Brain-Based Visual Impairment and AAC

Approaches for Success

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- Attendees will develop a basic understanding of CVI - causes, visual functioning, and related information

-Attendees will gain knowledge of the communication and language challenges associated with CVI

- Attendees will learn appropriate AAC modifications and strategies for implementation for children with CVI

The Importance of Vision for Development

- Motivation
- Social interaction and communication
- Provides information about the environment
- Aids in future learning
- A key "distance sense"

Typical Vision

Can shift focus

Improved hand/eye coordination

Shows interest in small, bright, objects

Attempts to move toward objects in visual field

Recognizes familiar faces

Mouths and looks at objects in hand

Typical Language

Can discriminate among sequences of sounds

Variety of vocalizations increases

Vocalizes excitement and pleasure

Uses sounds and gestures to indicate wants

Ocular Impairment Versus Brain-Based Visual Impairment

Definitions

Impaired vision that is due to bilateral dysfunction of the optic radiations or visual cortex or both. It can coexist with ocular and ocular motor disorders and can be the result of perinatal brain dysfunction or be caused by trauma.

- Approximately 30%-40% of children with visual impairments have CVI.

- Children with brain-based visual impairment make up the majority of the caseloads of teachers of the visually impaired.

American Printing House for the Blind, 2008 http://tech.aph.org/cvi/wp-content/uploads/2015/01/Statement-on-Cortical-Visual-Impairment.pdf).

But what is Cerebral Visual Impairment?

- Many names and a few definitions
- Traditional definition notes that the eyes are "normal"
- Not always diagnosed or misdiagnosed
- Complex
- Not widely accepted as a problem
- Features a number of common characteristics, but a wide spectrum of behaviors, challenges and abilities
- Is generally accepted as "getting better" or "improving"

Who has CVI ? and Why do they have it?
Populations at Risk

- Cerebral Palsy
- Hydrocephalus   Seizures
- Neonatal encephalopathy   Mitochondrial Disease
- Neonatal hypoglycemia
- Brain tumor
- Traumatic brain injury
- Genetic disorders
- Neonatal systemic infections

