Early Conversations

Key Words: Language development. Early childhood. Synchrony. Child-directed speech. Serve & Return. Conversational turns. Synapses. Mirror neurons. Fast-mapping

- To schedule THIS presentation in person or via Zoom:
  - Dj.dorothyjohnson@gmail.com Tel: 520-444-0018
  - Note: PowerPoint slide show will open slides stepwise with animations, including some content obscured in this pdf version.

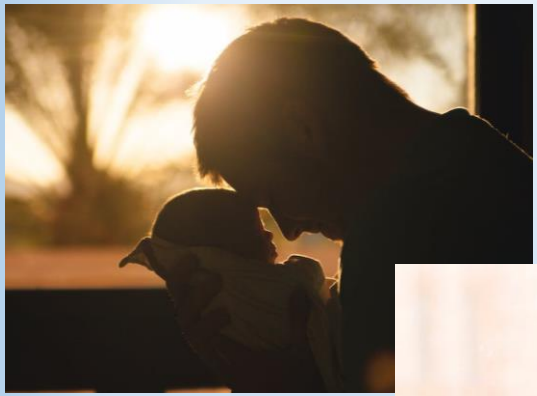
For *BRAIN BUS (kindergarten up)* & other PRESENTATIONS:

- **The Center for Neuroscience Foundation's Each Brain Matters.**
  - Website https://www.eachbrainmatters.org/
  - **Director Susan Hopkinson** foundation@neurotucson.com

    Tel: 520-529-5211 **ext. 7988**

Early Conversations:

Keys to Language Development & Reading



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Adjunct Retired Instructor, ECE, Pima Community College

References include several Worth Publisher's editions of Kathleen Stassen Berger's *The Developing Person Through the Life Span* & *Invitation to the life Span*.

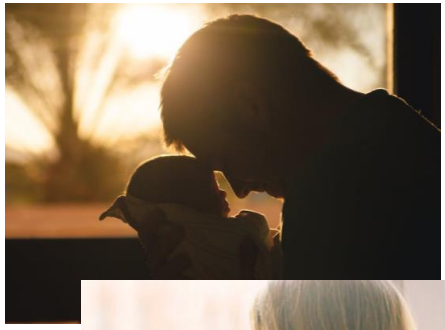
LANGUAGE --

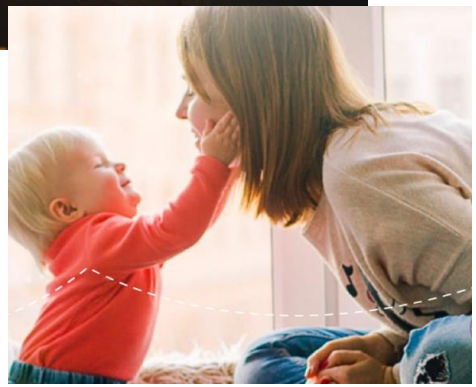
Imagine ---

How do they get from here

to there?

Early Conversations :





Research shows that turn-taking **conversation** with infants, toddlers and preschoolers is the **key ingredient in preparing brains to develop language, reasoning and reading.**

Goals:

To increase

Your understanding of early language development,

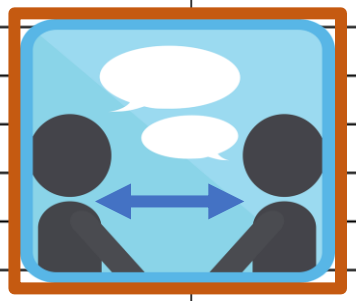
and

Your knowledge of language-building strategies and resources.

One's future in schooling and beyond is profoundly impacted by one's kindergarten vocabulary.

	2 years	3 years	4 years	5 years
20,000				20,000
19,000				
18,000				
17,000				
16,000				
15,000				
14,000				
13,000				
12,000				
11,000				
10,000			10,000	
9,000				
8,000				
7,000				
6,000				
5,000		5000		5000
4,000				
3,000			3000	
2,000	2000			
1,000	100	1000		

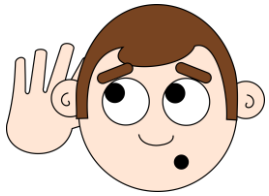
Turn-taking conversations have the greatest impact on the number of words that a child understands.



(Data in Berger 2011, p 248)

Hart & Risley's seminal 1992 research projected a huge variation in total words a child knows by kindergarten.

Children's vocabulary corresponded to words children heard at home.

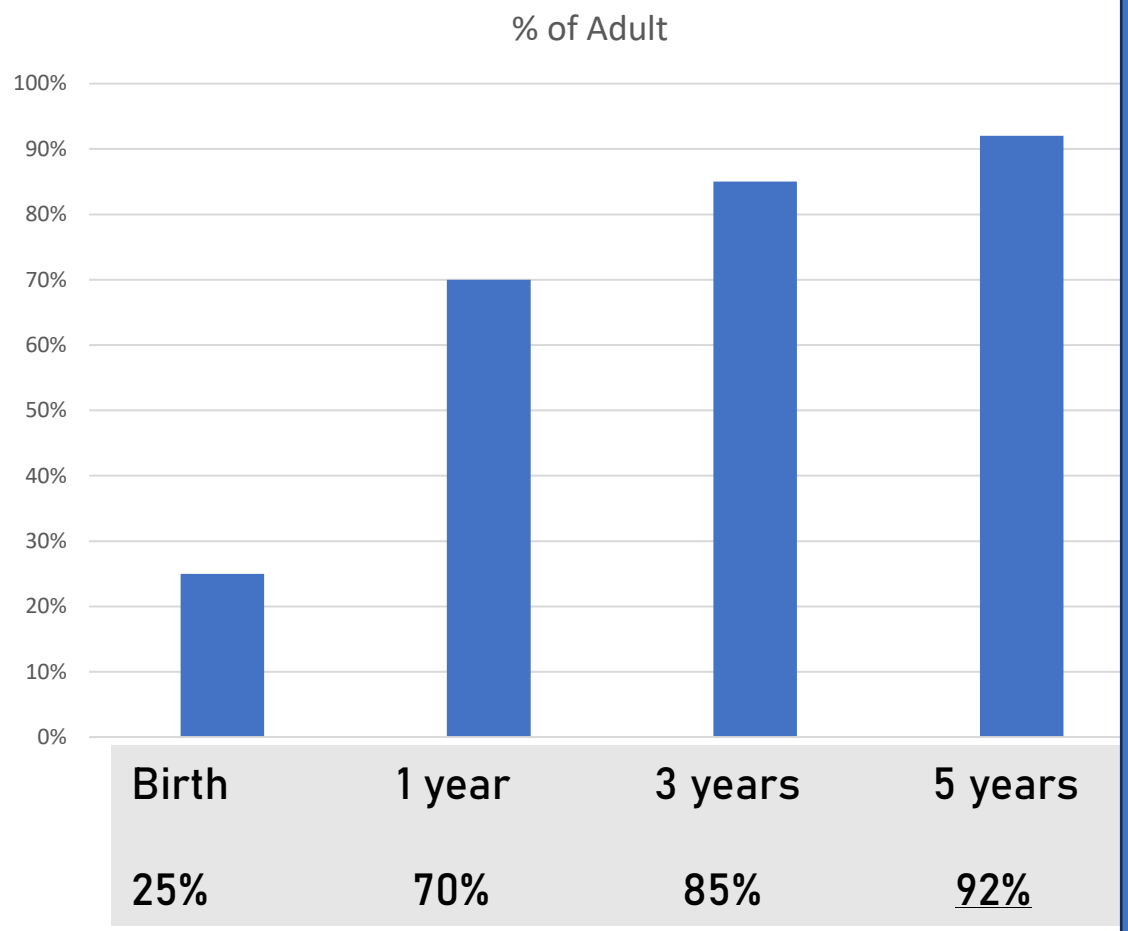


Brain Basics of Language Learning

Some brain-building basics will help us understand HOW language develops.

Early brain weight as % of adult brain weight at

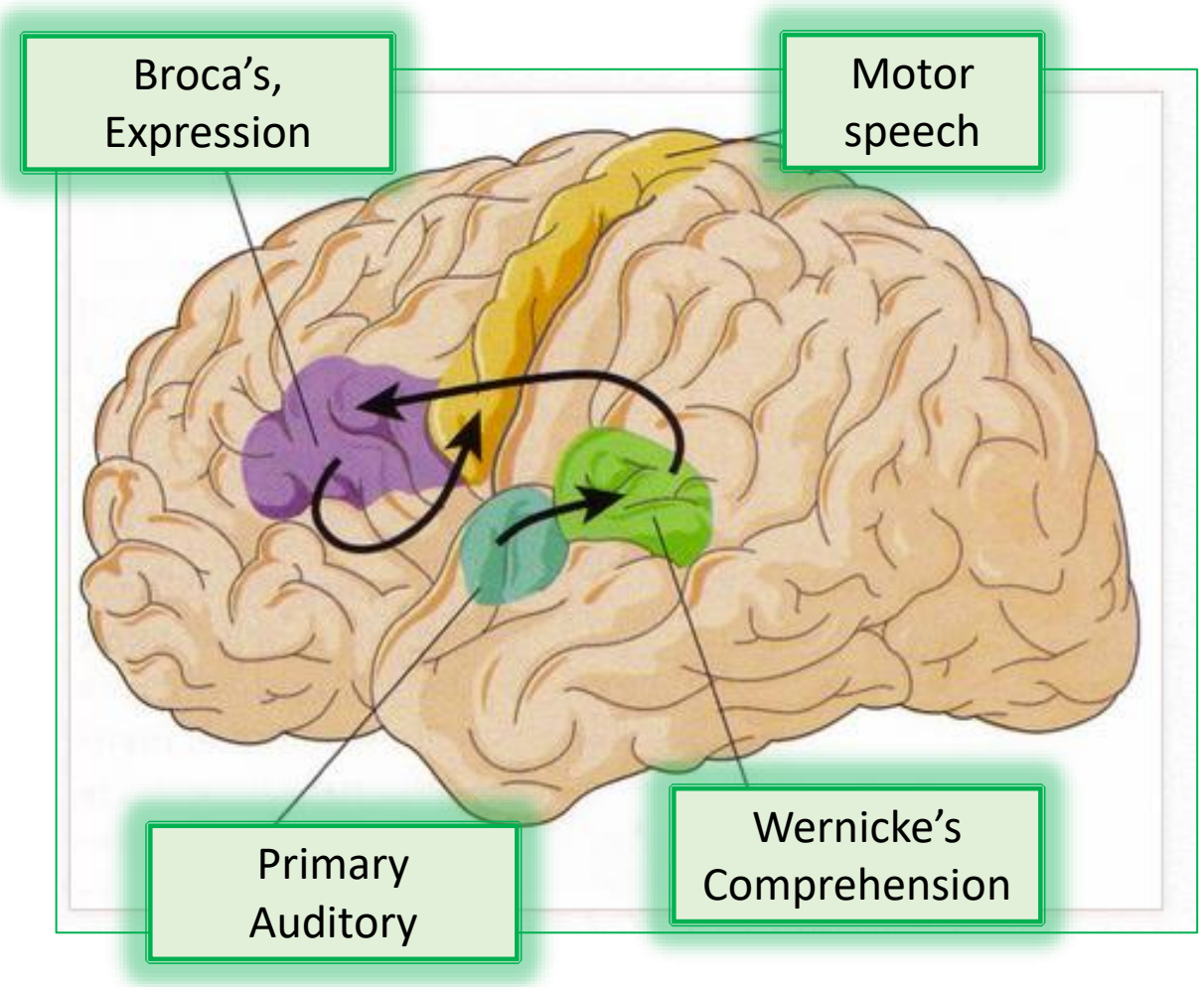
Growth of Brain, Birth to 5 yrs, as % of Adult Brain Weight



Patricia K. Kuhl - The Baby Brain, Brain Mind Summit
https://www.youtube.com/watch?v=ErPPXfsY6a8

Different parts of the brain do different things, with neurons specialized for that purpose. For instance:

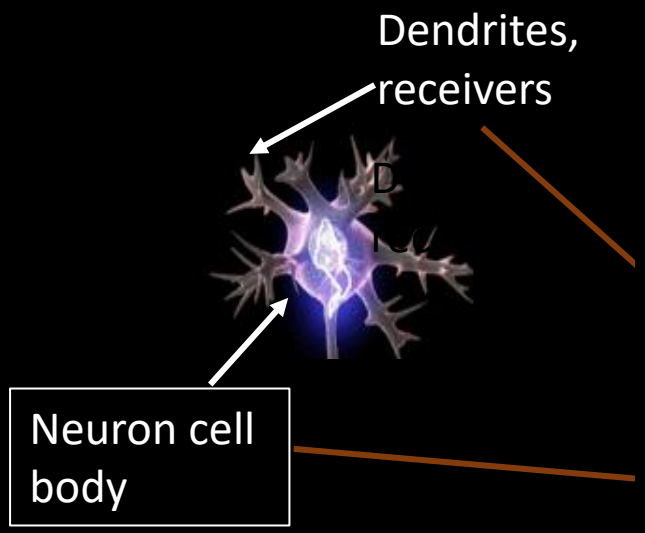
Primary Language Areas for Reception, Comprehension & Expression



https://sfstx.com/brocas-wernickes/(Courtesy of Neuroscience & Cloud)

At their destination, each neuron cell body sprouts multiple **receivers**, called **dendrite**s

And a single **sending arm**, called an **axon**.



