NATIONAL SCIENTIFIC COUNCIL ON THE DEVELOPING CHILD

Supportive Relationships and Active Skill-Building Strengthen the Foundations of Resilience

WORKING PAPER 13

Center on the Developing Child HARVARD UNIVERSITY

About the Authors

The National Scientific Council on the Developing Child is a multidisciplinary, multi-university collaboration designed to bring the science of early childhood and early brain development to bear on public decision-making. Established in 2003, the Council is committed to an evidence-based approach to building broad-based public will that transcends political partisanship and recognizes the complementary responsibilities of family, community, workplace, and government to promote the well-being of all young children. For more information, visit www.developingchild.net.

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The Issue

THE FUTURE PROSPERITY OF ANY SOCIETY DEPENDS ON A CONTINUING INVESTMENT IN THE HEALTHY development of the next generation. The well-documented connection between adverse early experiences and a wide range of costly problems, such as lower school achievement and higher rates of criminal behavior and chronic disease, underscores the extent to which reducing the burdens of significant adversity on families with young children must be a critical part of that investment. That said, not all children exposed to stressful circumstances experience detrimental consequences. A better understanding of why some do well despite serious hardship could inform more effective policies and programs to provide support for families and help more disadvantaged children reach their full potential.

Decades of research in the behavioral and social sciences have produced a rich knowledge base that explains why some people develop the adaptive capacities to overcome significant adversity and others do not. Whether the burdens come from the hardships of poverty, the challenges of parental substance abuse or serious mental illness, the stresses of war, the threats of recurrent violence or chronic neglect, or a combination of factors, the single most common finding is that children who end up doing well have had at least one stable and committed relationship with a supportive parent, caregiver, or other adult. These relationships provide the personalized responsiveness, scaffolding, and protection that buffer children from developmental disruption. They also build key capacities—such as the ability to plan, monitor and regulate behavior, and adapt to changing circumstances—that enable children to respond to adversity and to thrive. This combination of supportive relationships, adaptive skill-building, and positive experiences constitutes the foundations of what is commonly called *resilience*.

Recent discoveries in molecular biology, genomics, and epigenetics provide remarkable

What Is Resilience?

In the social, behavioral, and biological sciences, the term resilience is used in a variety of ways and contexts—sometimes as an individual characteristic, sometimes as a process, and sometimes as an outcome. Despite these differences, there is a set of common, defining features of resilience that illustrates how the concept has been used in research and intervention sciences. These features include the following:

1. The capacity of a dynamic system to adapt successfully to disturbances that threaten its function, viability, or development.[8]
2. The ability to avoid deleterious behavioral and physiological changes in response to chronic stress.[18]
3. A process to harness resources to sustain well-being.[76]
4. The capacity to resume positive functioning following adversity.[77]
5. A measure of the degree of vulnerability to shock or disturbance.[78]
6. A person's ability to adapt successfully to acute stress, trauma, or more chronic forms of adversity.[11]
7. The process of adapting well in the face of adversity, trauma, tragedy, threats, or significant sources of stress.[79]

Whether it is considered an outcome, a process, or a capacity, the essence of resilience is a positive, adaptive response in the face of significant adversity. It is neither an immutable trait nor a resource that can be used up. On a biological level, resilience results in healthy development because it protects the developing brain and other organs from the disruptions produced by excessive activation of stress response systems. Stated simply, resilience transforms potentially *toxic* stress into *tolerable* stress. In the final analysis, resilience is rooted in both the physiology of adaptation and the experiences we provide for children that either promote or limit its development.

new insights into the underlying causal mechanisms that explain how supportive relationships build the capacities to deal with adversity. This rapidly advancing research frontier demonstrates that resilience is the result of multiple interactions among protective factors in the social environment *and* highly responsive biological systems. These findings provide an opportunity to examine how current policies and programs could be enhanced to produce more favorable life outcomes for disadvantaged children, both by reducing their exposure to sources of adversity and by designing better ways of building their coping skills and adaptive capacities.

