

**Using Executive Function and Related Principles to Improve the Design and
Delivery of Assistance Programs for Disadvantaged Families**

by

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Introduction

At the start of the millennium, the National Academy of Science released a report, *From Neurons to Neighborhoods: the Science of Early Childhood Development* which significantly changed the way we think about early childhood development – and started a conversation about how to develop policies and programs for disadvantaged children that are rooted in science, with a special focus on early brain development. Since then, our knowledge of how the brain develops and the important role the environment plays in shaping early and later life experiences has expanded exponentially, paving the way for an expanded conversation about how to use this knowledge not only to develop effective early childhood policies and programs but also to consider the implications for policies and programs aimed primarily at parents and other caregivers. This expanded view is illustrated by the following passage from a recent article by Jack Shonkoff (a lead author of *From Neurons to Neighborhoods*) and Philip A. Fisher, Science Director for the National Forum on Early Childhood Policy and Programs at Harvard University (emphasis added):

“...science suggests that significantly greater impacts on the healthy development and life prospects of vulnerable young children could be achieved **by focusing greater attention on strengthening the capabilities of their caregivers, improving the economic stability of their families, and building stress-buffering resources in their communities rather than by continuing to focus primarily on the provision of child-focused enrichment, parenting education, and informal support.** With this objective in mind, the challenge for policymakers and practitioners is to move beyond the simple coordination of separate child- and adult-focused programs and to combine the best of both domains within a fully integrated, intergenerational strategy that is grounded in developmental science, aligned at the program, community, and policy levels, and committed to the pursuit of breakthrough outcomes in lifelong learning, behavior, and health.”¹

This work has been significantly influenced by brain science, of which executive function skills -- cognitive processes required to execute routine and complex tasks, solve problems, sustain attention, follow rules, make plans, monitor actions, control impulses, delay gratification and set and achieve short and long-term goals—are a key component. These skills are critical for success in many aspects of life, including school performance, parenting and work. These cognitive and social skills make it possible for adults to care for themselves and their children, run households, and find and keep jobs.² Executive function skills are controlled by a part of the brain – the prefrontal cortex-- that takes many years to develop, making them especially susceptible to negative environmental influences, including poverty and many of the adverse circumstances that often accompany living in poverty or in poor neighborhoods such as exposure to high levels of violence.³

¹ Jack P. Shonkoff and Philip A. Fisher. Rethinking evidence-based practice and two-generation programs to create the future of early childhood policy. *Development and Psychopathology*, 25 (4, part 2), 1635–1653. Copyright Cambridge University Press, 2013.

² Adele Diamond. “Want to Optimize Executive Functions and Academic Outcomes? Simple, Just Nourish the Human Spirit. In *Minnesota Symposia on Child Psychology. Developing Cognitive Control Processes: Mechanisms, Implications, and Interventions*, Philip David Zelazo and Maria D. Sera, eds., Wiley & Sons, Inc.

³ Philip Zelazo and Jacob E. Anderson. “What Is Cognitive Control?” *Minnesota Symposia on Child Psychology. Developing Cognitive Control Processes: Mechanisms, Implications, and Interventions*. Ed. Philip David Zelazo and Maria D. Sera. Minneapolis, MN: Wiley & Sons, Inc., 2014.

Adults with executive function deficits often have difficulties meeting deadlines, prioritizing and following through on tasks, arriving on time, organizing their work and following a conversation in a group setting or meeting. They also are easily distracted and have difficulty seeing new ways of doing things. Executive function skill deficits are not only found in disadvantaged adults, but because the disadvantaged have greater exposure to adverse circumstances and are impacted daily by the stress associated with making ends meet, a better understanding of executive function skills and how they develop could potentially help us to implement better strategies to reduce poverty's adverse impacts and improve programs designed to move families out of poverty (such as workforce development programs).

In this paper, I focus on executive function skills from the perspective of disadvantaged adults, recognizing that in many cases, adults are applying for or receiving assistance for the benefit of themselves and their children and that interventions designed to improve opportunities for adults may also have a significant impact on their children. I first provide a description of executive function skills, focusing on what they are, how they develop and the factors that influence their development. I then discuss the implications of this information --which is rooted in findings from neuroscience, developmental science and behavioral economics -- for policies and programs targeted to disadvantaged adults and families and provide concrete examples of strategies that have already been put into place that build on this knowledge (sometimes explicitly and sometimes implicitly). I conclude with suggestions for how this knowledge potentially could be applied more broadly to achieve better outcomes for disadvantaged families.

