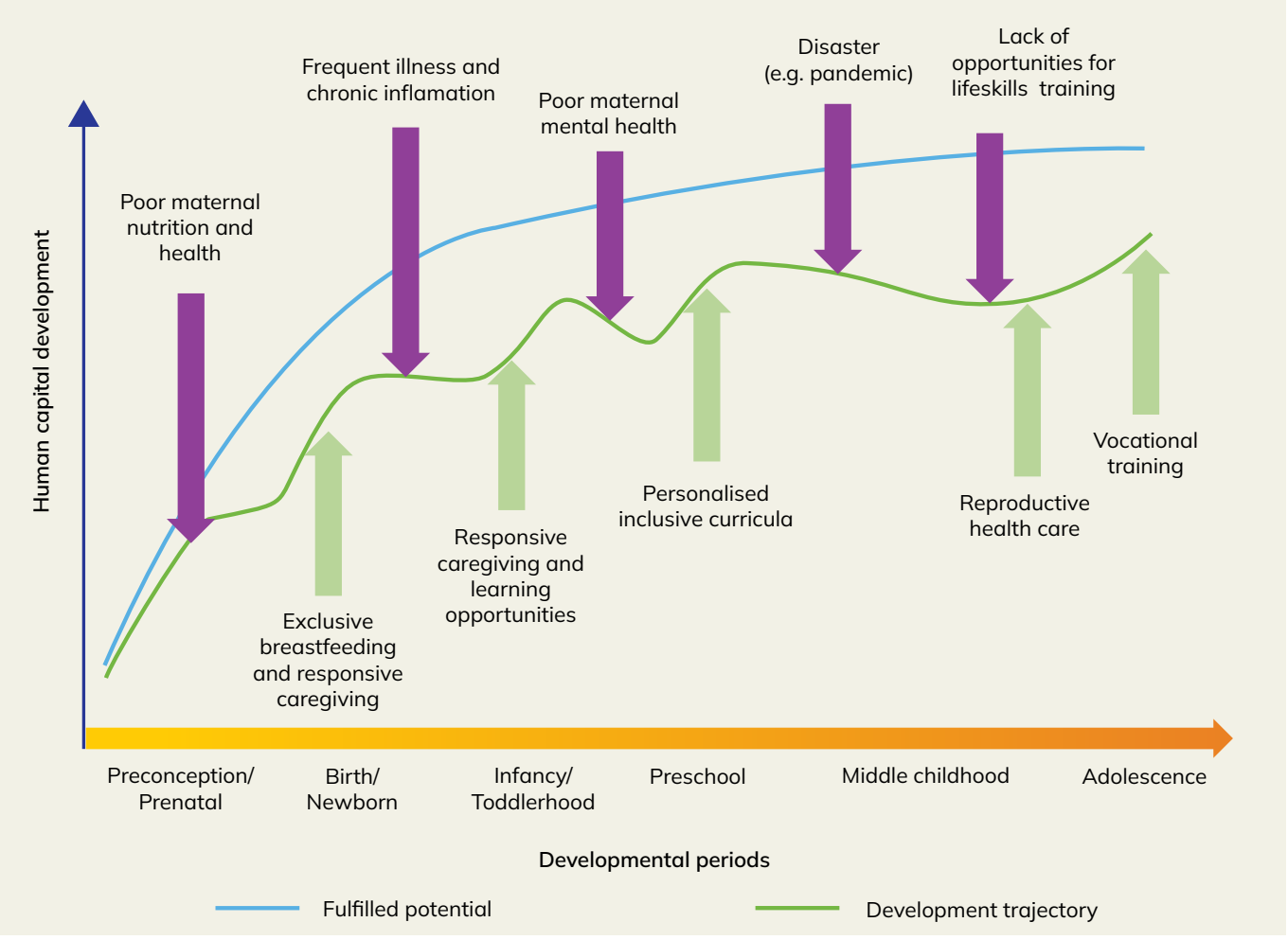
The science of early childhood development

Linda Richter,[i] Sara Naicker[ii] & Cathi Draper[iii]

The importance of early childhood is recognised historically in all cultures and, for more than a century, the development of young children has been systematically studied. While there is still much to learn, three fundamental principles are firmly established.

- The first principle is that human development is continuous across the life course. The separation of life stages, such as infancy; early, middle and late childhood; adolescence; young adulthood, mid-life and aging is somewhat arbitrary. Individuals pass through stages at different ages; stages are culturally specific and not always defined by age, but by social expectations and institutions, such as leaving education, starting work, becoming a parent and so on.
- The second principle is that development is progressive. Skills and capacities build on earlier skills and capacities – children walk before they run, babble before they say their first word, and reach for objects before they can pick them up. This is why early foundational skills are so important.

Figure 5: The effects of positive and negative experiences on developmental trajectories



Source: Black MM, Behrman JR, Daelmans B, Prado EL, Richter L, Tomlinson M, . . . Yoshikawa H. The principles of Nurturing Care promote human capital and mitigate adversities from preconception through adolescence. *BMJ Global Health.* 2021;6(4):e004436.

i Department of Science and Technology/National Research Foundation Centre of Excellence in Human Development, University of the Witwatersrand
ii Impact Centre, Human Sciences Research Council; Department of Science and Innovation/National Research Foundation Centre of Excellence in Human Development, University of the Witwatersrand
iii South African Medical Research Council/Wits Developmental Pathways for Health Research Unit, University of the Witwatersrand

- Third, our genetic and social potential is modified by our experiences, especially in the early years. For example, adverse experiences can undermine children's potential, while protective and stimulating conditions in early childhood can enhance outcomes across the life course, as shown in Figure 5 on the previous page. In all stages, the interplay of positive and negative forces can either promote or hinder development. In adverse environments, such as those experienced by the majority of young South African children, it is essential to maximise experiences that promote, protect and support their development, such as exclusive breastfeeding, responsive caregiving, safety and protection, healthy nutrition, and opportunities to learn at home and in preschool environments; in short, what is called Nurturing Care.[1]

What do we mean by human development?

The concept of human development is used in two senses which are related to one another. The first refers to the development of people and societies. From this perspective, human development is the capability of people to achieve the lives they value in addition to having rights or freedoms (that they may not be able to realise).[2] For example, some caregivers who have the right to receive a Child Support Grant may not be able to do so because they can't afford to travel to make the application, they don't understand the process, or they don't have all the required documents.