The answer to this challenge begins with extensive scientific evidence that the development of healthy brain architecture is influenced by consistent, "serve and return" interactions between young children and their primary caregivers.[1] When these experiences are unavailable or repeatedly disrupted, the body perceives their absence as a serious threat, and activates its stress response systems. Although the immediate effects of the stress response are protective, its excessive or prolonged activation produces physiological changes that can have a wear and tear effect on the developing brain, cardiovascular system, immune function, and metabolic regulatory systems—in short, it becomes toxic stress.[2,3] In contrast, when responsive interactions with caring adults are provided or restored, stress response systems return to their normal baselines, the developing brain and other maturing organ systems are protected from disruption, and children are helped to develop the coping skills needed to deal with adversity. The net result of these protective effects is that what could have been a toxic stress experience for a child becomes what we call "tolerable stress."

One way to understand the development of resilience is to visualize how protective experiences and adaptive skills both counterbalance significant adversity and produce positive outcomes. This can be illustrated through the concept of a balance scale or perhaps a seesaw or teeter-totter (see box). In this model, resilience is evident when a child's health and development are tipped in the positive direction, even when a heavy load of negative factors is stacked on the other side. Understanding all of the influences that might tip the scale in the positive direction is critical to devising more effective strategies for promoting healthy development in the face of significant disadvantage.

What Science Tells Us

OVER THE PAST FEW DECADES, THERE HAVE BEEN numerous longitudinal studies of children's development under conditions of adversity that typically lead to toxic stress responses. The power of this research lies in the compilation of rich datasets from the same individuals over an extended period of time, often beginning at birth or even prenatally and, in some instances, continuing well into adulthood.

Many of these studies have identified a subset of children whose life outcomes were remarkably positive despite their exposure to a variety of adverse experiences that typically produce increased risks for impairments in learning, behavior, and both mental and physical health. Gaining a greater understanding of how and why these unexpected outcomes happen is helping to build a more robust science of resilience. This science can stimulate fresh thinking about how to enhance the life prospects of all children—especially those living in environments that can prompt toxic stress responses. The observations and evidence described in the following sections provide a strong first step toward achieving that goal.

Resilience results from a dynamic interaction between internal predispositions and external experiences. Children who do well in the face of significant disadvantage typically exhibit both an intrinsic resistance to adversity *and* strong relationships with the important adults in their family and community. Indeed, it is the *interaction* between biology and environment that builds the capacities to cope with adversity and overcome threats to healthy development.[4-10] Resilience, therefore, is the result of a combination of protective factors—and neither individual characteristics nor social environments alone are likely to generate sufficiently positive out-

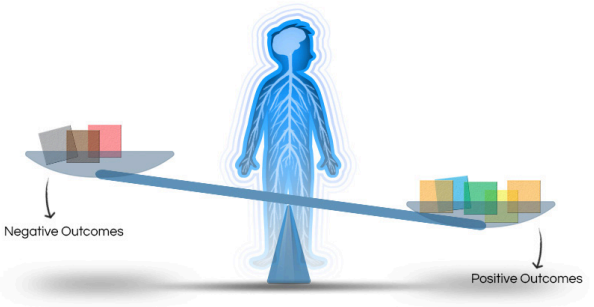
Tipping the Scale Toward Positive Outcomes

Child development is like a balance scale with two sides. Experiences that can result in toxic stress, such as repeated or chronic exposure to violence, poverty, or maltreatment, pile on the negative side of the scale. Positive influences that can help make significant stress tolerable, such as supportive relationships, skill-building opportunities, and practice dealing with manageable challenges, tip the scale the other way. Part of the reason for the variability in how individual children develop is that their scales can be loaded and tipped in different ways. Even under highly adverse conditions, development can proceed in a positive direction if parents and other caregivers provide consistent responsiveness, and if communities provide resources and supports that strengthen families' capacities and make a broader environment of protective relationships accessible to all children.

