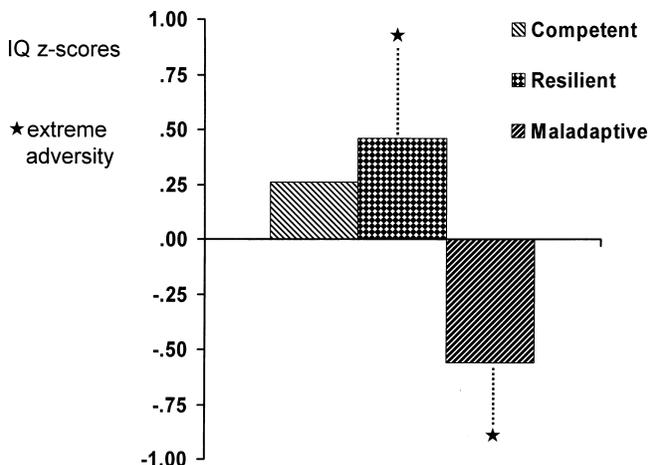


FIGURE 3. A comparison of three groups of youth “diagnosed” around the age of 20 years as *competent* (good adaptation and low adversity history), *resilient* (good adaptation and high adversity history), and *maladaptive* (poor adaptation and high adversity history). Mean IQ scores from childhood (measured 10 years earlier) are shown for the three groups.³¹ Means for the subgroups of resilient and maladaptive youth with extremely high lifetime adversity are shown by stars.³³

of high risk and good adaptation, perhaps indicating the adaptive and self-righting bias of development in a species shaped by eons of natural and cultural selection.

Recent advances in person-oriented studies hint that the next wave of work will use powerful new statistical tools for identifying subgroups pertinent to understanding resilience, such as group-based modeling of developmental trajectories,³⁴ (see the example provided by Obradović, Burt & Masten, this issue). It should be possible to identify positive pathways of development or recovery among groups of individuals who have experienced very high adversity exposure or trauma.

Multiple levels of analysis in person-focused studies are exceedingly rare to date. It should become feasible, once particular gene–environment findings become well established, to study subgroups who defy expected patterns in order to learn more about protective processes at many levels of interaction. It is clearly not the case that 100% of individuals with a particular and common polymorphism become ill or maladaptive in the face of a particular form of adversity. Moreover, adversity itself comes in many forms, contexts, and timings. There are bound to be processes that moderate gene–environment effects.

ISSUES AND CONTROVERSIES

Behavioral studies focused on competence, adversity, and resilience engendered much useful criticism about concepts, measures, methods, and gaps in knowledge that served (though sometimes slowly in the eyes of critics) to advance the thinking and quality of work on resilience in development. Challenging questions were raised, including the following:^{2,5,8,35–39}

1. Who decides or defines the criteria for judging good adaptation?
2. Does resilience refer to positive internal adaptation, positive external adaptation, or both?
3. Can an individual be resilient in one context and not another, at one time and not another, for one kind of stressor and not another, for one kind of adaptive domain and not another?
4. How can knowledge be aggregated if the criteria for defining and analyzing resilience often vary across studies?
5. Is a concept of resilience necessary or is this just a positive way of renaming the same underlying phenomenon of vulnerability and risk?
6. Does the focus on resilience distract us from addressing the burden of risk in the lives of children?
7. Does resilience research “blame the victim” when children do not overcome adversity?
8. What do we know about resilience in non-Western cultures and the developing world?

9. What are the processes behind the promotive or protective “factors” descriptively associated with resilience?
10. What is the role of neuroscience in the study of resilience?

Discussion of such issues by behavioral and developmental scientists served to sharpen subsequent research and is now shaping a future research agenda.

SURPRISINGLY CONSISTENT FINDINGS: CLUES TO ADAPTIVE SYSTEMS IN HUMAN DEVELOPMENT

Despite the growing number of well-deserved criticisms directed at the early waves of resilience research and the variability in definitions, measures, situations, and cultures studied, findings have continued to show a striking consistency.^{1,18} Recurring attributes of person, relationships, and context emerge as predictors or correlates of resilience across diverse situations, implicating a “short list” of probable and rather general factors associated with good adaptation or recovery during or following significant adversity. This list in turn suggests that there are fundamental but common and ordinary adaptive systems that play a crucial role in resilience, and also more broadly in human development.^{1,18} When these adaptive systems (see TABLE 1) are available and operating normally, individual resilience is common. The most devastating threats to children and child development occur when these systems are damaged, destroyed, or develop abnormally as a result of adversity. Moreover, many of these systems relate to the self-regulatory capacity of the human brain as

TABLE 1. Adaptive systems implicated in the world literature on resilience

Learning systems of the human brain
—problem solving, information processing
Attachment system
—close relationships with caregivers, friends, romantic partners, spiritual figures
Mastery motivation system
—self-efficacy processes, reward systems related to successful behavior
Stress response systems
—alarm and recovery systems
Self-regulation systems
—emotion regulation, executive functioning, activation and inhibition of attention or behavior
Family system
—parenting, interpersonal dynamics, expectations, cohesion, rituals, norms
School system
—teaching, values, standards, expectations
Peer system
—friendships, peer groups, values, norms
Cultural and societal systems
—religion, traditions, rituals, values, standards, laws

it learns and develops, and the social regulatory capacity embedded in human relationships and ties to cultural traditions.