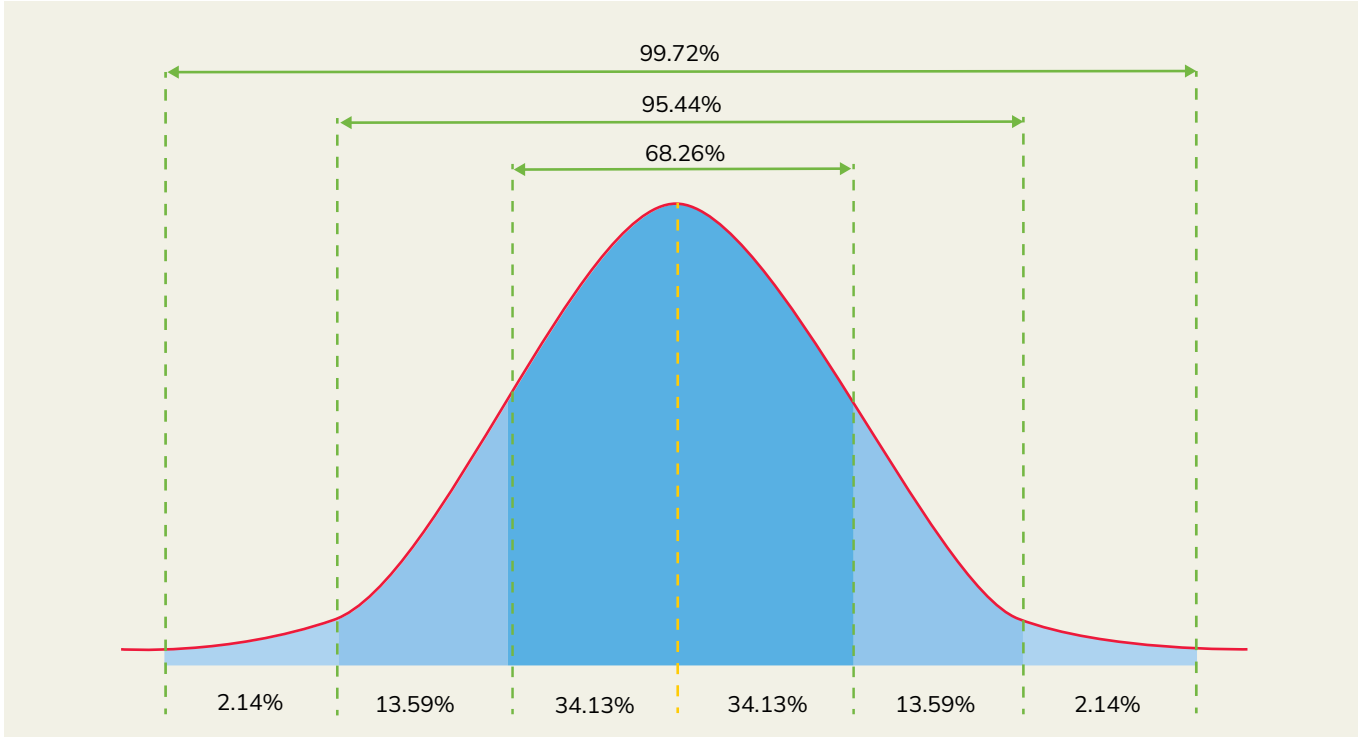
One measure of human development is the Human Development Index (HDI), based on life expectancy, education and gross national income per capita. Because this measure doesn't account for the impact of inequality on human development within countries, the index was adjusted in 2010 to reflect a more accurate measure of human development.[3] For example, in 2022 South Africa's HDI was 0.471, and we ranked 109 out of 156 countries because ours is such an unequal society.

The second conception of human development refers to the development of an individual, from conception to death. The two concepts are interdependent. For example, the development of a child in Norway is very different from that of a child in South Sudan because of differences in wealth, quality of health care and access to education between the two countries, among others. Investments in children's development in the form of health care, education and basic services, help to improve both individual human development and national human development.

How do young children's circumstances influence their growth and development?

In this chapter, we focus on different dimensions of individual human development in order to better understand how young children's circumstances influence their growth and development, the consequences this has for their lifelong health and development, and how the trajectories of young children growing up in difficult circumstances can be improved.

Figure 6: A normal distribution curve, with about 70% of people in the "average" range



From evolution to the individual

Like all living creatures, humans evolved over the last 200,000 years to become the people we are today. As a result, human beings all over the world, share many common characteristics and there are universal features of human societies, including some of the ways in which we rear our children. Likewise, because we are all born with unique genetic characteristics and live in very different circumstances, our individual and group characteristics vary, as do our childcare practices.

Universal features of children

Developmental progression

Certain characteristics are typical of human development and (barring children with specific disabilities) all young children develop motor skills, such as walking and running; cognitive capacities, such as language and basic arithmetic; social capacities such as recognising and feeling safe with familiar people, playing with other children; and personal-psychological capacities such as self-consciousness, embarrassment and pride. The ages and circumstances under which young children express these capacities vary widely, as illustrated by the examples given below of the approximate ages at which about three quarters of American children manifest particular milestones.[4]

- **Gross motor skills:** Most young children sit without support by six months, stand alone by 13 months and jump by 17 months. By three years old, a child will be able to try movements like balancing, climbing, and throwing a ball.
- **Fine motor skills:** Most young children reach for objects by five months, use their forefinger and thumb to pick up small objects by 9 – 10 months, do and undo big buttons and zips, and scribble with a crayon by three years, and copy a circle by 4 – 5 years.
- **Language development:** Most young children squeal by three months, say 'dada', 'mama' or equivalent by 11 months, say four words by 19 months, understand simple questions and commands by 2 – 3 years, and sing songs around three years.
- **Personal-social development:** Most young children smile spontaneously by six weeks, wave bye-bye or equivalent by 9 – 10 months, can put on a t-shirt by 2 – 3 years, and can brush their teeth and go to the toilet without much help by four years.

These skills are acquired at different rates, depending on children's inborn talents, and the stimulation and support that enables them to progress from simple to complex skills. Even though these skills are acquired by all children without significant impairments, the age range and competence with which they acquire them differs. The distribution of competence among populations of children follows a 'normal' distribution curve as illustrated in Figure 6 on the previous page, with most children clustered in the middle and a few children performing in the bottom and top 15%.

