Republic of Namibia

EARLY IDENTIFICATION AND INTERVENTION SERVICES FOR YOUNG CHILDREN WITH DEVELOPMENTAL DELAYS AND DISABILITIES IN NAMIBIA

Early Childhood Development

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UNITED NATIONS NAMIBIA

EARLY IDENTIFICATION AND INTERVENTION SERVICES FOR YOUNG CHILDREN WITH DEVELOPMENTAL DELAYS AND DISABILITIES IN NAMIBIA

MANUAL 2:

Early Childhood Development

Republic of Namibia

Namibia Statistics Agency

UNPRPD MPTF
Partnership on the Rights of Persons with Disabilities

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The project is jointly being implemented by UNDP, UNFPA and UNICEF and supported by the United Nations Partnership on the Rights of Persons with Disabilities (UNPRPD), under the coordination of the Office of the President: Disability Affairs. The United Nations Partnership on the Rights of Persons with Disabilities Multi-Partner Trust Fund (UNPRPD MPTF) is a unique collaboration that brings together UN entities, governments, organizations of persons with disabilities (OPDs), and broader civil society to advance the rights of the Convention on the Rights of Persons with Disabilities (CRPD) and disability inclusive Sustainable Development Goals (SDGs). We thankfully acknowledge the financial contribution of the UNPRPD in supporting Namibia to implement the project which is aimed at strengthening the voices of persons with disabilities.

These manuals were produced by Dr Hetta van Niekerk, Educational Psychologist under the supervision of the UNICEF Namibia Country Office. Inputs were received from individuals, parents, representatives of organizations of persons with disabilities and disability service providers, non-governmental organizations and institutions of higher learning. In addition, the Ministries of Health and Social Services; Education, Arts and Culture, Gender Equality, Poverty Eradication and Social Welfare, Office of the President: Disability Affairs; as well as health experts from both the private and public sectors also contributed.

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The findings, interpretations and conclusions expressed in this document are those of the author and do not necessarily reflect the policies or views of UNICEF or the United Nations.

It is hoped that these manuals will contribute to further enhancing the capacities of individuals, parents and institutions in the early identification, assessment and referral to services of children with disabilities before formal education.

Editing, layout and design by Jo Rogge.

Sen Pang
UN Resident Coordinator in Namibia

FOREWORD

> The essence of our effort is to see that every child has a chance. We must assure each an equal opportunity not to become equal, but to become different – to realize whatever unique potential of body, mind and spirit he or she possesses.
> John Martin Fischer

Namibia has committed to attaining the Sustainable Development Goals (SDGs) by the year 2030. Early childhood development is key to Goal 4 of the SDGs:

"Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all." Similarly, target 4.2 states: *"By 2030 ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education."*

During October 2019, the United Nations Children's Fund (UNICEF) Namibia facilitated an analysis of the scope and quality of currently available global good practice on the early identification and early intervention (IEIE) services for young children with disabilities and developmental delays in Namibia. It also identified the need to a develop a training manual for different service providers. This manual will focus on providing both service providers and parents with practical information on how to identify children with disabilities as early as possible and where to refer them for early assessment and early intervention.

During January-February 2020, extensive focus group discussions were held with a range of stakeholders involved in service provision to children with developmental delays and disabilities in Namibia. Barriers, gaps, as well as strengths, in terms of current service delivery, were identified. Data was also collected by means of an electronic questionnaire from educational institutions, disability organisations and health professionals. The contents of this manual are consistent with broad themes that emerged from consultations with over 200 stakeholders from all 14 regions of Namibia.

Service delivery is organised to be child-centred and family-focused, and if applicable, multidisciplinary in nature. The empowerment of parents and guardians of young children with developmental delays and disabilities, is most important.

Ester Anna Nghipondoka
Minister of Education, Arts and Culture

PREFACE

Early childhood spans the developmental period from conception to eight years of age. The child's first 1000 days - from conception to two years of age - are the most critical in child development as a child's brain develops rapidly during this stage and neural connections are formed.

When a child's brain fails to get what it expects and needs, especially during the most sensitive and rapid periods of development early in life, the amount of effort required to set it back on track later in life is enormous and optimal outcomes are far less likely.

The early years of a child's life provide an important window of opportunity to prepare a solid foundation for health, social well-being, lifelong learning and participation, and to prevent potential delays in development and disabilities. Early identification of disabilities in children is crucial to ensure future access to the appropriate intervention and support needed, to reach their full potential. Appropriate early intervention can remove or reduce the risk of secondary issues related to ongoing developmental difficulties.

Consistent with the UN Convention on the Rights of Persons with Disabilities (UNCRPD), disability is conceptualised as an interaction between the person's impairment and a variety of barriers that may prevent the individual's full enjoyment of life situations to the same extent as others. Moreover, from a human rights perspective, all children – with or without developmental delays and disabilities – should have similar opportunities with a view to optimally developing their potential.

This manual is intended to guide all stakeholders involved with children with developmental delays and disabilities in early childhood. It focuses on the improvement of service delivery in early identification of varied development and disabilities, as well as effective intervention. The manual further provides information for parents and/or guardians about their children's developmental issues, and guidance and support in caring for them.

The Parent and Guardian Manual contains practical and useful information for training purposes. This manual can be used as resource together with additional materials for existing workshops and courses with these caregivers. Manuals 1 to 4 are intended for study and research purposes for all involved with young children with disabilities.

Responsive caregiving of young children with developmental delays or disabilities is approached from an IECD perspective in which the healthcare system, ECD programmes and parents and/or guardians collaborate with one another. Information selected from the theoretical manuals (1 – 4), is concisely presented, practically applied and graphically supported. It is important to point out that stigma and discrimination against children with disabilities and labelling them must be avoided at all costs. Working with young children with disabilities requires a carefully personalised approach. The importance of meaningful parental involvement in their children's early years and ensuring access to early childhood development services for the child with a disability are emphasised.

Alexia Manombe-Ncube
Deputy Minister for Disability Affairs

ACRONYMS & ABBREVIATIONS

AAP	American Academy of Pediatrics
APA	American Psychiatric Association
ADHD	Attention Deficit / Hyperactivity Disorder
ASD	Autism Spectrum Disorder
DESA	Department of Economic and Social Affairs
ECD	Early Childhood Development
ECE	Early Childhood Education
ECI	Early childhood intervention
IECD	Inclusive Early Childhood Development
GH	Growth Hormone
GHO	Global Health Observatory
LTM	Long-term Memory
NAEYC	National Association for the Education of Young Children
OPD	Organisation of Persons with Disabilities
RSA	Republic of South Africa
SD	Standard Deviation
STM	Short-term Memory
ToM	Theory of Mind
TDH	Thyroid-stimulating Hormone
UNCRC	UN Convention on the Rights of the Child
UNCRPD	UN Convention on the Rights of Persons with Disabilities
UNICEF	United Nations Children's Fund
WHO	World Health Organisation
WM	Working Memory

GLOSSARY

Attachment
the first relational context in which a young child learns strategies for information processing, context representation and protection

Central nervous system
consists of the brain and spinal cord, with the spinal cord functioning as the channel of communication between the brain and the body. It receives sensory information, and after integration, responds accordingly

Cognitive development
process of coming to know and understand the world over time

Development
changes of an adaptive nature that occur in an orderly fashion from conception to death

Developmental delay
significant lag in terms of one or more expected developmental milestone(s)

Developmental disability
noticeable delays in one or more of the developmental domains that have proved to be lasting, and functional limitation associated with the impairment is expected to be present indefinitely

Developmental monitoring
also referred to as 'developmental surveillance;' continuous activity by (mental) health care provider of systematically documenting child's developmental trajectory on the basis of consultations with caregiver, observations, and assessment outcomes

Developmental screening
caregiver assessment of child's development across various domains through use of screening tool and discussion of outcome with health professional with a view to follow-up

Early childhood
the period from foetal development to eight years of age

Early childhood development

development of a young child's physical, cognitive, emotional and social aspects

Early childhood development

programme to foster young children's developmental capacities

Early childhood intervention

range of services that include enhancement of the development of young children with developmental delays and disabilities, the capabilities of their families and their inclusion in their communities

Emergent literacy

skills developed during the preschool years needed for understanding printed word and therefore basic to reading and writing; also called pre-reading and pre-writing skills

Emotional development

attaining capacity to understand, express and manage emotions over time

Experience-dependent plasticity

structuring of neuronal pathways due to specific interactions with social and natural environment

Experience-expectant plasticity

neuronal pathways that are triggered to develop during the usual course of development

Inclusive early childhood development

development of physical, cognitive, emotional and social domains of young children as a collective, and therefore irrespective of individual child's developmental status

Infancy phase

the first two years of a baby's life

Habilitation
the practice of assisting children with developmental delays or disabilities to strengthen abilities, and to gain skills and knowledge

Language development
gradual process to come to understand and communicate using the constructs of language

Learning
acquisition of knowledge

Maturation
the action or process of maturing

Memory
consolidation of learnt material and its retention

Neglect
failure to meet a child's basic physical, emotional and/or educational needs

Neonatal phase
the first four weeks of infancy

Overweight
the weight-for-height ratio is significantly higher (SD1 > 2) than the WHO growth norm, and means the child is heavy in comparison to other children of her/his age

Perinatal period
is between the end of Week 22 (154 days) of gestation and a full seven days after birth

Physical development
gradual changes in body structures and body functions

Prenatal phase
the developmental stage between conception and birth

Preschool phase
also called early childhood, from approximately 03 to 06 years of age

Rehabilitation
the process during which a person is assisted to regain abilities, skills and/or knowledge that was lost or compromised as a result of a change in functioning

Responsiveness
capability of the attachment figure to respond incidentally and appropriately to the infant's signals

Scaffolding
the momentary assistance a parent, caregiver or other person who is more skilled gives to a child while the latter is learning a skill or mastering a task

Sensitivity
capability of the attachment figure to be aware of the infant's signals (actions and vocalisations) communicating her/his needs and wants, and of the infant as a separate and unique person

Severe wasting
the weight-for-height ratio is very significantly lower (SD > 3) than the WHO growth norm, and means the child is very underweight

Sensory development
the adaptive changes of the senses over time

Social development
changes over time in relatedness to others

Stunting

the height-for-age ratio is significantly lower (SD > 2) than the WHO growth norm, and means the child is markedly shorter than other children of her/his age*

Theory of mind

the understanding that another person has mental states (feelings, thoughts or desires) different from one's own experience

Underweight

the weight-for-age ratio is significantly lower (SD > 2) than the WHO growth norm, and means the child is much thinner that children of her/his age

Wasting

the weight-for-height ratio is significantly lower (SD > 2) than the WHO growth norm, and means the child is underweight

** Standard deviation (SD) is a value indicating deviation from the mean (or expected variation among the group concerned)*

1 INTRODUCTION

Early childhood development (ECD) is a generic term that refers to a child's cognitive, social, emotional and physical development from conception to roughly the age of 6 years. The same term is often used to describe a range of programmes which have the ultimate goal of improving young children's capacity to develop and learn and which may occur at many different levels such as child, family and community, and across different sectors such as health, education, and social protection.

Focus on the development of young children with developmental delays and disabilities is motivated by four underlying principles:

Human rights

All children, also those who have developmental delays or disabilities, have the right to develop their full potential.

Neurobiology:

The first 1000 days – of an infant's development is vitally important. Fostering neurobiological development during this period holds a crucial advantage to all children, but particularly to children with developmental delays or disabilities.

Ecosystems:

Functional ECD programmes benefit all members of the child's family system directly or indirectly. Parents are released to fulfil a productive role in the community while their child's developmental needs are appropriately met in educare.

Economics:

The provision of sufficient early intervention services to young children with developmental disabilities, or those at risk, will potentially reduce future expenditure on education, health care and other living costs.

Although ECD spans the period from before birth to eight years, the primary emphasis of this manual is **up to the age of six years**. On account of the advances made in the field of neurobiology, the section on cognitive development is builds on the theories of information processing, rather than the stage theory of Jean Piaget. Insights gained from research in the 21st century challenge some aspects of his theory.

It is suggested that the manual is used in conjunction with the following manuals:

Manual 1	Understanding child disability rights
Manual 3	Understanding developmental delays and disabilities
Manual 4	Introduction to the International Classification of Functioning, Disability and Health: Children & Youth version (ICF-CY)

This user-friendly manual training manual on early childhood development (ECD) is a practical guide for professional stakeholders in the multidisciplinary field of early identification and intervention of developmental delays and disabilities, the assessment and referral to services of young children with disabilities as well as key ministries involved in children's rights.

Stakeholders providing training to parents and disability service providers should also include learners, teachers, and community members. The more people involved in assessments, discussions and decision making, the more support the school will have. Because school safety is a shared responsibility, all members of the school community need to be involved to achieve sustained change.

Figure 1: Key services associated with child disability rights

DEVELOPMENTAL STAGES DURING EARLY CHILDHOOD

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2.1 Overview

Early childhood spans the pre-natal period to eight years of age. It is the most intensive period of brain development and therefore the most critical stage of human development. What happens before birth and in the first few years of life plays a vital role in health, education, lifelong learning and social outcomes. While genetic factors certainly play a role in shaping children's development, evidence indicates that the environment also has a major influence in child development.

The seventh month is a very important milestone in the development of the fetus. This is the boundary between viability and non-viability; in other words between survival outside the uterus or not. Because the fetus's nervous, circulatory, respiratory and other body systems are reasonably well developed, there is a fairly strong possibility that the child will be able to survive, should he or she be born at this stage. Whether or not the child can survive depends on a number of factors such as birth weight, general physical wellbeing and the medical care received after birth. (Louw 2014: 72)

2.2 Prenatal stage

The **prenatal stage** covers the time from conception to birth. The approximate 40 weeks of pregnancy are divided into three trimesters. The first two weeks after conception are called the **germinal stage,** when cell division of the zygote takes place. The zygote then travels up the fallopian tube and attaches itself to the inner wall of the uterus. With implantation the **embryonic stage** has commenced. Over a period of eight weeks, organs are formed by cell differentiation and body parts become recognisable. Differentiation continues in the second month after gestation when the **fetal stage** starts. (Table 1)

The foetus should be approximately 50 centimetres long and weigh on average between 2,8 and 4,2 kilograms after a full-term pregnancy.

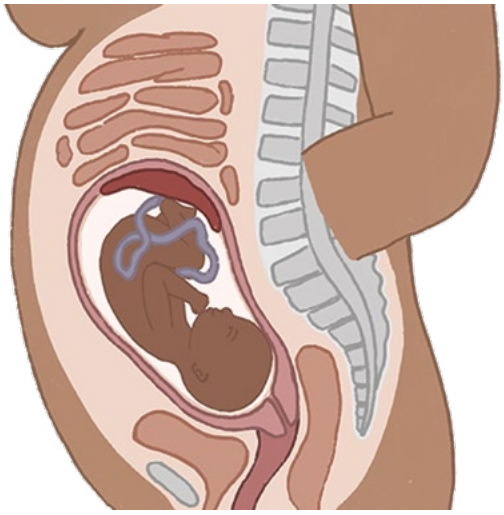


Table 1: The trimesters of pregnancy

2.3 Birth

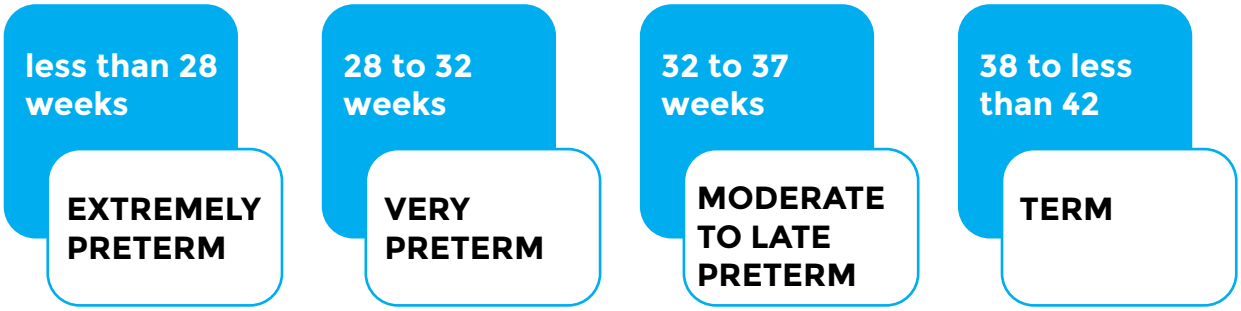
In the perinatal period developmental risk is associated with the occurrence of prematurity, birth asphyxia and maternal mortality.[1]

An infant born before the end of week 37 is considered **premature.** The degree of prematurity is classified according to the duration of pregnancy and period of gestation (Figure 2). The correlation between degree of prematurity and risk for compromised development is significant. The earlier the infant is born, the greater the risk. Risks include health conditions, neuro-developmental delays and disabilities.

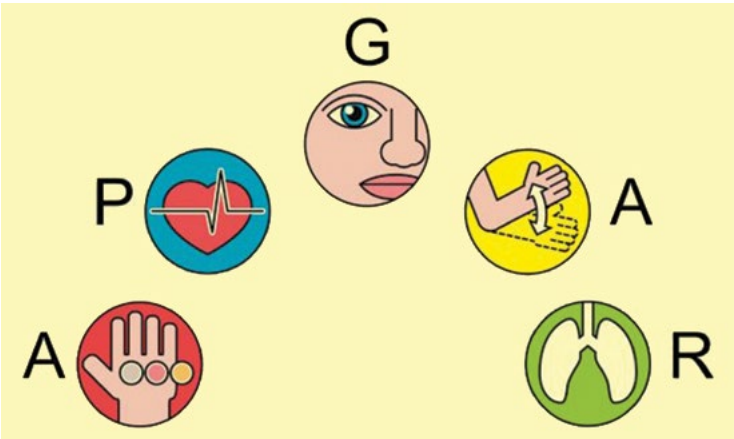
Natural birth is considered to be a rite of passage through the birth canal leading to stimulation of the lungs, sensorimotor impulses and the central nervous system. The soft tissue between

the bones of the foetus's skull, or the fontanelle, allows the skull to adjust to the pressure during birthing. Neonates (or newborns) can also be delivered by means of the Caesarean surgical procedure.

