



WHAT CAN
EARLY BRAIN AND BEHAVIOUR DEVELOPMENT
TELL US ABOUT
LATER READING?

Dr. Saloni Krishnan

WHAT'S THE BEST AGE TO INTRODUCE
RHYMES, BOOKS, AND STORIES?

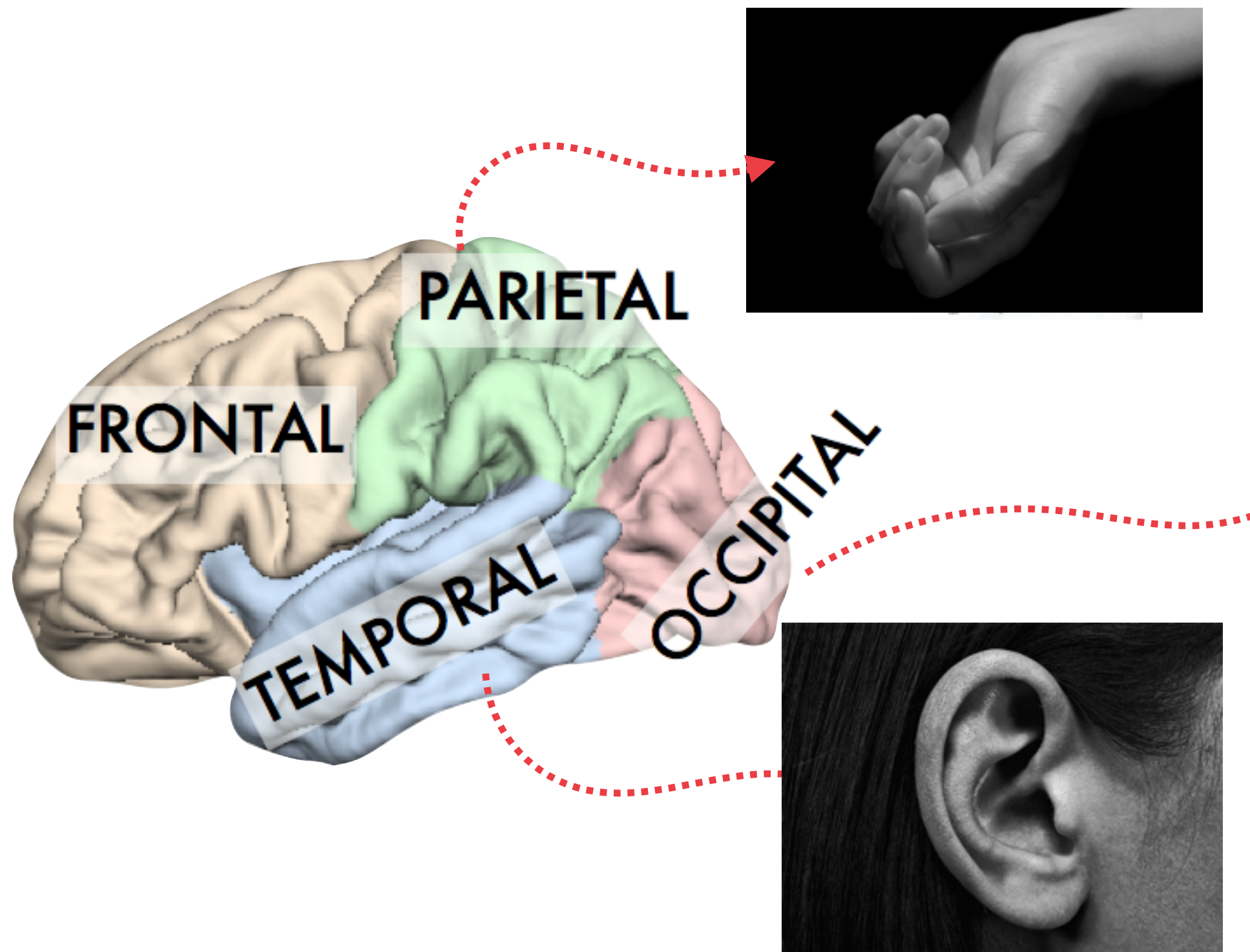
EARLY READING ACTIVITIES INVOLVE

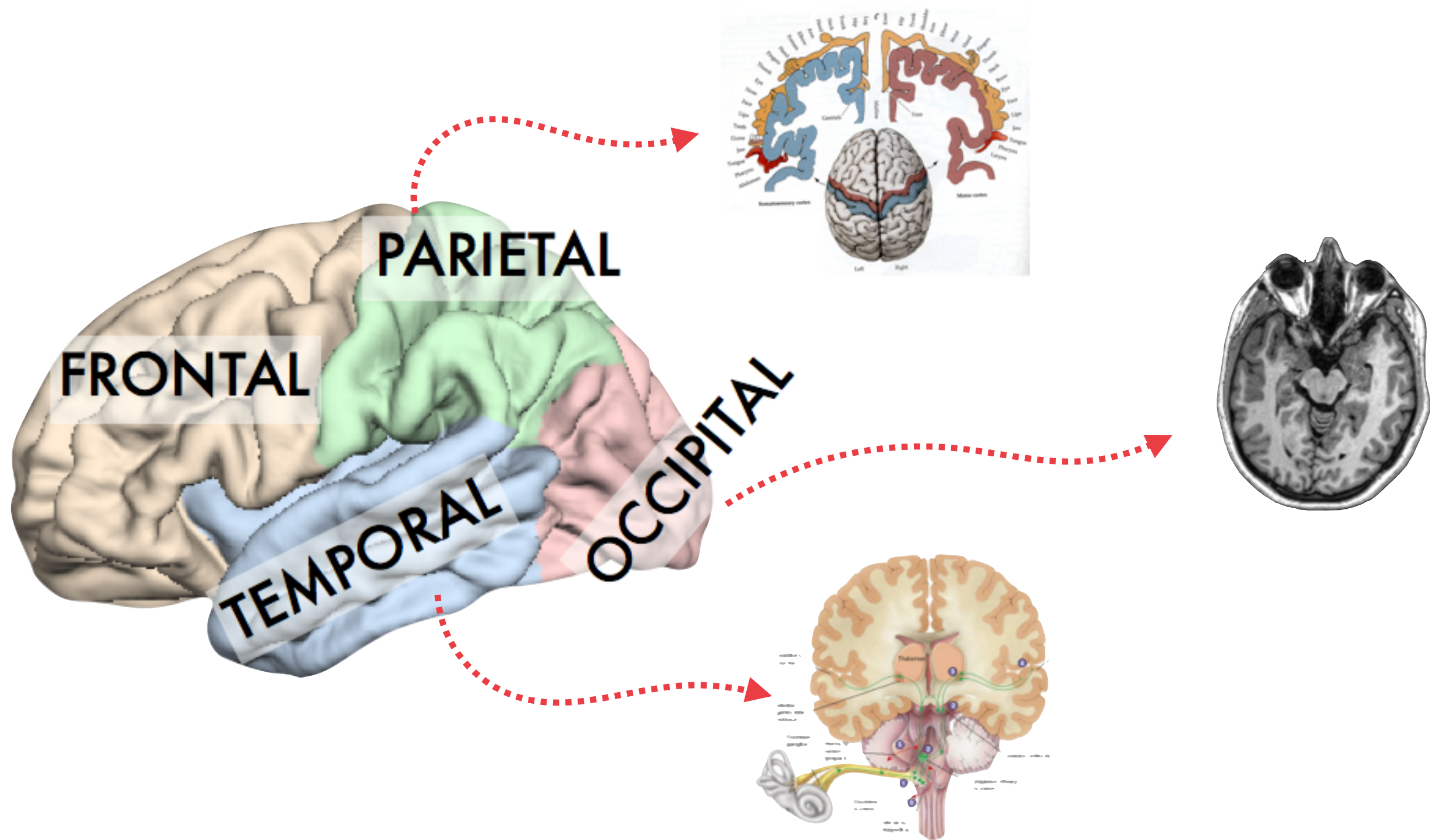
Let's start with a
little song.