Also populations with developmental delay, prematurity!
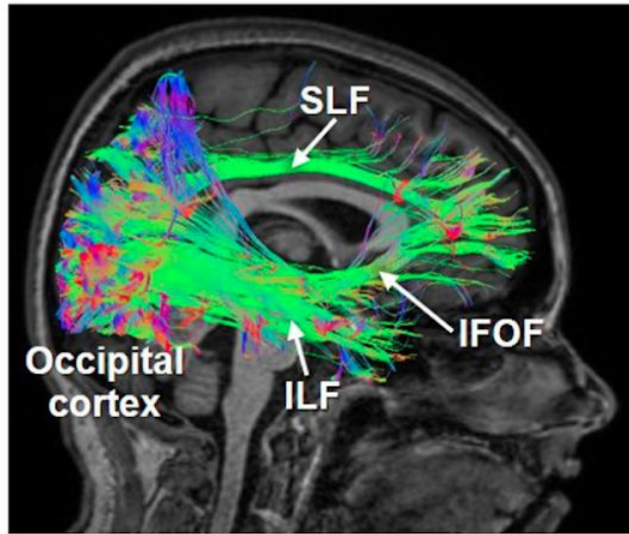
A Disorder of Information Processing
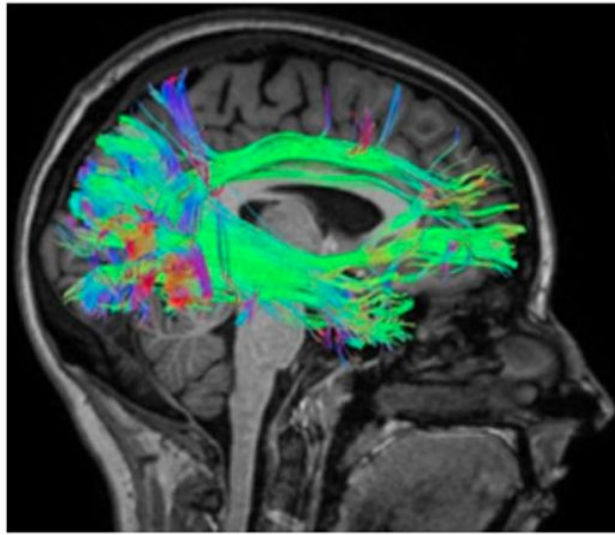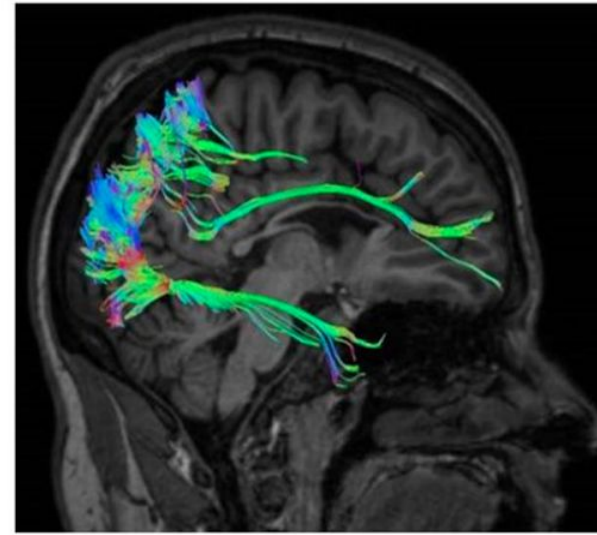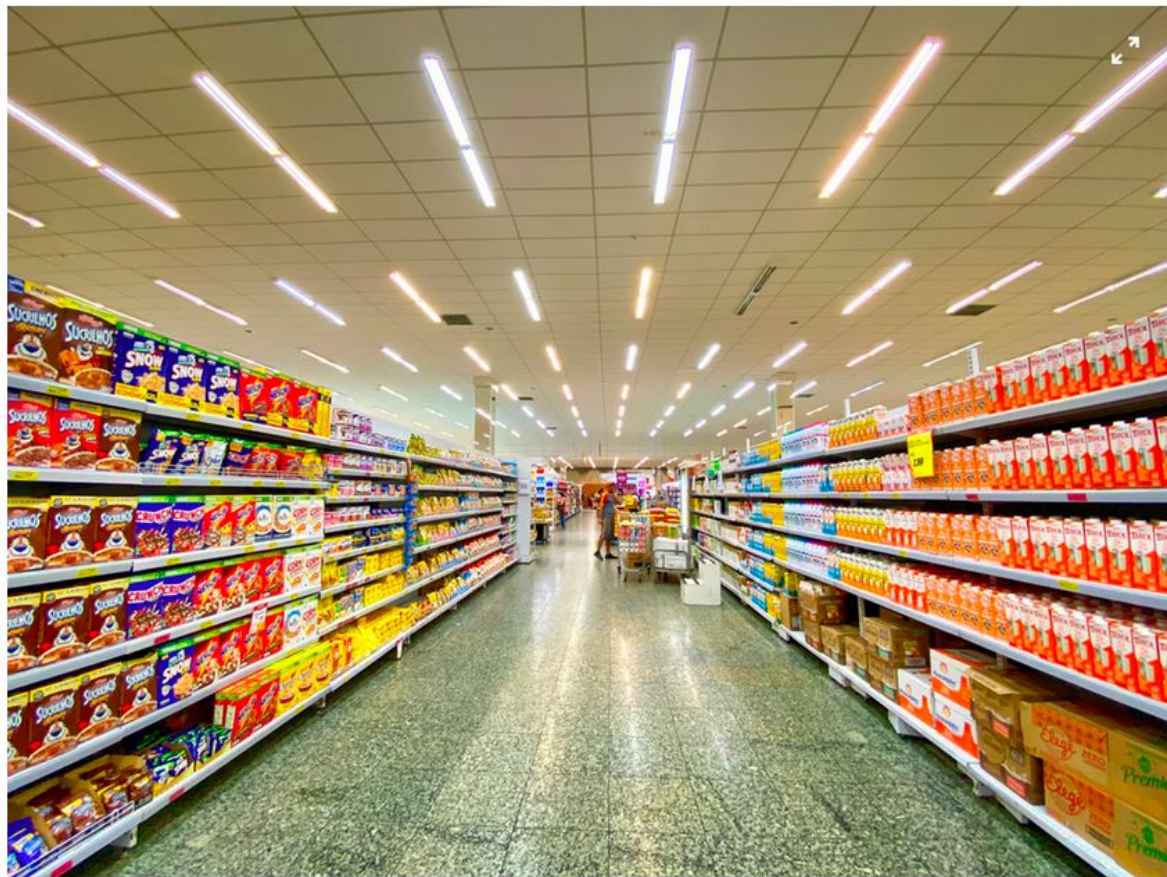
Grocery Shopping

Manifestations of CVI

Variable, poor or atypical response to visual stimuli

Poor or inefficient use of visually guided motor movements

Delayed in visual response (latency)

Difficulty with distance viewing

Difficulty with new materials, environments

Preference or familiarity

Light gazing

Color preferences

Difficulty in busy environments and with busy materials

Preference for certain visual fields

Better visual performance with movement

Difficulty recognizing and labeling people, places, objects

Difficulty with spatial relationships and mapping

How do you know if a student has CVI? (if they have no formal dx)

Diagnosed conditions/Red Flags?

