

CHILDHOOD BRAIN DEVELOPMENT



Nature, Nurture, Technology & Media

EARLY CHILDHOOD BRAIN DEVELOPMENT:

Nature, Nurture, Technology & Media

Presented By
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EDUCARE

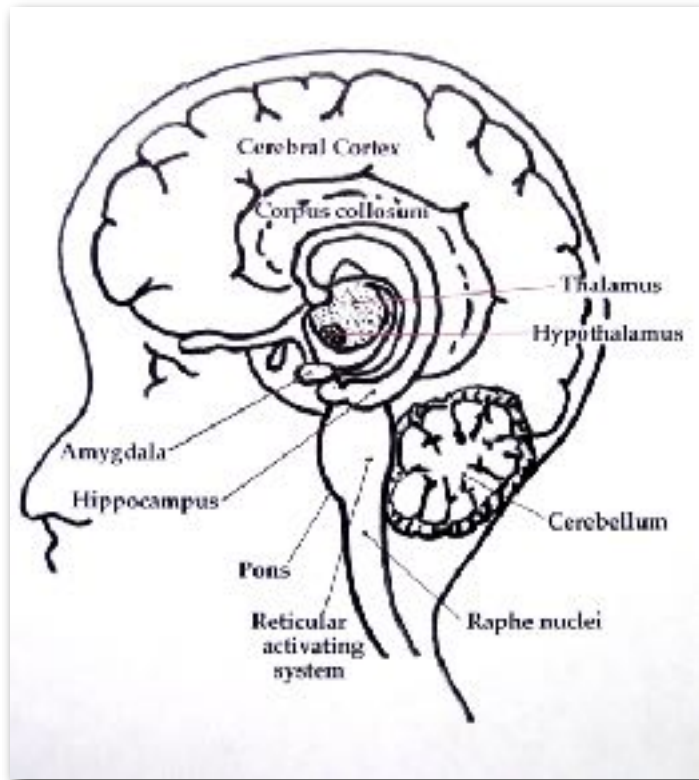
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STRUCTURE of COGNITIVE LEARNING

1. Stimulus of the model.
2. Practice, repetition, variation.
3. Application or generalization.

Burton White
Harvard Preschool Project
Raising a Happy, Unspoiled Child, 1995)