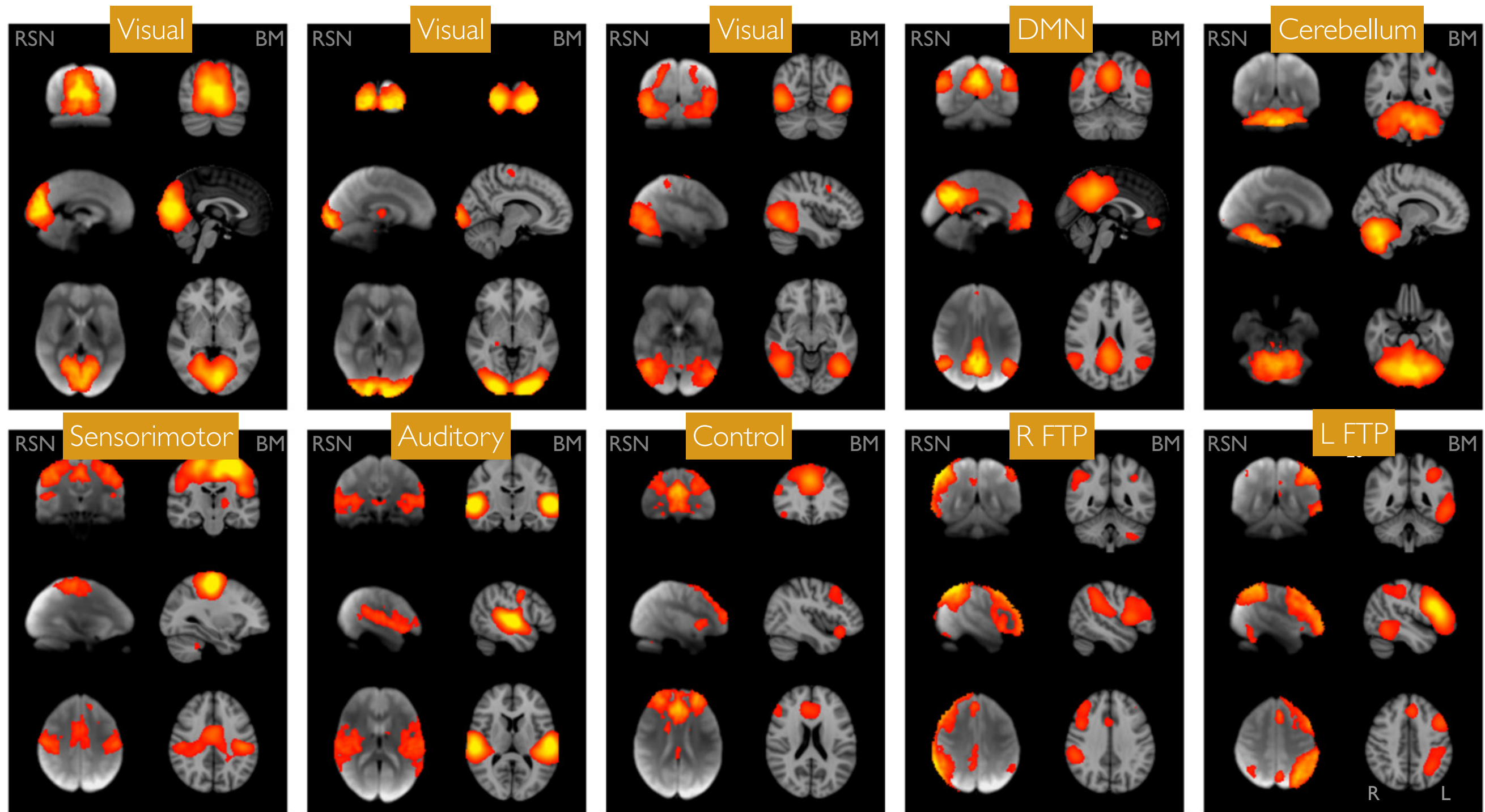
HOW IS THE TOOLKIT IMPLEMENTED IN THE BRAIN?