Executive Function Skills: What They Are and Why They Are Relevant to Poverty Policy and Programs

An Introduction to Executive Function Skills

There are many analogies used to describe executive function skills and the role they play in our day-to-day lives. A common analogy is that of a highly controlled air traffic control system that manages the arrival and departures of dozens of planes on multiple runways. This is because executive function skills play a critical role in helping us to focus on multiple streams of information at the same time, and revise plans as necessary.⁴ There are many skills that contribute to this “air traffic control system” and scientists and clinicians have developed different schemes for organizing them into clusters. A widely accepted construct focuses on three key cognitive processes:⁵

- **Working memory** is the capacity to mentally store and process information over short periods of time. It is the skill that allows us to retain information from one situation and use it in another context, follow multi-step directions and temporarily stop doing something and then come back to it later. Research shows that individuals can store and retrieve between two and four chunks of information in their working memory at any given time.

⁴ 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. Retrieved from www.developingchild.harvard.edu

⁵ Russell Carlock. “Executive Functions: A Review of the Literature to Inform Policy and Practice.” Cambridge, MA: Center of the Developing Child at Harvard University. 2011.

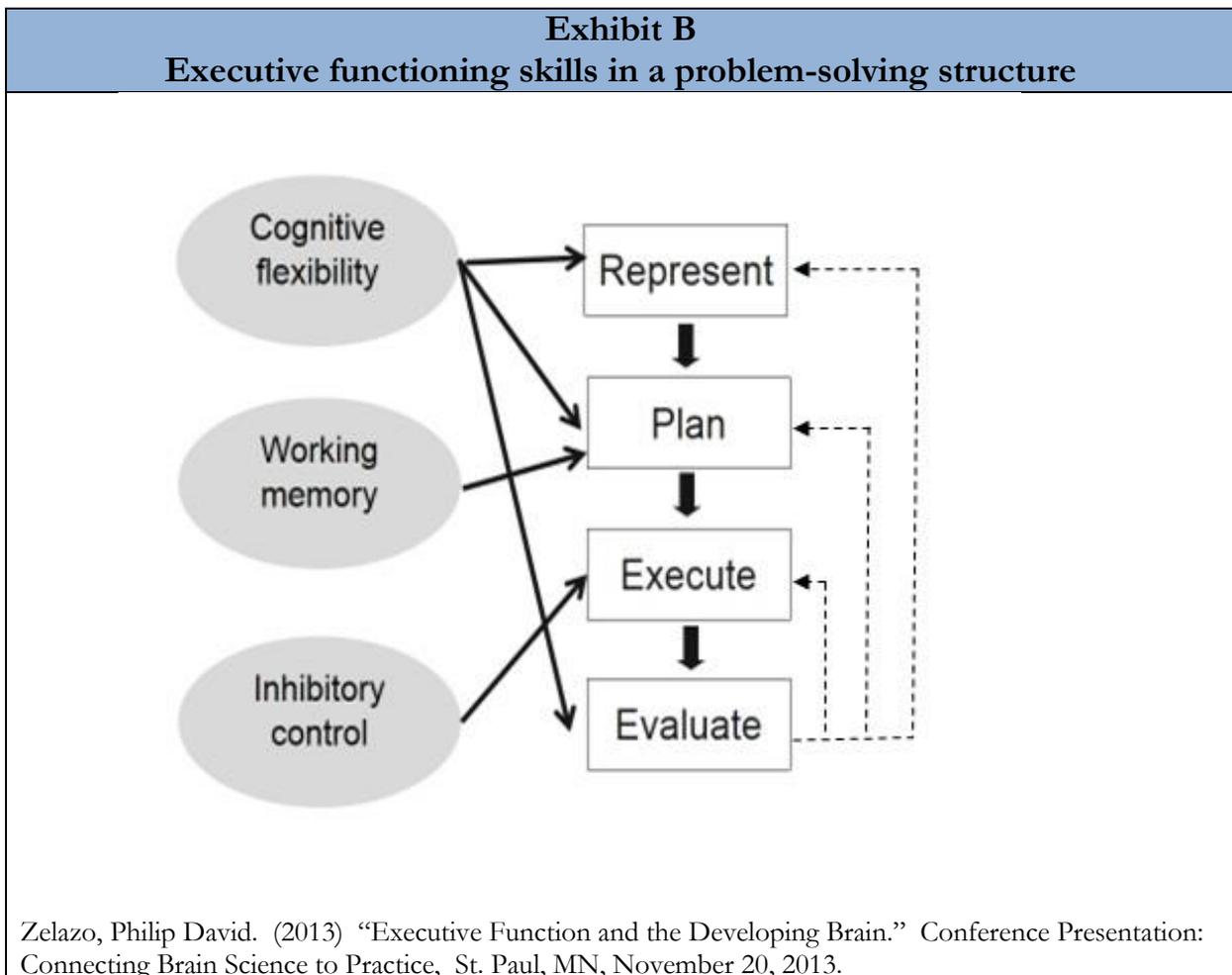
- **Inhibitory control** is the skill we use to master and filter our thoughts and impulses so we can resist temptations and distractions and not act prematurely. It is the skill that we use to stay focused and to pause and reflect on consequences before taking action. Activities that require sustained attention such as changing habits and achieving long-term goals require considerable inhibitory control. (Inhibitory control is also sometimes referred to as self-control and impulse control).
- **Cognitive flexibility** is the capacity to nimbly switch gears and adjust to changed demands, priorities, or perspectives. It is the skill that allows us to multi-task, apply different rules or social skills in different settings (e.g., to act differently at work than at a neighborhood social gathering) and change our approach based on feedback.

