

Effects of Early Adversity & Trauma

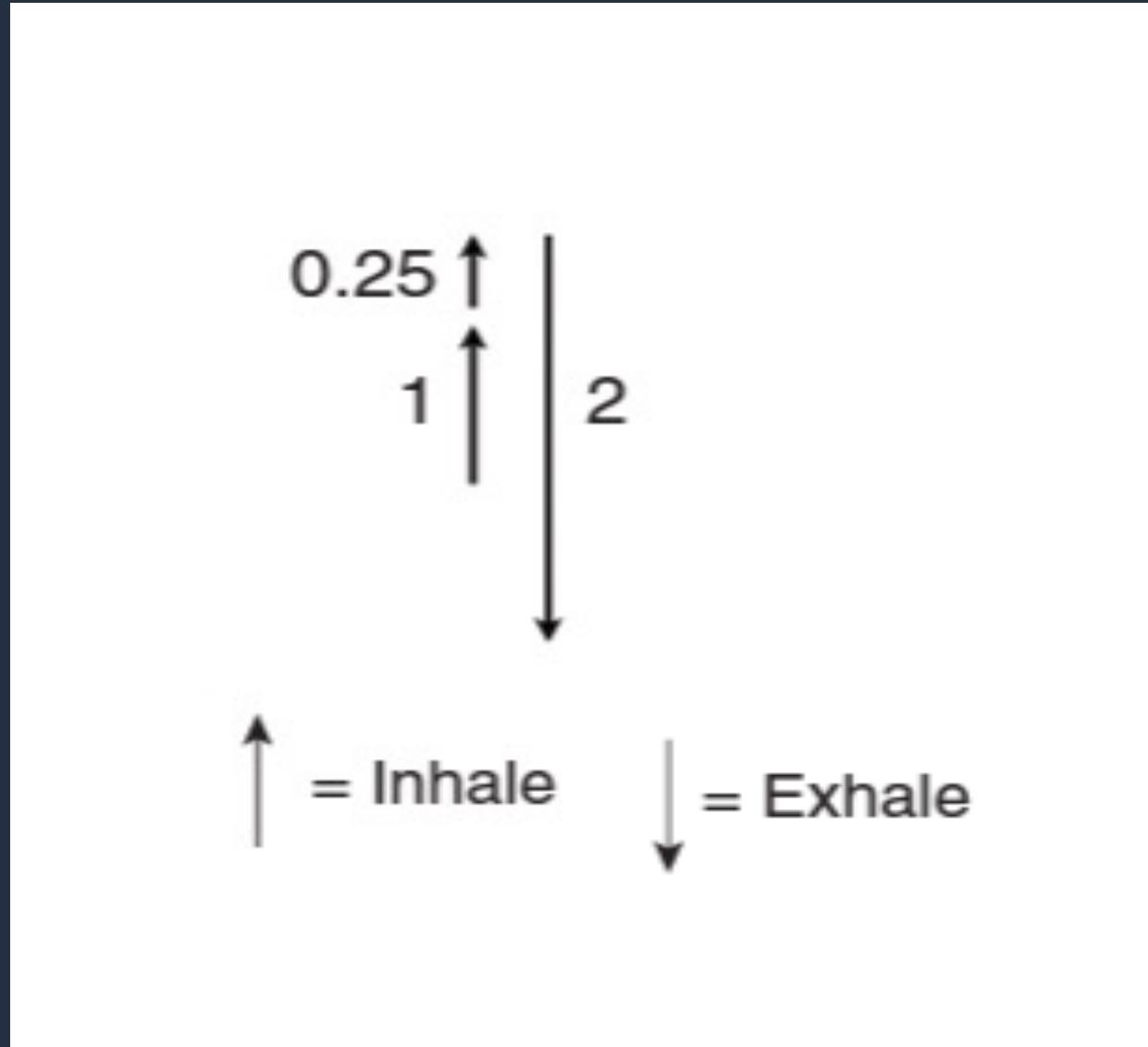
Psychology 134K
Spring 2023
Week 2, Class 1

PSNS Hack of the Day (Balban et al., 2023)

The Physiological Sigh (AKA
“Cyclic Sighing”)

“Breathwork, specifically cyclic sighing, is more effective in increasing positive affect than is mindfulness meditation (Balban et al., 2023).”

How?





Physiological Sighing

5 Minute Guided Cyclic Sighing: <https://www.youtube.com/watch?v=ZEI3FAaSrX4>

FYI: Slides updated after lecture on Canvas

...	 Lecture Slides (134K Intro - updated)	  :
...	 Lecture Slides (Week 1 Class 1 - updated)	  :
...	 Audio (Week 1 Class 1)	 :
...	 Lecture Slides (Week 1 Class 2 - updated)	   :
...	 Audio (Week 1 Class 2)	 :
...	 Read: Guidi et. al., 2021	  :
...	 Written Exercise #1 Apr 10 0 pts	 :
...	 Supplemental Materials for Week 1 (optional)	 :

Stress: Portrait of a Killer



National Geographic , 2008

Stress: Portrait of a Killer



National Geographic , 2008

Stress & Weight Gain



Cortislim



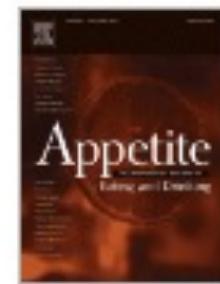
Refunds for Consumers Who Purchased CortiSlim or CortiStress

September 21, 2007



Until October 27, 2007, the Federal Trade Commission will be accepting refund requests from consumers who bought CortiSlim or CortiStress. The FTC alleged that CortiSlim was advertised with false and unsubstantiated weight loss claims and that CortiStress was advertised with false and unsubstantiated disease prevention claims. The FTC's settlement with the marketers of CortiSlim and CortiStress included money for consumer refunds. The amount of the refund will depend on the number of consumers who request refunds.

Consumers who bought CortiSlim or CortiStress between August 1, 2003, and May 31, 2006, can request a refund either by downloading a claim form at www.CortiSlimsettlement.com or by calling 1-800-560-6532 to receive a claim form by mail.



Research review

Weight stigma is stressful. A review of evidence for the Cyclic Obesity/Weight-Based Stigma model ☆