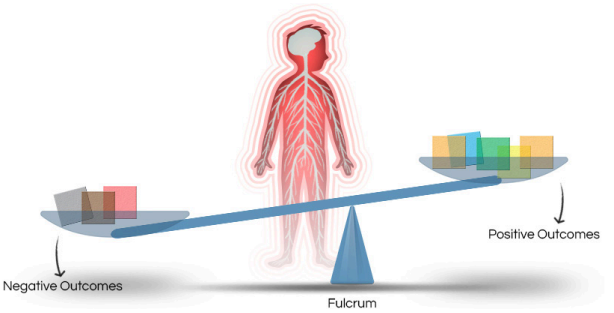
There is another part of the scale that affects how it tips, called the fulcrum. As with any scale or seesaw, if a child's fulcrum is placed closer to one end than the other, it becomes harder to tip the scale in that direction. In this representation, the initial placement of the fulcrum represents individual predispositions, which vary from one child to another. These variations in temperament and innate abilities, which reflect underlying genetic differences, mean that individual children start with their fulcrums in different places along the scale. This placement affects how they respond to the weight of experiences they have—whether minor adversity will tip the child's scale toward poor outcomes, for example, or whether major therapeutic intervention is needed to tip the scale toward positive outcomes.

Although the initial placement of the fulcrum has an early impact on a child's developmental trajectory, advances in science are now showing us that the position of the fulcrum is not fixed. To the contrary, the cumulative impacts of life experiences that tip the scale in either direction can also shift the fulcrum's location over time. Stated differently, the continuing accumulation of positive and negative experiences over time actually influences the child's mental and physical constitution—and thus has the power to slide the fulcrum.

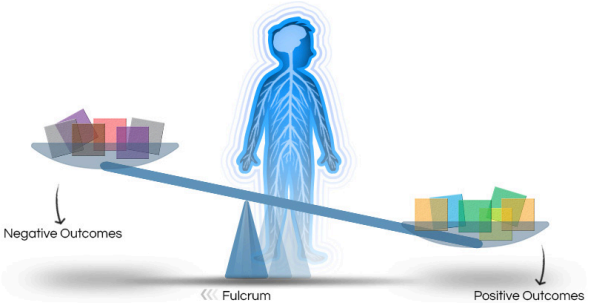
One way to actively move the fulcrum to a position that makes the scale better able to bear the weight of negative experiences is to build the capabilities needed to manage stress. These include the ability to focus attention, solve problems, plan ahead, adjust to new circumstances, regulate behavior, and control impulses. These skills, many of which fall within what is called executive function and self-regulation, constitute important building blocks for dealing with adversity, and the mastery of these skills can positively reposition the fulcrum. It is important to note that the fulcrum's position is never completely locked. However, the brain's ability to change decreases with age, making it more difficult to shift the fulcrum's location as children get older.



When positive experiences outweigh negative experiences, a child's "scale" tips toward positive outcomes.



The initial placement of the fulcrum affects how easily the scale tips toward positive or negative outcomes.



Over time, the cumulative impact of positive life experiences and coping skills can shift the fulcrum's position, making it easier to achieve positive outcomes.

comes for children who experience prolonged periods of toxic stress.

Resilience is seen in how the brain, the immune system, and genes respond to experiences during development. A deeper understanding of why and how some children have unexpectedly positive outcomes despite adversity is beginning to emerge as new scientific discoveries are illuminating the complex interplay among genetic differences, developing brain circuitry, and immune responsiveness, all of which interact with the caregiving environment and social context.[11]

- **Gene expression:** Given the extensive evidence that virtually all aspects of development and health are affected by the interaction between genes *and* experience,[12] scientists have begun to identify specific biological factors (including variations in gene sequence, gene expression, and neural mechanisms) that work together with aspects of the social environment to generate positive outcomes.[13-21] For example, certain genetic variants result in the production of proteins in the brain that control the chronic stress response, either exaggerating or blunting the negative effects of exposure to adversity.[22-25] Biological differences also control the sensitivity of genes to environmental influences,[26] which leads to different ways in which individuals respond to stressful experiences.[21] Certain genetic variations have also been shown to enhance the beneficial effects of a protective intervention, making some individuals more likely to thrive in response to supportive environments.[27]

Biological differences control the sensitivity of genes to environmental influences, affecting how individuals respond to stressful experiences.

