

THE IMPACT OF EARLY CHILD DEVELOPMENT AND EXPERIENCE ON LATER OUTCOMES

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OUTLINE

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CHILD DEVELOPMENT

What do we know about the development of young children's brains?

- ***The brain governs all our functioning, not just our cognitive processes.***
Brain development is important for all aspects of development - physical, social, emotional and cognitive. Therefore, healthy brain development is a prerequisite for our future physical and mental health, our social relationships, and our functional 'real life' skills, as well as our learning and academic achievements
- ***Most of the cerebral neurons we ever have develop during pregnancy - this growth starts at three weeks and is largely completed by 18-20 weeks.*** The human brain has approximately 100 billion neurons – these are produced at an average rate of over half a million per minute during the first four months of gestation. Unlike other tissues in the body, cerebral neurons do not divide any further once they are formed, which is why brain damage is so devastating – since new neurons cannot be grown, we are dependent upon other parts of the brain taking over the functions of the damaged areas
- ***Children's brains are not mature at birth - although neuronal growth is completed during pregnancy, most synaptic growth occurs after birth.***
Synapse formation is a much more protracted slower process than neuron formation, commencing during pregnancy and continuing until well into the second year after birth. At its peak, around 15,000 synapses are produced on every neuron in the cortex – which means they are being created at an average rate of 1.8 million new synapses per second between two months of gestation and

two years after birth. The cerebral cortex triples in thickness during the first year of life.

- **Brain development involves a process of synaptic 'pruning'** - the connections compete with one another, and the least useful die off. The reason why neurological development is not completely genetically determined is to allow the baby scope to learn: babies' brains are 'learning machines' - they build themselves, or adapt, to the environment at hand.
- **Brain development also involves the progressive integration of different parts of brain.** Most tasks involve collaboration between different areas of the brain, such as our cognitive and emotional systems. For this to happen, they need to communicate effectively with one another.
- **Early exposure to toxic substances damages brain architecture.** The immature brain is far more vulnerable to toxic exposures than that of an adult. Mature brains have a barrier of cells that restrict the entry of chemicals from the bloodstream into brain tissue, but that protective barrier is absent in the fetus and only reaches maturity in the first year after birth. Thus, the time of greatest brain growth and most intensive construction of brain architecture is also the period that is most vulnerable to the relatively free passage of toxins into its cells.

What are the key features of early child development?

- **Genes and experience interact to shape the architecture of the developing brain.** Genes always have their effect in interaction with the environment - even if attributes are heritable, they can develop very differently in different environments. Different stages of development (eg. prenatal neurological development) are more biologically determined than others (eg. postnatal neurological development).
- **Children affect their environment as well as being affected by it, therefore playing an active part in their own development.** The child plays a part in shaping the experiences to which the child's mind must adapt. Through their behaviour and characteristics, they selectively reinforce (and thereby alter) the behaviour of their caregivers towards them. In this way, behaviour itself alters genetic expression, which then creates behaviour.
- **Young children develop through their relationships with others.** Early development is determined by the quality of their attachment experiences. Attachment is an inborn biological instinct that motivates an infant to seek closeness to caregivers and to establish communication with them. Attachment involves a relationship with a caregiver in which the immature brain uses the mature functions of the mature brain to organise its own processes. It is based on collaborative communication: secure attachment results when the caregiver consistently perceives and responds to the child's mental states. Attachment relationships form the foundation for the development of the mind and the brain: human connections create neuronal connections.

- ***Relationships shape development and behaviour through neurobiological connections – our brains ‘talk’ to one another.*** Later development continues to be determined by the nature of relationships – the brain can be reprogrammed through positive relationships. These programming and reprogramming processes involves two complementary aspects of brain functioning: *hormonal and neurochemical reactions* and *mirror neurons*.

Hormonal / neurochemical reactions are involved in all aspects of brain development and functioning. When we are babies, the positive looks and smiles we see in our parents trigger the release of pleasurable neurochemicals (opiates) that actually help the brain to grow. *Mirror neurons* are found in various parts of the brain and function to link motor action to perception: they fire if you watch someone else doing something intentionally, and will also fire if you do the same action. Mirror neurons enable the brain to detect the intention of another person, that is, to ‘read’ other people’s minds and emotional states.

- ***Children's emotional development is built into the architecture of their brains.*** Emotional development begins early in life, is a critical aspect of the development of overall brain architecture, and has enormous consequences over the course of a lifetime. The foundations of social competence that are developed in the first five years are linked to emotional well-being and affect a child's later ability to functionally adapt in school and to form successful relationships throughout life.

‘There are many well-trodden pathways to misery. People may choose to eat too much or too little, drink too much alcohol, react to other people without thinking, fail to have empathy for others, fall ill, make unreasonable emotional demands, become depressed, attack others physically, and so on, largely because their capacity to manage their own feelings has been impaired by their poorly developed emotional systems.’ (Gerhardt, 2004)

The core features of emotional development (or ‘emotional intelligence’) are the ability to identify and understand one’s own feelings, to accurately read and comprehend emotional states in others, to manage strong emotions and their expression in a constructive manner, to regulate one’s own behaviour, to develop empathy for others, and to establish and sustain relationships.