Figure 2: Birth classification according to gestational age



Birth asphyxia is the physiological consequence of limited or lack of oxygen supply to the neonate during birth. Its effect varies from organ failure or death of the newborn.



The **Apgar scale**[2] is used to determine the newborn's physical wellbeing. Although the scale seems deceivingly simple, proper training in its use is fundamental. The scale is used twice – at one minute and then again five minutes after the birth – to calculate a score by evaluating five critical features (Table 2). The *one minute* score reflects how well the infant tolerated the birth process, and the score at *five minutes* the infant's adjustment to life outside the womb. Additional scores are recorded every five minutes for a 20-minute period following a low Apgar count at five minutes.

The **Apgar score** is not a valid predictor of adverse neurological outcome. Its purpose is to inform decisions about immediate intervention and perinatal monitoring. A second low Apgar score (five minutes) may indicate neurological and cognitive impairment, however, continued measurements and subsequent tests are needed to determine this. Different factors should be considered when interpreting Apgar scores. For example, Apgar scores of premature neonates are interpreted differently on account of their general varied status on three criteria: reflex sensitivity, muscle tone and breathing.

Table 2: The Apgar scale

	PHYSICAL FEATURE	SCORE		
		0	1	2
A	**Appearance** colour	blue / pale	body pink, extremities blue	pink
P	**Pulse** heart rate	absent	less than 100 per minute	more than 100 per minute
G	**Grimace** reflex sensitivity	no response	grimace	cry
A	**Activity** muscle tone	limp	moderate	active motion
R	**Respiration** breathing	absent	slow / irregular	strong
Well-being of the neonate: 07 – 10 (maximum) good; 04 – 06 poor; 00 – 03 (minimum) in danger				

Maternal mortality refers to the death of a woman while she is pregnant or after its termination due to causes related to the pregnancy. The inevitable disruption of roles within the newborn's family system as a result of the passing of the neonate's mother can have a varying impact on her/his development during the early years.

2.4 Infancy

Infancy, the first two years of life, including the neonatal phase, four weeks post-birth, is also called the 'baby' stage. The newborn makes significant adjustments to her/his new environment, ie., the world outside her/his mother's womb between the neonatal stage and infancy.

- The neonate's blood circulation system functions independently.
- As soon as they come into contact with air, newborns start breathing and their respiratory system kicks in.
- Newborns gradually gain independence in feeding, digestive and elimination systems.
- Body temperature becomes regulated.
- The nervous system operates by means of a variety of reflexes.
- While infants steadily lose their congenital immunity, i.e., the antibodies received from the mother via the placenta, they must build up an immune system of their own.

The newborn often loses a percentage of its initial birth weight, but usually starts regaining weight from the fifth day. The large size of the head in proportion to the rest of the neonate's body is notable.

Exclusive breastfeeding on demand is recommended for the first six months and then in combination with suitable foods until the end of infancy or beyond. According to the Global Health Observatory (GHO) of the World Health Organisation (WHO), 48% of Namibian infants were exclusively breastfed during the first six months (2013). It is important to place a newborn on the mother's breast immediately they are born to promote attachment and to use kangaroo mothercare for premature and underweight children.

There are various advantages to breastfeeding (as opposed to bottle-feeding). Breast fed children and have fewer incidences of childhood illnesses and helps the body to fight against some intestinal and respiratory diseases. It contains nutrients that stimulate myelination and brain growth. It is easily digestible and breastfed babies tend to be less constipated than bottle-fed babies. Breastfed babies also gain less weight and this prevents them being overweight as they grow. Breast milk contains sufficient nutrients so supplementation with additional foods is not required until after six months. Breastfeeding is therefore more practical, convenient and economical than bottle feeding. It protects against tooth decay and malocclusion, i.e., the misalignment of the infants' upper and lower jaws. Breastfed babies tend to be more accepting when solid foods are introduced.

2.5 Preschool stage

During the preschool years, children lose their 'baby fat.' Increase in muscle and bone growth, and body proportion changes, result in a leaner physical appearance. In general, four-year-olds have doubled their length at birth. Mass gain during these years is expected to be 2 kilograms per year, and the increase in height is 5 to 8 centimetres annually.

Also referred to as **early childhood,** this stage lasts from the ages of three to six years. The plasticity of the brain is significant as it develops very actively. **Plasticity of the brain** refers to the brain's malleability. It is sensitive and dynamic nervous system modification occurs in response to developmental factors, brain injury, and/or environmental input.

Brain plasticity

The interaction between brain development and the environment is detected in two systems. Both these interactions stimulate synaptogenesis or neuron formation. (see Appendix 1)

- **Experience-dependent systems** vary across individuals and are linked to personal experiences. When young children are exposed to and engaged in unique experiences that are considerably enriching, they are likely to develop skills more than developmental expectations due to additional neural changes that occur. For example, when a child grows up in a home in which she or he is exposed to musical training from a very young age, this will quite likely bring about musical skill advanced for her/his age.

- **Experience-expectant systems** develop according to expectation when appropriate input is received, but development can be seriously compromised in its absence. For example, language development can be unfavourably affected in the absence of expected language stimulation. This is also the case with visual and auditory development. The development of the affect regulation system relies on "good enough" caregiving as well.

• Growth hormone (GH)

The growth hormone is required for the development of all bodily tissue. Children who lack the growth hormone do not grow taller than 134 centimetres on average. However, with early treatment of this kind of deficiency, pre-schoolers will grow taller than the anticipated height. Hormones are released by the pituitary gland[3] of the brain.

• Thyroid-stimulating hormone (TSH)

The thyroid gland[4] is stimulated to release thyroxine. Thyroxine is required for normal neuronal development. Thyroxine deficiency in infants should be treated immediately to prevent intellectual disability.

2.6 Entering formal education

The **first day in Grade 1** is the milestone associated with a significant transition in the life of a young child. It is anticipated that the child who was prepared for the transition between home and/or preschool and the formal education setting will adjust to the emotional, cognitive and social demands that are associated with formal education.

School readiness is:

Ready children are ready to go to school due to their stage of maturity. They have the functions and skills associated with the developmental domains, and mastery of processes which require interdependency of these skills. Pertinent developmental aspects are: health condition, self-regulation expected for their age, favourable peer and adult relationships, emergent literacy and numeracy skills, and orientation towards learning and the formal learning environment.

Ready families are set to release their young yet 'ready children' to take the next step towards autonomy, by enrolling them at school. They have an optimistic attitude towards their children's participation in learning at school.

Ready schools are geared to receive young 'ready children.' Educational structures are accessible and diverse educational needs can be accommodated. Learning for all school beginners is facilitated by, among other things, creating continuity between early learning experiences and the formal educational setting, as well as young children's homes and their classrooms.

The transition between the preschool and primary stages is associated with the next developmental stage, **middle childhood.**[2]

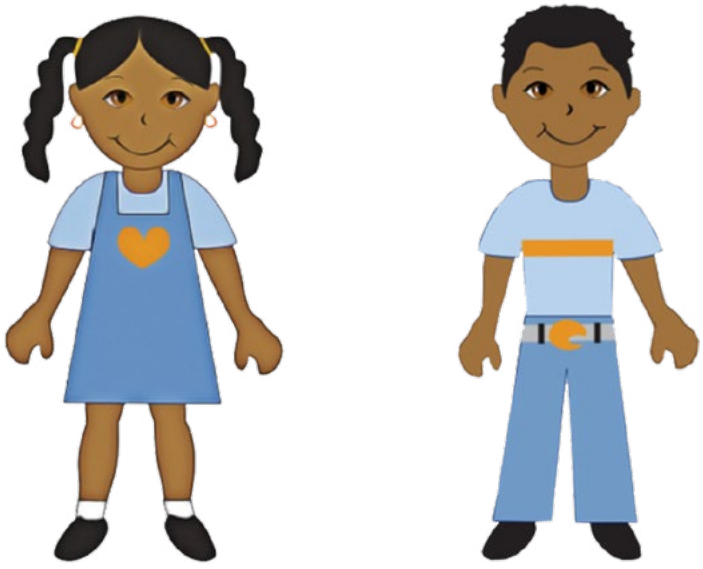
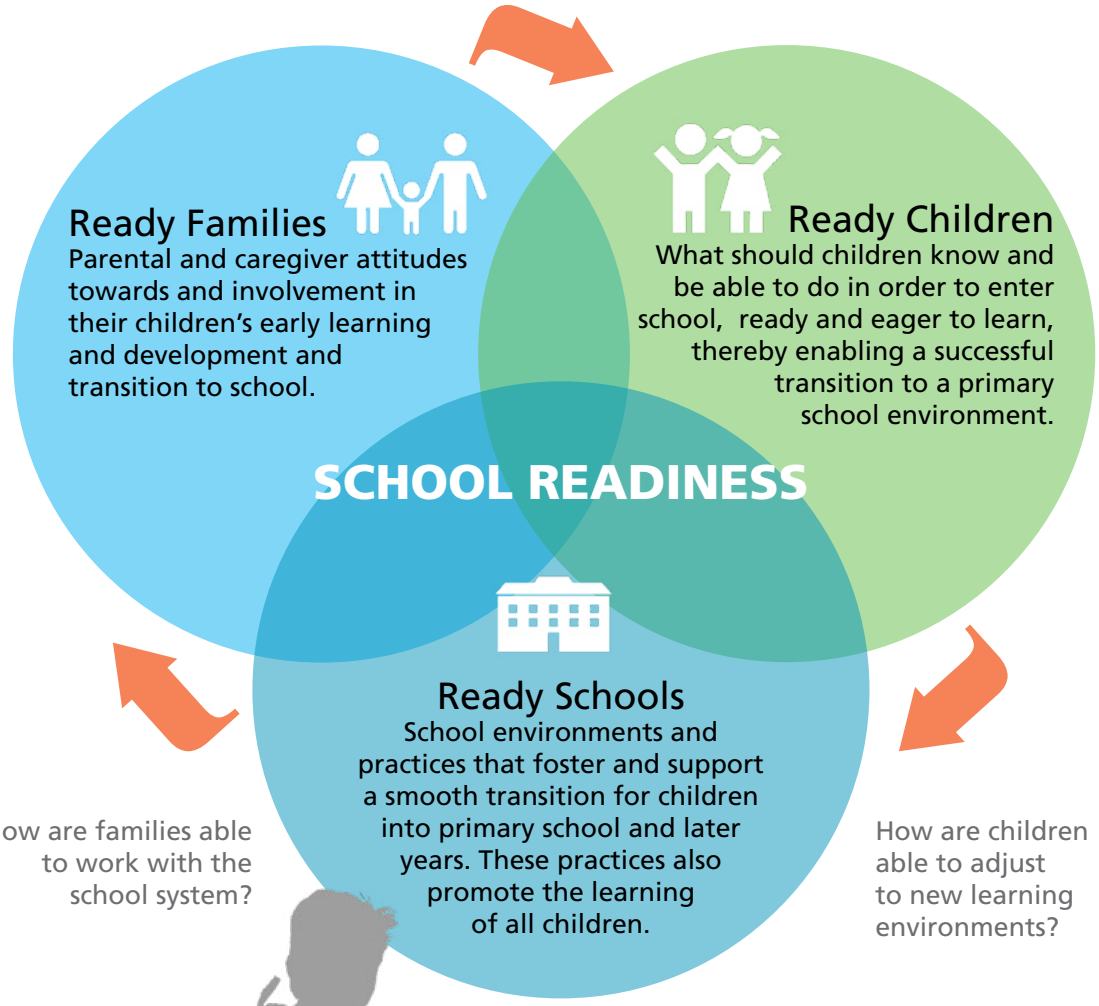


Figure 3: Dimensions of school readiness

How are schools making provision for admitting new children into the system and creating environments representing individual and societal diversity?



How are families able to work with the school system?

How are children able to adjust to new learning environments?

3 DEVELOPMENTAL DOMAINS

3.1 Overview

In the previous section, three of the four stages linked to early childhood were discussed. In this section, aspects particularly pertinent to development during this period are addressed. Information is organised according to seven domains: neurobiological, sensory, motor, cognitive, emotional, language and social development.

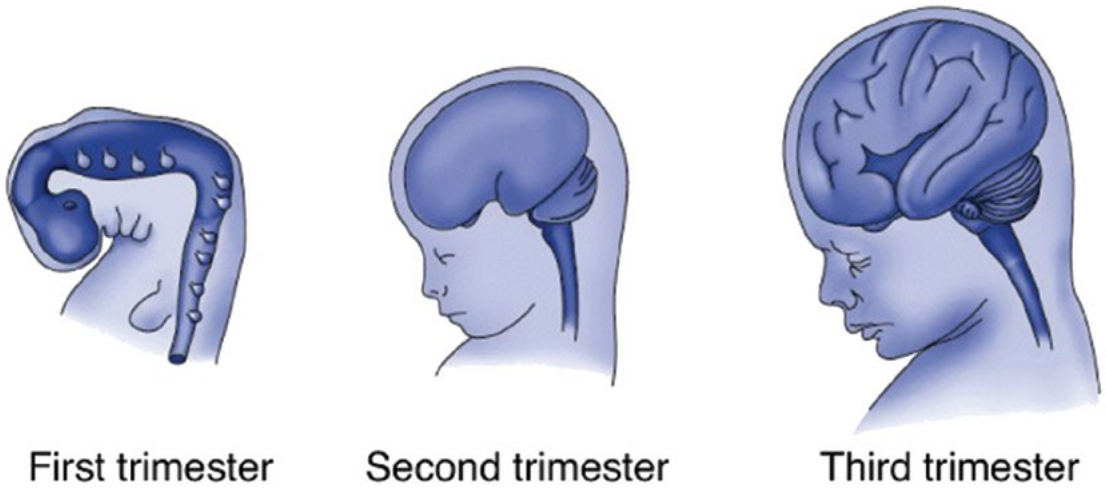
> A child's brain is not the same as an adult's, and yet in both children and adults the brain is exquisitely sensitive to environmental input. (Banich & Compton 2011: 429)

3.2 Neurobiological development

During the **embryonic stage** of prenatal development the fertilized egg differentiates into various types of tissue. At the beginning of the first trimester (Week 4), with the embryo the size of a lentil, an elementary cardiovascular system is formed from the heart tissue. Next, during **neurulation**, through the folding, twisting and expanding of a hollow tube the fetal brain and spinal cord evolve. In approximately week 7 of gestation, **neurogenesis** – the generation of nerve cells – commences and by the end of the second trimester, most neurons are produced and, scaffolded by glial cells[5], have travelled from the neural tube to form the layers of the cerebral cortex (the outside surface of the brain). (Figure 4 and Appendix 2)

A growth spurt within the frontal region of the brain occurs between birth and 24 months. At birth the brain is one fifth of the size of an adult's brain. In the first year, the fontanelle closes up.

Figure 4: The development of the fetal brain



Early childhood brain development

One of the most important aspects of physical development during early childhood is the development of the brain. At the age of three, the brain has already reached 80% of its total adult weight and at the age of five, approximately 90%. More specifically, the frontal lobe areas of the cerebral cortex devoted to planning and organising behaviour develop rapidly. Heightened development in the left cerebral hemisphere supports children's expanding language skills. Different connections are also established among different brain structures to enhance balance and motor control, alertness and consciousness. (Louw & Louw 2014a: 153)

Three factors that are principally associated with maturation of the brain from birth onwards, are synaptogenesis (synapse formation), pruning and myelination.

Synapses are the connections between neurons (nerve cells of the central nervous system), and the number of synapses increases more than tenfold in the first 12 months of the infant's life. (Appendix 1)

- During **synaptogenesis** the initial number of synapses is decreased to form functional circuits. Synaptogenesis does not happen randomly or generally:

Synaptogenesis occurs most rapidly in the primary sensory and motor areas first, followed by association areas and prefrontal cortex. This makes sense from a functional point of view; a baby needs to get basic sensory and motor skills up and running before more complex abilities can come online. (Appendix 2)

- **Pruning** refers to the elimination of synapses to lessen the number of neuronal connections over time – if the synapse proves to be redundant, it dies.

Synaptic overproduction is a mechanism that allows the brain initially to have maximal capacity to respond to the environment. Then, during development, the neurons or connections that do not receive much stimulation wither away. This provides the brain with the capacity to fine-tune and specialize itself for its specific environment.

- Glial cells are responsible for **myelination:** Axons – which are outgoing projections from neuronal cell bodies – are coated with a myelin sheath for protection and insulation.

A baby's brain is relatively unmyelinated, which means that it lacks the oligodendrocytes that insulate neurons. Therefore brain regions cannot interact quickly in the infant.

Myelination of the sensory and motor systems occurs during the first year of life. As is the case with myelination, the brain's **electrical and biochemical activity** is also associated with developmental stages.

During the first 24 months, the frequency of electrophysiological activity is low. One-to-five-year-olds have a dominant electrical frequency that is comparable to the state of relaxation in adults who are awake with eyes closed. At five years of age the frequency band changes and at this time is comparable to adults who are relaxed but alert.

After infancy, children develop a distinct sleep-wake cycle.

At three years of age, a biochemical change manifests as increased consumption of glucose in the brain metabolism. The rate of glucose uptake is double of what adults use, and begins to decrease at eight years of age. Glucose metabolism at this time is required for fuel in support of structural modifications to the cortex (see Appendix 2).