Accurate assessment of how a child is progressing through developmental milestones is challenging and needs to be done by a trained person to avoid parents and caregivers concluding that their child has a developmental difficulty just because they seem to be falling behind on a particular milestone. If parents are concerned about their child's development, they should seek advice from a trained professional.

Disability

Disabilities among children are seen universally, but their prevalence and the limitations they impose on an individual child, as well as the extent to which a child can be helped to compensate for those limitations, differ based on their access to effective prevention and support from both family and services.

In all parts of the world, a small – yet significant – proportion of young children do not achieve expected milestones or achieve them at a slower pace than most other children. In 2016, genetic, congenital or functional impairments, developmental difficulties or delays affected an estimated 8% of children under five years of age,[5] and nine out of 10 children with a serious congenital or inborn disorder are born in low- and middle-income countries where fewer services are available to prevent them from occurring or to assist children and their families to cope with disabilities.

Many of these disabilities can be prevented or minimised by protecting pregnant women and young children from nutritional deficiencies, toxins and injury. Maternal vaccination, adequate intake of folic acid or iodine through fortified foods, micronutrient supplementation, delivery by a trained birth attendant, post-delivery care, and protection of young children all help to prevent disabilities. Genetic testing during pregnancy and the neonatal period has advanced considerably, and screening is available in most high-resource settings.[6] However, South African public health facilities do not provide universal or targeted genetic testing during pregnancy or soon after birth.[iv] The feasibility of conducting routine newborn hearing screening has been assessed in South Africa, but implementation is challenged by lack of legislation and resources.[7]

iv Targeted screening refers to tests conducted after initial screening; for example, for Down's Syndrome or Trisomy 21 if the mother is over 40 years old.

Universal features of parenting

Intuitive parenting

Human infants are completely helpless at birth except in one special way. They have evolved to recognise and attach to other human beings and to appeal for care and protection by crying, which increases their chances of getting help and surviving. Mature human beings are also prepared by our shared biological, cultural and psychological background to respond to infants' cries for help and to react with affection to their appealing round faces and large eyes, as well as their attempts to engage us.[8] Human beings, including children, non-parents and older people, respond to babies in similar ways. They approach and touch babies gently and talk in lilting voices, often in the form of questions; for example, "how is my baby"?[9]

- This innate capacity for parenting is expressed universally by mutual gaze, changes in vocal intonation (referred to as motherese), and the ways in which we mirror or imitate infant vocalisations, gestures and actions.[10] These innate capacities are elicited and reinforced by the baby's appearance and behaviour and are designed to evolve into responsive caregiving and early learning. It is therefore critical that these complementary dispositions of parent and child to attach to one another are supported in the first hours, days and weeks after birth.[11] For this reason, the World Health Organization recommends that newborns are put to their mother's breast within the first hour of birth, and not separated from their mother so that their mutual social and biological capacities, including for breastfeeding and attachment, are activated and strengthened.[12]
- Responsive caregiving remains critical for children's development and well-being throughout the early childhood period, and continuing through adolescence.[13] As children's levels of energy and curiosity increase in the next 1,000 days,[v] caregivers (including other adults, such as grandmothers) and older siblings should be encouraged to engage in playful activities with young children. Activities that promote development of fine and gross motor skills and movement are particularly beneficial, along with those that help with language development, and the learning of early number skills, shapes and colours. As children are also developing their independence and autonomy at this age, they should be encouraged to engage in self-directed activities, and activities with other children to nurture their social and emotional skills, and they should be helped to learn how to solve problems, make decisions appropriate to their stage of development, and manage their behaviour and emotions. With all this increasing energy, curiosity and independence, establishing healthy boundaries (e.g. putting limits on screen time), and avoiding harsh methods of parenting (e.g. physical punishment) are critical for children's healthy development and well-being.

Individual and group variations

All human beings have a great deal in common, but both individual parent and child characteristics and childcare practices vary widely across contexts and cultures.

Individual characteristics

The full spectrum of individual characteristics, including height, intelligence, sociability and emotional sensitivity, for example, have their foundations in genetic configurations, but are modifiable. That is, they can be amplified or diminished by the environmental conditions in which a child grows up. Children reared in the same rural village or middle-class neighbourhood share characteristics that make them different from another village or neighbourhood. For example, in general, middle-class children do better at school than rural village children for a number of reasons. Their mothers tend to have healthier pregnancies and safer births, children tend to have good early nutrition and cognitive stimulation which prepares them well to enter school, the quality of their schooling is better, and their parents have the motivation and resources to encourage their learning and school achievements. While all the children in the middle-class neighbourhood or the rural village are different from one another, they are more similar to each other than to children in the other environment.

Childcare practices

Similarly, some elements of childcare are universal. For example, most women are capable of breastfeeding, but what is done with their colostrum varies widely across cultures. In 16th century Europe and in many traditional societies today, colostrum is discarded as 'unclean', yet this first milk has been found to boost babies' immunity and breastfeeding within the first hour of birth is strongly recommended by the World Health Organization. Co-sleeping with infants also differs across contexts, as do responses to infant crying, what parents and family try to teach infants, child-directed speech, and attitudes to children's exploration, disobedience and so on.

The differing physical, social and cultural settings in which young children are reared are called a child's 'developmental niche'[14] and the care of children within that niche patterns children's perceptions and experiences of the world. For example, whether infants are carried or transported in a

v Children aged 2 – 5 years or the preschool years.

Box 1: Changing caregiving practices in South Africa

Postnatal care

Many traditional societies, including in South Africa, prescribe a period of rest and protection for new mothers and their babies.[16] Other family members take on household tasks so that the mother and baby can recover from the birth, establish breastfeeding, and be protected from outside threats of infection and harm. With changes in family and residential arrangements, women's participation in formal labour and inadequate parental leave, many women rapidly return to work and to social activities with negative consequences for breastfeeding, their mental health, and the well-being of their baby if dedicated replacement care is not available.

Breastfeeding

While most South African women initiate breastfeeding after birth, the pressures of employment and aspirational marketing often lead to the early introduction of commercial milk formula and mixed feeding. This reduces the benefits of breastfeeding for both mothers (protection against breast and cervical cancer) and children (nutrition and immune protection).

