MOBILIZING SCIENCE TO REDUCE INTERGENERATIONAL POVERTY

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The proposition that local communities can generate innovative strategies to rise out of poverty has a long pedigree. Its roots are embedded in a rich combination of scholarly thought and popular conviction. Its growth is marked by parallel processes of rigorous evaluation and partisan advocacy. A wide variety of place-based initiatives have been inspired by organizing concepts such as collective efficacy and social empowerment and by deep commitments to eliminating structural inequities, combating institutionalized discrimination, building social capital, and advancing social justice. In this context, generations of efforts that began during the War on Poverty of the 1960s and continue to the present day have underscored both the promise and the challenges of community-based efforts to combat entrenched poverty.

As we ponder the future of place-based approaches to social change, four themes provide a promising framework for fresh thinking about the challenges. The first is the *complexity* of neighborhood poverty, whose diffuse burdens (such as jobs shortages, social and racial exclusion, transportation gaps, violent crime, poor public health, and deficient educational opportunities) all affect each other and demand simultaneous attention.[1] The second theme is *conflict*, which is fueled by disagreements among key stakeholders about objectives, resources, time horizons, and messaging (among others) that can result in deeply entrenched positions that block innovation.[2] For example, the War on Poverty's community action program quickly encountered tensions among public officials and neighborhood leaders over the extent to which the purpose was policy change or program implementation.

The third theme is *context*, which refers to the challenge of widely applying innovations developed in a particular community that depend on its unique aspects and are therefore difficult to incorporate into sustainable, large-scale policies.[3] The fourth and final theme is *time*, which is reflected in the simple reality that effective community development requires patience for listening and relationship building, while it faces intense pressure for rapid results.[4]

The aim of this essay is to describe a new approach to reducing intergenerational poverty by mobilizing science to stimulate community-driven innovation. This approach is premised on effective collaboration among scientists, community leaders, and

1 This challenge was recognized in the 1960s as policymakers worked to improve on early War on Poverty results; Robert Kennedy famously called it the need to "grasp the web whole."

2 For a recent account of pitfalls and strategies in this arena, see Xavier de Souza Briggs, Networks, Power, and a Dual Agenda: New Lessons and Strategies for Old Community Building Dilemmas (Boston: MIT, 2007). Available at http://web.mit.edu/workingsmarter/media/pdf-ws-kia-brief-0703.pdf (retrieved March 2012).

3 For an insightful review of this challenge, see Lisbeth B. Schorr, Common Purpose (New York: Anchor Doubleday, 1997).

4 This challenge, too, was encountered by community efforts in the 1960s, as Schorr (ibid., p. 311) notes.

other stakeholders, starting with agreement on ambitious goals and hypotheses about how they can be met. Connected in this shared purpose, communities and their partners can then begin to move along a pathway of practical action and continuous learning toward the co-discovery of effective strategies. This essay elaborates on the four themes outlined above and draws on recent experiences in diverse settings where people are applying this approach to enhance the healthy development of young children.

TAMING COMPLEXITY

Advances in the science of early childhood development, including its underlying neurobiology, offer an unprecedented opportunity for communities, families, and their partners to bring sharper focus to their efforts on behalf of vulnerable young children. Although it may appear that introducing new frameworks into an already complex set of dynamics can only complicate the challenges we described above, multiple stakeholders can capitalize on advances in science if they focus on a shared commitment to an explicit set of "stretch outcomes" and then work jointly on developing and testing a "causal theory of change" that links specific actions to those outcomes.

Stretch outcomes are results that represent high but potentially achievable aspirations for the well-being of a defined population.[5] Setting stretch outcomes entails agreeing on measurable goals along dimensions that matter to the community and specifying achievement targets (for example, in terms of population percentages) that represent substantial gains over what current practice yields. This is a distinctly different philosophy from the approach adopted by most poverty reduction efforts, which center on the effectiveness of an individual *program*, assessed by a combination of programmatic outputs, anecdotal examples, and the discovery of measured impacts that are statistically significant yet typically modest in magnitude. In contrast, a stretch outcomes approach

5 "Population" in this essay refers to a definable group of vulnerable children or families in a geographic area.

focuses on the *well-being of a population*, as defined by community-specified objectives, which serve as the central criteria for success and drive constant experimentation with combinations of program inputs. Stretch outcomes for a city might include, for example, cutting infant mortality in half over three years, and halving it again over the next three.

The concept of a *causal theory of change* refers to a testable notion of how a set of new or modified policies and programs can produce specifically targeted stretch outcomes. It begins by identifying assumptions and hypothesized pathways, drawn from a combination of scientific research and community experience, about how to reach important goals, beyond incremental improvement over the status quo. At its best, a productive theory of change serves as a continuously evolving tool for playing with new ideas and promoting collaborative discovery. While relentlessly focusing on stretch outcomes, good theories of change for reducing poverty reflect the complex interactions and reciprocal feedback loops that characterize human development.