Exhibit A provides a more expansive list of executive function skills that is sometimes preferred by clinicians who work on developing concrete strategies to help build executive function skills.

Exhibit A Executive Function Skills (Expanded List)	
Skills Involving Thinking (Cognition)	
<ul style="list-style-type: none">• Working memory: Ability to hold information in memory while performing complex tasks; incorporates ability to draw on past learning or experience to apply to current situations• Planning/prioritization: The ability to create a roadmap to reach a goal or to complete a task; making decisions about what's important to focus on• Organization: The ability to create/maintain systems to keep track of information or materials• Time management: The capacity to estimate how much time one has, how to allocate it, and how to stay within time limits and deadlines• Metacognition: The ability to monitor oneself; ability to ask oneself: how am I doing/did I do?	
Skills Involving Doing (Behavior)	
<ul style="list-style-type: none">• Response Inhibition: Capacity to think before you act• Emotional control: The ability to manage emotions to achieve goals, complete tasks, or control and direct behavior• Sustained attention: The capacity to keep paying attention to a situation or task in spite of distractibility, fatigue or boredom• Task initiation: The ability to begin a task or activity without undue procrastination and to independently generate ideas, responses, or problem-solving strategies.• Goal-directed persistence: The capacity to have a goal, follow through to the completion of the goal, and not be distracted by competing interests• Cognitive flexibility: The ability to revise plans in the face of obstacles, setbacks, new information, or mistakes	
Source: Peg Dawson, EdD and Richard Guare, PhD. (2009). <i>Smart but Scattered</i> . New York, New York: The Guilford Press.	

Scientists that study executive function each represent executive function skills and their relationship to one another in somewhat different ways. Philip Zelazo, a neuroscientist who specializes in the study of executive function at the University of Minnesota, has developed a framework focused on problem-solving that is especially useful for thinking about executive function skills in the context of policies and programs for disadvantaged adults.⁶ (See Exhibit B.) In this formulation, he breaks executive functions into four key subfunctions that must be completed in a specific sequence:

- **Representation:** What is the problem I need to solve? What do I need to accomplish? What is preventing me from accomplishing it?
- **Planning:** What is my plan for solving the problem?
- **Execution:** How will I carry out the plan? What resources/help do I need?
- **Evaluation:** Did my plan work? If not, what do I need to change? Did I define the problem correctly? Was my plan realistic? How well did I do at executing it? What can I do differently to get a better result?



Zelazo, Philip David. (2013) "Executive Function and the Developing Brain." Conference Presentation: Connecting Brain Science to Practice, St. Paul, MN, November 20, 2013.

⁶ Philip Zelazo. "What Is Executive Function?" Aboutkidshealth.ca. Accessed from <http://www.aboutkidshealth.ca/En/News/Series/ExecutiveFunction/Pages/default.aspx> on February 2, 2014.

In a slightly different, but related formulation, Sylvia Bunge, a neuroscientist at the University of California at Berkeley, focuses on how executive function skills support goal-directed behavior. Her formulation focuses on three basic skill sets required for setting and achieving long-term goals: planning, self-regulation and monitoring.⁷ Adele Diamond, a neuroscientist in the Department of Psychiatry at the University of British Columbia, notes that reasoning, problem-solving and planning are all higher-level executive functions that draw on working memory, inhibitory control and cognitive flexibility.⁸

All of these formulations illustrate the interconnectedness of the various executive function skills. They also illustrate how many skills an individual must draw upon to solve a problem or to set and achieve a goal. Deficits in any one of the executive skills can result in failure to achieve the intended outcome. Strengths can be drawn upon to compensate for areas of weakness. All individuals, regardless of their socio-economic status, are stronger in some areas than in others. Thus, interventions to increase individuals' ability to solve problems or achieve a goal need to consider how to build on strengths and how to make accommodations for or improve areas of weakness.