- ***The growth of self-regulation is a cornerstone of early childhood development*** that cuts across all domains of development. It underpins the subsequent development of emotional and social competences, as well as the mastery of academic tasks and general life skills.
- ***Early experiences can influence later health and developmental outcomes through a process of biological embedding.*** This is a process whereby experiences are programmed into the structure and functioning of biological and behavioral systems, and set the child on a developmental trajectory that becomes increasingly difficult to modify. Susceptibility to many adult diseases, including reproductive diseases and dysfunctions, is set in utero or neonatally as a result of the influences of nutrition and exposures to environmental stressors / toxicants

- **Excessive stress disrupts the architecture of the developing brain.** Toxic stress in early childhood is associated with persistent effects on the nervous system and stress hormone systems that can damage developing brain architecture and lead to lifelong problems in learning, behaviour, and both physical and mental health. Children whose relationships are insecure or disorganized have higher stress hormone levels which may alter the development of brain circuits and make them less capable of coping effectively with stress as they grow up.

A history of chronic and severe trauma in early childhood can result in alterations in fear-stress physiology and in brain development. Threat activates the brain's stress-response neurobiology, which then affects the development of the brain by altering the development and migration of neurons, the development of synaptic connections between neurons, and neurochemical differentiation. The result is children whose brains are smaller in volume, have larger lateral ventricles (ie. the fluid-filled cavities of the brain), and smaller areas of connection between the right and left sides of the brain (ie. the corpus callosum)

'Society reaps what it sows in the way it nurtures its children. Stress sculpts the brain to exhibit various antisocial, though adaptive, behaviours. Whether it comes in the form of physical, emotional or sexual trauma or through exposure to warfare, famine or pestilence, stress can set off a ripple of hormonal changes that permanently wire a child's brain to cope with a malevolent world. Through this chain of events, violence and abuse pass from generation to generation as well as from one society to the next.' (Teicher, 2002)

- **Brains are built over time.** Both brain architecture and developing abilities are built 'from the bottom up' Simple neurological circuits and skills providing the scaffolding for more advanced circuits and skills over time. Through this process, early experiences create a foundation for lifelong learning, behavior, and both physical and mental health. A strong foundation in the early years increases the probability of positive outcomes and a weak foundation increases the odds of later difficulties.

What do we know about children's developmental trajectories?

- **Human development is shaped by the ongoing interplay among sources of vulnerability or risk and sources of resilience or protection.** Exposure to adverse conditions does not inevitably lead to poor outcomes, but does significantly increase the risk. Children who are exposed to risk factors at an early age are more likely to experience problems in later life, while those exposed to protective factors are better equipped to deal with subsequent adverse experiences. The earlier in life risk factors occur and the longer they are sustained the greater the risk of poor outcomes
- **Development is 'weakly' determined – individual causal factors, whether genetic or environmental, rarely have a significant impact on development on their own.** No single risk factor makes a significant difference to children's development – it is the cumulative impact of multiple risk factors that does the

damage. Risk and protective factors are multiplicative rather than additive in their effects.

- ***Development is multiply determined, with both direct and indirect factors within and outside the child contributing to particular outcomes.*** Thus, many different risk or protective factors can lead to any particular developmental outcome, and particular risk or protective factors can lead to many different developmental outcomes.
- ***No single form of intervention makes a significant difference to child development or family functioning*** – it is the cumulative impact of a comprehensive range of interventions that leads to positive change. The earlier these are provided the better – the younger the child, the easier it is to make a difference, and the more cost effective the intervention
- ***Behaviour and functioning at any point in time are as strongly influenced by the immediate social and physical environment as by past experience.*** Early behaviour and functioning are predictive of later behaviour and functioning to the extent that children’s social and physical environments remain unchanged.

SCHOOL READINESS

What is school readiness?

- ***Readiness does not reside solely in the child, but applies to the environments in which children find themselves*** – their families, early childhood settings, schools, neighborhoods, and communities
- ***Readiness is a crucial construct that applies to all children***, prenatal to age five, not only those from disadvantaged backgrounds.
- ***Readiness includes multiple dimensions and does not only involve cognitive or academic skills.*** Readiness embraces five dimensions: physical and motor development; social and emotional development; approaches toward learning; language, literacy, and communication skills; and cognitive skills.
- ***Improving school readiness, therefore, must address children’s development of skills and behaviours as well as the environments in which they spend their time***

The School Readiness Indicators Initiative (Rhode Island KIDS COUNT, 2005) used a comprehensive view of school readiness as the foundation for its work and created the “Ready Child Equation” to describe the range of components that influence children’s ability to be ready for school.

READY CHILD EQUATION

Ready Families - children’s family context and home environment.

+ Ready Communities - the resources and supports available to families with young children.

+ **Ready Services** - the availability, quality and affordability of proven programs that influence child development and school readiness.

+ **Ready Schools** – the critical elements of schools that influence child development and school success.