A. Janet Tomiyama 

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obesity



health problems

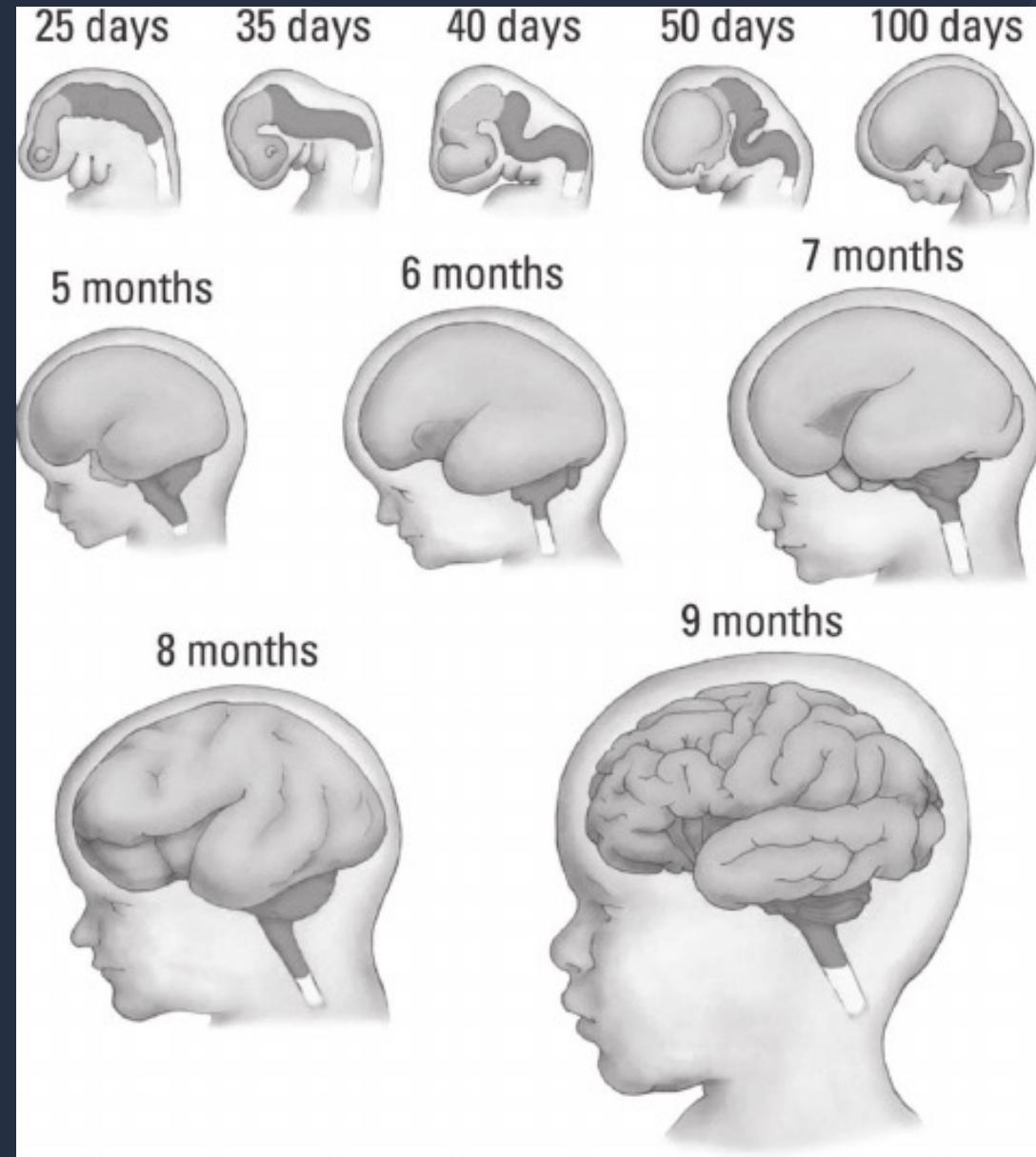
Effects of Early Adversity & Trauma

Early Neural Development

Gene-Driven Brain Development

Genes provide the blueprint
for basic brain architecture

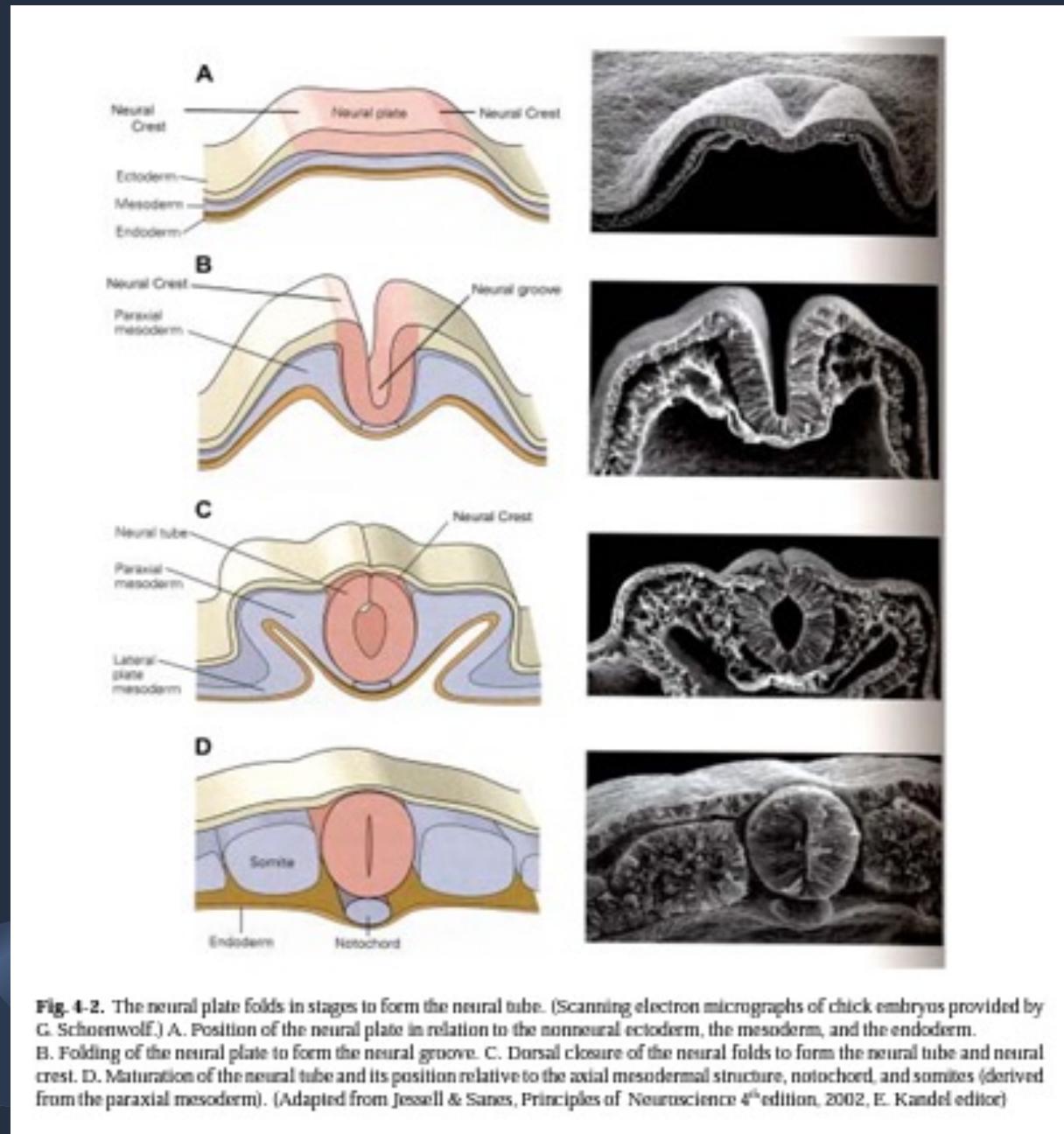
How?



Gene-Driven Brain Development:

1. Neurogenesis

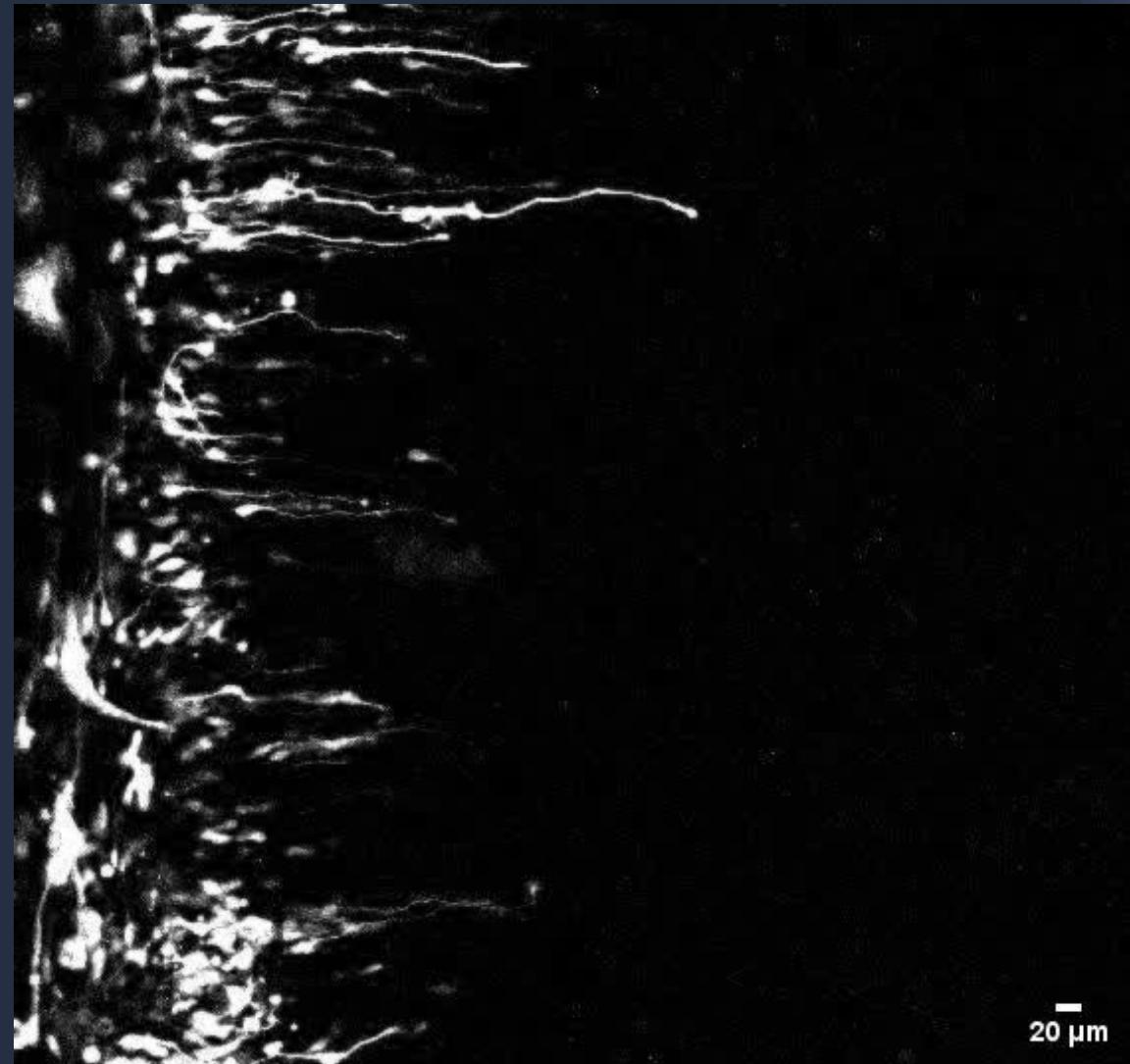
- 3-4 weeks gestation:
Neural tube forms
- Once the neural tube has closed neurons begin to form
(ie. neurogenesis)



Gene-Driven Brain Development:

2. Cell Migration

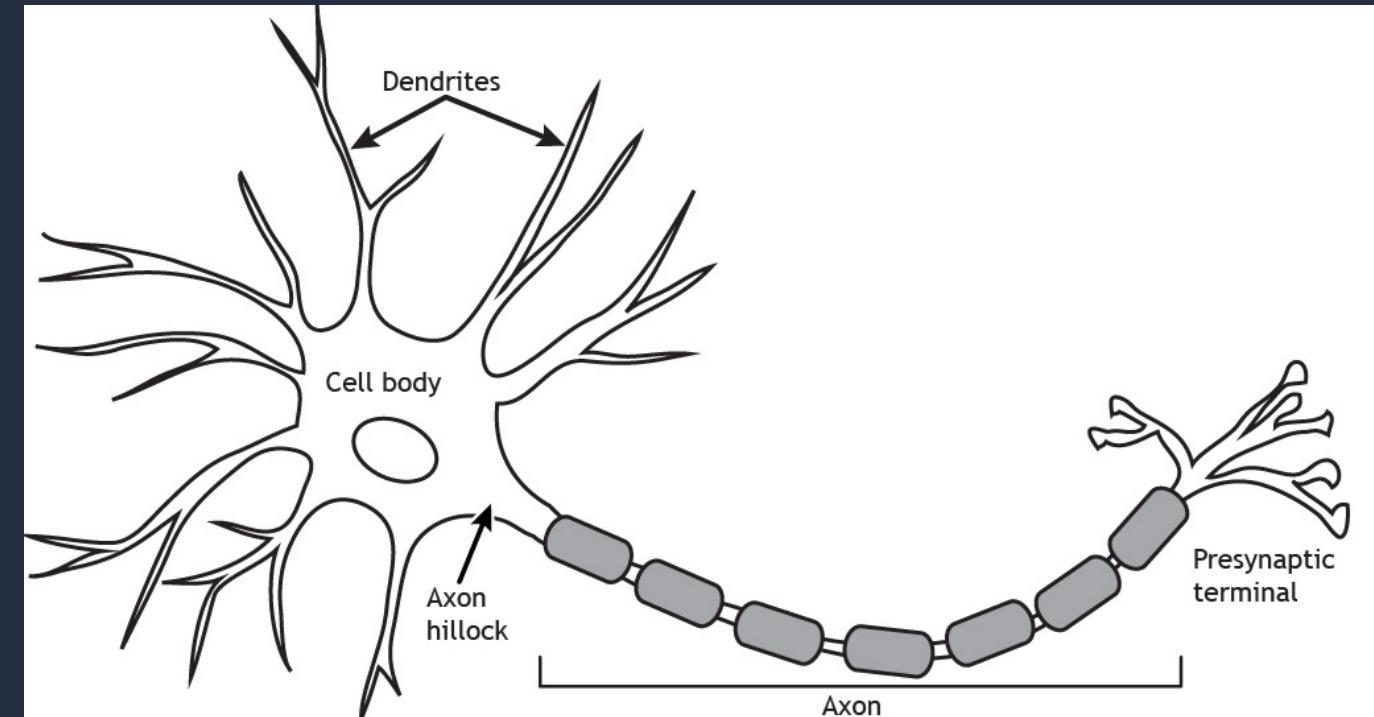
- 4-24 weeks gestation:
immature neurons
migrate to their
predetermined
destination



Gene-Driven Brain Development:

3. Cell Differentiation

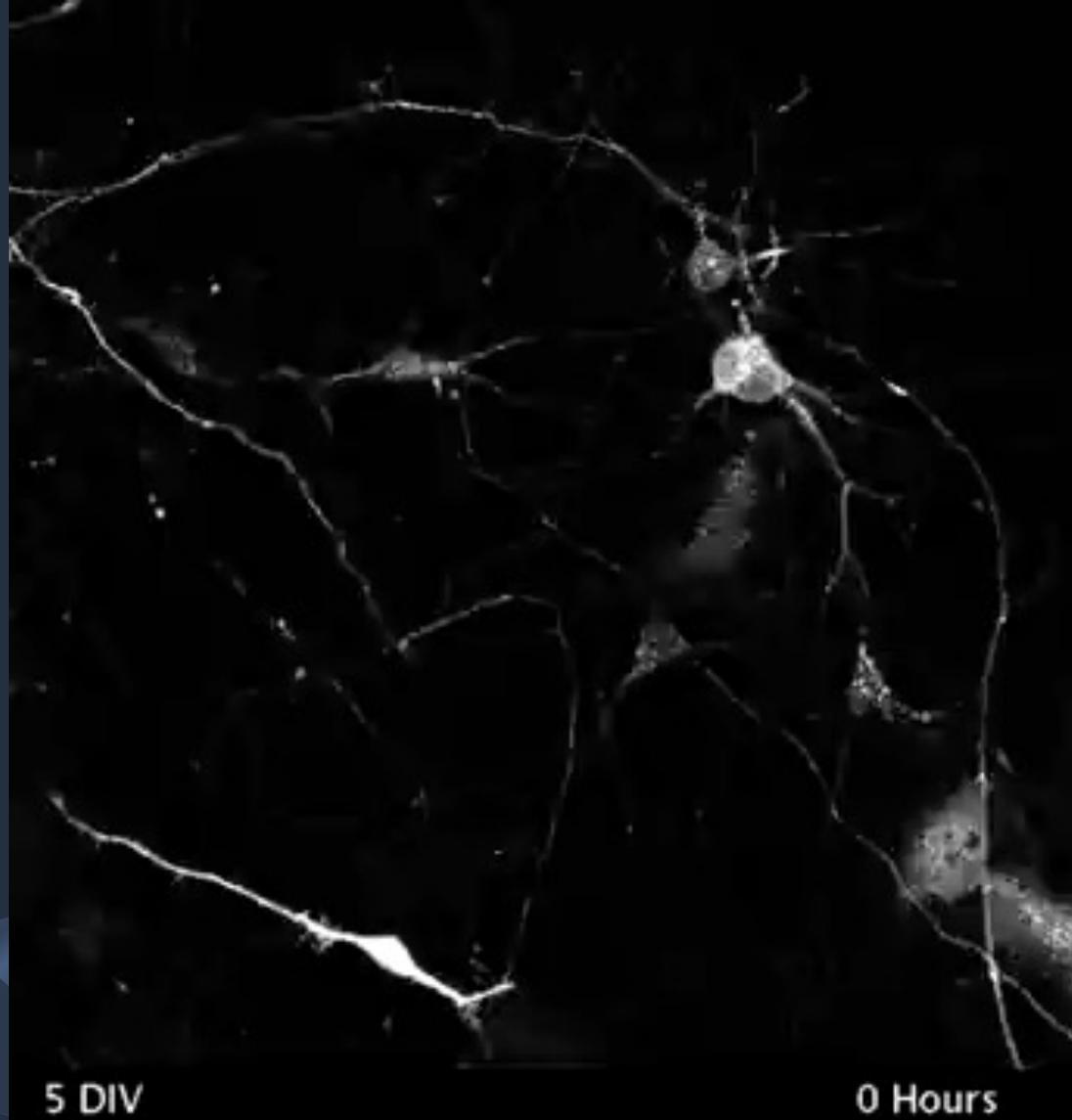
- Once the neurons have migrated, they will mature (into whatever type of neural cell they were programmed to be) and will develop axons and dendrites

