A selection of existing tools for the (neuro)psychological assessment of Cerebral Visual Impairment (CVI)

http://www.teachcvi.net

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Multidisciplinary team

- The diagnosis of Cerebral Visual Impairment (CVI) requires the participation of a multidisciplinary team

- A multidisciplinary team should include:
  - Pediatric neurologist / pediatrician
  - Ophthalmologist / orthoptist / optometrist
  - (Neuro)psychologist
  - Low vision therapist / special education teacher

  And might also include:
  - Physiotherapist
  - Occupational therapist
  - Speech language therapist
  - Special education teacher
  - Social worker / social care worker

Assessment tools

- The physiotherapist assesses the motor skills, and more specific the visuo-motor skills

- The (neuro)psychologist / educationalist is responsible for:
  - The (neuro)psychological assessment
  - Observations of free play or in a classroom
  - Interactions with caregivers
  - Interviews with parents or caregivers

- There are various assessments and observational tools available that can be used as part of the diagnosis of CVI. This list is intended to be comprehensive, but should not be taken to be exhaustive. These tools are currently used by professionals in the countries participating in the TEACH CVI project

  Note: it is always necessary to assess the cognitive abilities of the child as well!

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Attention / Neglect

Overview

< 3y	3y – 6y	6y – 12y	12y – 18y	> 18y
• BSID-II • Bayley-III • G.CVI.Tods	• NEPSY-II • Visual search task	• NEPSY-II • TEA-Ch • Cookie Theft Picture • CDT • Line bisection task	• NEPSY-II • TEA-Ch • Cookie Theft Picture • CDT • Line bisection task	• UFOV • Cookie Theft Picture • Bells test • CDT • Line bisection task • BIT

BSID-II – Bayley Scales of Infant Development, 2nd edition

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- **Aim** — Determine the mental and motor development level
- **Specification** — The BSID-II consists of:
  - Mental scale
  - Non-verbal scale
  - Motor scale
  - Behavioral scale
- **Age** — 1m – 42m
- **Time** — 45 minutes

Bayley-III – Bayley Scales of Infant and Toddler Development, 3th edition

- **Aim** — Examines all facets of a young child's development
- **Specification** — Developmental domains of the Bayley-III:
  - Adaptive behavior
  - Cognitive
  - Language
  - Motor
  - Social-emotional
- **Age** — 1m – 42m
- **Time** — 30 – 90 minutes

G.CVI.Tods (ongoing research)

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- **Aim** — Visual perceptual test for toddlers
- **Specification** — Test battery for toddlers aged 22 till 33 months:
  - Visual recognition subtests
  - Pursuit of motion subtest
  - Visual field subtest
- **Age** — 22 till 33 months
- **Time** — 30 – 45 minutes

NEPSY-II – Developmental Neuropsychological Assessment

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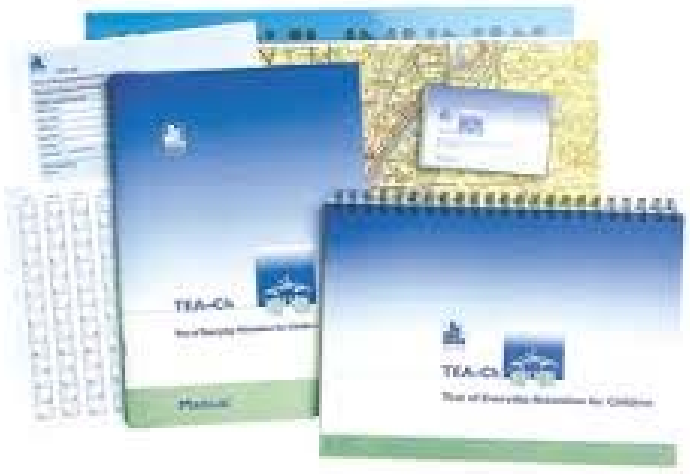
- **Aim** — Provides comprehensive information about the neuropsychological functioning of the child
- **Specification** — Measures 6 domains: memory and learning, sensomotor functioning, social perception, visuospatial processing, executive functioning/ attention and language
- **Age** — 3y 0m – 16y 11m
- **Time** — 45 minutes – 3 hours