When we began collaborating to catalyze innovation in the early childhood arena, we started with extensive interviews of leading researchers, practitioners, and policymakers. These conversations generated a range of potential stretch outcomes, from maternal mental health to family economic stability, but most pointed toward the importance of assuring that every child in each participating community arrives in kindergarten sufficiently prepared to succeed in school. Our plan was to begin with this concept in a variety of settings and encourage each community to develop its own consensus on what specific stretch outcomes it would pursue toward that goal. With that focus in hand, we proceeded to search for barriers to kindergarten readiness in vulnerable children, including variable availability of early learning services. This led to the hypothesis that the problem is not simply access to programs but that the effectiveness of existing services is constrained by the biological consequences of *toxic stress*—frequent, prolonged activation of the body's stress

response systems—that children experience when their families are facing significant economic hardship.[6]

Our initial theory of change therefore hypothesized that better outcomes would emerge if the current policy emphasis on enriched learning environments for children and parenting education for mothers were augmented by the complementary implementation of specific strategies designed to protect the developing brains of vulnerable young children from the disruptive effects of toxic stress. The knowledge base driving this approach was derived from advances in neuroscience, molecular biology, and epigenetics (the study of biological mechanisms through which environmental influences affect the activation or suppression of gene expression), combined with the cumulative wisdom of decades of practical experience and evaluation data from the field, which highlighted the extent to which significant adversity disrupts brain circuitry and precipitates cognitive, emotional, and behavioral difficulties that interfere with learning.[7] As we introduced this theory of change to diverse stakeholders, we found substantial resonance, but also some resistance, as we describe below.

LEVERAGING CONFLICT

Coalescing around stretch outcomes and a causal theory of change is a community development task that ought to benefit from decades of practical experience and systematic research. In this spirit, the determination of appropriate outcomes requires

6 Environmental sources of toxic stress include deep poverty, child maltreatment, social exclusion, chronic exposure to violence, and parental substance abuse. See the recent American Academy of Pediatrics (AAP) technical report: J.P. Shonkoff, A.S. Garner, the 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 129 (1) (January 2012): e232–246, and the AAP policy statement: 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 129 (1) (January 2012): e224–231.

7 See National Scientific Council on the Developing Child, Excessive Stress Disrupts the Architecture of the Developing Brain: Working Paper No. 3 (updated 2009). Available at http://developingchild.harvard.edu.

a consensus definition supported by families, civic leaders, and community-based service providers, as well as policymakers at multiple levels and academic researchers in an array of relevant disciplines. Indeed, the opportunity to define multiple pathways for different subpopulations and outcomes invites inclusion and becomes a way to build shared purpose.

The complexity of this process means that everything could and should be on the table at the outset. Heterogeneous groups can navigate inevitable sources of conflict and work toward consensus if the task is defined from the start as joint discovery, rather than power brokering or winner-take-all decision-making. For example, when a group of initially skeptical community leaders and other stakeholders discussed kindergarten readiness outcomes, they quickly agreed that classroom chaos is an important barrier. This provided an entry point for exploring the role of executive function[8] and self-regulation skills, which resonated with practitioners' observations[9] that they are dealing with disrupted development that needs expert management, not "bad" children who should be medicated or expelled from programs.

A broadly embraced theory of change must be co-created, beginning with high aspirations, population-based outcomes, and revisable causal hypotheses. The aim is not to decide whether the community accepts or rejects a predefined program imposed from the outside, but rather to create a welcoming environment that supports the joint development of evolving strategies. One of us recently observed such a process in a neighborhood facing poor health outcomes among immigrants, where health care providers and community residents were able to bridge their

8 Examples of executive functioning skills include working memory (such as ability to hold in mind and follow a sequence of instructions), inhibitory control (such as ability to delay gratification), and cognitive flexibility (such as ability to adapt to changes in rules). See Center on the Developing Child at Harvard University, "Building the Brain's 'Air Traffic Control' System: How Early Experiences Shape the Development of Executive Function." Working Paper No. 11 (2011). Available at http://developingchild.harvard.edu.

9 Such practitioner observations, which we heard frequently, are in turn well supported by relevant research. See, e.g., Linda S. Pagani et al., "Relating Kindergarten Attention to Subsequent Developmental Pathways of Classroom Engagement in Elementary School," Journal of Abnormal Child Psychology 40(5) (2012): 715-725.

differing perspectives by identifying gaps in access to services and then working jointly to develop practitioner checklists and multilingual, immigrant-oriented reference sheets to close those gaps from both ends.

