

The Impact of COVID and Screen Time on Development

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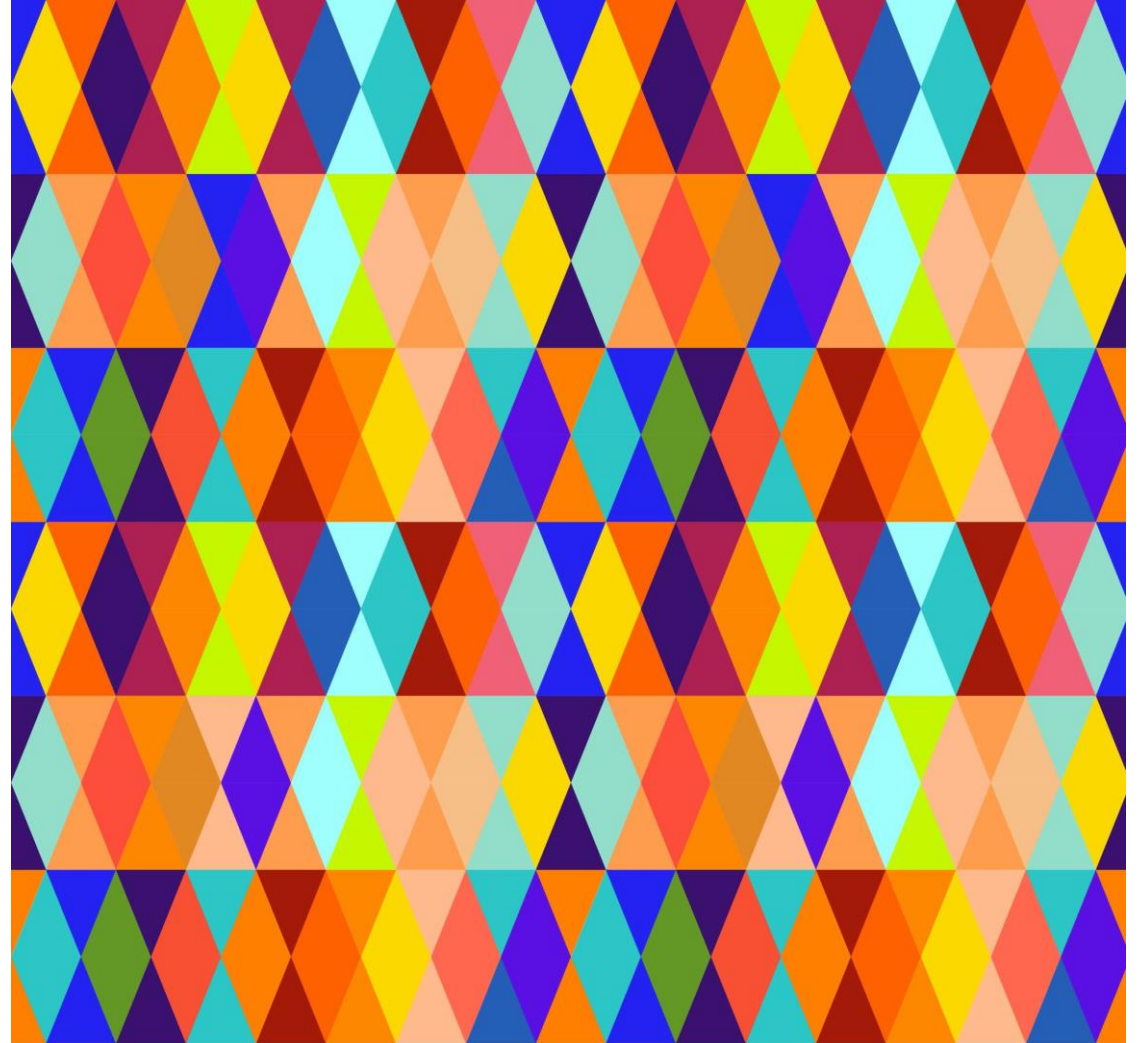
Disclosures

Financial:

- Presenter is receiving an honorarium for presenting.

Nonfinancial:

- Presenter is a member of ASHA's School Based Advisory Council
- State Education Agency Communication Disabilities Council Board
- Employed by the South Carolina State Department of Education



My Goal is For You to Leave This Presentation...

1. Informed about the impact of the pandemic and screen time on development.
2. Passionate about the importance of conversational turns and play.
3. Eager to apply what you've learned!



Let's get
STARTED



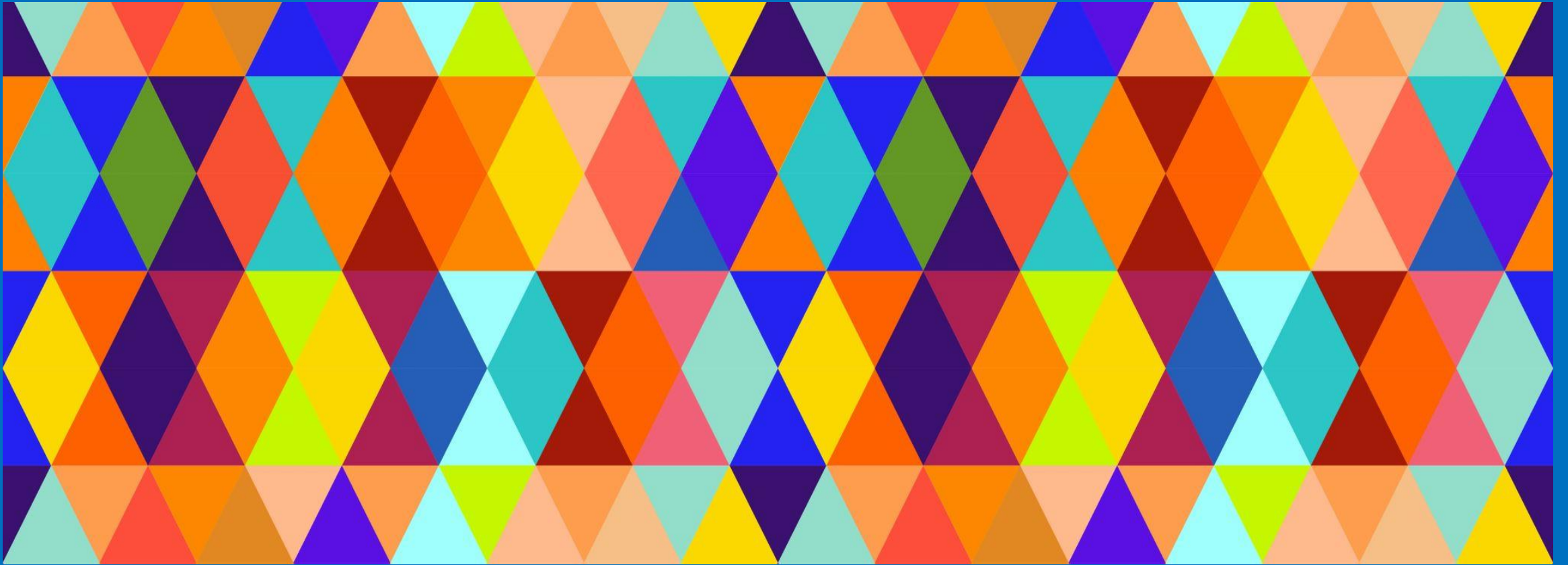
Do the best you can until
you know better.

Then when you know better,
do better.

