Seeing Language: How Vision Shapes Communication and Language

Angel Perez, Ph.D., FAAO
Florida and Virgin Islands Deafblind Collaborative

Objectives

By the end of this presentation, participants will be able to:

1. **Explain** how early visual development supports brain organization, joint attention, and foundational language acquisition in the first three years of life.

2. **Describe** the relationship between visual access and both receptive and expressive language development.

3. **Identify** red flags and risk factors indicating that a visual condition may be contributing to communication or language delays.

4. **Apply** evidence-informed, multisensory strategies to support language development in children with visual impairments within early intervention settings.

Overview of Early Development: The sensory-language connection

- The Central Premise
- Brain Development in the First 3 Years
- Sensory Systems as the Foundation of Meaning
- Why Vision Is Central

- **Key Concept:**
- **Language is built on access to experience.**

- **Experience is mediated by the senses.**

- **Vision often serves as the primary organizer of early meaning.**

Vision and Early Brain Development

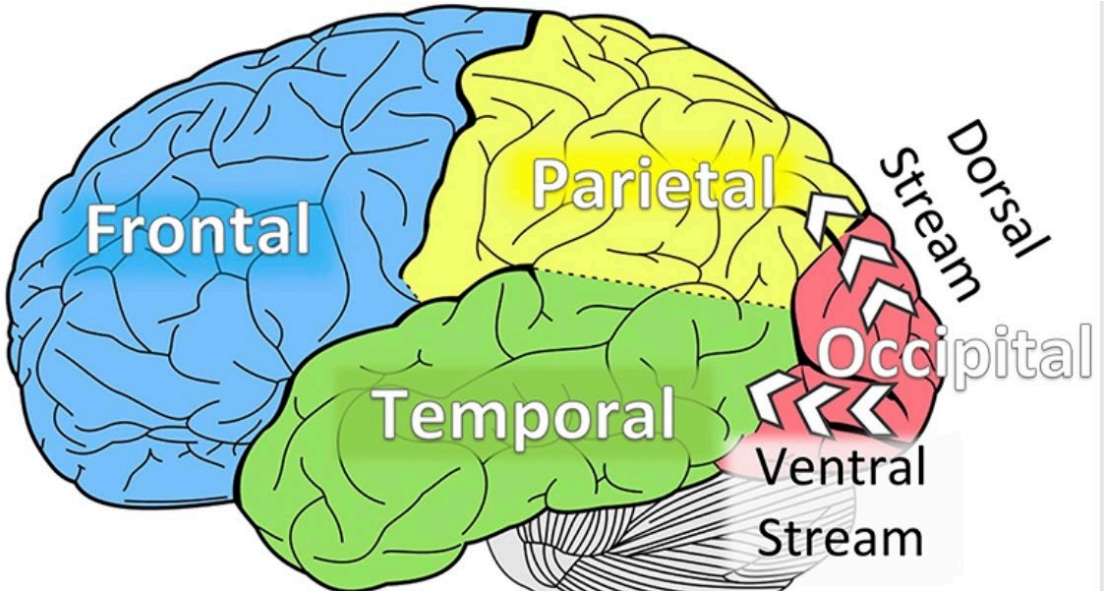
The Visual System and the Developing Brain

- **Vision Develops Rapidly in the First 3 Years**
- Experience shapes neural pathways
- Early input strengthens visual cortex connections

- **Two Critical Processing Streams**
  - Dorsal (Where) → Spatial awareness, movement
  - Ventral (What) → Object recognition, faces, meaning

- **Why it Matters for Language**

  Vision supports:
  - Attention
  - Joint Attention
  - Social Reciprocity
  - Concept Development



How Vision Supports Cognitive, Social, and Communication Milestones

Cognitive Development

- Object permanence
- Cause-effect understanding
- Catergorization and concept formation
- Spatial awareness

Social Development

- Eye contact and facial recognition
- Social referencing
- Imitation

Communication and Language

- Joint attention
- Gesture comprehension
- Word-object mapping
- Turn-taking cues

Role of Joint Attention, Facial Recognition, and Imitation in Language Learning

Joint attention

- Shared visual focus between child and caregiver
- Establishes word-objective association
- Predicts later vocabulary growth

Facial Recognition

- Interprets emotion and communicative intent
- Provides visual feedback during interaction
- Supports social reciprocity and engagement

Imitation

- Replicates gestures, expressions, and sounds
- Builds motor planning for speech
- Reinforces social learning loops

The Relationship Between Vision and Language: Receptive

Understanding Words, Gestures, Context

Vision's Role in Receptive Language

Words

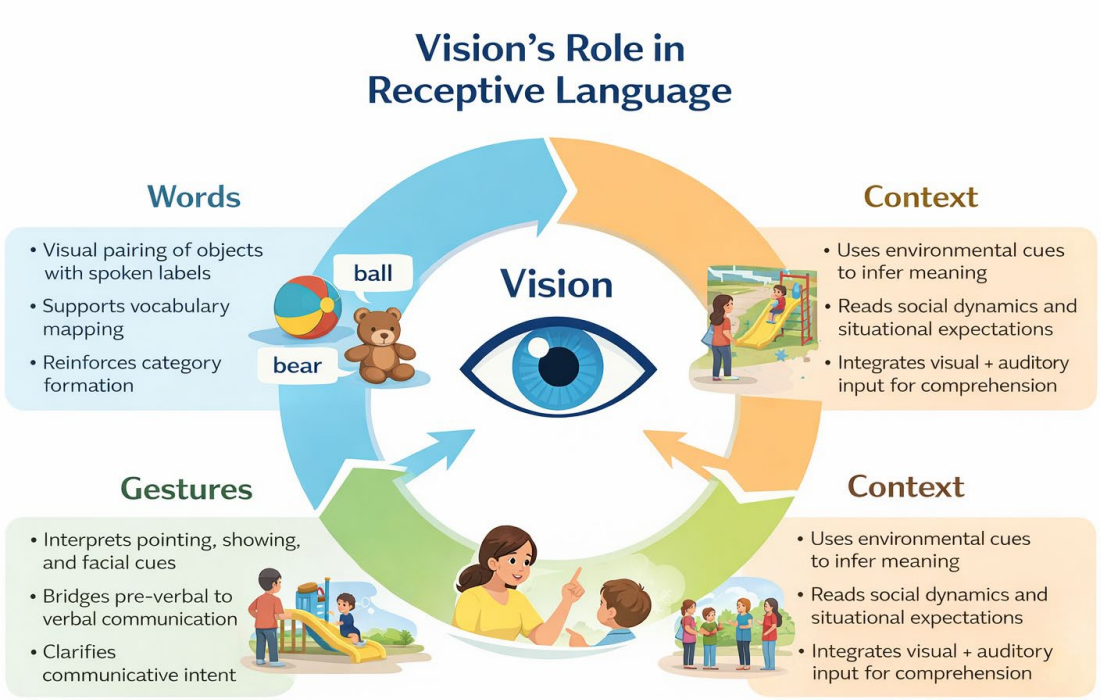
- Visual pairing of objects with spoken labels
- Supports vocabulary mapping
- Reinforces category formation

Gestures

- Interprets pointing, showing and facial cues
- Bridges pre-verbal to verbal communication
- Clarifies communicative intent

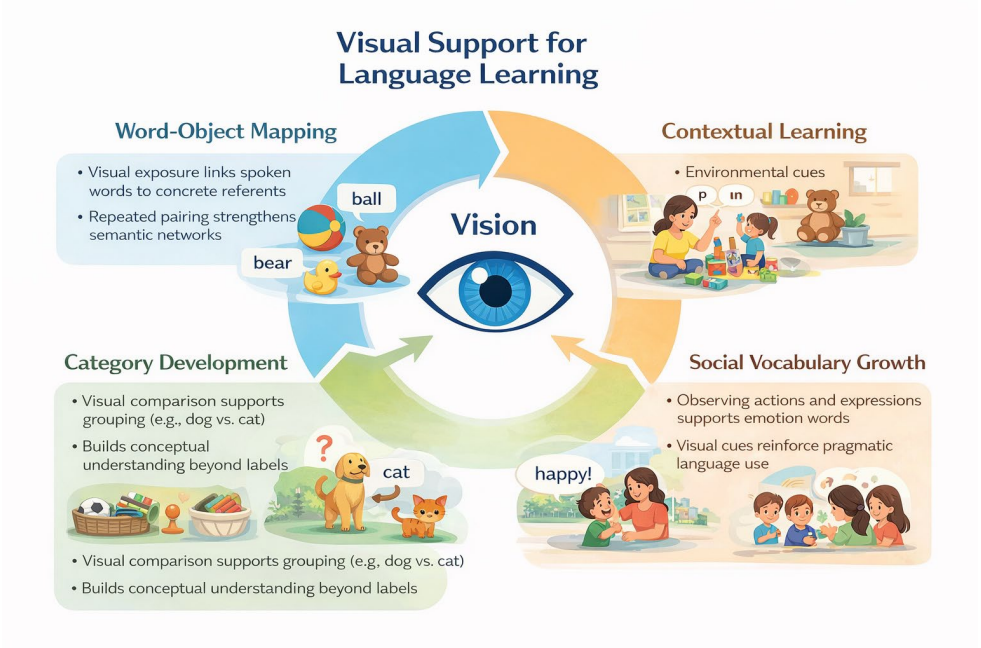
Context

- Uses environmental cues to infer meaning
- Reads social dynamics and situational expectations
- Integrates visual + auditory input for comprehension