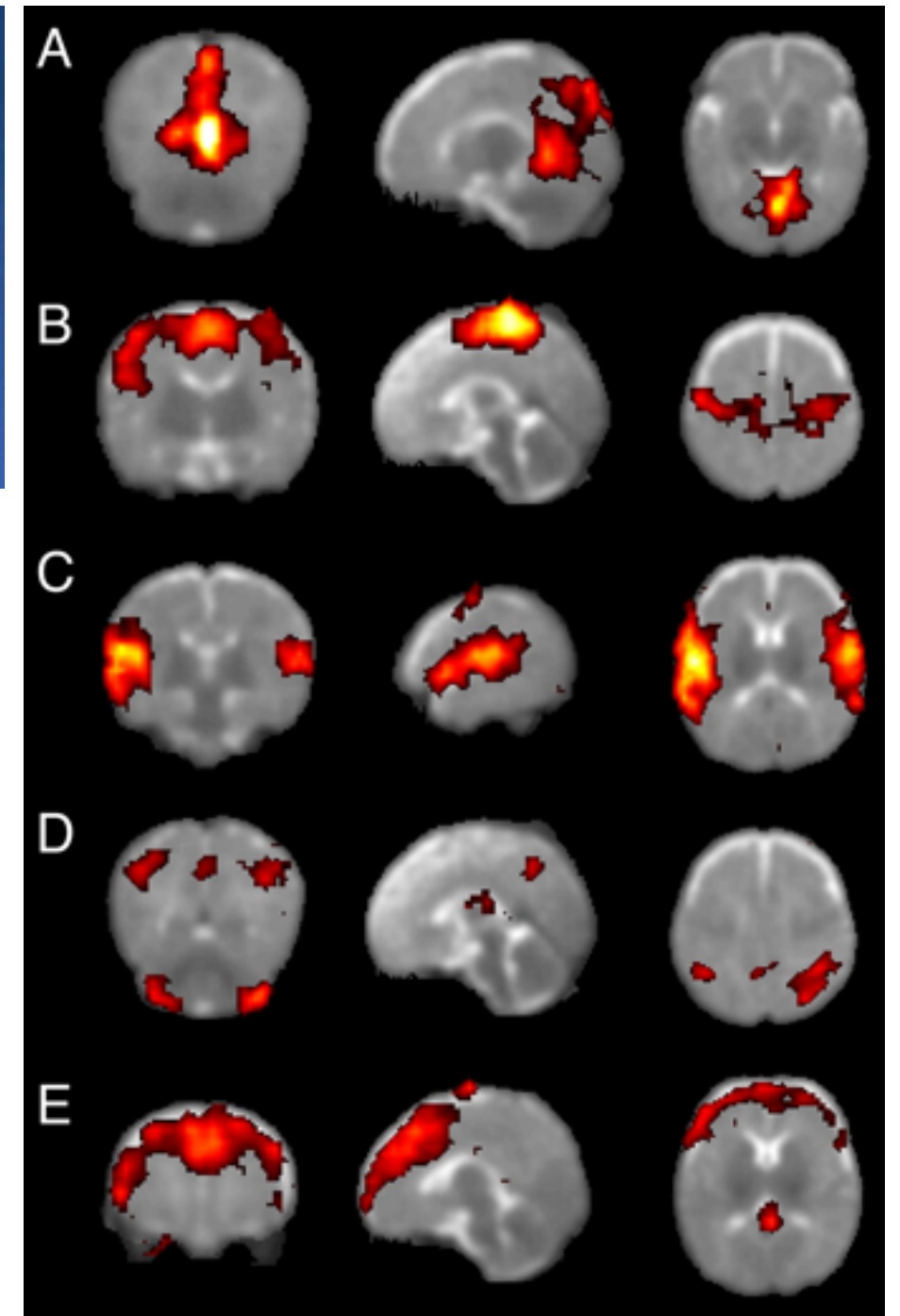


YOU CAN FIND THESE SYSTEMS
DURING REST

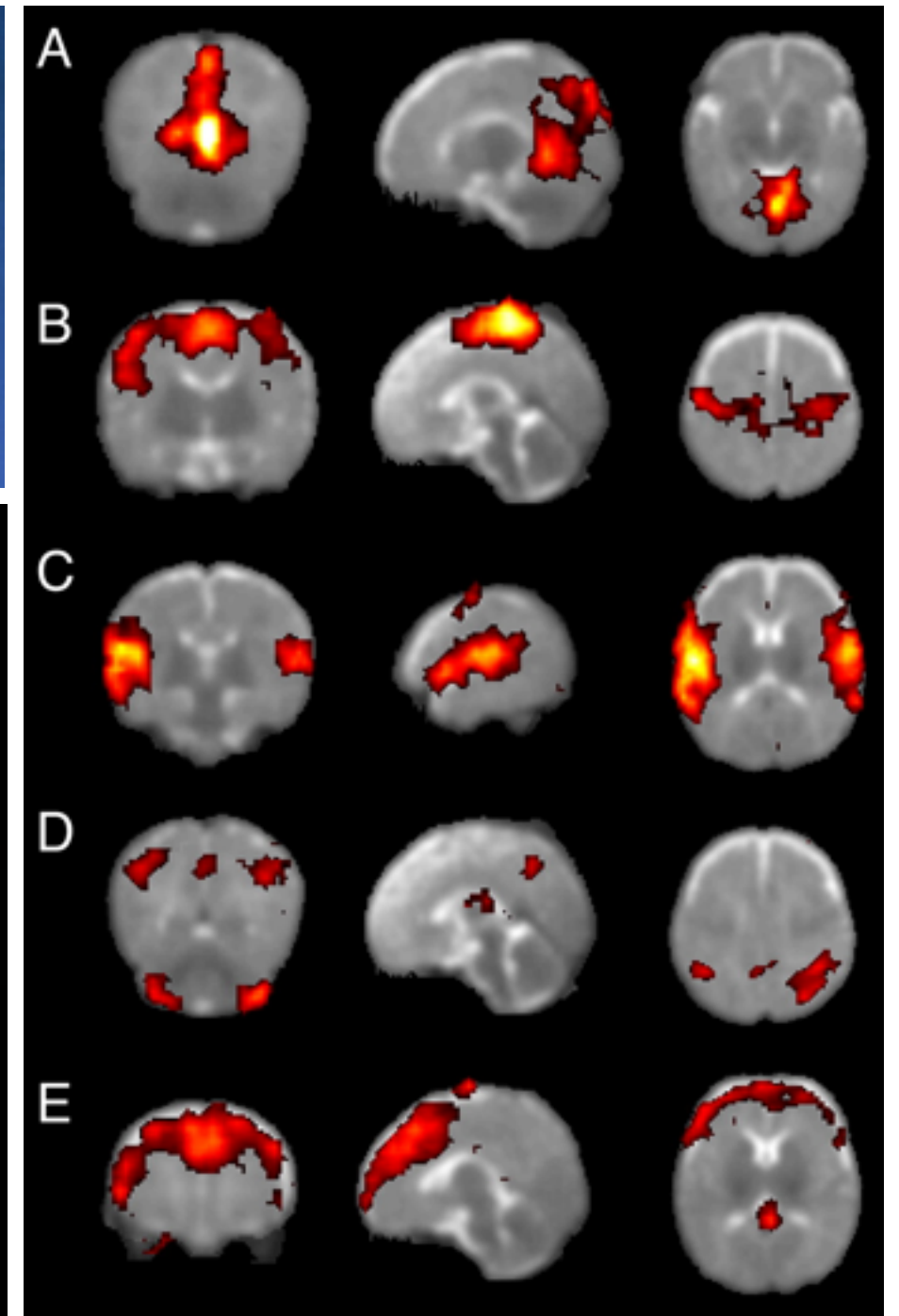


Smith et al., 2009, PNAS

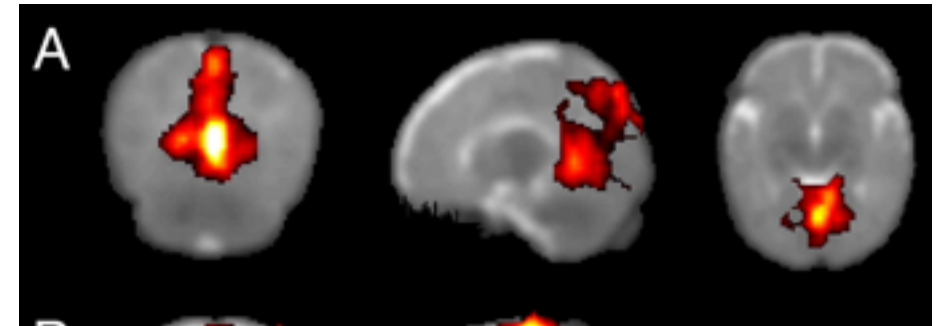
BRAIN BASES FOR THESE SYSTEMS ARE SET UP BEFORE BIRTH



