



## The Developing Brain:

### IMPLICATIONS FOR YOUTH PROGRAMS



#### OVERVIEW

The brain, with more than 100 billion neurons, is our body's most complex organ. There is increasing global attention to the growing field of brain research, but what are we learning today that may inform programs that serve children? How do environment and life experiences impact brain development? What can be done to mitigate the negative effects of trauma on the brain? As our knowledge of the brain grows, so too does the opportunity to use this information to actively shape programs, practices, and policies that promote the well-being of children and youth.

To contribute to the dissemination of new brain research as it applies to those serving children and youth, Child Trends invited Jane Roskams, Ph.D., a leading neuroscientist and executive director of strategy and alliances at the Allen Institute for Brain Science, to speak. Dr. Roskams is a long-standing researcher in the field of brain repair and epigenetics. She revealed new developments in our understanding of how the brain grows and learns, and how it adapts to its environment and trauma. Following her presentation, Dr. Kristin Moore, Child Trends' senior scholar and past president, moderated a discussion on the practical implications of shifting views on brain development and resiliency. The discussion aimed to inform programs and policies that affect young people, particularly at-risk children. It featured two repondents: Daniel Cardinali, President of Communities In Schools, the nation's largest drop-out prevention program; and Dianna Walters of the Jim Casey Youth Opportunities Initiative. This research brief summarizes their presentations.

#### KEY FINDINGS AND IMPLICATIONS

**Outdated notions about the brain are being updated by new scientific knowledge.**

##### Brain development

- *Outdated notion:* Brains develop largely during the first few years of life, without much change in later years.
- *What we now know:* Brains evolve over time. Some very specific abilities must develop within what we currently believe are strict windows of

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opportunity, but most are turning out to be more flexible than previously thought. In fact, brains are constantly developing and changing, even into old age, and “time windows” are different among different individuals.

### Brains and trauma

- *Outdated notion:* Brain development and functioning can only be disrupted by physical trauma.
- *What we now know:* Physical trauma is disruptive, but emotional trauma and stress can also disrupt brain development. Some brain pathways are more vulnerable to the effects of stress than others, and this changes with age.

### Brains and recovery/repair

- *Outdated notion:* Once disruption occurs, the brain has a very limited capacity to recover, and that capacity is mainly restricted to early childhood.
- *What we now know:* While things like age, sex, and prior experience can influence how well the brain recovers from trauma, all individuals at all ages can adapt or improve given appropriate immediate and long-term interventions.

### Brains and genetics

- *Outdated notion:* The role your DNA plays in brain development and functioning is set in stone.
- *What we now know:* The way DNA influences brain development and functioning is influenced by life experiences and can change over time – in every single cell in your brain

## DISCUSSION AND IMPLICATIONS

Dr. Roskams highlighted the practical implications of brain research for those working to improve outcomes for children and youth, particularly for youth who have been exposed to trauma. Her key points included:

**While early childhood is an opportune time for intervening to enhance brain functioning, it is important to identify and implement effective interventions at all stages of life.** Dr.