Role of visual input in vocabulary building

- **Word-Object Mapping**
- Visual exposure links spoken words to concrete referents
- Repeated pairing strengthens sematic networks
- **Category Development**
- Visual comparison supports grouping (e.g., dog vs. cat)
- Builds conceptual understanding beyond labels
- **Contextual Learning**
- Environmental cues
- Supports understanding of verbs, descriptors and spatial terms
- **Social Vocabulary Growth**
- Observing actions and expressions supports emotion words
- Visual cues reinforce pragmatic language use



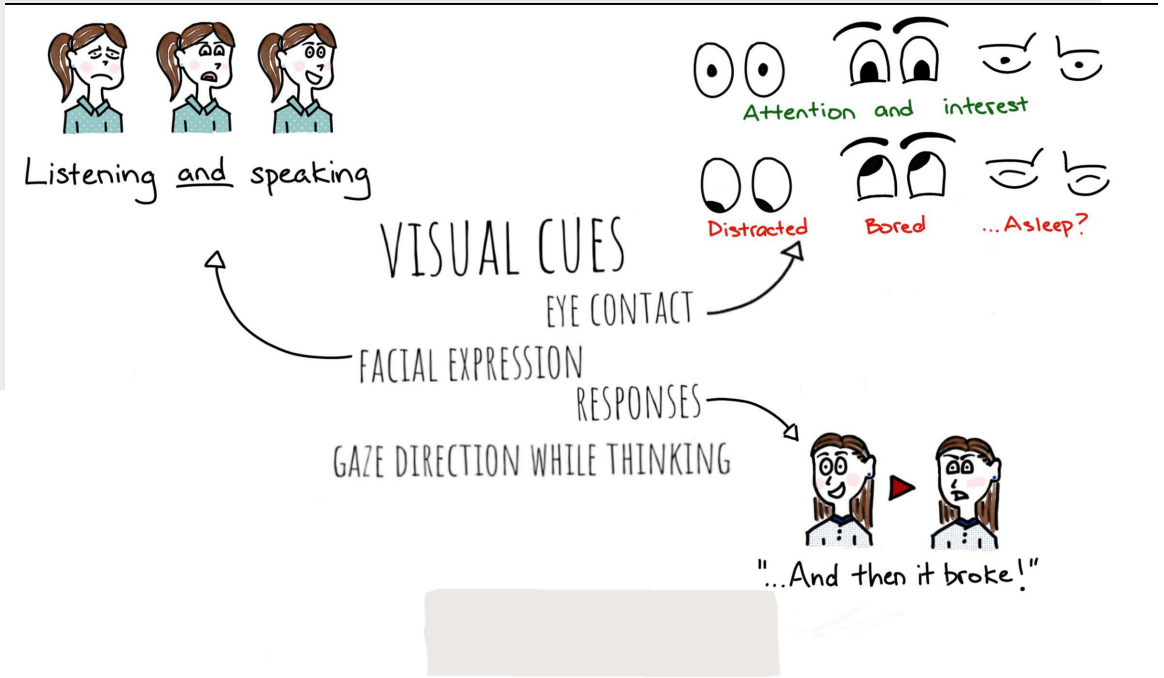
The Relationship Between Vision and Language: Expressive

Naming, Describing, Storytelling

Vision’s Role in Expressive Language

- **Naming**
- Labels people, objects, and action
- Describing
- Uses visual features (color, size, shape, location
- **Storytelling**
- Organizes events in sequence
- Relies on visual memory and imagery
- Integrates emotion, perspective, and context

Visual Feedback and Conversational Cues



How Vision Shapes Interaction

- **Visual Feedback**
- Monitors listener attention and engagement
- Adjusts volume, tone, and pacing
- **Non-verbal Cues**
- Facial expressions signal understanding or confusion
- Eye gaze regulates turn-taking
- Body posture communicates interest
- **Conversational Regulation**
- Supports timing of response
- Guides topic maintenance
- Facilitates repair of communication breakdowns

Infant (6-12 Months)

Follows caregiver's gaze to an object

Watches facial expression to interpret tone

Reaches toward visually identified targets

Toddler (12-24 Months)

- Points to request or share interest
- Labels objects seen in the environment
- Uses visual cues to imitate actions

e! Preschooler (2-3 Years)

- Describes what they see
- Interprets emotions from facial expressions
- Uses visual context to understand stories

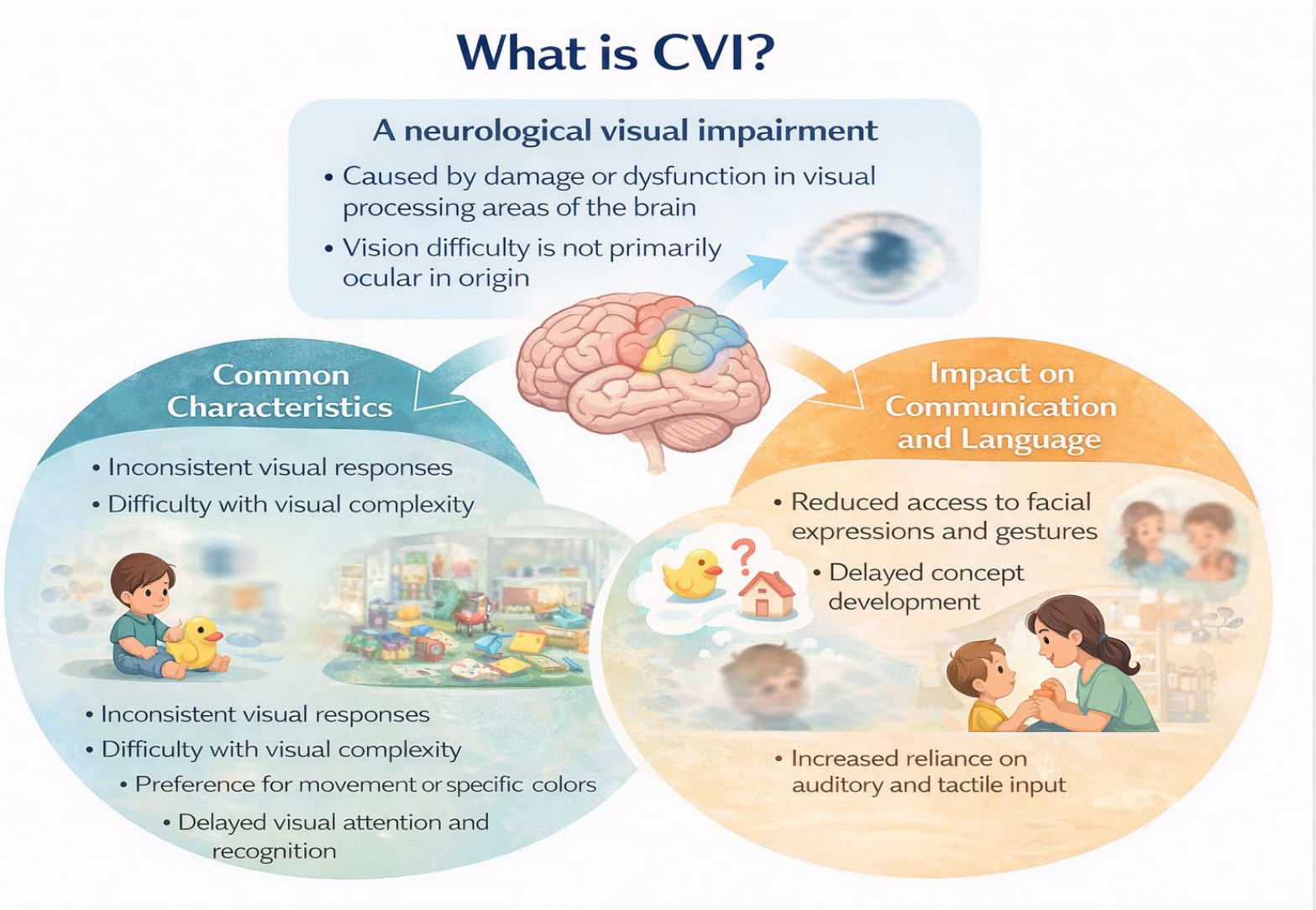
Examples of How Vision Shapes Early Communication