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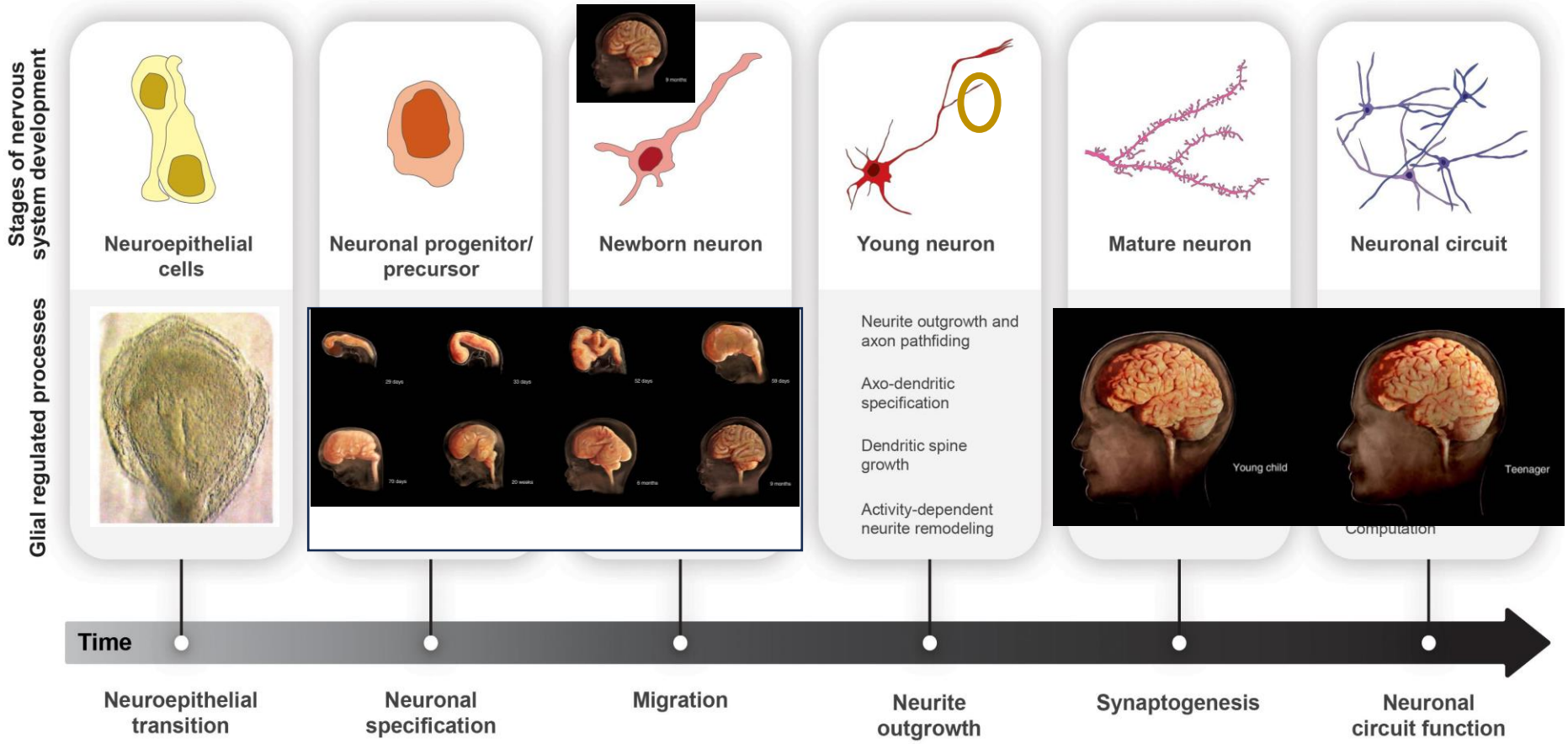
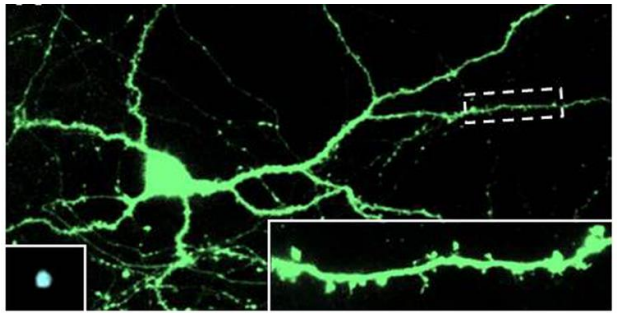
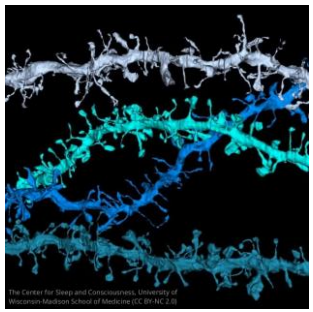
https://www.youtube.com/watch?v=ErPPXfsY6a8

Neurons continue to mature after birth.



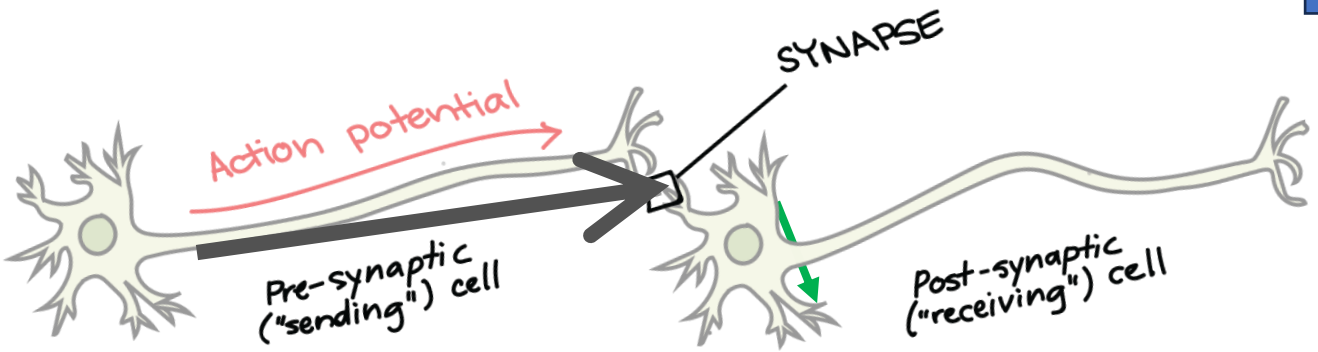




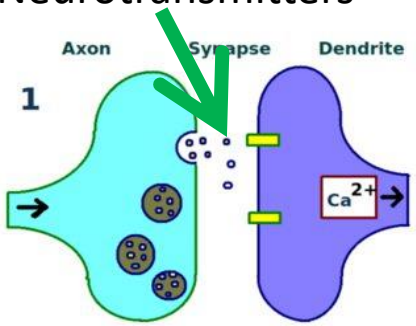
In their new positions, neurons begin to connect to one another at synapses.

The **Synapse** is where the axon from one neuron meets and can send messages to a dendrite of the next neuron.

Synapse



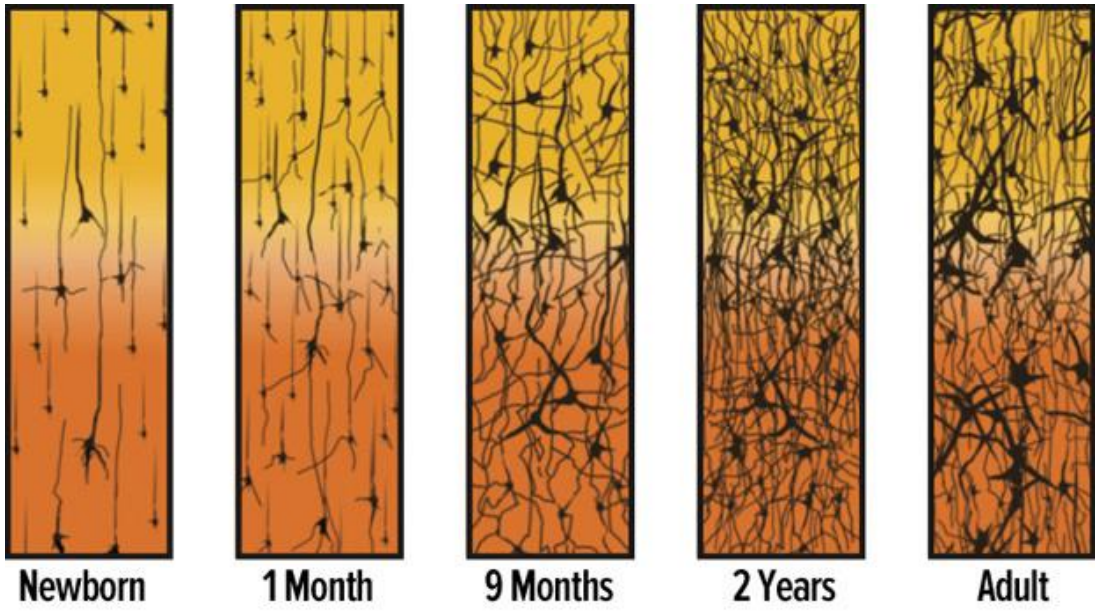
Neurotransmitters



Neurotransmitters are the chemicals that carry the message across the synapse to the next neuron.

Synapses build the architecture of the brain, driven by experience & use.

- In the first two years after birth 1 million synapses may form per second,
- forming as many as 250 trillion synapses by age 3.
- That's three times the 86 trillion synapses in the adult brain.
- "Pruning" will remove unused synapses as the brain becomes more efficient and specialized.