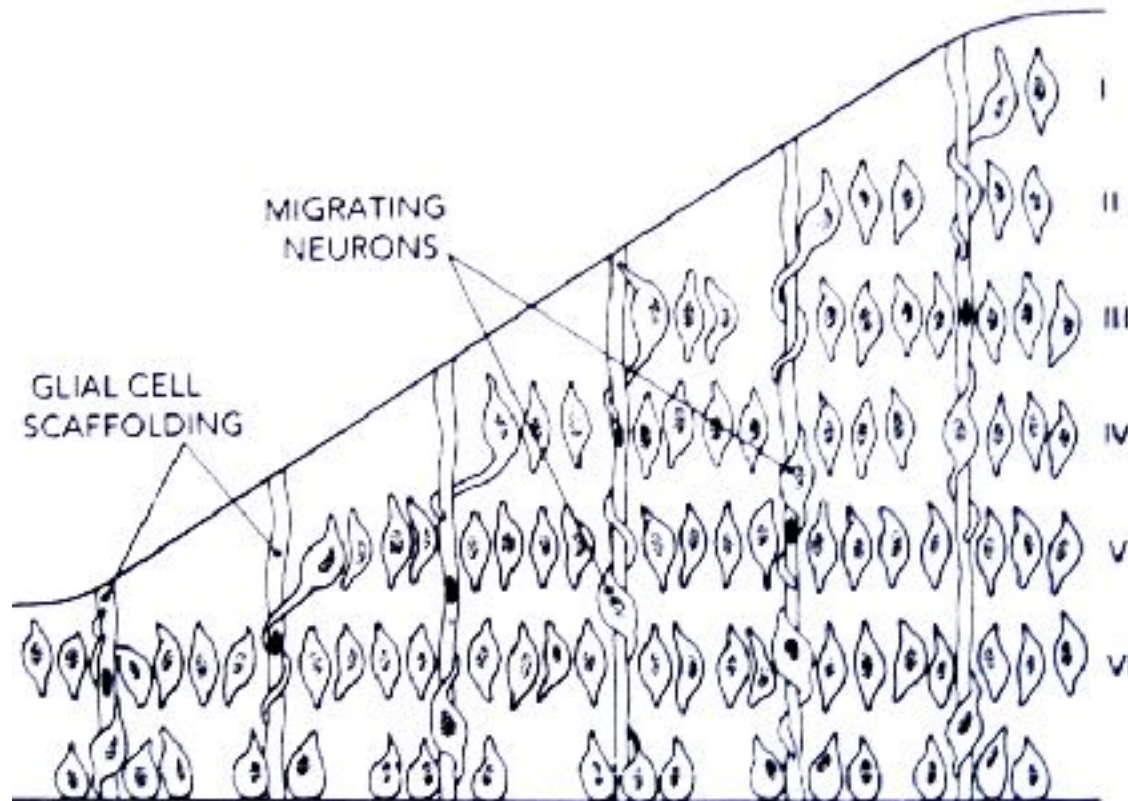
BRAIN MATURATION



- Bottom to top
- Inside to outside
- Side to side
- Back to front

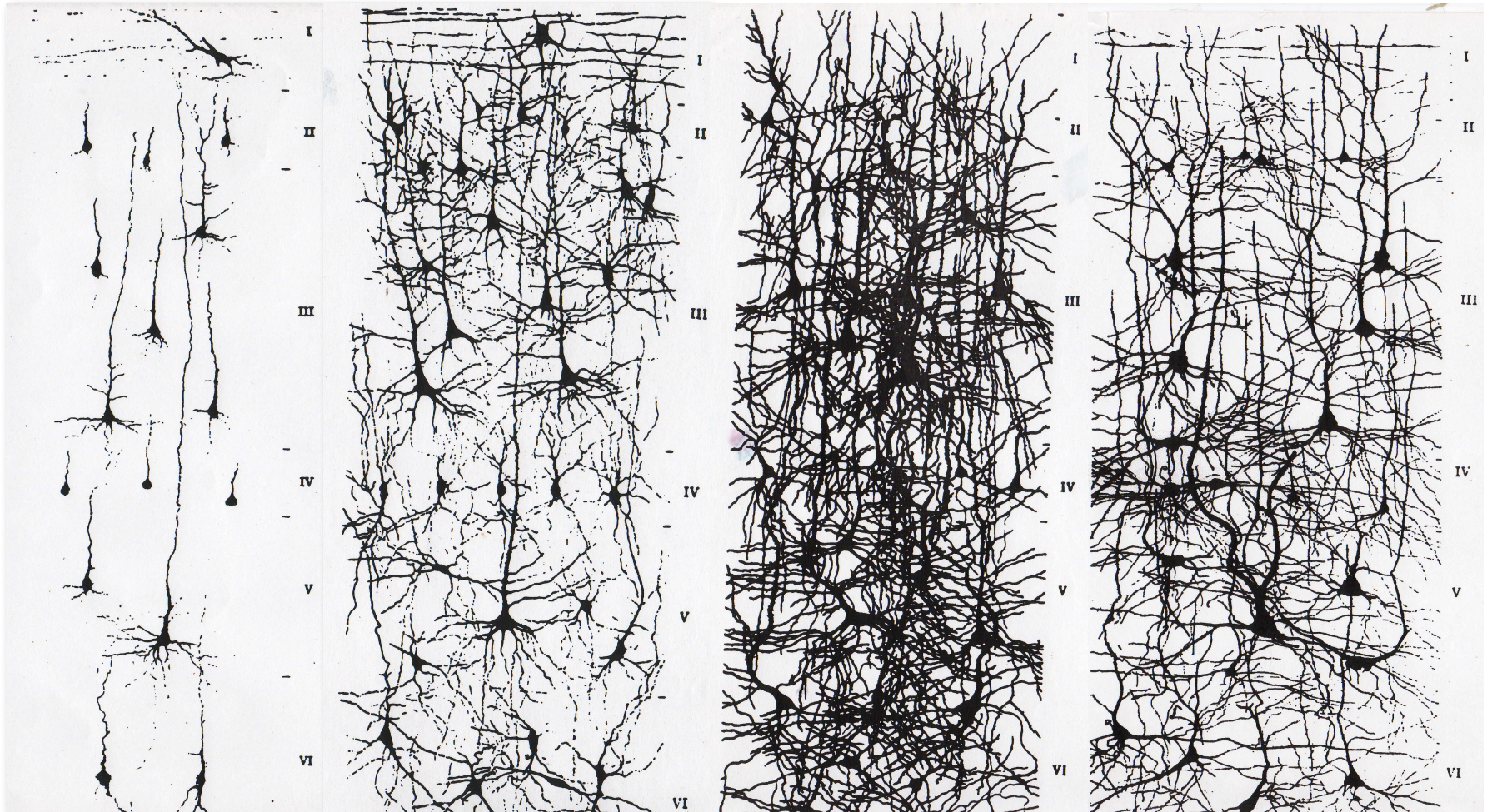
BRAIN MATURATION

Cerebral Cortex



Six Cell Layers

BRAIN MATURATION



BIRTH

3 MONTHS