- **Brain function:** Variation in the activation of brain chemicals, such as oxytocin and vasopressin, is related to the ability to initiate and sustain social behavior, form attachments with others, and manage social anxiety throughout life.[28,29] Functional differences in the brain's fear and reward circuits may also be responsible for capacity-building traits such as optimism or emotion regulation.[30,31] Many of these differences have roots in the way that early experiences affect brain development. For example, threatening situations cause a number of stress hormones to be released. Certain combinations of these hormones *enhance* brain function after mild to moderate stress, but *suppress* it after severe, acute stress. Sustained stress can even alter the size and number of neural connections in certain parts of the brain. When the danger passes, a healthy, resilient brain can recover from these changes, but early life adversity can alter that capacity for recovery. Moreover, chronic stress triggered by early adversity can cause long-term changes in brain regions that manage behavioral control and emotional wellness. These changes limit the brain's ability to respond appropriately to challenging or threatening situations, predisposing individuals toward the development of depression, anxiety disorders, substance abuse, and cardiovascular disease in adulthood.[32-34]

- **Immune-related responses:** Chemicals activated by the immune system, which are produced and expressed in the brain and other parts of the body, are also regulated by both genetic and environmental factors.[18] Inflammation, which is a physiological mechanism of self-protection over the short term, is a serious threat if activated chronically. Indeed, chronic inflammation can lead to a variety of illnesses, including diabetes, cardiovascular disease, arthritis, cancer, dementia, and depression. Given the centrality of inflammation to multiple diseases, the fact that early life adversity is associated with elevated inflammatory responses suggests that toxic stress increases the probability of lifelong health impairments. For example, the experience of abuse and neglect increases the production of pro-inflammatory cytokines, which are an early marker of greater risk for heart disease.[35] The body's ability to restore balance between pro- and anti-inflammatory cytokines in the aftermath of a stress-inducing experience can therefore be considered one biological indicator of resilience.[18] Scientific evidence is also building that differences in the types and amounts of microbes (bacteria and viruses) to which infants and young children are exposed may affect the responsiveness and adaptability of

the immune system to later environmental challenges.[36]

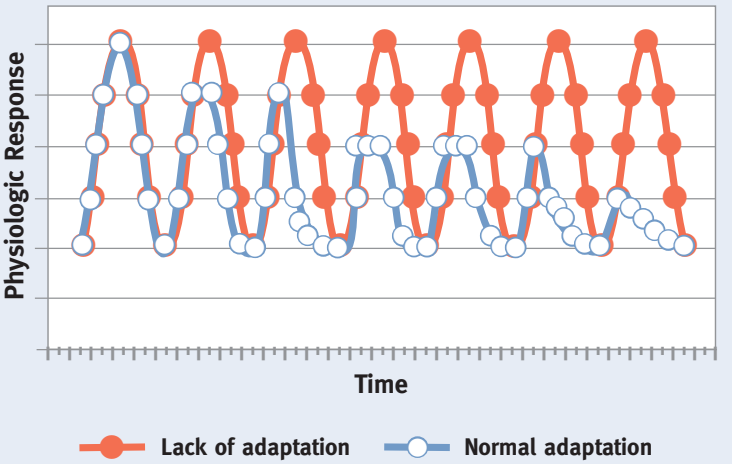
Multiple lines of research have identified a common set of factors that predispose children to positive outcomes in the face of significant adversity. These factors encompass strengths that derive from the child, the family, peer and adult relationships, and the broader social environments that build and support sturdy brain architecture. When these positive influences are operating effectively, they "stack the scale" with positive weight and optimize resilience.[8,37] When these positive factors are absent, disrupted, or undermined, there is little to counterbalance the negative effects of significant adversity, thus creating the conditions for poor outcomes and diminished life prospects. These counterbalancing factors include the following:

- The availability of at least one *stable, caring, and supportive relationship* between a child and the important adults in his or her life. These relationships begin in the family, but they can also include neighbors, providers of early care and education, teachers, social workers, or coaches, among many others.
- Helping children build a sense of *mastery* over their life circumstances. Those who believe in their own capacity to overcome hardships and guide their own destiny are far more likely to adapt positively to adversity.
- Children who develop strong *executive function and self-regulation skills.* These skills enable individuals to manage their own behavior and emotions,[38] and develop and execute adaptive strategies to cope effectively with difficult circumstances.
- The supportive context of *affirming faith or cultural traditions*. Children who are solidly grounded within such traditions are more likely to respond effectively when challenged by a major stressor or a severely disruptive experience.[39-41]

Learning to cope with manageable threats to our physical and social well-being is critical for the development of resilience. Not all stress is harmful; all children experience varying degrees of stress in the course of their day-to-day lives. From the impacts of minor infections or abrasions, which trigger immune reactions that activate the body's stress response, to the threat of social exclusion, failing a test, or flubbing one's lines in a play, there are numerous opportunities in every child's life to experience manageable stress—and with the help of supportive adults, this "positive stress" can be growth-promoting. Over time, both our bodies and our brains begin to perceive these kinds of threats as increasingly manageable and we become better able to cope with life's obstacles and hardships, both physically and mentally.[42,43]

One promising approach to strengthening adaptability is through the development of explicit skills and capabilities that support cognitive flexibility, goal-setting, problem-solving, and the ability to resist impulsive behavior.

Experiences and Coping Skills Build Resilience to Adversity



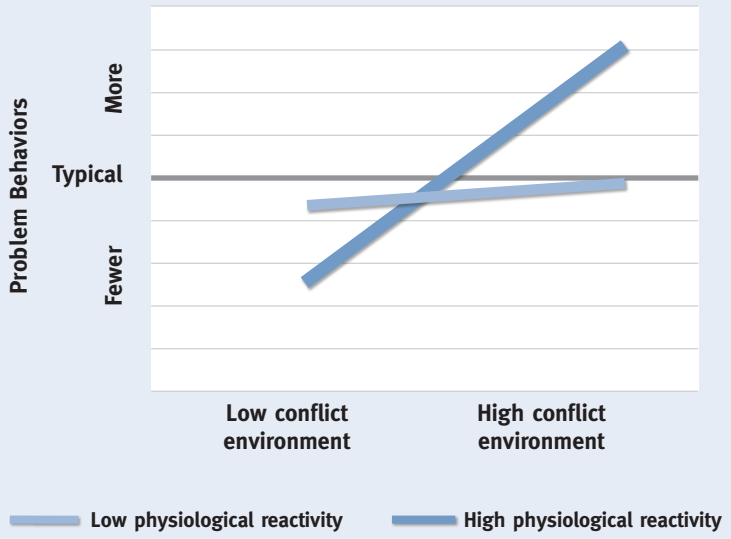
When we experience something stressful, our body's stress response systems are activated. A healthy physiological stress response is characterized by a sharp increase followed by a rapid decrease in activation. When the system is resilient, it adapts over time (depicted above in blue), leading to less activation each time a similar stressor is experienced. But when the stress response does not activate the way it should, fails to turn off when the stressful experience is over, or fails to recognize and adapt to the same type of stressor over time, we know that it is not working properly. In the latter case (depicted above in red), the same physiological response is triggered over and over with no signs of adaptation. When this happens, it can upset the body's chemical balance and change the architecture of specific regions of the developing brain. A resilient brain adapts to similar types of non-life-threatening stressors by adopting coping skills based on experience. As a result, the stress response system "learns" to activate more moderately.

Source: McEwen (1998). [80]

Many of these skills fall within the domains of executive function and self-regulation,[38] and have a lengthy developmental trajectory that begins in infancy and does not fully mature until age 25 to 30 years.[44] Just as these skills serve as protective factors for children (see above), they are critically important capabilities for the adults who care for them—and can be strengthened through coaching and practice.[45]

Some children demonstrate greater sensitivity to both negative *and* positive experiences. A growing body of evidence illustrates that some children experience more extreme biological responses to social contexts of all kinds than other children. These highly sensitive individuals show increased vulnerability in stressful circumstances but respond in exceptionally positive ways under supportive conditions.[46] Biologically sensitive children are more responsive to positive environments that provide parental warmth and supportive interventions,[27, 47] and easily overloaded in stressful caregiving contexts that are burdened by marital conflict, overall family adversity, and parental psychiatric disorders such as depression.[48-50] This heightened susceptibility to the consequences of adversity has also been connected to higher rates of respiratory illnesses,[51,52] as well as to depression and behavior problems.[53]