Patricia K. Kuhl - The Baby Brain, Brain Mind Summit
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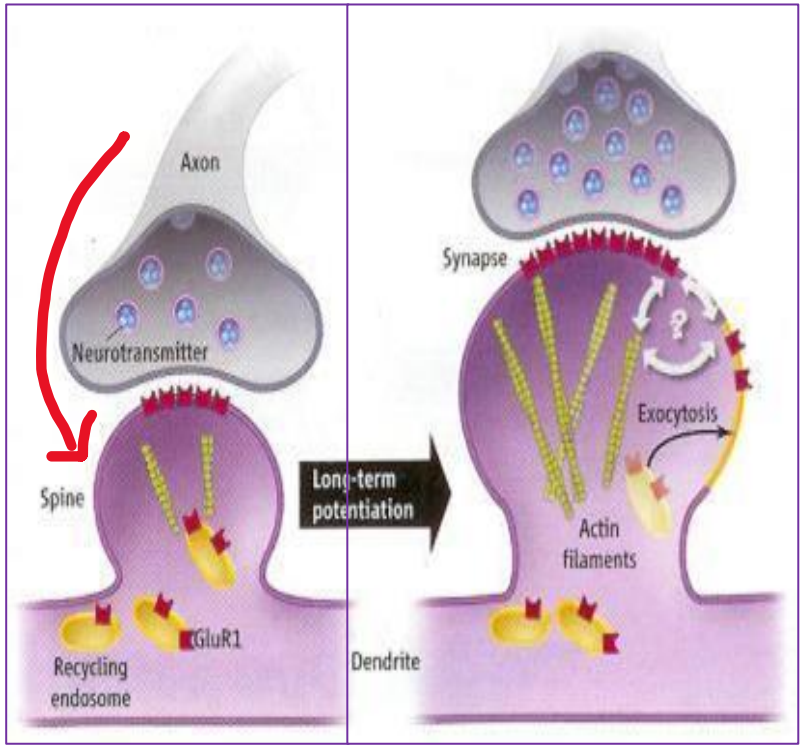
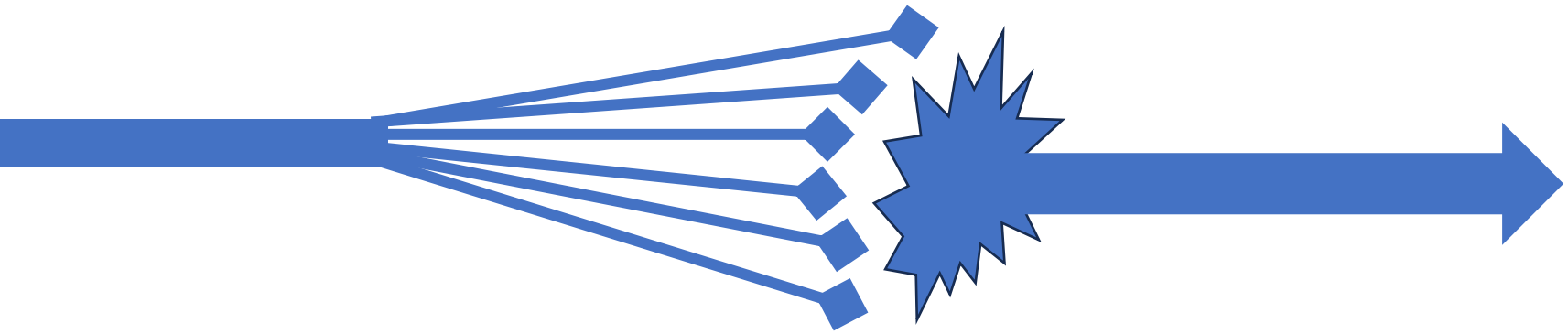
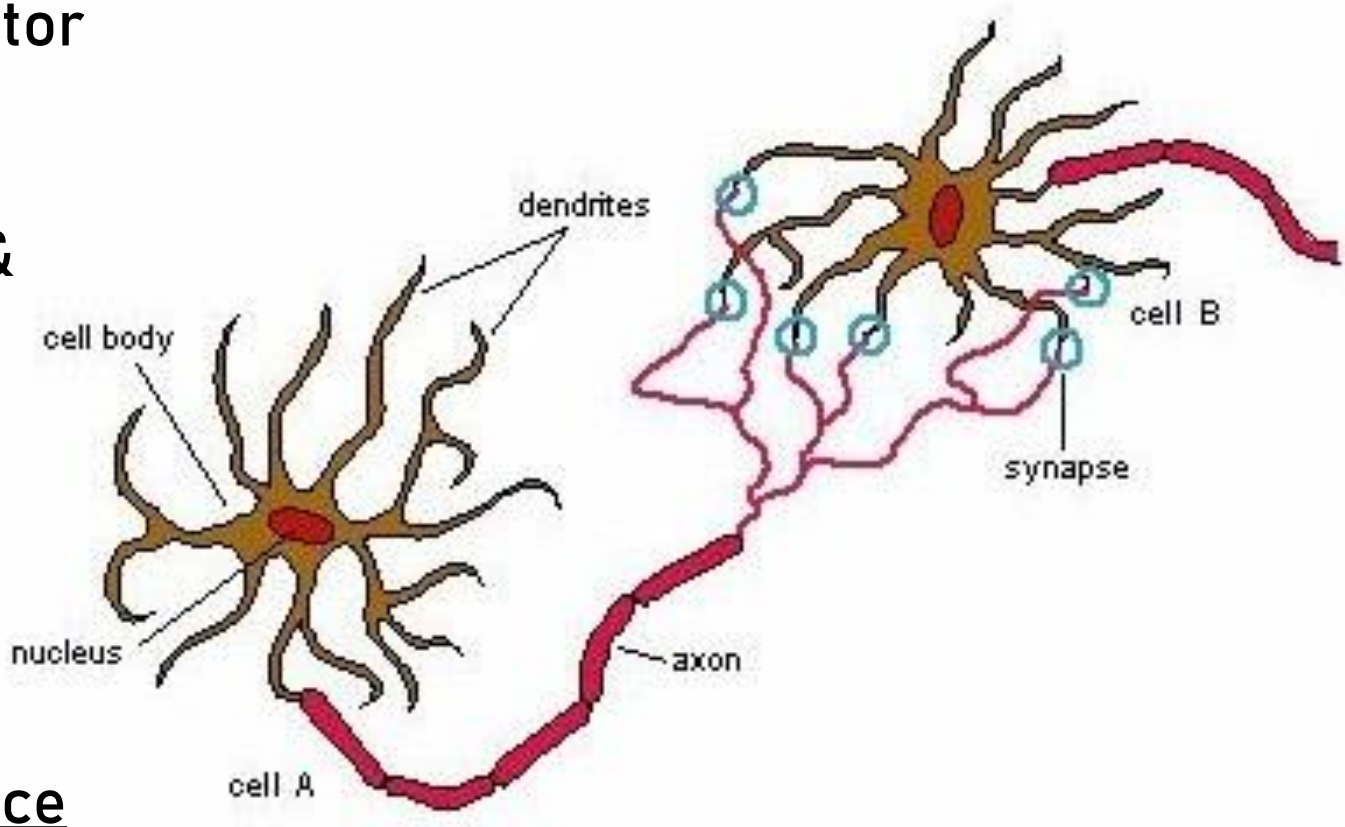
With repeated use, alteration in the dendritic spine changes a synapse from temporary to permanent.



And with repetition, synapses multiply & signals grow stronger.



SYNAPTOGENESIS is stimulated and supported by motor and sensory EXPERIENCES, including touch & talk.



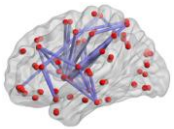
<u>This is the essence of learning.</u>

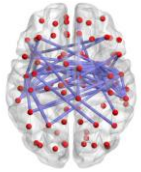
Not used? It withers or is “pruned”.

Brain Development Depends on Experience

- General principle: the young brain thrives with rich sensory and social stimulation
  - it's looking for patterns that will be important
- Coordinated back-and-forth or "serve and return", interaction with others is key.

- Enriched interpersonal and sensory experiences are associated with "good" brain development
  - Branching and synapse formation increase
  - Connections become more efficient
  - Complex networks develop

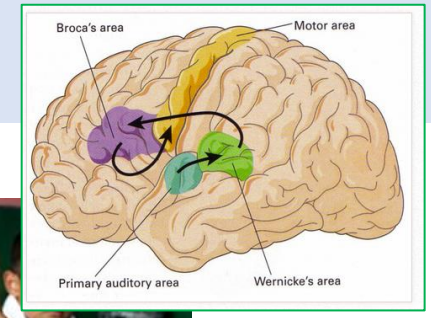




- Brain disasters:
  - Neurotoxins (including **toxic stress**) which interfere with correct powerful connections.
  - A lack of ample opportunities for interaction with others and for sensory discovery.

How do we learn language?

1. Our brains are wired for it.



DOG

dog

dog

They sit. Yesterday they sitted.

2. Repeated exposure makes strong synapses for language sounds and patterns.

3. Our Social Drive to Communicate is Key

❑ Wired for Learning Language

- Common steps occur in language acquisition (gaining language) in every language including sign language.
- All children are “wired” to expect language, and readily generalize grammar rules.
- Children will copy speech overheard as well as “taught”.

Berger 2014, pp 124-127

❑ LEARNING THROUGH REPEATED EXPOSURE

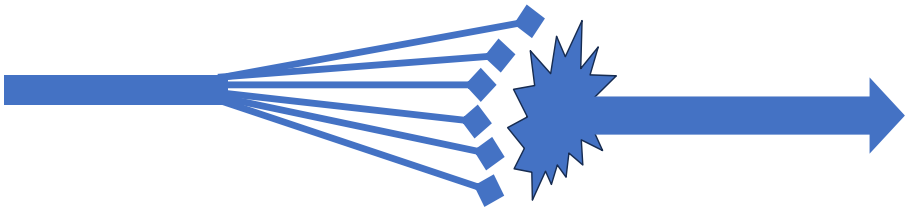
~ 10 mos, sounds specific to heard languages are mastered; readiness for any language is lost.

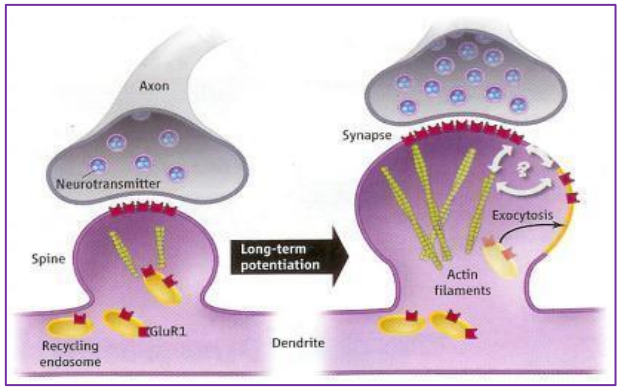
Patricia Kuhl – The Linguistic Genius of Babies

Between 6 and 12 months, an infant loses the expectant ability to recognize all unique speech sounds

as the ability to recognize sounds becomes dependent on those in the languages to which he or she is repeatedly exposed.

Connections correlate with use. Remember:





With increased use:

- Neurotransmission is enhanced
- More synapses are made.
- Dendritic spines increase & enlarge stabilizing connections.

Kopec, C. and Malinow, R. 2006. Science. 314: 1554-1555.

"Taking statistics" on language:

- Dendritic spines for sounds that aren't heard atrophy & are "pruned" around 10 months, so lose the "universal processor" for speech sounds.
- Get increase and enlargement of dendritic spines for high occurrence sounds, stabilizing those connections.

Nature (wiring) & Nurture (exposure)

By 3 years, children usually speak sentences that have

- correct word order,
- plurals,
- tenses,
- pronouns
- & articles

based on their home language,
impacted by both genes & experience.

Typical Early Errors of Grammar reflect Pattern Learning based on Exposure

overregularization: **The application of rules of grammar even when exceptions occur, speaking as if the language is more regular than it actually is.**

How do children make nouns plural?

Correct singular noun	Correct plural noun	Overregularized plural
mouse	mice	mouses
tooth	teeth	tooths
leaf	leaves	Leafs
sheep	sheep	Sheeps

How do children make verbs past tense?

If he "ficts" today, what did he do yesterday? What if he is doing it now?
So – how about "go" now, yesterday, doing it?

Infants can learn 2 languages at once.

If one parent speaks only one of the languages, the toddler usually will use the correct language with that parent.

Children master speech patterns and grammar reflecting the particular language(s) to which they are exposed.

- English infants learn more nouns, Chinese learn more interpersonal verbs.
- Toddlers learn to structure sentences reflecting the grammatical word order for their *home* language

  ("We must go." or "Go we must.")

But ongoing research clarifies that needed “Nurture” is more than just repetition.

The Social Drive to Communicate

❑ Our Social **Drive to Communicate** is Key to Language Development

Research shows that exposure to language in the **absence of personal connection** is **ineffective** for early language learning.

4 power-tools for early language learning:

1. **Synchrony** - sharing feelings
2. **Mirror Neurons –** gazing for feeling & learning
3. **Serve & Return –** taking conversational turns
4. **Child-directed speech** - the lilt of “parentese”

Language is about Communication

Language development is driven by the desire for social interaction

Our first interest is in **emotive** content rather than information.

"**Seek to understand** what others want and intend" – such as following gaze (which autistic children do <u>not</u> do).

Berger 208, Ch. 6 Berger 2014, pp 124-127

1. Synchrony – Feeling Together

- "Parent–child synchrony provides the first experience of nonverbal resonance –
- "the mother adapts her gaze, affective expression, vocal quality, and movements to the infant's earliest signals -
- "to create a shared dialog."

Levy, J., Goldstein, A. & Feldman, R. (2019). The neural development of empathy is sensitive to caregiving and early trauma. *Nature Communications*, *10*, 1905.

Eye contact matters.

How closely does a child watch you?

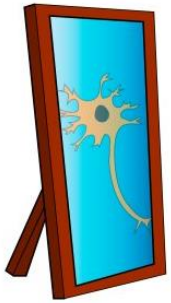
When you are looking into the young child's gaze,

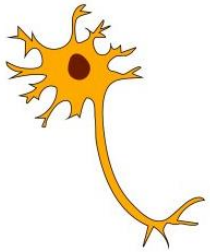
her eyes will be watching,

firing motor and emotional connections

in her brain's **Mirror Neuron** System.