-Maya Angelou



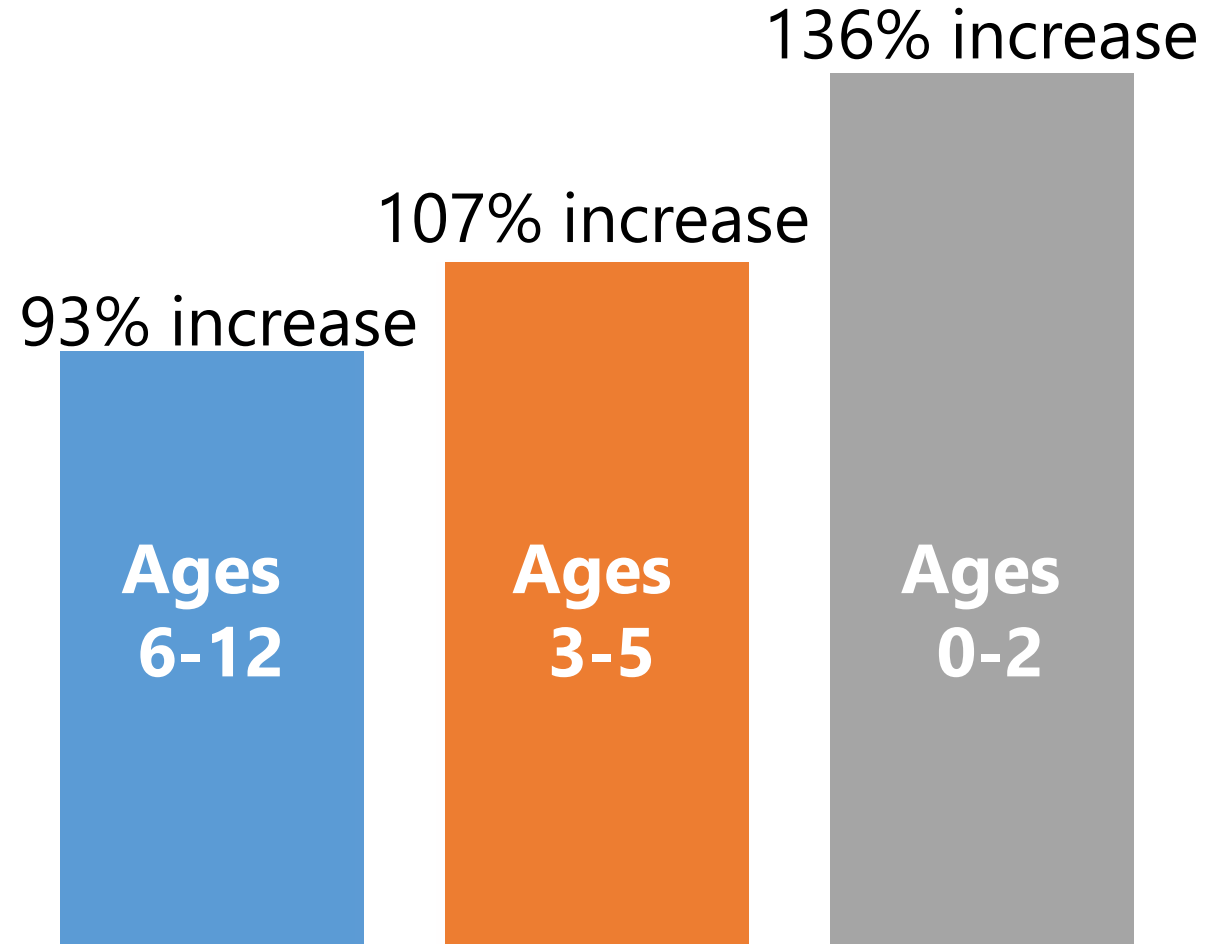
Has There Been An Increase in Disorders of Speech and Language from Pre to Post Pandemic?



Increases in Speech-Language Disorders

(Kahn, Freeman, & Druet, 2023)

New ICD-10 diagnoses for developmental disorders for speech and language **increased 110%** from pre-pandemic (January 2018-December 2019) to post-pandemic (January 2021 – December 2022) for children birth-12 in the U.S.



Speech-Language Impairments and Literacy

- The majority of all poor readers have an early history of spoken language deficits with 73% of second grade poor readers having poor phonemic awareness or spoken language problems in kindergarten (79).
- Preschoolers with speech sound disorders are at increased risk for deficits with phonological awareness (80, 81, 82, 83, 84, 85, 86).
- Phonological processing (word reading and phonological working memory) skills have been shown to be weak *even once the speech sound disorder is remediated* (87, 88).
- Phonological awareness has been shown to be more closely related to success in reading than intelligence (89) and is the strongest single predictor of word reading difficulties (90, 91).

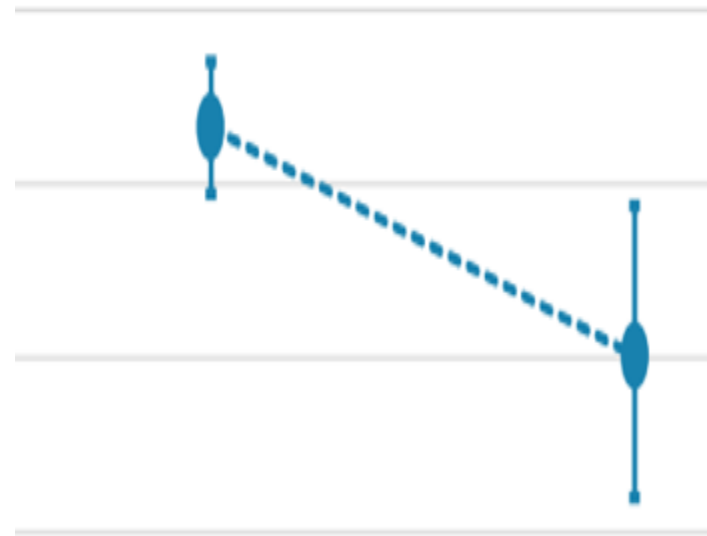


Longitudinal Data

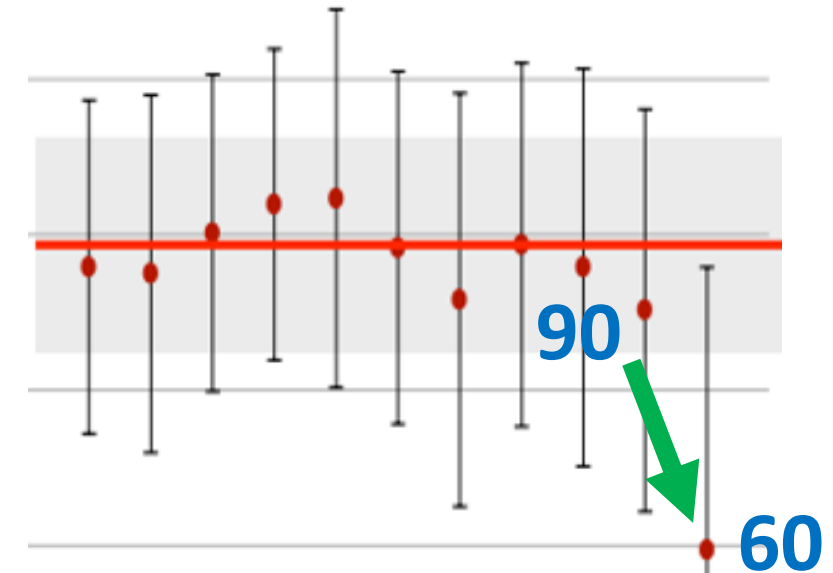
(Deoni et al., 2022)

A year into the pandemic, the average performance of 1,700 children ages 3 months - 3 years of age was the **lowest it had been since researchers began tracking it in 2010** with an average decrease of 24.6 points across composite values (cognition, verbal development, and nonverbal development).

Two-year-olds decreased conversational turns from 35-50 exchanges to 15-25.



Children one year of age when the pandemic began had a significant decrease in verbal scores (standard score of 90 to 60)



What is a Conversational Turn and Why is it Important?

- Children who engaged in an average of 40 conversational turns per hour **at the age of 18-24 months** had full scale IQ scores that were an average of 31 percentile points higher and verbal IQ scores that were 38 percentile points higher than those who engaged in fewer turns **ten years later** (Gilkerson, 2021).
- A conversational turn is counted in pairs - one utterance by someone that is responded to by another person (within five seconds).
 - For example, if a child speaks and an adult responds, or vice versa, that counts as one conversational turn.
 - If the child responds to the adult within five seconds, and the adult responds again, that is considered two conversational turns.



The Language Environment in PreK (Duncan et al., 2022)

- 20% of children are in **language isolation**, experiencing **fewer than five conversational turns per hour** for most of the school day.
 - Per year, some children may experience an estimated **25,000 fewer conversational turns** than their classmates.
- The difference in pre-k classrooms with higher amounts of conversational turns over the preschool year is around **2 million words**.