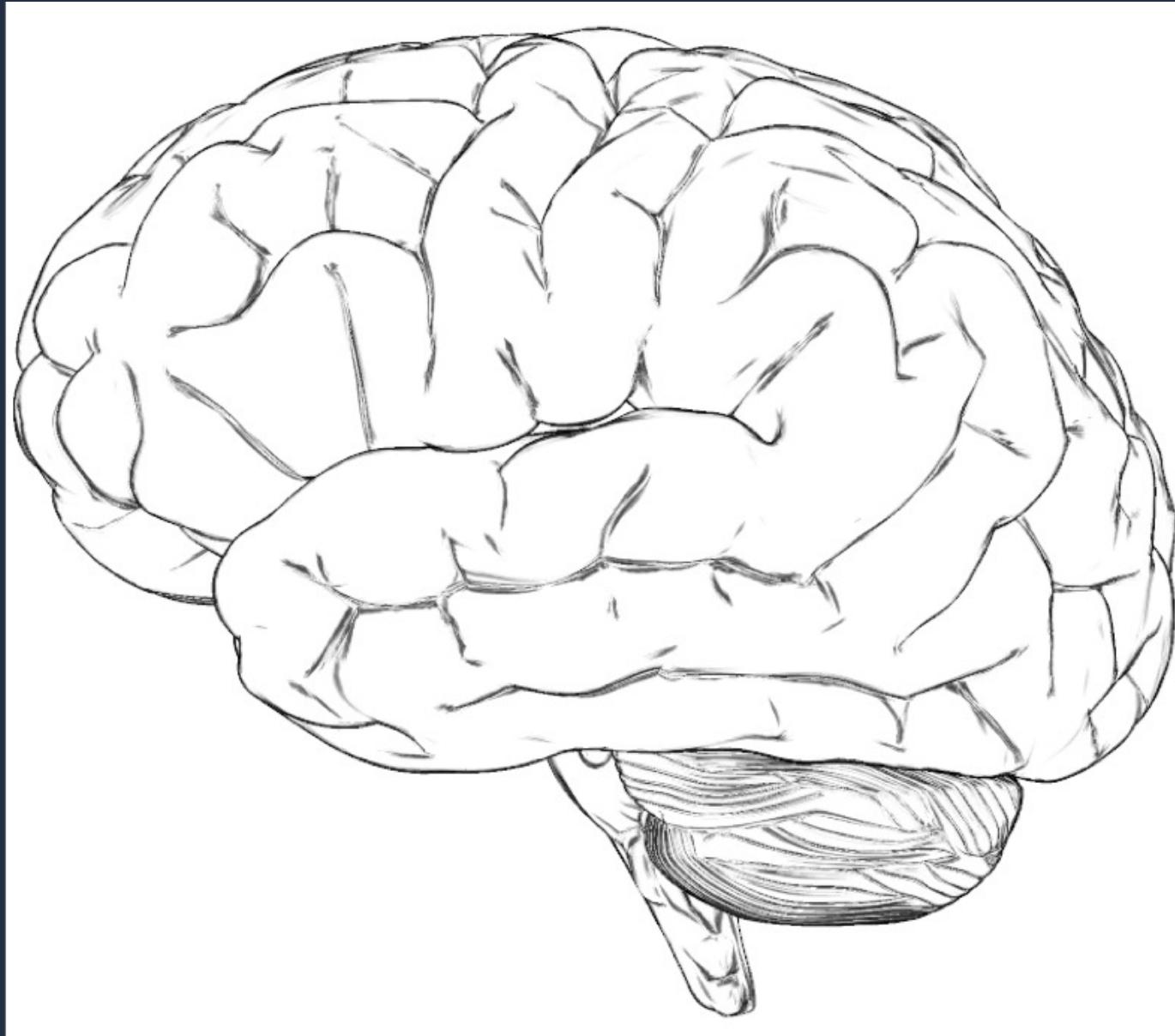


Gene-Driven Brain Development:

4. Synaptogenesis

- Once the axons and dendrites have been formed, the cells can begin connecting with each other to create synapses



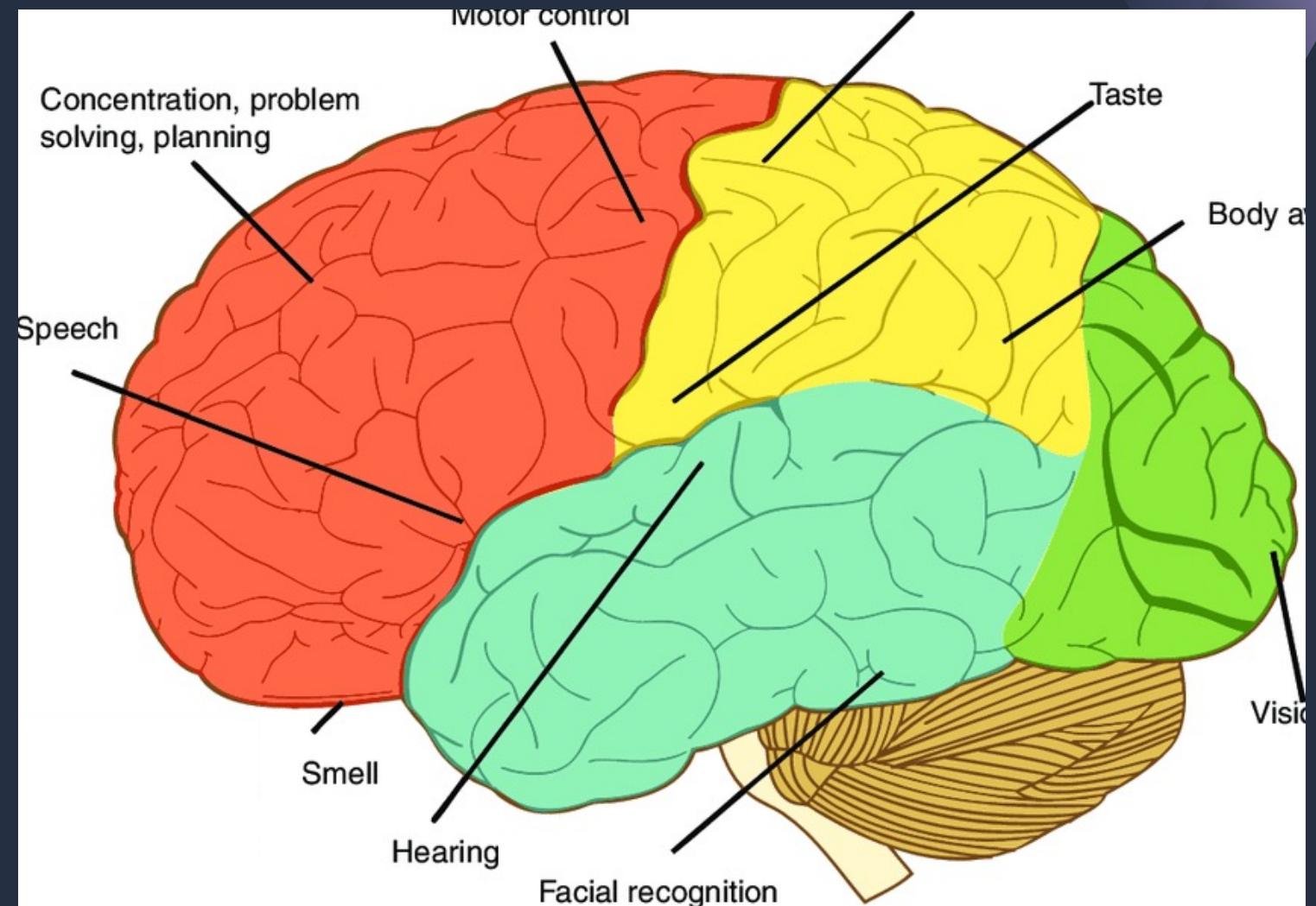


Gene-Driven Brain Development



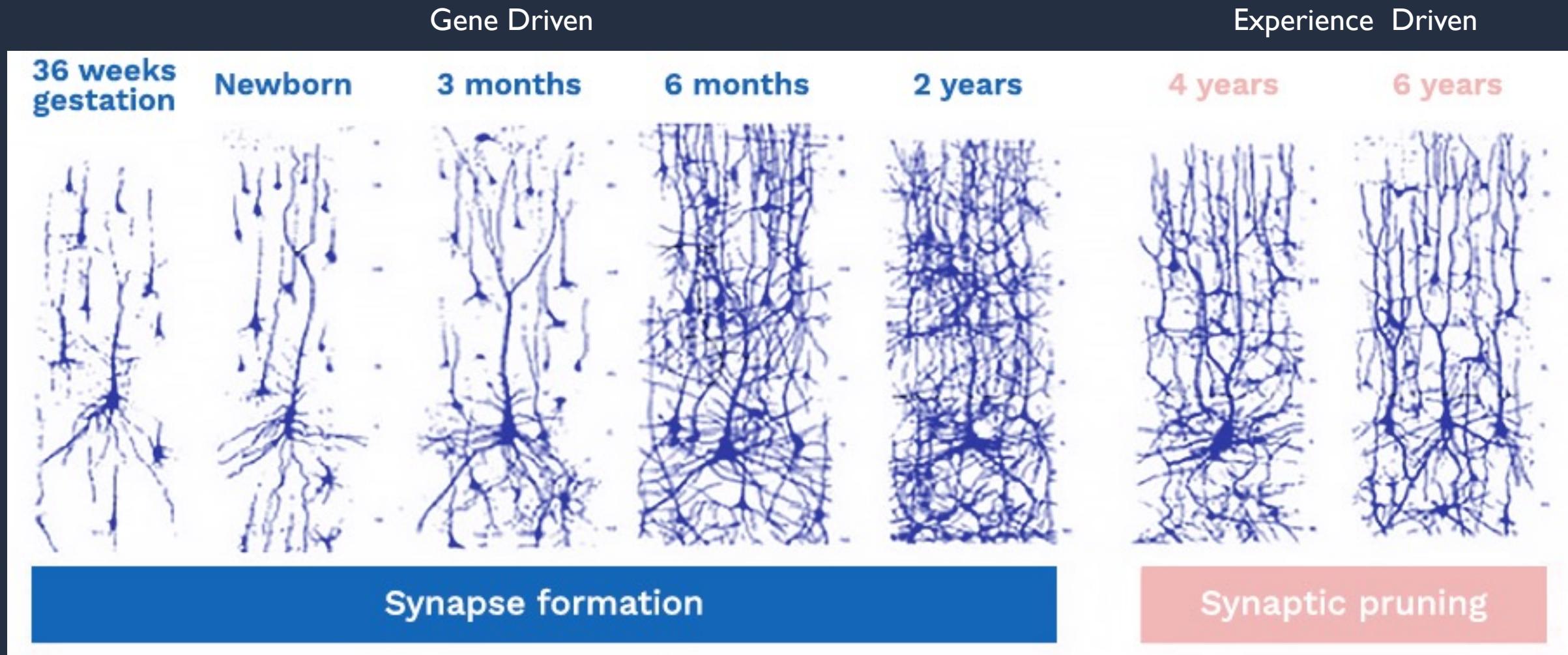
synaptogenesis

- During early development we overproduce both neurons and synapses
- Why?
- *Experience-Expectant synapse production*