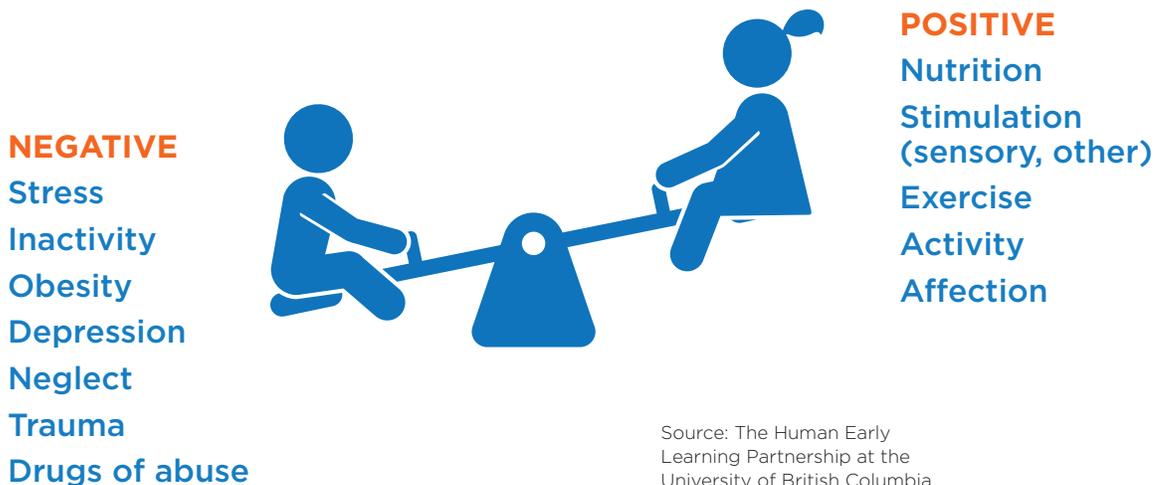
Roskams noted that one of the more exciting discoveries in recent years is that brain plasticity, or adaptability, is not restricted to childhood. In fact, our brains are capable of growing new neurons at all stages of life, something that most people thought impossible only a few years ago. Scientists have also debunked the myth that our brains are developed almost exclusively in the first few years of life, leaving little hope of success for interventions that target older youth and even less for adults. There are certain very specific abilities with defined windows of opportunity that are largely set in the first five years (especially related to the senses), but most windows of opportunity are more flexible than has been thought. Higher order cognitive functioning, for example, is still developing well into early adulthood.

**Programs and policies should seek to provide children and youth with experiences that stimulate brain growth, paying attention to the most relevant targets for each age group.** In

order to highlight the connections between the environment and brain functioning, Dr. Roskams explained that it can be helpful to think of the brain as a community. Fundamental structures such as the home, school, and grocery store are built first, and pathways are then established to connect those structures. Those pathways can grow as the structures are used more. Additional “specialty structures” – such as the parts of the brain used for complex thinking (analogous to the transport facilities, gathering places, hospitals, and workplaces that bring together a community) – appear to support this, and become more integrated over time. The more these pathways are used, the stronger and more efficient these connections become. Similarly, pathways that are used sporadically or not at all result in less-efficient connections, similar to an unused trail in the woods that becomes overgrown and potentially impassable.

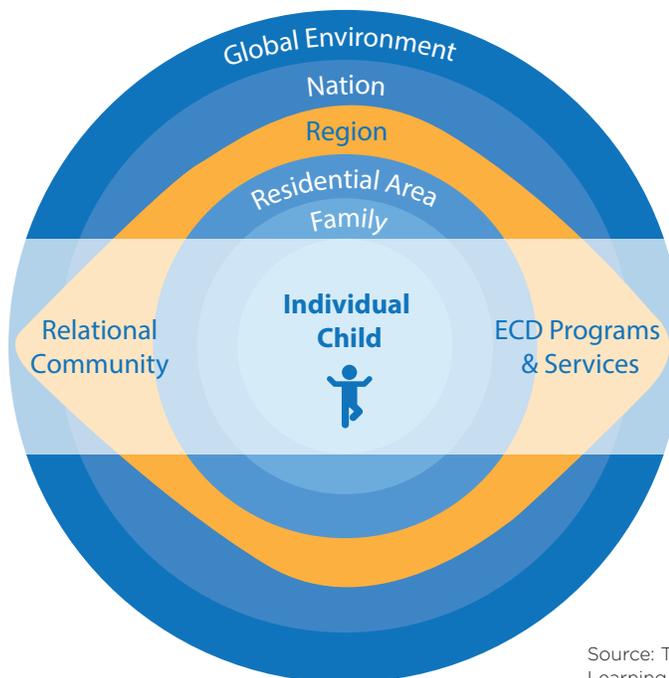
**Policies and programs can promote enhanced brain functioning by working to improve the physical and emotional environments that influence brain development.** Similar to the way communities develop institutions based on the needs of a changing population, brain development is strongly influenced by an individual's life experiences. Dr. Roskams emphasized that life experiences not only affect which structures are developed best in the brain, but how well the brain functions. Brain functioning, similar to other abilities, exists on a spectrum. Where an individual falls on the spectrum can change over time. She explained that brain plasticity – the brain's ability to change and remodel itself – can be influenced by the balance of the physical, emotional, and cognitive environment that an individual experiences. Supportive environments can enhance development and functioning, while unsupportive environments can diminish potential growth – just like neglecting a plant for a long time can reduce its capacity to recover later, but not destroy its potential to do that.