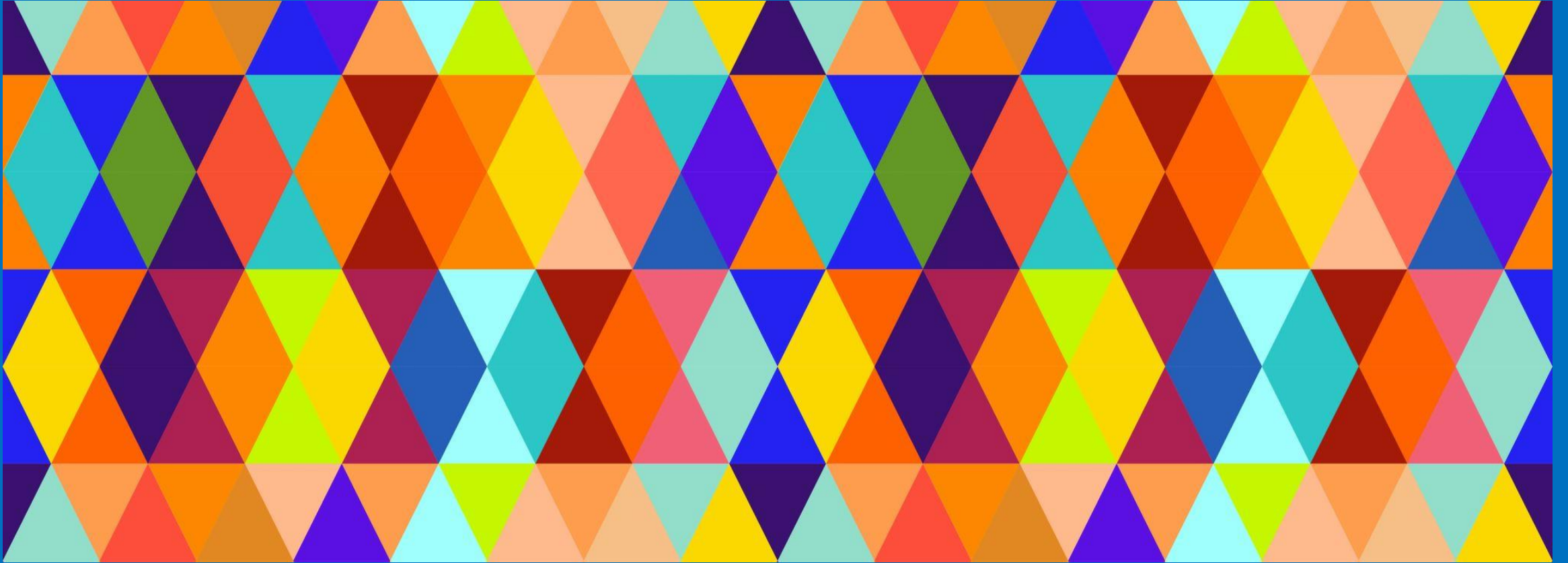
The Language Environment



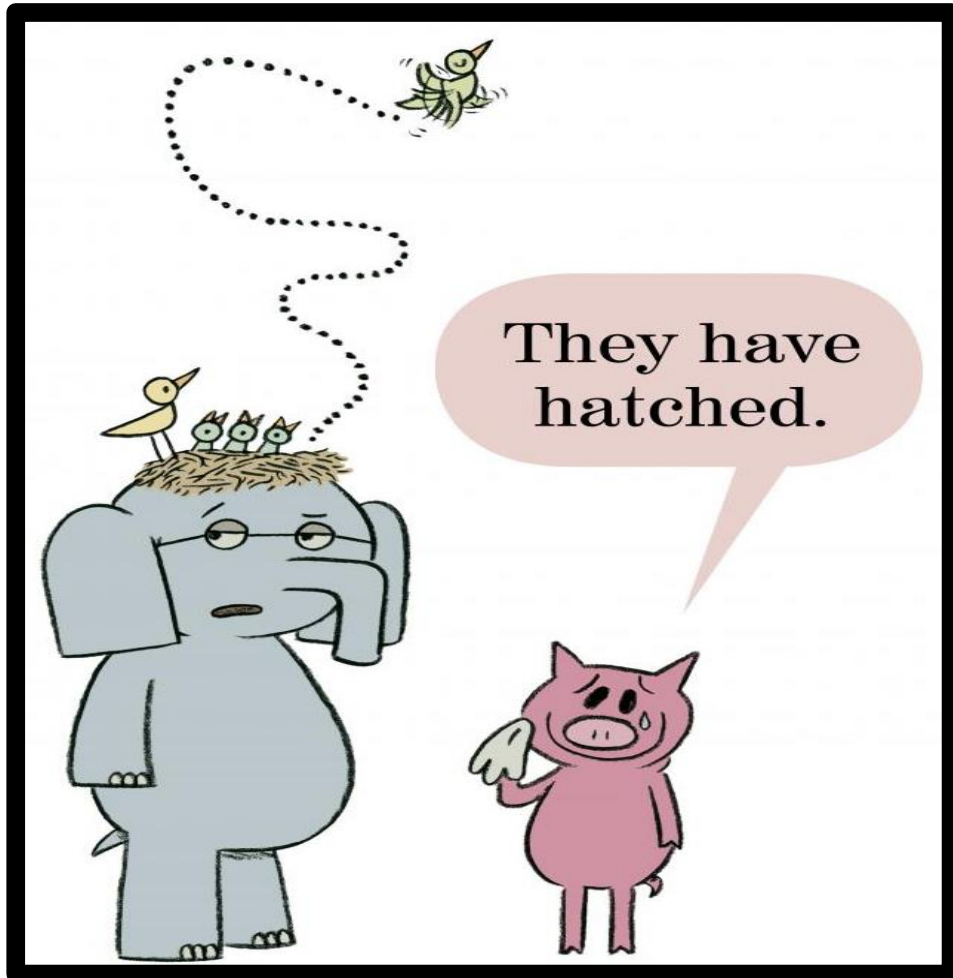
Social-interactional variables are increasingly viewed as important **predictors of early and longer-term achievement** (Tamis-Le Monda and Bornstein, 2002; Hirsh-Pasek et al., 2015; Gilkerson et al., 2017, 2018; Tamis-Le Monda et al., 2019), as well as **language-related brain structure** and function in childhood (Romeo et al., 2018, 2021).

- Conversation creates a language rich **environment**.
- Play is a language rich **experience**.
- Language Rich vs. Language Poor Environment

Why Is Play Important?



Play, Perspective Taking, and Reading Comprehension



- The foundation for perspective taking is built through pretending, playing, conversing, and engaging with other humans.
- Pretend play requires the ability to think about yourself as a "different self" as well as being aware of the thoughts and emotions of others.

Reading comprehension requires the ability to understand the perspective of characters, to recognize their emotions, and make inferences about characters' thoughts, emotions, intentions, and actions.

Play, Reading Comprehension, and Decontextualization

Decontextualization means thinking, reading, and talking about things that are outside of the here and now.

- When reading or listening to a story, comprehension depends on imagining what is being described that is occurring outside of the here and now.
- Preschool children's **use of decontextualized language supports vocabulary and acquisition of a wide range of concepts including print and number** (Friend et al., 2018).



Play, Mental Imagery, and Reading Comprehension

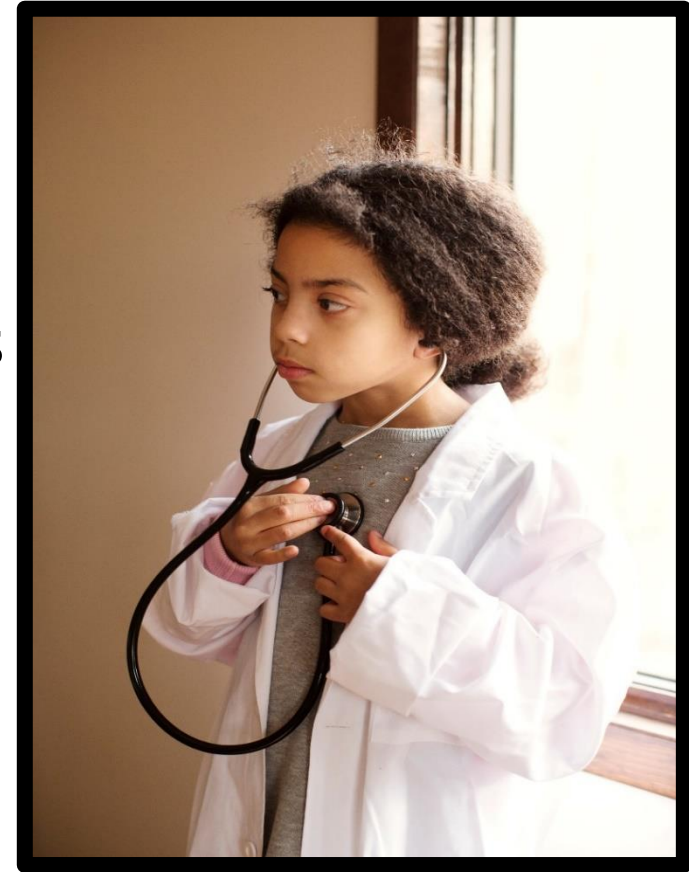
Mental imagery (also referred to as visual-spatial-perceptual skills or nonverbal IQ) is a necessary part of deep reading and relies on vocabulary, background knowledge, inference, and perspective taking.

- Listening and reading comprehension have been shown to correlate with visual-spatial-perceptual (VSP) skills (Coon and Mitterer, 2011; Adlof, Catts, & Lee, 2012; Joffe, Cain, & Maric, 2007; McCallum & Moore, 1999; Stothers & Klein, 2010)
- Nonverbal IQ measures taken in kindergarten were key predictors of 8th grade reading comprehension (62).
- Nonverbal skills in 1st grade predicted 5th grade reading comprehension (63).



Play and Mental Imagery

- Substituting one object for another requires a mental models/mental imagery as well as advanced language (more specific and descriptive language and complex sentences) to set the scene and carry out the play sequence *without* props.
 - **Age 3:** more dependent on real objects as play centers around common themes (taking care of a baby, driving cars, cooking, etc.)
 - **Age 4:** less dependent on real objects and create what they need from anything that is at hand (e.g., a bowl becomes a ship, a stick becomes a sword, etc.)
 - **Age 5:** play without props using mental models or mental imagery to imagine a vet's office, house, castle, restaurant, a phone, a steering wheel, etc.



Play, Vocabulary, and Reading Comprehension

- In pretend play, children learn to classify, compare, and reason, all semantic organizational skills (Westby, 2017).
- Three-year-olds talking more in pretend play was associated positively with the size of their vocabularies when they began kindergarten two years later (Dickinson and Moreton (1991).
- Guided interactions with adults in playful contexts increase children's vocabularies (Roskos, Tabors, and Lenhart 2009).



Developmentally appropriate play is the singular opportunity to promote the social-emotional, cognitive, language, and self-regulation skills that build executive function and a prosocial brain that is ready for academic learning (AAP, 2018).

Play is so powerful it can be used as an intervention to close gaps for children between the ages of 3 to 6 (Parker & Thomsen, 2019).

Do you assess or write goals for play?
If not, why not?