Infant carrying

Until recently, most South African women carried their babies on their backs for much of the day. This close bodily contact helps to regulates the baby's temperature and enables the mother to 'read' her infant's state of wakefulness and well-being; the rhythm of walking is soothing for the baby, and the upright position allows the baby to see the world as the mother sees it. These elements of infant care are embodied in 'kangaroo care' which is recommended to promote the survival and development of high-risk infants, and to calm and pacify all infants. Yet infant carrying is rapidly being replaced by pushchairs and prams. These are marketed as modern and fashionable – part of the general commercialisation of childcare – but they don't have the same benefits for mother and baby as carrying, either on the mother's back or in a pouch at the front.[17]

Co-sleeping

Traditionally infants sleep with their mothers and co-sleeping has been shown to facilitate breastfeeding. Although associated with Sudden Infant Death Syndrome (SIDS) in the West, other confounding factors such as drug abuse and excessive bedding may account for this finding. Increasing numbers of Western parents are co-sleeping with their babies for reasons of comfort, attachment and breastfeeding. At the same time, though, affluent African women are beginning to put their babies to sleep in cots, and even in separate rooms.[18]

Multiple caregivers

Infants in traditional families are reared by many people in their close and extended family, and children develop strong attachment to adults and older children in addition to their mother and father. This provides young children with a supportive reservoir of close and protective relationships and relieves mothers of the sole and sometimes exhausting responsibilities of caring for a young child.[19] Increasingly though, women have babies on their own, without paternal and sometimes even family support, which increases physical and mental health risks for both the mother and child.

pushchair, affects their visual experiences, exercise, sense of security and social interactions.

Cultural practices and developmental niches are not static; they change over generations. For example, the introduction of compulsory free primary education changed many families' everyday lives, in terms of caregiving responsibilities, household duties and the value they attributed to education. Women's increasing participation in the formal labour force has also changed the environments in which children are reared, highlighting the growing importance of accessible, high-quality childcare while women work.

In addition, rapid advances in technology have also influenced caregiving practices. In previous generations, caregivers had televisions as the main source of screen-based entertainment, with computers in higher income homes. Now, smartphones are ubiquitous, tablets are increasingly affordable, and caregivers have to balance the educational value and entertainment appeal of these devices against the risks associated with excessive screen time and sedentary behaviour.[15]

From the genotype to phenotype

Although all humans are born with the same basic human genotype, there are millions of variations that are expressed to differing degrees in our phenotype, or the way we look and function.

The processes and pathways between the genetic structure and the phenotype are passed on from mother and father during conception, and how genes are expressed in an individual child, are universal. At the same time, there is infinite diversity among us. We inherit our genetic structure from our parents, and they inherit their genetic structure from their parents. But, except for identical twins, each pairing of a mother's ovum with a father's sperm makes every child unique.

The health and potential of parental sperm and ova obviously influence the health and potential of the fertilised egg which, all going well, will rapidly develop into a foetus and be born as their child nine months later. An example of the influence of parental health and well-being is the effect of age on parental reproductive cells with children born to older mothers at increased risk of Down Syndrome, and children born to older fathers at greater risk of genetic disorders than children born to younger fathers.[20] Grandparents' exposures to smoking or hormonal drugs have also been reported to affect parental sperm and ova[21] and therefore their grandchildren. These effects highlight the importance of protecting adolescent and adult health prior to conception and across generations to improve early childhood development.

Pregnancy and foetal development

Pregnancy is often divided into three-month periods known as the first, second and third trimesters. Although the foetus is only about 12cm long at the end of the third month, it is fully formed, its heartbeat can be heard and it starts to explore itself and its environment by opening and closing its fists and mouth.

During the second trimester, the foetus becomes more differentiated: hair and nails form; bones harden; hearing, sight, taste, smell and sensation become functional; and the foetus can be observed to move, suck its thumb, yawn, stretch and grimace. Its pulse rate may change and the foetus may make jerking movements or change position in response to light, sound and pain. In the third trimester, brain and body size develop rapidly, reflexes are coordinated, and the foetus can open and close its eyes, turn its head and respond to its environment, including to touch that reaches it through the mother's body.

The foetus cannot respond to threat with fight or flight. Instead, it freezes; it stops breathing and its heart rate drops. The reaction can be so strong that the foetal heart can stop working and the foetus dies. Right from the start, the foetus and young child is attuned to inputs from humans. By 24 weeks, the foetus hears (and remembers) the mother's voice, and distinguishes it from other sounds, like intestinal movements and blood flow.[22] It is these human inputs of voice, touch, smell, hearing and taste that shape which connections in the infant's brain are retained and strengthened, and which die off when not stimulated by human contact and care. This is why pregnancy and early care are so important for the development of a child's brain, including the connections which support psychological functions.

Foetal development can be derailed by a number of factors, especially teratogens, which can cause, among others, miscarriage, stillbirth, congenital abnormalities and preterm birth. Teratogens include infections (like rubella), untreated maternal disorders (like diabetes), chemicals (such as pesticides), and prescription or recreational drugs. Alcohol abuse, causing foetal alcohol spectrum disorder (FASD), is a major cause of developmental anomalies and delay in South Africa.

South Africa has the highest prevalence of FASD-related childhood disability in the world, a long-term consequence of remunerating farm workers with alcohol (through the 'dop' system). Although the practice was outlawed in 1960, alcoholism remains a problem in these areas. Heavy alcohol consumption during pregnancy can cause neuropsychological deficits. In severe cases of FASD, children have small heads with small eyes, a thin upper lip and a smooth groove between the nose and upper lip, together with stunted growth and development. Preventive approaches using self-management, motivational interviewing and support have been shown to be effective in helping heavy-drinking women reduce their alcohol consumption during pregnancy.[23]

Changes in foetal development also occur through epigenetics – or the ways in which the expression of our genetic potential is shaped by our environments.

Epigenetics

The basics of foetal development are universal, but foetal and neonatal environments affect the way genes are expressed. Epigenetics help us to adapt to optimise the fit between our genetic make-up and our environment. For example, when foetal nutrition is compromised – either through maternal undernutrition or placental insufficiency – metabolic processes may slow down to improve the foetus' chances of survival. Which organs are affected depends on which bodily cells are sensitive at that time in development; that is, which cells are undergoing differentiation, proliferation or functional maturation. For example, both the size and function of the kidneys may be affected. However, a lack of fit of our epigenetic adaptations may occur when the environment changes. For example, if a nutritionally deprived foetus is fed large amounts of energy-rich foods after birth, there is an increased likelihood of overweight or obesity because the structures and systems for storing food are enhanced.[24] This is why some low birthweight babies are more likely to suffer cardiovascular ill-health in adulthood.