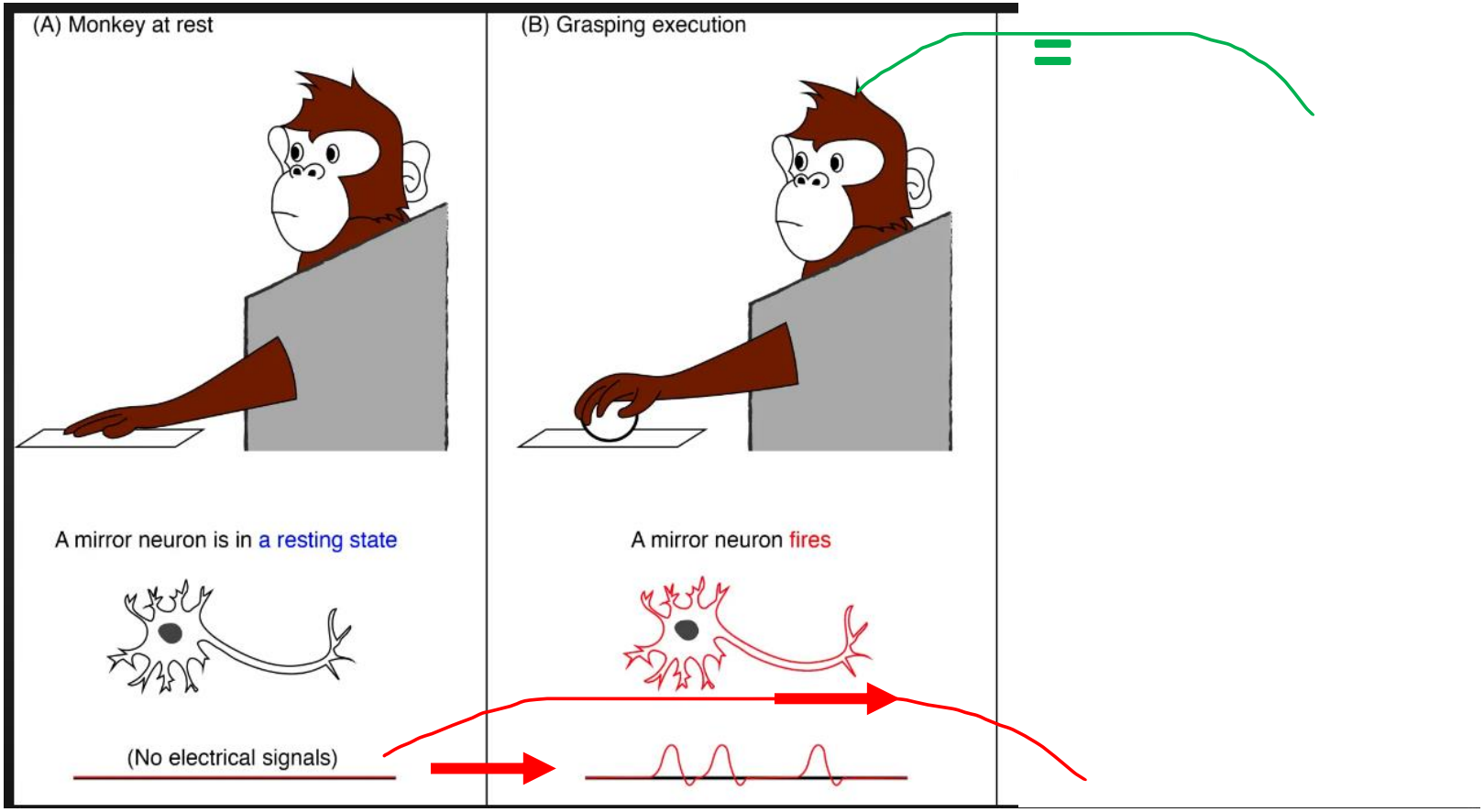
#2





In 1992 a Macaque monkey's brain was being recorded as it was grasping peanuts.

Mirror Neuron System



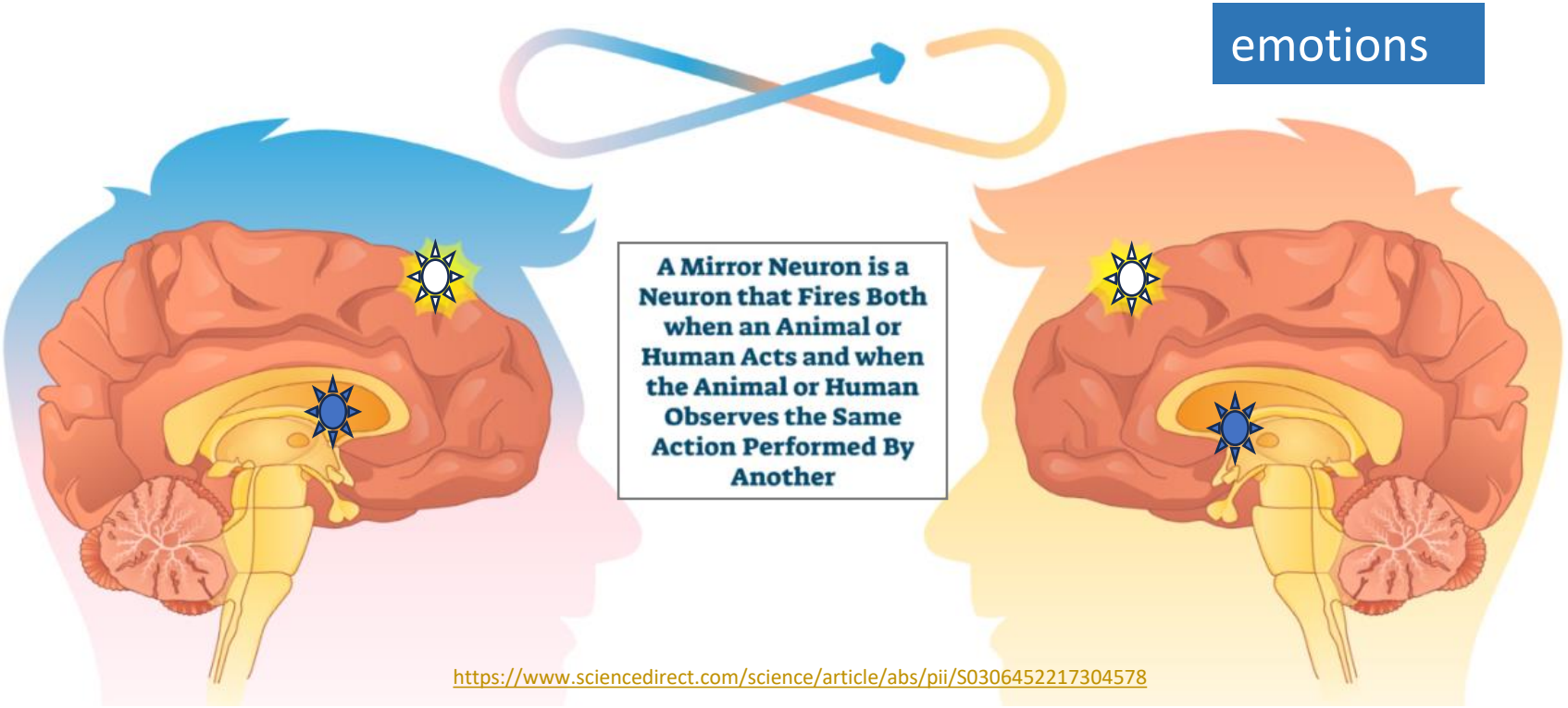
It happened that someone walking through the lab picked up one of the same peanuts.
The same part of the monkey's brain fired just as though it had picked up the peanut itself.

https://sitn.hms.harvard.edu/flash/2016/mirror-neurons-quarter-century-new-light-new-cracks/ *Youngeun Kaitlyn Choi*

Two Different Mirror Neuron Networks:

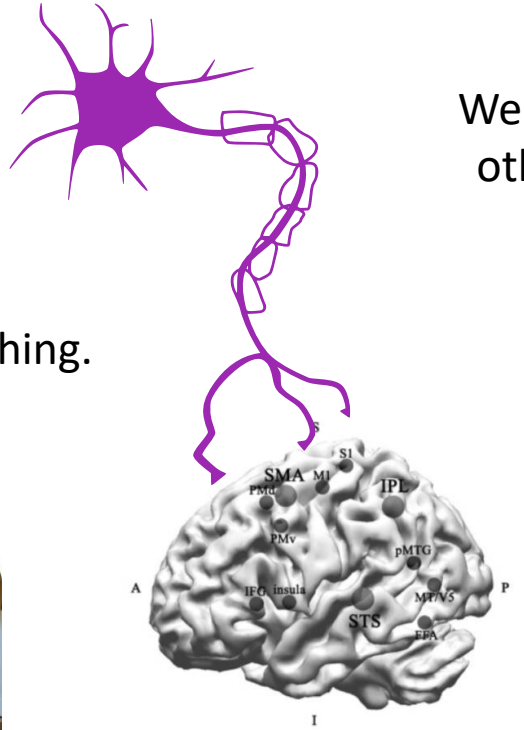
Sensorimotor (movements)

Limbic (emotions)



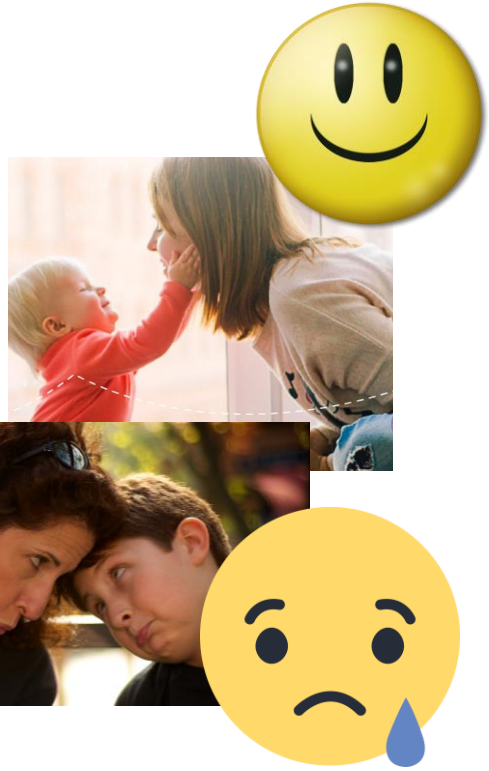
https://www.sciencedirect.com/science/article/abs/pii/S0306452217304578

Mirror neurons at work:



Mirror Neuron System
https://pubmed.ncbi.nlm.nih.gov/29397663/#&gid=article-figures&pid=fig-1-uid-0

We learn what others feel by watching.



We learn to tie shoes by watching.

Infants learn how to make language sounds by watching

Here American babies are studied. What would enable American babies to master Mandarin sounds?

Mandarin Chinese Exposure

12 sessions between 9 and 10.5 months of age

Kuhl, Tsao & Liu, *Proceedings of the National Academy of Sciences*, 2003

https://youtu.be/ErPPXfsY6a8

Mirror Neurons & Child-Directed Speech

- Watch the babies' eyes.
- Listen to the lilt of the speaker's voice.
- See babies seek understanding.

See 4:10-5:00.

Patricia K. Kuhl - The Baby Brain

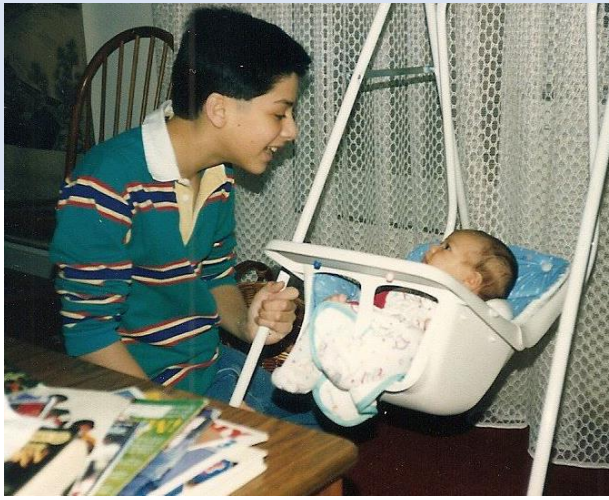
BrainMind Summit

https://youtu.be/ErPPXfsY6a8

3. Child-Directed Speech

(parentese)

"child-directed speech" – "parentese"



- High pitched, repetitive speech,
- Slowed so vowels longer,
- Simplified with short sentences, simple grammar
- Exaggerated inflection (melodic) makes it more appealing & educational

Infants preferentially attend to it

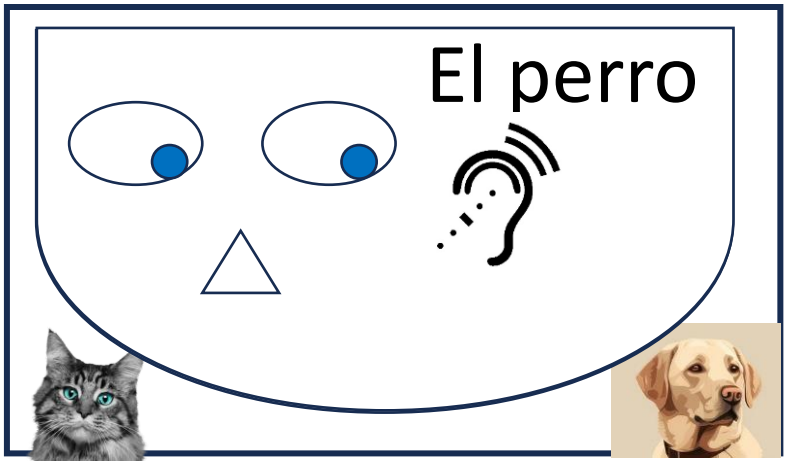
Powerful teaching tool when paired with interaction.