It is important to note that even though executive function skills are critically important in their own right, they are not a replacement for hard skills that could help disadvantaged adults qualify for better paying jobs. It is, however, possible that designing training programs with the important role executive function principles play in adult's lives in mind could lead to higher rates of participation and completion that could ultimately lead to better outcomes and bigger program impacts.

The Relationship between Poverty and Executive Function

Research suggests that there are two pathways through which executive function skills may be compromised in disadvantaged adults – through the impact of early life experiences that may compromise the development of executive function skills⁹ and through the day-to-day struggle of trying to make ends meet with limited financial resources.¹⁰

Like all skills, executive function skill levels vary from one individual to the next. What makes executive function skills different is the important role that environment plays in their development – and the length of time over which executive function skills can be influenced by the environment and by interventions. The prefrontal cortex, where executive function skills reside in the brain, matures as late as the mid-20s, providing a very wide window during which the environment can influence the development of executive functions. This is in direct contrast to how other parts of the brain develop. For example, the sensory regions of the brain – the areas that control sights and sounds – are fully developed within just a few years after birth.¹¹

During the long period in which executive functions develop, there are two distinct periods of

⁷ Bunge, Sylvia. "Executive Functions: Why Do They Matter, and How Do We Measure Them?" Presentation given at U.S. Department of Health and Human Services Meeting on Executive Function. Washington, D.C.: U.S. Department of Health and Human Services. February 10, 2014.

⁸ Adele Diamond. (2013). Executive Functions. *Annual Review of Psychology*. 2013.64:135-168, 2013.

⁹ Kimberly G. Noble. "Rich Man, Poor Man: Socioeconomic Adversity and Brain Development." *Cerebrum*, May 2014.

¹⁰ Sendhil Mullainathan and Eldar Shafir. *Scarcity: Why Having So Little Matters So Much*. New York: Henry Holt and Company. 2013.

¹¹ Bunge, Sylvia. (2014).

significant growth – between the ages of three and five and between the ages of 15 and 25. Although these sensitive periods denote times during which the neural system is *maximally* sensitive to environmental input, it is not the case that inputs to the system after the end of this period can no longer influence development.¹² This is important because it means that it is possible to build executive function skills throughout the life course.

This extended period of growth has both positive and negative aspects to it. On the positive side, there are multiple points at which it is possible to intervene to take advantage of the natural growth trajectory of executive function skills and the relative plasticity of the prefrontal cortex. On the negative side, the opportunities for adverse circumstances to negatively impact the development of executive function skills extends over a very long period of time. Over the long-term, chronic stress, inadequate nutrition, prenatal alcoholism, child maltreatment, drug abuse and head trauma all negatively impact the development of executive function skills. On a day-to-day basis, prefrontal function is affected by things like sleep and stress.¹³

Although it is an area in need of further study, there is some evidence that children who grow up in poor household have weaker executive function skills as adults. In a longitudinal functional magnetic resonance imaging study that looked at the association between brain functioning and poverty, researchers found that being poor at age 9 leaves its imprint on the brain at age 24. The researchers could see differences in the activity of the portion of the brain that controls executive functions. The same differences were not observed based on current family income. The brain patterns observed were the same patterns observed with depression, anxiety disorders, aggression and post-traumatic stress disorder which also influence the part of the brain that controls executive functions.¹⁴

While the exact way in which poverty impacts the development of executive function skills in children is not known, one possible explanation that has been offered is that the wide range of stressors that disadvantaged parents face make it difficult for them to provide and/or maintain the kind of well-regulated environment in which healthy development can happen.¹⁵ Some of the stressors that these families face include unstable and unsafe housing, employment instability, and exposure to excessive levels of violence. These and other stressors can undermine a parent's ability to engage in more positive interactions with his or her young child on a consistent basis.

Recent research on "scarcity" -- the condition of not having enough resources-- provides considerable insight into the relationship between poverty and cognitive capacity, including executive function skills. In their recent book, *Scarcity: Why Having Too Little Means So Much*, Sendil Mullainathan, and Eldar Shafir, experts in behavioral economics, suggest that there is a causal, not merely correlational relationship between poverty and mental function.¹⁶

The authors and their colleagues note that the time poor individuals spend trying to make ends meet

¹²Allyson P. Mackey et al. "Environmental Influences on Prefrontal Development." *Principles of Frontal Lobe Function*, Ed. Donald T. Stuss and Robert T. Knight. Oxford, England: Oxford University Press, 2012.

¹³ Ibid. (2012).

¹⁴ Pilyoung Kim et al. "Effects of childhood poverty and chronic stress on emotion regulatory brain function in adulthood." *PNAS*, Volume 110, no. 46, November 12, 2013.