The Disappearance of Play



- From 1998 to 2010, the percentage of classrooms with a dramatic play area dropped from 90% to 58% (Bassok, Latham, & Rorem, 2016).
- Many classrooms are sacrificing the discovery and critical thinking skills that arise through play in favor of academics **despite early social skills being an important predictor of students' learning trajectories** (Bassok, 2016).

Teacher Involvement in Play

Both child directed free play and guided play are essential for the development of academic skills (Singer, Golinkoff, & Hirsh-Pasek, 2006).

- Children need high-quality interactions with peers **and adults for learning *through play* to take place** (Jensen et al., 2019).
- In comparing free play, guided play, and direct instruction as contexts for supporting children's development, free play provided little novel learning, adult instruction allowed for some learning, but **guided play had the most significant effect on children's learning of the targeted academic skills** (Fischer et al., 2013).



Play Provides the Opportunity to Develop Executive Function

- **Cognitive Flexibility** = **Problem Solving and Perspective Taking**
 - thinking about something in multiple ways and perspective taking (e.g., considering someone else's perspective on a situation or solving a problem in multiple ways).
- **Working Memory** = **Multi-Tasking**
 - keeping information in mind and manipulating it in some way.
- **Inhibitory Control** = **Social-Emotional and Impulse Control**
 - deliberately suppressing attention (and subsequent response) to something such as ignoring a distraction, stopping an impulsive utterance or action, or overcoming a highly learned response.

Inhibitory control has a very **steep developmental slope between 3 and 5 years of age** (Rosas et. al., 2019; Best et al., 2009; Best & Miller, 2010).

Which of These Is Not Necessary to be Ready and Available to Learn?

- Perspective taking
- Problem solving
- Thinking about a problem in multiple ways
- Identifying the problem
- Remembering information
- Storing information for quick retrieval
- Self-monitoring
- Completing multiple steps or applying multiple skills at one time (e.g., writing)
- Controlling impulses
- Paying attention
- Ignoring distractions
- Regulating emotions
- Planning
- Time management



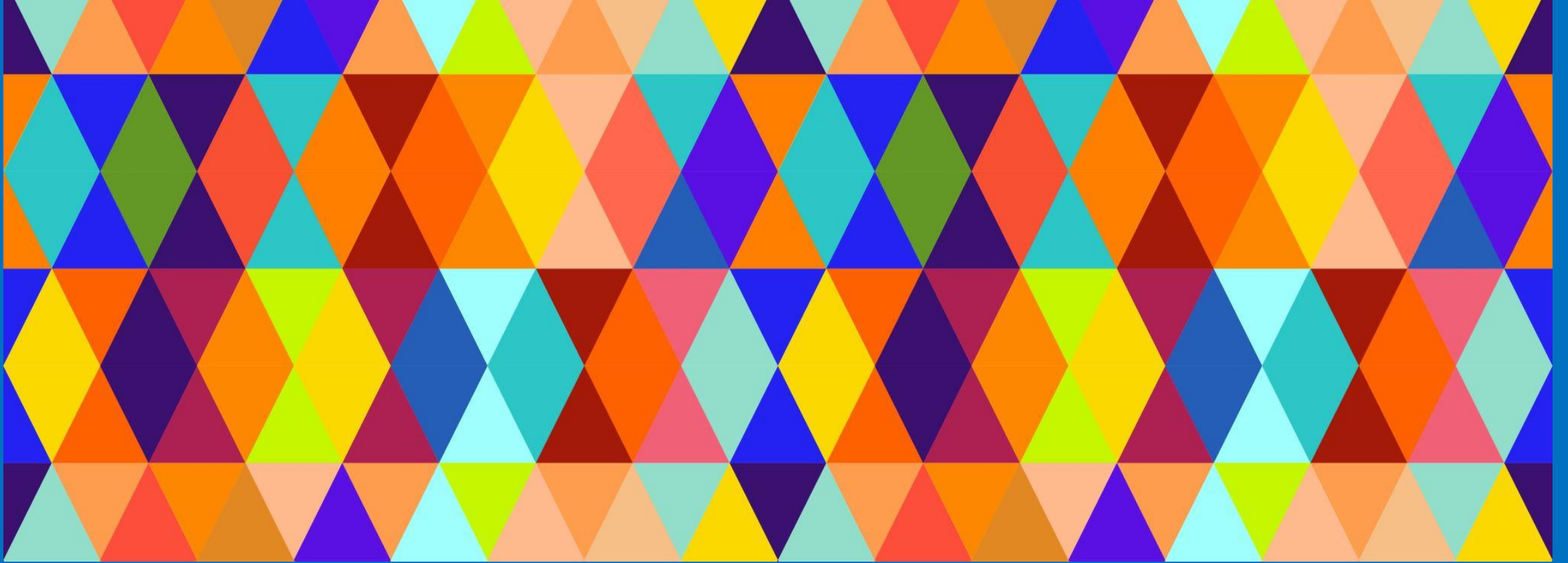
Executive Function, Adults, and Play

Children are not born with Executive Function skills - they are born with the potential to develop them.

- It is the early language and executive functioning skills at age four; not the early reading and math skills, that positively predicted the rate of learning in elementary school (Pace et al., 2019).
- **Adults play a critical role in the development of Executive Function skills through play**, first by helping them complete challenging tasks, and then by gradually stepping back to let them manage the process independently and learn from their mistakes (Center on the Developing Child at Harvard, University, 2014).



Why Is There a Decrease in Play and Conversational Turns?



A meta-analysis based on 29,017 children revealed that daily screen time **increased from 1.4 hours** pre-pandemic **to 2.7 hours** during the pandemic (Plamondon et al., 2023).



Define Screen Time

- Screen time isn't "one thing"; its many things!
- Screen time is different across age bands.
- Screen time is meant to imply passive and non-educational activities such as mindlessly watching videos or shows, scrolling, or playing games with no constructive or positive benefit to development nor connection to real world application.
- Screen time is a total amount per day which includes use of screens during the school day for *passive* activities.



Screen Time Recommendations of the American Academy of Pediatrics



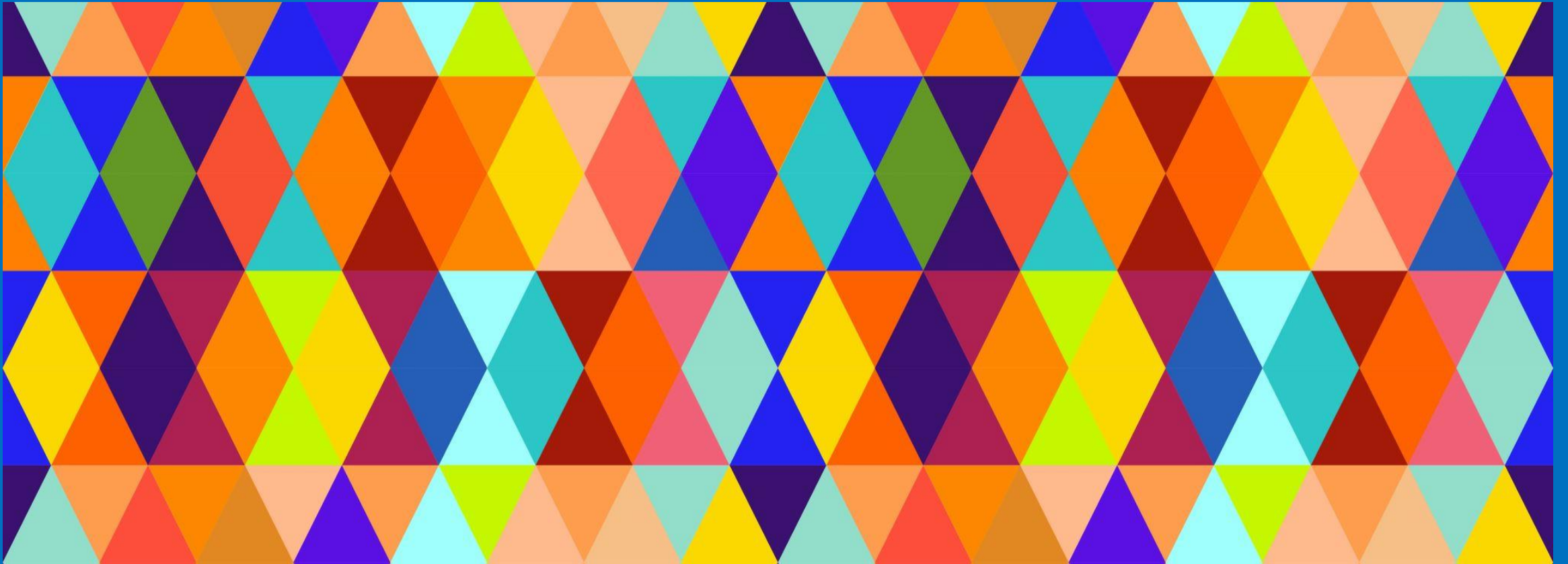
*Unless video chatting with parent or relative. *via co-viewing high quality content

Impacts of the Amount of Screen Time

- Screen use **before the age of 2** resulted in significantly lower emotional scores and higher risk of conduct problems, learning problems, and difficulties with impulsivity and hyperactivity *independent of excessive use* (Xiang et al., 2022).
- Children with **more than one hour of daily screen time prior to the start of kindergarten** were more likely to **be vulnerable in all five developmental domains** compared to children reporting up to one hour of screen time per day (Kerai et al., 2022).
- Children who engage in **two or more hours per day** are more likely to experience **behavioral problems and have poorer vocabulary acquisition** (McArthur, Tough, & Madigan, 2022).