Vocabulary at 24 months is correlated with amount of Parentese at 11 months

In these infants of low-income Spanish-speaking families:

1. Vocabulary at 24 months correlated with exposure to **child-directed speech** at 19 months.
2. 19 mo. **overheard speech,** whether from TV, radio or conversations of others, did **not** affect vocabulary or processing skill at 24 months.
3. The correlation between child-directed speech and later vocabulary was explained by **improved speech-processing skill** at 24 months, the **result of the extent of experience interacting with language sounds, meanings and production** through engagement with "parentese".

"--infants with more exposure to child-directed speech **are faster and more accurate** to orient to familiar words in real-time, **enabling** them to **learn new** words more quickly and facilitating rapid vocabulary growth."



Weisleder, A, Fernald, A., Talking to children matters: Early language experience strengthens processing & builds vocabulary. Psychol Sci. 2013 Nov 1; 24(11): 2143–2152. Published online 2013 Sep 10. doi: 10.1177/0956797613488145. PMCID: PMC5510534 NIHMSID: NIHMS661012 PMID: 24022649

high,
slow,
short,
simple,
melodic

FACE
TO
FACE

Playing with Parentese

Serve & Return

- Find a colleague, friend or family member to practice. Designate one person as ***child*** – **pick the age 0 – 18 months -** and the other(s) as ***parent***.
- ***Child*** **"serves"** with a hand and/or facial gesture and/or age-appropriate sound.
- ***Parent*** **"returns"** with **Parentese.**
- ***Child*** **"returns"** –the serve - copy or change.

Do a couple of turns,
then **switch roles.**

What did you notice?

- On *Parent, c*hanges in mouth, eyes or eyebrows?
- On *Child*, changes in eyes, eyebrows or mouth?
- Fun? Engaged?

Research Documents that Using Child Directed Speech (Parentese) as the "Return" to 0 – 2 year olds Increases Language Learning

For preschoolers, it's "icing on the cake".

Could “parentese” benefit story-reading?

Use Parentese tips when reading this story outloud:

- High pitched, repetitive speech,
- Slowed so vowels longer,
- Simplified with short sentences,
  simple grammar
- Exaggerated inflection (melodic).

The Three Little Pigs

When the first pig went out,
he met a man with a bundle
of straw.
The pig said,
"Sir, please give me the straw
so I can build a house."
The man gave him the straw,
& the pig built a house out of
straw.
Soon after,
a big bad wolf passed by.
He knocked on the door and said,
"Hey, little pig, let me in."

https://ririro.com/

Now take turns reading the Pig story to one another with "parentese"

- High pitched, repetitive speech,
- Slowed so vowels longer
- Simplified with short sentences, simple grammar
- Exaggerated inflection (melodic)

The Three Little Pigs

The pig replied,
"No, no, not by the hair on my chinny chin chin."

"Then I'll huff and I'll puff and I'll blow your house in,"
said the wolf.

And so he did.
He huffed and he puffed, and he blew the door down.

You can go back to the prior screen to keep reading substituting sticks and bricks for straw.

https://ririro.com/the-three-little-pigs/?msclkid=222c1ddc8c90119aa5a27ba78d5c6fd5&utm_source=bing&utm_medium=cpc&utm_campaign=United%20States%20%7C%20Search&utm_term=three%20little%20pigs%20and%20the%20big%20bad%20wolf&utm_content=The%20Three%20Little%20Pigs#google_vignette

4. Serve & Return

Can Parentese on a DVD Teach American Babies Mandarin Sounds?

See 5:00-6:50

Patricia K. Kuhl - The Baby Brain

BrainMind Summit

https://youtu.be/ErPPXfsY6a8

Patricia Kuhl – The Linguistic Genius of Babies

From 6 to 12 months, an infant loses the expectant ability to recognize all unique speech sounds

as the ability to recognize sounds becomes dependent on those in the languages to which he or she is exposed.

- To retain processing ability to particular sounds, the exposure must be IN PERSON.
- Electronic audio-visual or audio input does NOT cause the language development that occurs with interpersonal input

- https://www.ted.com/talks/patricia_kuhl_the_linguistic_genius_of_babies

Baby Einstein research

Infants and toddlers who watched Baby Einstein tapes showed less linguistic development.

Primary issue: relationship was absent.

Language develops in the context of a relationship.

Sources: Robb, Fender & Wardella (2010); DeLoache (2010)

EARLY NONVERBAL COMMUNICATION

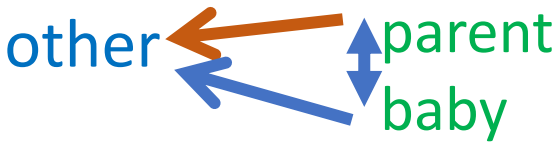
- **Starting 2-3 months - Synchrony**

  Emotional reciprocity, matching emotions.

  parent ↔ baby

- **9 months** developing **joint attention**
  Following head turn & **adult's** finger pointing→

- **10 – 11 months** Child **follows** parent's eyes-open **gaze** to look at same object as parent.



- **10- 12 mo**

  Child uses gestures to communicate, as pointing.
  [RED FLAG IF DOES NOT POINT by 12 months – suggest autism].

Berger 2011, Table At About This Time, p 166.

Serve & Return Shapes Brain Circuitry

Center on the Developing Child at Harvard.

Three Core Concepts in Early Development

https://www.youtube.com/playlist?list=PL0DB506DEF92B6347

Photo permission of this father whom I spotted in the grocery store doing Returns to their infant's Serves as Mom did the shopping.

Serve & Return,

to-and-fro exchanges between adult and child, are

Necessary, Experience-Expectant

The child's serve indicates what the brain is ready to learn.

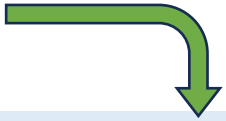
A great video: **Building Babies' Brains Through Play: Mini Parenting Master Class.** Jack Schonkoff, M.D., Center on the Developing Child at Harvard. https://developingchild.harvard.edu/resources/building-babies-brains-through-play-mini-parenting-master-class/

Studies show that Returns to Serves Enhance Vocabulary Building

Why?

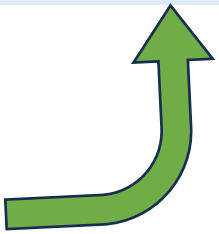
- As infant make sounds and begins to say words, we reward with enthusiasm.

The more times a parent imitates babbling in 10 minutes,



the faster vocabulary builds & the bigger it gets.

The more a parent sings, reads explains, listens, responds,



- In these exchanges Adults model language, connecting words & gestures with objects, acts and feelings.

Serve & Return is Multisensory
seeing, hearing, moving, touching

Motor and sensory experiences –
including seeing, hearing, being held –
stimulate & support

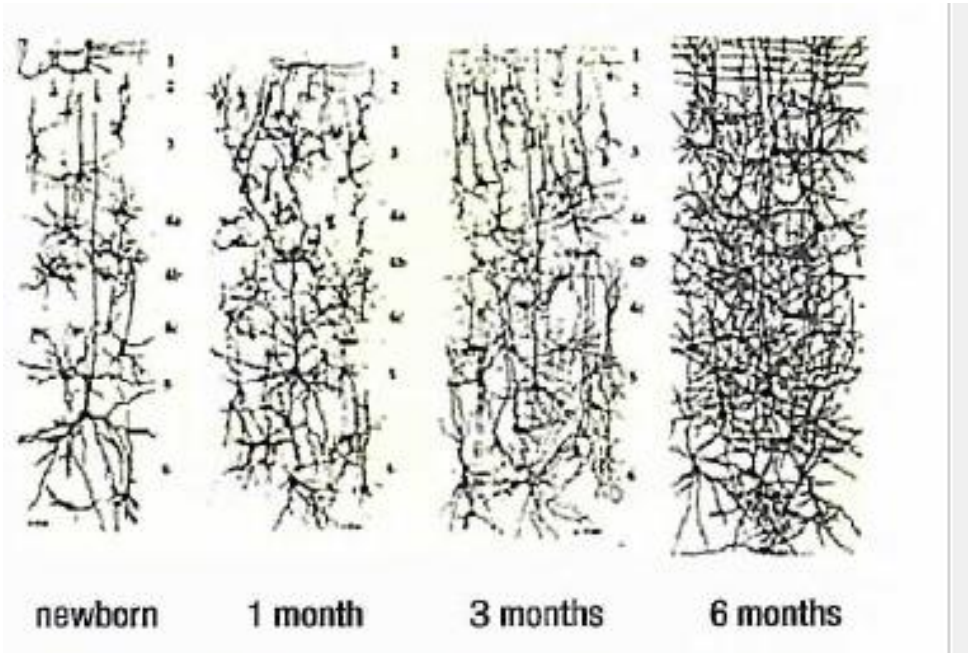
nerve-to-nerve connections.

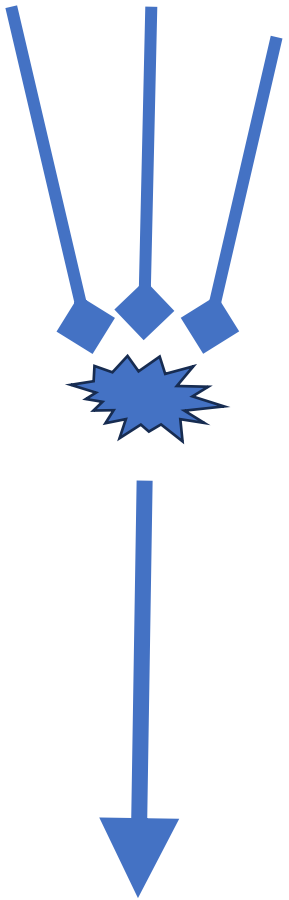
This is the essence of brain building.

Serve & Return is Multisensory

seeing, hearing, moving, touching →

- Dendrite Multiplication,
- Axon Growth &
- Increased Synapses

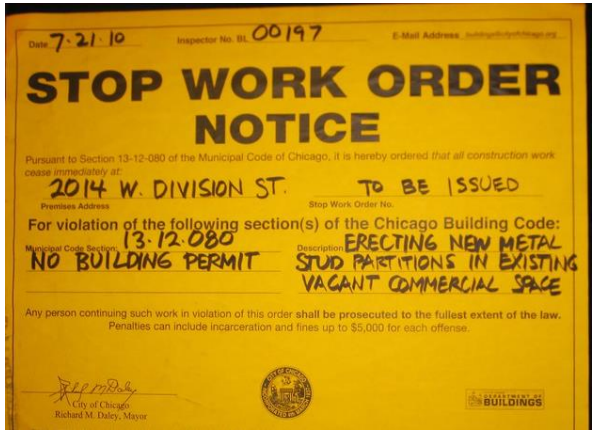




The essence of learning and development

Absence of ***Serve & Return*** is a "double whammy"

- The needed stimulus for brain building is absent.


Date 7.21.10 Inspector No. BL 00197 E-Mail Address

STOP WORK ORDER NOTICE

Pursuant to Section 13-12-080 of the Municipal Code of Chicago, it is hereby ordered *that all construction work cease immediately at:*

2014 W. DIVISION ST. (Premises Address) TO BE ISSUED (Stop Work Order No.)

For violation of the following section(s) of the Chicago Building Code:

Municipal Code Section(s) 13.12.080 NO BUILDING PERMIT

Description ERECTING NEW METAL STUD PARTITIONS IN EXISTING VACANT COMMERCIAL SPACE

Any person continuing such work in violation of this order **shall be prosecuted to the fullest extent of the law.** Penalties can include incarceration and fines up to $5,000 for each offense.

City of Chicago
Richard M. Daley, Mayor

DEPARTMENT OF BUILDINGS

- Its absence causes an increase of toxic stress hormones, leading to withering of neuron connections.

- Original
  Still Face
  Experiment with
  Dr. Ed Tronick, Ph.D.

The lack of interaction from a parent or other important care provider who is physically present, is highly stressful.

https://youtu.be/YTTSXc6sARg

Impact of stress on learning

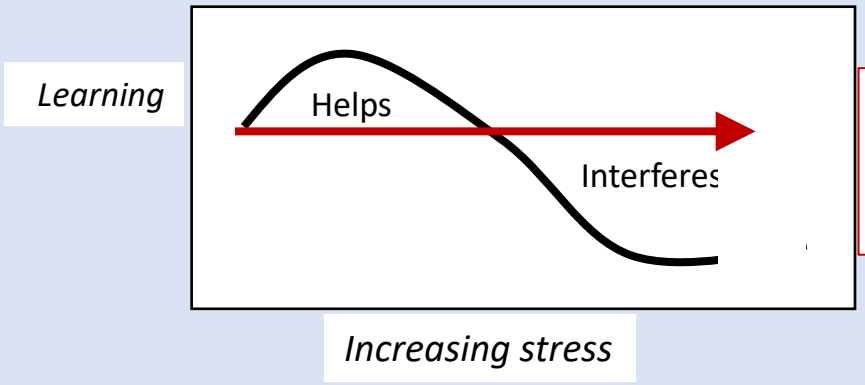
Stress causes release of noradrenaline, adrenaline and cortisol.