These findings are evidence for the foetal and infant origins of adult disease. The trend towards overweight or obesity may continue into adolescence and adulthood with associated risks of cardiovascular and metabolic diseases like diabetes.[25]

Another example of epigenetic adaptations and their effect on later function are prenatal and early postnatal stress. Stress during this most sensitive and plastic period of life programmes the body's stress response system, by raising the baseline level of stress and increasing the individual's reactivity to stress. It is important to note, though, that health and psychosocial care during this early period can reduce physiological and psychological responses to stressful experiences among both mothers and children.[26]

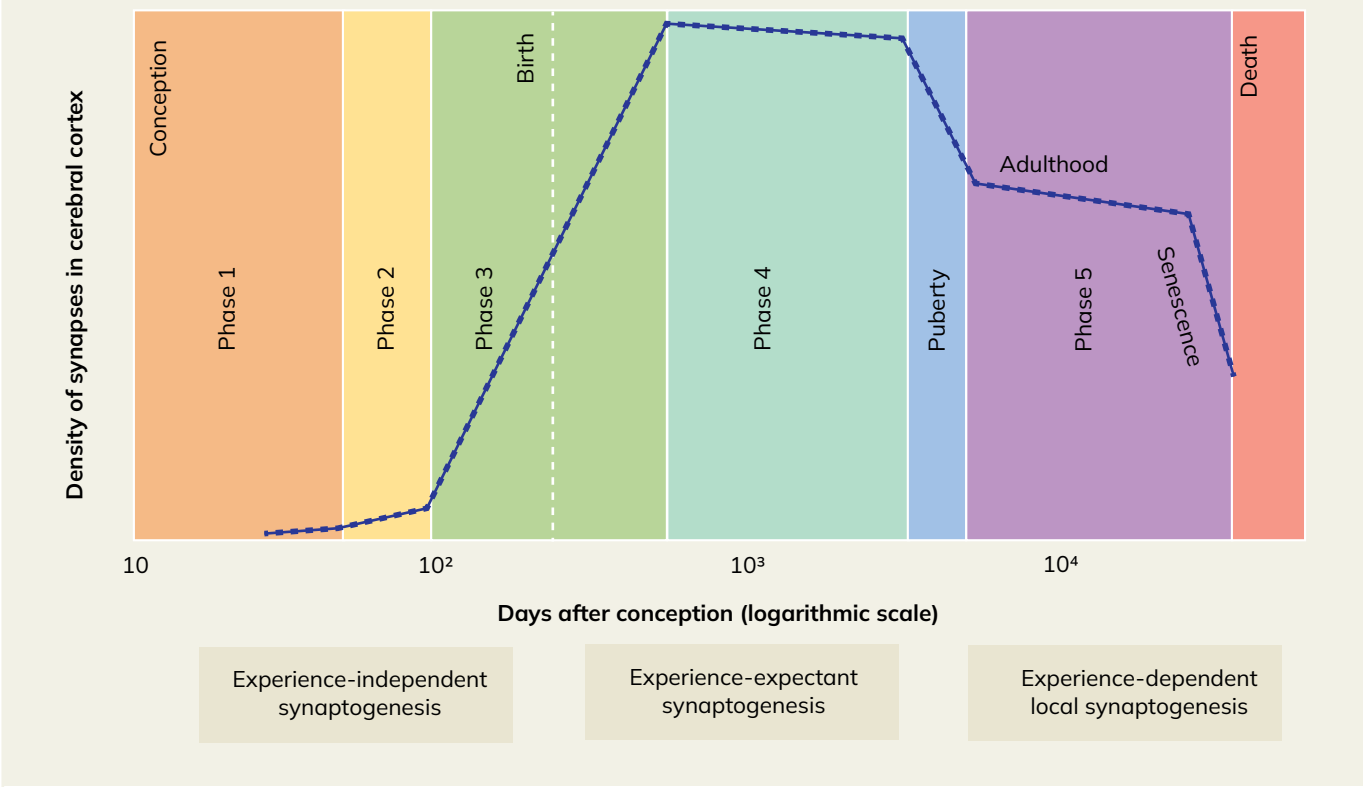
Interventions for pregnant women and new mothers include encouraging partner and family support,[27] increasing exercise and sleep, as well as relaxation procedures. Interventions to decrease the impact of toxic stress[28] on young children entail affectionate contact and reassurance, protection from stressors, and restoration of daily food, play and sleep routines.[29]

From the womb to the world

The closure of the neural tube, which happens 20 – 30 days after conception, is considered one of most important events in human life.[30] If the top end does not close, the foetus will be born anencephalic (without a cerebrum), leading to miscarriage, stillbirth or death soon after birth. If the bottom end doesn't close, the child will be born with spina bifida (paralysis of the bottom half of the body), which affects one in a 1,000 children. This can be prevented if mothers take folic acid before they fall pregnant, a supplement that also prevents anaemia. For this reason, many countries, including South Africa, have regulations to fortify staple foods such as maize meal, with a range of vitamins and minerals including folic acid and iodine. However, South Africa – like other low- and middle-income countries – have poor implementation and monitoring mechanisms, resulting in many people, including children, not benefitting from national programmes.[31]