Visual search task

- **Aim** — The visual search task measures visual attention
- **Specification** — The child has to search and indicate the target stimulus as soon as possible
- **Age** — 3y – 6y
- **Time** — 10 – 15 minutes

TEA-Ch – Test of Everyday Attention for Children

- **Aim** — The aim of this test is to measure attention problems in children
- **Specification** — The battery measures: selective attention, sustained attention, attention control/switching and response inhibition
- **Age** — 6y – 16y
- **Time** — 60 minutes



Cookie Theft Picture

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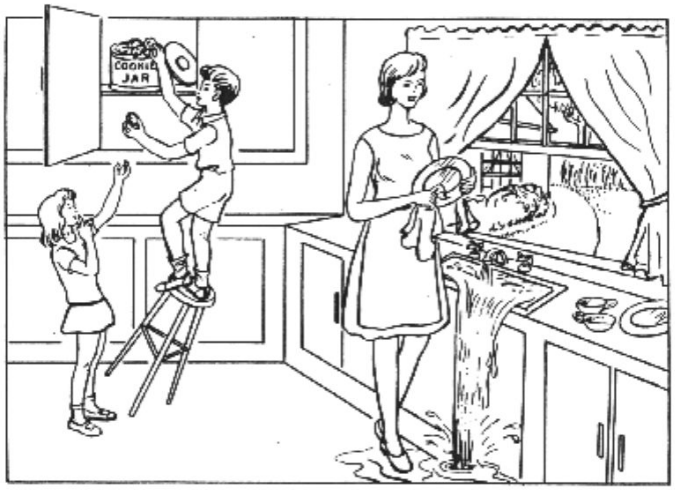
- **Aim** — The Cookie Theft Picture measures visual attention
- **Specification** — This is a subtest of the Boston Diagnostic Aphasia Examination (BDAE). The subject has to examine the picture and describe everything he/she sees happening
- **Age** — Children and adults
- **Time** — 10 minutes



CDT – Clock Drawing Test

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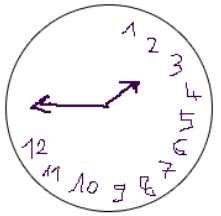
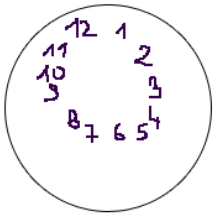
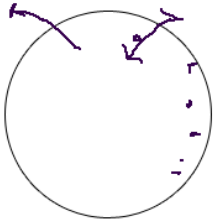
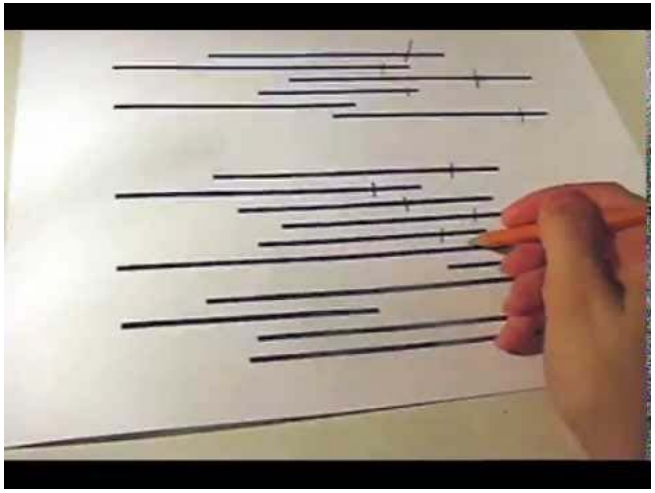
- **Aim** — The CDT provides information about memory, information processing and vision
- **Specification** — The CDT consists of 2 tasks:
  - Free drawn clock
  - Clock copying task
- **Age** — Children and adults
- **Time** — 15 – 20 minutes