24 MONTHS

6 YEARS

Frontal Lobes of the Brain

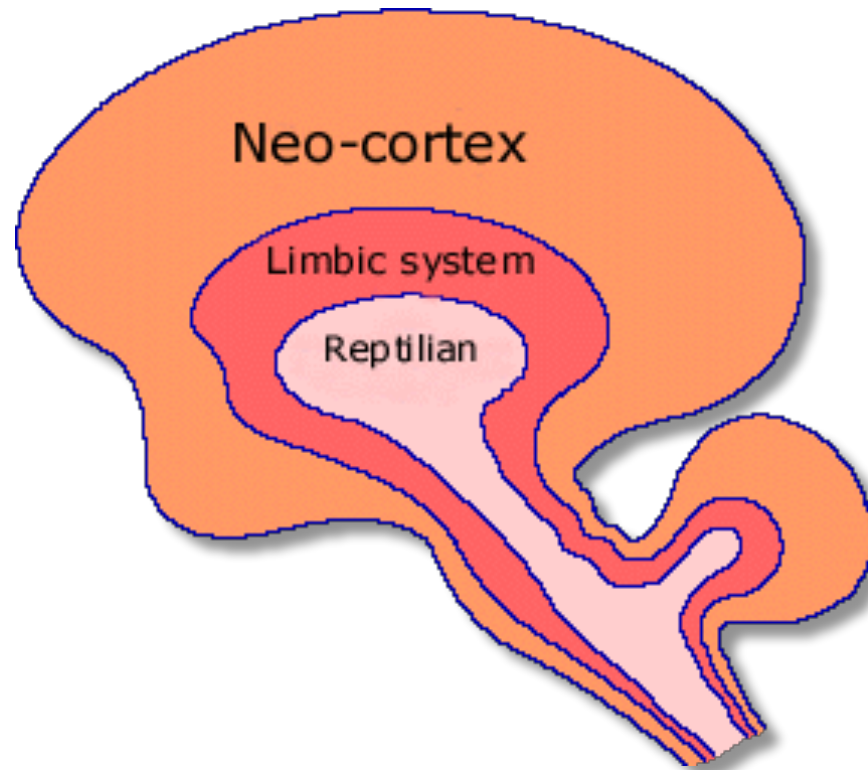
- Envision the future
- Dream big dreams
- Set goals
- Carry out plans
- Detect problems
- Solve problems
- Manage emotions
- Control impulses
- Consider consequences