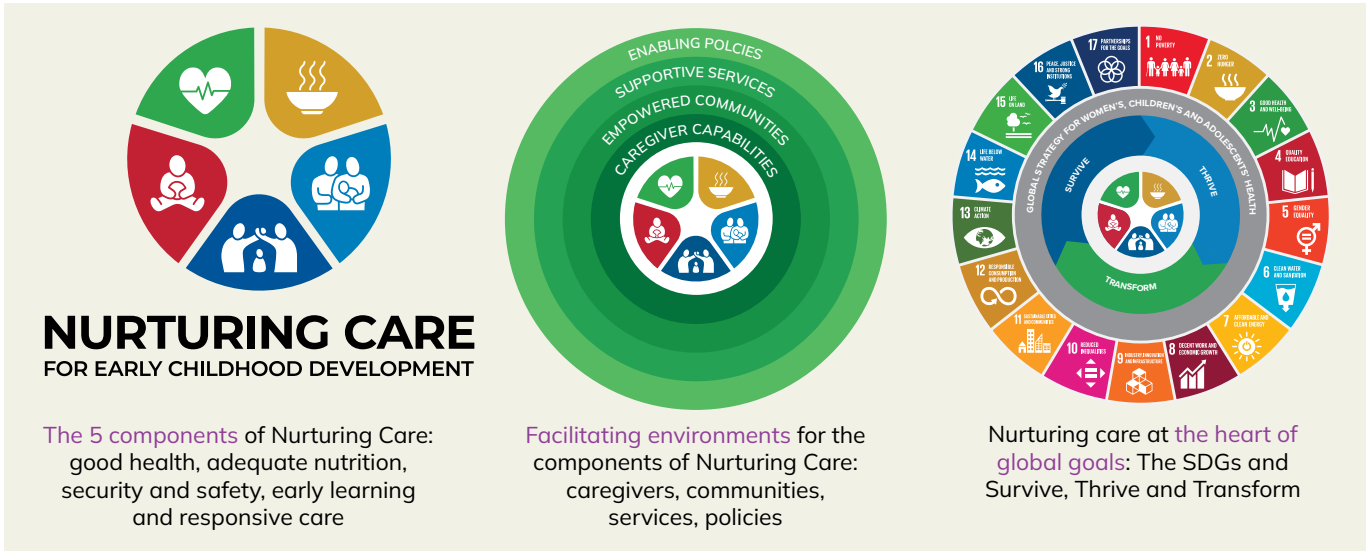
These devastating outcomes affecting initial child brain development emphasise why the period of early pregnancy is so important for children's development. Furthermore, the second semester (from 3 – 6 months of pregnancy) is the period of maximum brain growth and development, when the majority of the 100 billion neurons in the adult brain are generated. Although many surplus neurons are lost, those that are retained, are what we have for our whole life. New cerebral neurons are not generated after birth, except in the hippocampus.

Figure 7: Development of synaptic connections in the First 1,000 Days



Source: Bourgeois JP. Synaptogenesis, heterochrony and epigenesis in the mammalian neocortex. Acta Paediatrica Supplement. 1997;422:27–33.
Note: 10^2 = 100 days, 10^3 = 1,000 days (28 months) and 10^4 = 10,000 days (28 years)

Figure 8: The Nurturing Care Framework



Adapted from: World Health Organization. *Nurturing Care for Early Childhood Development: A Framework for Helping Children Survive and Thrive to Transform Health and Human Potential.* WHO: Geneva. 2018.

The first thousand days

The development of synapses (the connections between neurons) proliferate during the third trimester (between 6 – 9 months) when up to a million connections per second are formed. This period is called the 'big bang' of brain development.[32] This very rapid proliferation of connections continues after birth into the second or third year of life (see Figure 7).

This early period, from conception to the end of the second or third year – depending on an individual child's trajectory – is commonly referred to as the first thousand days of life (270 days of pregnancy, plus 365 days in each of the first two years). When we talk about early childhood development, we really mean early. While we can promote learning at four or five years of age, the potential of a child's brain is built only once, during the first 1,000 days of life.

The rapid development of synapses then levels off until puberty. Although new synapses continue to develop throughout life, development slows down during adulthood, and more rapidly as we age. Synapses are stimulated and pathways organised by sensory and emotional input from caring adults, and connections are reduced under conditions of deprivation. For this reason it is so important to ensure that women have a safe and healthy pregnancy and birth, that their mental and physical health is maintained, and their emotional connections and social conditions enable them and their families to provide their infants with nurturing care as this lays the foundation for the continued provision of nurturing care for the rest of the early childhood period (and beyond).[33]

Nurturing care

The concept of Nurturing Care was proposed in the 2016 Lancet Series *Advancing Early Childhood Development: From Science to Scale*[34] to describe the conditions under which young children survive and thrive. Infants and young children need an environment in which they receive good nutrition and health care, security and safety, opportunities to learn, and responsive caregiving. This environment is provided mainly by their family at home, with support from kin, community, services and policies which enable families to provide nurturing care to their children. The Nurturing Care Framework is at the heart of the Sustainable Development Goals and has been widely adopted by multilaterals, governments and funders.

From the human 'pouch' to autonomy

Human babies are born before they are ready to leave their mother's body. Even though their brain is about a tenth of their birth weight, babies are completely helpless and dependent at birth. However, evolution has prepared both infants and parents to negotiate this vulnerable period of development.

From birth, the infant's brain directs its sensory and motor systems specifically to other human beings. Infants preferentially orient and respond to human faces, voices, smells and touch as well as tastes to which they have been exposed *in utero*. Distress signals, especially crying, ensure parents and other adults stay close to and protect the baby. Newborns calm when conditions emulate their uterine environment, as in skin-to-skin contact – which has the added benefit of temperature regulation. They show preference for their mother's smell, voice,

and breastmilk soon after birth and they tend to mirror the facial expressions of their mothers and fathers.[35]

Together these newborn capacities 'prepare' babies for their entry into a human world and to connect with other human beings, what Colwyn Trevarthern calls "innate intersubjectivity".[36] Intersubjectivity is the conscious and unconscious interchange of thoughts and feelings between two people, which is facilitated by emotional connectivity. The emotional exchanges between mothers (primary caregivers) and their infants enable them to achieve pre-verbal intersubjectivity – emotional resonance and interpersonal understanding before the baby begins to speak. This early intersubjectivity, in the first 4 – 5 months after birth, is the platform upon which the infant is progressively inducted into the linguistic, behavioural and emotional culture of their caregivers. For example, a five-month-old baby enjoys being thrown into the air by their trusted father and a six-month-old 'understands' their caregiver's intentions when they 'tease' them in games with a climax, like 'round and round the garden'.

On their part, parents have evolved to provide what is called intuitive parenting:[37] to breastfeed infants; to be roused to respond to infant signals of distress; to closely monitor their infant's physical and psychological states; to speak slowly, repetitively and with exaggerated intonation in high-pitched tones (called motherese[38]); and to anticipate their infant's requirements and wishes.