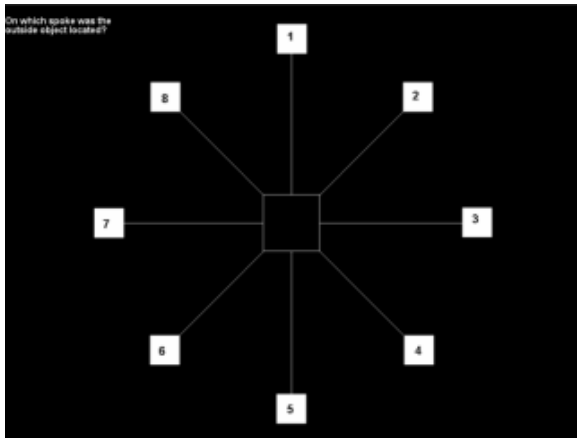
Line bisection task

- **Aim** — This is a quick measure to detect the presence of unilateral spatial neglect
- **Specification** — The subject must place a mark through the center of a series of horizontal lines.
- **Age** — Children and adults
- **Time** — 15 – 20 minutes



UFOV – Useful Field of View Test

- **Aim** — This is a test that assesses parallel attention processing
- **Specification** — The test contains 3 subtests which measure the ability to perform a central visual identification task, to divide attention between central and peripheral stimuli and to select peripheral stimuli among distracters
- **Age** — Adults
- **Time** — 30 minutes



Bells Test

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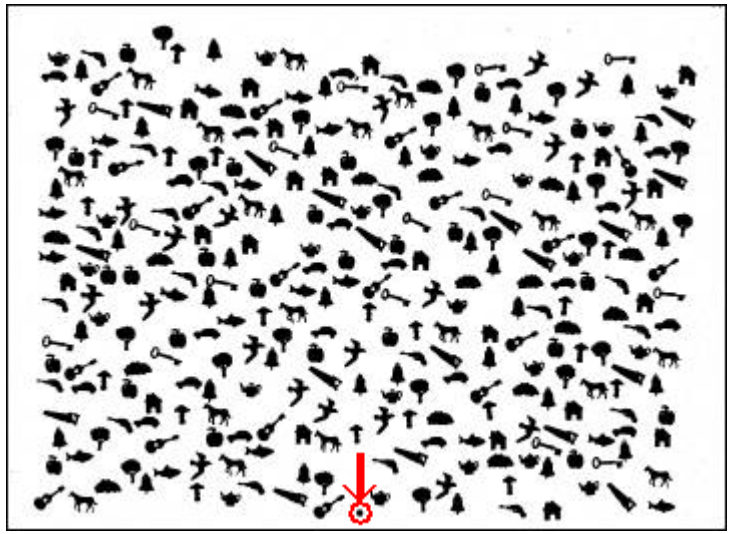
- **Aim** — The Bells Test is a cancellation test that assesses visual neglect
- **Specification** — The subject has to circle 35 bells embedded within 280 distractors (houses, horses …)
- **Age** — Adults
- **Time** — 5 minutes



BIT – Behavioral Inattention Test

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- **Aim** — The BIT is a test for assessing unilateral visual neglect

- **Specification** — The test consists of 2 subtests:
  - Conventional subtests (6): line crossing, letter cancellation, star cancellation …
  - Behavioral subtests (9): phone dialing, article reading, map navigation …

- **Age** — 19y – 83y

- **Time** — 60 minutes

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Lines / Visuospatial processing

Overview

< 3y	3y – 6y	6y – 12y	12y – 18y	> 18y
• BSID-II • PDMS-2	• Preschool JLO • DTVP-2 • MVPT-3 • Beery VMI • TVPS-3 • EFT • PVMIA • NEPSY-II • M-ABC-II • WRAVMA • Bender-Gestalt II • PDMS-2	• JLO • DTVP-2 • MVPT-3 • Beery VMI •TVPS-3 • EFT • RCFT • NEPSY-II • M-ABC-II • WRAVMA • BVRT • Bender-Gestalt II	• JLO • DTVP-A • MVPT-3 • Beery VMI • TVPS-3 • EFT • RCFT • NEPSY-II • M-ABC-II • WRAVMA • BVRT • Bender-Gestalt II	• JLO • DTVP-A • MVPT-3 • MVPT-V • Beery VMI • EFT • RCFT • BVRT • VOSP • L-Post • Bender-Gestalt II