3.3 Sensory development

The sensory system begins to develop during the prenatal phase. Two kinds of sensory receptors provide critical information to the nervous system in order to manage internal and external challenges. **Exteroreceptors** are perceptive to the external environment and sense conditions outside of the body. The human sensory organs receive information from the external environment – the ears by hearing, the eyes through vision, the tongue by tasting, the olfactory system associated with the nose through smell and the skin by touch. **Interoceptors** are sensitive to internal bodily conditions, and the heart and blood play a vital role in processing sensory information. Physical balance is located in the vestibular system; proprioception relates to muscles and joints, and interoception to internal organs.

3.3.1 Hearing

Midway during pregnancy, around the second trimester, the foetus starts to hear sounds and **hearing** continues to slowly mature after birth. The most consistent sounds for the foetus (also referred to as prenate) are the mother's heartbeat and voice. From 23 weeks into gestation

the foetus responds to sound and by 34 weeks, auditory threshold levels are comparable to those of an adult. Exposure to loud noises at this stage can weaken hearing. At 26 weeks, the prenate learns intonation, rhythm, and other speech patterns of the mother's voice.

Although the neonate has to adjust to sound conducted by air and no longer through liquid, it can already distinguish between sounds hours after birth, for example the mother's voice. Within days after birth, the newborn is able to locate the source of sound.

3.3.2 Vision

Development of vision begins at 28 days of gestation, and from approximately 21 weeks the visual system is formed. During the last trimester, the foetus sees light through the amniotic fluid as well as the mother's belly.

Although the newborn is already equipped with a complete functional visual system, it is not yet fully developed and lacks visual acuity. This means that for a neonate the world looks blurred: The muscles that control the eye lenses are still underdeveloped, with the result that the eyes are not able to focus on objects at differing distances. The newborn is more interested in some objects than others. For example, it can distinguish its mother's face from that of a stranger within the first two weeks of life. Farsightedness is common among young children, because the eyeball has not developed fully yet. Visual acuity matures from the age of five, while contrast sensitivity reaches full maturity from eight years of age.

During the course of the first year of life, infants develop depth perception and visual constancy. The ability for figure-ground perception increases between four and six years. The development of visual discrimination generally allows six-year-olds to distinguish between objects with similar visual features (for example, the letter symbols b/d/p, m/w or g/q).

3.3.3 Taste

Taste buds are formed on the tongue at 13 weeks and by the fourth month, the foetus can taste the amniotic fluid surrounding it. The tongue is prepared for breastfeeding immediately after birth by means of cranial nerve innervation ('nerve energy' supply). This 'suck-swallow-breathe' reflex is essential to neurological and cardiovascular development.

The newborn can distinguish between strong tastes and the degree of hunger also affects response to taste.

3.3.4 Smell

The olfactory (smelling) system is almost completely mature at 8 weeks, and connected to the limbic system.[6] The capacity for smelling is intact, and the neonate is able to distinguish between smells. (Appendix 2)

3.3.5 Pressure and touch

The tactile (touch) system is the earliest system to develop in utero. It is also the most mature sensory system at birth. Sensory receptors for touch and pressure emerge from five weeks' gestation. The purpose of the tactile system is twofold. With a view to its **protection**, the foetus is able to perceive pain. It is also able to discriminate between tactile **pleasant** or **unpleasant** input. Tactile awareness at the back of the body and the top of the head only develops after birth, probably to decrease the perception of pain during birth.

A newborn perceives pain similar to an adult. This contradicts the belief that newborns do not experience pain and past practices of not administering analgesics are to be revised. It is therefore of the utmost importance that proper monitoring of pain in neonates should always be in place.

3.3.6 Vestibular system

The vestibular system is located in the inner ear, and by five months' gestation, it has reached maturity. This system provides equilibrium and balance when the body is moving through space. It makes the body responsive to movement of the head and body in relation to gravity and is what keeps humans upright.

3.3.7 Proprioception

Proprioception is the felt-sense of the location and relative position of different parts of the body in relation to objects and individuals. Proprioceptors are found in the muscles, tendons and joints, and provide continuous internal awareness of bodily posture. Proprioception develops in tandem with the prenate's muscular system.

3.3.8 Interoception

Interoception is the ability to sense internal states and bodily processes. Interoceptors found on the heart, stomach, liver, and other bodily organs, convey sensory information to the brain in order to promote homeostasis of internal physiology. They are also linked to 'embodied self-awareness' that develops in the last trimester of pregnancy. This entails an awareness of internal bodily processes such as hunger, pain, breathing, urge for elimination and emotion.

3.4 Motor development

The development of 3 types of motor skills is associated with the preschool years (Table 5).

Gross motor skills are used when the large muscles are involved. Three-year-olds particularly enjoy physical activities of this nature. Fine motor skills involve the small muscles of the hand and fingers. **Fine motor skills** develop more slowly than gross motor skills. For example, three-year-olds still find it hard to fasten shoelaces and buttons. **Bilateral coordination** refers to the coordination of the right and left sides of the body. The left and right sides must work together to execute a complex motor task, such as tossing a ball and hitting it with a bat.

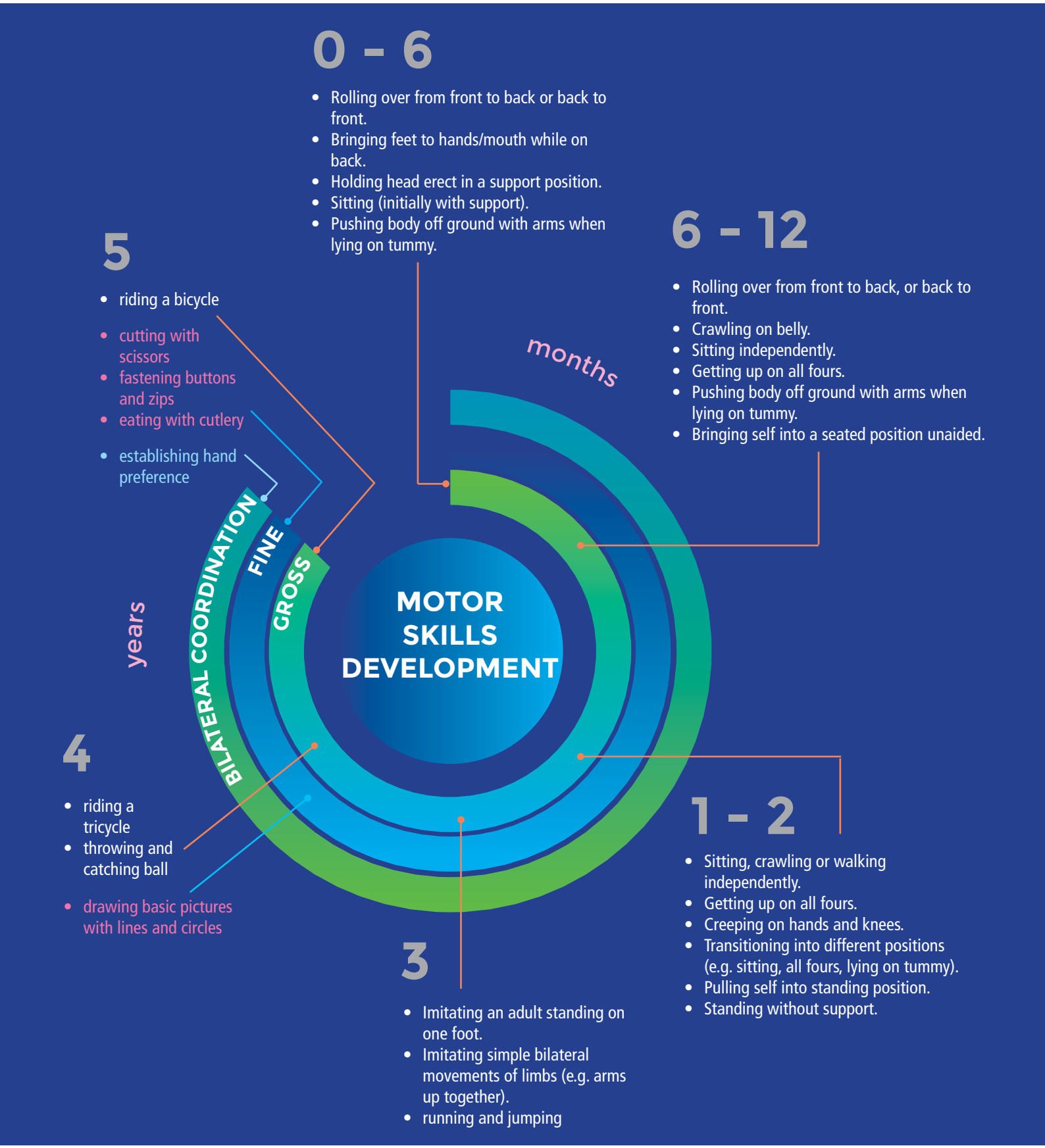
Children's motor development depends on their total physical development. In order to crawl, walk, climb and grasp, they must first have reached a certain level of skeletal, neural and muscular development. The development of motor skills allows children to explore, understand and enjoy their environment. As infants' motor skills improve, it enables them to experience their world in new and more sophisticated ways.

The emergence of children's proficiency in 'mark-making' or drawing also takes a developmental course. Although drawing can initially be described as a visual-motor activity, it progressively matures into meaning-making through visual representation. Representation through drawing during childhood involves an integration of various developing mental functions. Artistic development unfolds according to stages that are linked to approximate chronological ages, but children's art activities can also display features of different stages. (Table 4)

Table 4: Development of drawing as artistic expression

APPROXIMATE AGE	Stage
18 months – 03 years	I. Scribbling
03 – 04 years	II. Basic forms
04 – 07 years	III. Human forms and beginning schemata
07 – 09 years	IV. Visual schema development
09 – 12 years	V. Realism
12 years and older	VI. Adolescence

Table 5: Motor skills development



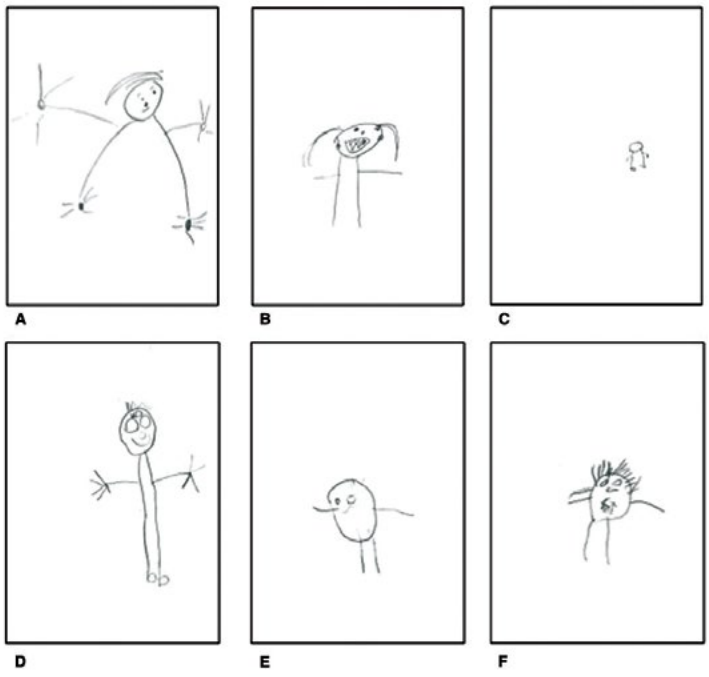
The scribbles of the very young child between 18 months and three years can already hold some meaning. However, the kinaesthetic and motor activities that accompany scribbles on paper and other surfaces in the **first phase** is of developmental significance. Use of line and colour is not intentional and only at the end of the phase, location of scribbles may be planned. Marking with scribbles can be categorised according to the following progression:

- disordered and chaotic appearance, reflecting little motor control;
- longitudinal, suggesting repeated motion with more motor coordination;
- circular appearance, implying more progress in terms of developing motor skill and control; and
- naming scribbles, indicative of a shift from kinaesthetic activity to imaginative thinking.

In the **second phase**, from approximately three to four years, children spend some time naming and telling stories related to the visual forms they produce. Besides scribbles, basic geometric forms and mandalas emerge. Through colour, form and size they start making sense of their surroundings. However, labelling and narration are usually spontaneous and names and stories can change from instance to instance.

The **third phase** includes the age group four to seven years of age. At the beginning of this stage (and sometimes earlier), the 'tadpole' appears as the first simple form used to represent the human body. (Figure 5)

Figure 5: Typical human body drawing of 4-year-olds



The tadpole study

In a study of the tadpole figures of 183 pre-schoolers between the age of three and six years, three 'ecosocial' contexts were compared:

- Western urban educated,
- non-Western urban educated, and
- non-Western rural traditional context.

The study demonstrates the cultural shaping of young children's symbolic activity. The starting point is given by children's universal experience of postural and locomotor activities, demanding a permanent battle with gravitational force. One essential outcome of this experience is the child's implicit knowledge of the vertical structure of the human body, which seems to be reflected in the top down arrangement of head and legs in the tadpole figure. Another outcome is that children perceive legs (and arms) as mobile extensions from a solid entity. In the tadpole figure, this knowledge is reflected in separate lines attached to a rounded form.

So far, the tadpole figure conveys a basic graphic scheme, which is shared by healthy children living in very different cultural environments. However, when children are asked to portray themselves (or a known person) the mere production of this basic scheme is not sufficient, as the task requires the depiction of a real person (e.g., the self), not only a human body. At this point cultural concepts of self and others come into play, elaborating the child's basic representation of the human being by implementing particular features.

This process may be mediated in at least two ways: on the one hand implicitly through the child's emerging, culture-specific concept of persons that result from immediate socialization experiences and on the other hand explicitly, for example through instruction, training, and drawing rules. Hence, young children's symbolic activity, as in the early tadpole drawings, reveals a finely-tuned cultural shaping, similar to what has been demonstrated in various other fields of cognition.

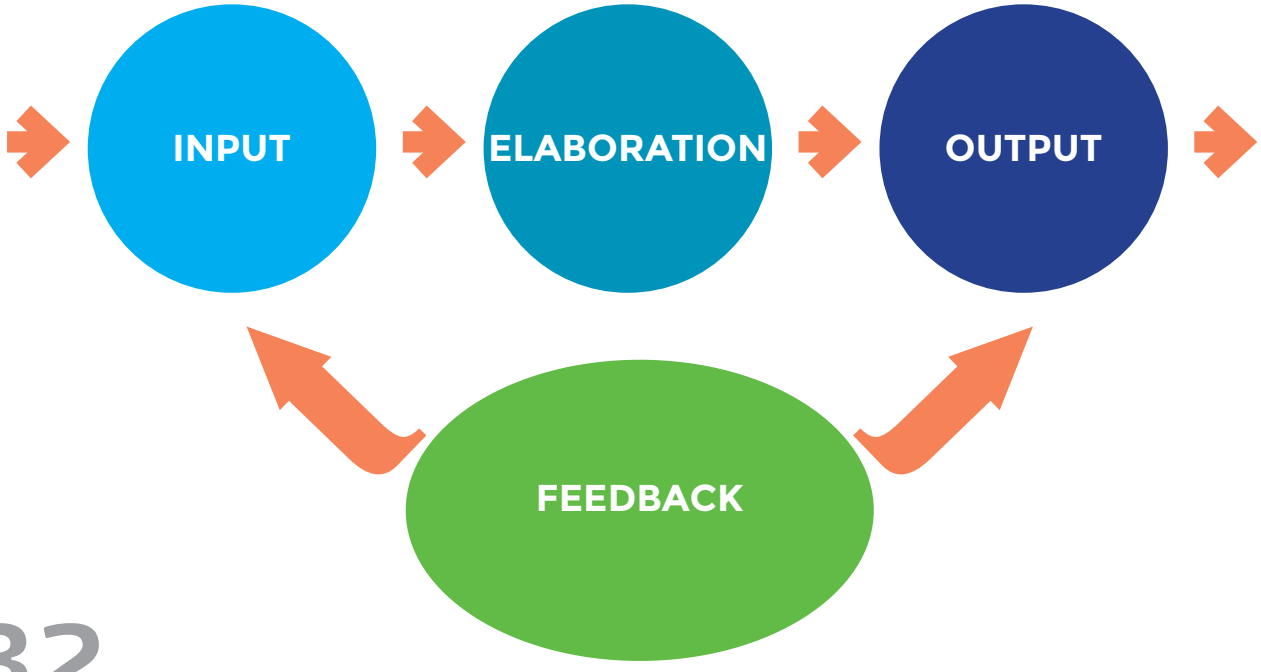
This study confirms the universality of the tadpole as first rudimentary drawing of the human figure. Further, two tendencies were found: pre-schoolers from traditional rural areas (in comparison to children from urban educated settings) drew smaller tadpoles with less facial features and without facial expression. In terms of number of facial features, an age effect was found, which means the number of facial details increased with age. At the end of this phase the human figure becomes more detailed, all of the body parts are included and a variety of shapes are employed for representation. Representation of persons and characters begins to be less general and more individualised. Six-year-olds typically do not signify depth yet - a table is drawn in profile view. Schemata are used to draw pictures for common objects in the environment eg. a house, tree, flower, the sun, moon and rain.

As cognitive processing matures, it allows for better understanding of the principles of visual representation and their application. Schemata make room for realism and conventional representation.

3.5 Cognitive development

Cognitive development runs parallel to brain development. (Appendices 1 to 3) Incoming information is processed in order for the person to make sense of it. Similar to the workings of a computer, thinking occurs in three stages: the input, elaboration and output of data, and includes a feedback loop indicating the cyclic nature of processing. The feedback loop is especially significant for the development of executive functioning and metacognition. (Figure 6)

Figure 6: A basic model for information processing



Research studies have tended to focus on children of school-going age, and specific findings on pre-schoolers are minimal. However, contrary to traditional views on cognition, evidence does exist in support of infants' cognitive processing capabilities.