Developmental Stages and the Brain

	Brain Stage	Intelligence Domain	Piaget Cognitive	Erickson Virtues	Maslow Needs	Kohlberg Moral	Steiner Spiritual
Mature Adult	<i>Brain-Heart Integration</i>	<i>Heart: Wisdom and Compassion</i>	<i>Post-formal operations</i>	<i>Care/Wisdom: Generativity vs. Stagnation/ Integrity vs. despair</i>	<i>Self-actualization: morality, creativity, acceptance</i>	<i>Post-conventional: principled conscience universal ethic</i>	<i>Spiritual orientation</i>
Teen - Adult	<i>Neo-mammalian: Frontal cortex Teen to Adult</i>	<i>Thought: Abstraction & Meaning-making</i>	<i>Formal operations</i>	<i>Fidelity: Identity vs. Role confusion Love: Intimacy vs. Isolation</i>	<i>Esteem orientation: confidence, achievement, respect for & by others</i>	<i>Conventional: social-contract to Post-conventional</i>	<i>Soul orientation</i>
6/7 - Puberty	<i>Neo-mammalian: Posterior cortex Ages 6- 11/12</i>	<i>Thought: Concrete & Problem-solving</i>	<i>Concrete operations</i>	<i>Purpose: Initiative vs. Guilt Competence: Industry vs. Inferiority</i>	<i>Belonging orientation ----- Esteem orientation</i>	<i>Conventional: conformity authority social-order maintenance</i>	<i>Truth orientation</i>
2 - 6/7	<i>Paleo-mammalian: Limbic system Ages 2 - 6</i>	<i>Social-Emotional: Relationship</i>	<i>Pre-operational "The dreaming child"</i>	<i>Will: Autonomy vs. Shame & Doubt</i>	<i>Love and affection orientation</i>	<i>Pre-conventional: punishment & obedience</i>	<i>Beauty orientation</i>
Birth - 2	<i>Reptilian: Brain stem/ Cerebellum Birth - 2</i>	<i>Body: Self-preservation</i>	<i>Sensory-motor</i>	<i>Hope: Trust vs. Mistrust</i>	<i>Survival and Safety orientation</i>	<i>N.A.</i>	<i>Goodness orientation</i>

TRIUNE BRAIN

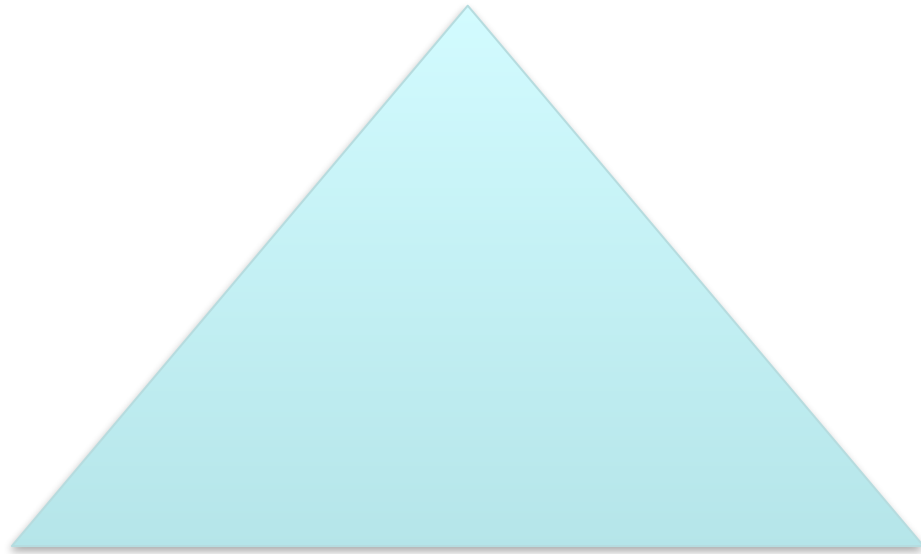


McLean, Paul, *The Triune Brain in Evolution: Role in Paleocerebral Functions*.
New York: Plenum Press. 1990.

TRIUNE BRAIN

Three Non-Negotiable Requirements

NURTURE



FEEDBACK

PLAY!