PDMS-2 – Peabody Developmental Motor Scales, 2nd edition

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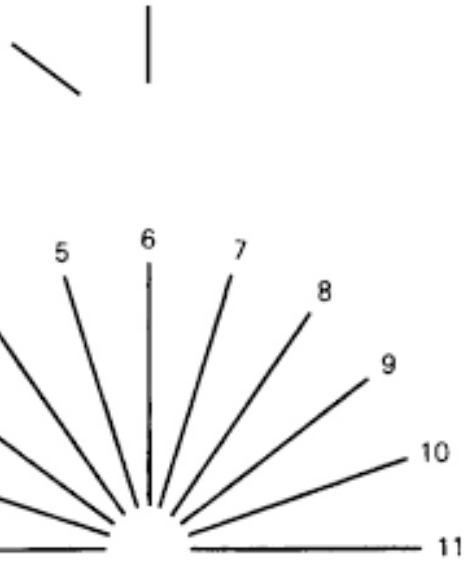
- **Aim** — This is an early childhood motor development program that assesses the motor skills of children
- **Specification** — The test contains 6 subtests: reflexes, stationary, locomotion, object manipulation, grasping, and visual-motor integration
- **Age** — 0y – 5y
- **Time** — 45 – 60 minutes

Preschool JLO – Preschool judgement of line orientation

- **Aim** — This test measures visuospatial judgement
- **Specification** — The subject is asked to indicate which line on the bottom of the page is in exactly the same position and points in the same direction as the line on top of the page
- **Age** — 3y – 6y
- **Time** — 25 minutes



JLO – judgement of line orientation

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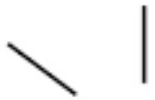
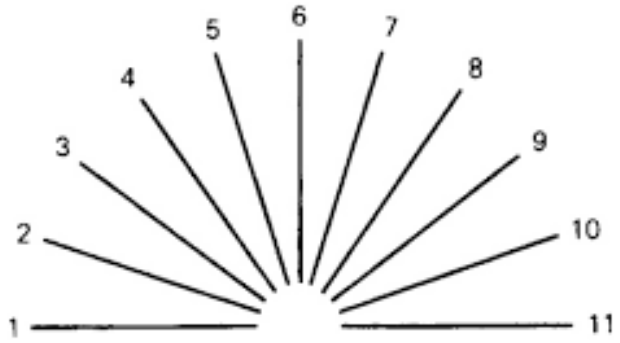
- **Aim** — This test measures visuospatial judgement
- **Specification** — The subject is asked to indicate which line on the bottom of the page is in exactly the same position and points in the same direction as the line on top of the page
- **Age** — 7y – 74y
- **Time** — 25 minutes





DTVP-2 – Developmental Test of Visual Perception, 2nd edition

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- **Aim** — This test measures both visual perception and visual-motor integration skills

- **Specification** — The test consists of:
  - 4 visual perceptual tasks: position in space, figure ground, visual closure and form constancy
  - 4 visuo-motor tasks: eye hand coordination, copying, spatial relations and visual motor speed

- **Age** — 4y 0m – 10y 11m

- **Time** — 35 – 60 minutes

DTVP-A – Developmental Test of Visual Perception, A version

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- **Aim** — This test measures both visual perception and visual-motor integration skills
- **Specification** — The test consists of 6 subtests: copying, figure-ground, visual-motor search, visual closure, visual-motor speed and form constancy
- **Age** — 11y 0m – 74y 11m
- **Time** — 25 minutes

PVPT-3 – Motor-free Visual Perception Test, 3th edition

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- **Aim** — This test measures an individuals visual perceptual ability, with no motor involvement needed to make a response
- **Specification** — 5 categories of visual perception are measured: spatial relationship, visual closure, visual discrimination, visual memory and figure ground
- **Age** — 4y – 94y
- **Time** — 20 – 30 minutes

MVPT-V – Motor-free Visual Perception Test-Vertical

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- **Aim** — This test assesses problems in visual perception in individuals with hemispatial visual neglect
- **Specification** — All stimuli are presented vertically at the visual midline
- **Age** — 18y – 94y
- **Time** — 25 minutes

