Brain Development (0 to 3 years)

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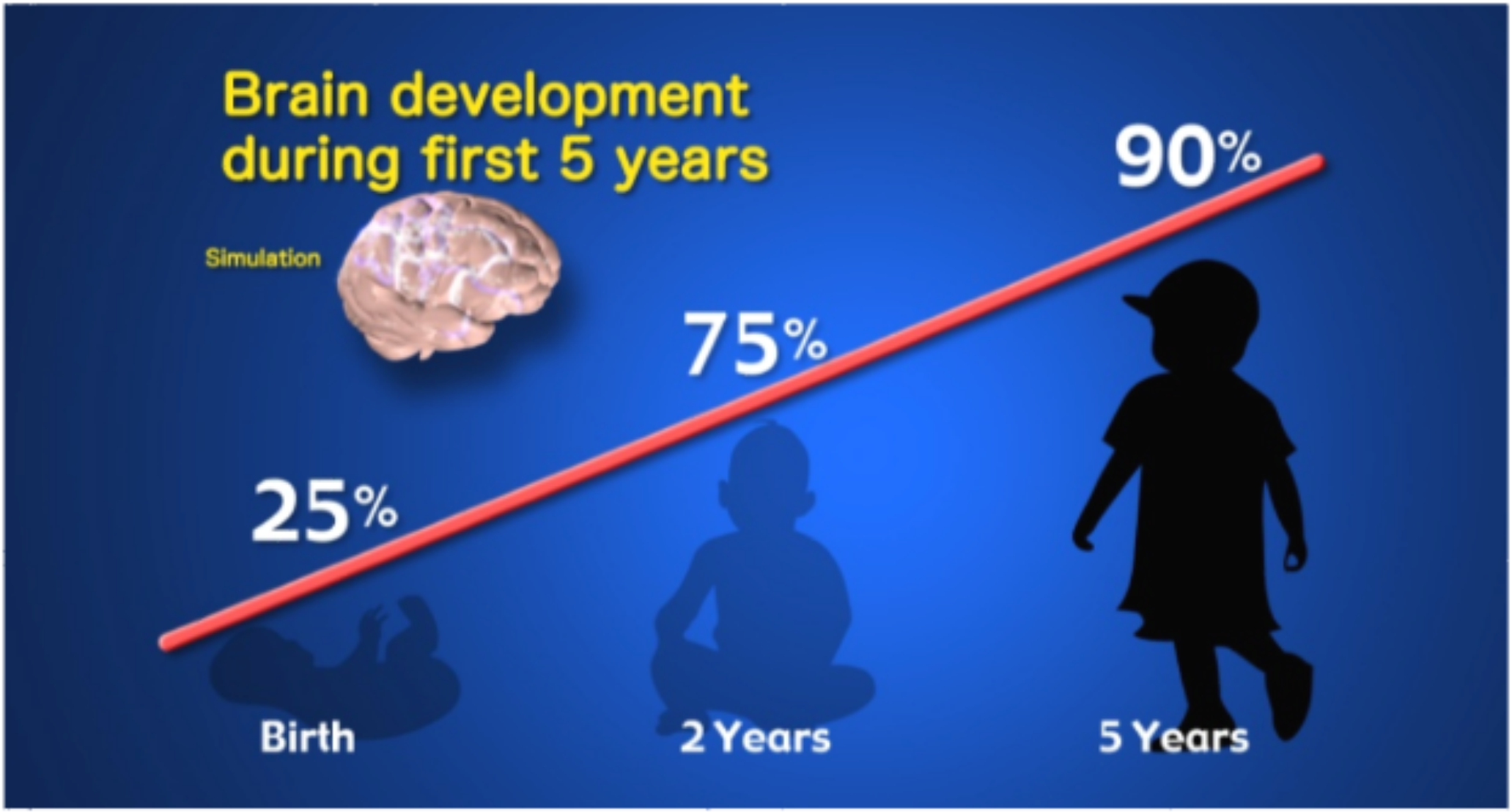
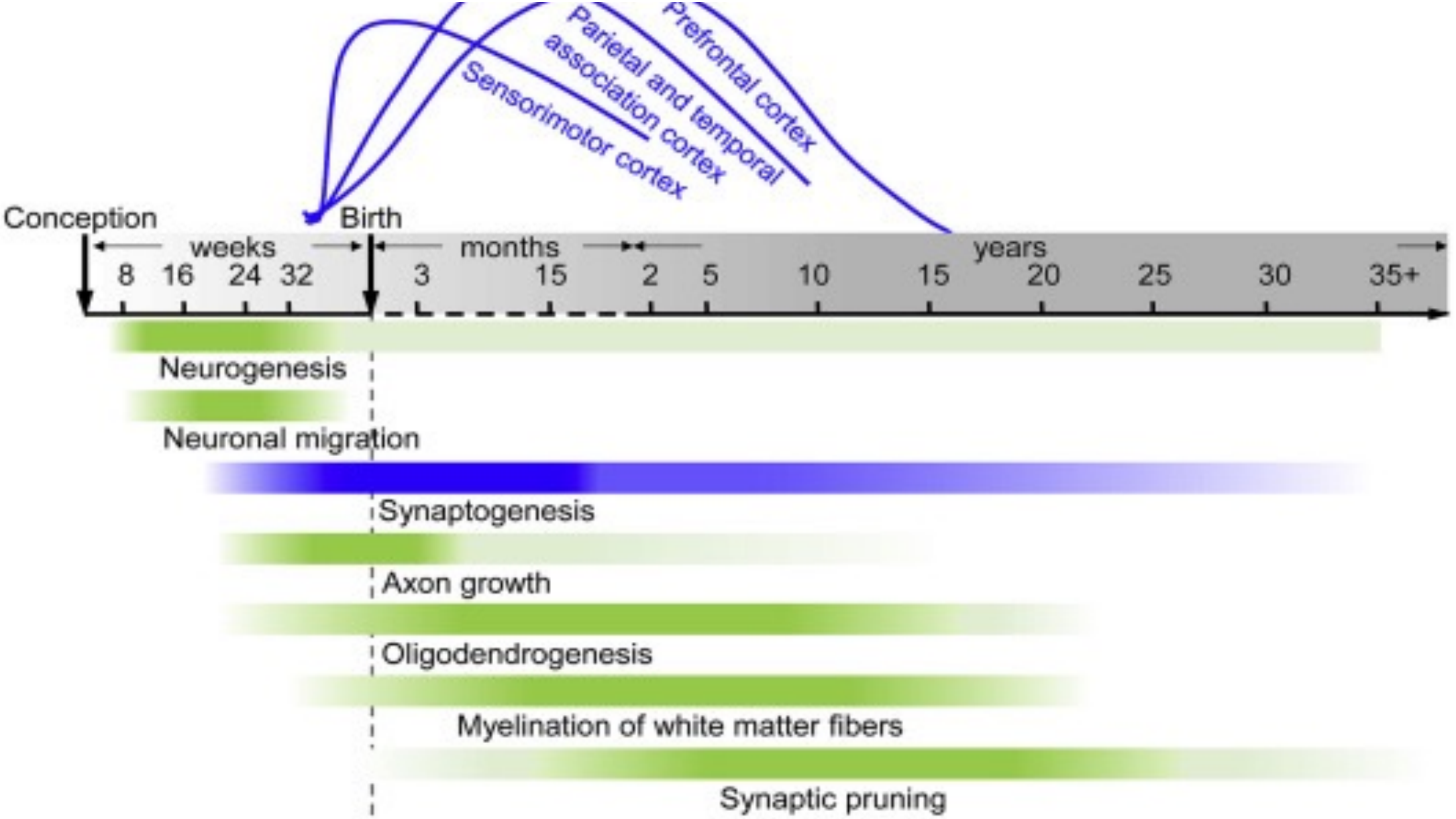
OUTLINE