ATTENTIONAL NETWORKS

Alerting network

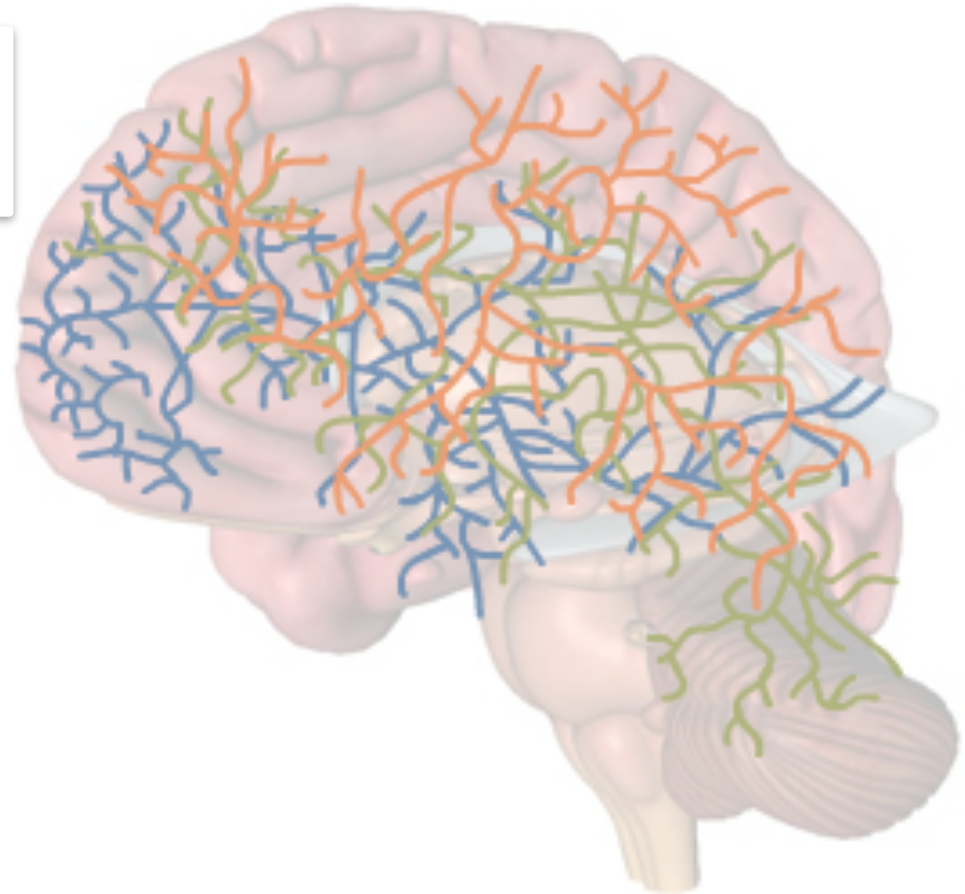
Frontal & parietal activity

Orienting network

Frontal eye fields
Temporietal lobe

Executive network

Pre-frontal cortex
Basal ganglia



BRAIN-MIND STATES



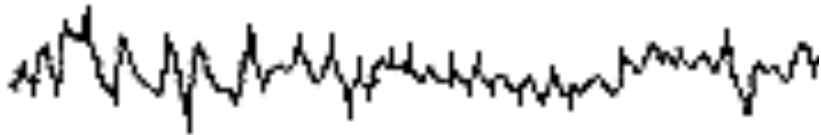
Gamma - 25-100 Hz (40hz typical).
Binds conscious perception



Beta – 13-30 Hz. Active, alert,
concentration



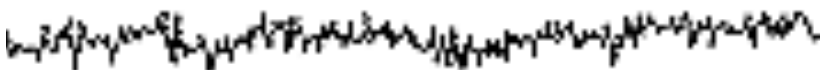
Alpha – 9-13 Hz. Relaxed focus, light
trance, enhanced serotonin
production



Theta – 4-8 Hz. Trance-like state;
enhanced catecholamine aids
retention of learning



