

+ Natasha Huffine MS, OTRL, CBIS

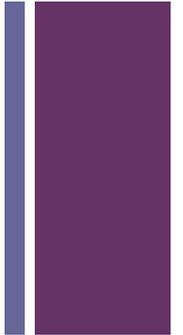
Kara Christy MS, OTRL, CBIS



Vision Therapy: Beyond Compensations and Addressing the Root of the Problem

+ Objectives

- **Understand vision diagnoses and the functional impact they play with B/IADLs**
- **Understand how to screen for common brain injury and stroke related vision deficits.**
- **Identify “shoe box” activities for each of the outlined vision diagnoses.**
- **Improve knowledge and understanding of commonly used vision therapy equipment.**
- **Utilize iPad applications for vision therapy treatment.**



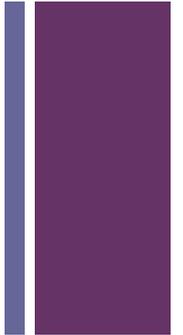
+ Components of Vision

- Accommodation (focus)
- Oculomotor
- Vergence skills (near work)
- Depth perception (driving)
- Peripheral vision
- Binocularity
- Visual spatial processing/ visual perceptual skills
- Visual attention



+ Objective 1

- Understand vision diagnoses and the functional impact they play with B/IADLs



+ Accommodation

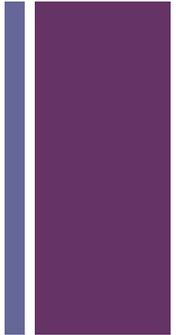
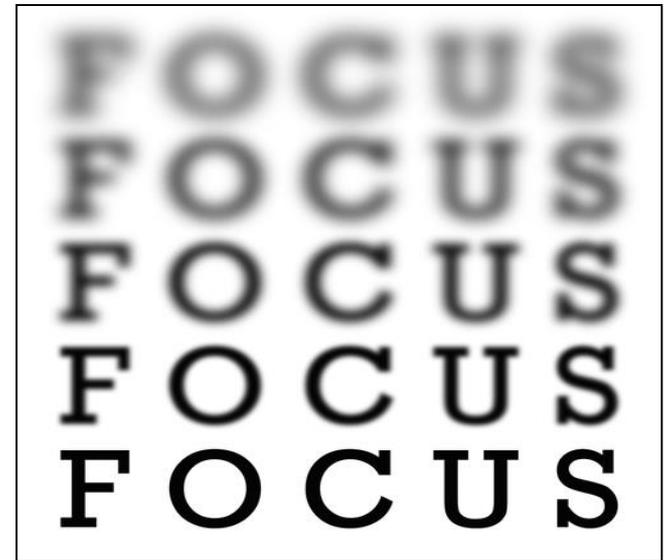
■ The automatic adjustment of the eye for seeing at different distances

■ Three Components

- Amplitude- Getting it clear
 - Can be a problem for many farsighted individuals who usually pass the far Snellen chart.
- Sustenance- Keeping it clear
 - Print comes into and out of focus, especially with fatigue.
- Facility- Changing focus from one distance to another.

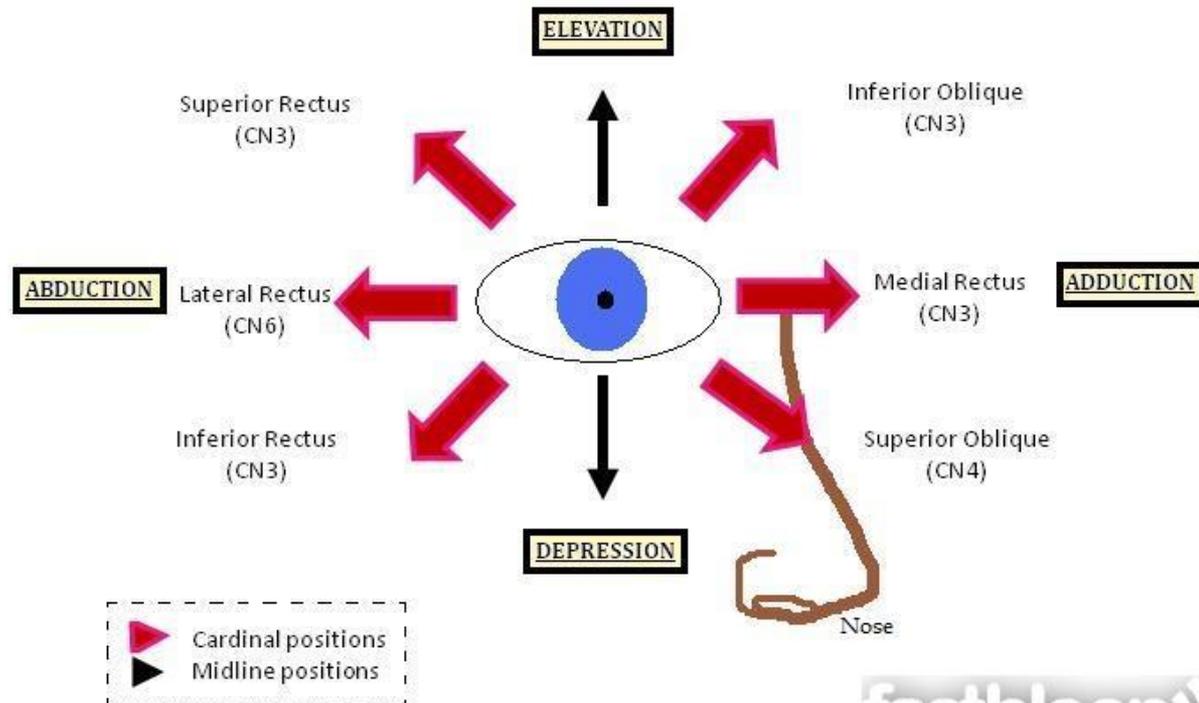
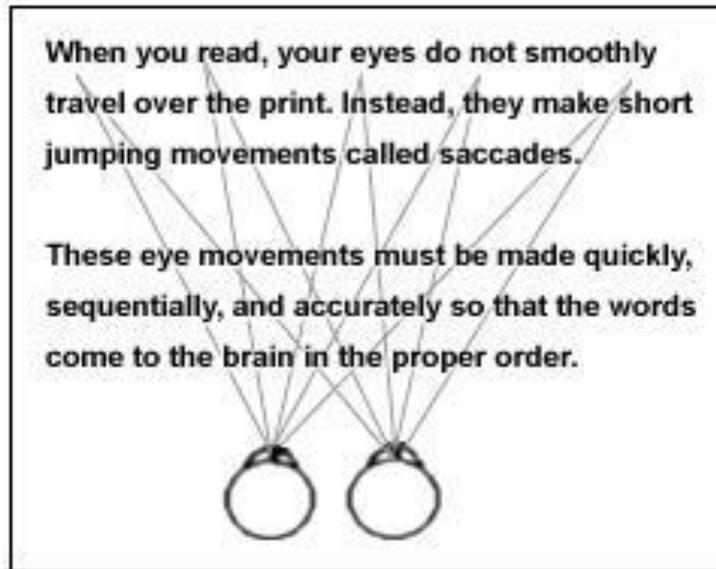
■ Function