¹⁵ Shonkoff and Fisher. (2013).

¹⁶ Mullainathan and Shafir. (2013).

with scarce resources uses up cognitive resources, creating a “bandwidth tax” that leaves them with fewer cognitive resources to succeed in other critical tasks such as parenting, education or work. In their view, the poor are less successful than the non-poor in various aspects of life because living in poverty impedes cognitive capacity, not because those living in poverty are inherently less capable. They liken living in poverty to living perpetually on a missed night of sleep, a sizable impact that could have large consequences. In their words:

“The poor must manage sporadic income, juggle expenses, and make difficult tradeoffs. Even when not actually making a financial decision, these preoccupations can be present and distracting. The human cognitive system has limited capacity. Preoccupation with pressing budgetary concerns leaves fewer cognitive resources available to guide choice and action. Just as an air traffic controller focusing on a potential collision course is prone to neglect other planes in the air, the poor, when attending to monetary concerns, lose their capacity to give other problems their full consideration.”¹⁷

The researchers note that although poverty impacts cognitive capacity, it does not mean that disadvantaged adults' decision-making processes differ dramatically from the non-poor. In fact, they note that some of the basic decision-making weaknesses adults living in poverty exhibit are similar to those exhibited by individuals from all walks of life – the difference is that in poverty, there are narrow margins for error, and the same behaviors end up manifesting themselves in more pronounced ways and can lead to worse outcomes.¹⁸ For example, consider the consequences of staying home from work to care for a sick child. Individuals in higher-paying jobs are likely to have paid sick or vacation days they can use if they don't have anyone else to care for their child. And, increasingly, they are able to simply work at home. In contrast, a parent in a low-paying job who stays home to care for a sick child will at best lose a full day's pay and at worst, may get fired for taking the day off.

This research on scarcity is important for a number of reasons, but an especially important one is that it suggests that bandwidth is not permanently compromised by poverty. On a day-to-day basis, poverty imposes a “bandwidth tax” that comes from the cognitive demands required to make ends meet, but when income rises, so, too, does cognitive capacity. In addition, public benefit application processes themselves can consume considerable bandwidth – and if those processes can be simplified, that should also free up cognitive resources that individuals can draw upon for other tasks such as parenting and achieving short and long-term goals related to employment and career advancement. To the extent that an individuals' executive function skills were compromised because of early stressful events, they may experience executive function deficits that remain even when the “bandwidth tax” is removed. Thus, the combination of early and current influences on individuals' cognitive capacity suggest that both strategies that help to reduce the “bandwidth tax” and strategies that help to build or accommodate executive function deficits and bolster executive function strengths may be necessary to produce the best long-term outcomes for disadvantaged adults and their children.

¹⁷ Anandi Mani, Sendhil Mullainathan, Eldar Shafir and Jiaying Zhao. “Poverty Impedes Cognitive Function.” *Science*, Volume 341, August 30, 2013.

¹⁸ Bertrand, Marianne, Sendhil Mullainathan, and Eldar Shafir. “Behavioral Economics and Marketing in Aid of Decision Making Among the Poor.” *American Marketing Association*, Volume 25 (1), Spring 2006.

Developing Executive-Function Informed Human Service Programs

What we know about executive function skills and the important role they play in adult success suggests that it is worth considering how we can use this information to produce better long-term outcomes for low-income families – and especially for the children that live in these families. The available information suggests that adults who grew up in poverty or were exposed to multiple stressful life events may have weaker executive function skills than adults that did not grow up in poverty or otherwise stressful environments. In addition, even if currently poor adults did not grow up poor or were not exposed to significant stress during childhood, it is quite likely that their executive function skills may be weakened *because* of the very fact that they are currently living in poverty.