As soon as infants become goal-orientated, they start to process information. Cognitive growth is achieved by acquiring, practising and utilising various cognitive functions and skills. Consistent with the notion of 'development,' cognitive functions and skills mature with age. Gradual maturation of various neurological processes and their integration do not only benefit children's cognitive functioning as they grow older but children themselves also get progressively more capable of utilising these functions and skills, because 'practice makes perfect.' Four basic cognitive systems as well as the executive system are required to process information.

Enhancing cognitive development in the preschool years

1. Encourage young children's exploration of their environment. Curiosity sparks exploration, and exploration facilitates opportunities to learn.

2. Provide them with a language rich environment. Spoken and written language is important for communication in the settings pre-schoolers grow up in.

3. Mentor cognitive skills. Young children are guided to master basic cognitive skills (e.g. classification, sequencing and comparison) and their intellectual development is not left to chance.

4. Facilitate practice and mastery of new skills. Caregivers devote time to teach them new skills.

5. Value young children's developmental attainments. Their accomplishments are acknowledged and celebrated by significant people in their lives.

6. Protect children in early childhood from experiences that could impact their development of self adversely. Caregivers discipline their young children respectfully and constructively.

3.5.1 Attention

Attention refers to the ability to focus on the relevant stimuli of a mental task while resisting distraction by irrelevant stimuli. Concentration is the ability for sustained attention. This function is very important due to its relation to other cognitive functions, e.g. memory and reasoning. Insufficient sustained attention will negatively impact the execution of various cognitive functions irrespective of the phase of information processing.

- **Young children have limited attentional capacity.**
- **The age of six years is associated with the improved ability to resist distraction and sustain attention.**

3.5.2 Processing

Information is received through the sensory organs. **Perceptual information will be registered in sensory memory only if it is attended to.** (Figure 7)

Information is processed in **working memory**, also called short-term memory (STM). Working memory is the ability that allows us to retain limited amounts of information for a short period of time while we are actively working on that information.

'Online' work requires the **central executive processor** to access the phonological loop and the visuospatial sketchpad and perform operations. The central executive controls and mediates the interaction of these subsystems. The **phonological loop** is the store of vocal information. The **visuospatial sketchpad** stores encoded visual, visual-spatial and haptic (tactile) information. The **episodic buffer** is a temporary multidimensional representation of linked chunks of information of different modalities, and also of working memory (WM) and long-term memory (LTM).

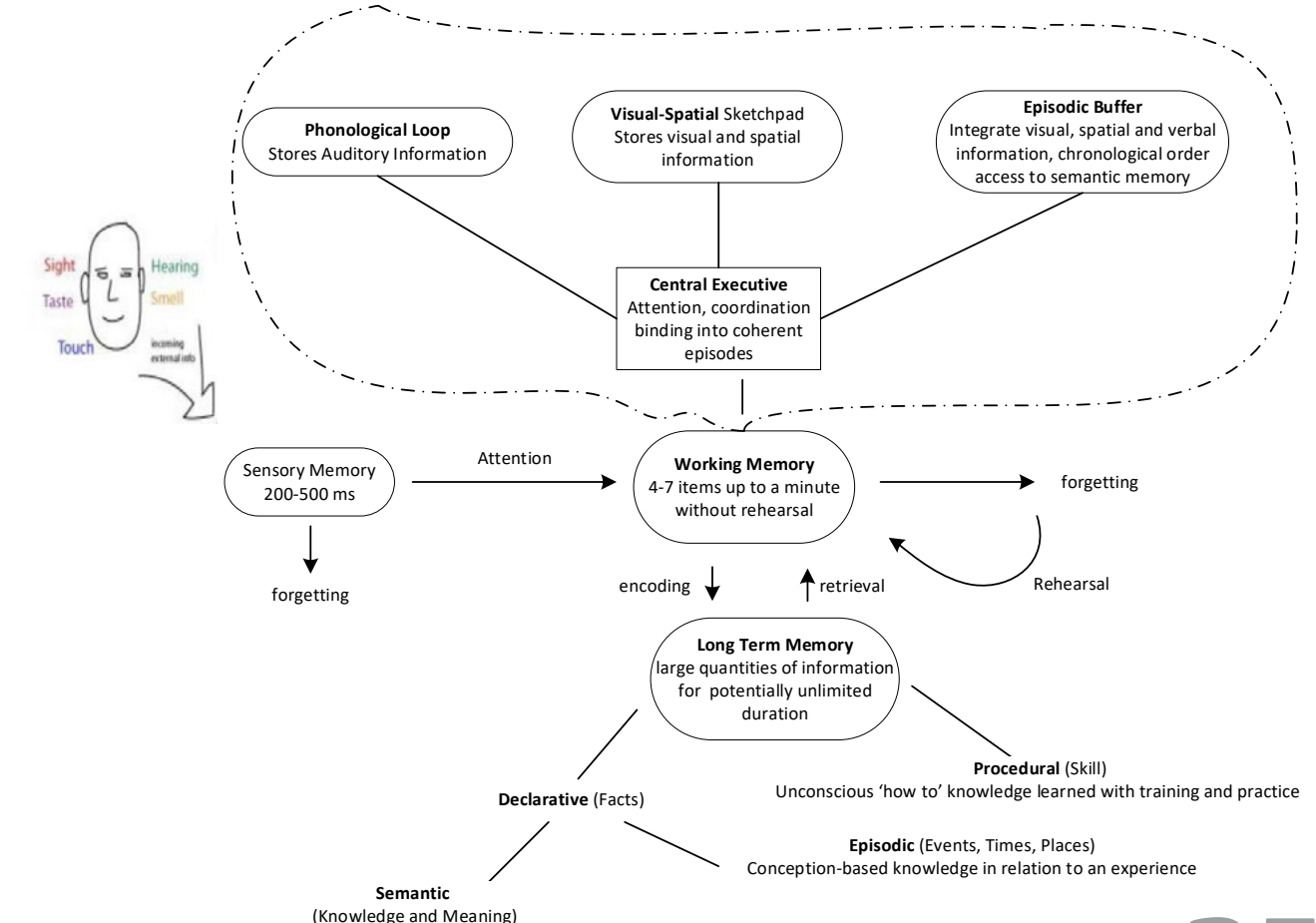
Processing systems involve both simple or complex visual, auditory or multi-sensory information. Information is encoded through the application of cognitive processes with a view to be stored successfully (and therefore to be considered 'learnt'). A **cognitive operation** is a strategy by which information is 'organized, transformed, manipulated and acted upon.' Examples of **simple** cognitive operations are **recognition** and **comparison**, whereas classification and inferential thinking are considered to be **complex** mental strategies.

The transmission rate of information determines the efficiency of the information processing system. A fast processing speed results in simple tasks being completed quickly. The advantages of a fast processing speed are: it the child is less likely to be distracted before a task is completed

- **Young children are able to hold three or four 'chunks' of information in STM.**
- **They take more time to process information.**
- **Their capacity to utilise cognitive strategies is restricted.**

and it supports the child's working memory which 'holds' units of information only briefly during processing. The chance of material getting lost during processing, is consequently also reduced.

Figure 7: Memory systems in relation to information processing



3.5.3 Storage

Encoded information is stored in long-term memory (LTM), which has basically unlimited capacity. Various memory subsystems are employed for storage (Figure 7 and Appendix 3). The two **explicit memory** subsystems are semantic memory and episodic memory.

Semantic memory refers to the retention of facts, and therefore a person's knowledge base. Episodic memory refers to the retention of personal experiences and events, and hence the system related to memories and recollections of an autobiographic nature.

Procedural memory is classified in the **implicit memory** subsystem. Procedural memory holds skills and procedures required for task execution that have been practiced to automaticity. **Rote** memory is a system by which information is mechanically stored in semantic memory, and can be compared to a voice recorder.

Alternatively, **organised** memory utilises executive function strategies for the purpose of retaining information in semantic memory.

3.5.4 Retrieval

Retrieval from memory takes two forms – recognition and recall. **Recognition memory** means registering that a stimulus is the same as or similar to one that has been experienced before. R **Recall memory** requires representational skills, because the stimulus being recollected is no longer present.

3.5.5 Executive functions

Executive functions include the ability to plan the actions needed to reach a goal, to use information flexibly, to think abstractly, and to make inferences. Executive functioning encompasses various capacities for self-regulation, including metacognition and higher-order thinking. **Metacognition** refers to the ability to contemplate on personal cognitive processes. Monitoring and cognitive control are important for executive functioning.

Monitoring refers to keeping track of mental activities, and cognitive control is 'a continuous exchange of information between the object level (the task at hand) and the meta-level (a representation of the task at hand and its mastery).' Examples of **higher-order thinking** are conceptualisation, inferential reasoning and evaluative thinking. Higher-order cognitive processes are applied to information in the LTM system.

- Metacognitive skills – albeit undifferentiated – develop from the age of three years.
- Developing strategies for monitoring increase in usefulness in the period from five to eight years.
- Around the age of six years, children begin to have access to executive skills such as planning behaviour.

The trajectory of intellectual development is explained by Greenspan as: 'mature thinking abilities emerge into a world view from the integration of the senses to gradually transformed emotions.' (Table 6)

Table 6: Intellectual development according to Greenspan

AGE	LEVEL OF THINKING	DESCRIPTION
First days of life	Attention	Showing interest in and responding to various sensory experiences
02 – 05 months	Engaging the world	Developing expressions of relatedness and intimacy
04 – 10 months	Interaction and communication	Communicating intentions through nonverbal interactions
10 – 18 months	Shared problem-solving	Problem-solving through sequential social and emotional interactions
18 – 36 months	Meaningful use of ideas	Using meaningful words and phrases and pretend play with caregivers / peers
03 – 04 ½ years	Logical thinking	Using logic to connect meaningful ideas
04 – 06 years	Multi-causal thinking	Offering various explanations for feeling / idea
06 – 10 years	Comparative thinking	Grading feelings, relationships and objects
From 09 years lifelong	Reflective thinking	Evaluating and reflecting on feelings, the self and external world

3.6 Emotional development

Emotional development is a basic aspect of personality development. The function of emotions is adaptive and protective in nature. Emotion is used by infants to communicate their needs, e.g., crying because she or he is thirsty. Emotion can mobilise an emergency response, for example when a caregiver acts on seeing a child being fearful. It can also stimulate exploration of the environment in the case of a child motivated to action by excitement. Although it is difficult to study the development of emotions in infancy, there are markers of its developmental course during early childhood. (Table 7)

Table 7: Markers of emotional development in early childhood

EXPECTED AGE	KIND OF EMOTION	EXAMPLES
Soon after birth	Basic	distress, contentment, interest
Birth – 06 months	Basic / Differentiation	joy, sadness, anger, fear, surprise, disgust
From 15 – 24 months	Involving self / Awareness	embarrassment, jealousy
Approximately 24 months, onwards	Involving others	empathy, altruism
36 months	Involving self / Evaluation	shame, guilt, pride, remorse

The cerebral cortex organizes sensory, motor and conscious experiences, as well as learned interactions with the world. The growth of the cortex is largely experience dependent. (Cozolino 2014:30-31)

During infancy, emotion is primarily conveyed by smiling and crying. **Smiling** first occurs when newborns are asleep and they are dreaming. Smiling is seen to be reflexive, and indicates a shift in physiological arousal. As awareness in their environment grows, infants start to respond to it. The non-selective social smile is usually a reaction to random pleasant sensory experiences. At approximately three months, the selective social smile appears. At a higher frequency, smiling is associated with interactions with people to whom they are accustomed. Babies laugh aloud to express pleasure and to show that they are having fun from around four months old.

The shift from smiling as a reflexive behaviour to a voluntarily, controlled response parallels the increasing maturation of the cerebral cortex, which is responsible for higher-order mental

processes and deliberate goal-directed behaviour. Smiling behaviour has adaptive functions: It influences the parent-child interaction and contributes to a warm, supportive relationship that promotes the child's developing competencies.

Newborns mainly cry in response to experiencing some form of discomfort, while infants utilise crying for rudimentary communication:

The **basic cry** is a rhythmical sequence of vocalisation, pausing and inhalation.

The **angry cry** is characterised by extra air passing through the vocal cords during vocalisation of the sequence of the basic cry.

With the **pain cry**, long vocalisations are followed by silences of breath holding and gasps.

The tasks associated with emotional development during early childhood include:

- **Understanding emotions**

Cognitive processing is required to understand complex emotional states. As soon as the infant has developed **self-awareness** – that is, cognizance of her/his separateness from other people and objects – they experience various associated emotions. When pre-schoolers are able to understand basic social values and apply skill in social reasoning, they experience emotion related to **self-evaluation.** Developing **Theory of Mind (ToM)**, which is the understanding of mental states, relates to understanding social interactions **(social cognition).** Social referencing also depends on ToM. The affective display of an adult is used by an infant to respond to their environment.

ToM unfolds in three stages:

1. Typical two-year-olds have developed basic ToM. They express desires and have an understanding that desires can be causally related to actions.

2. Typical three-year-olds are able to distinguish between the physical and mental worlds, and they have developed a basic understanding of different mental states. This is evident in them being able to use (or at least understand) 'mental' verbs such as 'think', 'forget', 'remember' or 'wish'. However, at this point in time, desires are more important than thoughts, and the former will therefore dominate explanations of others' actions.

3. Typical four-year-olds have advanced in ToM development. They can appreciate that other people's behaviour as well as their own, is based on beliefs (whether correct or incorrect) about the context.

Pre-schoolers who feel emotionally secure tend to be advanced in their emotional understanding when their attachment figures have affect-rich conversations with them.

Between the ages of two and four, their emotion-related vocabulary expands markedly. Four- and five-year-olds begin to make causal links between affective states and behaviour, and due to development of ToM they are also progressively able to interpret emotional states and anticipate emotional responses, and adjust their behaviour accordingly. Preschool children do not fully comprehend the notion of reciprocal thought. Although they understand that other people have minds of their own, they do not yet grasp the idea of other people thinking about them. Reciprocal thinking is vital for children to maintain meaningful friendships.

Developing Theory of Mind (ToM)

A basic distinction is made between first-order ToM which develops first, and second-order ToM which develops later, approximately two years after the 'simple' ToM attributions. First-order attributions are limited to the child's mental state. Second-order attributions include the mental state of another person. Other attributions are based on higher-order beliefs – a person's reflection on another's thinking about his or her mental state, and subsequently 'mutual knowledge'.

Examples of the attributions are:

Second-order ToM: "Mary believes that John believes that the ball is in the closet."
Higher order ToM: "Johnny is thinking of Daddy thinking of mummy."

A typical three-year-old is still unable to pass the classical 'test' for first-order ToM, which is the false belief task, but this is no longer the case for most four-year-olds. At four years a shift takes place in terms of representational understanding. A representation is dependent on the perspective of the observer (appearance-reality distinction) and it also depends on the function of representation (pretend-real distinction).

At the age of approximately four or five years, children develop a realisation that someone can act on an incorrect belief and that emotional misrepresentation and social deception are possible. Around the age of six or seven years, children gain the understanding that expectations and biases have a direct effect on knowledge and comprehension. Children also develop some understanding of how mental states are affected by psychological characteristics associated with individual experiences. Performance continues to improve with age.

- **Expressing basic emotions**

Pre-schoolers develop greater expressiveness regarding the basic emotions of **happiness, fear, anger and sadness.** At two years of age, children are capable of spontaneous expression. However, most children are socialised from a young age to adjust their behaviour in relation to their setting, for example, to rough-and-tumble play with peers as opposed to being calm and contained while walking along a busy street.

Pre-schoolers tend to have more fears than older children. Due to the boundary between reality and fantasy that is not necessarily defined yet, certain fears are specifically associated with this age group: the dark, imaginary/supernatural creatures, loud noises, or separation from caregivers, and strangers. Expression of anger through temper tantrums is quite common between the ages of two and four.

- **Expressing complex emotions**

Complex emotions involve the self and/or others. Growing awareness of self and consideration of another's perspective are linked to the emergence of these emotions. Pre-schoolers act upon evaluation of themselves in relation to norms of social acceptance. The interplay of developing cognition and language facilitates their ability to express emotions that require ToM skills, e.g., empathy. (Table 7)

Social acceptance

Do children in all cultures define their self-concepts in terms of their individual skills and social acceptance? Research into the self-concept of two types of societies, an individualistic (e.g. Western) culture and a communal or collectivistic (e.g. African) society, provided different views of the self.

In an individualistic society, preference is given to personal goals, self-reliance, independence and creativity in child-rearing practices. In a communal society, individual goals are subordinate to collective (community) goals, therefore child-rearing styles emphasise interdependence, obedience and conformity. This means that individualistic societies will value individual skills more in their defining of the self-concept. Communal societies on the other hand, will consider social acceptance, living in harmony with others and subordination to the wishes of others, as important attributes of the self.

It is therefore clear that the culture in which children grow up will determine which aspect of the self-concept will be emphasised. For example, in African communities parents sensitise their children from an early age to approach others, to elicit 'intelligences' from others, and to define the self by obtaining meaning through interaction with others, especially with the peer group. The Zulu concept *umuntu umuntu ngabantu*, which means 'a person is only a person with other people', is an example of this self-definition. (Nsamenang, 2011a)

The culture in which children are reared will determine which aspect of self-concept will be emphasised.

- **Regulating emotion**

A particularly important **socio-emotional developmental task** in the preschool years is developing skills and practising **emotional control.** Emotion regulation refers to the strategies we use to adjust or change our emotional state to a comfortable level (e.g., in intensity or duration), in order to accomplish certain goals (e.g. social interaction). The guidance of parents and practices modelled in the family setting are central in this regard.