Some Children Are Affected More by Both Positive *and* Negative Experiences



Each child has a different level of physiological reactivity—the degree to which one's biological systems trigger a response to an external event. In this study, children who have higher reactivity (dark blue line) showed more problem behaviors when they lived in an environment with significant conflict than their less reactive peers (light blue line). However, in a low-conflict environment, highly reactive children responded with far fewer problem behaviors than their counterparts. Behaviors included oppositional defiant behaviors (anger, resentment, arguing), conduct problem behaviors (cheating, vandalizing, threatening), and overt hostility behaviors (fighting, kicking, taunting).

Source: Obradović, et al (2011).[53]

Resilience can be situation-specific. Research shows that differences that protect some children in the face of one form of adversity may have little or no effect in other conditions.[54,55] For example, some children may demonstrate resilience in response to being bullied at school but not to witnessing parental conflict. Others may demonstrate resilience in achieving some kinds of positive outcomes (e.g., academic performance) but not others (e.g., risk of stress-related disease).[56,57] In short, resilience is often situation-specific, rather than a general trait that applies in all contexts.

How individuals respond to stressful experiences varies dramatically, but extreme adversity nearly always generates serious problems that require treatment. Most children do not experience the unpredictable, uncontrollable, chronic stressors that can lead to lifelong negative consequences. However, children who experience circumstances of threat or catastrophe of historic magnitude—such as genocide, famine, or environmental devastation—almost always exhibit short-term and/or long-term impairments in their health and development.[58-60] For example, studies of children who survived the Holocaust during World War II, many of whom showed remarkable resilience in the face of horrific atrocities, reported residual vulnerabilities to psychiatric symptoms well into the adult years.[61] Irrespective of constitutional strengths or the availability of supportive relationships that help build capacities to deal with a wide range of challenges or threats, extreme adversity can rarely be weathered without harm. Under such conditions, intensive therapeutic interventions tailored to individuals and contexts are often needed.

Facts About Resilience That Are Often Misunderstood

SCIENTISTS HAVE STUDIED THE PHENOMENON of resilience in a wide range of perilous circumstances, including poverty,[10] severe parental psychopathology,[62] conditions of racially motivated threat,[63] institutional care,[9] exposures to violence and war,[64,65] and the Holocaust during World War II.[61] Consistent findings from this extensive knowledge base provide an opportunity to set the record straight about several widely believed but incorrect assumptions about individuals who beat the odds in the face of severe hardship.

Resilience requires relationships, not rugged individualism. There is no "resilience gene" that determines the life course of an individual irrespective of the experiences that shape genetic expression. The capacity to adapt and thrive despite adversity develops through the *interaction* of supportive relationships, gene expression, and adaptive biological systems.[8,18,66] Despite the widespread belief that individual grit, extraordinary self-reliance, or some in-born, heroic strength of character can triumph over calamity, science now tells us that it is the reliable presence of at least one supportive relationship and multiple opportunities for developing effective coping skills that are essential building blocks for the capacity to do well in the face of significant adversity.

The capabilities that underlie resilience can be strengthened at any age. A growing body of evidence shows that the coping skills that support effective adaptation in the face of adversity are built through a developmental process that occurs over an extended period of time, from infancy through adolescence and into the adult years. Age-appropriate activities that confer widespread health benefits (for the brain as well as for the rest of the body) hold considerable promise for improving the odds that an individual will recover from stress-inducing experiences. For example, increasing evidence suggests that regular physical exercise and stress-reduction practices (such as mindfulness meditation) at all ages can alter brain structure and function, while also reducing the expression of proinflammatory genes.[67-69] Programs that actively build skills for planning, organization, impulse control, cognitive flexibility, and other executive functions can also improve the abilities of adults with limited education and low income to cope with, adapt to, and even prevent adversity in their lives and in the lives of their children.[45]