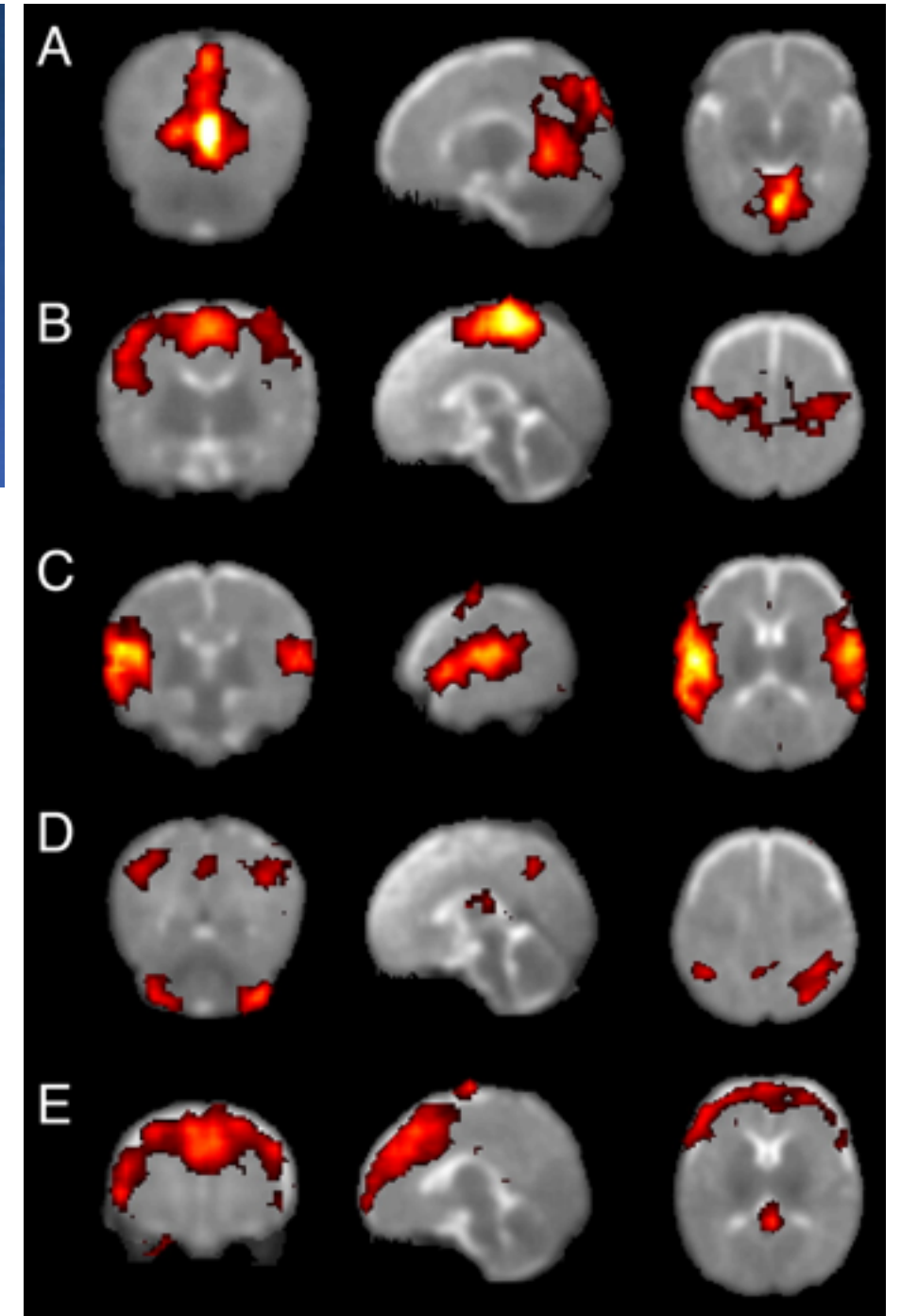
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DEVELOPMENT OF SYSTEMS: SOUND