Newborns have immature nervous systems and between birth and approximately 18 months, their environment is instrumental to the neural pathways while self-soothing and self-regulation are formed. Advances in emotion regulation are associated with the maturing of the cerebral cortex due to its contribution to inhibiting impulsivity, as well as the benefit infants derive from favourable attachment relationships. The infant is able to modulate their level of arousal when required in response to a caregiver's attunement.

Early development of self-regulation

Sensitive caregivers learn to respond to their children's responses and synchronized engagement and disengagement. As children and caregivers move in and out of attunement, the cycle of joining, separating, and reuniting becomes a central aspect of developing psychobiological regulation. Caretakers intuitively slacken their scaffolding as their children's self-regulatory capacities increase. Through these separations and reunions, children slowly learn that they can survive on their own, that caretakers return, and that they (children) have some ability to regulate their bodily and emotional states. (Cozolino 2014: 64-65)

Lev Vygotsky, the Russian psychologist, related seven manifestations of defiance by three-year-olds to the individuation process and their pursuit of independence. This 'crisis' plays out in their family relationships and is observed in the following behaviours:

negativism: not wanting to do something simply because she or he was asked to;

stubbornness: insisting on something on the basis of the initial decision to demand it and not because she or he wants it;

obstinacy: showing anger against norms and rules, and generalised dissatisfaction;

wilfulness: refusing assistance;

protest: arguing decisions, and in conflict with the environment;

devaluation: assigning negative traits to people and objects; and

despotism: desiring complete control over those around her/him.

Pre-schoolers gradually gain skills to manage emotional interactions with caregivers and peers, and they also use strategies to regulate emotional expression. They are progressively able to interpret, predict, and even change the affective state of another person. Employing a strategy of emotion regulation can also form part of a premeditated plan to reach a goal. Strategies for emotion regulation include avoiding situations associated with unfavourable emotion, and pretence of not experiencing the felt emotion (masking).

Display rules are cultural guidelines for when, how and to what degree, emotions may be displayed. Children therefore learn behaviour prescribed by culture; for example, according to Western and Asian culture, you should smile even when accepting a gift you do not like.

3.7 Language development

Language is a noun not a verb. People do not do language; they speak, write, or sign, to communicate using language. Language entails a set of abstract symbols, a lexicon, and a grammar that specifies syntax and discourse structures for combining symbols to represent an infinite variety of concrete and abstract meanings and to achieve communicative functions. Language must be encoded into and transmitted through physical symbols that can be understood by others who know the same language.

Language may be expressed and understood phonologically through speech, orthographically through writing, or gesturally through sign language. Any form of symbolic communication that uses words is considered verbal, whether or not it is spoken. On the other hand, communication can be nonverbal as well as verbal. Communication involves co-construction of meaning by interacting partners who use gaze, non-symbolic gestures, facial expression, physical proximity, tone of voice, and other forms of paralinguistic modulation (eg. intonation) to enrich linguistic meanings and convey the emotional tone of the message, or to communicate without verbal symbols.

Language acquisition is a primary task for the young child. From a developmental point of view, communication precedes language. The typical process of mastering vocal communication starts with the crying of the newborn and proceeds for approximately 24 months when – at the beginning of preschool period – full sentences are spoken. (Figure 8)

Universal vocabulary acquisition

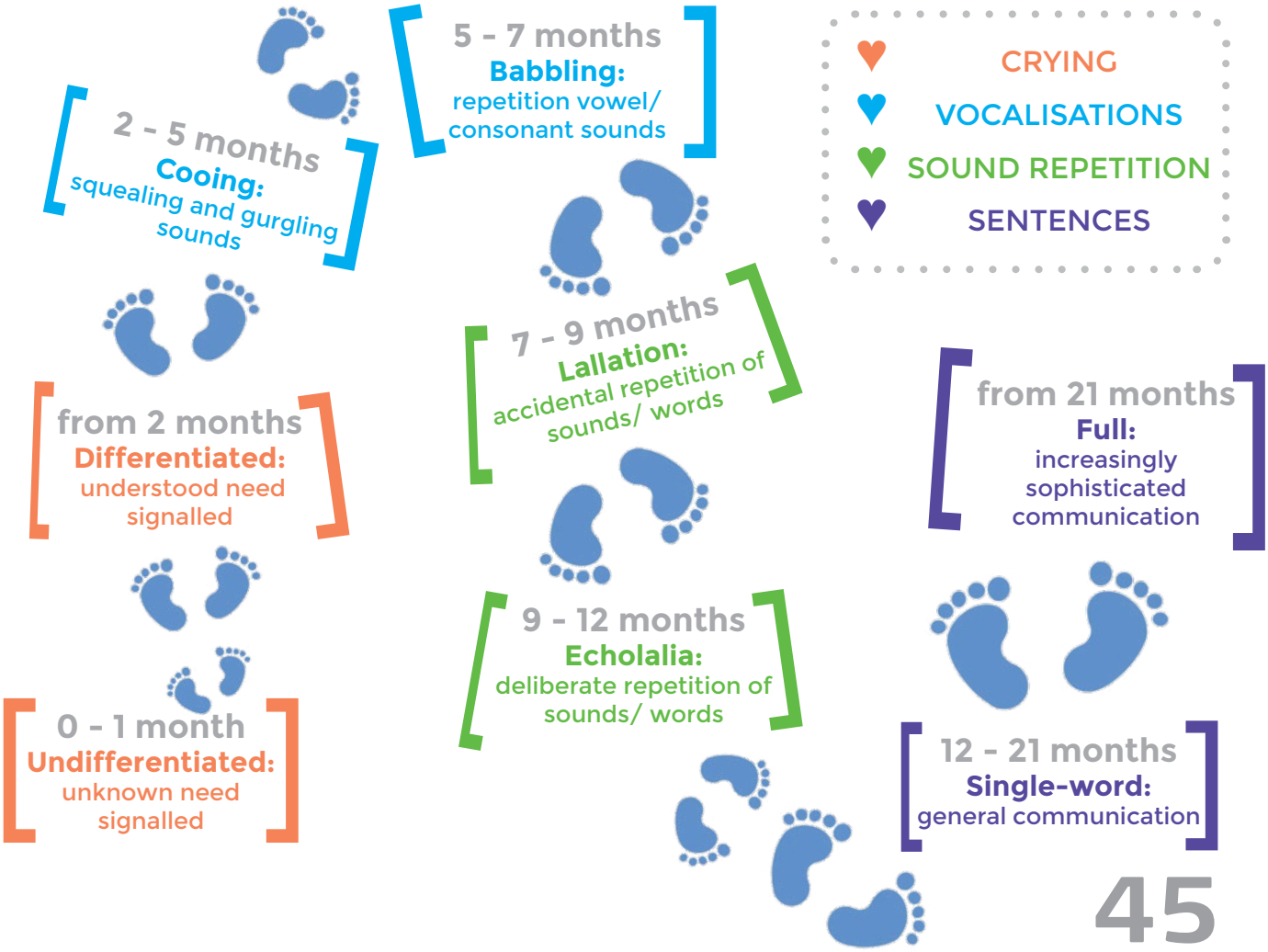
Regardless of the language they are learning to speak, young children learn vocabulary in fundamentally the same way. There is a universal order to how children learn language. No matter which language they speak, children acquire classes of words in a particular order, because of what the children are bringing to the task. Researchers found that for the seven languages studied, nouns comprise the greatest proportion of 20-month-old children's vocabulary, followed by verbs and then adjectives. This study shows that while languages may differ greatly, the sequence in which young children learn the parts of speech appears to be the same across different languages. Specifically, mothers in every country reported that their children said significantly more nouns than any other word class (verbs, adjectives, closed-class words). The researchers added that the finding held true regardless of whether the language spoken tends to emphasise nouns, as in American English or verbs, as in Korean. It is theorised that children learn nouns first because nouns are concrete things that can be seen and touched. Verbs and adjectives are more abstract and so are more difficult concepts for children's minds to grasp. (Louw & Louw 2014c: 116)

Children follow the same steps to learn vocabulary, regardless of the language spoken.
(Bornstein et al. (2004)

A distinction is made between receptive and expressive **vocabulary. Receptive** vocabulary refers to the understanding of what is being communicated, and **expressive** vocabulary to the set of words used to communicate personal thoughts and ideas.

In general the individual's receptive vocabulary is greater than her/his expressive vocabulary, but this difference is especially obvious during the time of developing the command of language. An infant's understanding of what is communicated to her/him is more advanced than the vocabulary available for communication exchange. Between the ages of 16 to 24 months, a "vocabulary growth spurt" occurs, and the learning of words increases considerably.

Figure 8: Development of productive speech



The rapid expansion of vocabulary continues for three-to six-year-olds and is supported by two processes:

Fast mapping:

When pre-schoolers pick up the approximate meaning of a word they have heard once or twice, it is tentatively added to their lexicons.

Extended mapping:

With time, the 'full' meaning of the word is learnt by further exposure and its usage.

The phenomena of over extension and under extension are consistent with immature vocabulary acquisition.

Overextension refers to the over inclusive use of a word. In the absence of a specific label, a familiar word is used on the basis of a shared characteristic. For example, a little girl seeing a lobster for the first time, calls out to her mother to look at the big 'cricket', as in her mind, both animals share the same features.

Underextension refers to restricting the meaning of the word used. An example is when a young child does not consider a swimming costume to be 'clothes', because they cannot yet relate to the use of clothing for different activities.

The age of three years appears to be a significant marker in terms of language development. Regarding **phonology (the system of sounds of a language)**, three-year-olds are able to say all of the vowels and most consonants. Over-generalisation is evidence of their emergent understanding of **morphology (the word structures of a language)**. For example, when the rule to form the past tense is applied to a verb that is an exception – they may say 'eated' instead of 'ate', for the past tense of 'eat'.

Regarding **syntax (the rules of sentence construction of a language)**, three-year-olds generally use short and simple sentences that include a variety of word forms. At the age of four and five, their sentences consist of more words and are more complex; and between five and seven years, children's sentences become 'adult-like'. However, during early childhood their production of complex sentences may not necessarily mean they understand what they are saying. Double negatives, embedded phrases and passive voice are examples of morphology that can be challenging.

The use of pragmatic language (using language for social communication) is linked to ToM. Typical three-year-olds enjoy having a conversation and would try to explain themselves even if they are not clearly understood. Five-year-olds are more able to adjust themselves to their communication partners' frame of reference. The ability to participate in reminiscing unfolds with age. Conversation about young children's recollection of personal events – or reminiscence – not only stimulates language, memory and ToM development, it also promotes attachment and strengthens their evolving sense of self. (Table 8)

Table 8: Developing participation in reminiscing

AGE	NATURE OF ENGAGEMENT
18 – 20 months	starts to refer to the immediate past
20 – 36 months	responds to questions in simple way
03 – 05 years	participates when reminiscence is guided
05 – 06 years	creates personal narratives

Very young children require extensive scaffolding from adults to develop **narrative ability.** The dominant narrative text structure is described as an account of details of a specific event in chronological order, in order to make meaning of information. To be able to give an account of a personal experience is a conversational skill that develops gradually in relation to other language skills and cognitive abilities, in particular, understanding the concept of time. (Table 9)

In this context, narrative ability is preceded by children's ability to create scripts. Script knowledge is stored in semantic memory and refers to general knowledge about a subject or an event resulting from a personal routine. Narratives can be structured according to implicit relationships between topics which, from an uninitiated point of view, may result in an apparent lack of across-topic cohesion. In addition, narratives might also have different functions and display different narrative text structure elements across languages and cultures. These narratives are consistent with the socialisation of children within the oral tradition of communication.

Table 9: Mainstream discourse development

AGE	NARRATIVE STRUCTURE	DESCRIPTION
3 ½ years	Two-Event	combines two events
4 years	Leap-Frog	more than two events, but narrated out of sequence; omits important information
5 years	End-at-High-Point	narrates events chronologically, but ends prematurely with a climatic event
6 years	Classic	introductory details, chronological order of events and resolution after high point

> (I)n most languages, reading is the cornerstone of learning, and the foundation for reading is built in early childhood. (Woolfolk 2010: 56)

The groundwork for **emergent literacy** is laid within the language and communication environment in which the child is raised.

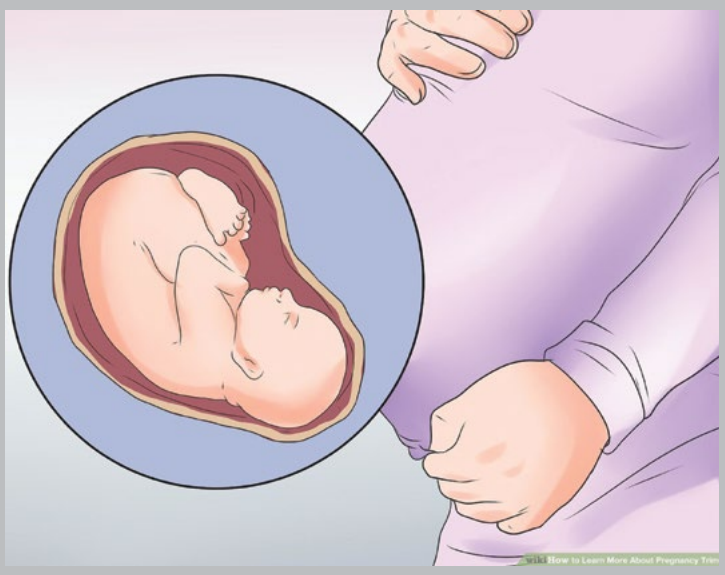
In preparation for eventual mastery of reading as a scholastic skill, the focus is on developing the phonological awareness and oral language of preschoolers..

Phonological awareness enables children to make links between sounds and letters (phoneme-grapheme association) and to break down words into parts (auditory discrimination).

Oral language skills are linked to expressive and receptive vocabulary, knowledge of syntax and narrative ability (which refers to the ability to give an organised account of an event).

Parents, caregivers and teachers are well aware of the importance of promoting activities that involve reading and having conversations with their children. In contexts where age-appropriate printed material for young children are not readily available, other opportunities for language development and communication should be capitalised on, for example singing, story-telling, conversing as a family or group of community members and using proverbs to instil values. Experience-dependent plasticity of the brain is at work here: pre-schoolers who are raised in language-rich contexts enjoy an added advantage of mastering communication skills over and above those developed in the normal course of language development.

3.8 Social development



Fetus and mother, both in adaptive states of calm inwardness, interact by way of muscular activity – of the fetal body and of the mother's uterine contractions, heartbeat, breathing and her whole body movements - and by various senses. In the last trimester they respond to one another and learn. The human infant at birth is more helpless than a newborn monkey or chimpanzee, and much more developed than a newborn rat or kitten. Above all, the human infant is born with unique powers of expression and intersubjective communication of thinking. (Hobson, 2002)[7]

A young baby tries to communicate self-generated purposes and interests, with emotional evaluations of experiences, including remembered or imagined ones. This condition is the adaptation of a species that employs psychological abilities of a highly evolved consciousness. (Donald, 2001)

This consciousness grows in a long period of dependence not only on maternal nurturance and paternal protection, but also on communication of interests and meanings in affectionate relationships with other family members, and on learning with companions of all ages in play. (Trevarthen et al 2006: 24)

3.8.1 Attachment

Already as an unborn, the child is introduced to the social world by the relationship with her/his mother. The newborn's neurological circuitry is set in motion with mother-baby communication. The father's voice is recognised in utero, and the neonate's bond with the father therefore also starts before birth. Bonding with the father is fostered by his presence during the delivery. Soon after birth, the infant's attachments gradually extend to other significant persons in her/his social context, beginning with family members and other relatives. In African cultures, the infant's relatives and community members usually play a much more prominent role early in her/his life than in Western traditions.

Attachment in different cultures

John Bowlby's theory on attachment is based on the biologically functional behavioural system developing as a result of the shared desire of Mother and Child for physical closeness, with survival and reproduction as its purpose. Irrespective of their social / cultural context, the primary task of parents keeping their offspring alive involves two parts: protecting them from danger when they cannot do so themselves and equipping them with skills that enable them to take care of themselves.

Culture can be defined as a symbolic and behavioral inheritance out of the historical / ancestral past that provides a community with a framework for other-directed vicarious learning and for collective deliberations about what is true, beautiful, good and normal.

- The symbolic inheritance of a cultural community consists of its received ideas and understandings, both implicit and explicit, about persons, society, nature, and the metaphysical realm of the divines.
- The behavioral inheritance of a cultural community consists of its routine or institutionalized family life, social, economic, and political practices.

Bonding is the neurobiological process that occurs at birth and a few days thereafter, and the cognitive process associated with emotional connection that follows throughout the developmental years is called attachment.

Bonding is a special kind of togetherness. It is a comfortable feeling of well-being that occurs within the dynamic relating of the mother and her newborn.
It is a 'settling in together.'

Bonding has four components:

- skin-to-skin touch,
- communication by means of eye contact and the mother's vocalisation,
- holding, and
- playfulness.

Attachment develops as a result of responsive caregiving fuelled by the qualities of sensitivity and responsiveness. It is dyadic of nature which means that the infant develops a unique relationship with each of her/his attachment figures. Attachment is a dance – as the child is constantly changing (developing), and so are her/his attachment figures in terms of responsivity. Early attachment is organised in four stages. (Table 10)

Table 10: The phases of attachment

EXPECTED AGE	PHASE	CHARACTERISTIC
0 - 2 months	Pre-attachment	Indiscriminate social responsiveness
2 - 7 months	Attachment-in-the-making	Discriminate sociability
7 - 24 months	Clear-cut attachment	Proximity seeking
24 - 36 months	Reciprocal relationship formation	Goal-directed partnerships

- **Pre-attachment**

The infant employs crying and smiling to get the attention of the caregiver. Caregivers become associated with basic need fulfilment and therefore also relief of distress. The infant recognises the caregiver by means of voice or smell, but is not particular about which caregiver fulfils her/his basic needs. The vocalisations and facial expressions of adults increase interaction.