In short, conflict challenges can be transformed into assets by devoting substantial collective effort up front to the invigorating task of defining a set of jointly owned stretch outcomes and a shared theory of change. When these are both in place, the work can shift to collaborative discovery, where heterogeneity is an advantage, as each participant makes distinctive contributions to the learning process. In this context, the community itself plays a vital, ongoing role, not only in co-creating innovative interventions but also in monitoring progress toward stretch outcomes and in stimulating revisions to the theory of change until results match aspirations for all families.[10]

After consultations among early childhood stakeholders as we described above, we shared the preliminary goal (i.e., assuring school readiness) and theory of change (complementing enrichment with protection) at a workshop including researchers, practitioners, policymakers, and philanthropists. Although the participants were largely from the field of early learning, a strong reaction emerged that stretching on the learning dimension only—even merely as an initial step—was not sufficient, given the way early experiences also affect physical and mental health. Consequently, the group's overall goal now includes *both* building readiness for school success *and* strengthening foundations for lifelong health, and community partners are currently defining stretch outcomes on both dimensions.

In a parallel fashion, in order to narrow the focus for designing pilots, the workshop identified causal pathways that would serve both learning and health objectives simultaneously. The theory of change thus progressed from a general emphasis on the need

10 We have seen this approach work in complex settings, such as when a community bridged racial and ethnic differences by following this sequence both in plenary sessions and in small working groups that reflected the diversity of the whole. However, it is far too early to report results against stretch outcomes.

to balance developmental enrichment with protection against the burdens of severe adversity to a more nuanced strategy designed to build the capacities of caregivers to buffer stress. Two sources of such capacity then stood out: (1) children's and adults' executive functioning and self-regulatory skills, and (2) family economic stability. Because adult executive functioning and related skills are important to both parenting and employability (hence economic stability), participants saw exciting leverage[11] in targeting such skills.[12]

EMBRACING CONTEXT

If an innovation strategy is aligned around the needs of a specific population or subgroup in a single community, the task of producing comparable results in other places can be formidable. That said, successful mastery of this challenge begins with embracing it. Private sector experience suggests that innovation most often emerges from problem solving in a specific context. A good place to start in the social sphere is to formulate stretch outcomes in a single community that is open to new ideas and to take the distinctive constraints and opportunities within that setting as the basis for collaborative problem solving aimed at those outcomes.[13]

Paradoxically, the very approach that engages problem solvers in a unique local environment can also position them to achieve broader impact. If the stakeholder model includes clusters of communities working with external stakeholders (such as policymakers, researchers, or social entrepreneurs), then goals can be defined for multiple subpopulations through an inclusive

11 For example, a community-based team, including agency and civic leaders, single-parent mothers, public officials, and researchers is currently considering an intervention strategy that aims to build such skills through a combination of parent (and parent-child) mental health services with employment and life coaching.

12 See E. J. Costello et al., "Relationships between Poverty and Psychopathology: A Natural Experiment," Journal of the American Medical Association 290 (15) (2003): 2023–2029.

13 It is thus helpful to begin in settings where effective community work has already created a functioning planning forum, including a full range of stakeholders from families to public officials. A good example is the New Haven, CT, MOMS Partnership, http://researchforher.com/current-studies/moms-project.

theory of change. Within this framework, each community can set its own stretch outcomes, and multiple communities can share hypotheses, strategies, and results. Researchers and other external stakeholders are then positioned to broadly apply discoveries from their participation in specific community settings.

When we met with a community agency providing child care for vulnerable children and jointly reviewed their outcomes—applying formal data and staff experience—we found that one inhibitor of success was the tendency to lose ground after program exit. Working with researchers to apply the broader theory of change described above, the agency is now designing tailored interventions to support families as their children transition to kindergarten or Head Start. This can involve the application of insights[14] and tools developed by researchers in other contexts (for example, an experimental set of manual or electronic games that parents and children can play together to build cognitive and executive functioning skills)[15] as well as adaptations to the specific "transition" problem (such as through specially supported family game nights for alumni).[16] Concurrently, researchers can draw lessons from experiences in this particular context as they design broadly applicable learning tools for other purposes. Finally, with state policymakers at the table, further discussions could focus on how these intervention

14 For example, based on laboratory results reported in Allyson P. Mackey et al., "Differential Effects of Reasoning and Speed Training in Children," Developmental Science 14 (3) (2011): 582–590. See also S. B. Nutley et al., "Gains in Fluid Intelligence after Training Non-Verbal Reasoning in 4-Year-Old Children: A Controlled, Randomized Study," Developmental Science 14 (3) (2011): 591–601.