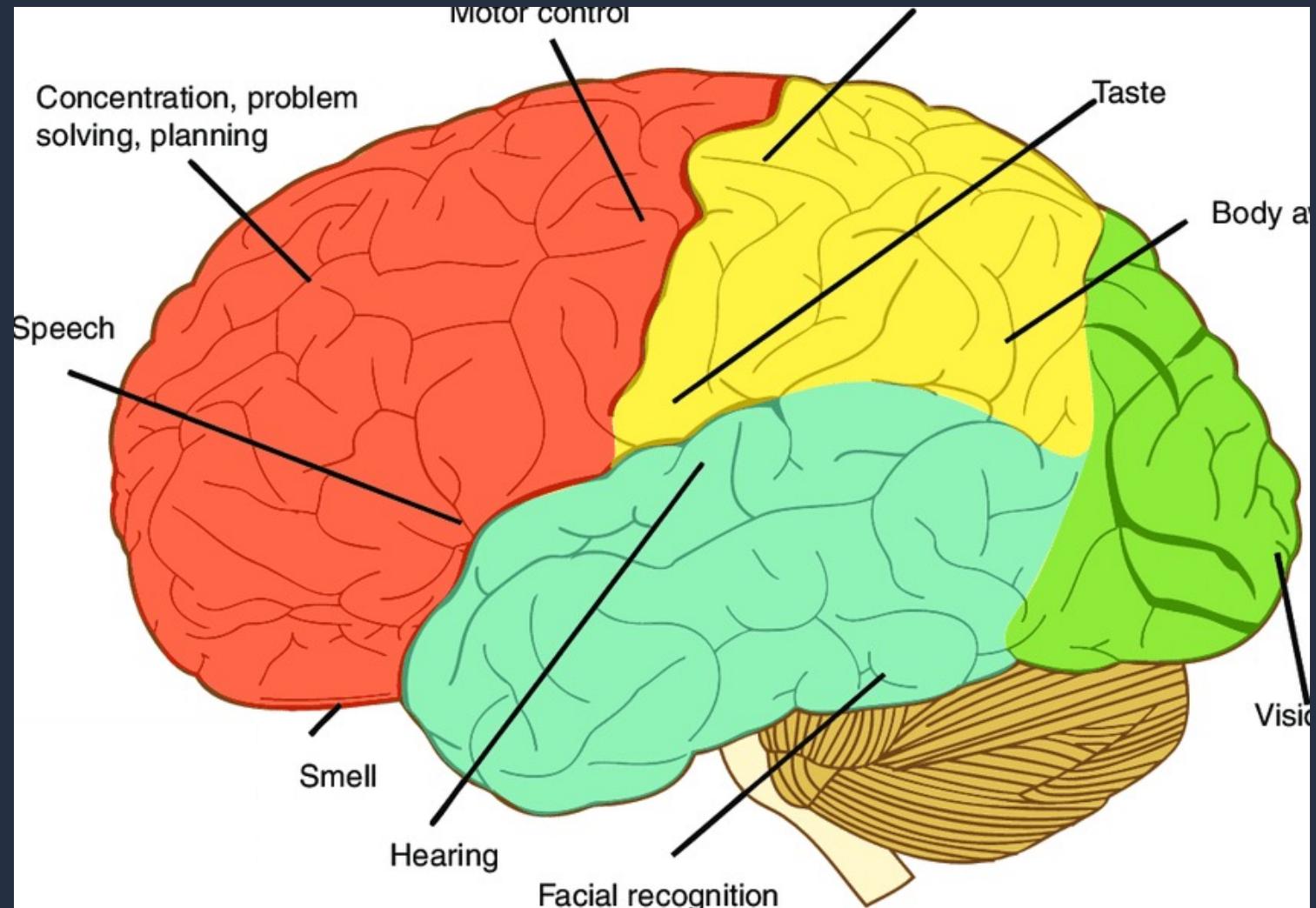
Universal Human Experiences

Neural Development



synaptic pruning

- During the first few years of life, we will begin removing the extra neurons (apoptosis) and synapses (synaptic pruning)
- Why?
- *Experience-Dependent synapse production*



Unique Human Experiences

Brain Development

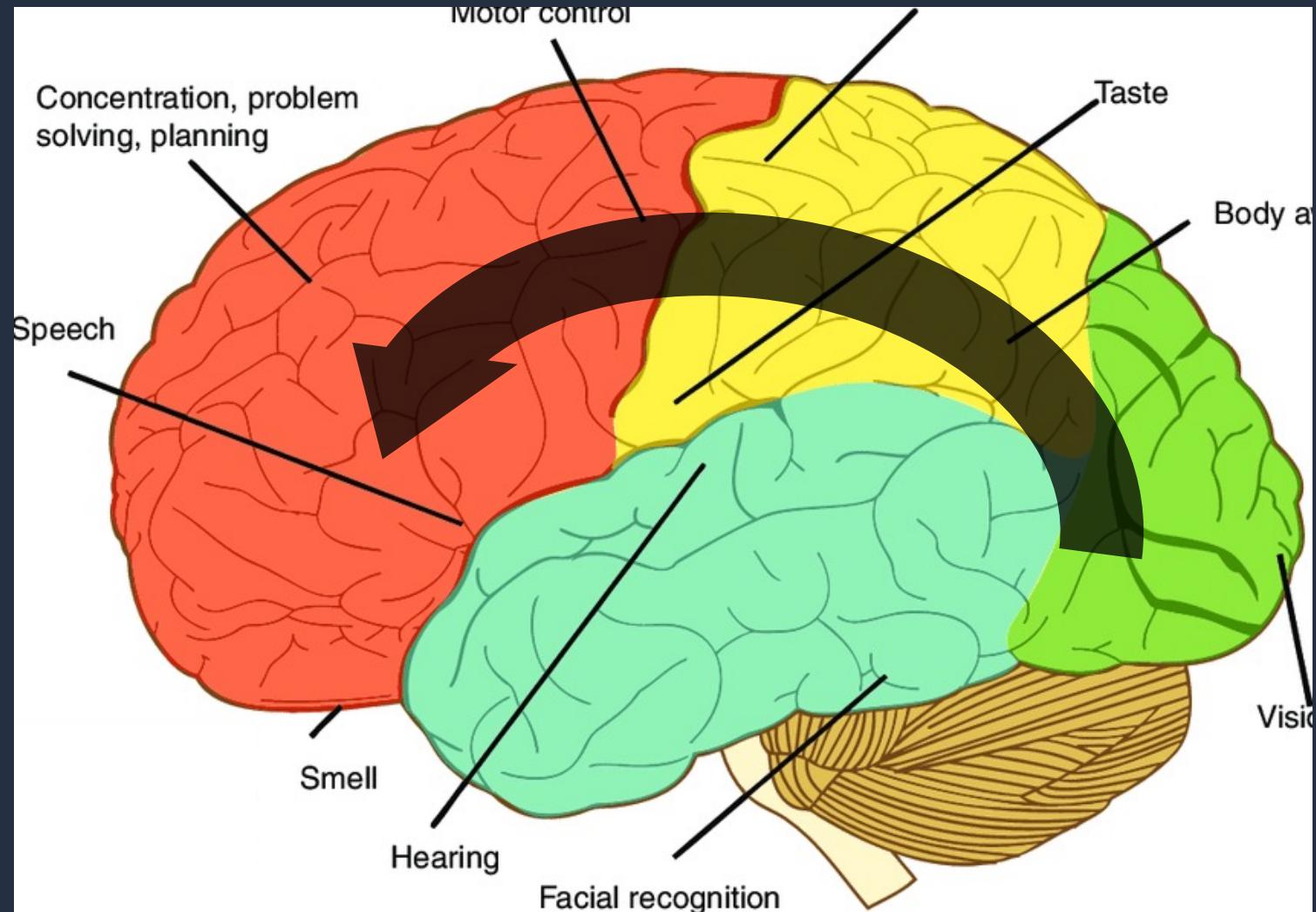
- Our genes, to a certain degree, dictate the properties of neurons and neuronal connections in our brain (Gene-Driven Brain Development)
- Our brain's structure and function is customized based upon on our unique experiences (Experience-Expectant and Experience-Dependent Brain Development)