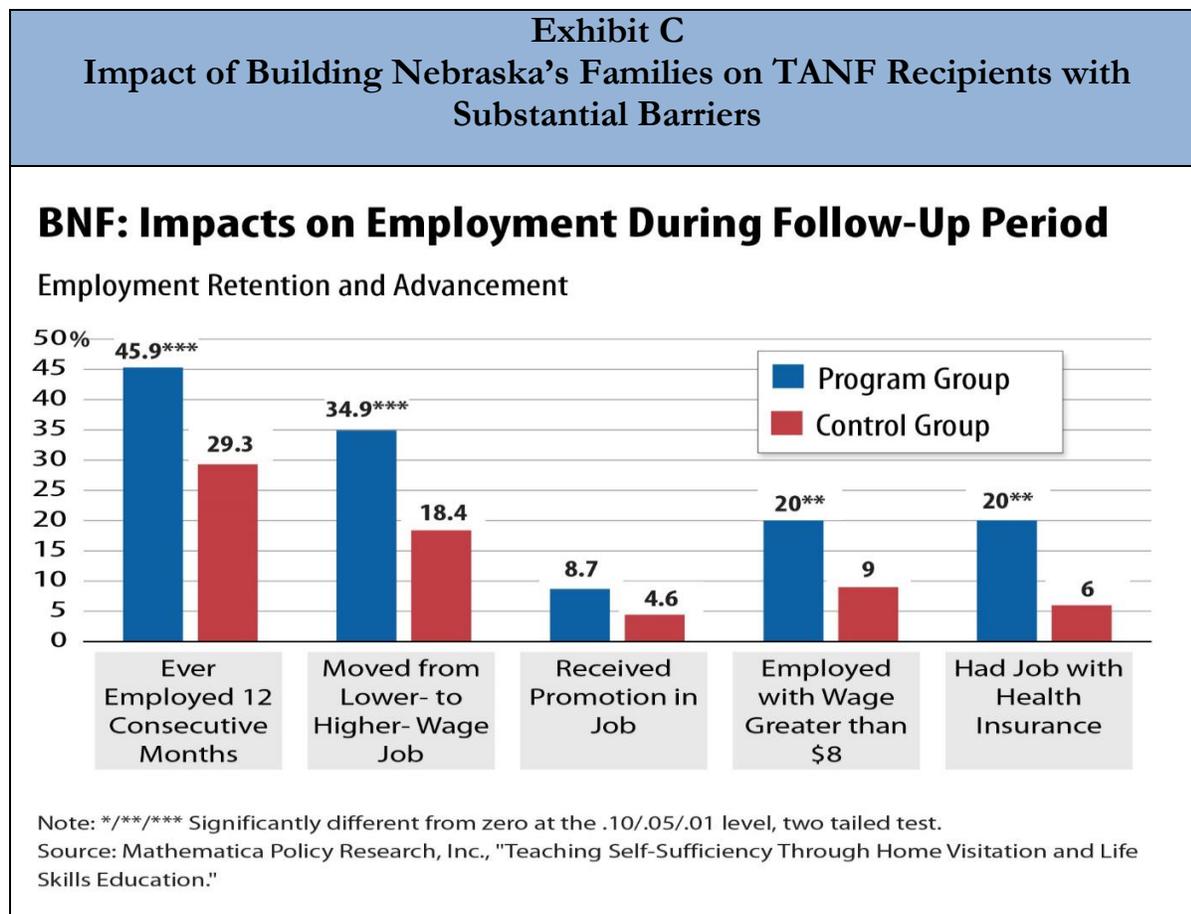
Redesigning Human Service Programs Using Executive Function Principles

There is considerable evidence that executive function skills can be improved in children and there is growing evidence that it is also possible to “remove the brakes” on adult plasticity and improve executive function skills in adults, as well. Thus, it may be possible to redesign workforce, parenting and other social service programs targeted to adults to improve their executive function skills or to take into account potential executive function weaknesses. Coaching individuals to achieve personal goals, creating opportunities for individuals to practice executive function skills, providing incentives and helping adults to develop positive peer groups are all strategies that potentially could help adults to improve their executive function skills. When it is not feasible to redesign programs to improve executive function skills, it is possible that programs could achieve much greater impacts by taking into account potential executive function skill deficits and putting into place accommodations or strategies that can mitigate the impact of weak executive functioning skills.

The use of Executive Function principles in designing and delivering services is in its infancy, but some of these early efforts suggest that these principles may have the potential to greatly improve the return on the investments we are already making in social service, mental health and employment programs. I present these three examples below.

Building Nebraska Families. The Building Nebraska Families (BNF) project -- a program that worked with Temporary Assistance for Needy Families (TANF) recipients in their homes in rural Nebraska to increase their life skills and job readiness-- provides strong evidence that executive function principles may help to significantly improve employment stability for families facing multiple personal and family challenges.¹⁹ Unlike other home visiting projects that are primarily focused on improving health and developmental outcomes for children, this program was focused on improving employment outcomes for parents. Even though the program did not provide employment services directly, it achieved some of the biggest impacts on employment stability we have ever seen for families facing multiple personal and family challenges. (See Exhibit C.)

¹⁹ Alicia Meckstroth, Andrew Burwick, Quinn Moore and Michael Ponza. “Teaching Self-Sufficiency Through Home Visitation and Life Skills Education.” *Trends in Family Programs and Policy, Issue Brief #3*. Princeton, NJ: Mathematica Policy Research, 2009.