**Individuals working with children and youth must understand how trauma influences brain functioning so that appropriate immediate and long-term interventions can be provided.** Dr. Roskams emphasized that life experiences can change how cells in our bodies access our genetic information. This is often referred to as epigenetics. This new understanding of brain functioning has dramatically altered how scientists think about the brain's potential for damage and recovery, particularly related to trauma. While DNA does not change, the way that it is packaged can and does change based on experiences. When DNA is packaged tightly, it is more difficult for a cell to access that genetic information. Dr. Roskams stressed that both negative and positive experiences can be triggers that change how DNA is packaged, and consequently how genetic information is used. Policies and programs should seek to promote positive experiences and decrease exposure to negative experiences throughout childhood and adolescence: it is almost never too late to promote positive development and enhance brain functioning!



**Programs and policies should consider numerous spheres of influence when thinking about ways to intervene to promote positive development and enhance brain functioning.** Dr. Roskams stressed that how an individual develops, from early childhood on, is influenced by multiple spheres. Promoting positive family functioning; creating safe communities with accessible resources related to health and education; fostering supportive relationships at home, school, and community; and implementing programs to help fill the gaps that are not

met at home are critical to helping a child develop his or her full potential. She emphasized that developing a set of coordinated programs and policies is essential to providing opportunities for all children and youth, noting that these would reflect a society that believes it can impact its most vulnerable individuals and do so at each stage of life. “Hope,” she said, “is the belief that you have the power to do something to impact the lives of children at all ages, from all ethnicities, and in all regions of the world.”



Source: The Human Early Learning Partnership at the University of British Columbia

## **BRAIN SCIENCE AND POSITIVE YOUTH DEVELOPMENT: TRANSLATING RESEARCH INTO PRACTICE**

Daniel Cardinali and Dianna Walters responded to Dr. Roskam’s presentation, in order to highlight the importance of incorporating brain research into policies and programs that affect children and youth. Their experiences emphasized the many connections between brain science and positive youth development.

Ms. Walters highlighted the ways many of the messages that the Jim Casey Youth Opportunities Initiative has been promoting among child welfare agencies align with brain research. They are working to help child welfare agencies put positive youth development and brain science principles into practice. Ms. Walters emphasized that:

- Child welfare agencies must help youth develop relational skills in order to become interdependent, rather than merely focusing on helping youth become independent.
- It is imperative to provide young people exiting foster care with opportunities to engage in their own case plans and take responsibility for themselves.
- Child welfare agencies must shift their thinking away from viewing youth as damaged for life. With appropriate supports and relationships, youth can be resilient.
- Youth need opportunities in multiple areas, including athletics, the arts, and relationships, rather than a sole focus on economic, educational, and self-sufficiency outcomes.

### Examples of child welfare policies that promote healthy brains and positive youth development

- Realizing the importance of maintaining supportive relationships and providing a support environment for youth aging out of foster care, **Maine** has extended support to age 27 for youth attending college or some other postsecondary institution.
- **Indiana** has reduced the number of foster care providers so they can more easily ensure that each agency's policies and practices support positive growth and development.
- In line with a positive youth development approach, **Tennessee** ensures that youth in foster care are receiving the positive supports necessary to support brain development during adolescence, by engaging youth in developing training materials. This is meant to ensure that case workers understand what older youth need to be prepared to be successful.
- **Iowa** has begun administering surveys to youth in foster care to ask whether they have been meaningfully engaged in their case planning and whether they feel they are achieving the outcomes that they want.
- The federal **Strengthening Families Act's** reasonable and prudent parent standard allows foster parents to make normal parenting decisions for their foster children, so these children can engage in developmentally appropriate activities like sleepovers and joining sports teams, without having to consult their case worker.