There is extensive, though often fragmented research, on the development, functioning, and dysfunction of many of these adaptive systems in the lives of individuals, such as attachment relationships or executive functioning. Other systems, consistently implicated in resilience studies, have been relatively neglected until quite recently, such as the mastery motivation system and religious beliefs and practices. In either case, this list provides important clues for integrating biological and behavioral approaches to resilience. Some domains already have been investigated at multiple levels of analysis, as well as across species (e.g., executive functioning has been studied at the levels of observed behavior, neuropsychological test performance, and neural function, through tests and functional magnetic resonance imaging of rats, monkeys, and people) and these approaches could be integrated in studies of resilience. Other areas of work seem ripe for multilevel integration in studies of resilience, including the up- or down-regulation of arousal and response tendencies by prosocial or deviant peers⁴⁰ and the regulatory or relational functions of cultural systems embedded in religion and faith.⁴¹

CAUTIONARY NOTES

Beyond the issues and controversies that have hounded and also informed the research agenda on resilience, the first three waves of work produced a set of important cautions for fourth wave investigators to keep in mind. These include the following:^{36,41–45}

1. Resilience is a complex family of concepts that always requires careful conceptual and operational definition.
2. Resilience is not a single trait or process—many attributes and processes are involved.
3. There are multiple pathways to resilience.
4. Resilience definitions are embedded in cultural, developmental, and historical contexts, even if these contexts are assumed rather than made explicit.
5. Resilience definitions always have a time frame and it is quite possible for the picture to look quite different in a shorter or longer time frame, and there are likely to be cases of adaptive trade-offs, with risk and benefits in the short and long term.
6. It is easy to make the mistake of blaming the victim when resilience does not occur, if one assumes that resilience arises only from internal capacities.
7. The evidence strongly implicates the roles of transactional processes and adaptive capacity arising external to the organism in resilience.

8. Adaptive systems that are operating in normal ways can be “hijacked” for goals and purposes disapproved by society or damaging to development (e.g., by drug addiction or by savvy gang leaders recruiting young people for antisocial goals).
9. There are no magic bullets for producing resilience.
10. There are no invulnerable children.
11. There are levels of risk and adversity so overwhelming that resilience does not occur and recovery is extraordinarily rare or impossible.
12. And, finally, in the enthusiasm for understanding and promoting resilience, it is important to remember that many sources of threat to child development are preventable (e.g., land mines, premature birth, many injuries, homelessness, war), and far less costly to prevent than to address once they begin to erode development and the adaptive tools for life.

FOURTH WAVE RISING

The *Resilience in Children* conference signaled a sea change and the rise of the fourth wave in resilience research, focused on integrating the study of resilience across levels of analysis, across species, and across disciplines. Of course, this surge is part of a larger transformation in all the sciences concerned with genes, brain function, and development, made possible by dramatic advances in technologies for studying biobehavioral processes (e.g., brain imaging, noninvasive assaying, statistic modeling of complex dynamics), advancing strategies for studying measured genes in relation to measured behavior and environments, and new animal models for behavioral phenomena, a transformation quite evident in this issue of the *Annals*. The tools are at hand for venturing across levels of analysis and mapping the processes in development that account for the diverse phenomena described as resilience in the lives of children. Integrative research promises to open new avenues for basic and applied research, but this work is likely to require a new level of collaboration among scientists, each equipped with expertise in the concepts and methods of their disciplinary training, but also equipped with the skills, motivation, and funding required for cooperative multilevel research. Transdisciplinary training experiences would facilitate this kind of collaboration.

The fourth wave offers intriguing possibilities for a much deeper understanding of how processes work within and across levels to produce resilience in children. The first three waves of research, which focused on individual and family systems for the most part, suggest “hot spots” for integration, where theory and data to date point to important processes amenable to study at multiple levels and across species. Some of these spots include the core adaptive systems implicated by the short list at the level of child, relationships, family, and other systems (e.g., effortful control; goal-directed behavior in the context of affectively arousing conditions; the motivation to adapt and succeed; parenting

under stress; up- and down-regulation of affect by media, peers, parents, and religious practices). Many of these hot spots involve human and social capital and reward systems that serve positive regulatory functions in the presence of threat. It is also important to remember that resilience in children depends on resilience across interconnected systems in which human development unfolds, such as families, schools, and neighborhoods. During major disasters (natural and by human design), systems may collapse at multiple levels, with reverberating effects across diverse domains of functioning.⁴⁶

The integrated agenda of the fourth wave also promises to overturn some long-held assumptions of early work on resilience, particularly on the plasticity of adaptive functioning itself. This conference suggested the tantalizing possibility that fundamental adaptive systems that develop within the individual child, once thought to be enduring attributes, may be “reprogrammable” to a degree unimagined by the pioneers in resilience. Examples include attention-regulation⁴⁷ and stress-regulation⁴⁸ systems that may have developed in nonoptimal ways due to early experiences. A wave of creative new interventions is beginning to appear on the horizon just behind the rise of research that integrates neuroscience, molecular genetics, and behavioral development in the study of resilience in children.

ACKNOWLEDGMENTS

The authors are indebted to the past and present Project Competence research team and study participants. Project Competence studies of resilience have been supported by grants from the William T. Grant Foundation, the National Institute of Mental Health, the National Science Foundation, and the University of Minnesota to Ann Masten, Norman Garnezy, and Auke Tellegen.

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