The program was evaluated using a random assignment design, providing confidence that the improvements in individuals' employment outcomes were due to the program. The program group saw significant increases in employment that lasted for at least 12 consecutive months, movement from a lower- to higher-wage job and employment in a job that provided health insurance. In the final six months of the 30-month follow-up period, participants also had significantly higher earnings and were significantly less likely to report health-related hardships, including poor physical health, self-reported depression, and domestic abuse than those not randomly assigned to participate in the program. The program was not cheap, costing an average of about \$8,300 for individuals facing multiple personal and family challenges. However, the researchers studying the program estimated that if the program was targeted to individuals with the most limited employment prospects and if the employment impacts observed in the last six months of the follow-up persisted for 1.7 years, the benefits to society would outweigh the costs.

There are several features of the program that are consistent with executive function principles that the researchers and program operators believe contributed to its success. First, the program focused on helping families to identify and achieve individual goals in a variety of domains, including such diverse areas as time management, parenting, financial management, coping skills, building self-esteem, and anger and conflict management. Second, the program was designed and delivered as an educational curriculum – it was designed to teach skills that participants could then practice in their daily lives. Third, the program was individualized – the curriculum was flexible and could be

delivered in any sequence. Fourth, staff were highly skilled and saw their role as helping participants to achieve their goals.

Unfortunately, the program ended shortly after TANF rules changed, narrowing the employment activities that could count towards helping that state meet its TANF work participation rate and the program has never been replicated.

Mobility Mentoring created by the Crittenton Women’s Union (CWU) in Boston is a program that is leading the way in using executive function and related principles to dramatically change the way we deliver employment and related services to disadvantaged families.²⁰ At the heart of their program is a goal-setting framework they refer to as “The Bridge to Self-Sufficiency.” This framework includes five pillars: (1) family stability; (2) well-being; (3) education and training; (4) financial management; and (5) employment and career management, with a scaffold for each one. The “Bridge” is used to help participants assess their current circumstances and to set goals for the future. Staff employ coaching techniques to help individuals achieve their goals and they provide incentives when participants reach specified milestones. They also encourage the development of social networks that participants can carry with them beyond their time in the program.

The program has used the Bridge in a variety of different settings, from a drop-in short-term community-based drop-in employment program to an intermediate transitional housing program to a long-term, five-year intensive program for public housing residents who are aiming to move into jobs that pay enough for them to cover the cost of market rate housing as well as all of their other expenses.

When they have sufficient time, their goal is to employ techniques that will help participants to strengthen their executive function skills. When that is not possible, they have focused on designing their program to mitigate and accommodate executive function weaknesses and to rely more on participants’ executive function strengths. For example, to ease program access and increase participant retention, CWU has located its programs in neighborhood settings, such as public housing, or in community settings where individuals already receive services. They also use the Bridge to provide services holistically, ensuring that participants are not being asked to do multiple things that compete with one another. Similarly, the program has created “rules and tools” that are provided to participants in writing and are regularly discussed. In order to foster follow through and the development of personal efficacy, participants are engaged from the very beginning in a process of clarifying and stating their own needs, goals, and preferred pathways for achieving their goals.

The New Haven MOMS Partnership is a relatively new endeavor being undertaken by nine public and private organizations in New Haven, Connecticut. The MOMS Partnership is focused on combatting depression, reducing stress, and building foundational skills that the project hopes will lead to success in multiple dimensions of the participants’ lives, including mental health, parenting and employment. The project has surveyed over 1,000 mothers and has used the information they’ve gathered to design their services and approaches to service delivery. An early indicator of the project’s promise is their success in achieving high levels of participation in one of the key program components – an 8-week cognitive behavioral therapy intervention which the program presents to mothers as a stress reduction program. While the standard for adherence to

²⁰ Elisabeth D. Babcock. *Using Brain Science to Design New Pathways Out of Poverty*. Boston, MA: Crittenton Women’s Union, 2014.

mental health protocols is usually about 35 percent, the MOMS Partnership has achieved an adherence rate of between 96 and 97 percent.²¹

Executive function and related principles, which the MOMS Partnership has explicitly considered in the design and delivery of their program, are evident throughout their program. The MOMS Partnership chose to initially focus on delivering a mental health intervention to address the high rates of depression among the mothers they interviewed. Depression impacts many aspects of mothers' lives, including their ability to parent effectively, find and maintain employment and ensure their kids are ready to succeed in school.²² Research shows impaired executive functions among individuals who are clinically depressed, but it is not known whether depression causes weakness in executive function skills or executive function skill deficits may trigger depression. The program chose to implement a cognitive behavioral therapy intervention, both because it is evidence-based and because it aims to help individuals set and achieve goals, build problem-solving skills and learn stress reduction techniques that they can use throughout their lives. The program refers to their cognitive behavioral therapy program as a stress reduction intervention to reduce the stigma attached to receiving mental health treatment.