- Ability to take notes in school shifting focus from white board to notebook
- Shifting visual focus from the speedometer in the car to traffic signs
- Ability to read directions on a recipe and then set the timer/oven temperature



+ Oculomotor

- Range of Motion
- Pursuits
- Saccades
- Function
 - Reading
 - Sports (tracking ball)
 - Giving attitude 😊





Vergence Skills

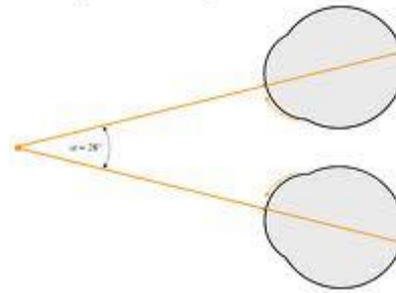
■ Convergence

- Required for near work
- Common to have difficulty with both accommodation and convergence
- CITT- Convergence Insufficiency Treatment Trial:
 - Compared in-office therapy, placebo, pencil push-ups, and home computer exercises.
 - Most effective= in office, followed by home computer
 - Pencils push-ups = placebo
 - **Scheiman, O.D., et al. (2005)**

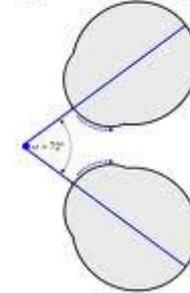
■ Function

- Sewing
- Reading pill bottles
- Dialing a phone

Convergence for a far target



Convergence for a near target



+ Vergence skills

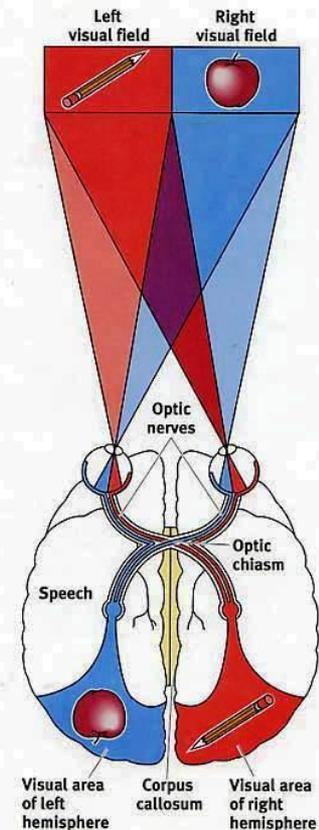
- Divergence
 - More strenuous/harder
- Vergence facility
 - Changing alignment at change in distance
 - Affects how quickly we can change our viewing distance
- Function
 - Playing board games
 - Packing medication box
 - Measuring ingredients
 - Reading labels in the grocery store





Peripheral Vision

- Important in moving about, speeds performance
 - Many times amblyopic (lazy) eye may be better at peripheral awareness.
 - Remember that visual fields overlap
 - Symptoms
 - May look like an eye movement disorder (doesn't track in certain quadrant)
 - bumping into things
 - decreased night vision
 - spatial insecurity
 - decreased body image
 - dry eye and low blink rate
- Function
 - Riding a bike
 - Sports (balance, awareness of other players)



+ Depth Perception

■ Binocular

- Stereopsis, or 3rd degree fusion
- Requires 2 eyes working together
- Brain uses retinal disparity to compare information from two differing points of view
- Lack of stereopsis leads to difficulty with coordination

■ Function

- Driving
- Stairs
- Getting into the bathtub
- Pouring liquids



+ Depth Perception

■ Monocular Cues

■ Superimposition

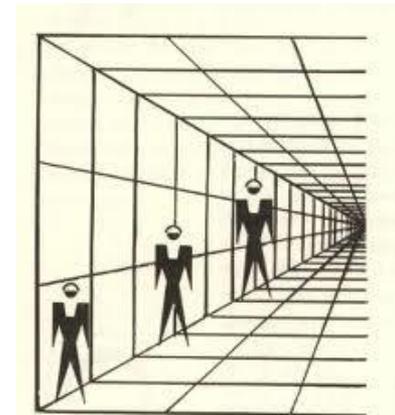
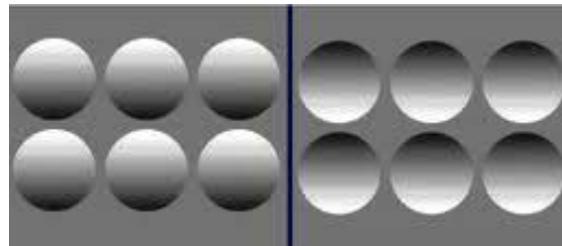
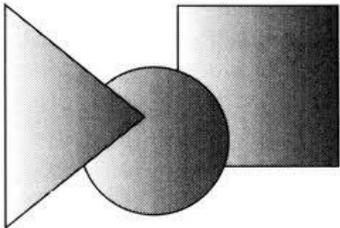
- When there are 2 overlapping objects, the overlapped object is considered further away (shapes)

■ Shadowing

- Highlights and shadows can provide information about an object's dimensions and depth. Our visual system assumes light comes from above. (balls)

■ Parallax

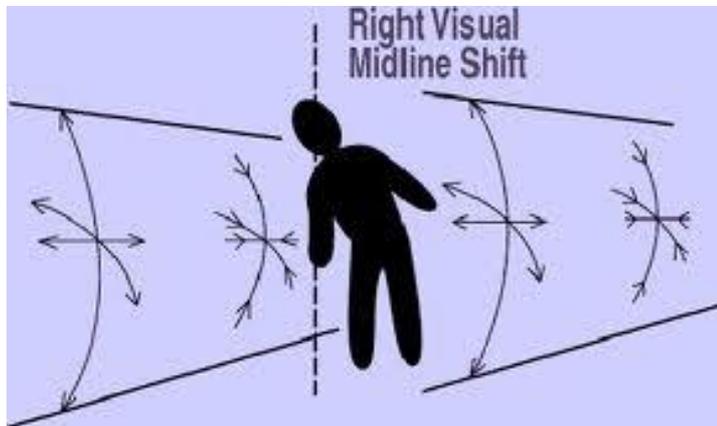
- Has to do with angles along line of sight. Nearby objects have a larger parallax than more distant objects.