- **Infant (6-12 Months)**
- Follows caregiver's gaze to an object
- Watches facial expression to interpret tone
- Reaches toward visually identified targets

- **Toddler (12-24 Months)**
- Points to request or share interest
- Labels objects seen in the environment
- Uses visual cues to imitate actions

- **Preschooler (2-3 years)**
- Describes what they see
- Interprets emotions from facial expressions
- Uses visual context to understand stories

Visual Impairments and Language Risk: Overview of common pediatric vision conditions

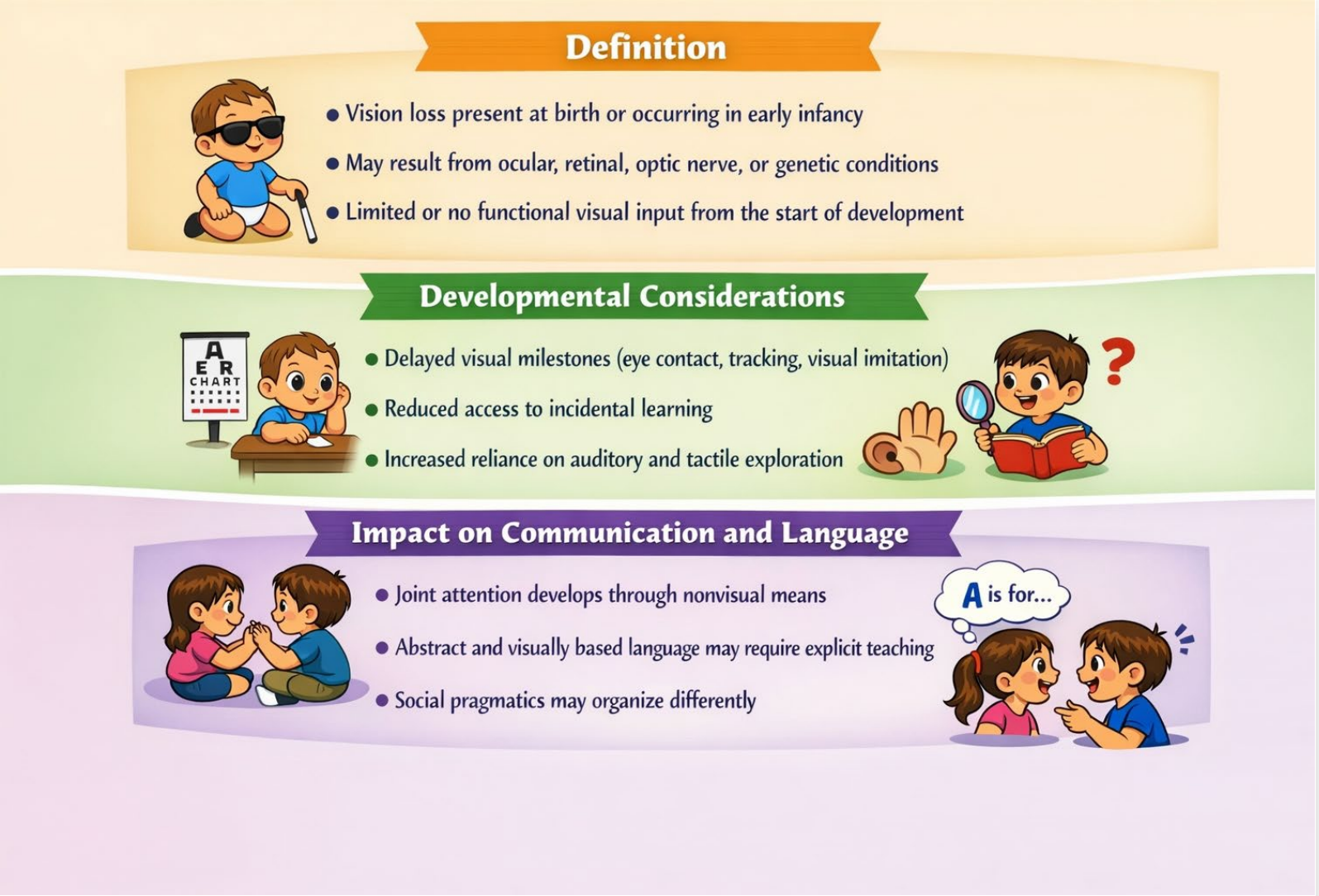


Cortical Visual Impairment (CVI)

- **What is CVI?**
- A neurological visual impairment
- Caused by damage or dysfunction in visual processing areas of the brain
- Vision difficulty is not primarily ocular in origin

- **Common Characteristics**
- Inconsistent visual responses
- Difficulty with visual complexity
- Preference for movement or specific colors
- Delayed visual attention and recognition

- **Impact on Communication and Language**
- Reduced access to facial expressions and gestures
- Delayed concept development
- Increased reliance on auditory and tactile input



Congenital Blindness

Definition

- Vision loss present at birth or occurring in early infancy
- May result from ocular, retinal, optic nerve, or genetic conditions
- Limited or now functional visual input from the start of development