Challenges and abilities

Glasses? Why or why not?

Ability to attend

Movement

Children with CVI need

An ophthalmologist/optometrist

Holistic evaluations

Someone on the team with expertise in visual impairment and desirably CVI

Understanding of the barriers of sensory impairment

Visual Impairment and Communication

Blind children are delayed during sensorimotor development

Delayed object permanence
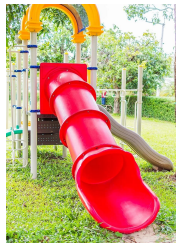
Delayed symbolic play

Delayed development of self-representation

Eye contact/reciprocal gazing

Barriers to interactive routines

Brain-Based Visual Impairment and Communication

Vision serves to organize and integrate incoming information from all senses

*Use their hands for self-stimulation instead of reaching out

*Rarely achieved or delayed in ability to reach an object presented through sound

*Find it difficult to separate themselves from environmental points of reference and contact

"When a child's visual impairment is associated with other impairments, the capacity to explore surroundings is profoundly limited" (Fazzzi, et al., 2015).

Approaches for Success

Proper management of CVI requires

● Holistic, multidisciplinary assessment and habilitation

Key elements to promoting habilitation are…

↪ **Promoting Visual Development**

↪ **Adapting materials and the environment**

Strategies for Learning

Access to familiar, repetitive activities

Beginning, middle and end (short durations)

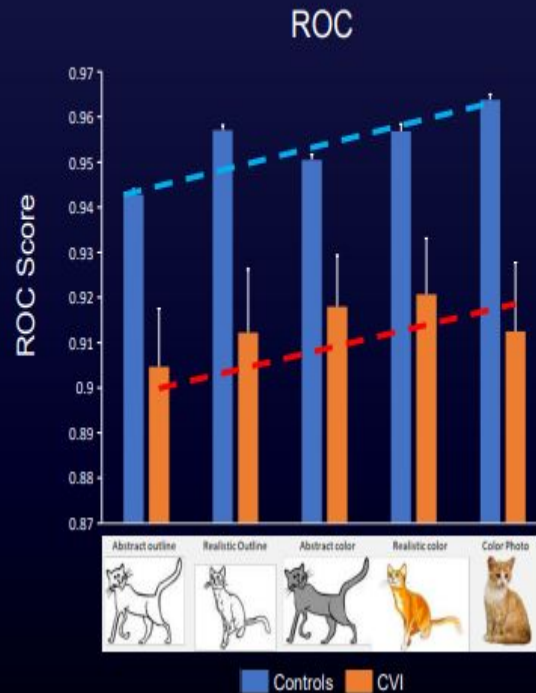Routines to locate spaces and activities
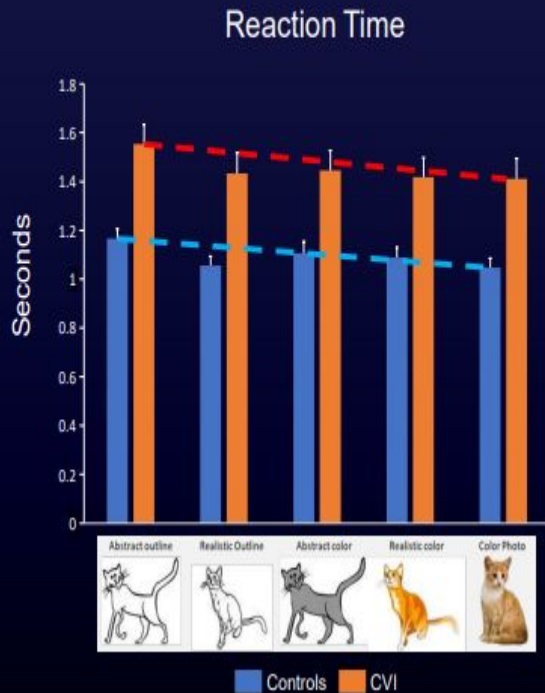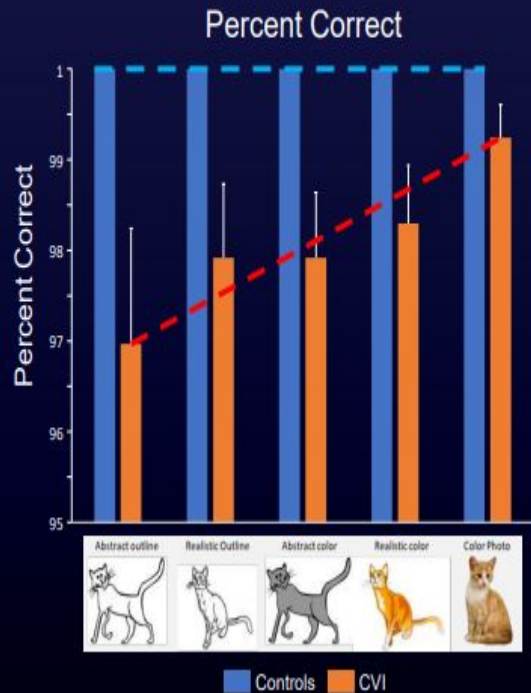
Familiar and adapted materials