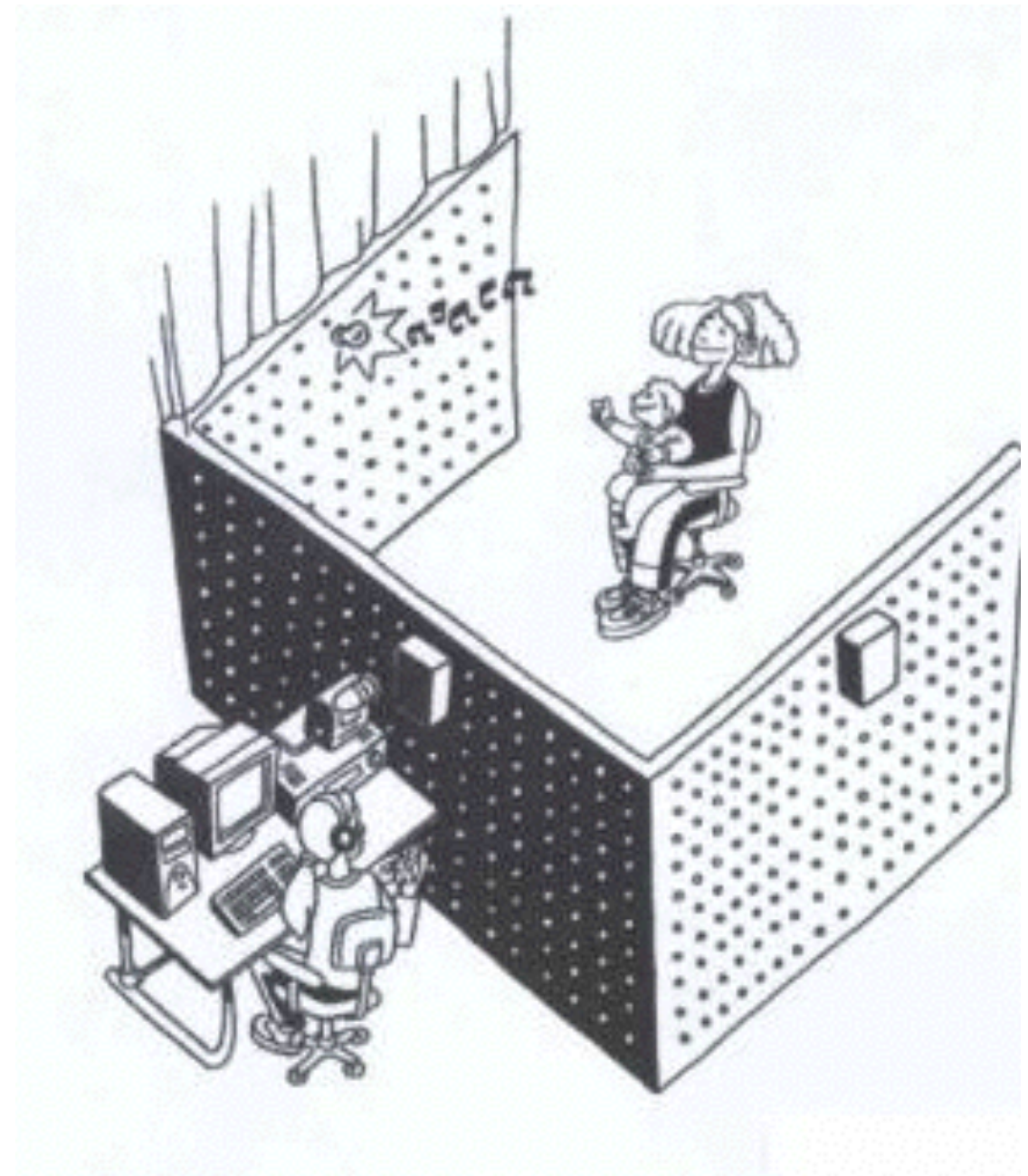


- Babies can hear in the womb - but they hear **differently**
- Hearing **rhythms and vowels** of their native language gives them a bias for their native language
- Biases for **consonants** get shaped from birth - by about 10 months of age, babies lose the ability to discriminate between consonants that are not present in their language
- Children also learn how sounds **combine** in their native language
- A well-developed sound system (**phonology**) is integral for later reading proficiency (but reading itself shapes the sound system)

DEVELOPMENT OF SYSTEMS: LANGUAGE



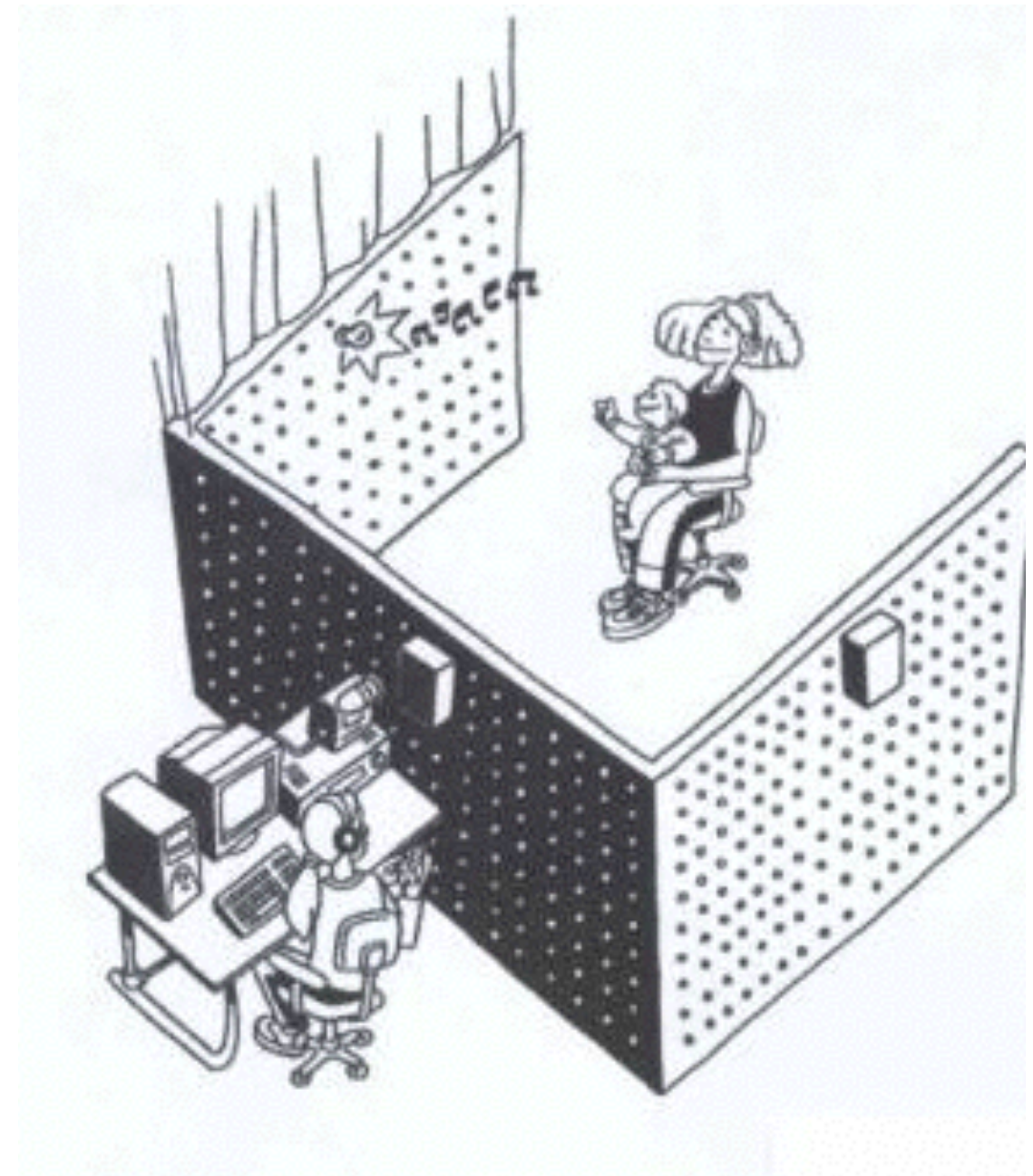
- Infants start to extract words in their language using statistics, rhythm etc. as cues
- They map these words onto objects using a range of strategies
 - fast mapping
 - mutual exclusivity
- By about 12-14 months, they are producing these words as well
- Vocabulary development is characterised by a great deal of individual variability



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VISUAL ACUITY & OBJECT RECOGNITION EMERGE OVER THE FIRST SIX MONTHS OF LIFE