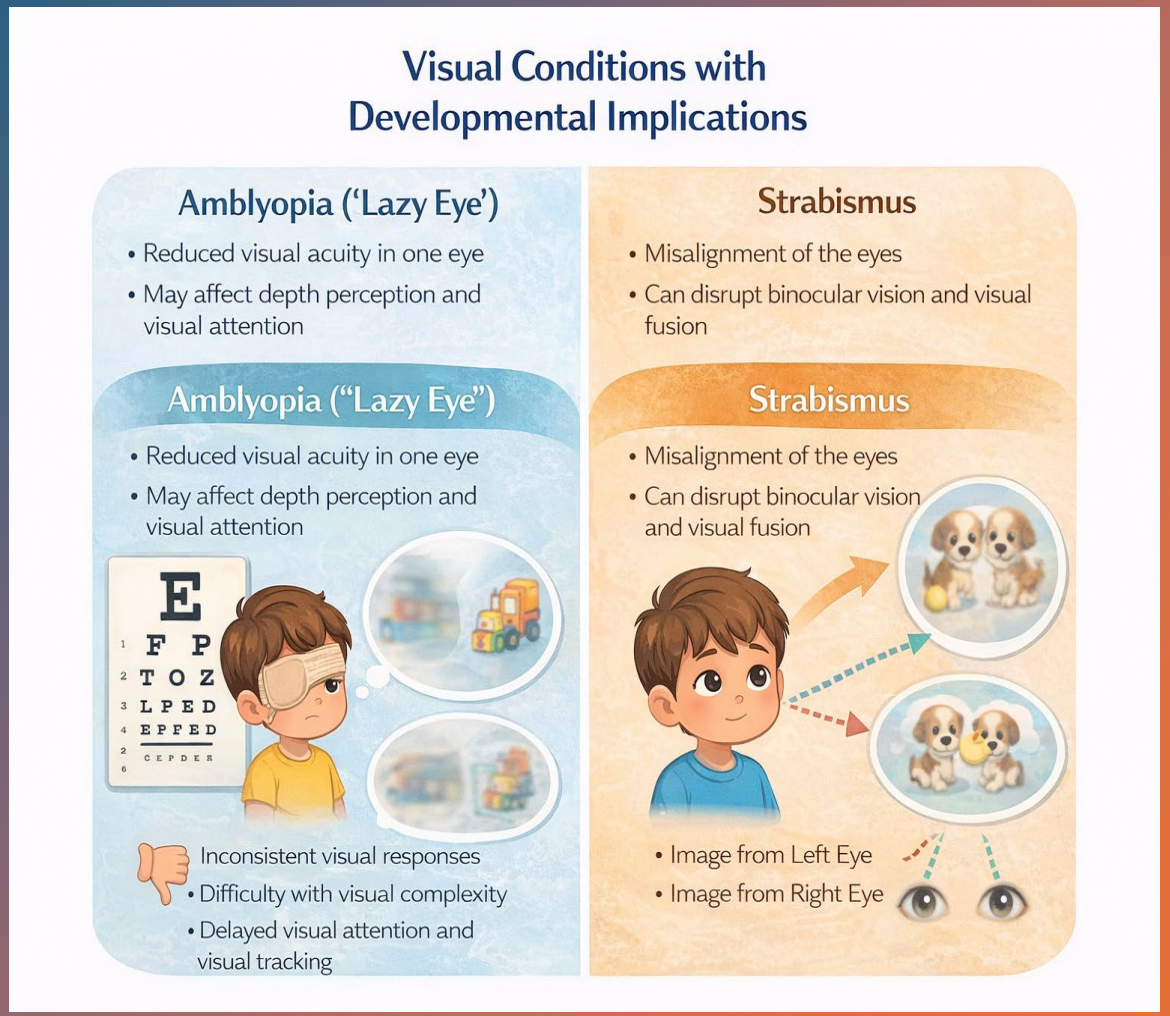
Developmental Considerations

- Delayed visual milestones (eye contact, tracking, visual imitation)
- Reduced access to incidental learning
- Increased reliance on auditory and tactile exploration

Impact on Communication and Language

- Joint attention develops through nonvisual means
- Abstract and visually based language may require explicit teaching
- Social pragmatics may organize differently

Amblyopia, Strabismus, Low vision



Visual Conditions with Developmental Implications

- **Amblyopia (”Lazy Eye”)**
- Reduced visual acuity in one eye
- May affect depth perception and visual attention

- **Strabismus**
- Misalignment of the eyes
- Can disrupt binocular vision and visual fusion
- May impact eye contact and visual tracking

Continuation

Low Vision

- Reduced visual functioning not fully correctable with lenses
- Variable acuity, contrast sensitivity, or field loss
- May limit access to visual details and environmental cues

Communication Considerations

- Reduced visual clarity can affect joint attention
- Missed facial cues or gestures
- Increased fatigue during visually demanding tasks

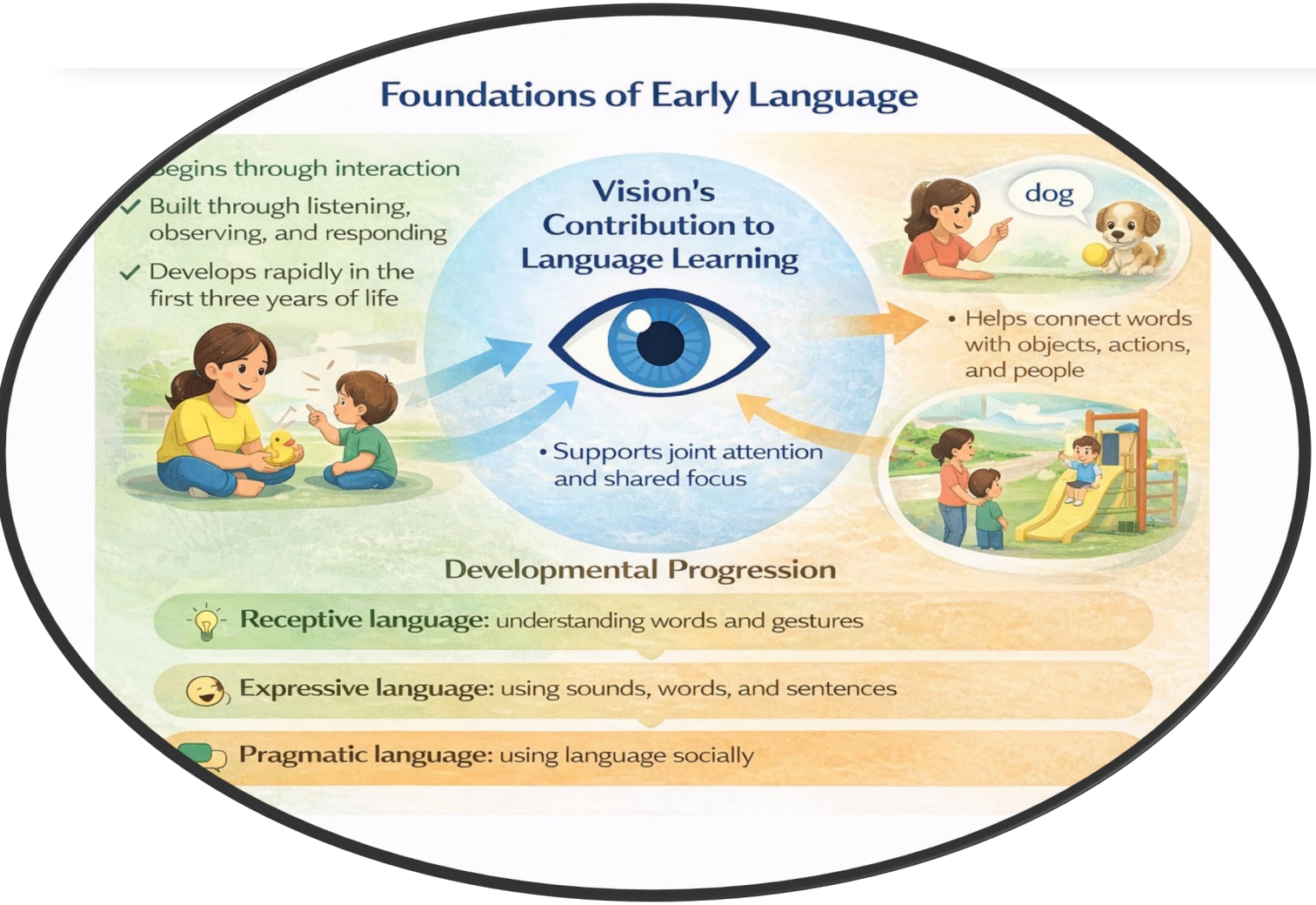
Social Interaction

- **How Vision Supports Social Development**
- Recognizing faces and familiar people
- Interpreting facial expressions and emotions
- Observing social behaviors and interactions

- **Role in Early Communication**
- Establishes eye contact and engagement
- Supports shared attention and caregivers
- Helps children understand social cues and responses

- **When Visual Access is Limited**
- Reduced access to facial expressions and gestures
- Challenges interpreting social cues
- May rely more on voice, touch, and environmental cues

Language Development



Foundations of Early Language

- Begins through interaction
- Built through listening, observing, and responding
- Develops rapidly in the first three years of life

Vision's Contribution to Language Learning

- Supports joint attention and shared focus
- Helps connect words with objects, actions, and people
- Provides visual cues for meaning and context

Developmental Progression

- Receptive language: understanding words and gestures
- Expressive language: using sounds, words, and sentences
- Pragmatic language: using language socially

Play and Exploration

- **Why Play Matters for Development**
- Primary way young children learn about the world
- Supports cognitive, social, and language development
- Encourages curiosity and problem-solving

- **Role of Vision in Play**
- Guides reaching, grasping, and manipulation of objects
- Supports imitation of actions and social play
- Helps children observe cause and effect

- **Exploration and Learning**
- Visual observation encourages discovery
- Interaction with objects builds concepts and vocabulary
- Shared play experiences support communication

Case Studies and Real-World Examples: Three short child profiles showing

A child with CVI

Child Profile

- Age: 20 months
- Diagnosis: Cortical Visual Impairment
- Medical History: Premature birth with neurological complications
- Observed Behaviors
- Inconsistent visual attention to faces and objects
- Difficulty locating items in visually complex environments
- Preference for movement and brightly colored objects

Continuation

Communication and Language Impact

- Limited use of joint attention
- Reduced imitation of facial expressions and gestures
- Relies more on auditory cues and familiar routines

Intervention Strategies

- Reduce visual complexity in the environment
- Present objects with high contrast and movement
- Pair visual input with tactile and auditory cues

A child with delayed vision screening

Child Profile

- Age: 2 years
- History: No vision screening completed during infancy
- Referral: Early Intervention due to delayed speech
- Observed Behaviors
- Limited contact during interaction
- Difficulty identifying objects in books or pictures
- Reluctance to engage in visually guided play