In an effort to maximize their reach and effectiveness, the MOMS Partnership delivers its services in non-traditional ways. First, they deliver services in places where MOMS conduct their daily activities – in laundromats, banks, neighborhood parks and in the public housing projects where they live. They currently are in the process of building a mental health and workforce center in the neighborhood grocery store. Second, they hired moms from the neighborhood to work as community mental health ambassadors. In their view, these staff bring a unique understanding of the experience, language and culture of mothers in the neighborhood, making it possible for them to conduct culturally appropriate mental health care and outreach. They are the staff that the program participants interact with on a day-to-day basis and they co-lead the cognitive behavioral therapy group with a mental health clinician. Third, they provide incentives to participants at the point of participation. Participants receive a \$20 gift card at the end of each cognitive behavioral therapy session and can earn other incentives when they complete special challenges. They also provide diapers and personal hygiene items as incentives. Fourth, they have developed a cellphone application, known as the MOMBA app, to promote healthy behaviors and encourage positive social interactions after the structured 8-week cognitive behavioral therapy intervention ends.

Increasing family income

Much of what we know about the development of executive functions suggests that one way to maximize individuals' ability to develop strong executive function skills and maximize their use is by increasing family income. In the short-term, additional income should reduce the "bandwidth tax" that poverty imposes on individuals. In the long-term, additional income could increase the likelihood that parents are able to create home environments that support the development of stronger executive function skills in children that will carry over into adulthood. Two potential

²¹ Megan Smith, (2014). "The New Haven MOMS Partnership: Combatting Depression, Reducing Stress and Building Foundational Skills for Success." Webinar presented for the Center on Budget and Policy Priorities, January 30, 2014.

²² Research shows that mothers who are depressed are less likely to engage in positive parenting and preventative child health practices. In addition, parental depression is linked to children's lack of school readiness and early school success, impairments in cognitive and motor function and increased risk for mental illness. Individuals of working age with mental health issues also have an extremely high 'want to work rate' but even among individuals with relatively common mental health issues such as depression, only about half are employed.

options for increasing family income that are gaining support include: (1) providing subsidized jobs (where the government pays an individual's wages) for individuals who are unable to find unsubsidized employment on their own and (2) increasing the minimum wage. While it may be an uphill climb to enact federal policies in these two areas, there may be more possibilities at the state level. Thirteen states increased their minimum wage at the beginning of 2014. Several states, including California, Connecticut, Minnesota, and Nebraska all have recently started new statewide subsidized jobs programs or are expanding existing programs.

Reduce the burdens associated with applying for public benefits

Applying for public benefits is all too often an extremely onerous process. Multiple trips to out-of-the-way offices, long wait times, and seemingly endless requests for the same information all impose a significant burden on applicants. Simplifying these processes could free up cognitive resources that could then be available for other tasks. In addition, a number of public benefits, especially food, housing and child care assistance act much like cash so may have the same positive benefits in the short and long-term as increasing families' incomes. This is an area where technology improvements have started to play a very significant role. Two recent examples highlight the possibilities. The "express lane eligibility" provisions in the Children's Health Insurance Program (CHIP) Reauthorization Act of 2009 allowed states for the first time to use information from another public agency to determine that a child is eligible for Medicaid or CHIP – even if other programs calculate income differently. This means that if a state has information collected for eligibility for other benefits such as the Supplemental Nutrition Assistance program (SNAP), the state can use that information to determine eligibility for Medicaid or CHIP, saving the family and the agency time and money. With the advent of the Affordable Care Act and expanded Medicaid options for disadvantaged adults, states can request permission to use SNAP data to automatically enroll SNAP recipients in Medicaid – as long as recipients agree they want to enroll in Medicaid. This strategy has allowed states to enroll tens of thousands of adults in Medicaid without imposing a huge burden on either those applying or the state agency that determines eligibility. For example, West Virginia estimates that this strategy has reduced its uninsured population by 25 percent; by mid-November 2013, they had automatically enrolled 65,000 adults in Medicaid.

Conclusion

Over the last several decades, there have been a plethora of rigorous studies of programs designed to improve the life circumstances of disadvantaged adults – especially single mothers, for whom employment often is their only potential source of income. The majority of these evaluations show no or modest impacts on participants' outcomes. This means there is significant room for improvement in our current approaches to helping disadvantaged adults. This also means that there is little risk to considering new ways of designing and delivering these programs. What we have learned from brain science provides a starting point for beginning to think about new ways of designing and delivering services. The case for doing so is compelling. We are in a political and fiscal environment where we are unlikely to see significant new investments in safety net programs. Thus, it is important that we look for ways to improve the return on the investments we have already made.

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