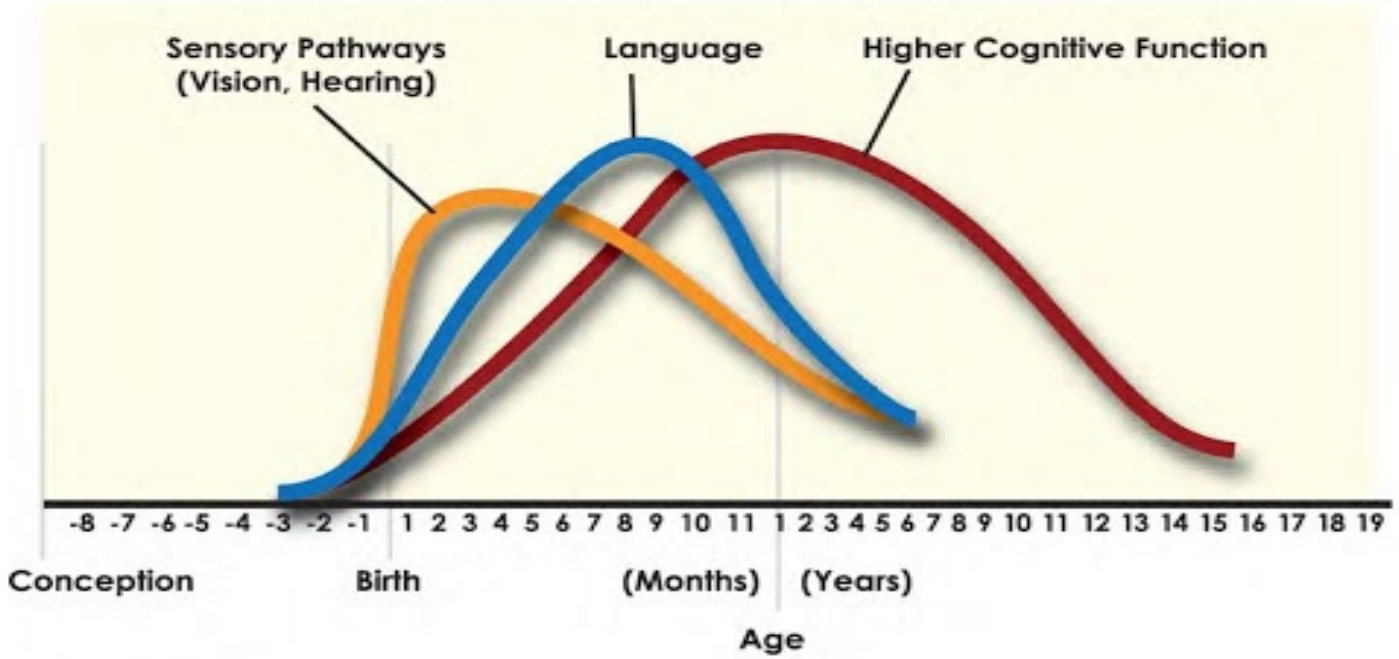
- Introduction
- Brain development
- Neuroplasticity & Pruning
- Activities to support brain development
- Factors influencing brain development
- Screen time and brain development