Visual Midline Shift Syndrome

- A neurological event that often corresponds with hemiplegia and hemiparesis.
- The ambient visual process attempts to create a balance by expanding a concept of space on the unaffected side and compressing the concept of space on the other side.
- You may observe an individual leaning or tilting their head away from the neurologically affected side.
- Yoked Prisms can move the image to midline

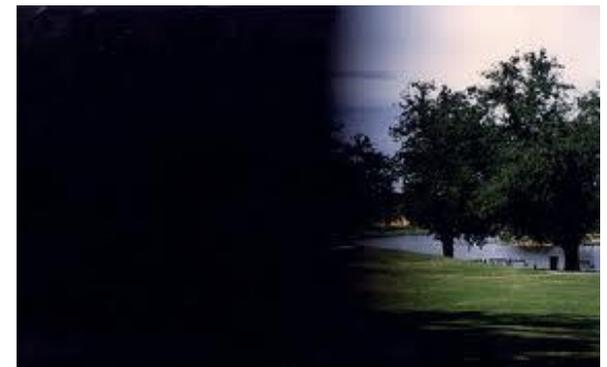
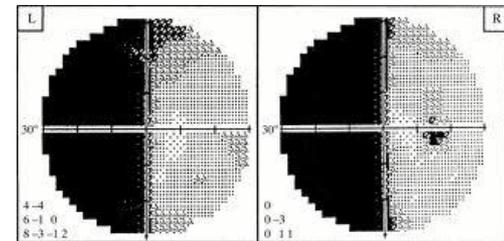


+ Visual Field Deficits / Neglect

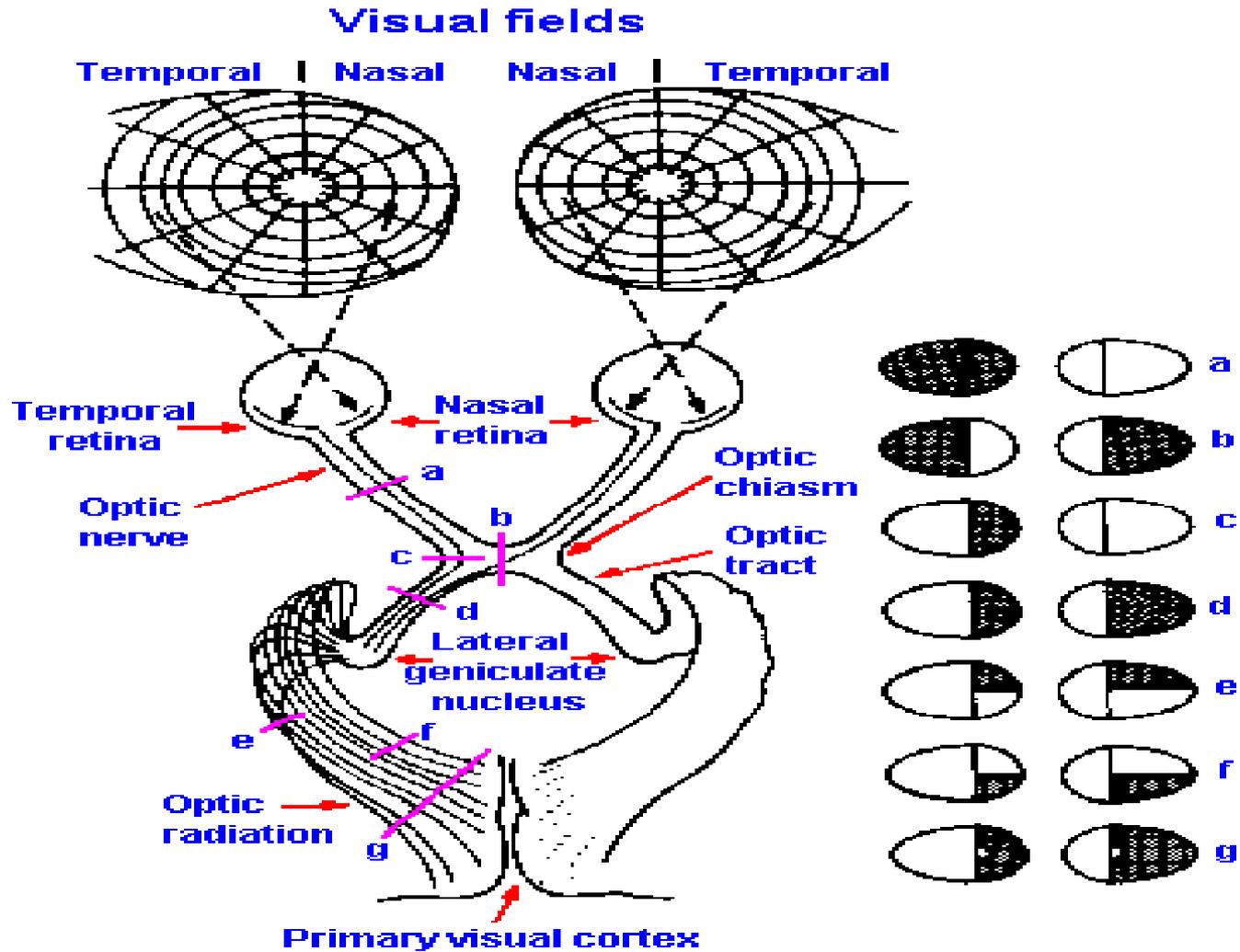
- Visual field deficit – a partial or complete loss of vision in the central and/or peripheral range of vision.
 - Homonymous hemianopsia
 - Homonymous quadrantanopsia
- Visual Neglect – a more severe form of visual inattention, often paired with a visual field deficit.