15 Relevant background includes research on computer tools to train and measure executive functioning, and on the role of parent-child interaction, including play, in cognitive development. In addition to the two Developmental Science studies cited above, see, for example, G. B. Ramani and R. S. Siegler, "Promoting Broad and Stable Improvements in Low-Income Children's Numerical Knowledge through Playing Number Board Games," Child Development 79 (2) (2008): 375–394; and A. Bernier et al., "Social Factors in the Development of Early Executive Functioning: A Closer Look at the Caregiving Environment," Developmental Science 15 (1) (2012): 12–24.

16 As the agencies recognize, families will need logistical support to make it to game nights, and these evening programs themselves need thoughtful structure to engage parents, teachers, and children. Some families will need significant therapeutic support before regular participation in events like this would be feasible for them.

strategies could benefit from policy reforms (such as in transition regulations governing the child welfare system).

RESPECTING TIME

Effective connections rarely happen spontaneously. They require active support that can be generated through face-to-face meetings, web linkages, and collaborative problem solving. Most important, however, productive connection takes time.

Constructive dissatisfaction with the status quo serves as an engine for innovation. Impatience for impact at scale for multiple populations simultaneously, however, nearly guarantees frustration. Fast, large-scale program gains depend on the rare phenomenon of already existing transformative ideas that are immediately acceptable to key (and typically entrenched) actors. Consequently, innovators need time. However, they must also work fast, not only because of stakeholder pressures but also because success requires trying many new things, learning from both progress and setbacks, and testing modified interventions repeatedly in quick cycles.

Stated simply, effective stakeholders must strike a balance between the patience required for large-scale change and the impatience that drives discovery, especially when it is guided by visionary stretch outcomes and measured against testable theories of change. In this spirit, current efforts to promote innovation in early childhood policy and practice are being designed to include both a *connection* function (to leverage conflict and embrace context) and an *acceleration* function (to both respect and push the dimension of time).

Washington State, for example, has developed connection through a cross-agency working group of policy leaders who are collaborating with 11 community sites across the state and a team of participating scientists. An early product of this collaboration, now heading for field testing, is a new curriculum on executive functioning with a video tool designed for state program leaders, community-service providers, and caregivers.

This will enable programs across the state to begin acting on the theory of change we described above, so shared knowledge can accumulate without each intervention having to wait for results from another.

Meanwhile, on the acceleration front, two of those 11 community agencies are now working more closely with scientists and policymakers to design pilot interventions geared to stretch outcomes for the most vulnerable populations they serve (such as families needing transition support, as we described above). Seeking the investment of local philanthropists, each team is developing a funding strategy that can, with full accountability, catalyze a quick launch and ongoing empirical revision of program designs. In short, the aim is to accommodate and even nurture impatience for discovery.

Impatience for discovery of pathways to stretch outcomes is well served by close attention to early feedback at the community level. That feedback gains power from an innovation design that works backward from stretch outcomes through the formulation of a provisional theory of change to hypotheses about what must be true about a specific intervention to actually achieve those goals. These are the assumptions that need quick testing. As Scott Anthony observed about business innovation, "No matter how smart you are, your first plan is sure to be wrong—test and learn to figure out *how*."[17] From university laboratories to community antipoverty coalitions, early learning about what's wrong is a critical challenge that all successful innovators must master.

CONCLUDING THOUGHTS

Community-based strategies occupy an important niche in the effort to combat intergenerational poverty. Although the rationale for such strategies remains strong, the complexity of the challenges and the diversity of the interventions that have been tried (with variable success) have made it difficult to build cumulative impact. Advances in the biology of adversity, linked

17 Scott D. Anthony, The Little Black Book of Innovation (Cambridge, MA: Harvard Business Review Press, 2012), p. 206.

to practical experience, offer an opportunity to develop new community-based strategies that could catalyze greater impact and sustained progress.

To capitalize on this opportunity, many communities would benefit from a focused approach to innovation that enables direct engagement with researchers and other stakeholders. This could begin productively with a commitment to ambitious outcomes for defined subpopulations and collaborative development of a theory of change that is sufficiently inclusive to overcome stakeholder conflict and geographic separation. When resources are provided by investors who understand the need for "intellectual venture capital," innovative thinkers and doers could then design pilot interventions geared to those outcomes and subpopulations, and ignite fast-cycle action learning to deliver local results while testing and enhancing the broader theory of change. A compelling new framework for such collaborative action beckons. Through focused reduction of neighborhood sources of toxic stress, communities can apply converging biological and experiential knowledge to dramatically curtail the cycle of intergenerational poverty that still threatens the learning, health, and life prospects of millions of young children.

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