Brain development
during first 5 years
Simulation
25%
75%
90%
Birth
2 Years
5 Years


Prefrontal cortex
Parietal and temporal association cortex
Sensorimotor cortex
Conception
Birth
weeks
8 16 24 32
months
3 15
years
2 5 10 15 20 25 30 35+
Neurogenesis
Neuronal migration
Synaptogenesis
Axon growth
Oligodendrogenesis
Myelination of white matter fibers
Synaptic pruning

Human Brain Development

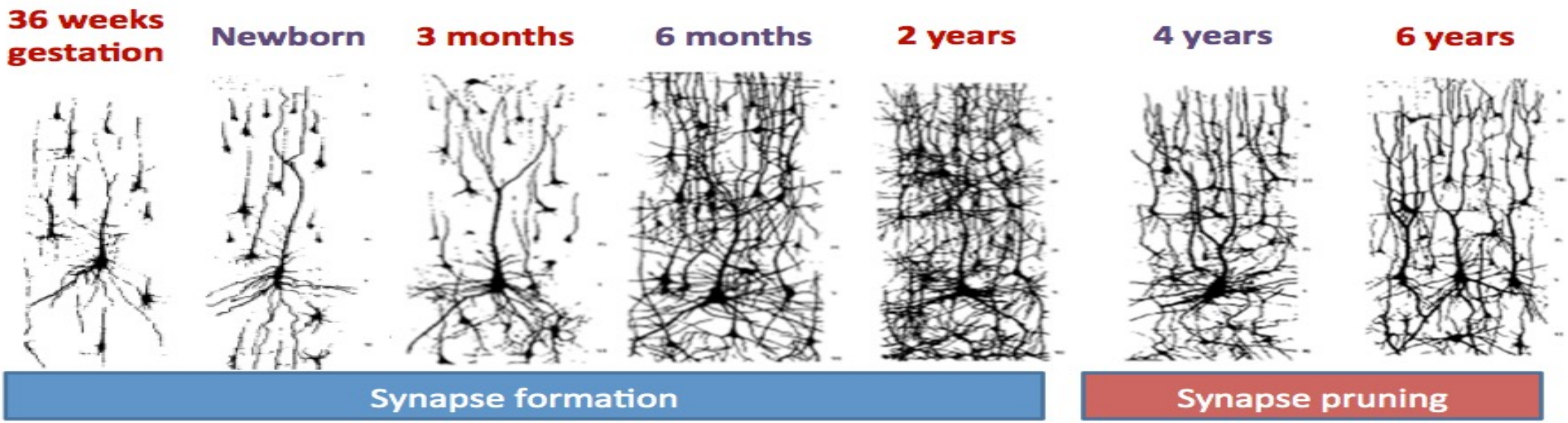
Synapse Formation Dependent on Early Experiences



Source: Nelson (2000)

Neuroplasticity & pruning

- Young brain is very impressionable
- Connections strengthened through sensory play
- Pruning: Connections not in use will be lost



What Are Your 8 Senses?

Vision

Auditory

Olfactory

Tactile

Gustatory

Vestibular

Proprioception

Interoception

Suggested activities for toddlers

Hug something bigger than you.	Sit on something that is very, very big.
Put something very small into a bucket.	Run to something that is bigger than a tree.
Jump on something that is very, very small.	Put something very small in your pocket.
Hide behind something that is very big.	Sit on something that is very small.
Hide something that is very, very small.	Pretend to pick up something that is very, very big.
Put a ball on top of something that is big.	Put 3 small things in a row.