Continuation

Communication and Language Impact

- Reduced vocabulary development
- Limited pointing or gesture use
- Difficulty linking words to objects in the environment

Intervention and Outcome

- Vision screening identified moderate refractive error
- Corrective lenses prescribed
- Increased visual engagement and vocabulary growth with early intervention

Language Challenges and Observed Outcomes

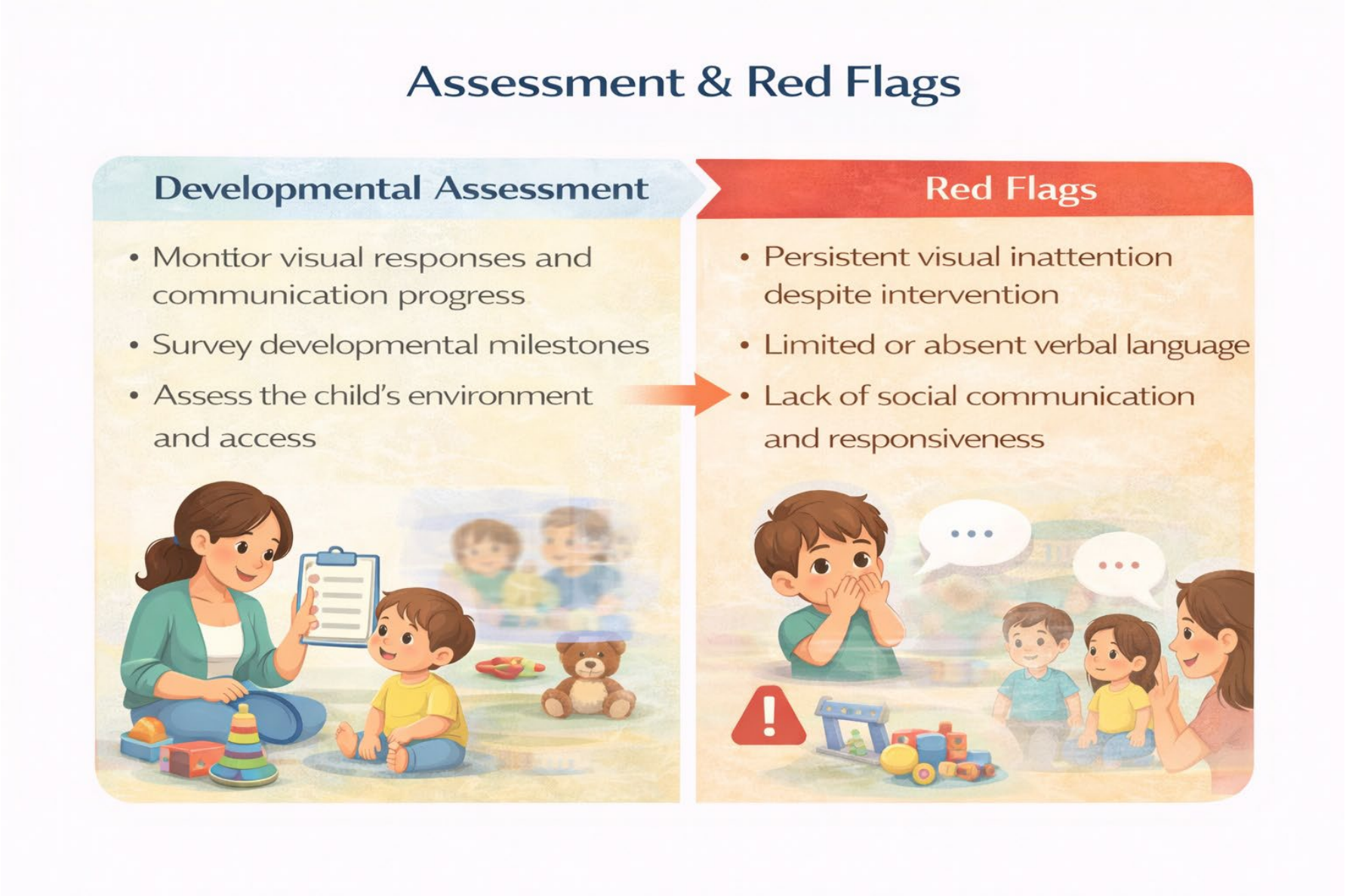
Common Language Challenges

- Reduced joint attention with caregivers
- Delayed vocabulary development
- Limited use of gestures or pointing
- Difficulty connecting words with objects or actions

Observed Outcomes with Support

- Increased engagement during interaction
- Growth in receptive and expressive vocabulary
- Improved shared attention and turn-taking
- Greater participation in play and communication

Assessment & Red Flags



Signs that Vision might be affecting Communication

- Limited eye contact during interaction
- Difficulty maintaining visual attention
- Inconsistent response to visual stimuli

Communication Indicators

- Reduced use of gestures such as pointing or showing
- Difficulty following another person's gaze or pointing
- Delayed vocabulary development

Interaction Indicators

- Limited interest in picture books or visually guided play
- Difficulty recognizing faces or expressions
- Relies heavily on auditory or tactile cues

Red Flags for Referral (Speech-Language or Vision)

Speech-Language or Vision Evaluation

Vision Referral Indicators

- Difficulty making or maintaining eye contact
- Inconsistent visual attention to people or objects
- Trouble locating or tracking objects
- Limited interest in visually guided play or books

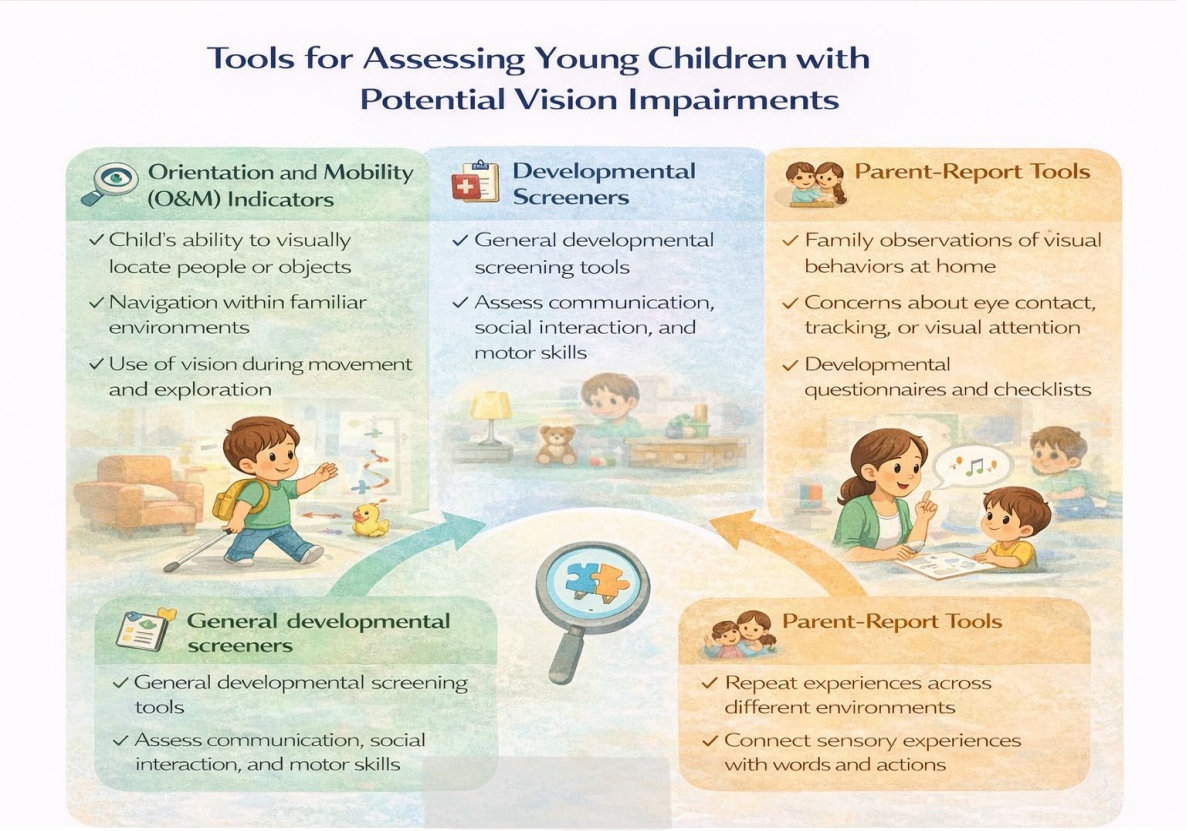
Speech-Language Referral Indicators

- Limited babbling or vocalization by 12 months
- Few Words by 18-24 months
- Difficulty understanding simple directions
- Limited use of gestures (pointing, waving, showing)