1 month old

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1 month old



2 month old

VISUAL ACUITY & OBJECT RECOGNITION EMERGE OVER THE FIRST SIX MONTHS OF LIFE



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3 month old

VISUAL ACUITY & OBJECT RECOGNITION EMERGE OVER THE FIRST SIX MONTHS OF LIFE



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Adult

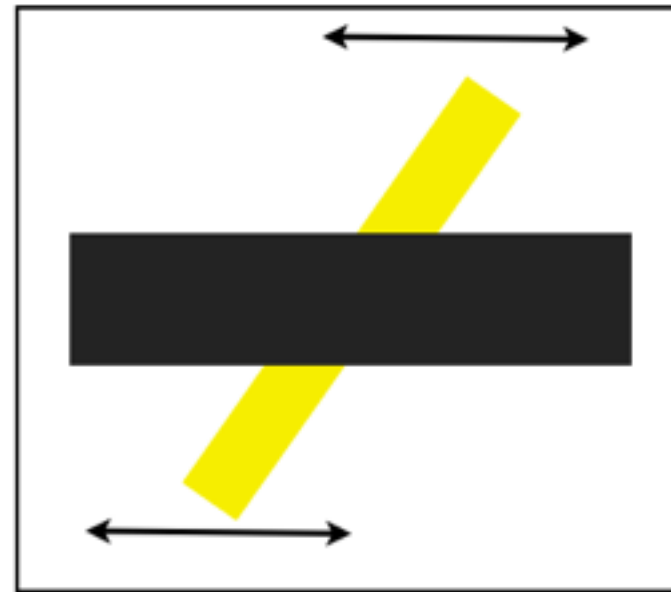
VISUAL ACUITY & OBJECT
RECOGNITION EMERGE OVER
THE FIRST SIX MONTHS OF LIFE



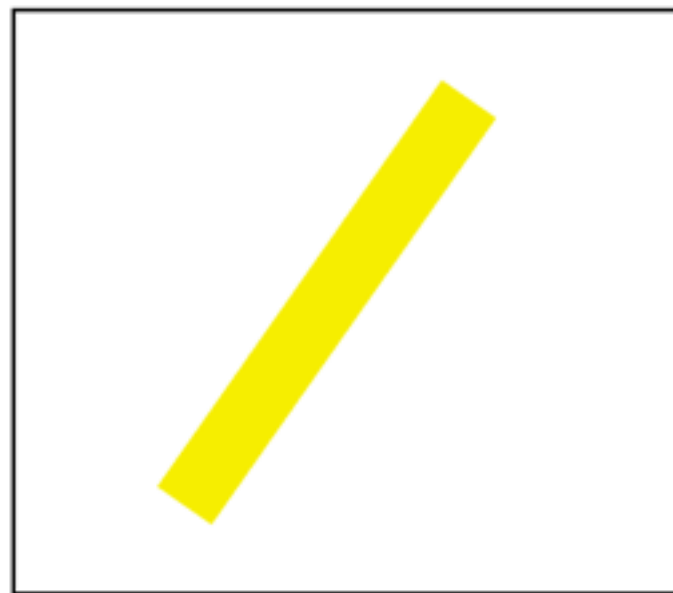
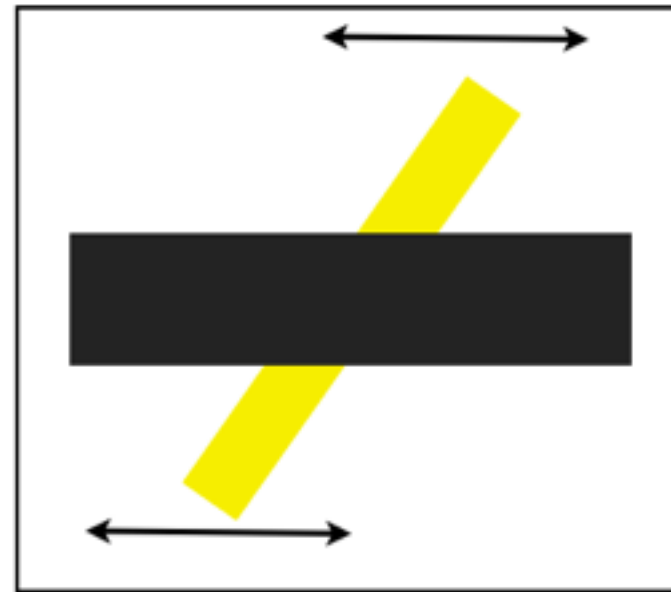
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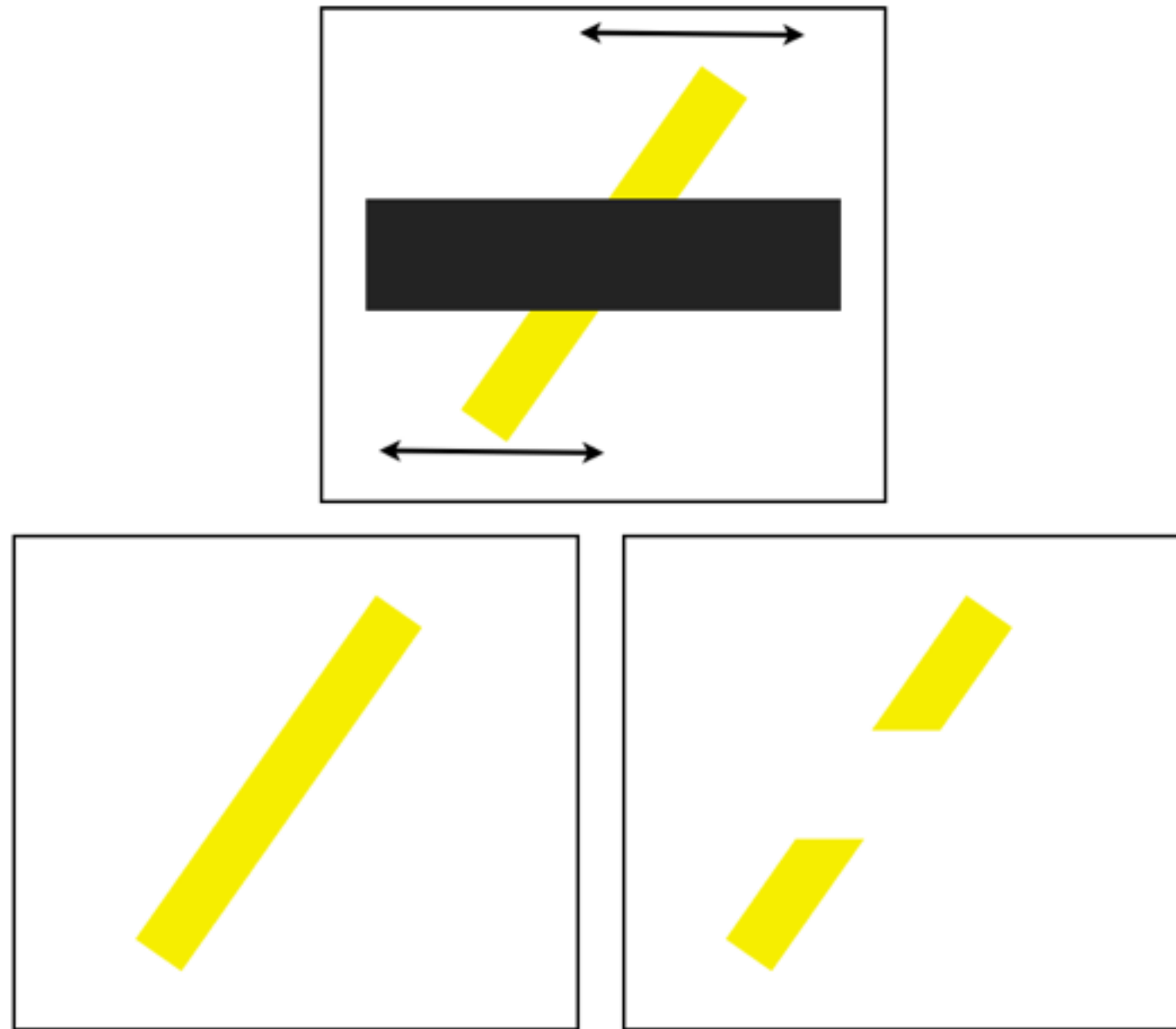
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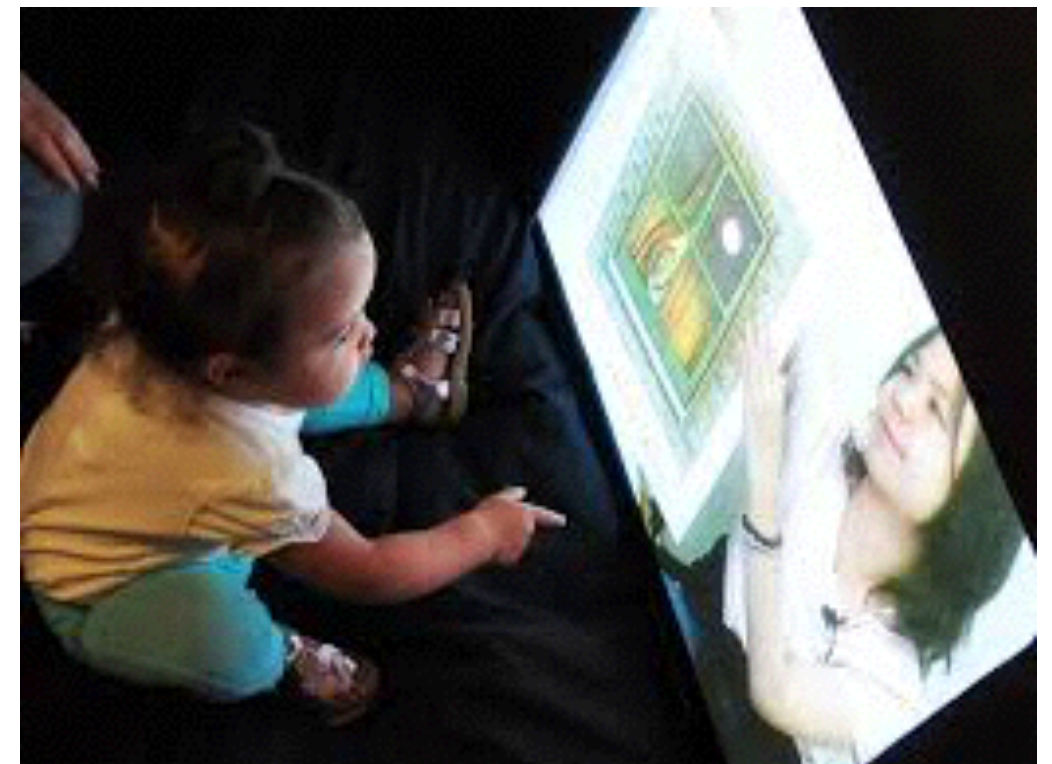
WHAT'S THE BEST AGE TO INTRODUCE RHYMES, BOOKS, AND STORIES?