Delta – 1-3 Hz. Dreamless sleep; human
growth hormone produced

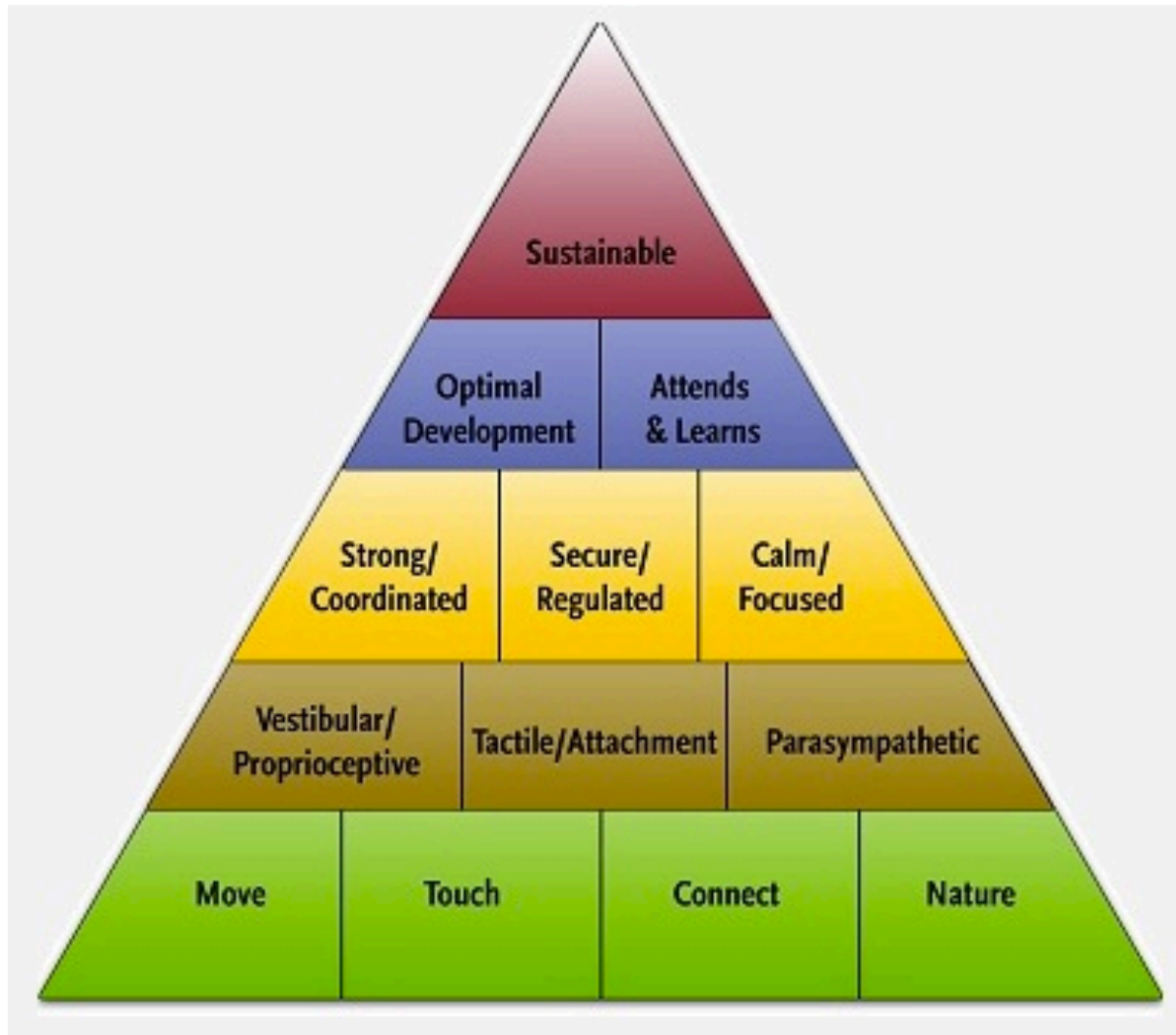


REM – Rapid Eye Movement; dreaming

Brain Enrichment Findings

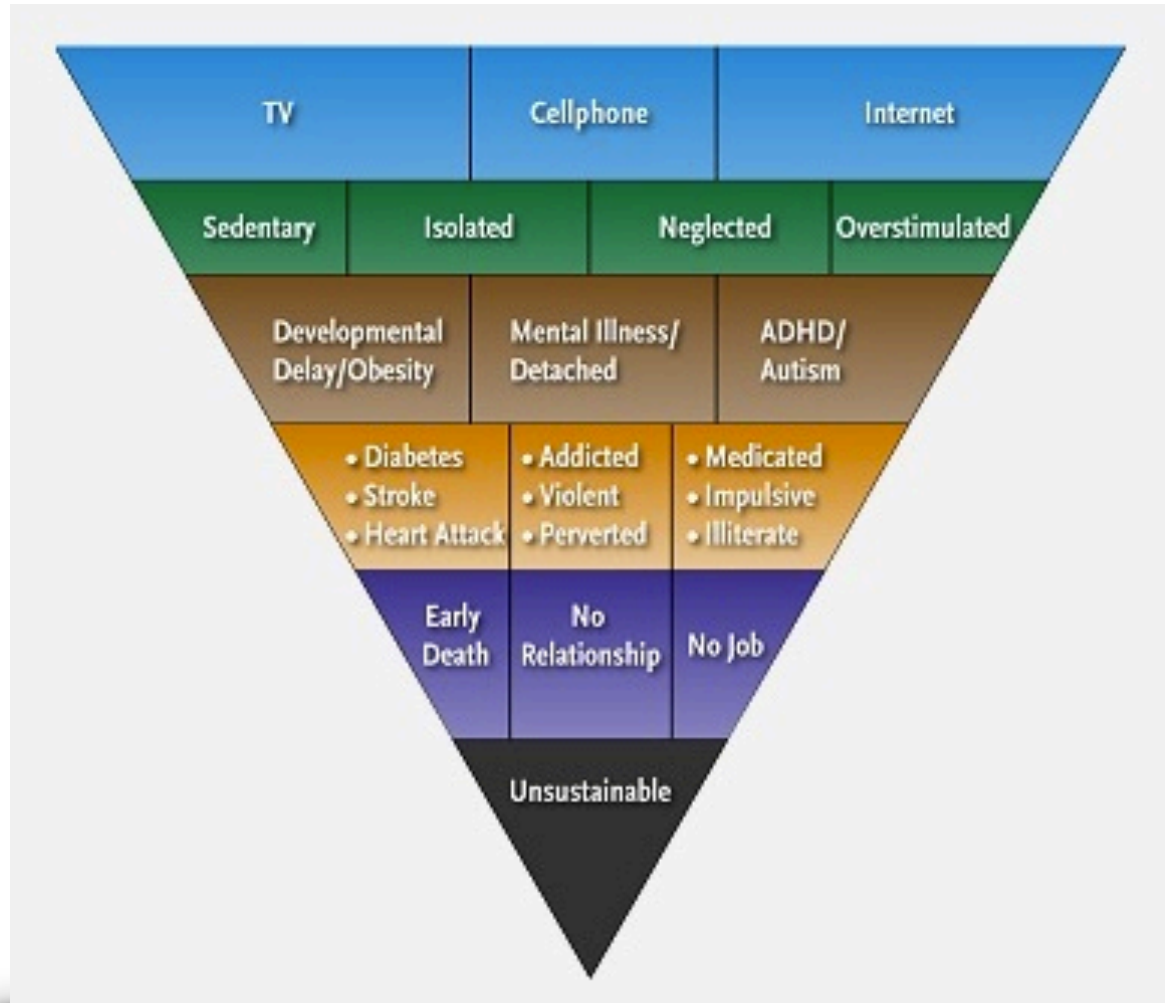
- New synaptic connections
- New neural networks
- Larger cell bodies
- Greater dendritic branching
- Enhanced glial production
- Increased quantity of synapses
- Multiple contact areas
- Increased neurogenesis at multiple brain sites

Movement, Touch, Human Connection, and Nature



“Growing a child is like building a house: It’s all about the foundation.”

Sedentary, Isolated, Over-stimulated, and Neglected



“The ways in which we are raising and educating our children with technology are not sustainable.”