When to Consider Both Referrals

- Delayed joint attention
- Limited engagement during interaction
- Difficulty connecting words with objects or actions

Tools and Checklists (e.g., O&M, Developmental Screeners, Parent-Report Tools)



Orientation and Mobility (O&M) Indicators

- Child's ability to visually locate people or objects
- Navigation within familiar environments
- Use of vision during movement and exploration

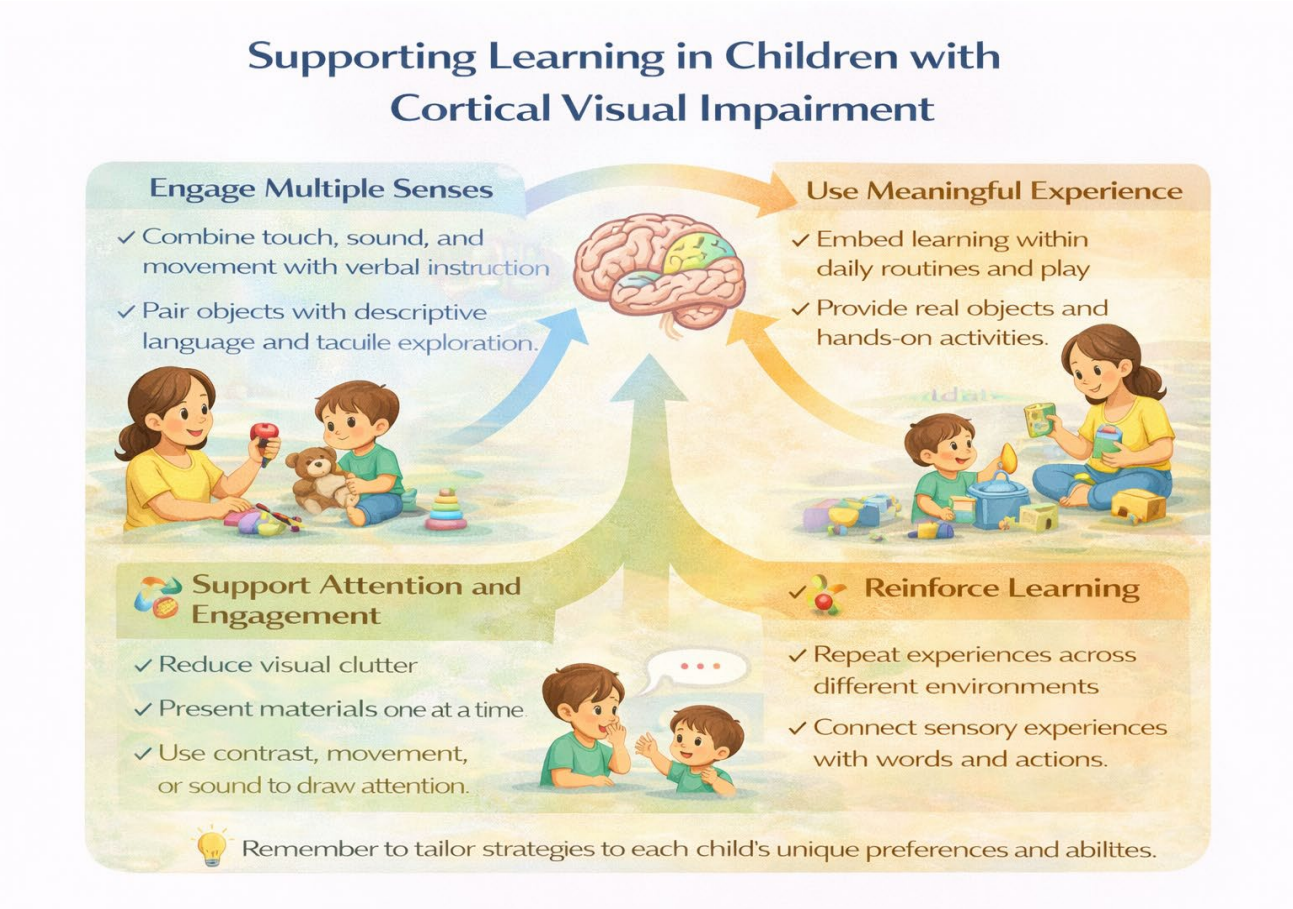
Developmental Screeners

- General developmental screening tools
- Assess communication, social interaction, and motor skills
- Help identify potential vision-related developmental concerns

Parent-Report Tools

- Family observations of visual behaviors at home
- Concerns about eye contact, tracking, or visual attention
- Developmental questionnaires and checklists

Supporting Language Development in Children with Vision Impairment



Strategies for: Enhancing Multisensory Learning

Engage Multiple Senses

- Combine touch, sound, and movement with verbal instruction
- Pair objects with descriptive language and tactile exploration

Use Meaningful Experience

- Embed learning with daily routines and play
- Provide real objects and hands-on activities

Support Attention and Engagement

- Reduce visual clutter
- Present materials one at a time
- Use contrast, movement, or sound to draw attention

Reinforce Learning

- Repeat experiences across different environments
- Connect sensory experiences with words and actions

Supporting Joint Attention Without Vision

Use Auditory Cues

- Call the child's name before speaking
- Use varied tone and expressive voice
- Pair sounds with objects or actions

Incorporate Touch and Movement

- Gently guide the child's hands to objects
- Use hand-under-hand exploration
- Encourage shared tactile experiences

Create Shared Experiences

- Narrate activities during play and routines
- Use consistent verbal cues to direct attention
- Repeat familiar interactions

Using Tactile and Auditory Cues

Tactile Cues

- Allow children to explore objects through touch
- Use hand-under-hand guidance to support learning
- Provide materials with different textures, shapes and sizes

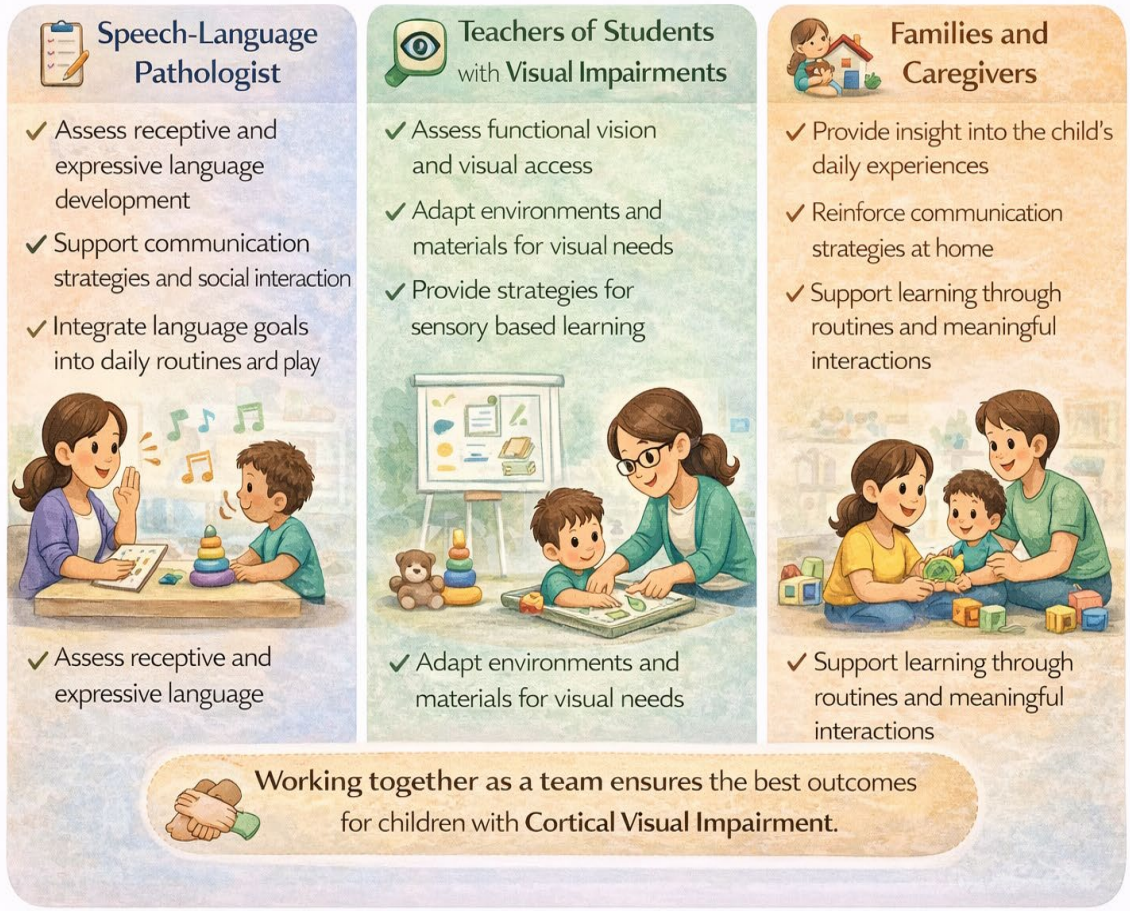
Auditory Cues

- Pair objects and actions with clear verbal labels
- Use sound cues to attract attention to people or activities
- Emphasize tone, rhythm, and repetition in speech