At low doses,

- adrenaline and noradrenaline increase **alerting and focus**
- cortisol **increases glucose** available for the cell activity of learning.

When toxic (more, longer):

- Persisting elevated cortisol results in
  - **depletion of glucose** stores
  - **compromises synaptogenesis**.
- Adrenaline and noradrenaline trigger **fight-flight-freeze** response.

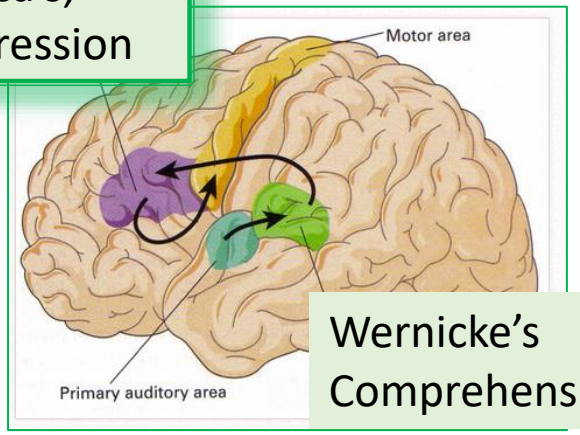


A little stress helps learning.

Too much or too long, interferes.

Children's Conversational Exposure Is Associated With Language-Related Brain Function

Broca's, Expression



Wernicke's Comprehension

https://sfstx.com/brocas-wernickes/(Courtesy of Neuroscience & Cloud)

"During a story-listening functional MRI task, children who had experienced more conversational turns with adults—**independently of SES, IQ, and adult-child utterances alone**—exhibited greater left inferior frontal (Broca's area) activation, which significantly explained the relation between children's language exposure and verbal skill."

Turns correlated with parent education, not SES.

Romeo, R.R., Leonard, J.A., Robinson, S.T. *et al*. (2018). Beyond the 30-million-word gap: Children's conversational exposure is associated with language-related brain function. *Psychological Science*, *29*(5), 700-710. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5945324/ DOI: 10.1177/0956797617742725

Serve and Return
Turn-taking Conversations
are the best nutrient for growing language.

- **Tune in**
- **Talk more**
- **Take turns**

30 Million Word Project

- **Look**
- **Follow**
- **Chat**
- **Take Turns**
- **Stretch**

VROOM

Tune in. What do you see?

What tells you that this child wants to understand? What is this child's "serve"?

Why might this child be in such distress when everyone else is laughing?

If this child had the same expression when you were together, how would you "return the serve"?

Serve and Return
Turn-taking Conversations
are the best nutrient for growing language.

- **Tune in**
- **Talk more**
- **Take turns**

30 Million Word Project

https://www.youtube.com/channel/UCzWJknjQRGDflLyIQEoHfeQ

- Self talk
- Parallel Talk
- Wait and See
- Modelling
- Expansion & Recasting

Talking Matters, UA/FTF

- **Look**
- **Follow**
- **Chat**
- **Take Turns**
- **Stretch**

VROOM

https://www.vroom.org/

https://slhs.arizona.edu/community/parents-other-professionals Strategies--

Talking Matters:
5 Strategies for Enhancing Speech-Language Skills

1. Self talk – about what **you** are doing
2. Parallel Talk – about what the **child** is doing
3. Wait Wait Wait & See - what your child will say.
4. Modelling –
   - show & say what you want the child to do & say before (Good morning, Mr. Jones), &
   - restate, correcting language errors

     "The sheeps goed to the stream" ⟶

     "Yes, the sheep went to the stream. "
5. Expansion & Recasting – lots of synonyms and more questions
   - *"I wonder if they were sweltering hot or parched and thirsty? Did they want a chilly freezing ice-cold bath or a refreshing cool drink? What did they do next?"*

Expansion & Stretching

Using Descriptive Language

- Instead of saying, "Bring me your shoes," try
  - "Bring me your pink, lace-up shoes."
- Turn "Do you want to go for a walk?" into
  - "Do you want to go for a long walk outside where we can look at the blue sky and colorful flowers?"
- -If the child says, "I want my doll," respond with,
  - "The doll with brown hair? Or the one with the green dress?"

Quoted from

https://www.verywellfamily.com/word-play-tip-4-expanding-your-childs-vocabulary-2764916

Expansion & Stretching

Synonym Substitute Suggestions

- Big: large, huge, enormous, tremendous, jumbo, monster
- Little: tiny, teeny, small, compact, mini, miniature
- Good: excellent, great, wonderful, marvelous, fantastic
- Bad: poor, awful, terrible, lousy
- Soft: mushy, doughy, gooey, spongy, squashy, smooth
- Hard: firm, stiff, rigid, tough, strong
- Tall: high, lofty, towering
- Small: tiny, petite
- Car: automobile, vehicle, motor vehicle
- Fun: enjoyment, entertainment, amusement
- Happy: cheerful, merry, jolly, gleeful
- Sad: sorrow, gloomy

http://preschoolers.about.com/od/learningeducation/qt/vocabtip2.htm
(These have been removed from this page; I copied them years ago. Now you have them.)

Expansion & Stretching

More Substitute Synonyms

'When it comes to preschool vocabulary building, enormous is always better than big. Here are some other suggestions:

- **Cold**: Cool, chilly, bitter, freezing, raw
- **Hot**: Warm, humid, boiling, tropical
- **Smart**: Clever, bright, brilliant, wise

AND

Use Descriptive Words

Make Labels

Become a Super Sorter

Practice Rhymes

How many rhyming words can your preschooler come up with?

- The fat cat sat on the mat.
- The white kite flew at night.

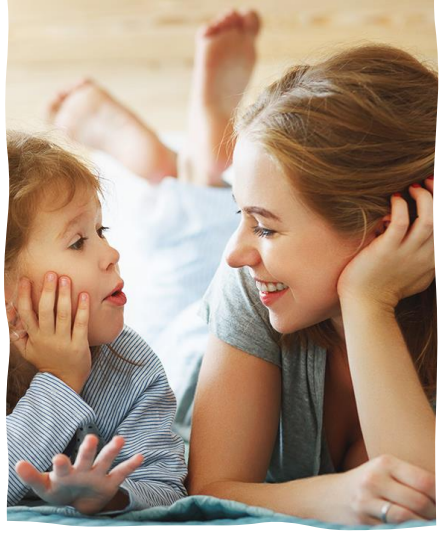
Read Aloud Together

https://www.verywellfamily.com/how-to-build-a-childs-vocabulary-2765147

See also: https://www.verywellfamily.com/top-online-dictionaries-for-kids-1259236

Playing with Serve and Return

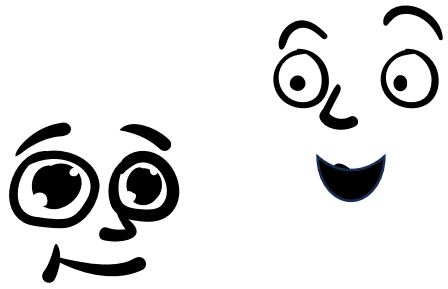
With a friend, colleague or family member, designate one person as 3 – 4 year old ***child*** –- and the other(s) as an ***adult***.

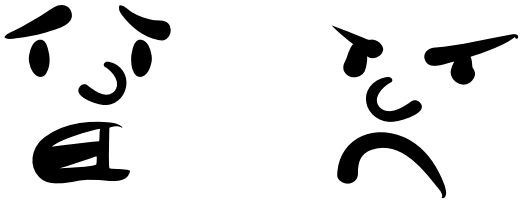


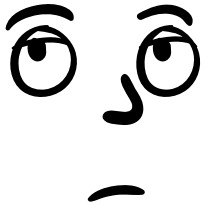
- ***Child*** **"serves"** with a hand and/or facial gesture and/or a few words of a story, complaint or question.
- ***Adult*** **"returns"** – restating/ copying and modifying. ***Child*** **"returns"** – copy or change. Use the synonyms list.
- Keep the game going for at least **five sets** of "serve and return". The switch roles.

Did you notice?

- Eye contact?
- Distress? Frowns?
- Fun? Smiles?
- Boredom?
  Embarrassment?

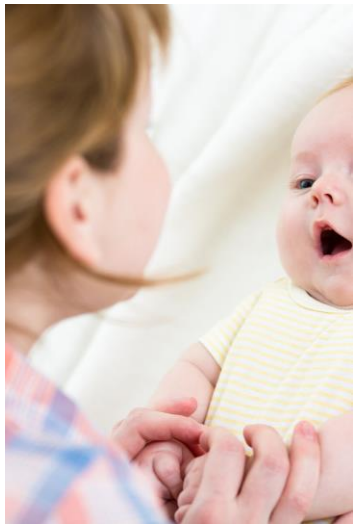






- Our Social Drive to Communicate is Key to Language Development

Research shows that
exposure to language in the
absence of personal connection
is ineffective
for early language learning.



Conclusions:

- Language development requires human interaction.

- Two very powerful nutrients for language development are

1. Both non-verbal and verbal “serve and return” turn-taking communication with a child.

2. Parent use of child directed speech or “parentese”

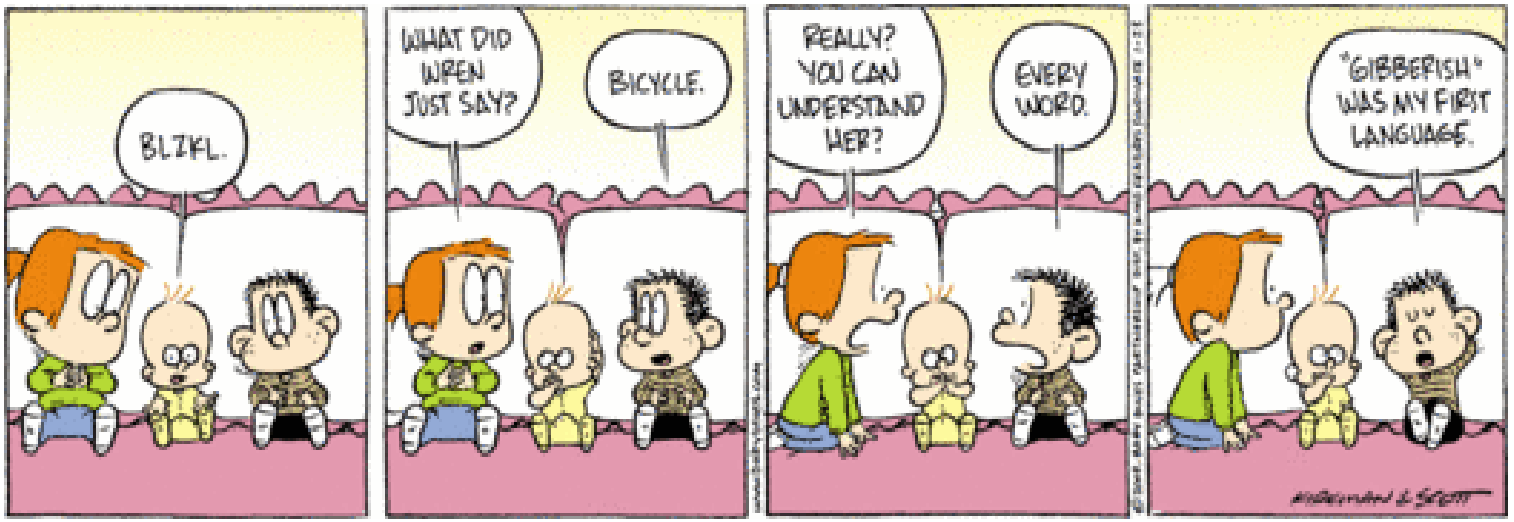
EARLY LANGUAGE STAGES!

Early Language Stages

Getting from here to there --

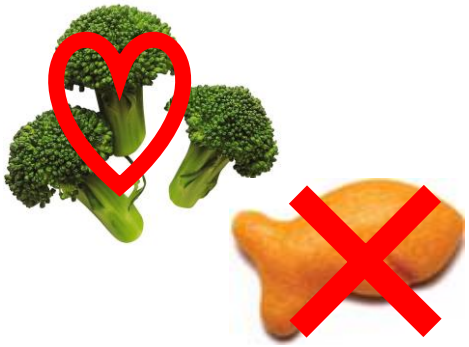
It's pretty amazing!

Early Language Milestones



Infant's & toddler's understanding precedes recognizable speech,
and utilizes visual and social context.