- **Rhymes and songs:** before birth
- **Stories:** full understanding of narrative only in preschool years, but children may get earlier benefit from other aspects of shared reading, including social routine
- **Books:** ~4-8 months

WHAT'S THE BEST WAY FOR
PARENTS TO SHARE READING?

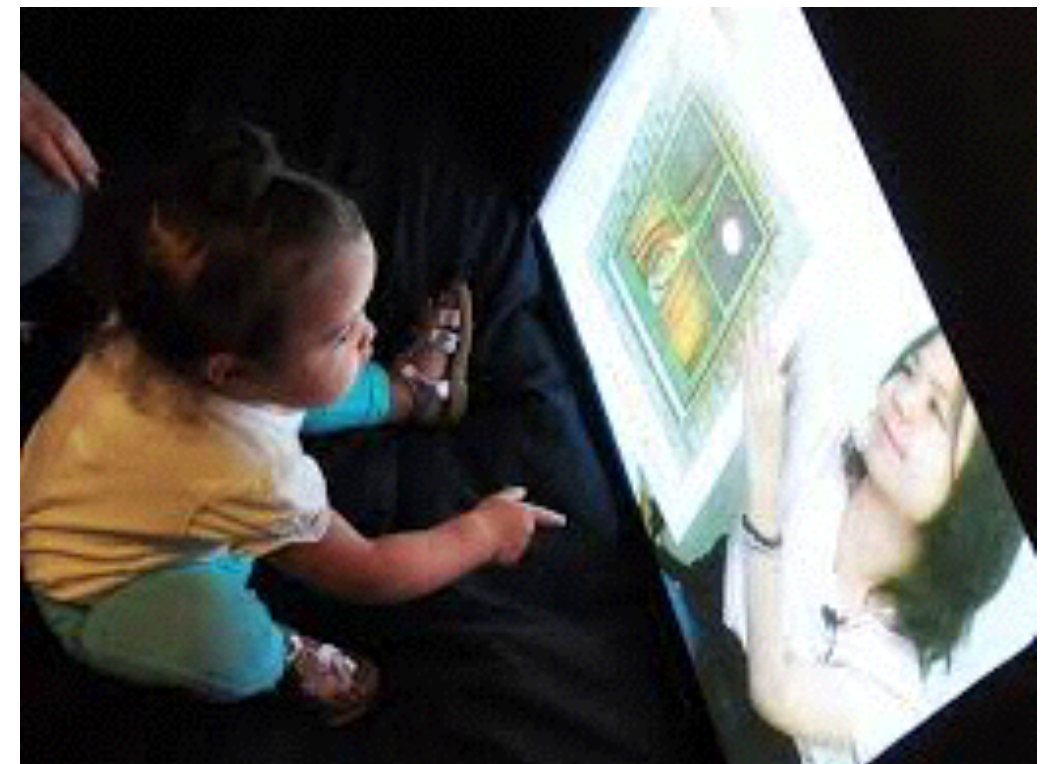
SOCIAL SYSTEMS

- Babies need to learn about others so they can learn from others
- Understanding adult cues like eye gaze => sharing attention with adults => directing adult attention
- Social interaction improves learning
 - attention and arousal?
 - joint attention?