Supporting Communication

- Combine touch, sound and language during interaction
- Narrate actions during play and daily routines
- Encourage active participation and exploration

Collaboration with SLPs, TVIs, and Families



Speech-Language Pathologist

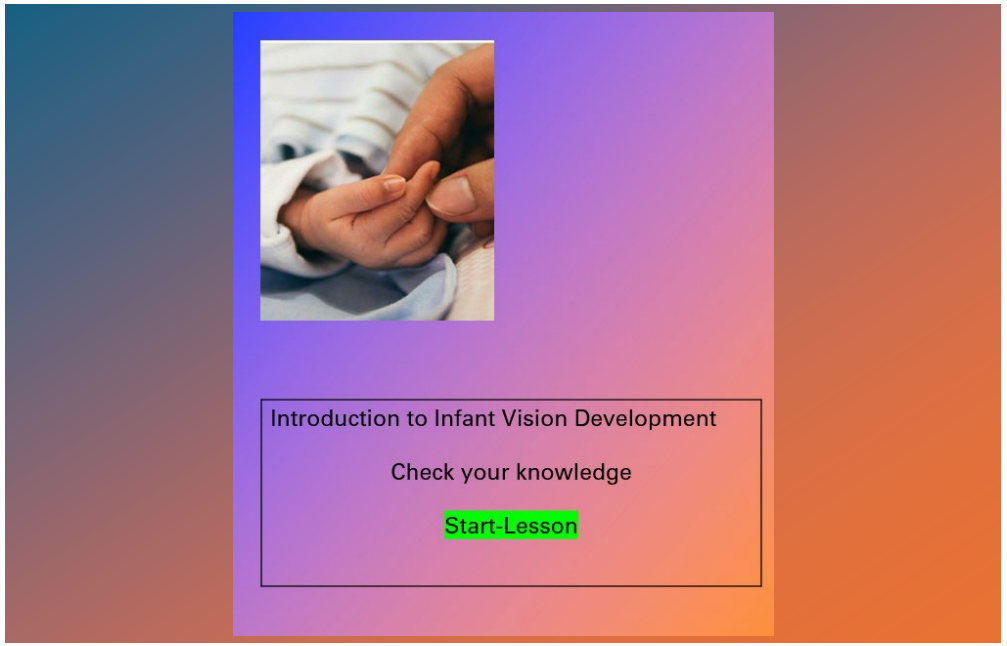
- Assess receptive and expressive language development
- Support communication strategies and social interaction
- Integrate language goals into daily routines and play

Teachers of Students with Visual Impairments

- Assess functional vision and visual access
- Adapt environments and materials for visual needs
- Provide strategies for sensory-based learning

Families and Caregivers

- Provide insight into the child's daily experiences
- Reinforce communication strategies at home
- Support learning through routines and meaningful interactions



Birth to 3 Years Program

Purpose of Early Intervention

- Supports infants and toddlers with developmental delays or disabilities
- Focuses on children birth to 3 years of age
- Promotes development in natural environments

Key Areas of Support

- Communication and language development
- Vision and sensory development
- Cognitive and social-emotional growth
- Motor and adaptive skills

Interdisciplinary Services

- Early Intervention specialists
- Speech-Language Pathologists
- Teachers of Students with Visual Impairments
- Occupational and Physical Therapist

Family-Centered Practices & Early Intervention

Partnering with Families

Family-Centered Practice

- Recognize families as the child's first teachers
- Respect family knowledge, culture, and priorities
- Build trusting, collaborative relationships

Supporting Families

- Share information about the child's development and needs
- Provide practical strategies for daily routines
- Encourage active participation in intervention

Empowering Caregivers

- Coach families to support communication and learning
- Reinforce strengths and successes
- Promote confidence in supporting their child's development

Coaching Strategies in Natural Environments

Learning Within Daily Routines

- Embed strategies into mealtime, play, and caregiving routines
- Use familiar activities to support communication and development

Modeling and Guided Practice

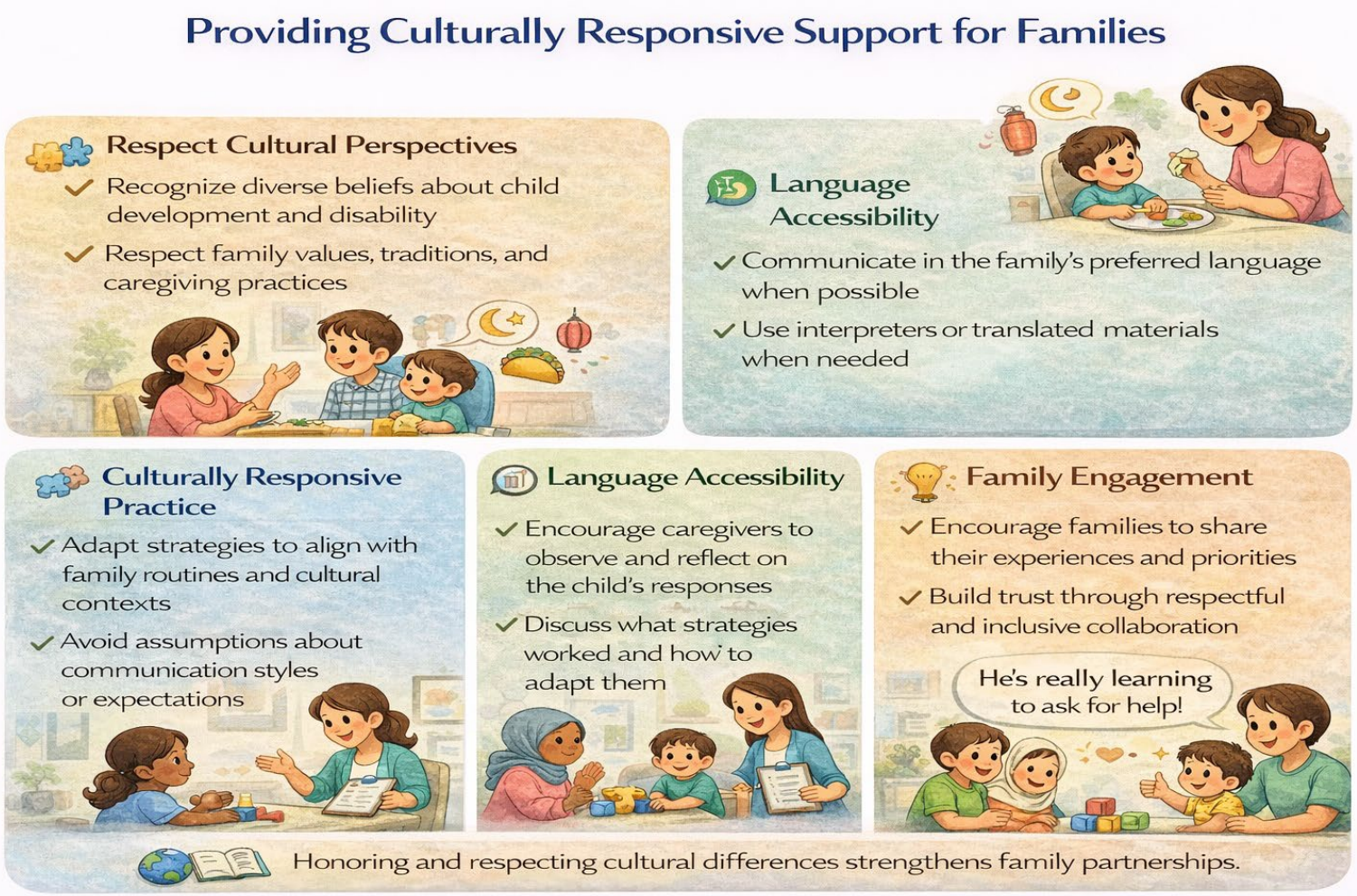
- Demonstrate strategies during real-life interactions
- Provide opportunities for caregivers to practice with support