Beery VMI – Beery-Buktenica Test of Visual Motor Integration

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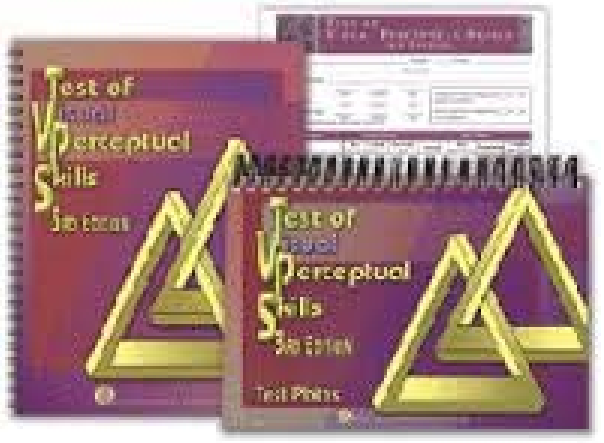
- **Aim** — This test examines the integration of motor and visual skills
- **Specification** — The test consists of a visuo-motor part and 2 additional tests: visual-motor integration, visual perception and motor coordination
- **Age** — Full form: 2y – 100y
  Short form: 2y – 8y
- **Time** — 25 minutes

TVPS-3 – Test of Visual Perceptual Skills, 3th edition

- **Aim** — This test examines visual-perceptual skills without the involvement of motor ability
- **Specification** — The test consists of 7 subtests: visual discrimination, visual memory, spatial relationships, form constancy, sequential memory, visual figure-ground, and visual closure
- **Age** — 4y 0m – 18y 11m
- **Time** — 30 – 40 minutes



EFT – Embedded Figures Test

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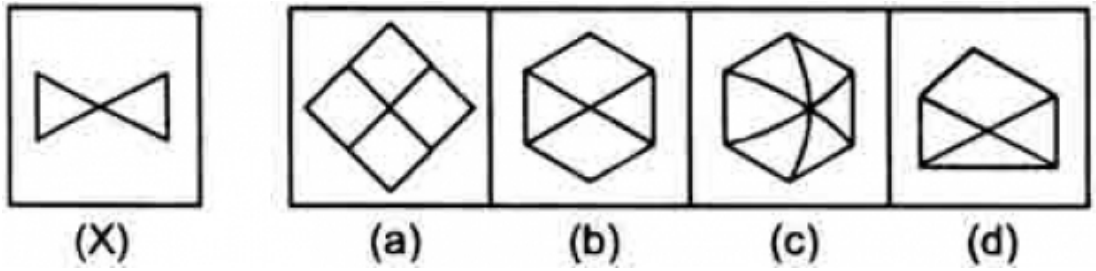
- **Aim** — The EFT is a visual perceptual test
- **Specification** — The test requires the subject to locate a previously seen figure within a larger complex figure. The test is comprised of 18 complex figures
- **Age** — Different age groups
- **Time** — 20 minutes



PVMIA – Preschool Visual Motor Integration Assessment

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- **Aim** — This test identifies visual motor integration deficits in preschoolers
- **Specification** — Specific skills addressed by the PVMIA include: perception of position in space, awareness of spatial relationships, color and shape discrimination, matching two attributes simultaneously and the ability to reproduce what is seen
- **Age** — 3y 6m – 5y 6m
- **Time** — 20 – 30 minutes

M-ABC-II – Movement Assessment Battery for Children

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- **Aim** — This test determines motor impairment in children
- **Specification** — The test contains 8 tasks for each range in three categories: manual dexterity, ball skills and static and dynamic balance
- **Age** — 3y 0m – 16y 11m
- **Time** — 20 – 40 minutes

WRAVMA – Wide Range of Visual Motor Abilities

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- **Aim** — This test examines how children deal with visual-motor, visuospatial and fine motor tasks
- **Specification** — The test contains 3 subtests: drawing test, matching test and pegboard test
- **Age** — 3y 0m – 17y 11m
- **Time** — 15 minutes

Bender-Gestalt II

- **Aim** — This test is a motor and perception test
- **Specification** — Administration consists of two phases:
  - Copy phase
  - Recall phase
- **Age** — 3y 0m – 85y 11m
- **Time** — 10 – 15 minutes