Almost all 15 - 18 month olds prefer goldfish crackers to broccoli. Very few of them can say “broccoli”.



But if an adult models and verbalizes loving the broccoli & disliking goldfish crackers, and then puts out her hand and says: “Can you give me some?”,

The 18 month old will give her **broccoli,** while a 15 month old would stare for a long time == and then give her **crackers**.

https://www.ted.com/talks/alison_gopnik_what_do_babies_think

RECEPTIVE LANGUAGE

Universal Sequence – prenatal – 12 months

RECEPTIVE vocabulary develops ahead of expressive vocabulary

- Fetus responds to sound by 35 weeks. Prefers mother's speech >native language> foreign speech > non-speech sound.
- At birth, hearing is functioning, including ability to discriminate sounds (phonemes) of human language {"k", "t", "s", oo, o--- }.
- Infants prefer hearing speech to other sounds, & watch speaker. Child-directed speech (motherese or *parentese*) fosters early language learning.
- 4- 8 month olds prefer native music
- **10- 12 mo – comprehend simple words; alert to intonations.**

EXPRESSIVE LANGUAGE:
Universal Sequence 0 – 12 months

- Newborn – reflexive - crying
- 2 months meaningful noises (coo, fuss, cry, laugh)
- 3-6 mo – makes new sounds;
  vowel sounds, squeals, growls, croons, trills;

- 6-10 mo – Babbling – repeated consonant-vowel pair as baba baba, or dada dada. Babbling is Experience-Expectant, done by all babies.

- 10- 12 mo –using gestures as pointing, &
  - Speech-like intonations.
  - Start vocal and signed words.
  - Deaf children start to sign.
  - Family can understand some sounds as words.

Red flags at 12 months
- **No babbling &/or**
- **No pointing**

Berger 2011, Table At About This Time, p 166.

EXPRESSIVE LANGUAGE:
Universal Sequence 13 – 24 months

- 13 – 18 mo – slow vocabulary growth to ~50 words, including names for caregivers & siblings;
  - Holophrases – one word (part → whole), with inflection, functions as a sentence.
- 18 mo – Naming explosion starts when have ~50 EXPRESSIVE words.

  Then learn 50 – 100 new words/month (~2-3 per day) if exposed to lots of language.
- 21 mo – first 2-word sentences
- 24 mo – ½ of utterances are 2 or more words long.
- 90% of 2 year olds have >/= 100 word vocabulary.

Grammatical complexity increases with vocabulary.

Red flags:

- **No words by 16 months**
- **Any loss of language**

Berger 2012, Table At About This Time, p 166 & pp 166 - 171.

LANGUAGE FROM SINGLE WORDS TO PARAGRAPHS
18 months – 5 years

Vocabulary Explosion

and the role of fast-mapping

- Naming explosion:
  - Starts when have mastered ~50 words.
  - Then at least 50 – 100 words/month →

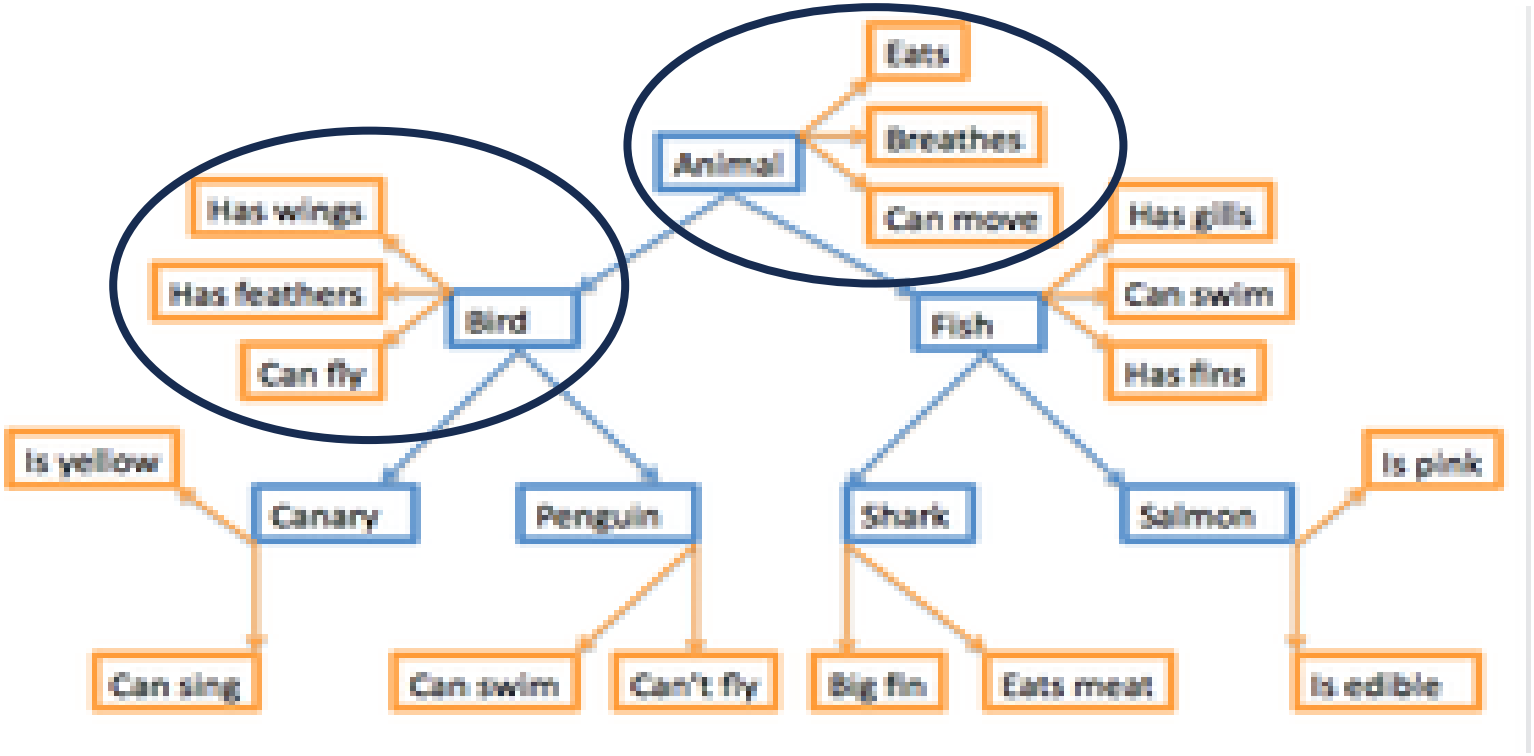
  Average 500 words at 2 years (100 – 2,000) →
  5,000 -20,000 at 5 years.

- Fast-mapping: enables >/= 2 year olds to quickly (but not always accurately) understand the meaning of a word.
- Telegraphic speech: putting 2 words together as a whole statement *(beyond the "holophrase").*

From Berger 2014, p 189

Fast-mapping:

- Typically **speeds a child's approximate *understanding of the meaning* of new words,** enabling rapid vocabulary building by tentatively "mapping" a new word to other words they know based on their ever enlarging "grid" of known words and categories.



The more words one knows in a category, the faster this occurs.

From Berger 2014, p 189

Principles of childhood fast-mapping

- Whole object: Word applies to whole object, not part.
- Categories: Word applies to anything similar to the initial object, as all small 4-legged things are dogs→ OVER-EXTENSION or OVER-GENERALIZATION of a term.
- Mutual Exclusivity: A new word will be assumed to belong to a new (previously unnamed) object rather than modifying a previously named object.
- Use Social Context: Using body language or direction of gaze to identify the object being named.

Which way(s)?

"Blicket"?

a. whole object
b. social context
c. categories
d. mutual exclusivity

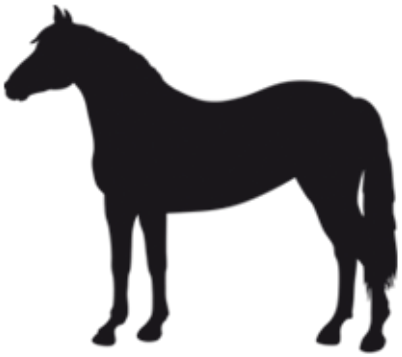
Which is the letter from Grampy? (demo)

a. whole object
b. social context
c. categories
d. mutual exclusivity

Fast Mapping – How do 1 ½ -3 year olds figure out what you mean?

What is the fast-mapped word for each of these?

Which Fast-Mapping principle is demonstrated?



Horse

Camel
Fast mapped as…

Horse

Zebra
Fast mapped as…

Horse

a. whole object
b. social context
c. categories
d. mutual exclusivity

fast-mapping: The speedy and sometimes imprecise way in which children learn new words by tentatively placing them in mental categories according to their perceived meaning.

TYPICAL ERRORS OF EARLY LANGUAGE

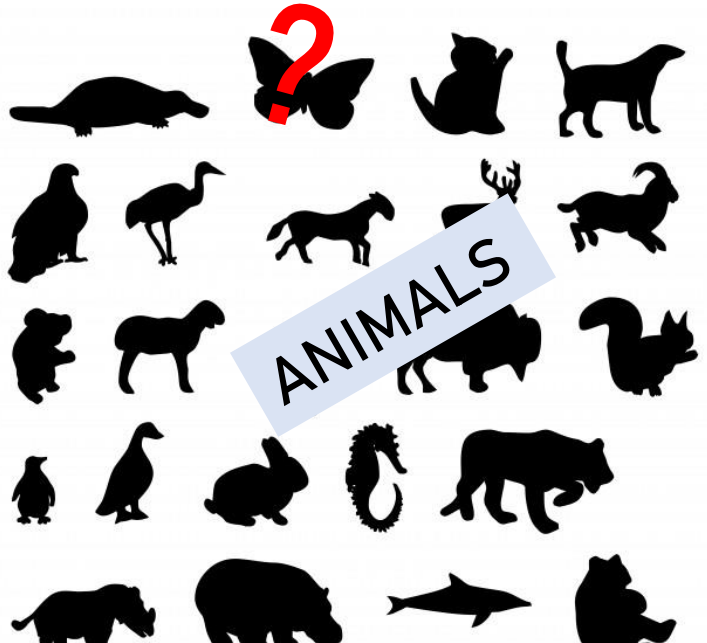
Categorization errors

Overgeneralization: apply one name to similar but different objects, as calling all of these HORSIE.

Undergeneralization:

assume too narrow a realm for category – as that *insects* aren't *animals*

NOT ANIMALS



TYPICAL ERRORS OF EARLY LANGUAGE

MISUNDERSTANDINGS

Comprehension challenges of preschoolers

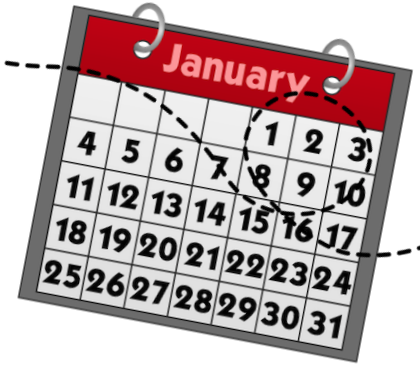
- They assign meaning with word logic, which doesn't always work (as butterflies come from butter).

- They learn parts best if named with name of the whole:

  door→ knob

- They have trouble with:

  time & place, as here, there, yesterday, tomorrow and comparisons that are context-dependent (big/small etc).



TYPICAL ERRORS OF EARLY LANGUAGE

Common Errors of Grammar

overregularization: **The application of rules of grammar even when exceptions occur, speaking as if the language is more regular than it actually is.**

How do children make nouns plural?

Correct singular noun	Correct plural noun	Overregularized plural
mouse	mice	mouses
tooth	teeth	tooths
leaf	leaves	Leafs
sheep	sheep	Sheeps

How do children make verbs past tense?

If he "ficts" today, what did he do yesterday? What if he is doing it now?
So – how about "go" now, yesterday, doing it?

Sequence of COMMUNICATION DEVELOPMENT 1-5 yrs.

1 holophrase
2 vocabulary of 50 words
3 language explosion
3 fast-mapping
4 telegraphic speech
5 phrases & sentences
6 collective monologue*

*"Collective monologues" and "parallel play"

- Despite being in a group, the talking and play of any one 3 or 4 year old are minimally if at all related to the words or play of any nearby children.

- With normal development, this changes by around 5 years of age.

Progression of Expressions with Age

- 100- 2,000 words - 2 years
  - Phrases 2-6 words
- 1000 – 5,000 words - 3 years
  - Sentence 3-6 words
- 3000 – 10,000 words - 4 years
  - Sentences 5-20 words
- 5,000 – 20,000 words - 5 years
  - Sentences run-on with *and-that-and* –

Language exposure has greatest impact on receptive language!

Where do you want your child's or grandchild's vocabulary to be for Kindergarten?