Mr. Cardinali echoed the importance of incorporating brain science into program and policy decisions, but he also cautioned against getting in front of what we are learning, noting that moving too quickly to change practices and policies can lead to the development of interventions that are here today and gone tomorrow, redirecting money and effort away from interventions that are proven to improve outcomes for vulnerable youth. At the same time, he emphasized that there is sufficient evidence to call for changes in the way that programs for vulnerable youth operate, particularly school-based programs. He noted the following points:

- The experiences that youth have at home, in their schools, and in their communities are important and can facilitate or frustrate potential. In particular, opportunities to make a difference for adolescents are often overlooked and underfunded.
- Education should be student-centric. Schools should develop individualized plans for students based on their unique strengths and weaknesses. This approach provides each student with a set of academic and non-academic supports that match their unique characteristics and needs.
- Funding silos should be broken down so that resources can be distributed in a way that ensures children experience a consistently supportive environment over time.

### Relationships: A critical ingredient

Mr. Cardinal and Ms. Walters both emphasized the important role supportive relationships play in developing environments that promote positive growth, and also in buffering young people from the damaging effects of trauma. Dr. Roskams illustrated the critical role of relationships by recounting the story of a young boy from Africa who had grown up in an orphanage environment that lacked many physical resources such as adequate food and parental nurturing, but provided abundant opportunities to develop supportive relationships with older peers. She explained that at the age of three he was adopted and brought to an environment that was rich in both physical and social resources. While he was the size of a child half his age at three, she emphasized that he was very social and, after a few years of adequate nutrition, love, and continued social support, he hit the average size for his age, performed exceptionally well in sports, and was at grade level in academics. Dr. Roskams noted that from birth to age three, caring relationships with peers and part-time caregivers supported his brain development even in the face of physical deprivation with no family.

## SUMMARY

Great strides have been made in recent years to better understand how the brain works, and as Dr. Moore pointed out at the close of the lecture, the message is one of promise and hope. While it remains true that intervening early in life is the most effective way to promote optimal brain development, improved functioning can be achieved across the lifespan. No young person is a lost cause. New brain research also reinforces what many individuals working to improve the lives of children and youth and have long known: children are products of their environments. In fact, their bodies, brains, and even their DNA are affected by what they experience.

There is still much more to be discovered. To provide the most appropriate intervention for each person, we need to better understand the ways the environment and experience merge with genetics to impact how our brain responds to challenges. The hope and promise that new brain research represents must also create new urgency for ensuring that policies, programs, and funding are aligned. They should work together to ensure that all young people have access to the physical, cognitive, emotional, and social resources necessary to build healthy brains and bodies. To learn more, please visit Child Trends' website and listen to the lecture in its entirety: <http://www.childtrends.org/our-research/the-kristin-anderson-moore-lecture-series/>.

**See the Kristin Anderson Moore Lecture Series, including these presentations, on Child Trends's website at** <http://www.childtrends.org/our-research/the-kristin-anderson-moore-lecture-series/>.

**Child Trends** is a nonprofit, nonpartisan research center that provides valuable information and insights on the well-being of children and youth. For more than 35 years, policymakers, funders, educators and service providers in the U.S. and around the world have relied on our data and analyses to improve policies and programs serving children and youth. Our team of experts brings together a range of educational, work, policy and cultural experiences to provide cutting-edge research on issues affecting children from birth to early adulthood. Our work is supported by foundations; federal, state and local government agencies; and nonprofit organizations. <http://www.childtrends.org/>

**Allen Institute for Brain Science** is a nonprofit medical research organization dedicated to accelerating the understanding of how the human brain works. The Allen Institute promotes the advancement of brain research by providing free data and tools to scientists worldwide with the aim of catalyzing discovery in disparate research programs and disease areas. <http://alleninstitute.org/>

**Jim Casey Youth Opportunities Initiative** works to ensure that young people — primarily those between ages 14 and 25 — make successful transitions from foster care to adulthood. The foundation works nationally, in states, and locally to improve policies and practices, promote youth engagement, apply evaluation and research, and create community partnerships. Their work creates opportunities for young people to achieve positive outcomes in permanence, education, employment, housing, health, financial capability, and social capital. <http://www.jimcaseyyouth.org/>

**Communities In Schools** is the nation's largest drop-out prevention program and has been in existence for nearly 35 years. Communities In Schools is a nationwide network of passionate professionals working in public schools to surround students with a community of support, empowering them to stay in school and achieve in life. The network currently consists of 2,200 sites in 375 school districts across the country, serving more than 1.3 million students annually. <http://www.communitiesinschools.org/>