This close nurturing environment, akin to a human 'pouch', helps the newborn adapt to life outside the womb, gradually becoming less fretful, feeding with less gastro-intestinal irritation and beginning to approximate the diurnal sleeping pattern of adults. Apart from the large size of a human newborn and the proportion of a woman's pelvis, the most important reason why babies are born early is because an enormous amount of brain development is experience-dependent, relying on physical, emotional, linguistic and cognitive input from caregivers from birth. To develop consciousness and the human faculties associated with it, the infant must be exposed to other human beings who interact affectionately with them. For example, newborns react differently when someone else touches them compared to when they touch themselves.

The first type of interaction between parents and newborns is emotional, conveyed through close bodily contact, gentle touch, gaze, soft words and imitation. Babies show delight when others imitate their vocalisations (like a cough or sneeze) and facial expressions (like yawns and coughing) and begin to imitate their caregivers in return. In the first few months of life, communication and joint attention develop between parent and child, resulting in a shared perception of the world, which is primary intersubjectivity. Between 5 – 9 months, the period of secondary intersubjectivity, their relationship expands to include topics, objects and people beyond themselves, creating triadic joint attention.[36] Caregivers and babies refer to a toy, the sound of a car, and other people and events around them. By the middle to end of the second year, children show tertiary intersubjectivity – self-recognition and embarrassment, use of possessive pronouns and claims of ownership and autonomy (saying things like 'mine!', 'Mary do it').[39] Paralleling growing intersubjectivity with others is the infant's increasing interest in, and exploration and mastery of, the environment.

Responsive caregiving and early learning

As children develop, their capacities, interests, exploration and delight in interaction with others and the environment, outline 'a curriculum for learning' to which parents respond. That is, the infant demonstrates, by sounds, words, expressions and gestures, what they are interested in and what they want to do. This is the crux of responsive caregiving and early learning – parental observation of infant behaviour, interpreting the infant's intentions, and answering or facilitating in ways that amplify their child's behaviour. Responsiveness prompts and enables the baby's exploration and learning and this 'scaffolding' of early learning enables their child to take the next steps in autonomy and skill acquisition. Parent-infant play involves the same processes, with repetition and mutual enjoyment. At the same time, parents provide limits to infant behaviour, stopping them when they approach danger and calming and gently restraining them to demonstrate how they should control their emotions, such as when they shout or hit out at others.

A child's interactions with adults and other children in the family, as well as with people in the wider community, progress along similar lines. Most children show 'stranger anxiety' around 8 – 9 months of age, which is prompted by their ability to recognise 'familiar' and 'unfamiliar' adults, and their experience of feeling safe and protected by familiar adults.[40]

Relationships with other children develop along a path described many years ago through observations of infants and children in nurseries and kindergartens.[41] Children 'play' from 3 – 6 months of age, starting with 'teasing' interactional play with parents (such as 'this little piggy went to market') to more functional play, such as rolling a ball, pushing a car, etc.

Rubin[42] categorised different types play[42] including functional play (using objects as intended), constructive play (creating or building), dramatic play (assuming roles and pretending), and games (governed by formal rules). Levels of young children's play tend to progress from being an onlooker to solitary and then parallel, associative and cooperative

play. That is, from playing alone, children progress to playing alongside other children and playing with the same objects, before being able to play *with* them. These stages of positive social play development indicate that most children are unable to benefit or enjoy group play or care until about 18 months of age. Until then, their capacities, initiatives, emotional regulation, and learning are best supported by one or more caring adults in a familiar environment, alone or with a few other infants. Social play with other children begins around 18 months with exchanging smiles, vocalisations and objects, and imitating each other's actions. Between two and three years, children enjoy a few hours of social interaction with other children in play groups and small nurseries. Children are generally ready for preschool at around 3 – 4 years of age when they are able to communicate and socialise with other children, and can engage in and learn social skills such as sharing and turn-taking through organised and free play activities. At this age, young children start to prefer to play in pairs or in small groups of three or four, a context in which friendship develops and gradually extends to more children.

In the main, young children generalise behaviours acquired in child-adult interactions when they play with their peers.[43] This means that parents need to model, teach and encourage cooperative behaviour and sharing in the family, and discourage selfish or tyrannical outbursts. If poor behavioural and emotional control is allowed or tolerated in the home, young children find it difficult to understand why it is not accepted with other children in group care and preschool settings.

From composite skills to competencies

For the baby, their most fundamental human skill is recognition, identification and learning from other human beings in warm, affectionate and devoted contexts. All other skills – sensory, motor, cognitive, linguistic and emotional skills – develop from this core capacity. Despite knowing this, our usual assessment of infant and young child development tends to focus on secondary competencies which enable the baby's drive to be human to be expressed – in walking, talking and other developmental milestones. But without fundamental emotional and communicative connections with others – children are unable to form and sustain relationships with others that are essential in enabling them to acquire complex skills through imitation, identification and cooperation.

From emotional to language expression

Babies can communicate from birth. Long periods of mutual gaze, back and forth vocalisations and gestures with parents, and mutual mirroring or imitation create both the format of language (proto-conversations) and interpersonal understanding. Cognition and language are created in the crucible of these emotional exchanges between infants and their caregivers. When assessing the health and development of children under six months of age, it is important to gauge the emotional fit, resonance and affection between them and their caregivers as this is the basis of all subsequent integrated development.

By six months of age, children babble, can follow pointing, and they delight in repetitive games. Early intersubjective understanding and trust is being established and it is common to see a child 5 – 9 months of age squealing with pleasure when they are thrown up in the air and safely caught by someone they love. By the end of the first year, children start to say words like 'mama', they can imitate social gestures like 'wave bye bye' and clap hands in concert with an adult. Language – either spoken or gestural, comprising shared understanding of meaning – becomes generative, with children adding and combining words at a rapid pace.

To acquire enhanced language, with reference to objects, people and events that are not present, either in the past or imagined (the foundation for abstract thinking), children need to be exposed to a rich language environment. Adults talking around children so they hear many different words is important, but language spoken to the child is critical to enhanced language development.[44] Child-directed language may take the form of interpreting actions ('you're playing the drum!'), asking questions ('what is this, what do we call this?' – when holding up a plate), teaching ('be careful, it's hot'), praising ('good, you're drinking from the cup'), and so on. It is also important for adults to elaborate on people, events and objects and relate them to categories beyond the here and now. For example, 'that's a red car, granny also has a red car; daddy has a blue car'; 'this ball is big, but the yellow ball is small'; 'John is here with us. Daddy's coming home tomorrow') etc. This enables the child to categorise the world, an essential cognitive capacity and helpful preparation for preschool education.