What is the “Opportunity Cost” of Screen Time on Social Development?



What Is Meant by “Social Development”?

“Social” isn’t one thing; its many things.

- Joint attention
- Inference and prediction
- Play skills
- Emotion labeling and regulation
- Language and adjusting language to the context
- Narrative/Story telling
- Nonverbal communication
- Perspective taking
- Social reasoning
- Problem solving
- Conflict resolution
- Flexible thinking



Critical Periods of Social Development

- Birth to 12 months
 - Sharing attention
 - Using and imitating gestures
Simple games (e.g., peek-a-boo)
 - Discriminates facial expressions
 - Imitates
- One – Two years of age
 - Aware of the social value of speech
 - Demonstrates sympathy, empathy
 - Verbal turn taking
 - Emotional/behavioral regulation
 - Responds speech with eye contact
 - Co-regulates emotion
- Two-Three Years of age
 - Clarifies and asks for clarification
 - Demonstrates social/cultural politeness
 - Follows rules
 - Understands others can feel differently
- Three - Four Years of age
 - Asks permission
 - Repairs conversational breakdown
 - Makes inference
 - Tells simple stories
- Four - Five Years of age
 - More sophisticated labeling of emotions
 - Able to tell a lie



Between birth and age three all learning
takes place in a social context,
through our relationships with others
it cannot be replicated any other way.

How Do Children Develop Those Socially Related Skills?

The foundations of social competence are developed within the first five years of life,

are connected to emotional well-being, and influence a child's later ability to form relationships and adapt in school (Collins & Laurens, 1999).

- Children acquire new social behaviors as they **imitate other's actions**, **extract important features** of other's behaviors, and **conceptualize and imitate rules** they see other people use (Williamson et al., 2010).
 - Parents/Caregivers provide children their **first opportunities** to develop a relationship, communicate, and interact.
 - Parents/Caregivers also **model** how to interact with others, how to regulate emotions, how to resolve conflict, and problem solve.



How Do Children Develop Those Socially Social Skills? (continued)

- Children **practice** the various socially related skills in their interactions with other children.
 - This practice provides the opportunity to receive feedback from peers about those socially related behaviors.
 - However, the less they interact with other children, the less opportunities they have to receive feedback from peers about their behavior which is critical for shaping and refining social interactions.
 - The less refined the social interactions, the more difficult it is to build, establish, and maintain relationships with others.



Opportunity Costs

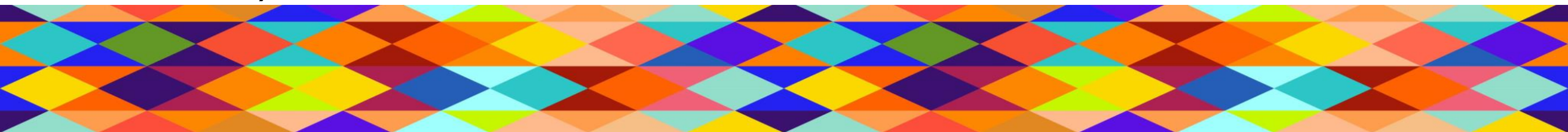
Screen activities “COST” children the OPPORTUNITY to engage in conversation and developmentally appropriate play with others.

- The more screen time, the less social interaction (Stiglic & Viner, 2019; Taheri, M. 2013; Ray & Jat, 2010; Bickman & Rich, 2006).
- **Screen time diminishes the quantity and quality of interactions** between children and their parents, **resulting in fewer opportunities** for the child to practice and develop language (Mustonen, Torppa, & Stolt, 2022).

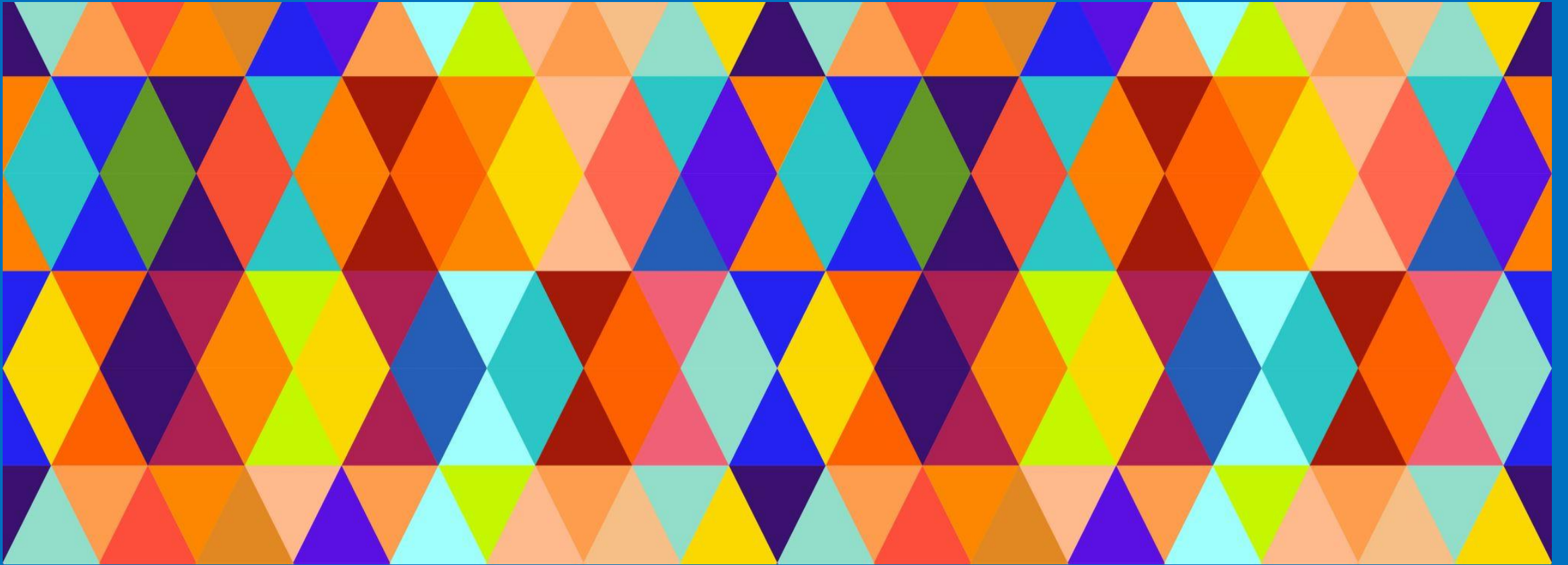


The Good News

- In four-year-olds, **the greater average screen time, the poorer the social skills**, but **pretend play moderates this relationship** (Perez, 2023).
- Children who view more social emotional content tend to have better behavioral control (Dore et al., 2023).
- In a preschool setting, children who were **taught** how to play games with peers **continued** to share, interact, and teach one another (Shifflet et al, 2012).
- Active involvement and guidance by **adults** during play **facilitates positive impacts on social development** (Rasmussen et al., 2016; Shifflet et al., 2012).



What About...

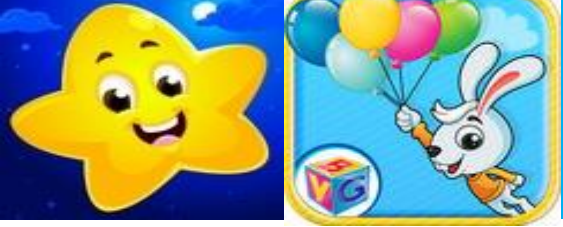


“But It Keeps Them So Calm...”

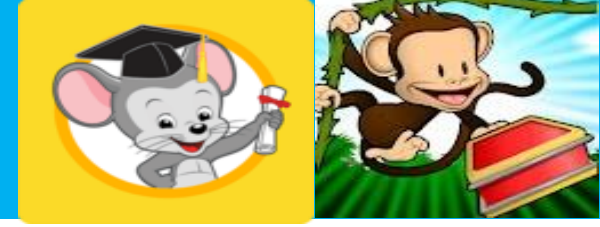
iPads are the new pacifiers (Wolf, 2018)

- The reason why screens appear to calm children is because every bit of their brain is working to keep up with the pace of the visual stimuli.
- When the visual processing system is **super-focused**, the vestibular system (which is closely associated with mood) is **turned off** because all the brain's energy is focused on processing ***at the same pace as the visual content***.
- Once the hyperstimulating content is removed, the visual system is now super **UNfocused**, and the vestibular system is **Unlocked** (mood comes back on).
- To rebalance, it is helpful for children to do something physically active immediately after screen use.





Educational Apps



- Most apps have **no evidence of effectiveness**, target only rote academic skills, are not based on established curricula, and use **little or no input from developmental specialists or educators** (Chiong & Shuler, 2016; Christakis et al., 2013).
- Research shows that screens **do not make children learn faster or better than human interaction** (Teichert, 2020).
- Higher-order thinking skills and executive functions essential for school success, such as task persistence, impulse control, emotion regulation, and creative, flexible thinking, are **best taught and learned through unstructured and social (not digital) play** (Shaheen, S., 2015) **as well as responsive parent–child interactions** (Zelazo et al., 2011).