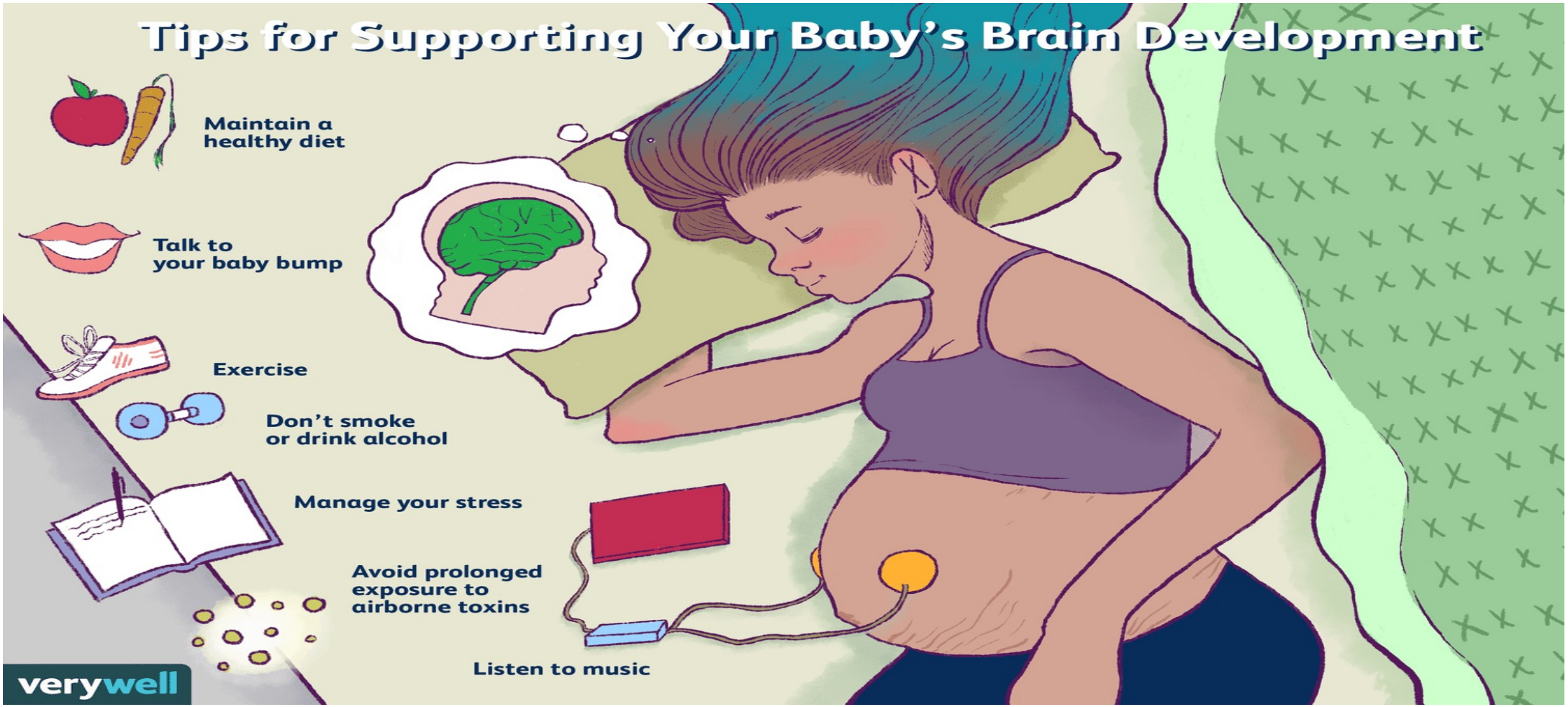
Squeeze something that is very small.	Find something that is smaller than you.
Do a silly dance around something very big.	Run around something that is very big.
Go touch the biggest thing you see.	Stand next to something that is the same size as you.
Run to something that is smaller than the house.	Bring me the smallest thing you can find.
Show me something smaller than a bike.	Point to something bigger than a car.
Touch something big and small at the same time.	Find something pretty that is very small.

Very Big & Very Small – action cards
themeasuredmom.com

BRAIN DEVELOPMENT

Factors Influencing

Prenatal Environment



Prenatal Development

- Both genetic and environmental factors influence prenatal development
  - Teratogens – Harmful agents that can cross the **placenta**
    - Opiates such as heroine
    - Nicotine
    - Alcohol
  - Mother's nutrition and emotional state
  - Mother's illness
  - Mother's drug use
  - Alcohol and nicotine
    - Fetal alcohol syndrome

Nutrition


Important Nutrients for
Optimizing Baby's
Brain Development
Iodine
Zinc
Iron
Protein
Omega 3
B Vitamins
@RachelHiltsNutrition

Genetics

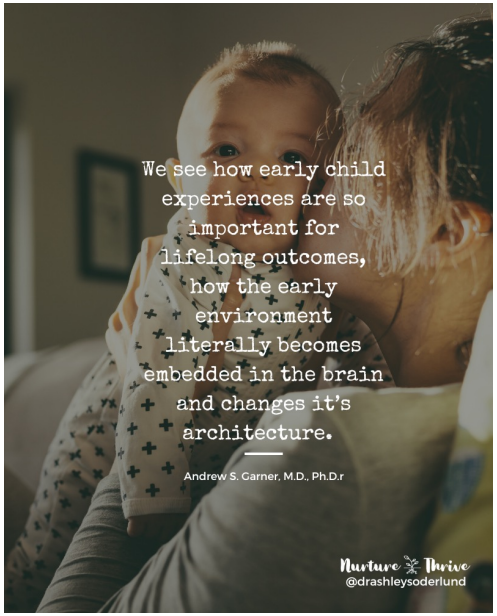
Generally speaking, genes are responsible for the basic wiring plan—for forming all of the cells (neurons) and general connections between different brain regions–while experience is responsible for fine-tuning those connections, helping each child adapt to the particular environment (geographical, cultural, family, school, peer-group) to which he belongs. An analogy that is often used is wiring a phone network: genes would specify the number of phones and the major trunk lines that connect one relay station to the next. Experience would specify the finer branches of this network—the connections between the relay station and each person's home or office.