■ Function

- Walking
- Driving
- Riding Bike
- Cooking
- Shopping
- Writing



+ Visual Fields



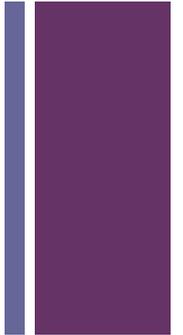
+ Visual Perceptual/Processing

- Visual information processing speed
- Figure Ground Perception
- Visual Closure
- Form Constancy
- Size and Shape Discrimination
- Visual memory and visualization

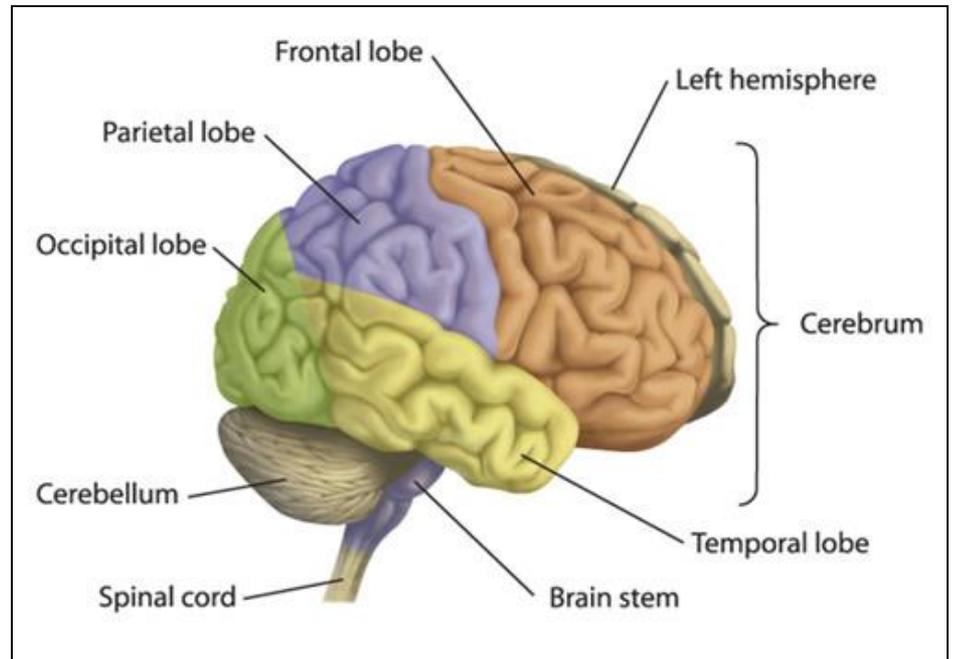




Area of Injury Corresponding to Visual Deficits

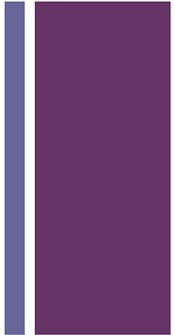


- Occipital Lobe
 - Primary visual cortex
 - Visual association cortex (analyzed for orientation, position, and movement)
 - Initiation of smooth pursuit eye movements
 - Visual field loss
- Brain Stem/Cerebellum
 - Dizziness
 - Balance





Area of Injury Corresponding to Visual Deficits

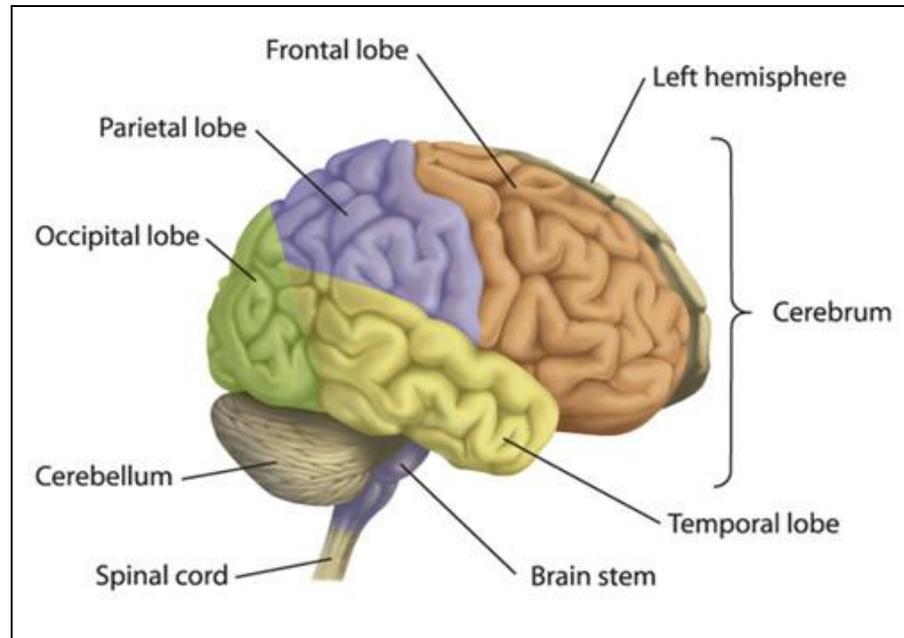


■ Frontal Lobe

- Saccades
- Attention

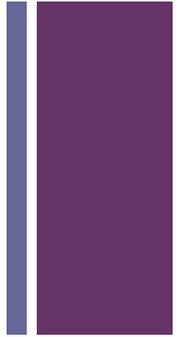
■ Temporal Lobe

- Combines sensory information associated with the recognition and identification of objects such as people, places, and things
- Processes visual information leading to visual recognition and language
- Hallucinations
- Object identification