By the age of 3 – 4 years, children can usually run and jump, dress themselves in simple garments, wash their faces, know where familiar objects are and fetch them on request, know and use hundreds of words in two- to four-word sentences, tell simple stories, express their emotions and use speech in their play with other children. At this stage they are ready to participate in a supervised social group in a crèche or preschool, to learn behavioural conventions such as saying 'please' and 'thank you', and to acquire the basic elements of literacy and numeracy.

Delays and deviations

As indicated before, children develop differently at different tempos and speeds. This is expected, given the diversity of our lineage and circumstances. But a small number of children develop slower than others, and stop developing at a particular stage because of genetic, congenital or birth problems. The delays may be due to physical difficulties that affect movement, or neurological difficulties that affect learning, language and higher cognitive functions.

It is important to remember that the essence of childhood development is the same for all children, regardless of whether they experience delays or not. The Nurturing Care Framework is the basis for providing care and support for children developing well and for children experiencing difficulties and delays. Strong emotional bonds with caregivers, responsive caregiving and scaffolding help all children learn new skills. This is part of normal development, but especially critical for children facing developmental delays and difficulties. Positive emotional relationships with parents and caregivers enable these children and their parents to deal with inevitable challenges.

A small number of children also deviate socially from expected developmental phases. While all young children go through stages of learning how to share with others, make friends, control their temper and aggression, and obey rules of the home and the preschool, some children persist in 'difficult' and challenging behaviour. A good adage is that 'young children are not usually trying to be a problem, rather they are usually trying to solve a problem'. Frequently, the problems young children are trying to solve are things like feeling neglected and wanting attention, and difficulty in understanding what is expected of them when adults are inconsistent. Such children are helped by warm and consistent adult time and attention when they engage in positive behaviours, as well as encouragement and supervision to help them learn how to take turns and cooperate with other children. Harsh physical punishment, humiliation, scorn and isolation may help adults vent their frustration with a young child, but they do not help children learn. In fact, children's pain, confusion and anger disrupts their attention and learning, and may cause them to withdraw or engage in devious behaviour to avoid repeat episodes.

What are the implications for policy and practice?

This chapter outlines the basic physical and psychological structures of human development in the first few years of a child's life. It emphasises both the universality and individuality of developmental processes and outcomes, and the central role of family, peers and the community in fostering and protecting the integrity of young children's development.

The science of childhood development makes clear that the first 1,000 days of life are fundamental, as this is when the foundations for emotional, language and cognitive developments are laid down. After this time, development becomes additive and progressive, though quite dramatic transformations may occur at particular points in time in response to both physical and social changes. For example, when a younger sibling is born, when entering formal schooling and when moving house. These changes can be stressful and young children may need additional care and support to cope with these transitions.

There is a saying that 'the time to help THIS child is now, but the time to help ALL children is when or before they are conceived'. Very early childhood development, beginning at conception and influenced pre-conception, is the foundation of each child's trajectory through life. Importantly, though, this trajectory is influenced, in positive and negative ways, by experiences and events in the years after they are born, emphasising why nurturing care is so important. It also means that we cannot separate optimising the development of young children from efforts to optimise the health and well-being of women, and the health and well-being of young people who may one day become parents.

Early childhood development has been called "a powerful equalizer".[45] During this period of very rapid development, the young child's potential is highly plastic, open to influence by experiences and environmental conditions. For this reason, it provides a unique opportunity to balance the scales in a child's favour, with benefits for the rest of their life and the lives of their children. A child who is born small or sick can survive and catch up to the development of other children if provided with kangaroo care, exclusive breastfeeding and nurturing care. Similarly, a happy and stimulating playgroup or nursery can boost the learning of a child who has spent their first two years in a home where poverty strips the family of time and energy to stimulate a young child. The family's surprise, relief and pride in their child's learning and achievements may encourage them to invest more in their child's education and give the family hope for the future.

Early childhood is a once-in-a-lifetime opportunity to improve the world, child by child, family by family, and community by community. Together these individual effects add up to substantial economic benefits for countries, improve the likelihood of peace and progress, as well as the sustainability of our planet. Seemingly insignificant or trivial actions engaging with a young child – making eye contact, enjoying their discoveries, encouraging them, explaining and guiding, ensuring that they eat nutritious food and monitoring their

health – have the power to change our shared futures. Every parent, whether a president or a tea picker, has the power to give this love to a child, a gift that keeps on giving through this child's life and those that follow.

Key takeaway messages

- Human development is continuous and progressive, showing both universal, contextual and unique characteristics. Parenting and families also show both universal, contextual and unique features to support the development of young children.
- Child development and parenting are both biologically and socially determined and shaped. They are complementary processes to ensure the survival and healthy development of children and of our human species. The essential features of parenting are best facilitated and enabled rather than taught in a didactic fashion. The latter approach risks undermining parental confidence and effectiveness, both critical to responsive caregiving.
- The development of a child is governed by his or her brain development which is both experience-expectant and experience-dependent. The developing foetus and child brain has evolved to anticipate a human environment, and its development is dependent on a human environment that is loving, responsive and protective.
- The earliest phases of a child's development – during pregnancy and the first two to three years – are critical for their lifelong development and the development of their children and their grandchildren. Deficiencies and injuries during these early phases of brain development may be compensated for by later experiences and remedial care, but they can't be made up. The brain might change many times during a person's life, but it is only built once, during foetal life and early infancy.
- Despite this, advocates, programme implementers and policy makers continue to 'age up' their actions with respect to young children by concentrating almost exclusively on children in the preschool years. Unfortunately, by this time, the greatest opportunities for healthy physical growth and enriched neural connections have passed. Increased efforts will be needed to try and compensate for these lost opportunities in young children's lives.
- Science, experience and common-sense show that Nurturing Care is necessary for all children to be able to realise their human potential by laying a firm foundation for development in their early years. Safe and loving families, childcare and preschool education are all needed to foster and safeguard a young child's human potential.
- Play is an important feature of child development and of human societies. Unfortunately, many interventions tend to simplify 'play'. Encouraging parents to 'play' with their children by shaking objects in front of their babies, seriously 'dumbs down' child development, and trivialises parental responsiveness. Play and child-directed speech are important inputs to children's cognitive and emotional development, and the role of parents and families in both can be activated through sensitisation, encouragement and links to cultural values and activities.

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