	20,000				20,000
	19,000				
Total	18,000				
Words	17,000				
a Child	16,000				
Knows	15,000				
	14,000				
	13,000				
	12,000				
Range	11,000				
	10,000			10,000	
	9,000				
	8,000				
	7,000				
	6,000				
	5,000		5000		5000
	4,000				
	3,000			3000	
	2,000	2000			
	1,000	100	1000		
		2 years	3 years	4 years	5 years

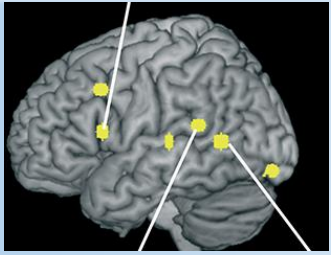
Nurturing Oracy:

- *Read and talk from infancy.*
- *Respond. Describe.*
- *Ask questions.*
- *Enroll child in a high quality preschool.*

(Data in Berger 2011, p 248)

READING!

What's Going On In Your Child's Brain When You Read Them A Story?



Anya Kamenetz , NPR May 24, 2018 6:05 AM ET reporting on research by Dr. John Hutton, Cincinnati Children's Hospital

Using **Functional MRI** to see what areas of brain light up and an **assessment of understanding** of what was read to preschoolers, they compared:

an animated cartoon

Findings: "Goldilocks Effect" of storybook pictures with audio.

Listening only, without illustrations:	Listening and looking at pictures:	Video presentation:
Excessive activation of listening but not much connectivity. ➢Lack of visuals made it difficult to process the story.	Required less work in language center and more connectivity between visual, imagery (making mental images), language and "default" (how it matters to the child). ➢Pictures permitted better understanding and more imagination and integration without taking over. Comprehension best.	Lots of visual and auditory activation but not much connectivity. ➢lacking imagination and integration. Comprehension was worst.

Quality infant & toddler books

- Black, white and red colors for young infants
- Bold colors
- One illustration or primary focus per page
- Photos, especially of babies
- Themes about their daily experiences
- Text that is a familiar children's song
- Simple rhythmic or rhyming text
- Tactile books
- Cloth or board books

Source: Choosing Baby Books & Toddler Books, Parent & Child Magazine, www.scholastics.com, 2014

Thanks to Teddi Schnurr for slide.

Get “Make Way for Books” app at Apple App Store or Google Play

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- ❖Best books for each age, 0- 5yrs,
- ❖Where the books are in Pima County Libraries with distance from you.

8:38 5G 100%

Books Activate child mode

Infant Toddler Preschool Our Page

Five Little Speckle...

This Little Piggy

Yes, I Know

Read Now

Five Little Ducks

Read now

Twinkle, Twinkle Little Star

Twinkle, Twinkle Littl...

Read now

I Can Make a Baby Smile

I Can Make a Baby Smile

Print Books

View more

Maisy's Food

Flora and the Chicks

The Pigeon Has Feeling...

Books Activities Journal Settings

8:39 5G 99%

Books Activate child mode

Infant Toddler Preschool Our Page

Read Now

View more

Read now

My Inside Weather

Read now

Fruit Salad

Read now

Muddyful Day

Read now

Goldfish Genius

Read now

Let's Hop!

Read now

Mildred & Dildred

Print Books

View more

The Book With No Pictures

Iggy Peck, Architect

Beautiful Oops!

Books Activities Journal Settings

8:45 5G 98%

Covered hands, muddy batter, I don't mind — it doesn't matter.

8:59 5G 97%

Activities Activate child mode

Infant | Toddler | Preschool | Our Page

What's new

Watercolor Painting
Watercolor paints are an easy, safe and inexpensive way to b...

Watch now

View more

If You're Happy an...

Adventures at the Library

Bug Hunt

Video Video Video

Books | Activities | Journal | Settings

8:58 5G 97%

Settings Activate child mode

- My language >
- My children >
- My account >
- My library >
- Help >
- Feedback >
- Privacy policy >

Books | Activities | Journal | Settings

8:57 5G 97%

←

Primary language

English

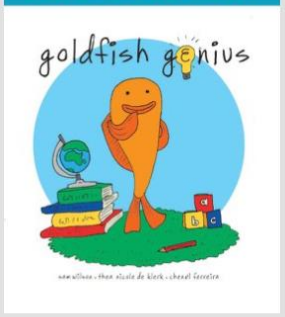
Español

Bilingual Mode

Would you like to see books and activities in English and Spanish simultaneously?

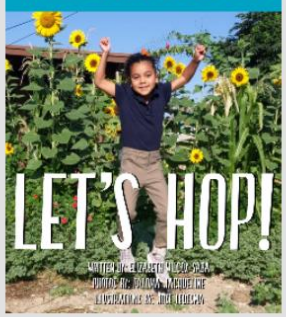
Yes No

Read now



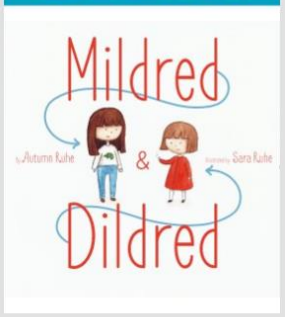
Goldfish Genius

Read now



Let's Hop!

Read now

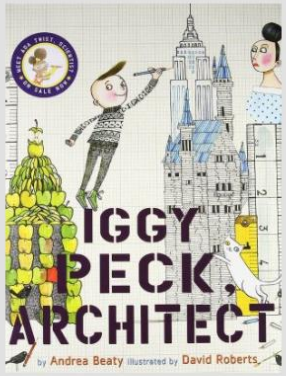


Mildred & Dildred

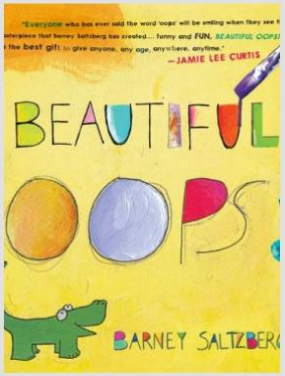
Print Books

View more

The Book With N

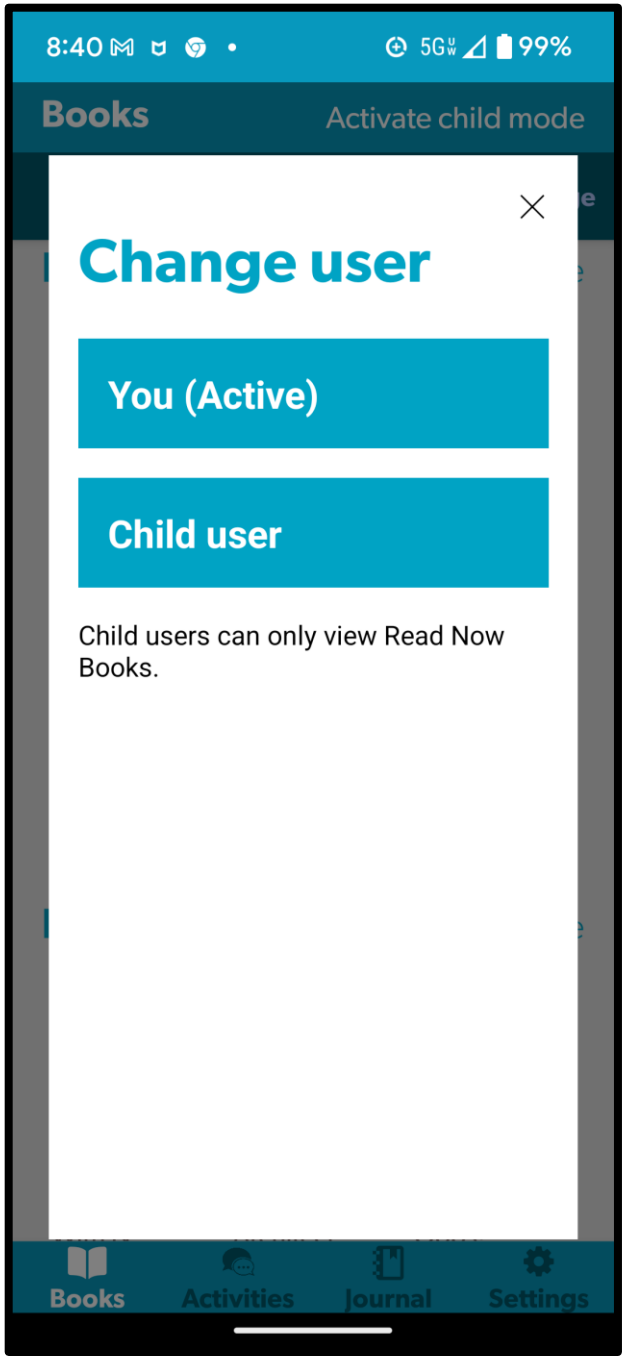


Iggy Peck, Architect

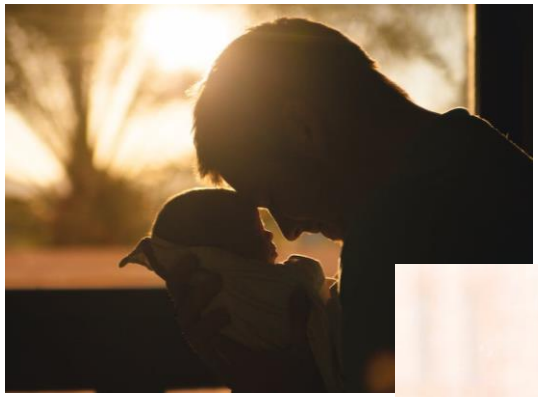


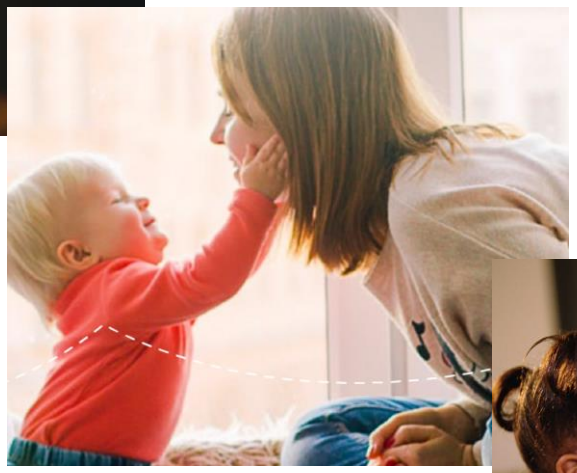
Beautiful Oops!

Books | Activities | Journal | Settings



Early Conversations





THANKS!

DOROTHY DAVIES JOHNSON, MD, FAAP
Consultant, Each Brain Matters,
The Center for Neurosciences Foundation

SUSAN HOPKINSON, Director

Many thanks for all your conversations with one child or many. Each conversation matters!

And thanks for viewing this.

Thanks again!

Feedback please.

Susan and I would be grateful if you would email feedback and questions to us at foundation@neuroTucson.com.

We'll listen

Contact information

The Center for Neuroscience Foundation

- **Each Brain Matters** website https://www.eachbrainmatters.org/
- To request PRESENTATIONS and Brain Bus – website form, or contact
  - **Susan Hopkinson** foundation@neurotucson.com

    Tel: 520-529-5211 **ext. 7988**
- To discuss details for Dr. Johnson's presentations (in-person or Zoom):
  - Dj.dorothyjohnson@gmail.com Tel: 520-444-0018

Early Conversations

PS – More excellent resources for parents & early childhood providers.

FTF = Arizona's **First Things First**

Center on the Developing Child at Harvard. **Three Core Concepts in Early Development,** **https://www.youtube.com/playlist?list=PL0DB506DEF92B6347**

Serve and Return as Play Jack Schonkoff, M.D., Center on the Developing Child at Harvard. https://developingchild.harvard.edu/resources/**building-babies-brains-through-play**-mini-parenting-master-class/ Serve and Return as Play

From Cries to Conversations: The Development of Communication Skills from Birth to 3 https://vimeo.com/130344328 https://vimeo.com/130344328 By ZEROTOTHREE.

Talk with me Baby https://coxcampus.org/course-talk-with-me-baby/
Early childhood professionals engaging parents in conversations with their infants

Vroom at https://www.vroom.org/ A wealth of conversation tools & tips for parents of infants and children. Their intro:**Brain Building Basics** at https://youtu.be/WQNm4ASB7iY

Language and Early Literacy Development – multiple blogs & videos on **FTF**'s website
https://www.firstthingsfirst.org/resources/language-and-literacy/?utm_source=First+Things+First+mailing+list&utm_campaign=b76c73ef83-February+2020+Latest+Things&utm_medium=email&utm_term=0_ab57e3d95b-b76c73ef83-9145795

Effective Teacher-Child Interactions by Teachstone
https://www.youtube.com/watch?v=2Hw0DbxOmJQ

Checking for Quality Teacher-Child Interactions by **FTF** https://youtu.be/CUViSwMWvLk