Environmental Stimulation

Researchers have long known that babies of all kinds need to be exposed to rich, complex environments for optimal brain health and potential. Exposure to new sights, sounds and other sensory experiences appears to be critical for strengthening infants' developing brains and encouraging smoothly running neural networks. 23 Aug 2017

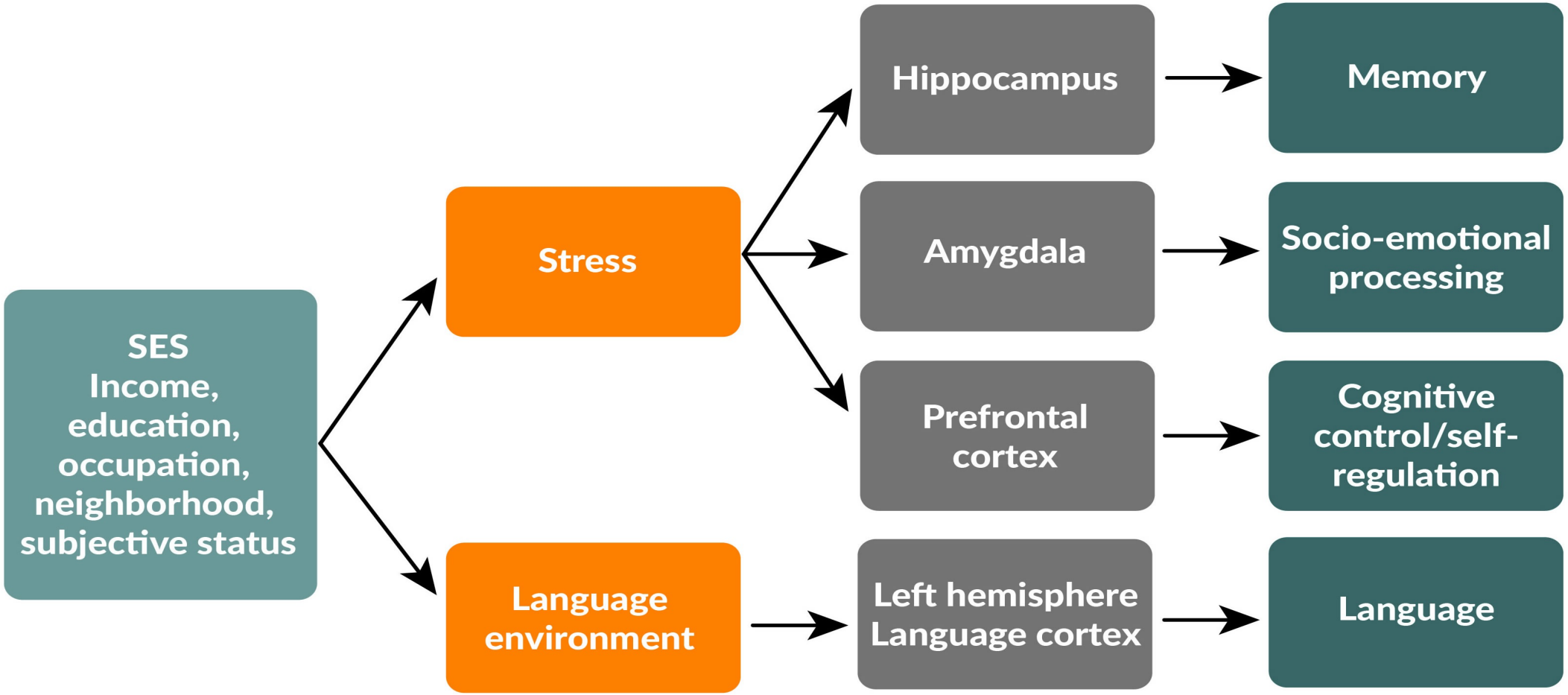
Children's National Hospital

Early Childhood Experiences



- Care giver interactions (PPD & Stress & DV)
- Child sensory and physical experiences
- Health (complex medical Hx, Ex prematurity)
- Psychological Trauma (Abuse, wars, natural disasters)
- Early experiences affect brain architecture (fragile or sturdy)
- 1 million new neural connections per second in 0 to 3 years

Socioeconomic Factors



Physical Exercise/Activity

- Better Academic Performance
- Better memory
- Better attention and Focus
- Better recall and short term memory
- Better emotional development
- All schools should have PE and movement in their curriculum.