YouTube Videos

- For every 30-minute increase of screen time per day there is 2.3 times greater risk of language delay (van den Hewel, 2019).
- Children who watch videos before the age of 3 are more likely to have attention problems
 - **For every hour per day**, there is a 10% risk of attention problems than those children who never watched videos (Christakis, 2004, 2009).
 - 2 hours = 20% risk
 - 3 hours = 30% risk
 - 4 hours – 40% risk

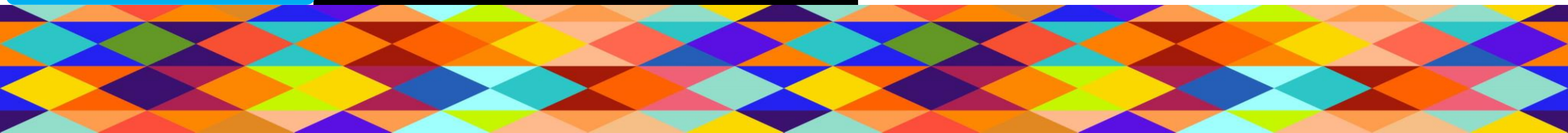


But What About...

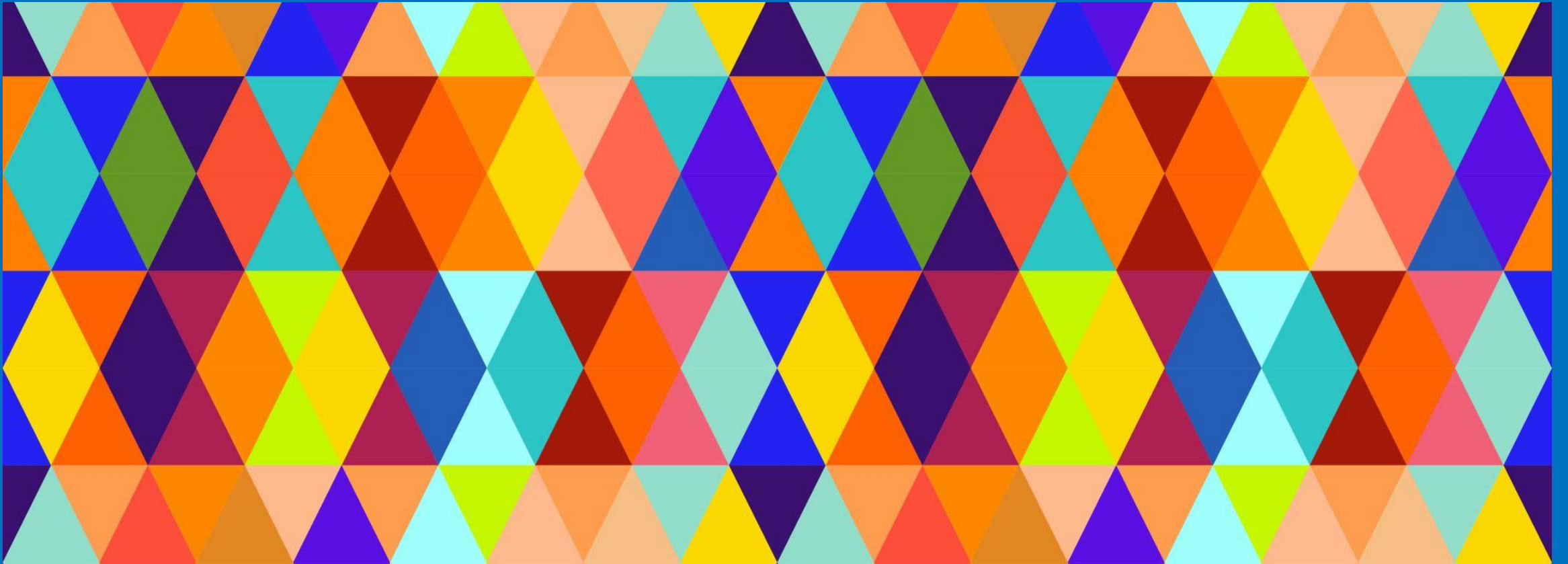
- Ms. Rachel is interactive and utilize many techniques used by pediatric Speech-Language Pathologists.
- Apps such as Speech Blubs and the Daniel Tiger conversation starters and tips for parents with practical ways to use Daniel Tiger songs in everyday life..

- Sesame Street was creating content for emotional regulation before it was "a thing". Cookie Monster has an entire series dedicated just to emotional and self regulation.

- **Need someone to make connections to real life.**
- **Too much of a good thing is no longer good.**



What About Adult (Parent/Caregiver) Use of Screens?



5-Year-Old Draws Cell Phones Attached to Parents' Body

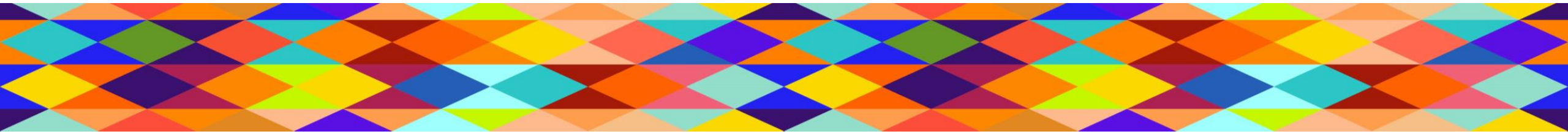
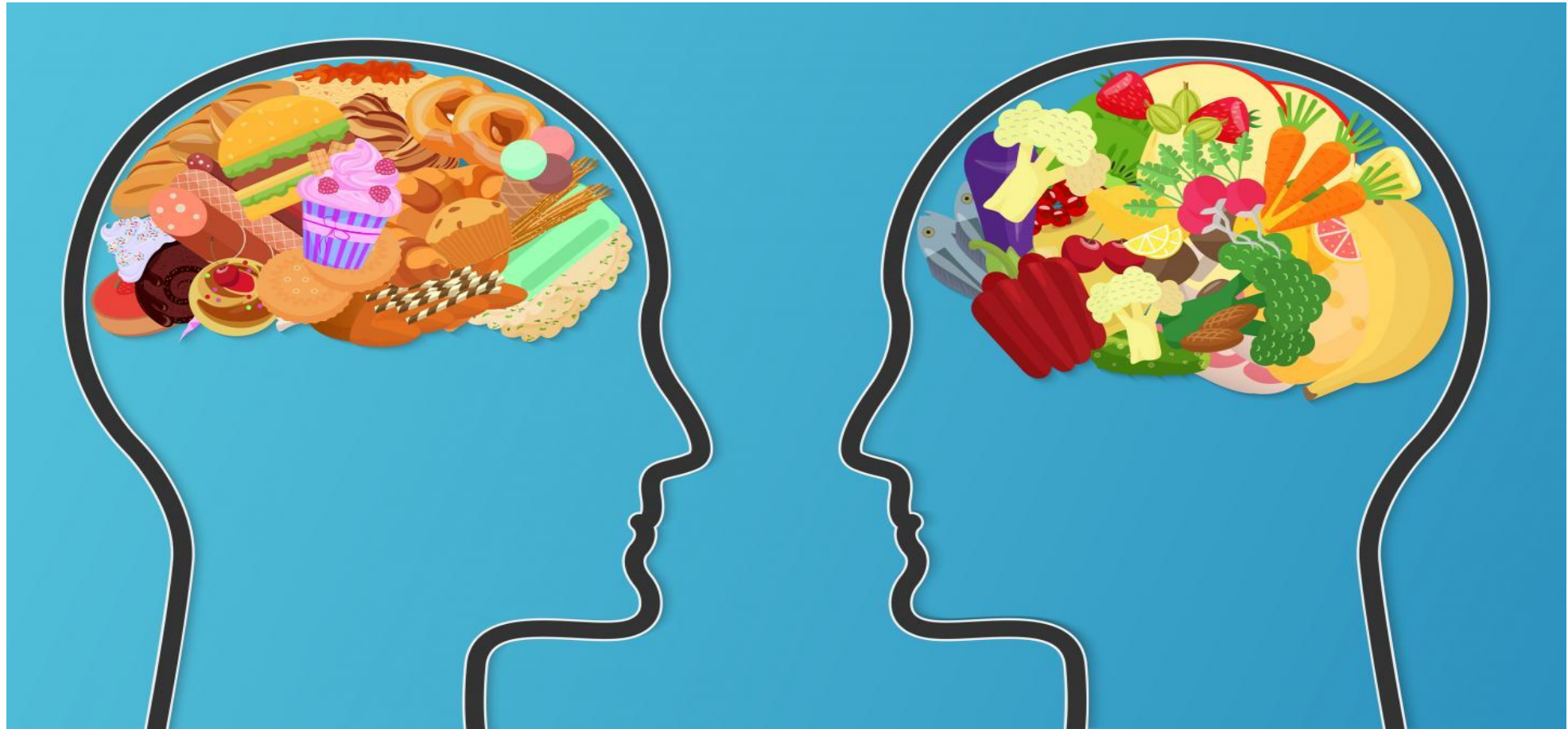