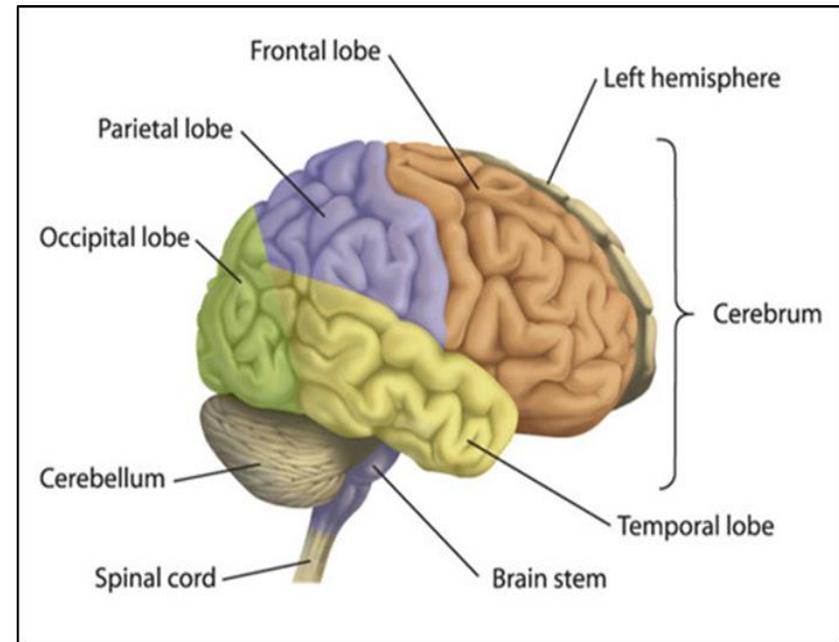


Area of Injury Corresponding to Visual Deficits



■ Parietal Lobe

- Locating Objects
- Eye Movements
- Drawing or Construction of Objects
- Amnesia for routes and location
- Difficulty moving through space
- Neglect





Steps for Vision Therapy:



■ Vision Screen

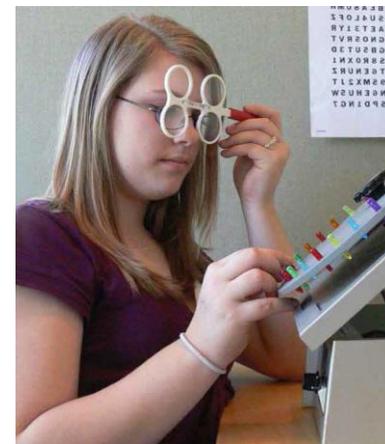
- Occupational Therapist
- Acuity, diplopia, suppression, visual fields, convergence, accommodation, saccades, pursuit

■ Behavioral Optometrist Evaluation

- Functional evaluation with OT present
- Goal is to determine if the visual system is effectively processing information for functional skills
- Prescribes vision therapy
- Visual fields test
- Visual Evoked Potential
- Important to medical clearance for driving
- Eye posture, stereo depth perception, suppression, diplopia

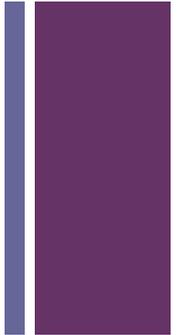
■ Vision Therapy Treatment

- OT follows prescription plan
- Developmental approach
- Tools and activities
- Discharge per Optometrist recommendations



+ Objective # 2

- Understand vision diagnoses and the functional impact they play with B/IADLs



+ Vision Screening

- The typical vision screening (utilizing the Snellen eye chart) only identifies about 5% of vision problems in children
- There are over 17 visual skills critical to reading and learning
 - Very important as it applies to therapy and rehabilitation



E	1	20/200
F P	2	20/100
T O Z	3	20/70
L P E D	4	20/50
P E C F D	5	20/40
E D F C Z P	6	20/30
FELOPZD	7	20/25
DEFFOTEC	8	20/20
LEFODPCT	9	
FFFLTQBO	10	
EEEOLOTTD	11	

+ Vision Screen (subjective)

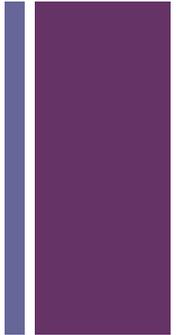
□ Client Reports:

- Headaches
- Dizziness
- Double vision
- Fatigue
- Difficulty reading (errors, decreased speed, loss of place)
- Red, sore, or itchy eyes
- Jerky eye movement, one eye moves in or out more than the other
- Head tilt or covering one eye when reading
- Avoiding near work
- Low self-esteem
- Temper flare-ups/ aggression/ irritability



+ Eye Strain and Fatigue

- Redness
- Watery Eyes
- Rubbing/Itching Eyes
- Tiredness and fatigue



+ Vision Screen

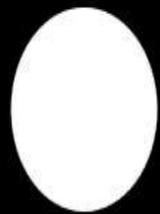
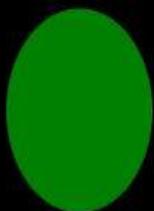
- **Visual acuity** – How clear it is. Screened using Snellen Charts for distance and near.
- **Accommodation** – The automatic adjustment of the eye for seeing at different distances. Screened using near acuity chart (or other reading material) and moving in until blurry.
- **Ocular pursuit** – The ocular motor skill of following a moving target with the eyes. Observe the client following a moving object such as a pencil eraser with their head still. Note lack of smooth movement, sluggish movement, overshooting or undershooting the target, and complaints of double vision or pain.
- **Saccadic eye movement** – quick, simultaneous movements of both eyes in the same direction. Ask client to alternate gaze between one object and another rapidly. Observe for undershooting, overshooting, or searching for the target.
- **Diplopia** – Another name for double vision. Note if this is in one area/quadrant only, or all the time.



+ Vision Screen

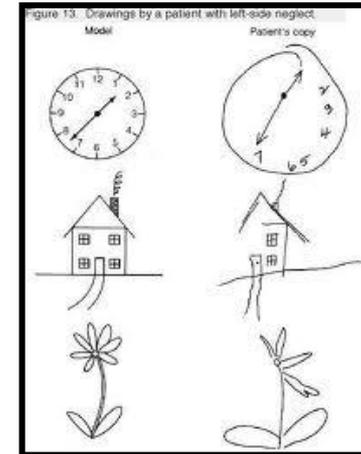
- **Convergence** – Coordinated movement of the two eyes so that the image of a single point is formed on corresponding retinal areas. Have the client follow an object (finger, pen, etc.) in toward their nose. Note distance from face when they cannot keep image single. Note if one eye breaks before the other. Approximately 4 inches is normal, however many can converge to the nose (TTN).
- **Visual scanning** – Coordinating eye movement in an organized fashion (efficient search pattern) while actively searching the environment for information (i.e. scanning a store shelf for a specific product, reading).
- **Depth perception** – The ability to determine the relative distance between objects, figures, or landmarks and the observer (i.e. the car in front of you or beside you when driving or parking a vehicle). Screened using the Stereo Fly Test or similar.
- **Suppression** – The neurological phenomenon of the brain's ability to disregard information from one eye; suppression frequently results following prolonged double vision, and is thought a natural adaptation of the brain to try and make sense of the information received from the eyes. Tested through red/green activities such as the Worth 4 Dot Test.