Education and Learning

- Early learning opportunities help children's brain reach their full potential.
- Human social interactions, parental language input & reading all play a role in brain development.
- New brain connections are made through learning and learning is done through play.
- Babies are born ready to learn. Repetitive , consistent & familiar everyday routines and practices help their brain develop.
- Children need a caring, stimulating, playful environment to learn.

Tell us more about how screen time affects language and communication.
Research shows that talking with children in a reciprocal dialogue is extremely important for language development and social interaction. It's that back-and-forth "conversation," sharing facial expressions and reacting to the other person — in real life, rather than "passive" listening or one-way interaction with a screen — that improves language and communication skills in young children.

What age is appropriate to introduce screens?
The American Academy of Pediatrics (AAP) recommends avoiding screens for children younger than 18 to 24 months, except when video chatting with family. The AAP also recommends limiting screen use for preschool children, ages 2 to 5, to just one hour a day of high-quality programming (think *Sesame Street* or PBS).

Please note that this article discusses young children using devices for the purpose of pleasure (e.g., watching videos, playing video games) and is not about children who use devices for the purpose of communication (i.e., Augmentative and Alternative Communication).

Nowadays screens are all around us! Children are often happy and quiet when they have a device in their hands *(*sigh* peace and quiet)*. However, we know that children do not learn best from screens [1]. Two new studies have gone further to show that screen time can decrease the words and sentences that toddlers use, resulting in delayed language development.

How does screen time impact language development?

A new study from the Hospital for Sick Children in Canada followed almost 900 young children between six months and two years of age [2]. They found that the **toddlers who were exposed to more handheld screen time were more likely to have delayed expressive language skills** (i.e., the child's ability to say words and sentences was delayed). They also found that for every 30-minute increase in daily handheld screen time, there was a 49% increased risk of expressive language delay!

Another study surveyed over 1,000 parents of children under the age of two [3]. They found that **toddlers who watched more videos said fewer words**. For each additional hour of videos that eight- to 16-month-old infants watched in a day, they said an average of six to eight fewer words!

These new studies show that increased screen time places infants at risk for expressive language delays and can result in young children saying fewer words.

The Importance of Early Learning

FOR **CHILDREN AGES 0 – 3**

80%
OF BRAIN*
growth and development
happens in the
first 3 years

Experiences
during these years
SHAPE HOW A CHILD
sees the world

A child will
develop the first
1000
WORDS
of their vocabulary

Children receiving high quality early learning
from parents, family and care givers are
happier, healthier and more likely to succeed later in life.


рахмат
danke
謝謝
ngiyabonga
teşekkür ederim
Баярлалаа
спасибо
faafetai lava
mersi
kia ora
barka
welalin
spas
tack
vinaka
спасибі
blagodaram
dank je
misaotra
matondo
paldies
grazzi
mahalo
tapadh leat
kiitos
dankie
nanni
nandri
dhanyavad
maururu
köszönöm
thank you
gracias
хвала
asante
manana
obrigada
tenki
bedankt
bayarlalaa
gràçie
hvala
dankon
ačiū
akun
enkosi
djiere dieuf
tau
mochchakkeram
murakoze
mamnun
дякую
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dziękuję
chnorakaloutioun
gratias ago
gràcies
sulpáy
go raibh maith agat
sobodi
dėkuji
obrigado
sagolun
sukriya
kop khun krap
taiku
arigatô
takk
dakujem
trugarez
mèsi
didi madloba
ありがとう
najis tuke
tanemirt
grazie
rahmet
kam sah hamnida
rahmat
terima kasih
diolch
dhanyavadagalu
shukriya
mercé
мерси
তোমাকে ধন্যবাদ
감사합니다
xièxie
ευχαριστώ
merci