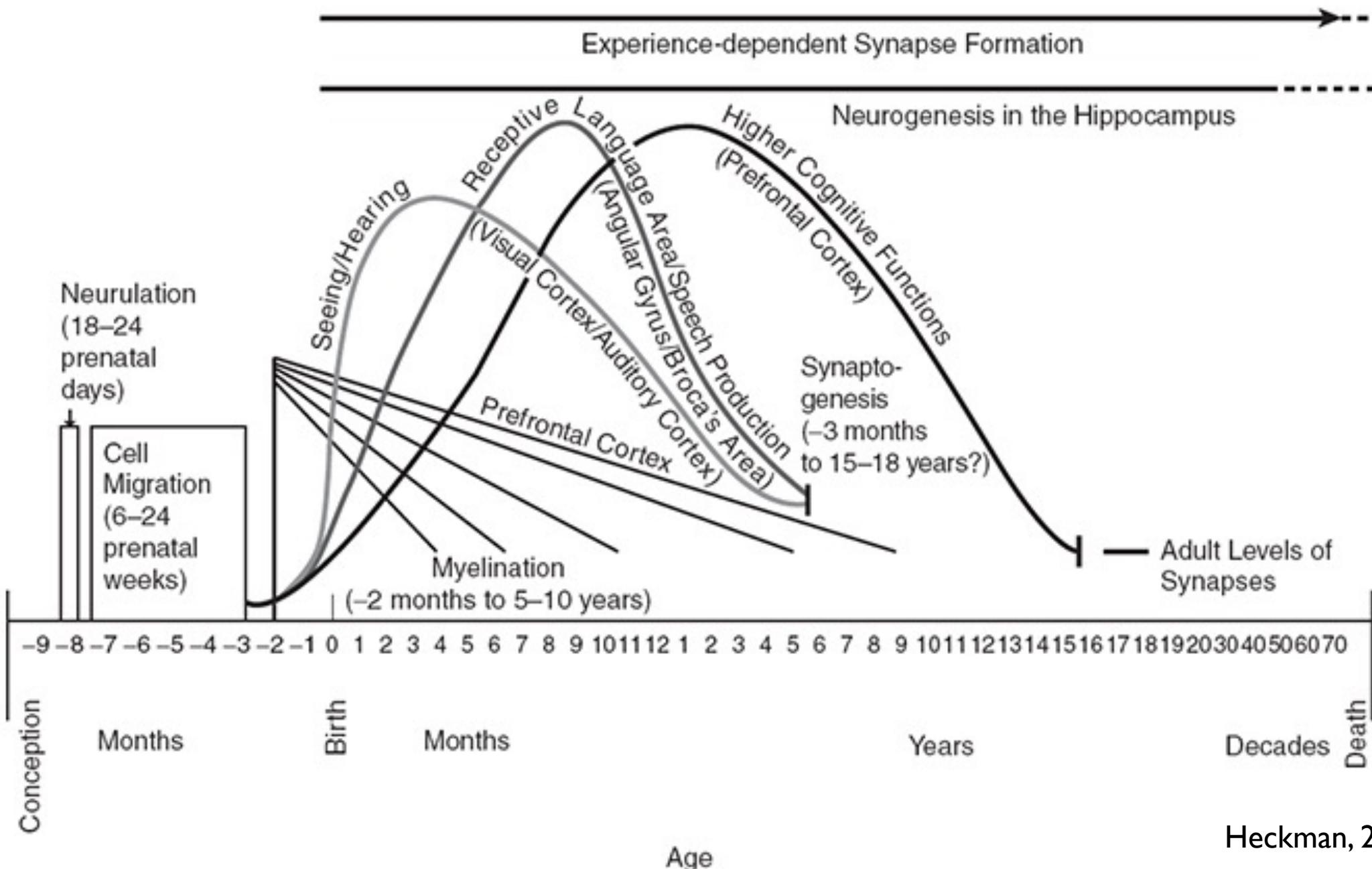
Developmental Considerations

Processes of synaptogenesis and synaptic pruning do not happen uniformly across the brain

Different neural regions develop at different times and different rates (lower-level processing precedes higher-level processing)



Human Brain Development

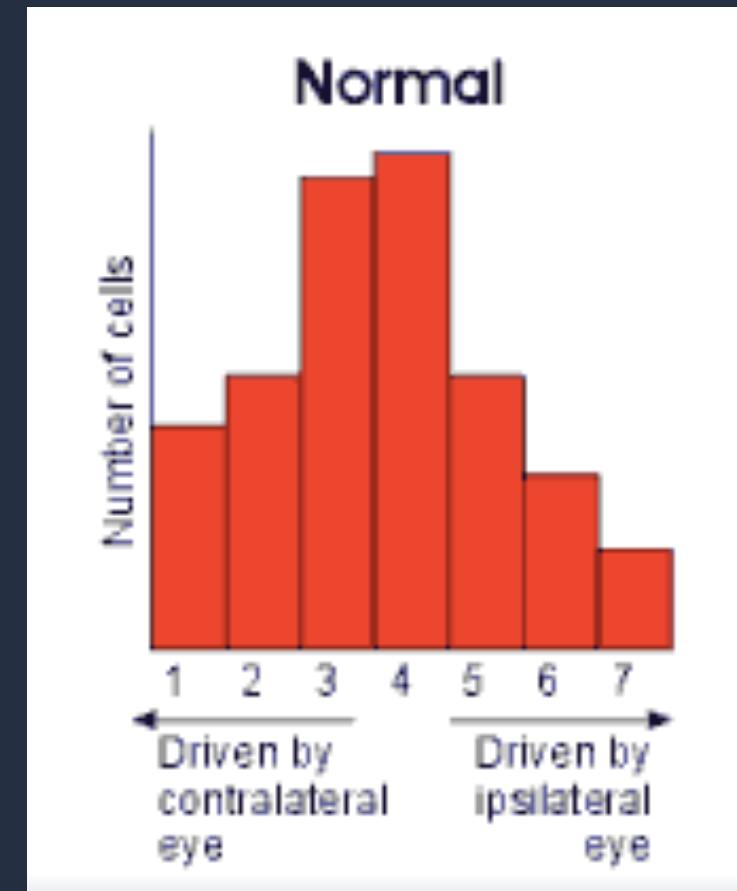
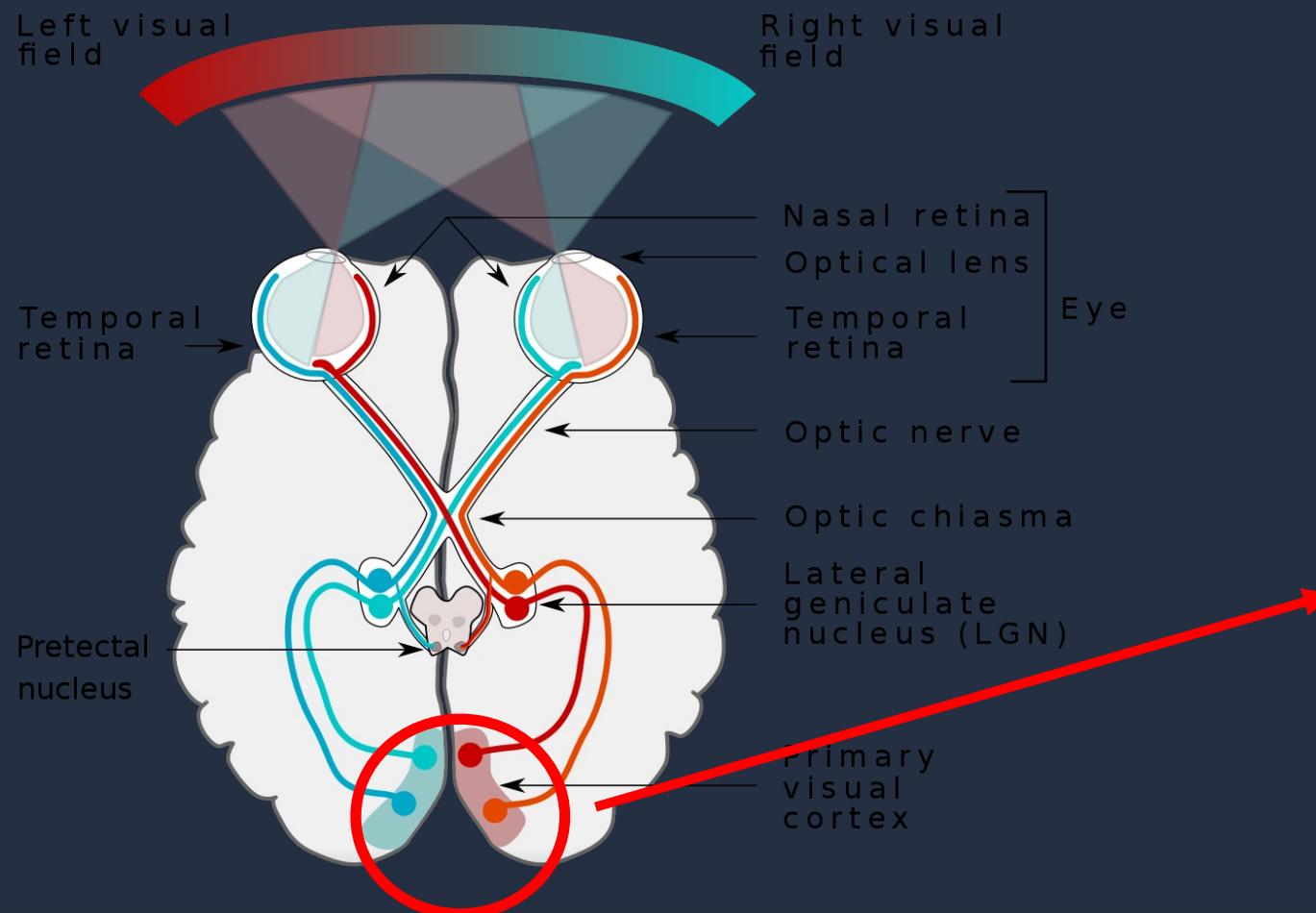


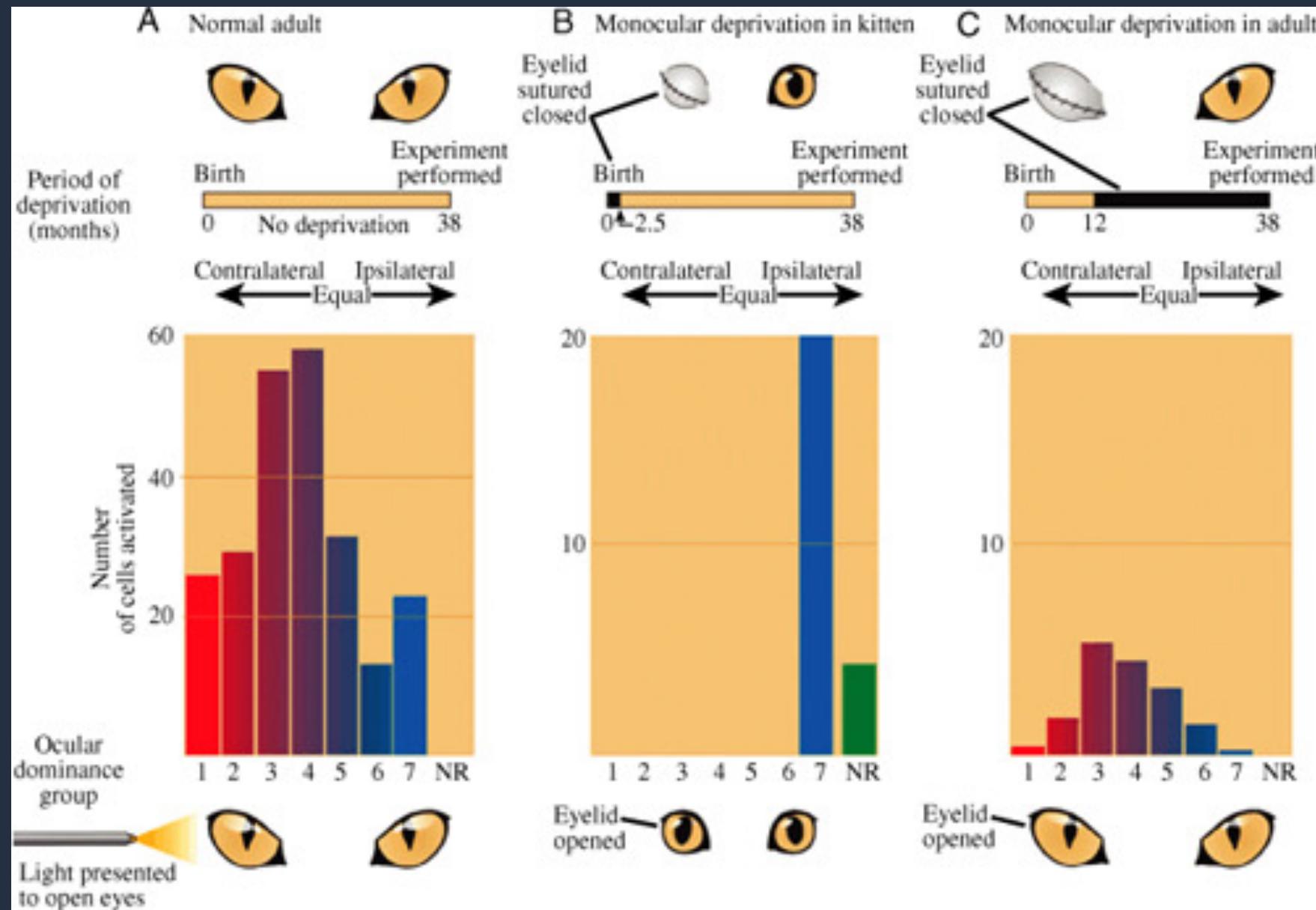
Heckman, 2013

Sensitive Periods

- A period during which the brain is particularly responsive to environmental input
 - “window of opportunity”
- If the absence of environmental input during this time results in irreversible change, it will be termed a “*critical period*”