Individuals who demonstrate resilience in response to one form of adversity may not necessarily do so in response to another. Resilience is shaped by the accumulation of experiences—both good and bad—and the continuing development of adaptive coping skills that are attuned to those experiences. The brain and other biological systems are most adaptable early in life, and the development that occurs in the earliest years lays the foundation for a wide range of resilient behaviors. As individuals develop over time, they never completely lose their ability to hone these capabilities, but they often must learn how to adapt to new challenges. Nevertheless, when adverse experiences are extreme or cataclysmic, even the hardiest individual is likely to require therapeutic support at some point. Stated simply, resilience in the face of some hardships does not guarantee resilience in the face of all threatening circumstances.

The Science-Policy Gap

WHEN OVERCOMING THE ODDS IS ERRONEOUSLY viewed as simply a matter of individual motivation or grit, the failure to succeed is perceived as the fault of the individual, and "blaming the victim" becomes the most frequent response.[8,70] Many economic, education, health, and social policies that address the effects of adversity in individuals do little to create the conditions that are known to build greater resilience. The following examples illustrate the extent to which many public policies do not yet reflect the scientific understanding of how the capacities that support resilience develop.

When child welfare policies focus solely on removal of a child from an environment that is physically unsafe, they miss the opportunity to restore the relationships and build the capacities that underlie resilience. Removal from harm's way without also strengthening supportive relationships and providing therapeutic services does not provide the healing experiences necessary to counterbalance the negative effects of maltreatment and move toward positive outcomes. The science of resilience demands a critical shift from focusing exclusively on protection from imminent danger to adopting a strength-building approach that promotes the adaptive capacities that facilitate healthy development.

When poverty-reduction policies require parents to work without assuring access to affordable, high-quality child care, they miss the opportunity to promote *both* adult economic self-sufficiency *and* developmentally supportive experiences for their children. The failure to invest in state-of-the-art early care and education programs for the children of low-income, working parents reflects a fundamental misunderstanding of how the foundations of resilience are built early in life. Decades of research on child development suggest that programs that facilitate positive and stable adult-child relationships, both in the home and in the non-parental settings in which young children spend significant amounts of time, are likely to reduce the intergenerational transmission of economic dependence and social disadvantage. Conversely, policies that neglect the basic needs of vulnerable young children miss critical opportunities that can "tip the scale" in a more positive direction and pay a lifetime of dividends for the individual and for society for generations to come.

When programs use "character education" models in contexts for which they were not designed, they miss the power of creating supportive, growth-promoting environments that build skills that generalize across contexts. Socially desirable character traits require a foundation of underlying skills and capabilities that include self-regulation and executive functions, such as inhibitory control, planning, and cognitive flexibility. Thus, programs that have been designed to "build character" in a context where children already have those underlying skills, such as high-achieving schools, are not necessarily going to transfer successfully to the different context of most low-achieving schools. In these latter circumstances, where children have not had the experiences needed to develop the same foundational capabilities, program staff must work on building supportive relationships and adaptive capacities that can be applied in multiple contexts before introducing conventional "character education" curricula.

Future Directions for Policy and Programs

ADVANCES IN THE SCIENCE OF HUMAN DEVELOPMENT and its underlying biology can be mobilized to inform a new wave of innovative strategies for building the capabilities that help both children and adults thrive in the face of economic and social disadvantage. Promising new approaches include both public and private sector actions that can strengthen the foundations of resilience, beginning in the earliest years and continuing well into adulthood.

Use scientific knowledge to help identify and support children whose needs are not being addressed adequately by existing services. Individual differences in resilience and vulnerability among children facing significant adversity present important unmet challenges for intervention programs that have been developed as a "one size fits all" model for service delivery. Drawing on new insights from 21st-century medicine, molecular biology, and genetics, as well as advances in the social sciences, researchers are beginning to identify interesting patterns of differential impact and new ways of measuring the variable effects of adversity that can strengthen our ability to match specific interventions to the distinctive resources and needs of different subgroups of children and families. These rapidly moving frontiers of scientific investigation could be mobilized to develop, test, and scale new ways of individualizing services for children who are more likely to exhibit resilience in severely challenging situations and those who will need greater assistance.