> Attachment relationships are the context in which children learn to process information, represent experience, and develop protective strategies.
> (Crittenden 2016: 225-226)

- **Attachment-in-the-making**

Specific caregivers slowly gain preference. The infant visibly shows more pleasure to be with favoured ones (usually the mother), for example, by the increased frequency of vocalising, posture and attentiveness. The infant learns about responsivity – and anticipating caregiver engagement is built on previous experience.

Human babies are born with the potential to adapt to almost any family. The immediate issue for babies is to adapt to their specific mother and family. This relationship transforms their universal potential into a specialist's competence. Infants become specialists in surviving – and thriving – in their families.

Parents employ two strategies to establish and maintain interaction with their infant. The infant is familiarised with enjoyable interactive routines of shared experience (e.g., playing peek-a-boo or reading a book together). Secondly, parents respond contingently to the infant's cues regarding levels of attention, activity and communication.

Early childhood in the life cycle

Erik Erikson proposed that the life cycle unfolds in eight stages of psychosocial development. The individual's social context is not only taken into account, but also personal agency, i.e., her/his active involvement in fulfilling emotional needs by resolving tension regarding a specific issue associated with developmental phase. The stages applicable to early childhood can be translated into questions pertaining to attachment.

Trust vs mistrust — **Feeding**

Birth to 1 year — Can I rely on my caregivers to fulfil my needs?

A sense that the world is safe and good place is developed, resulting in hope and optimism.

Autonomy vs shame / doubt — **Toilet training**

1 to 3 years — Am I safe while separated from my caregivers?

A sense of self-sufficiency is developed, resulting in pride and self-belief.

Initiative vs guilt — **Independence**

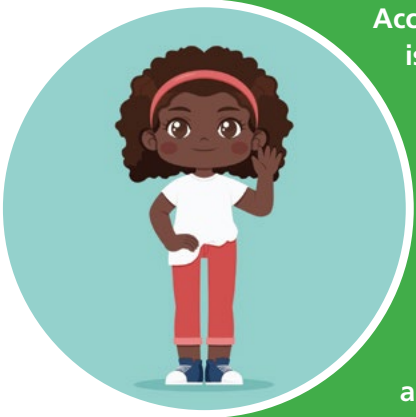
3 to 6 years — Will I be able to do it?

A sense of resourcefulness while venturing out is developed, resulting in willpower and advances in self-control.

Industry vs inferiority — **School**

6 years to adolescence — Am I good at what I do?

A sense of skilfulness is developed, resulting in competency and self-confidence.



According to the African life cycle theory, child development is a process of gradual and systematic social integration by the acquisition and growth of competencies in the physical, cognitive, social, and emotional domains and the moral maturity required to competently engage in family and society. The social selfhood phase – an individual lives together with others in the community – unfolds in seven periods. The periods are determined by biologically-based social markers and associated with a cultural developmental task. Three of the seven periods apply to early childhood.

- **Clear-cut attachment**

The infant seeks proximity to particular caregivers. During the first year, an infant gets unsettled when separated from her/his attachment figures.

During the early years, the infant is highly dependent on the caregiver and develops a sense of security when confident that parental care will be available when needed. This secure attachment relationship provides a platform for the child's independent exploration of the wider world.

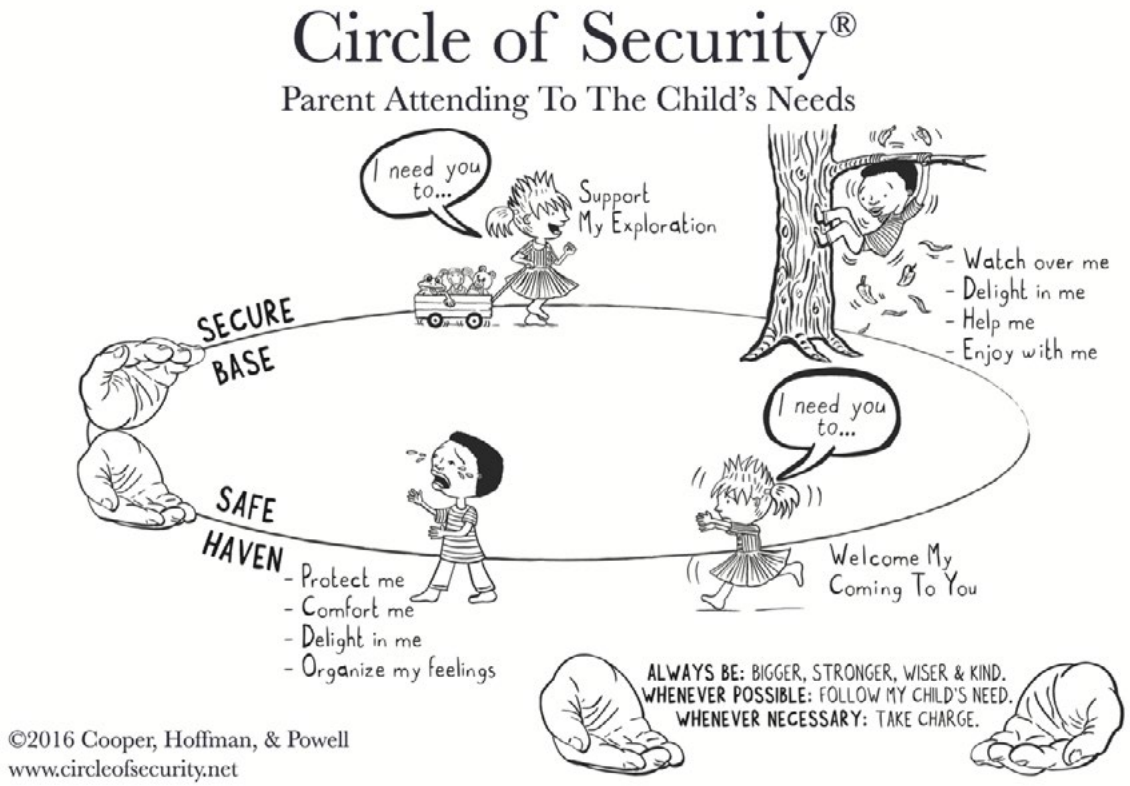
The essential features of healthy attachment are its provision of a secure base and a safe haven for the child. The infant is encouraged and supported to explore her/his environment and thereby expand their horizons. This is prerequisite to a child's acting upon their need for autonomy. On the other hand, when necessary, she or he is at liberty to approach the caregiver for comfort and protection. This is vital to a child developing self-regulation skills. (Figure 9)

- **Reciprocal relationships**

Pre-schoolers associate attachment relationships with safety and security. They are subsequently able to manage caregivers who come and go, because parents' behaviour has become predictable. Cognitive development allows for caregivers to negotiate some compromises with a view to goal attainment.

Infants tend to show a maternal preference in the early months of life, whether or not their fathers are engaged in childcare. In these early years, fathers are largely seen as mothers'

Figure 9: Attachment in a nutshell: Circle of Security ®



helpers. Nonetheless, children show strong attachment to their fathers by the end of the first year of life. Many studies have found that fathers play more with their toddlers and preschool children than do mothers, that children prefer to play with fathers, and that mothers talk to and play with children is attenuated when fathers are present.

Particularly during the early period from 9 to 15 months, several longitudinal studies have found that responsive parental behaviors reliably predict children's subsequent rate of language acquisition. That is, parents who are more likely to provide language input that is contingent on children's attention and activity have children who subsequently develop language at a faster rate than children of parents who are less likely to provide contingent language initially.

The attachment between **father** and pre-schooler should be promoted. In a two-parent caregiving setting, two- and three-year-olds benefit more from the input of fathers than mothers in developing language, and in particular those fathers whose vocabularies are varied. Among the Bamiléké of Cameroon, fathers usually will talk to the child about the importance and value of the name they bear and family expectations regarding the name. Parental talk on this issue begins very early even before the child starts to talk in mother/child dyads.

Experiences related to attachment during early childhood are organised into the implicit memory system. The teachings about relatedness that early unconscious memory holds, whether positive or negative influence later psychological development.

The four dimensions of parenting: **attitude, control, expectations and communication** combine in four different parenting styles: authoritative, authoritarian, permissive and uninvolved. (Table 11)

The **authoritative** parenting style appears to be most conducive to raising competent children. In this style, all of the four parenting dimensions are operational. The authoritative caregiver is loving and accepting of the child, though also controlling. Inductions are utilised for limit-setting, that is, conversation about transgression includes explanations, moral reasoning and guidance, while expression of negative affect is accepted. Expectations of the child are high, but the standards are realistic and the caregiver is supportively involved in the process of the child meeting these. Open communication between caregiver and child is valued.

Alternatively, the **authoritarian** caregiver gives priority to her/his position of power in relation to the child. They tend to exercise control in a negative fashion, including the use of (physical) punishment and (hostile or anxiety-provoking) threats while being emotionally dysregulated. This style is a potent model for aggressive behaviour. High expectations are held for the child.

Permissive caregivers tend to be loving, sensitive and nurturing towards their children, but due to neglect of setting boundaries, children are not guided in terms of self-regulation. **Uninvolved** caregivers do not display behaviour related to any of these domains.

Table 11: Parenting styles

STYLE	DIMENSION			
	ATTITUDE: warm and nurturing	CONTROL: consistent	EXPECTATIONS: high	COMMUNICATION: open and continuous
Authoritative	✔	✔ democratic induction	✔	✔
Authoritarian		✔ autocratic power exertion		
Permissive	✔			
Uninvolved				

3.8.2 Family relationships

Sibling relationships in a family are usually characterised by positive close bonds. During early childhood, children's psychologically significant relationships with their siblings go through phases. Infants are more active and confident by 18 months and as a consequence, fighting with older brothers and sisters become frequent. Pre-schoolers usually have conflict about right of possession. Due to progress with mastery of cognitive and emotional skills, disputes can turn more constructive when pre-schoolers are able to participate in the resolution of conflict. As is the case with differences among peers, practising to settle disputes is an important facet of socialisation. Healthy attachment relationships are the stepping stone to fulfilling social relationships in future.

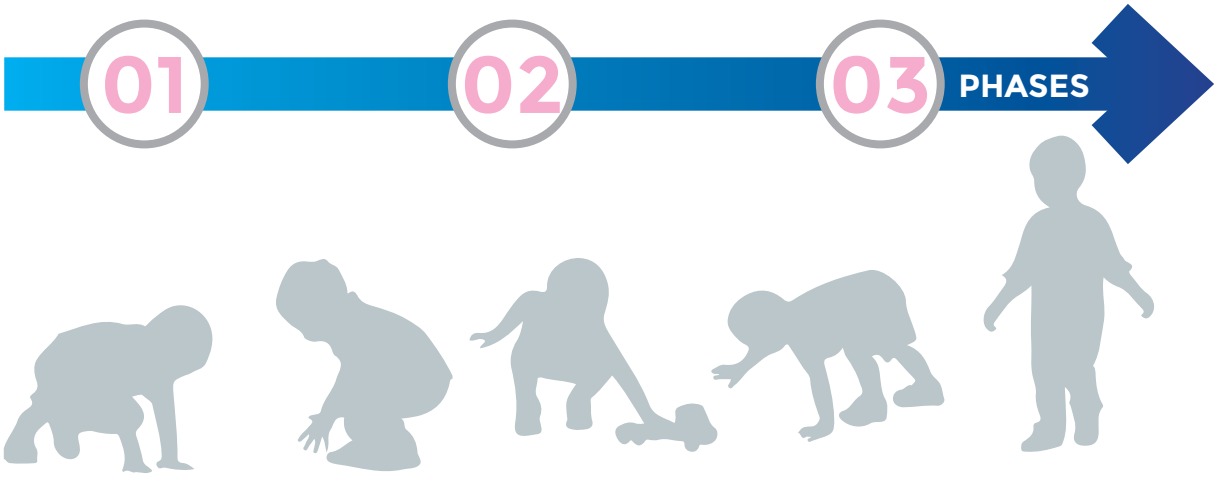
In various African cultural contexts, the qualification of 'sibling' is defined broadly, and may also include extended family members such as cousins. Predominantly in rural areas, older siblings are involved in the caregiving of their younger brothers and/or sisters, as well as "mentoring" (teaching) them and playing traditional games.

3.8.3 Peer group relationships

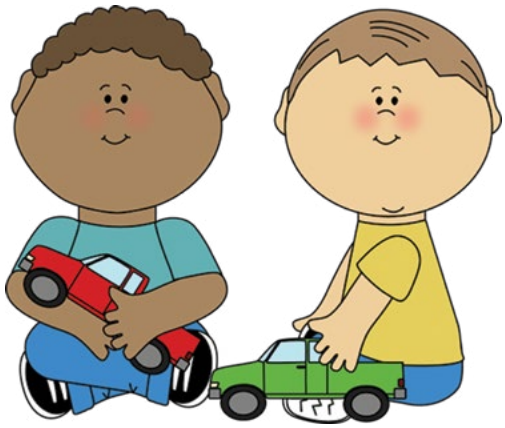
Stepping from family life into the world, the first step of a life-long process to fit in and even feel 'at home' with others, is making friends. **Peers** are equals; approximately the same age and developmental levels are shared. During infancy, relationships with peers develop in stages: the focus shifts from objects to interaction.

Table 12: Phases of peer relations during infancy

Object-centred	Interaction initiation	Role exchange
Focus on common toy; conflict over the toy will result in negative reactions	One baby offers another baby the toy	Babies take turns offering each other the toy



The friendships of pre-schoolers have marked significance in terms of social development. Pre-schoolers' ToM is a good predictor of social skills in later years.



Not all caregivers are aware of the value of **play** in young children's lives. When children play, different aspects of development are interacting. Play therefore provides an excellent opportunity for the development of various skills: perception, movement, cognition, language, self-regulation and interpersonal relationships. Although many older pre-schoolers also enjoy solitary play for varied periods of time, forms of play that complement their stage of developmental mastery are often favoured.

Functional play

involves repetitive physical activities such as running, skipping and jumping and playing with water, sand and clay. Tongue twisters – to say words or phrases of which the order of sounds make pronunciation difficult – are used as a sophisticated game in some traditional African settings to practice verbal fluency. **Gross and/or fine motor skills are practised.**

Construction play

involves the manipulation of objects and/or toys to create something such as building a tower or a puzzle, or making dolls or doll clothes. **Visual perceptual, fine motor and cognitive skills are practised.**

Social pretend / fantasy play

involves make-believe to change the function of objects, enact social roles and give form to imagination. **Cognitive, language and communication, as well as social skills are practised.**

Games

are structured according to sets of rules. Games can be physical (hide-and-seek or hop-scotch) or mental (board games).
Cognitive and social skills are stimulated.

Social participation in play

A classic experiment was conducted by Mildred Parten (1932), during which the play behaviour of 42 young children between two and five years of age were observed over period of eight months, and analysed according to frequency of six forms of play classified according to the child's relation to the peer group.

A **passive** child, perhaps fidgeting with her/his own body, was regarded to be **unoccupied**. An **onlooker** was a child who observed others playing without joining in. **Solitary independent play** referred to the child who played with toys among other children without taking notice of them. When the child played "beside" other children in a group rather than 'with' them, while having conversation and using the same toys, it was described as **parallel play. Associative play** referred to a child playing together with other children in a loosely structured group that allowed movement in and out. The children's interactions and conversation were primarily focused on a joint activity. C**ooperative play** occurred when a group of pre-schoolers became organised by one or two leaders into roles and the group members collaborated with a view to a common cause.

Play follows a developmental progression during early childhood. Social participation is dependent, to a large extent, upon the age of the children. As a rule, the youngest children either play alone or in parallel groups, while the oldest individuals play in the more highly organized groups. Marked individual variation, however, was observed.

3.8.4 Socialisation

Socialisation is the process by which norms and values associated with the community or culture, and expectations regarding socially acceptable behaviour are taught to children. Weaning and toilet training are two important socialisation milestones in early childhood. The expectation for the young child is greater self-sufficiency. In traditional African cultures, a child is **weaned** between two and three years of age. Various practices are associated with taking the young child from the mother's breast.

Toilet training is closely related to neuromuscular development. Sufficient control of the sphincter muscles is required and the child must be able to sit upright. Development of both receptive and expressive vocabulary has to allow understanding of instruction and basic communication. Toilet training generally happens between 20 and 24 months of age. Between the ages of 30 months and three years, full bladder and bowel control and successful toileting are usually reached.

Socialisation, as part of social development, already starts during infancy, and the following agents and mechanisms contribute to the socialisation process:

1. As **authority figures**, parents and caregivers give direct instruction on basic desirable behaviour. Various disciplinary techniques are used for this purpose. They serve as role models of prosocial behaviour (to the benefit of another person) and moral behaviour (what is good and right). Parents are also the gate keepers in control of most aspects of their young children's social lives.

2. Young children learn much from interaction with their **siblings and peers**, and this is of particular value to their emotional and social development.

3. Children in early childhood are exposed to the **media** to different degrees, depending on accessibility. Media refers to communication in printed form (books, magazines, newspapers), by means of electronic technology (cell phone, television, computer) and the radio. Socialisation through the media has advantages and disadvantages. It can bring them in contact with examples of prosocial behaviour, and have a positive effect. Alternatively, contact with models of violence and aggression through the media will likely have a harmful effect.

4. **ECD centres and pre-primary classes** form part of an essential social system for pre-schoolers. Children learn how to join and function within an organised group setting. Whether through direct instruction or vicarious learning - picking up the skill as a result of modelled behaviour - social and moral behaviour is acquired and the children have ample opportunity to practise the applicable skills.