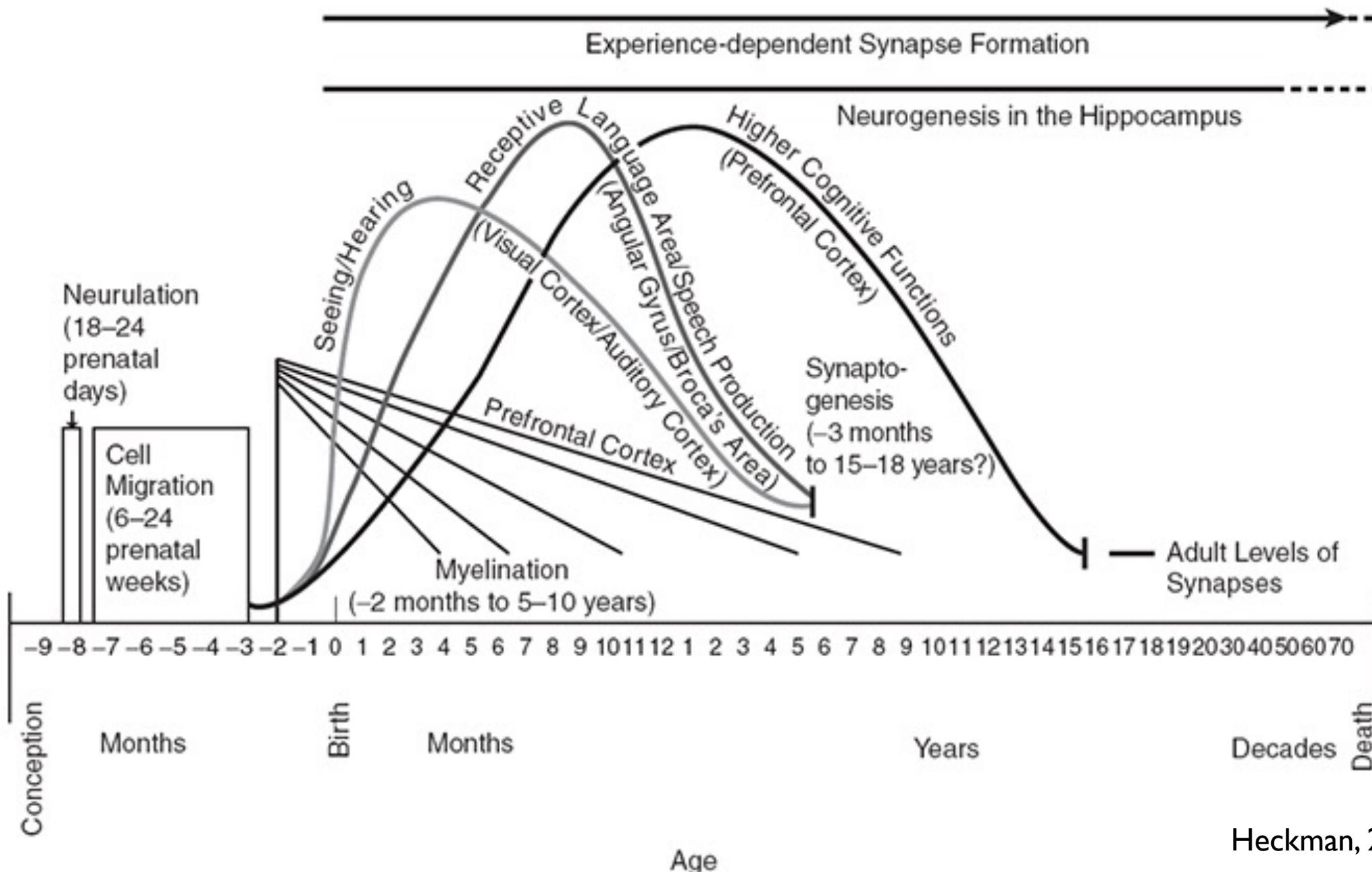
An example:







Human Brain Development



Sensitive/Critical Periods

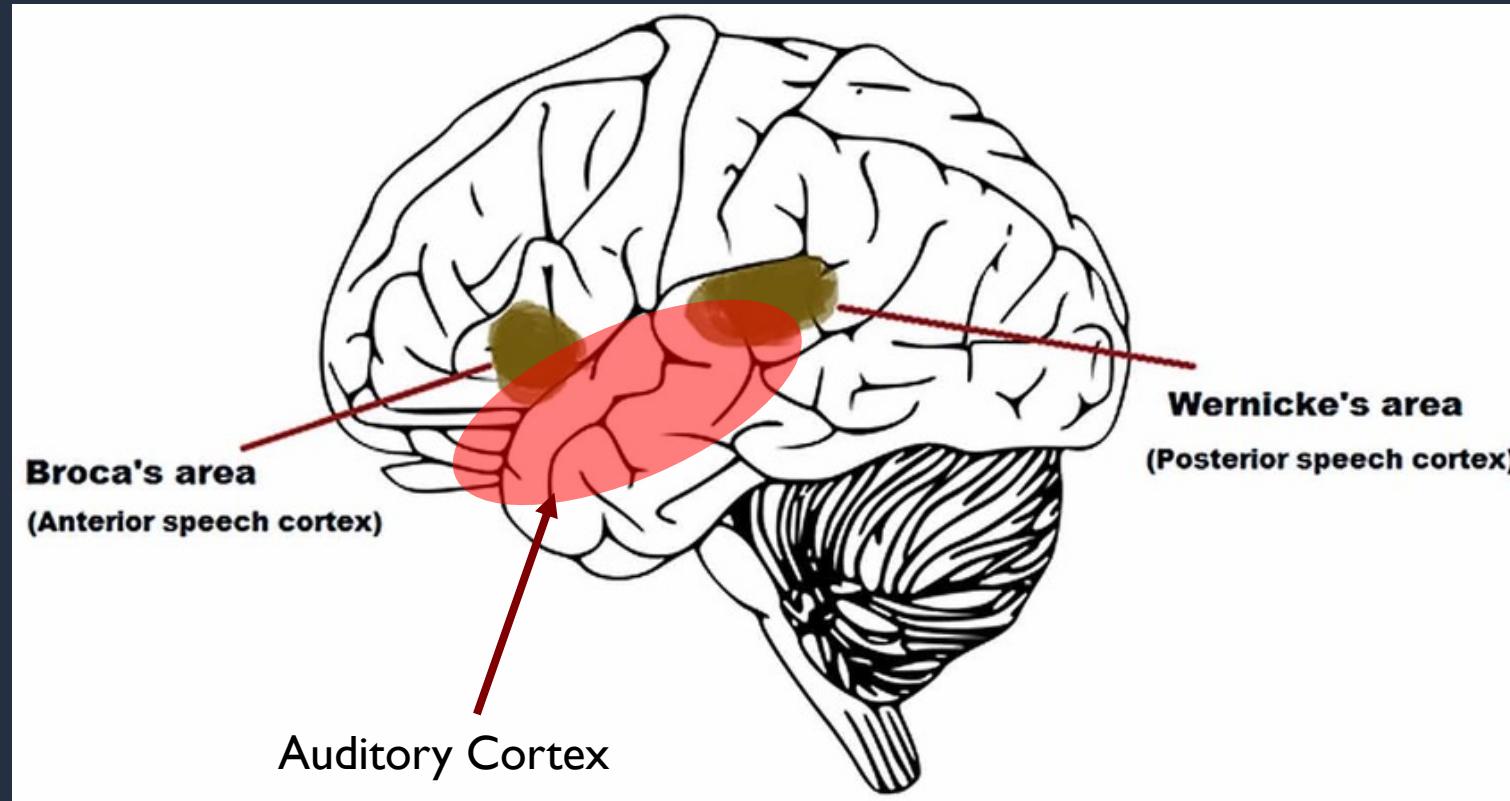
- In order for typical brain development to occur certain types of experiences must occur during a certain window



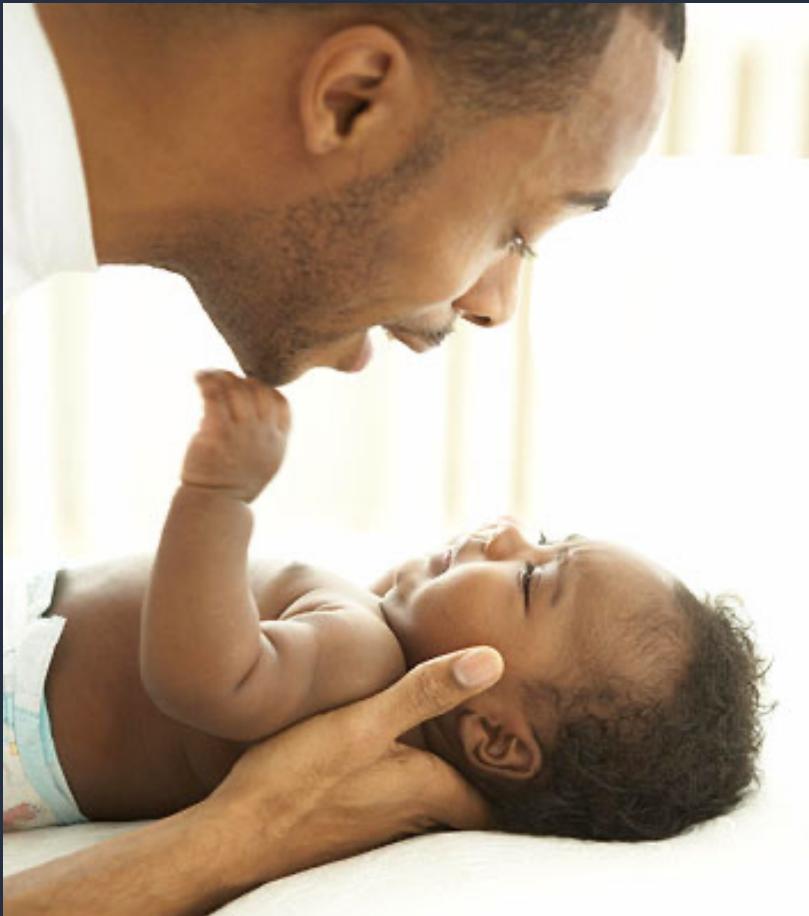
Language Development



Language Development (experience-expectant)



Language Development (experience-dependent)



Which language(s)
do we encounter
in early life?

Language Development (sensitive periods)

Are these two sounds the same or different?