Adult Screen Use With the Child Present

- What you pay attention to is what is perceived as the most important thing to you.
- Physically present, but emotionally disconnected.
- Excessive amounts of screen use by the child **and/or** the parent has a **negative impact** on play-based and other activities that enhance **cognitive and social-emotional skills necessary for kindergarten readiness** (Sigman, A., 2017; Pagani et al., 2010).
- Face-to-face interactions, especially with primary caregivers, promotes **the development of social emotional competence** in young children (Skalická et al., 2019)



Mental Junk Food

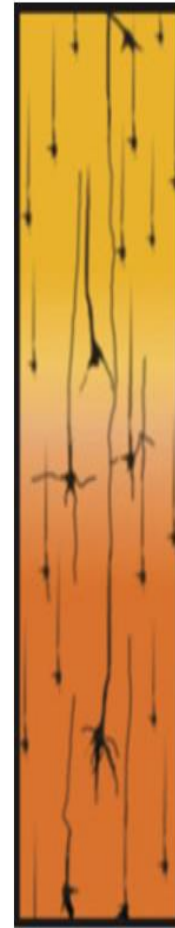


Building a Brain That is Ready to Learn



Critical Periods of Development

- At birth, a child's brain already has nearly all the neurons (brain cells) it will ever have, and it triples in size over the course of **the first three years** in response to what we learn from...
 - interactions with other people,**
 - our environment,**
 - and physical interaction with objects.**
- The connections within the brain are formed at a **faster rate during these years than at any other time in the life of a human** and are extremely responsive to external stimuli (Huttenlocher, 2002).



Newborn



1 Month



9 Months



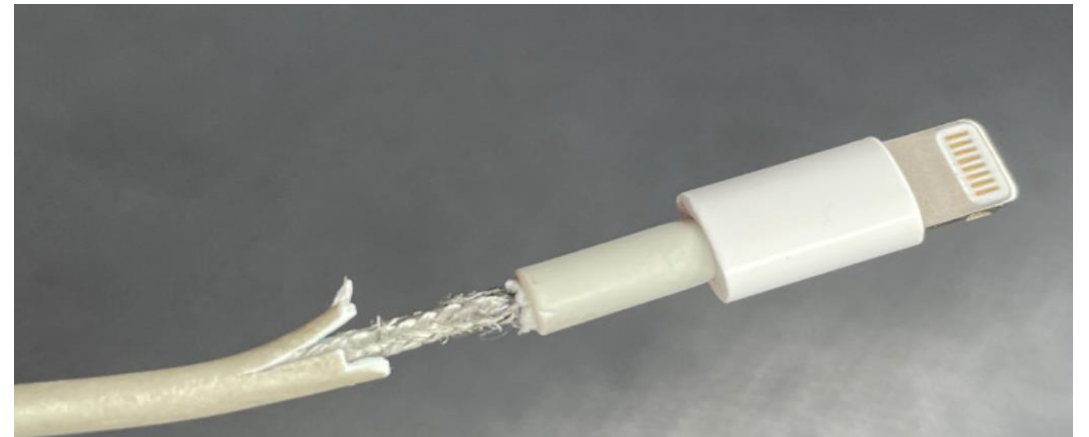
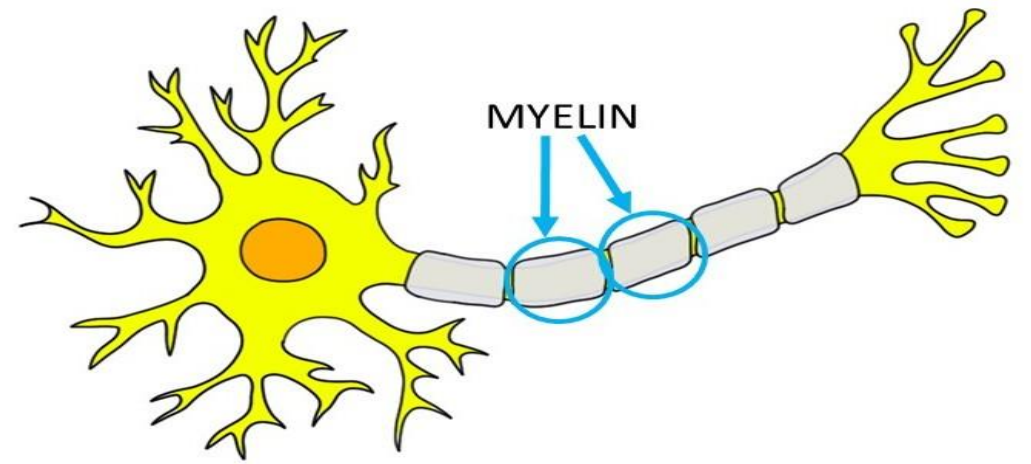
2 Years



Adult

Myelin

- Synapses are the connections between brain cells and are formed based on meaningful experiences.
- Myelin plays the essential role of making brain signals faster and stronger.
- The brain cells that produce the cholesterol for myelination **are very easily damaged** by *“the wrong kind and wrong amount” of stimulation* including under stimulation and over stimulation.



Myelin and Literacy

- The role of early oral language experiences (**conversational turns and play**) is related to the anatomical connections of the brain for shaping **myelin** tracts correlated with reading proficiency (Torre, McKay & Matejko, 2019).
- Screen use among **pre-kindergarten** children that exceeded the AAP guidelines was associated with decreased myelination in the of areas of the brain that support **language and emergent literary skills as well as corresponding cognitive assessments** (Hutton et. al., 2020).
- Parent-child **conversational turns at 2 years** correlated with pre-literacy skills (letter identification and letter-sound knowledge), as well as **myelin density** estimates within the left arcuate and superior longitudinal fasciculus (Weiss et al, 2022).



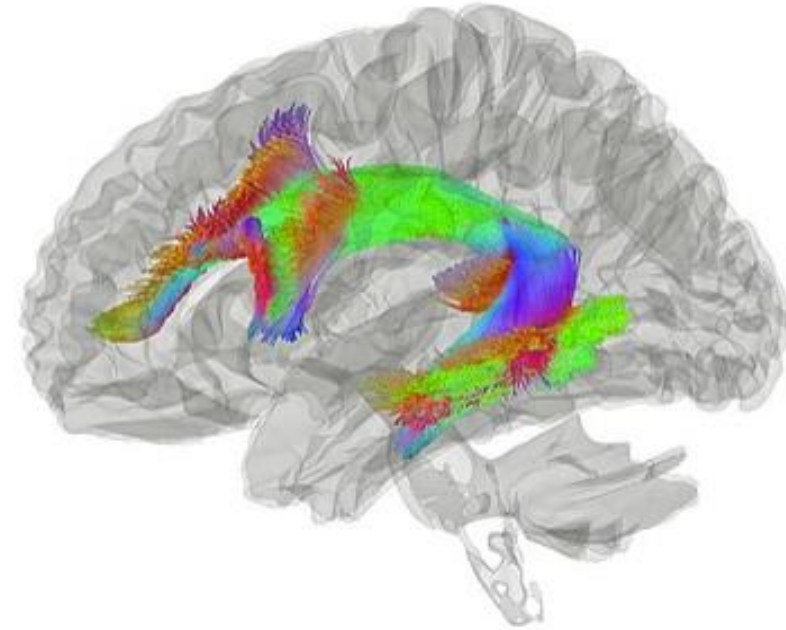
Reading IS Language, Just in the Print Modality

- Remember... Conversation creates the language rich environment. Play is a language rich experience.

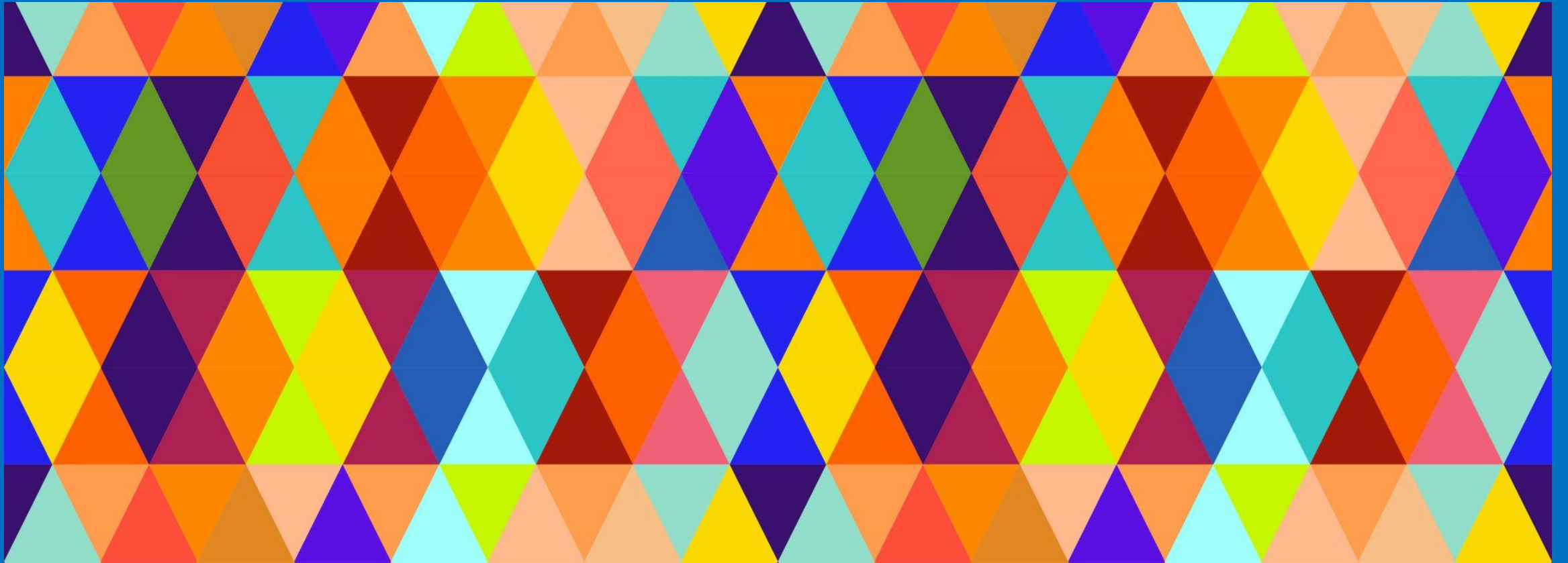
**Reading is not a primarily visual skill;
it's a language skill.**

How do we know?