+ Vision Screen

- Visual field –visual field deficit is an inability to see objects located in a specific region of the field of view ordinarily received by each eye. Have client sit facing forward , gaze at an object in front of them. Standing behind them, have them tell you when they can see an object approaching from their side vision (left, right, superior and inferior fields). We use long dowels with white tips.
- Visual Neglect – Baking Tray Task (BTT) – clients place 16 blocks of wood on a 50 cm x 75 cm board in as symmetrical a layout as possible – as if cookies on a baking tray. Individuals with neglect will skew placement of the blocks. (functional tasks such as baking cookies or making a pizza can elude to neglect).
- Visual Spatial – Use the tip of a pen to touch the eraser of a pencil in all planes
- Midline Shift – move a dowel from side to side, instructing the client to tell you to stop moving the dowel when the dowel is exactly at the center of their vision.
- Visual Perceptual Assessments (motor-reduced and visual motor)
- Developmental Test for Visual Perception – Adolescent and Adult (DTVP-A)
- Brain Injury Visual Assessment Battery for Adults (BiVABA)



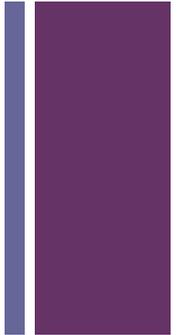


Facts to Consider

- 7 out of 10 juvenile delinquents have vision problems which are affecting their performance in the classroom.- California Department of Youth Authority
- American Optometric Association:
 - 1 out of 4 children have an undiagnosed vision problem that interferes with their ability to read and learn.
 - Over 60% of children with a learning disability (LD) have undiagnosed vision problems.
 - *Again : 90% of individuals post-TBI experience visual deficits.*

Role of OT

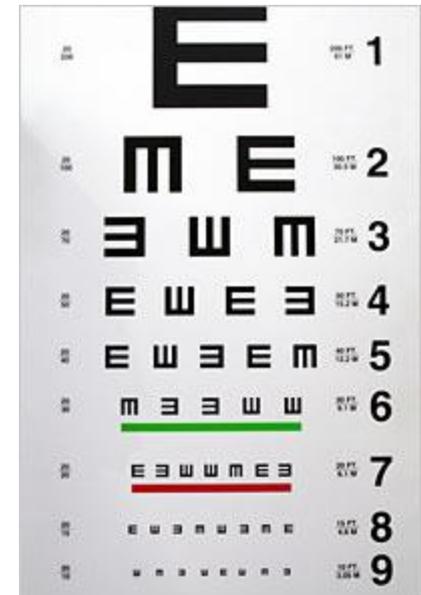
- Educate
- Refer to a vision specialist
- Address through functional activities





Optometry vs. Ophthalmology vs. Behavioral or Neuro Visual Optometry

- Optometrist - An optometrist is a Doctor of Optometry (not to be confused with a Doctor of Medicine, an M.D.). They examine the eyes for visual problems, disease, and abnormalities. They may prescribe drugs, lenses, and vision therapy.
- Ophthalmologist – A medical doctor dealing with pathology, physiology, and anatomy of the eye, includes medical and surgical treatments of disorders.
- Behavioral Optometrist – specialize in vision therapy and prism lenses, which is an expanded area of optometry. Theory tends to be holistic and functionally based.



+ History

- Vision therapy came about in the 1930's and 1940's when A.M. Skeffington developed an integrated model of vision.
- Vision therapy was much more common in the 1950's and 1960's.
- In the 1970's the profession of optometry became much more medically oriented (glaucoma, minor surgery, etc.)



+ Research & Vision Therapy

- Vision therapy cannot correct **all** visual deficits
- Research on VT suggests potential improvement in the following areas:
 - Ocular motility (**eye movement disorders**)
 - Non-strabismic binocular disorder (**eye teaming**)
 - Strabismus (**misalignment of eyes**)
 - Accommodative disorders (**focusing disorders**)
 - Information processing/visual-motor dysfunction



+ Vision Therapy

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz

Hoft @rn hoBy kelm @roe peurot. lx
rish. @op fult hurs lim k@eph thoz



- Following a comprehensive eye examination, if spectacles and lenses cannot correct visual conditions alone, visual exercises will be prescribed and monitored by the behavioral optometrist.

- Origami's clients typically receive vision therapy 2-3x/week for 4-6 months with a home vision exercise program issued upon discharge.



+ Objective #3

- Identify “shoe box” activities for each of the outlined vision diagnoses.