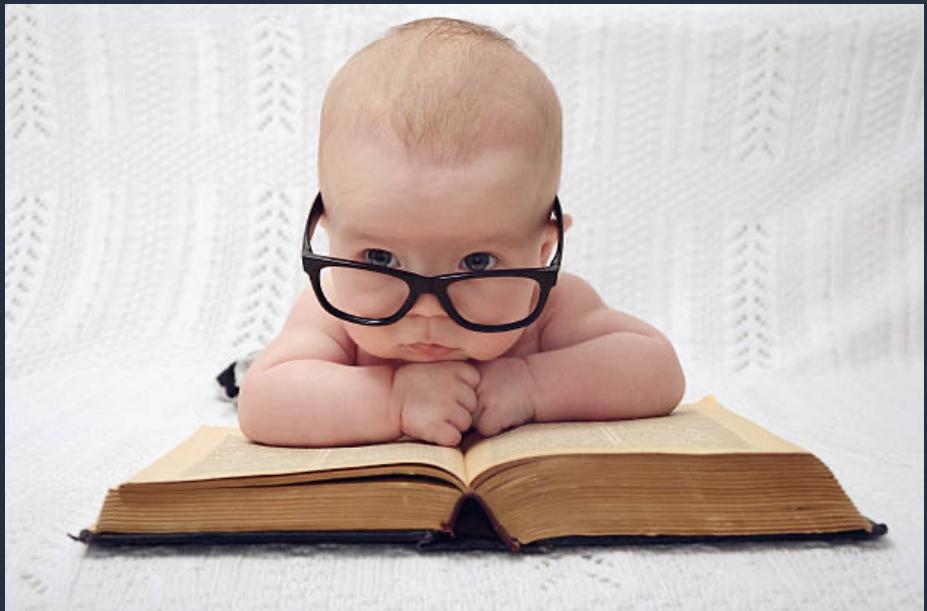
Example 1



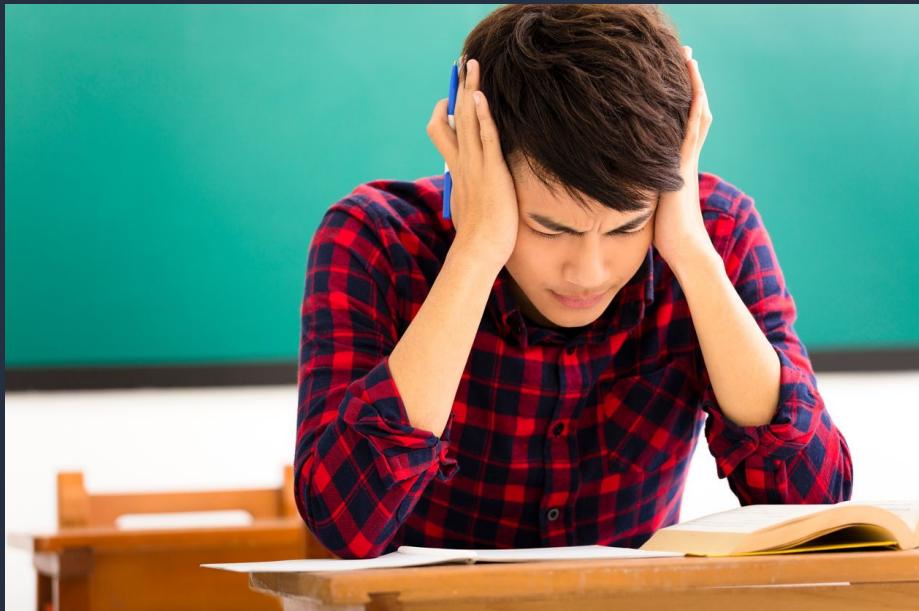
Example 2



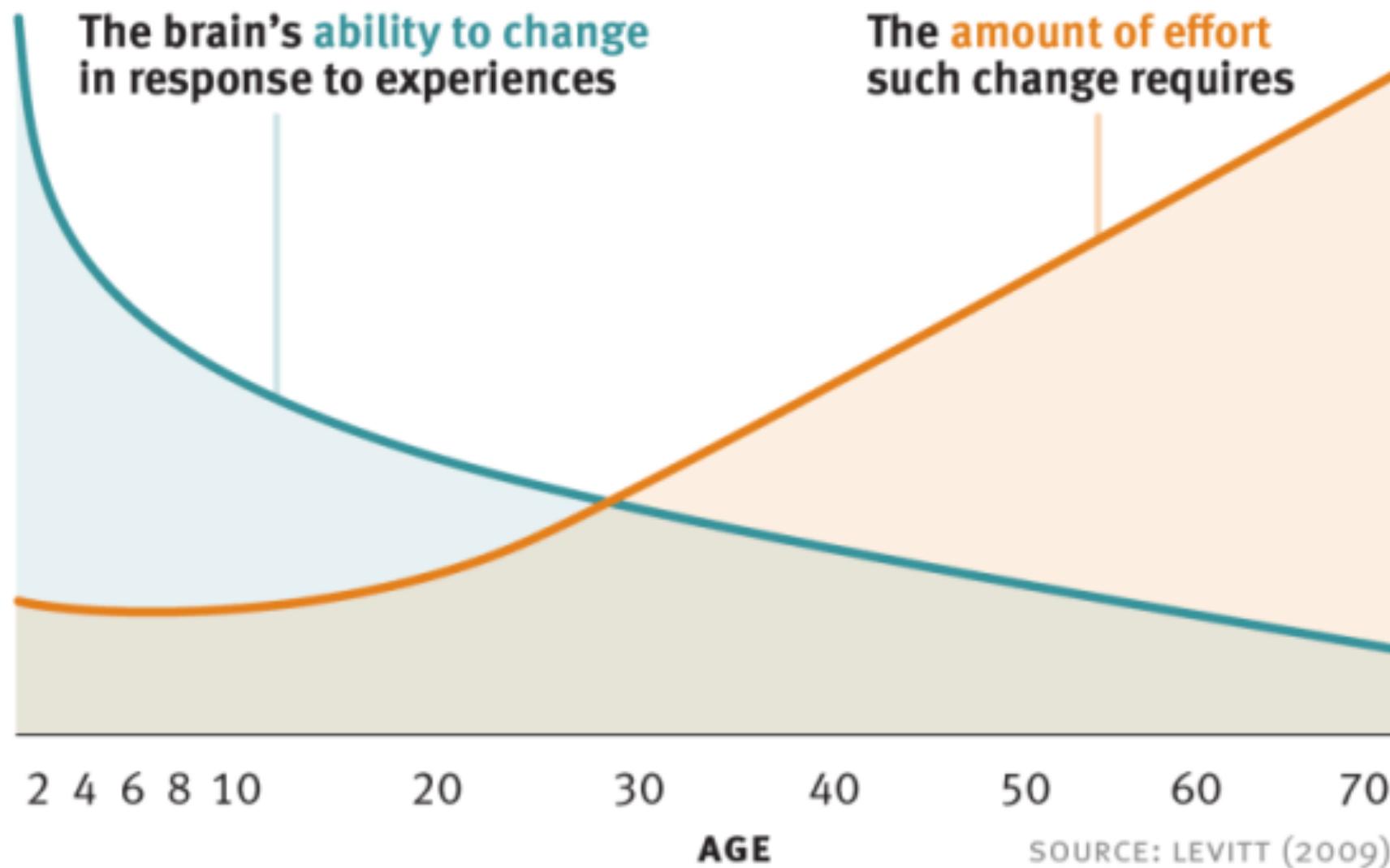
Language Development (sensitive periods)



vs.



When do we encounter language(s)?

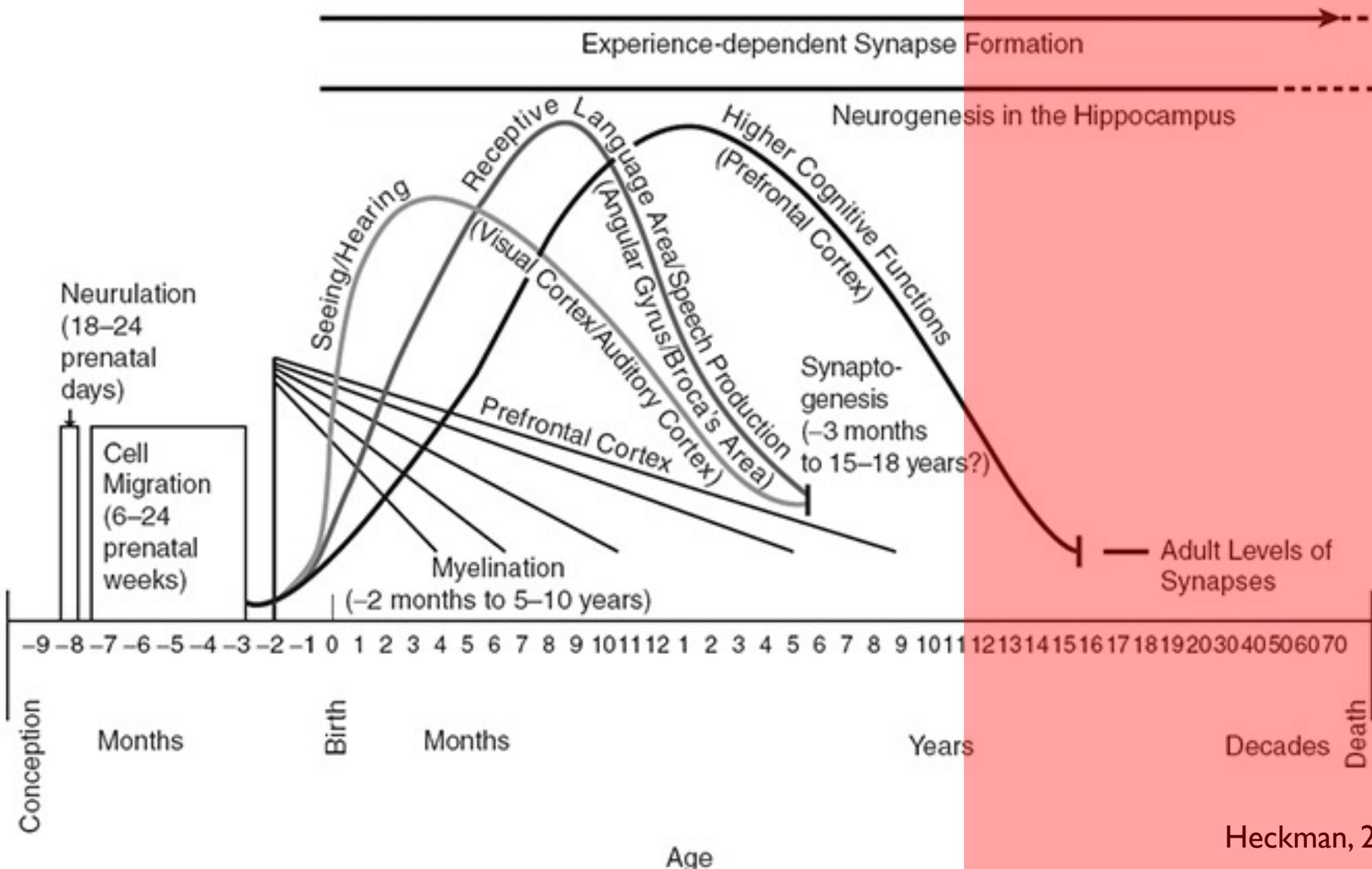




“Genie”