- Because **the areas of the brain that we use for reading are the same as the language areas**, early intervention programs aiming to close the achievement gap should **focus on increasing children's conversational turn taking** to capitalize on the early neural plasticity underlying cognitive development (Deckner, et al., 2006).



How Can We Support Families and Schools?



Things to Consider

- What is being watched on the device/what activity is being performed on the device?
- Is the child benefitting from the time spent on the device?
- Why is the screen being used/what is it replacing (e.g., “opportunity cost”)?
- What is the balance of screen use and other activities?
- Is someone ...
 - ...monitoring what is watched?
 - ... tracking the length of time in front of screens?
 - ... co-viewing and connecting what is watched with the real world?



Strong evidence shows that **raising parents' awareness** and other straightforward actions may significantly lower children's screen time (Sigman, 2012).



Connect.



Co-view.



Converse.



Tips for Adult Tech Use With the Child Present

- A Simple Guide for Adults on When to Use **or When Not To Use** Digital Devices...
 - Would I read a book now?
- How will I ever get anything done?
 - Involve the child.
 - Turn on **TV** for educational content.
 - The difference between TV and handheld devices is that TVs are fixed to one location and meant to be experienced as a group whereas handheld devices are meant to be experienced alone and can go anywhere ("opportunity cost").



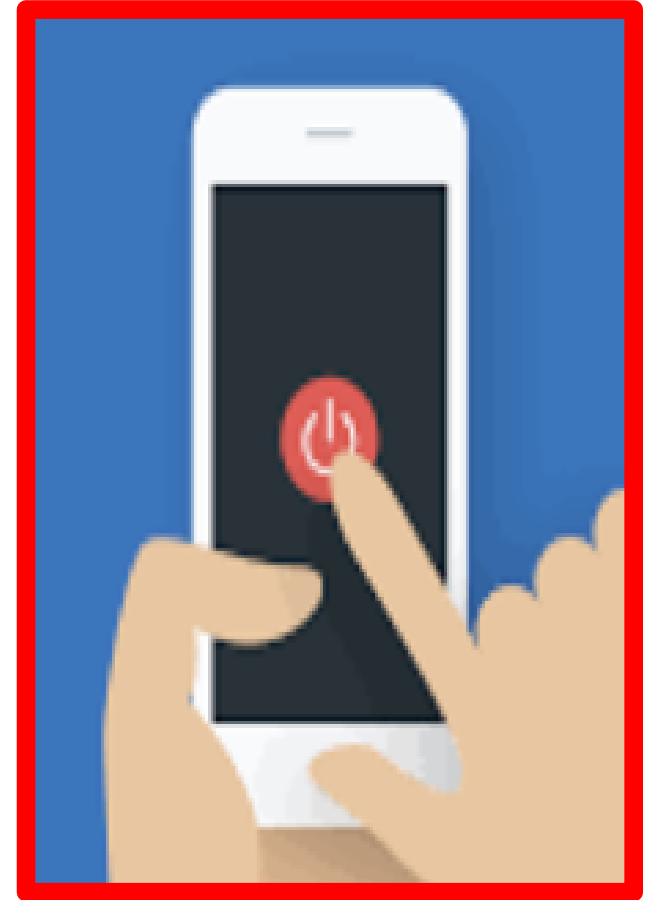
Clues That Screens May Be Becoming an Obstacle

1. Getting angry or upset when asked to turn off or put away screens
2. Insisting on more and more screen time
3. Spending time off screens thinking about how and when they will get back online
4. Preference for spending time on screens as opposed to with other humans
5. Use of technology as an escape from reality
6. Inability to calm or regulate emotion without technology
7. Deterioration of mental health or behavior (depression, anxiety, irritability, etc.)
8. Negative impacts on **sleep** or eating



Screen Time Tips

1. Know the screen time recommendations
2. Understand “the why”
3. Watch for negative changes in behavior
4. Create tech free times and locations **AND** tech “possible” times and locations (as appropriate)
5. Teach screen time etiquette
6. Be in control of the charger and/or password
7. Use and set up timers
8. Change device setting to grayscale
9. Plan ahead
10. Balance screen time with other activities



Encouraging Conversation

Even young children **who are not yet speaking** do engage in conversation in ways other than through words!

- Ask questions that cannot be answered with one word (e.g., **Tell me three things about your day**).
- Initiate conversations with...
 - I remember when...
 - Do you remember when...
 - I wonder if...
 - What do you think will happen if...



Resources in the ASHA Leader

1. Tap 'Be Tech Wise' Resources to Help Families Manage Children's Screen Time
2. Screen Time: New Resource Helps Achieve a Healthy Balance
3. World Health Organization Recommends Against Screen Time for Infants
4. Help Families Find a Screen Time Balance
5. Guiding Families on Screen Time Recommendations



GROWING UP WITH TECH



TVs, tablets, smart phones, and computers, are part of our every day lives, but does that mean that they are safe for children? The American Academic of Pediatrics warns that excessive screen time can negatively impact a child's development, but why is that and what can we do in a world full of screens?

What About Educational Apps and YouTube Videos?

Most videos have a screen changes every 3 to 7 seconds. This trains the brain to seek out new and interesting content just as frequently. Most educational apps have no research to support that they lead to better academic outcomes and do not lead to applying skills in the real world. Videos and apps are also



TALKING TIPS

ASK QUESTIONS THAT CANNOT BE ANSWERED WITH ONE WORD (E.G., TELL ME THREE THINGS ABOUT YOUR DAY).

START A CONVERSATION BY SAYING...

I REMEMBER WHEN...
DO YOU REMEMBER WHEN...
I WONDER IF...

WAIT FOR THEM TO RESPOND. GIVE THEM UP TO 3 SECONDS.

Critical Periods of Development



From birth through the age of three, the brain grows faster during any other time of a child's life. This happens through interactions with other people in the world around them, and physically interacting with toys and objects. Play and conversation are the most important tools necessary for building a brain that will be ready for academic learning.

To be ready for academic learning, children need to...

- grow a large vocabulary,
- take turns in conversation,
- understand another person's perspective,
- attempt multiple ways to solve a problem,
- have task persistence,
- think about things outside of the "here and now",
- ignore distractions,
- manage their emotions,

...but none of these skills can be learned from a screen.



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recommends...

- No screen time for children birth to 18 months unless video chatting.
- Co-viewing of digital content for less than an hour a day for 18-24 month old children.
- No more than 1 hour per day for children ages 2 - 5 which includes time spent in front of screens at school for passive activities.

Conversation, play, and reading to your child are the best ways to grow a brain that is ready to learn!

For more information, contact Angie Neal, M.S.CCC-SLP - wordnerdspch@gmail.com

(SIMILAR TO HOW COOKING SHOW HOSTS TALK TO THEIR AUDIENCE).

TALK THROUGH WAYS TO SOLVE PROBLEMS...

"I WONDER WHAT WOULD HAPPEN IF I TRIED TO..."

ASK QUESTIONS ABOUT WHAT THE CHILD IS INTERESTED IN OR IS DOING.

COMMENT ON WHAT OTHERS ARE DOING DURING PLAY...

"HEY, DID YOU SEE WHAT ___ IS DOING WITH ___?"

ASK THINKING QUESTIONS LIKE... IF YOU HAD \$100 DOLLARS, WHAT WOULD YOU BUY? WHAT DO YOU THINK YOU WILL BE DOING IN 10 YEARS?

DESCRIBE WHAT THE CHILD IS DOING SUCH AS "I SEE THAT YOU ARE..." (SIMILAR TO HOW SPORTS BROADCASTER TALKS TO THEIR AUDIENCE).

WHEN YOUR CHILD IS UPSET SAY... "YOU LOOK LIKE YOU ARE FEELING -----." HOW ABOUT SMELL THE FLOWERS (DEEP INHALE) AND BLOW OUT THE CANDLES (EXHALE)

SOME OF THE BEST TIMES FOR CONVERSATION ARE: IN THE CAR/WHILE TRAVELING AROUND TOWN, DURING MEALS, BEFORE BED,

Question and Answer

Thank you for your time, attention, attendance,
and for what you do for children every day!



If you'd like more information,
please do not hesitate to reach out!

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A list of references is available in a separate Word document.