Verbal and tactile cues associated with language concepts

2 D Image Study: Behavioral Performance

n=88, Controls=44 (mean age: 16.43 y.o), CVI=44 (mean age: 13.34 y.o), majority Category 3, Phase III

Social Interactions

Pragmatics related to response to faces
From CVI Profile Guide (Lueck, Chen,& Hartman, 2021)

Cannot recognize faces or facial expressions

Cannot recognize faces out of context

Cannot follow fast moving facial expressions

Cannot look at a face and listen at the same time.

Seeing versus recognizing

- Consider level of representation
  - 2 dimensional versus 3 dimensional
  - Concrete vs abstract
- Different representations and novelty
  - Are they able to recognize a cup in a variety of presentations
  - Can they only recognize their own familiar cup? Do they recognize it as a cup or by the color?
- Consider their preferred learning channel

Contrast

Reduced contrast sensitivity has an impact on how the individual sees and can cause an image to appear faded or washed out, like this example. It is possible to have perfect visual acuity but to have low contrast sensitivity. (CVI Scotland)

Consider the background on which objects, photos or communication symbols are placed

Visually Directed Reach

Challenges with visually directed reach may impact access to a SGD or even a voice-output switch.

Consider spacing, array size and motor planning to increase accuracy.

Consider increasing spacing or using alternate access on SGDs

Adapt switch placement to compensate - use strategies such as light or reflection to attract visual attention or consider placing switch where it can be easily accessed without need for visually directed reach allowing focus to be on visual stimuli such as toy.

Visual Clutter

"Children who have difficulties with visual clutter often have problems finding objects unless they are presented in front of a clear background. These difficulties increase the more background colors or forms blend in with the figures in the foreground." (Lueck & Dutton, 2015)

Clutter in Speech Generating Devices

- Clutter may also impact the array size on a communication device.
- May need to consider more spacing between images
- Reduce array size per page
- Use of alternative scanning methods such as a switch or auditory scanning.
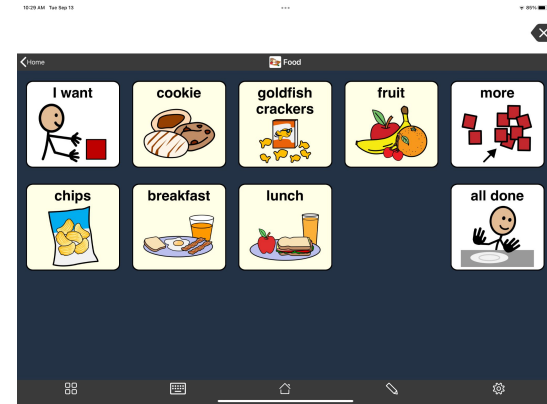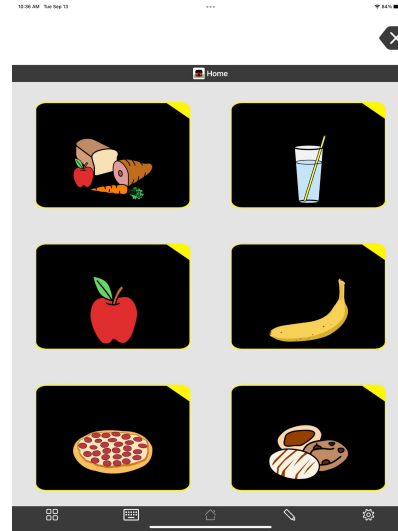
Area of Vision

Awareness of where the child sees best and if there is visual neglect or field cuts present

Considerations include:

Use of slant board to raise materials

Positioning of array in preferred field

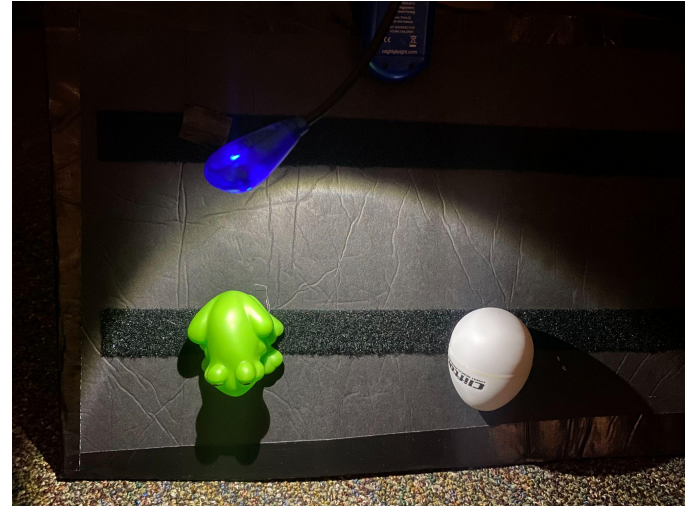*Use of vertical vs horizontal presentations*

Light as an adaptation

Use of a spotlight or backlit materials may help attract a child's gaze

Shifting the spotlight between objects rather than shining on all can help facilitate shift of gaze and encourage viewing the full array.

- Holistic and Multidisciplinary Assessment is Key!
- Always consider the child's vision!
- More severe the CVI ➡️ more likely it is the child will need alternatives to visual media!
- TSVI is responsible for teaching team about child's visual abilities!
- Balance need for vocabulary and spacing, visual reccs for the student's abilities

References

Dale, Salt, SArgent, & Greenaway (2022) Children with Visual Impairment: Assessment, Development, and Management. Mac Keith Press

Dale, N., & Sonksen, P. (2002). Developmental outcome, including setback, in young children with severe visual impairment. *Developmental medicine and child neurology*, *44*(9), 613-622.

Lueck, A. H., & Dutton, G. (2015). *Vision and the brain: Understanding cerebral visual impairment in children* (Vol. 2). Arlington, VA: AFB Press, American Foundation for the Blind.

Pérez-Pereira, M., & Conti-Ramsden, G. (2013). *Language development and social interaction in blind children*. Psychology Press.

Tadić, V., Pring, L., & Dale, N. (2010). Are language and social communication intact in children with congenital visual impairment at school age?. *Journal of Child Psychology and Psychiatry*, *51*(6), 696-705.

Resources

[Perspectives of Individuals with CVI "CVIers](#)   (Youtube)

Alternative & Augmentative Communication (AAC)/
Cortical Visual Impairment (CVI) Matrix:
Student-Centered Guidelines for AAC & Expressive Communication Development

An instrument for professionals and families to balance the results of Communication Matrix assessment
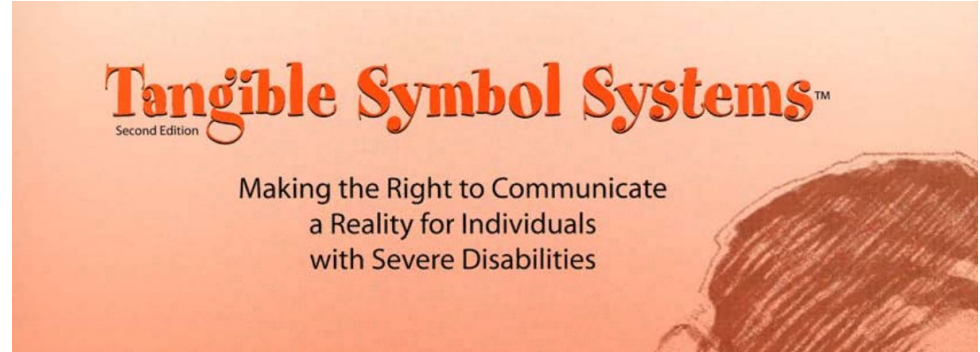(Rowland, 1996; Rev. 2004) with CVI Range assessment (Roman, 2007; Rev. 2018)

Developed by Christopher Russell & Jennifer Willis   CVI

https://www.perkins.org/cvi-and-the-ecc-focus-on-social-interaction-skills-2/#impact

www.cviscotland.org

Resources

Tangible Symbol Systems - Roland & Shweigert

CVI Companion Guide - Lueck, Chen, Hartman