Reflective Coaching

- Encourage caregivers to observe and reflect on the child's responses
- Discuss what strategies worked and how to adapt them

Building Caregiver Confidence

- Reinforce strengths and progress
- Provide practical, achievable, strategies for home use



Cultural and Linguistic Considerations

Respect Cultural Perspectives

- Recognize diverse beliefs about child development and disability
- Respect family values, traditions, and caregiving practices

Language Accessibility

- Communicate in the family's preferred language when possible
- Use interpreters or translated materials when needed

Culturally Responsive Practice

- Adapt strategies to align with family routines and cultural contexts
- Avoid assumptions about communication styles or expectations

Family Engagement

- Encourage families to share their experiences and priorities
- Build trust through respectful and inclusive collaboration

Vis-CAT®

The Visual Cognition Assessment Tool

Early Detection of Visual Processing Difficulties Made Simple

1 in 5 kids | Hidden Visual Processing Difficulties

520K Children in Australia | 150M+ Globally

Delayed Detection = $30K Remediation Costs/Child

Fast | Affordable | Game-like | Evidence-based

Test < 4 minutes | No specialist required

Successfully Integrated in

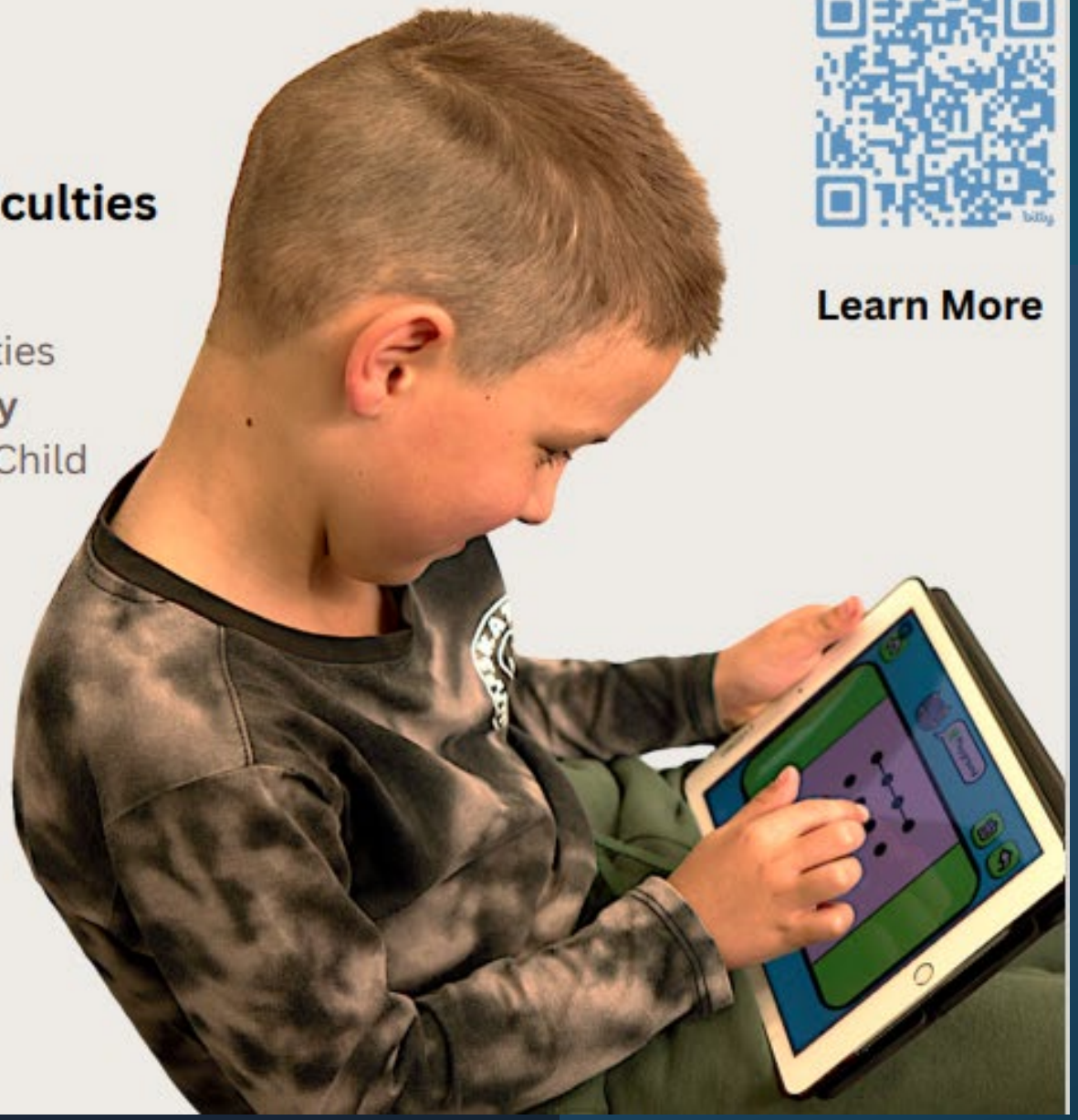
Schools | Clinics | Homes

"Essential, quick, easy to administer, simple to use." **94% Children *"had fun"***

Christine Nearchou

Founder | CEO

Giving Every Child a Clearer Path to Learning Through Early Testing



Learn More

Sound Scouts - the Auditory Assessment Solution

Designed to identify hearing loss & listening difficulties in noise

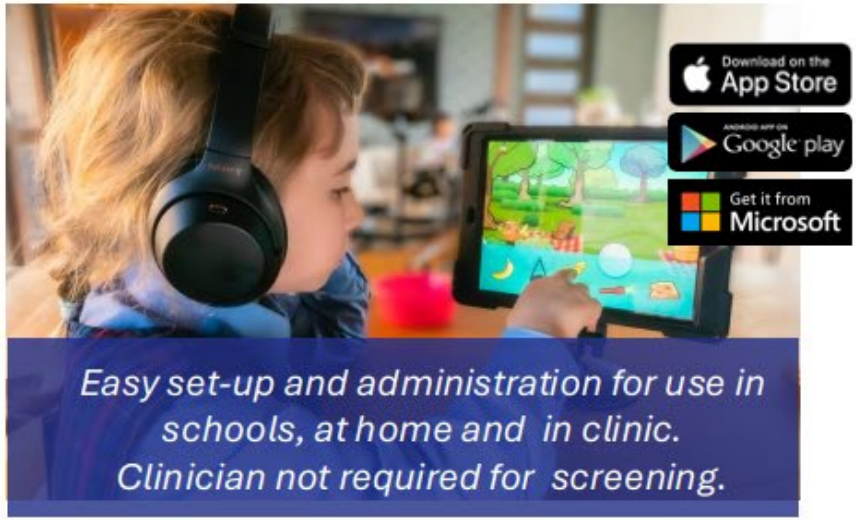
Sound Scouts™
Hear for your future.

Sound Scouts – download app and start testing

Includes: two evidenced-based triage tools to identify hearing related barriers to learning before they manifest as behavioural or academic 'failures', with an estimated 1 in 10 children affected

Triple Factor Hearing Screener (4+yrs; test time 7mins)
- Identifies hearing loss and indicates type: including conductive, sensorineural and listening difficulties in noise
- Scalable, fun, instant results with active internet

Automatic Audiometer (3+yrs; test time 4.5 mins)
- Gamified pure tone test with audiogram output
- Identify level of loss across frequencies
- Adjustable screening settings



Easy set-up and administration for use in schools, at home and in clinic.
Clinician not required for screening.

APD Suite - Clinical toolkit to diagnose underlying cause of listening difficulties in noise. LiSN-S, DDdT, DigiSpan and more!

Q&A

Dr. Angel Perez

Florida and Virgin Islands Deafblind Collaborative

perez.angelea@ufl.edu