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LEARNING

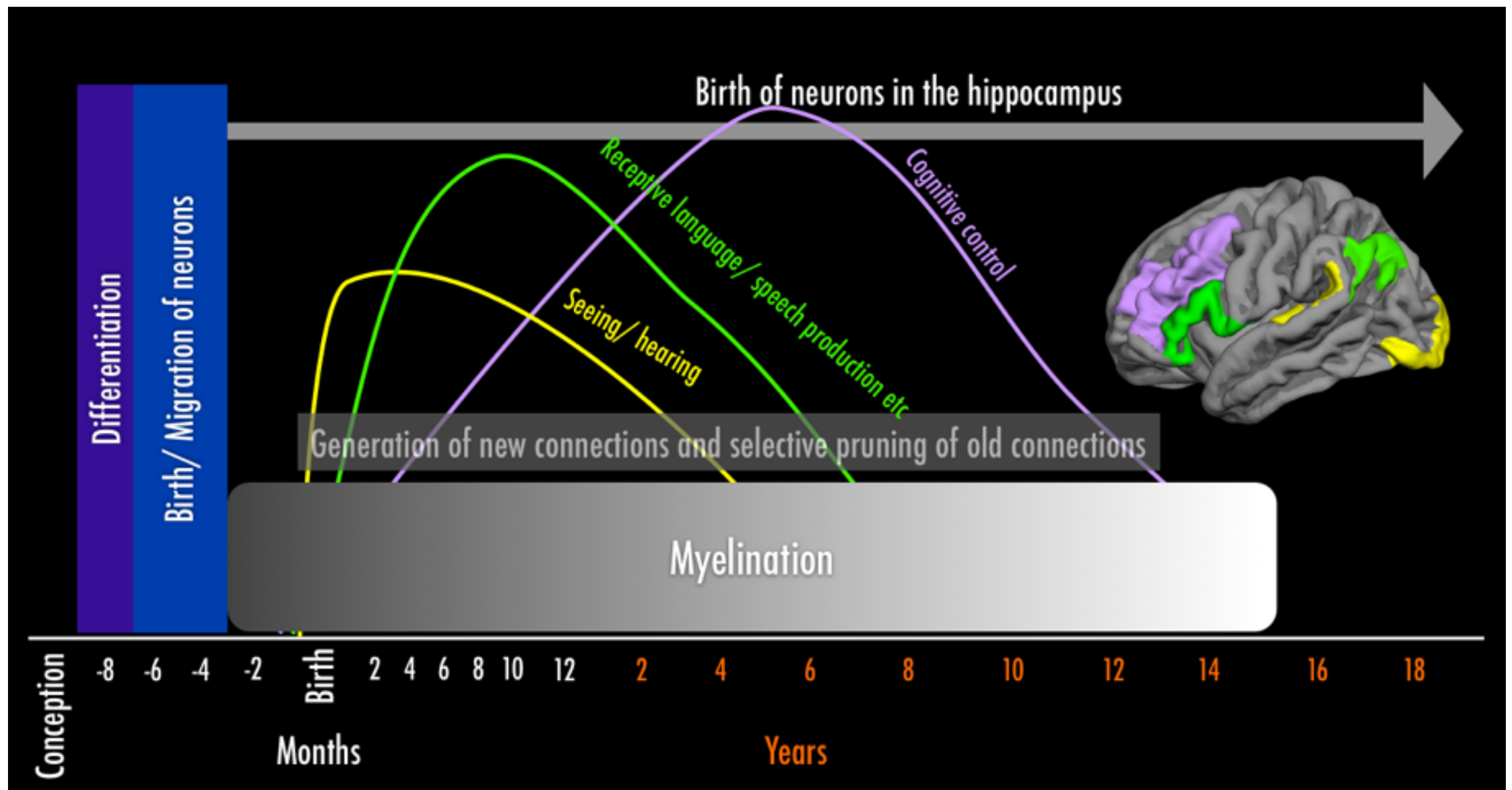
- Do you repeat the same story? Or do you keep introducing new ones?
- Reading the same story repeatedly can help children learn the *words* better
- But in some cases, introducing more examples is better - learning variable *spelling-sound rules*; *grammar*
- Sounds contrary? The principle is you add more variation to what the child's trying to learn and decrease the variation of the background

WHAT IS THE BEST WAY FOR PARENTS TO SHARE READING?

- The greatest language gains are associated with responsive interactions - parents need to provide opportunities for infants to communicate
- During live social interactions, removing distractors (like TVs, radio and de-cluttering environments) might improve attention and consequently learning
- It's not that screens that are bad - more research is needed in terms of how interaction might help the child

HOW DO ENVIRONMENTAL FACTORS
AFFECT LANGUAGE & LITERACY?

DEVELOPMENT IS MOSTLY ABOUT THE CONNECTIONS



BEING BORN DEAF

- Children face difficulties in learning spoken language (sometimes even after receiving hearing aids or cochlear implants)
- Sensitive period for language development: lack of early sound experience?
- However, language milestones for deaf children in deaf families are comparable to those of hearing children in hearing families
- It is early language experience by any means that is very important

BILINGUALS



- Bilinguals tend to pass language milestones *slightly* later than monolinguals
- Bilingual children receive less input in each of their languages than a monolingual child would
- However, they can exploit a variety of cues to switch between languages (monolingual children do not) - this switching may confer later benefits
- They use different strategies to learn and may have an advantage in understanding the symbolic function of print
- There are real-world benefits to knowing more than one language
- Furthermore, it is less effortful to learn some aspects of language, such as *pronunciation* and *grammar* as a child

HOW DO ENVIRONMENTAL FACTORS AFFECT LANGUAGE & LITERACY?

- Deaf children may particularly benefit from exposure to books - to learn symbols and to be able to communicate with the hearing community
- Bilinguals use different strategies to learn - but this does not place them at a disadvantage

Thank You!

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