Enhance "serve and return" interactions between babies living in disadvantaged environments and the adults who care for them in order to strengthen the building blocks of resilience. The ability to respond to life's challenges in a positive, adaptive manner is rooted in the quality of the relationships that children have with their primary caregivers and other important individuals in their lives. The importance of this influence emerges directly from an understanding of how much *serve and return* responsiveness facilitates cognitive, social, and emotional development. These growing capabilities are then available to help a child cope with hardship and adapt to challenging situations. The knowledge and skills of parents, teachers, and caregivers greatly influence the responsiveness of their interactions with children. Recognizing the critical role of these interactive capabilities provides a strong incentive for developing new intervention strategies that explicitly target adult skill-building to improve the quality of adult-child relationships in order to improve life outcomes for vulnerable children.

Target the development of specific skills that are needed for adaptive coping, sound decision-making, and effective self-regulation in children and adults. Interventions to help individuals master stressful experiences are likely to be more effective if they target skills that can be used in a variety of circumstances and roles, whether as students, parents, job seekers, or community members. Many of these essential capabilities fall within the domains of executive function and self-regulation, which can be built through programs that focus explicitly on their development, beginning in early childhood,[38,71] and strengthened in adulthood through services that provide appropriate coaching, scaffolding, and practice.[45] A wide range of early care and education, parent training, and employment preparation programs could all benefit from a greater scientific understanding of how these skills develop from early infancy into the adult years.

Develop new frameworks for integrating policies and programs across sectors that collectively reduce adversity and build capacity. Some sources of significant adversity are out of one's control, such as natural disasters, the death of a loved one, and serious illnesses, yet most severe hardship encountered by young children and their parents is preventable. Common triggers of toxic stress in families and communities include severe neglect, recurrent abuse, malnutrition, chaotic environments, and poor health management. Strategies that build child and adult capacities work best when they are integrated within complementary policies across sectors that collectively lower the burden of stress on families due to the often interrelated threats of poverty, crime, mental illness, substance abuse, discrimination, and community violence. A fresh approach using a unified, science-based framework could identify the best strategies for coordinated public-private partnerships to implement together. These could include subsidized parental leave policies, access to affordable and high-quality early care and education services, community recreation and support activities, and home-visiting programs that coach new parents on how to interact positively with their children.

Promising new approaches can strengthen the foundations of resilience, beginning in the earliest years and continuing into adulthood.

The following are some of many examples of how current policies and programs could build the foundations of resilience in children more effectively.

- Work requirements for receiving cash assistance through Temporary Assistance for Needy Families (TANF) could be linked directly to the availability of high-quality child care.
- Child welfare policies could work with families to reduce sources of chronic stress in their lives and provide therapeutic services to strengthen vulnerable relationships *before* the removal of children becomes necessary.
- Formal school settings can provide a range of opportunities for meaningful participation and belonging, as well as for the development of knowledge, cognitive skills, and self-regulation abilities, all of which augment adaptive systems that underlie the capacity to deal with adversity.[8,72-73]

Productive innovation is likely to have its greatest impact when family-based programs are designed to complement teacher-student

programs with a common goal of assuring supportive and caring relationships as well as child skill-building.[74] School-based programs that focus explicitly on enhancing children's executive function skills and preventive interventions that foster secure attachment in infants where there is risk for maltreatment are promising examples of applying such knowledge.[71,75]

Finally, maximize the ultimate effectiveness of all early childhood policies and programs by focusing collectively on the full range of factors that facilitate resilience. Extensive evidence collected over decades of research points toward the powerful influence of a composite of personal, relational, and contextual factors that are associated with positive outcomes in the face of adversity. Drawing on this powerful knowledge base, all prevention and intervention programs would benefit from focusing on combinations of the following factors: (1) facilitating supportive adult-child relationships; (2) building a sense of self-efficacy and perceived control; (3) providing opportunities to strengthen adaptive skills and self-regulatory capacities; and (4) mobilizing sources of faith, hope, and cultural traditions.

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