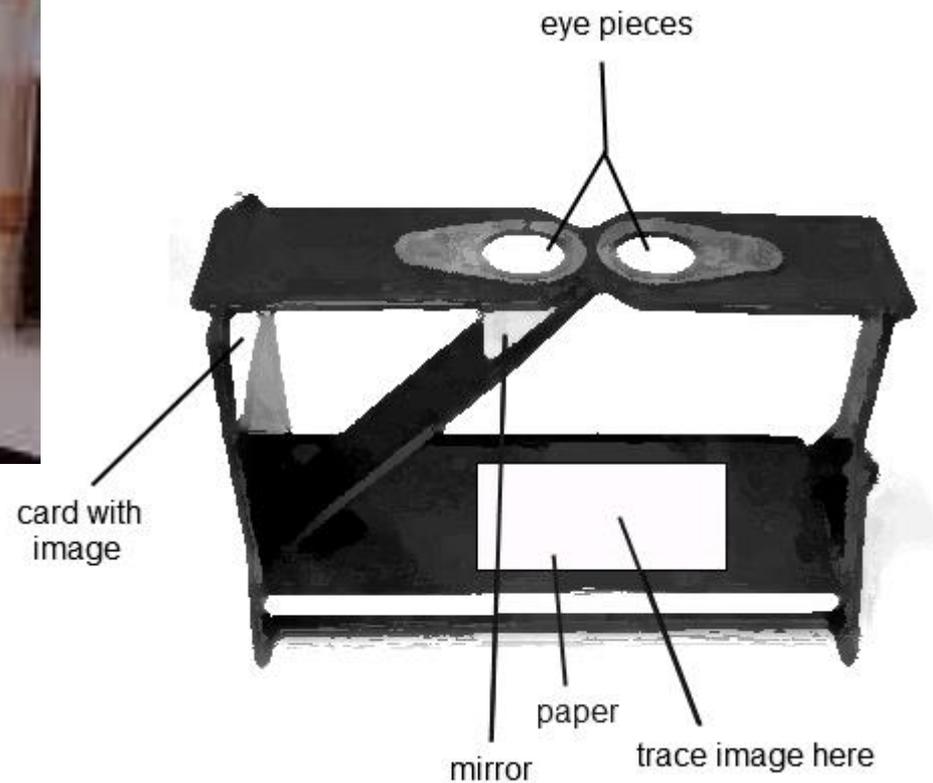
+ “Shoe Box” Activities

- Bean bags
- Laser pointer/flashlight tag
- Puzzles
- Paper/pencil
- Board games
- Cards
- I Spy, Where’s Waldo, etc.
- Tweezers and rice
- Door Jambs
- Beads and string
- Yard Games
- Models
- Sewing
- Peg/bead patterns
- Color by number
- Making potholders
- Toothpicks in straws
- Mock Wayne Saccadic



+ Objective #4

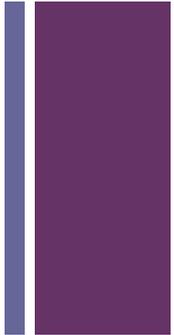
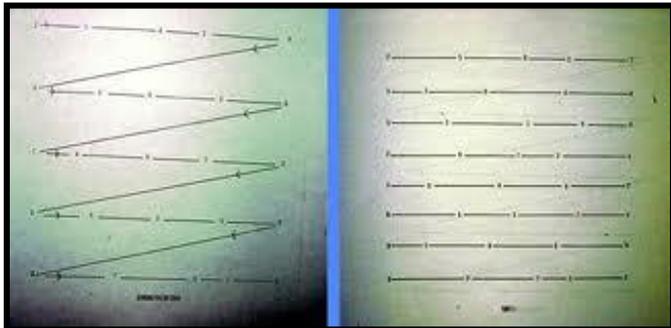
- Improve knowledge and understanding of commonly used vision therapy equipment.



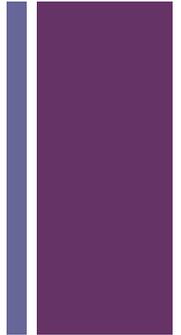


Treatment Oculomotor Skills

- Word finds, mazes, dot-to-dots, tracing , hidden pictures
- Letter cancellation
- Tracing
- Dynavision/Vision Coach/Wayne Saccadic Fixator
- Marsden Ball
- King Devicks
- Letter Tracking (i.e. Ann Arbor Letter Tracking)
- Picture charts
- Columns Chart
- Puzzles
- Line discrimination
- Balloon Batting
- Nintendo Wii Big Brain Academy
- Saccadic sticks



+ Anti-Suppresssion

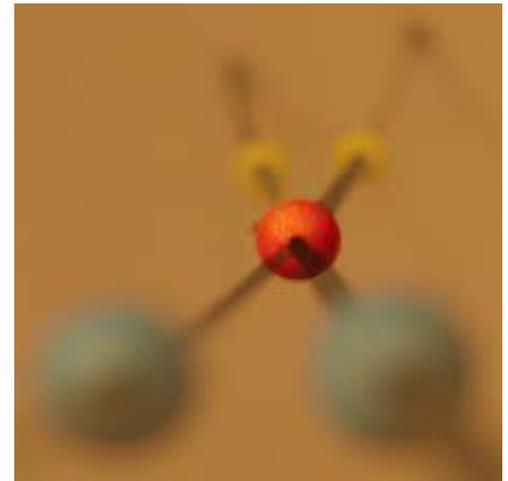
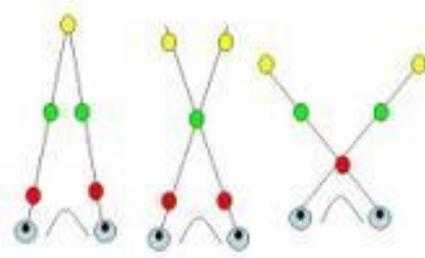
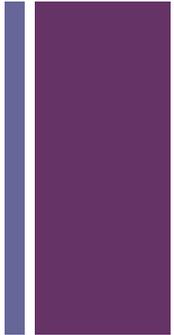


- Near/ Far GTVT Charts
- Red/Green Bar Readers
- Red/Green TV Filters
- Red/Green Playing Cards (Sherman)
- Carl's Cards
- 3D Tranaglyph Rings
- Brock Mazes
- Sports Vision Slides
- Marsden Ball



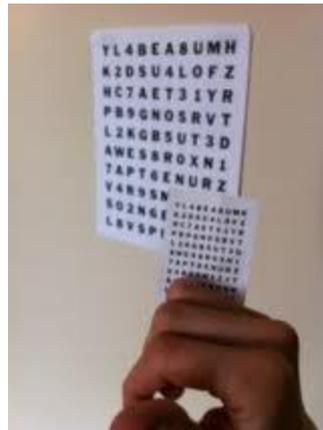
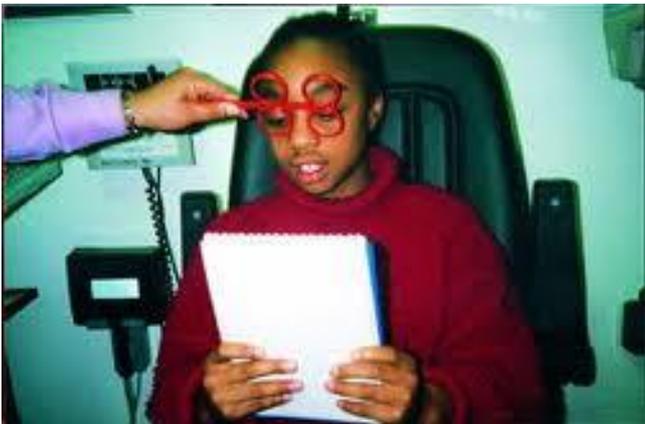
+ Convergence/Divergence

- Brock String
- Aperture Rule
- Flashlight Mazes
- Tranaglyph/Vectogram slides
- Prisms
- 3D Tranaglyph Rings
- Cheiroscope Trainer