3.9 Summary

Three prominent developmental tasks of the early childhood years muster resilience (hardiness in the face of adversity):

Self-regulation

not only to be able to gain control over emotions and behaviour, but also to be able to sustain attention, i.e., cognitive control;

Communication and learning

to use language to express thinking and reasoning; and

Relatedness

to develop friendships and practise social skills.

4 EARLY CHILDHOOD INTERVENTION

4.1 Definition

The term Early Childhood Development (ECD) is used to refer to development taking place during the period of early childhood, i.e. over the life span from before birth to about six years. It is also used to refer to programmes advancing development in the various domains. Considering young children with developmental delays and disabilities, Inclusive Early Childhood Development (IECD) and Early Childhood Intervention (ECI) are applicable.

IECD services and supports foster the physical, cognitive, language, and social-emotional development of children with delays and disabilities as well as their typically developing peers in early childhood programs that are accessible, equitable, and enable participation from, and support for, all children. **ECI is a system of service**s that provides support to the families of children with developmental delays, disabilities, social-emotional difficulties, or children who may develop delays due to biological or environmental factors.

Effective ECI systems are:

- **individualized;**
- **intensive;**
- **family-centered;**
- **trans-disciplinary or interdisciplinary;**
- **team-based;**
- **evidence-informed; and**
- **outcomes-driven.**

ECI, a social and child rights model, replaces traditional approaches to service provision, such as the medical model. Whereas traditional deficit-focused approaches involve an "expert" providing the child with intervention services typically delivered in a clinical setting, a contemporary ECI approach involves the provision of individualized, family-focused and child-centered services delivered in the least restrictive natural environment of the child. Rather than being 'expert driven', ECI service delivery is 'family driven'. The family is a partner in the provision of services and makes all decisions regarding the child and family.

4.2 Developmental delays and disabilities

According to Article 24 of the **UN Convention on the Rights of Persons with Disabilities (UNCRPD) (2007)**, opportunities for persons with disabilities to develop optimally must be prioritised. In view of this, very young children with developmental delays and disabilities should be identified, assessed and their development promoted by their participation in childcare and educational programmes, with school readiness as a main focus. This approach paves the way to the successful implementation of the twin-track approach to inclusive education.

The twin-track approach to inclusion

According to the Community-based Rehabilitation (CBR) Guidelines, "(a) twin-track approach is generally the best way to promote inclusion, and this can be applied to early childhood care and education. The 'two tracks' are as follows.

1. Focus on the system: determine the existing situation regarding early childhood care and education in the community, and find out who is included or excluded, and what the strengths and weaknesses are. This needs to be done in collaboration with families, community leaders, health workers and teachers, plus anyone else who is involved.

2. Focus on the child: develop a system to identify and support children who are at risk of being marginalized or excluded, or who might need additional support. This is usually referred to as early identification."

4.2.1 Developmental delay

Development during childhood constitutes various domains, of which seven were discussed in Section 3

- **neurobiological,**
- **sensory,**
- **motor,**
- **cognitive,**
- **emotional,**
- **language and**
- **social development.**

The **developmental track** is often plotted in terms of (age-related) milestones and/or (process-related) markers. Children who are found to display considerable variation from expectations in one or more of the developmental areas are considered to have developmental delays. In order to avoid a situation in which immaterial variations in development are classified as delays, **systematic assessments** are conducted:

Even though there are predictable stages and ages for development, the range of normality is broad. No individual child should be expected to conform to all of the averages or milestones presented. Mean ages, weights or heights do not describe any given child but rather some fictitious 'average' child, who is a combination of all children. A child who is outside the norms may be experiencing a momentary acceleration or delay or may be proceeding at his own individual pace. Even a child with severe retardation [sic] is a developmental being; his personal schedule may be delayed beyond the normal period, but development proceeds nonetheless.

There are different reasons why children present with developmental delays. On the one hand, delays are associated with specific health conditions. For example, autism is associated with delays and variations in language and communication development. On the other hand, delayed development can be the result of external circumstances such as poverty and its knock-on effect in the early years.

During developmental assessment, an **age equivalent** is frequently used. An age equivalent is used to measure the functioning of the child in comparison to an age norm, which is the "age level at which the average person in the population performs the same as the individual who is being assessed. The magnitude of the delay is revealed by comparing the age equivalent to the child's chronological age, and can be expressed as mild, moderate and severe. While an age equivalent is useful to express the measure of delay, there are also **caveats** in terms of application.

- The child may fall behind in one developmental domain, but not in others. It follows that the age equivalent only applies to the specific developmental area that was assessed.

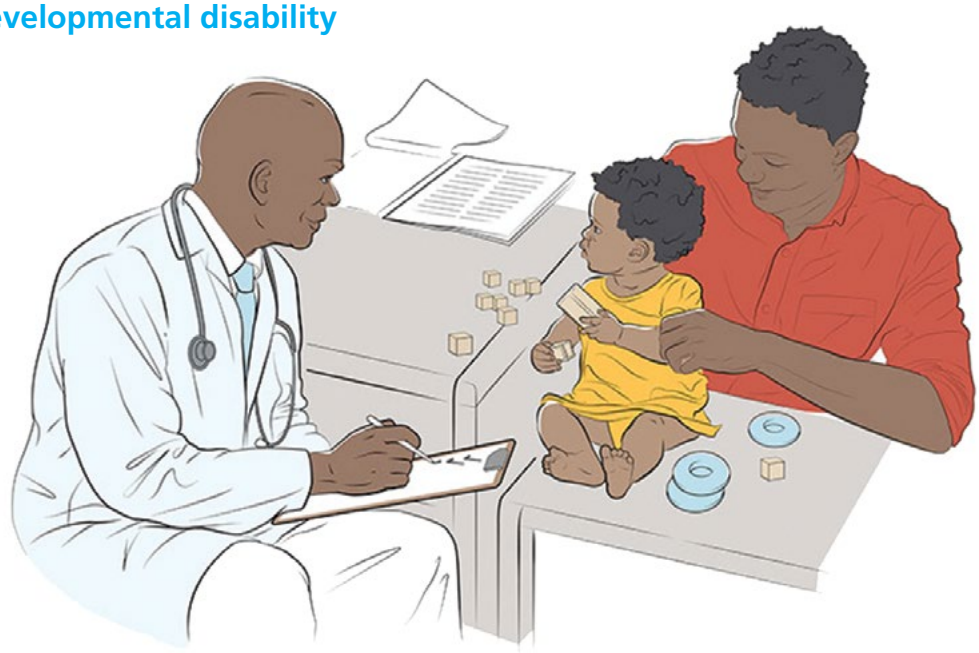
- The younger the child, the less certainty exists whether the developmental delay will continue. Therefore, besides being applicable to a specific aspect of development, the validity of the age equivalent is of limited duration as well. A conclusion with regard to the extent of the delay should therefore only be made after very young children have received suitable intervention.

- Due to a raw score that is linked to a chronological age, it can be misinterpreted from a developmental perspective.

  Scale scores are unequal. 'One year's growth' has a very different meaning at different points in the age continuum and for different areas of adaptive behavior. For example, children acquire communication skills more rapidly between the ages of 2 and 3 than between the ages of 10 and 11; thus a 3-year-old who obtains an age equivalent of 2 years is further behind his or her age mates than is an 11-year-old who obtains an age equivalent of 10.

Some children catch up with their peers at some point in time, and others do not. The classification **Global Developmental Delay** is sometimes used for children younger than five years who present with delays in reaching various developmental milestones, but who cannot be assessed. Systematic assessment is then not possible due to very young age or the extent of delays.

4.2.2 Developmental disability



When a developmental delay or delays have proved to be long-term, and its unfavourable impact is expected to continue throughout the individual's life-time, it is regarded as a **developmental disability.**

Developmental disabilities are frequently characterised by the marked degree of the developmental delay(s) present. As a result, it is often already recognisable in one or more aspect of daily functioning during early childhood or by the time the child enters school.

There are different **causes** of developmental disability. Most developmental disabilities are congenital (biological origin before or during birth), but some happen at a later stage because of a health condition, injury, or exposure to toxins. For example, duplication of chromosome 21 during cell differentiation is linked to Down Syndrome. Premature birth and/or low birth weight hold a significant risk for neurodevelopmental conditions. Other congenital disabilities are cleft palate and club foot. Anoxia (no oxygen) and probably hypoxia (interrupted oxygen flow) during birth cause damage to the brain and therefore neurodevelopmental conditions. Illnesses such as jaundice left untreated, meningitis and measles are linked to developmental hearing impairment. Traumatic brain injury is associated with cognitive impairment.

Poverty is associated with harmful environmental conditions that hold a significant risk for disability. A substantial group of children who grow up in impoverished circumstances are exposed to unintentional neglect. Whereas parents and/or caregivers are focused on family members' basic survival, these children often do not get the nourishment needed for physical growth. When caregivers become psychologically unavailable due to stress, their children forfeit the benefits of nurturing relationships. They may be deprived of sufficient opportunities for age-appropriate stimulation.

Medical and educational services required in support of children with delays in the window period of development are frequently too expensive to access. Children are more accident prone when supervision is inadequate in unsafe neighbourhoods. Whether deliberate or unintended, the impact of neglect is the same. Physical injury, ingestion, illness and cognitive and psychosocial developmental delays resulting from compromised neurodevelopment are associated with neglect.

4.3 Inclusive Early Childhood Development (IECD)

At the basis of IECD lies the philosophy of **inclusive education that is practised holistically.** All young children – with or without developmental delays and disabilities – are supposed to enjoy the years preceding formal schooling by utilising opportunities for mastery of developmental skills and early learning related to the various developmental domains. Inclusion of very young children with disabilities in the ECD system has been challenging.

Physical access to spaces of learning is required, as well as developmentally appropriate accommodation within the learning environment to ensure their active participation. Pre-primary education relates to school readiness as well as the transition between preschool and foundational education.

ECD programmes of a high quality have **common features**. Educare staff are not only trained in teaching methods, but also have sound knowledge on relevant aspects of childhood development and most importantly on disability and developmental delays. Programmes are designed to be child-centred, that is, the planning of activities are guided by children's interests and field of experience. A variety of materials are used for lessons. A holistic approach is followed and the curriculum covers the spectrum of developmental domains. Activities are presented both within small and large group settings. Play is utilised as the primary vehicle for pre-schoolers to master skills and to learn. Thinking skills are developed by the way teachers share information. Lastly, teachers encourage and support children while, and up until, skills are mastered.

> ECD programs are necessary for two reasons: brain development during the first years of life is experience-based and it has significant, lifelong effects."
> (Young & Mustard 2008: 74)

The **advantages** of attending ECD programmes are numerous. Pre-schoolers enjoy better health due to immunization and nutrition systems that are often linked to the programmes. Their socio-emotional development is fostered through play and interaction with peers and caregivers. Cognitive development is enhanced by engagement in age-appropriate stimulating activities. There is a connection between pre-schoolers attending ECD programmes and those who are eventually enrolled at primary school. Further, there is also an association between ECD attendance and grade promotion (as opposed to repetition), as well as enrolment (as opposed to dropout)

4.4 Early Childhood Intervention (ECI)

According to the UNCRPD, early identification and intervention, as well as the minimisation and/or prevention of secondary disability should be promoted. Intervention in the form of habilitation or rehabilitation should start as early as possible and be available in as close proximity as possible to communities concerned.

Early childhood intervention (ECI) during the first five years of life works on three preventative levels:

- **Primary prevention** aims to avert or reduce the incidence of developmental difficulties through the removal or reduction of risk factors as well as the enhancement of stimulation and care in the family.
- **Secondary prevention** intends to curb the impact of possible or existing developmental challenges.
- **Tertiary prevention** works towards avoiding or decreasing the sequelae of developmental disabilities.

An important aspect of ECI programmes is a focus on children who are **developmentally at risk**, irrespective of the factors related to these risks. Therefore, whether the risk is linked to biological factors such as varied neurodevelopment or psychosocial challenges, contextual factors (e.g., poverty), or a combination of factors, it should be addressed during the preschool period. Developmental screenings should be conducted at regular intervals.

Pre-schoolers gain most advantage from child-focused intervention programmes that start before the age of three years, and continue into the school-going years to retain positive outcomes. Consistent involvement of the child's family – irrespective of cultural background – contributes to programme intensity. Effective intervention programmes provides an array of services, including family support. Programmes are available to cater to the individualised needs of children whose development is being monitored.

While some very young children's developmental delays or disabilities are pronounced, other pre-schoolers 'grow into shortfall' as a result of what is known as the sleeper effect when it comes to brain growth. At this developmental stage, the infant does not depend on some cognitive functions related to the frontal area of the brain, because its synaptogenesis is not yet complete or other neurological functions have to be set first. Consequently, in the event of a brain injury, the effect of injury will appear minor. However, at a later developmental stage, the complexity of information processing has to have such functions 'online'. It is only then that the actual impact of the damage years before turns out to be significant. This is one reason why early identification, monitoring and intervention during early childhood is vital.

Research continues to confirm the greater efficacy of early action - and in some cases, intensive intervention - as compared with remediation and other "too little" or "too late" approaches. Changing young children's experiences can substantially affect their development and learning, especially when intervention starts early in life and is not an isolated action but a broad-gauged set of strategies.

The period from conception to the start of school is considered a **window of opportunity** to reorganise and salvage some brain function in the event of early brain lesions. Brain plasticity is beneficial to two processes during this time:

- new neural circuitry is brought about by restructuring in association with experience and intervention; and
- lost or injured neurons are replaced by continued neurogenesis.

There are different life situations linked to ECI. For example, improvement of 'birth outcomes' starts with adequate maternal health services that include provision of micronutrients, monitoring maternal health and family disability histories, and genetic counselling if applicable. Skilful medical staff are responsible for deliveries, and newborns are screened and if necessary referred for postnatal services. Moreover, the potential long-term consequences of preterm births are mediated through intensive intervention.

In summary, early childhood intervention services are supposed to be available to young children who are developmentally at risk due to biological and/or psychosocial factors, or young children who have confirmed developmental delays or disabilities.

> Neuroscience evidence also directs attention to the early detection, identification, and treatment of problems such as visual impairments, auditory deficits, and major perceptual-motor delays that have profound effects on children's capacity to access and incorporate the stimulation needed to organize the developing nervous system. For these aspects of development, there is solid evidence that the timing of corrective efforts matters a great deal.
> (Shonkoff & Phillips 2000: 216)

The efficient ECI system functions holistically.

- **It is child-centred:** Following the identification of a disability, intervention is planned according to the individualised needs and circumstances of the child, with a view to her/his optimal development. The interrelationship among various factors is recognised, for example between nutrition and growth, and neurodevelopment; or hygiene and chronic illness. Pre-schoolers attend educare centres or pre-primary schools. In these environments, children at risk are constantly monitored. Young children with autism, attention difficulties or mental health conditions receive appropriate support, counselling or therapy.

- **It is family-centred:** All parents and/or caregivers, irrespective of cultural traditions, have access to support, counselling and education, and as active participants are empowered to make informed decisions about their child. Informal (extended family and community) and formal (government) safety nets are in position for the family to provide adequate care. Support to parents and caregivers includes educare for infants and pre-schoolers while they work, as well as opportunities for respite if required.

- **Multidisciplinary services** are rendered in a coordinated fashion to ensure flow of information among involved stakeholders who are proficiently trained. Programmes are evidence-informed, eg. scheduled home-visits throughout infancy, including the prenatal period, as part of developmental assessment, supporting parents and caregivers by means of information dissemination and equipping them with or enhancing caregiving skills.

- **Developmental monitoring** is beneficial to all young children, irrespective of whether developmental risks or complications are present. It is reassuring to parents and/or caregivers of those children whose development follows the expected trajectory and contributes to their confidence in caregiving. Parents and/or caregivers of children with notable variations to expected development can count on the support and assistance of service providers in dealing with identified delays or differences.

Seven guidelines for developmental monitoring

- The professional who is responsible for monitoring develops a relationship with the young child's family.
- Monitoring is family-centred and the family therefore takes an active role in the process.
- It is approached holistically with the result that multiple factors related to the child's health condition and development and the contextual circumstances of the family are taken into account.
- The professional tasked with monitoring is well-informed by childhood development theories.
- Reliable instruments appropriate for the purpose of screening are employed.
- Screening for identifiable and treatable conditions (vision and hearing tests), and for genetic and metabolic disorders forms part of developmental monitoring.
- When screening procedures reveal the young child's need for developmental support, she or he has easy access to services to this effect.

WHO 2012: 42-43

Ten guidelines for developmental assessment

Developmental assessment is an essential component of functional ECI programmes. It is employed in a multidisciplinary framework according to particular guidelines.