= **Ready Children** - what children know and can do in each of the domains of child development including physical well-being and motor development, social and emotional development, approaches to learning, language development and literacy, and cognition and general knowledge.

Why is school readiness important?

- **Children enter school with marked differences in the cognitive, non-cognitive and social skills needed for success in the school environment**
Ability gaps in both cognitive and non-cognitive skills across individuals and across socioeconomic groups open up at early ages.
- **These differences are predictive of later academic and occupational success.** Children who enter school not yet ready to learn tend to do less well in school, are more likely to become teenage parents, to engage in criminal activities, and to have mental health problems. Ultimately, these children tend to have lower educational levels on leaving school and are more likely to have poor employment records in adulthood.
- **Skills develop cumulatively**, so that those acquired early form the basis for later skill development. This is a life-long process.
- **Children unwittingly contribute to their own developmental outcomes, in positive or negative ways:** the skills they possess on school entry contribute to a chain of effects that either reinforces and amplifies their initial skills and dispositions, or exacerbate initial difficulties and even produces new ones.
- **Academic skills at school entry can, in turn, be traced to capabilities seen during the preschool years and the experiences in and out of the home that foster their development.** Young children's home environment is strongly associated with their relative skills and abilities upon entry to school.
- **Participation in high quality early child care and education programs also contributes positively to children's development during the early years.** Children from disadvantaged backgrounds benefit particularly from high quality compensatory early education and care programs during these years.
- **School readiness is not restricted to cognitive development but is multidimensional**, involving physical, social, and emotional development as well as general approaches to learning.
- **School 'unreadiness' is expensive.** Failure to start school 'ready to learn' has substantial consequences and costs to society as well as to the child

- **Investments in the early years are cost effective, yielding long-term social and economic benefits.** Early investment in cognitive and noncognitive skills lowers the cost of later investment by making learning at later ages more efficient.
- **It becomes increasingly difficult and costly to change children's developmental trajectories as they get older,** and schools have increasing difficulty compensating for early cognitive and non-cognitive deficits as children grow.
- **Early investments in children must be followed up by later investments in order to be effective.** The nature and quality of the educational programs and environments provided to children in the early years of schooling help determine whether preschool-related gaps in academic skills at school entry are quickly eliminated or persist.

What can be done to improve children's readiness for school?

Before school commencement:

- **Provide children with high quality early educational experiences.** Early education for children, particularly those from disadvantaged backgrounds, can make a difference when those children reach school and beyond. Yet, a significant minority of children still lack ready access to early education. This is especially the case if their parents had negative experiences of schooling.
- **Help families provide learning resources and experiences for their young children.** Parent-training strategies that are targeted specifically to strengthen young children's pre-academic skills have shown good promise in terms of both early literacy and early mathematics skills.
- **Build strong links with families before, during and after transition.** It is particularly important to encourage families to maintain their contact and involvement as their children move from child care or preschool environments to school. No matter what their backgrounds are or how involved they are in their children's preschool or early care settings, parents' at-school involvement diminishes when their children start school. The consistency of this pattern suggests that schools must take the initiative to alter families' perceptions of the roles and levels of involvement expected of them.
- **Provide a variety of supports to help ease children's transition to school.** This should be built into teachers' roles. It is important to differentiate between orientation and true transition support programs.
- **Build strong links and relationships between schools and early childhood services** to ensure continuity of care and joint planning of transition support activities.
- **Collaborate with other services and programs** to ensure that the children and families receive all the help they need and that potential barriers to children's learning are addressed.

After school commencement:

- ***Provide a range of programs / educational strategies that are adapted to the varying needs and learning styles of the children entering school***, including programs for children having trouble adjusting (eg. nurture groups) or who have behavioural problems. Build school teachers' awareness of the long-term impacts of differences in children's pre-academic skills when they enter school.
- ***Create many opportunities for families to be involved in school activities and learn how to support their children's learning***. Families whose own experiences of schooling were not positive need to be particularly welcomed and engaged in activities that will help them to support their children's learning and engagement with the school community.
- ***Open the school up to greater involvement with and by the community***. This can take many forms, including use of school facilities by outside groups.
- ***Collaborate with other services and programs*** to ensure that the children and families receive all the help they need and that potential barriers to children's learning are addressed.

IMPLICATIONS AND CONCLUSIONS

- We need to build rich and supportive social environments for families with young children, to build a well-coordinated and easily accessible system of services for young children and their families, and to develop ways in which the service system is able to respond promptly and effectively to the emerging needs of young children and their families.
- We need to promote greater integration of primary and specialist support services, and ensure that there is an efficient and effective tiered system of universal, targeted and treatment services capable of meeting the needs of all children and families.
- We need to strengthen the links between early childhood services and schools to ensure that children and their families are provided with rich and responsive environments during the early childhood years and are well-supported during the all-important transition to school.
- We need to address all aspects of school readiness – ready families, ready services, ready communities and ready schools – to ensure that more children arrive at school ready and able to take advantage of the learning and social opportunities schools offer.
- We need to engage the whole of society in these endeavours: child development is a foundation for community development and economic development, as capable children become the foundation of a prosperous and sustainable society.

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