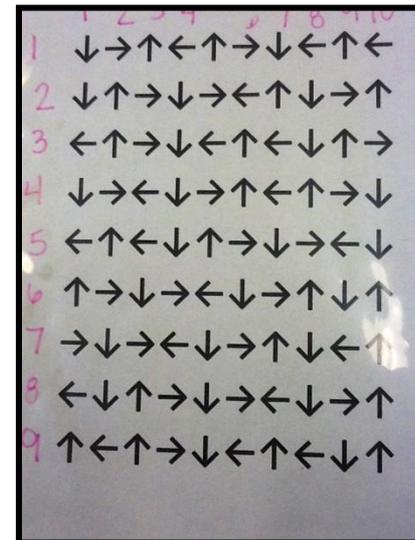
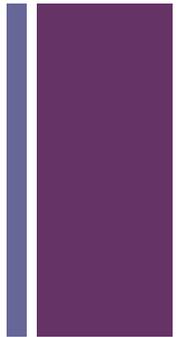
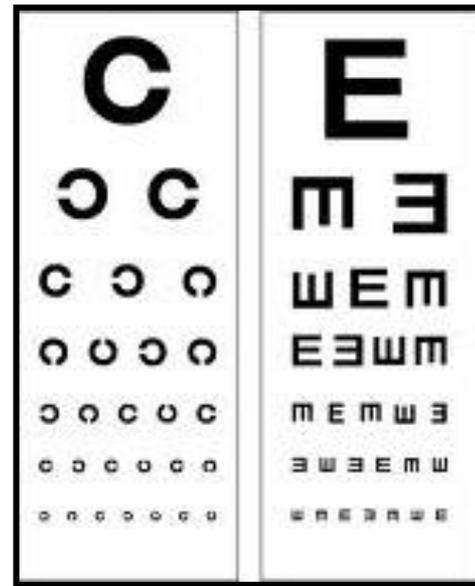
+ Accommodation

- Near/Far Hart Charts
- +/- Flippers
- Functional practice
 - Mock classroom set-ups
 - Pre-driving – speedometer to road signs on closed course with practice vehicle



+ Laterality

- Arrow orientation charts
- Body image awareness charts
- Clock Orientation
- Same/different cards
- “U” Chart
- Slap tap



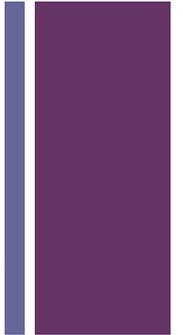
+ Objective #5

- Utilize iPad applications for vision therapy treatment.



+ I-Pad Apps

- Doodle Find
- Ravelous
- Mahjong!!
- Matrix Match
- Boost 2
- Find It Match It
- Fruit Ninja
- Cooking Fever
- Jetpack Joyride
- Vision Tap
- Sam Phibian
- Temple Run/
Minion Rush/
Streaker
- Yummy Burger
- Tap the Frog
- Rail Rush
- Look Again
- Street Chicken
- Flow Free
- Labarynth
- Donut Rush
- Glow Burst
- Toy Balls
- Falling Words
- Fly Smasher
- Smash Hit
- Swipe Game
- Color Line Crusher
- Color Switch
- Hello Color
- Fishdom
- Candy Crush (all
versions)
- Cut the Rope
- Cookie Jam/
Bejeweled
- Slither.io



+ Functional Vision Activities

- Item retrieval from cabinets
- Grocery shopping
- Match socks when doing laundry
- Cut out coupons
- Way finding
- Map reading
- Reading (i.e. med labels, recipes, balance checkbook)
- Packing medications
- Set dials on oven, microwave, washer, dryer



+ OT Scope

■ Low Vision

- Environmental adaptation
- Compensations
- Assistive devices (and optical lenses)
- Education

OT Alone	Collaboration	OD Alone
Fixation	Diplopia	Prescribe lenses
Binocular Pursuits	Nystagmus	Prescribe prisms
Binocular Saccades	Acuity Impairments	Treat injury or disease
Scanning	Dizziness/ Imbalance	
Visual Attention	Gaze Limitations	
Spot patching	Cranial Nerve Palsy	
Visual perception	Visual Field Cuts	
	Other patching techniques	
	Significant photophobia	
	Cortical vision impairment	
	Use of lenses and prisms	

+ Helpful Resource

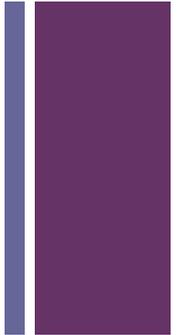
- To find a qualified provider and see resources such as a symptoms checklist visit:
- College of Optometrists in Vision Development (COVD) at: www.covd.org
- Neuro-Optometric Rehabilitation Association (NORA) www.nora.cc
- Optometric Extension Program Foundation www.oepf.org
- American Optometric Association www.aoa.org





Objectives

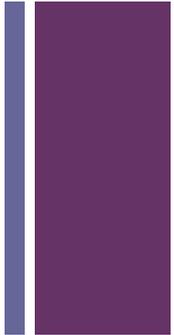
- **Understand vision diagnoses and the functional impact they play with B/IADLs**
- **Understand how to screen for common brain injury and stroke related vision deficits.**
- **Identify “shoe box” activities for each of the outlined vision diagnoses.**
- **Improve knowledge and understanding of commonly used vision therapy equipment.**
- **Utilize iPad applications for vision therapy treatment.**



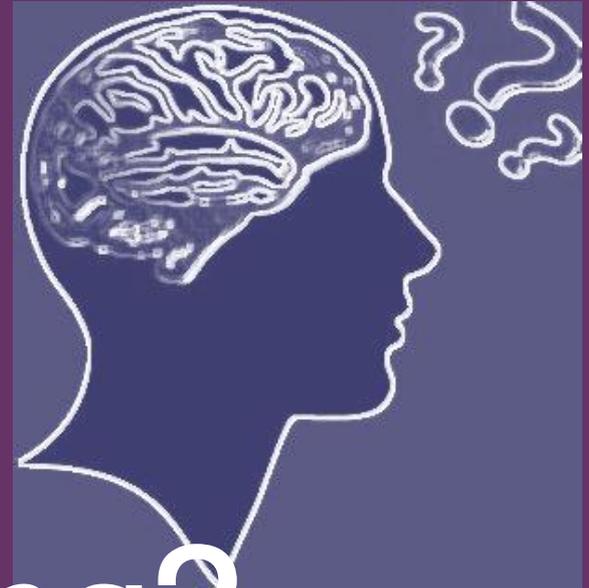


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+ Questions?

Thank You!