01 **A family-centred approach is followed.**

02 **All developmental domains are evaluated systematically.**

03 **Establishing the concerns of the caregiver forms an integral part of the first consultation.**

04 **A detailed history is obtained, including a developmental track record and list of risk and protective factors.**

05 **The respective caregiver–child interactions are observed in the home setting.**

06 **Priority is given to obtaining information on the child's daily life at home, including nurturing and stimulation.**

07 **The support system of the family / caregivers is identified.**

08 **Caregivers' mental and physical health is an important consideration in relation to the child's development.**

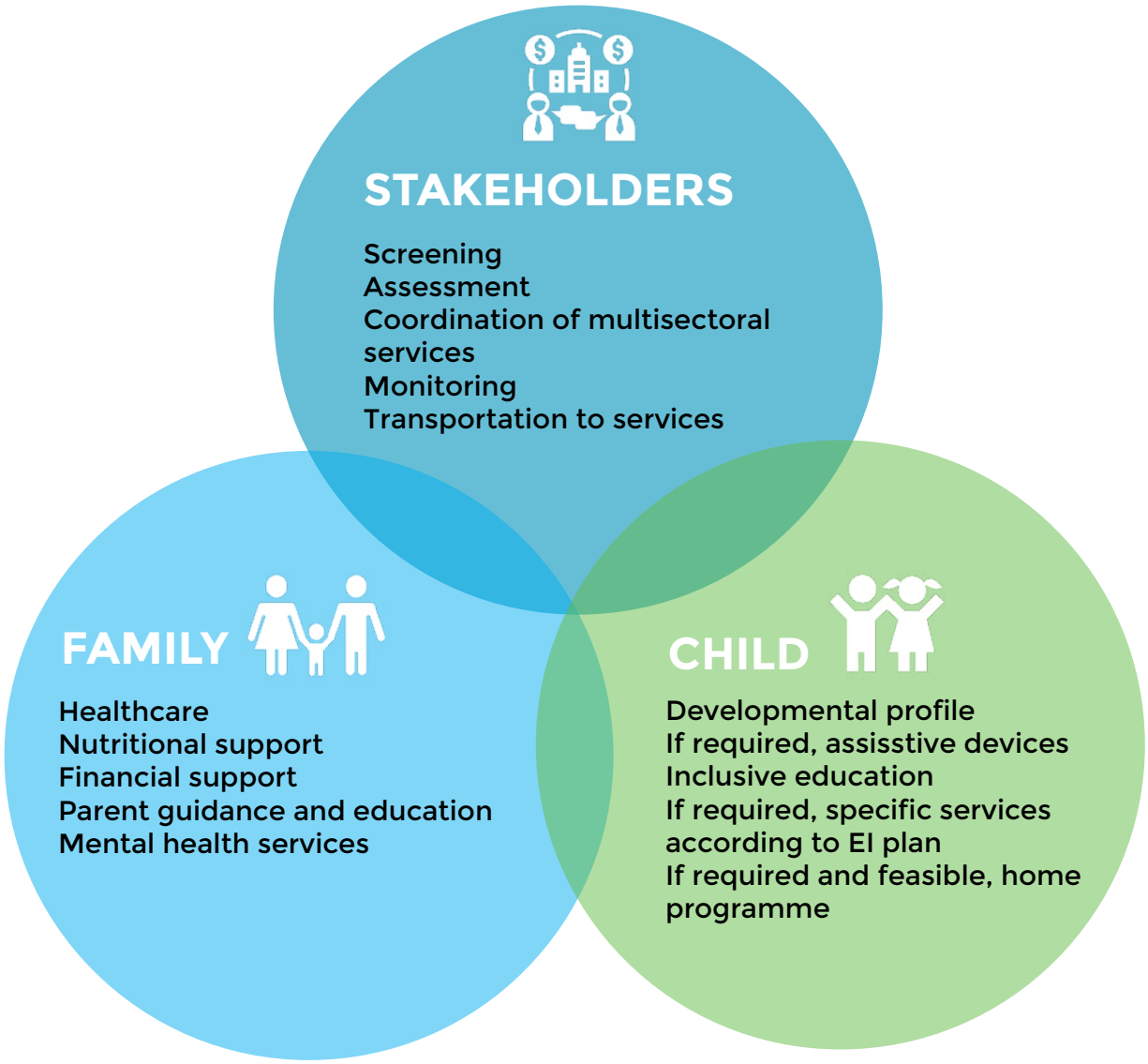
09 **Assessment material provides a structure for communication between the evaluator and the family system about the child.**

10 **The outcome of the assessment merges into intervention strategies to address developmental challenges.**

In conclusion, the following processes are essentially linked to effective identification of developmental delays and disabilities and addressing the accompanying developmental, health and educational needs appropriately:

- early identification of children with delays and disabilities;
- prioritising their access to ECD programmes / school;
- ensuring parent or caregiver guidance, education and support with regards to nurturing care;
- strengthening parents' or caregivers' ability to work; and
- addressing the mental health needs of parents or caregivers.

The following services should be available in an operational early childhood intervention system:



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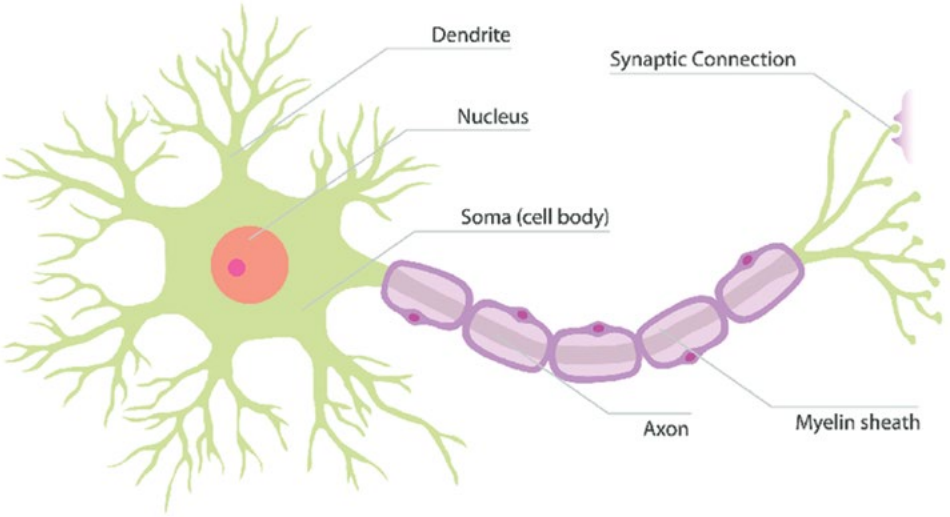
APPENDIX 1

NEURON



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GLOSSARY: Neuron

Axo
neuronal structure that carries information from the cell body to synapse cleft

Cell differentiation
the repeating process of cell division by which one type of cell changes into another usually more specialised type

Dendrite
the part of the neuron that receives information from other cells

Myelination
process of insulating neuronal axons with myelin sheath, from birth to approximately 18 years

Myelin sheath
fatty casing that insulates axon

Neurogenesis
generation of neurons

Neuron
cell that carries information from one place in the nervous system to another by means of electro-chemical signals

Neurulation
development of hollow tube that evolves into foetal brain and spinal cord

Nucleus
structure contains the genetic material of the neuron

Soma
cell body which contains the nucleus

Synaptic connection
chemical neurotransmitters carry electrical signal from sending axon to receiving dendrite

Synaptogenesis
formation of connections among neurons

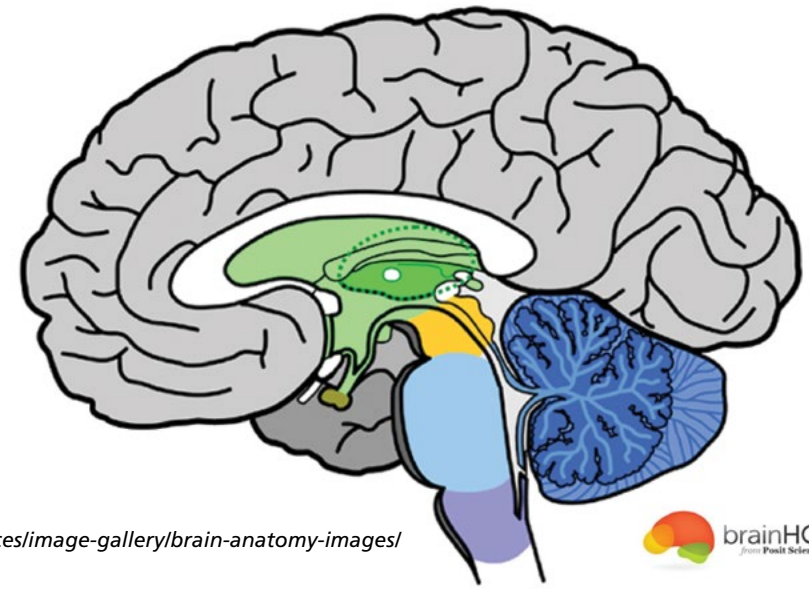
APPENDIX 2

HUMAN BRAIN

The human brain can be grouped into four key components: (1) the brain stem, which is responsible for regulating core functions such as respiration, body temperature, heart rate, and blood pressure; (2) the midbrain, which works with the brain stem to mediate the state of arousal, appetite control, and sleep; (3) the limbic area, which is responsible for aspects of emotion, including regulation and attachment; and (4) the cortex, which is responsible for abstract cognition and language systems. Although each component is responsible for different functions, there are many interacting and interconnected systems composed of neural networks. The network systems work together to carry out specific functions, such as sensing (vision, hearing) and responding (arousal, emotion, and thinking) in different areas of the brain. (Young & Mustard 2008: 74)

KEY

1. BRAINSTEM
2. MIDBRAIN
3. LIMBIC SYSTEM
4. CORTEX



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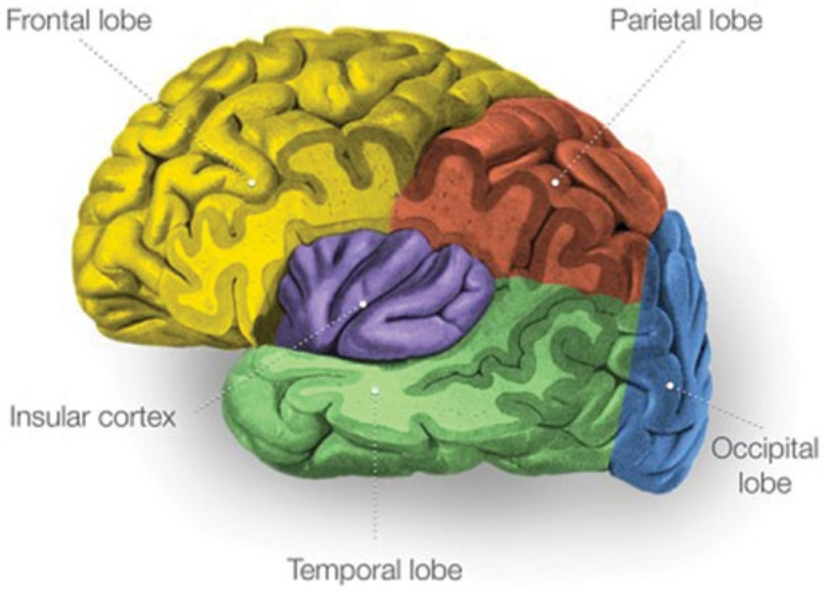

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GLOSSARY: Human Brain

Cerebral cortex
outer layer of the cerebrum (grey matter) and has different parts. Also divided in left and right hemispheres linked by corpus callosum. Each hemisphere has four lobes

Frontal lobe
"managing director" of behaviour; involved in higher-order / cognitive / executive functioning, as well as emotional processing

Insular cortex / insula
also called fifth lobe of the brain; receives and relays information related to taste and interoception (internal bodily states)

Occipital lobe
area in which visual processing is localised

Parietal lobe
multimodal processor responsible for integration of information from various sensory modalities, of sensory and memory systems, and of internal states and external sensory information

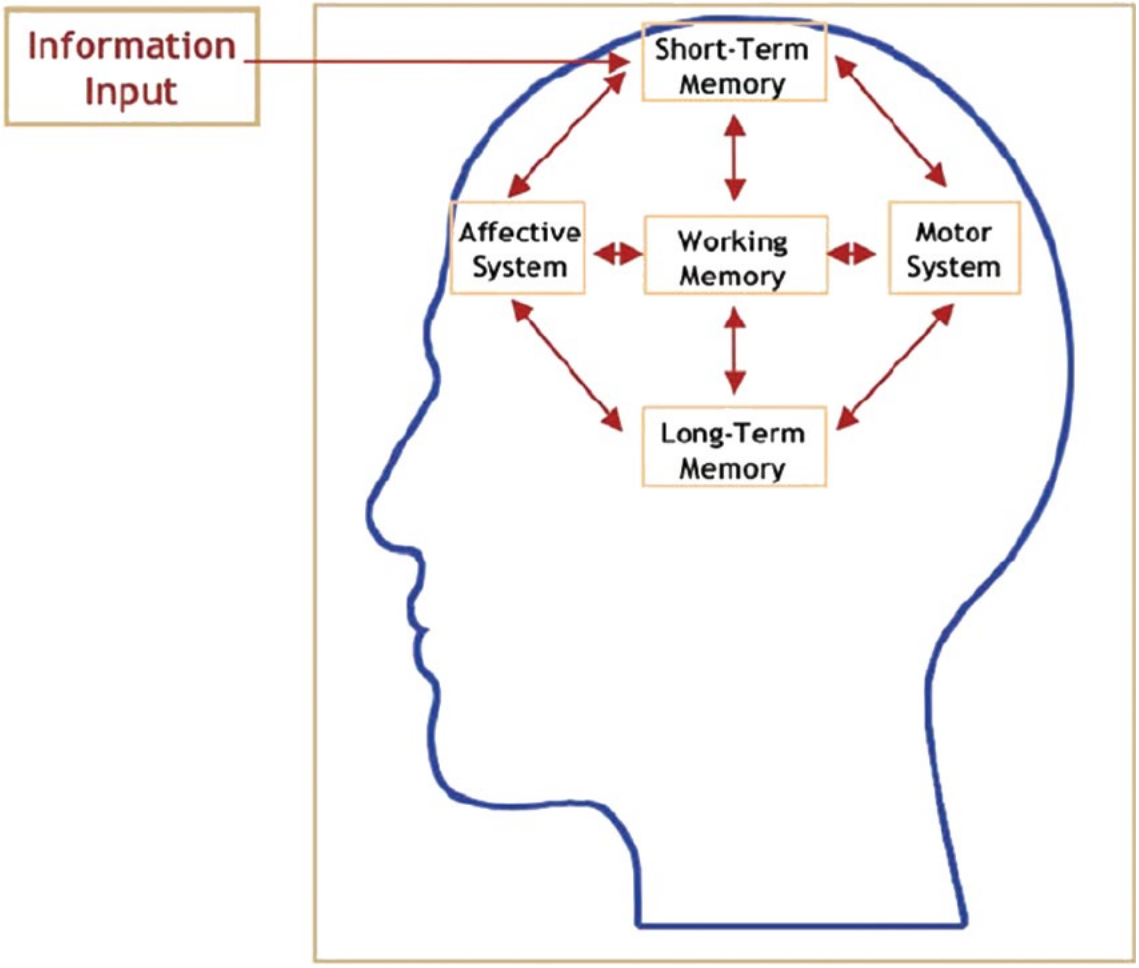
Primary motor cortex
one of the regions of the frontal lobe; sends information for fine motor control of muscles

Primary somatosensory
receives information related to touch, pressure, pain and proprioception (body parts and their movements)

Temporal lobe
area in which auditory processing is localised, and important role regarding emotion and memory. Visual item recognition (part of visual processing) also localised here

APPENDIX 3

MEMORY



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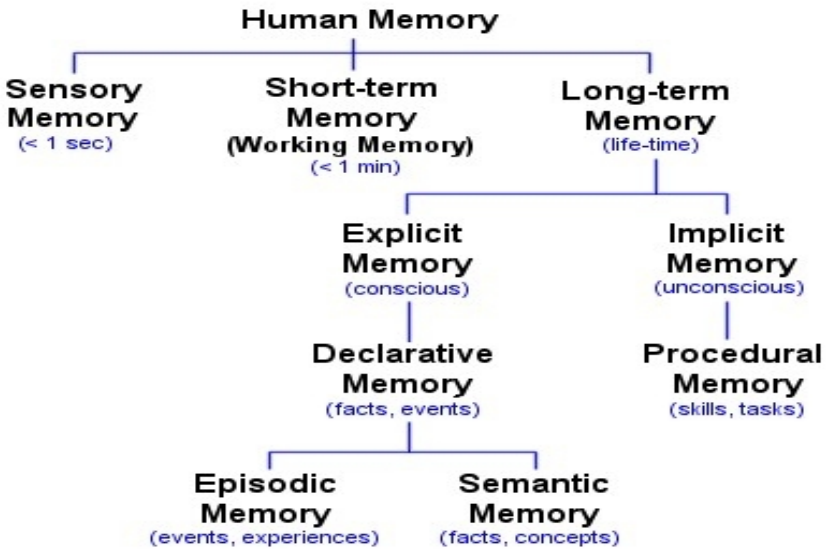

GLOSSARY: Memory

Declarative memory
long-term memory (LTM), explicit memory system
factual information

Episodic memory
LTM, explicit memory system
particulars of events / personal experiences, i.e, autobiographical memories

Explicit memory
conscious LTM system
memorisation and recollection intentional

Implicit memory
unconscious LTM system
memorisation and recollection involuntary

Organised memory
LTM, explicit memory system
information processed through application of executive functions in declarative / semantic store

Procedural memory
LTM, implicit memory system
processes required for action, task or skill execution

Rote memory
LTM, explicit memory system
memorised by means of repetition and stored in declarative / semantic system
also known as mechanical memory

Semantic memory
LTM, explicit memory system
concepts and facts, non-personal knowledge base

Sensory memory
short-term memory (STM)
very brief mental representation of stimuli received from one of the senses

Working memory
STM, limited capacity
limited amounts of information retained for brief period while cognitive processes are executed thereon

END NOTES

[1]the period before, during and after the birth process

[2]The Apgar score is indicated in the Health Passport.

[3]"The major endocrine gland. A pea-sized body attached to the base of the brain, the pituitary is important in controlling growth and development and the functioning of the other endocrine glands." https://www.lexico.com/en/definition/pituitary

[4]"A large ductless gland in the neck which secretes hormones regulating growth and development through the rate of metabolism." https://www.lexico.com/en/definition/thyroid

[5]support cells of the nervous system

[6]system of the brain that deals with emotion, memory and arousal

[7]Intersubjectivity is "the appreciation and sharing of the subjective state of another individual" (Stefanos & Baron 2011: 255).

Republic of Namibia

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