Human Brain Development



Sensitive/Critical Periods

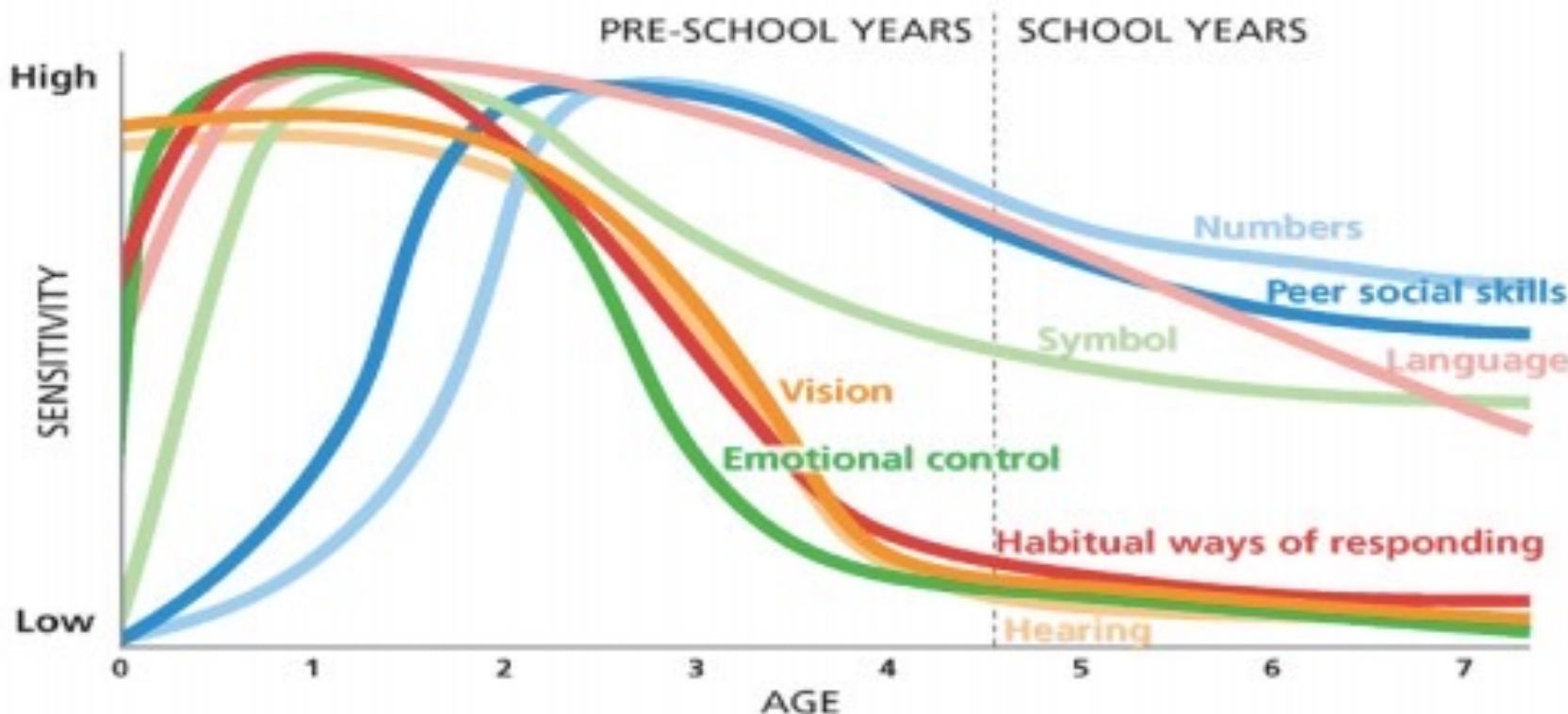
- Not all systems are constrained by sensitive/critical periods
 - eg. Learning & Memory
- Why not just keep sensitive/critical periods open forever?
 - system craves stability
- Can sensitive/critical periods be reopened?
 - we're working on it

Sensitive/ Critical Periods

- The developing brain is heavily shaped by the environment and experiences.
- Early brain development is characterized by sensitive periods – a time of exceptional sensitivity to the effects of environment and experience.
- It is far more difficult to alter neural circuits substantially after their sensitive periods have ended, thus experiences during sensitive periods play an exceptionally important role in shaping the capacities of the brain.

What does this have to do
with early-life stress?

Sensitive Periods in Early Brain Development

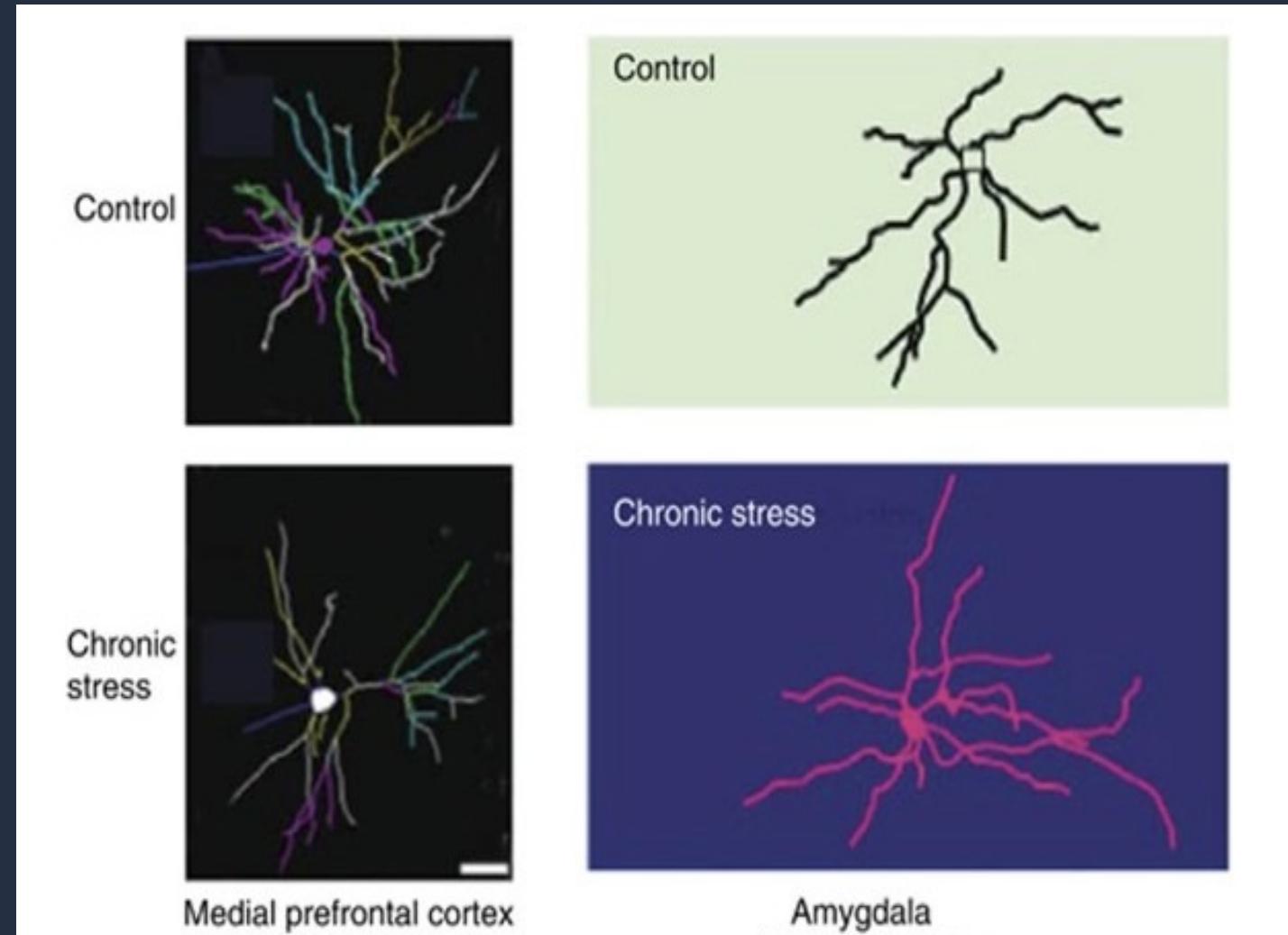
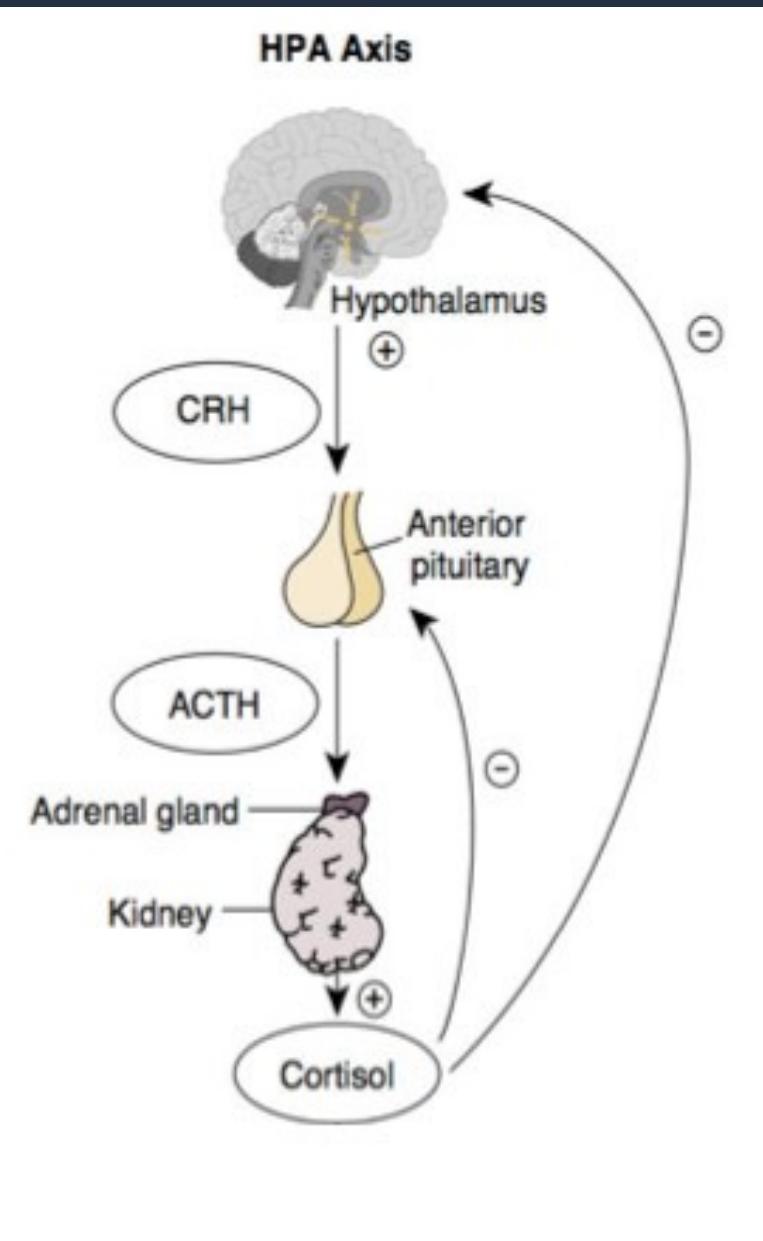


Graph developed by Council for Early Child Development (ref: Nash, 1997; Early Years Study, 1999; Shonkoff, 2000.)

Figure 1

Sensitive periods in early brain development

Brain architecture is developed in a bottom-up sequential manner, and is especially sensitive to environments and experiences in the early years (Council for Early Child Development, 2010).
Used with permission.



Early Adversity and Critical Periods: Neurodevelopmental Consequences of Violating the Expectable Environment

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Abstract

It is now widely recognized that children exposed to adverse life events in the first years of life are at increased risk for a variety of neural, behavioral and psychological sequelae. As we discuss in this paper, adverse events represent a violation of the expectable environment. If such violations occur during a critical period of brain development, the detrimental effects of early adversity are likely to be long-lasting. Here we discuss the various ways adversity becomes neurobiologically embedded, and how the timing of such adversity plays an important role in determining outcomes. We conclude our paper by offering recommendations for how to elucidate the neural mechanisms responsible for the behavioral sequelae and how best to model the effects of early adversity.

Keywords

Adverse childhood experiences; brain development; neurobiological embedding; developmental programming; early adversity; critical periods

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1. Raff (2016): "[How to Read and Understand a Scientific Article: A Guide for Nonscientists](#)"
2. Hartwright (2017): "[How to Read an Academic Journal Article](#)." (To download the "Scrapbook" Hartwright references, click [here](#); then, click on the blue "Download" button in the upper right-hand corner.)
3. Kossowaska (2013): "[How to Read and Get the Most Out of a Journal Article](#)"
4. Pecchia's (no date): "[Reading and Taking Notes on Scholarly Journal Articles](#)"
5. Purugganan and Hewitt (2003): "[How to Read a Scientific Article](#)"
6. Laubepin (2013): "[How to Read \(and Understand\) a Social Science Journal Article](#)"



Questions?



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