RCFT – Rey Complex Figure Test and Recognitial Trial

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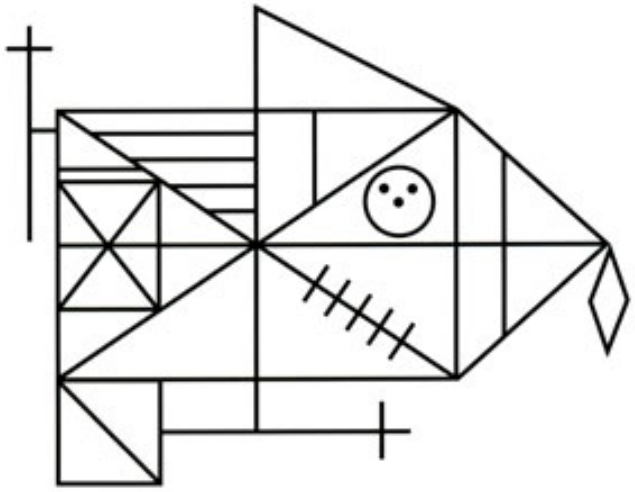
- **Aim** — This test examines various cognitive processes including planning, organization, problem solving, memory, and perceptual-motor functions
- **Specification** — The test consists of 4 trials: copy trial, immediate recall, delayed recall and recognition
- **Age** — 6y 0m – 17y 11m
  18y – 89y
- **Time** — 45 minutes



BVRT – Benton Visual retention Test, 5th edition

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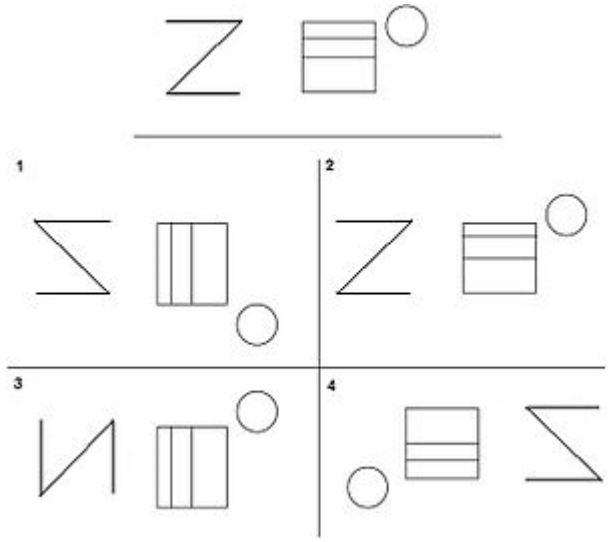
- **Aim** — This test measures visual perception and visual memory
- **Specification** — The subject is given a booklet containing 10 blank pages on which he reproduces the design. The test can be administered in 5 different ways
- **Age** — 8y – 74y
- **Time** — 30 – 60 minutes



VOSP – Visual Object and Space Perception Battery

- **Aim** — This test assesses object and space perception
- **Specification** — The test consists of 8 subtests divided into 2 categories:
  - Object recognition: incomplete letters, silhouettes, shape decision, progressive silhouettes
  - Spatial relations: dot counting, position discrimination, number location, cube analysis
- **Age** — Adult
- **Time** — 60 minutes

L-Post – Leuven Perceptual Organization Screening Test

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- **Aim** — This test is a computerized visual perceptual screening test
- **Specification** — The test consists of 15 subtests that measure a wide range of processes of perceptual organization, such as segregation, local and global processing, grouping … The test is freely available at http://gestaltrevision.be/tests/
- **Age** — Adult
- **Time** — 20 – 40 minutes

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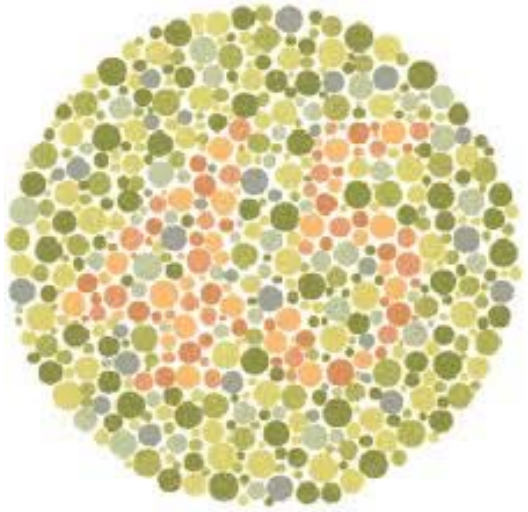
Colour

Overview

< 3y	3y – 6y	6y – 12y	12y – 18y	> 18y
• Ishihara	• Ishihara • AOHRR • PVMIA	• Ishihara • AOHRR	• Ishihara • AOHRR	• Ishihara • AOHRR

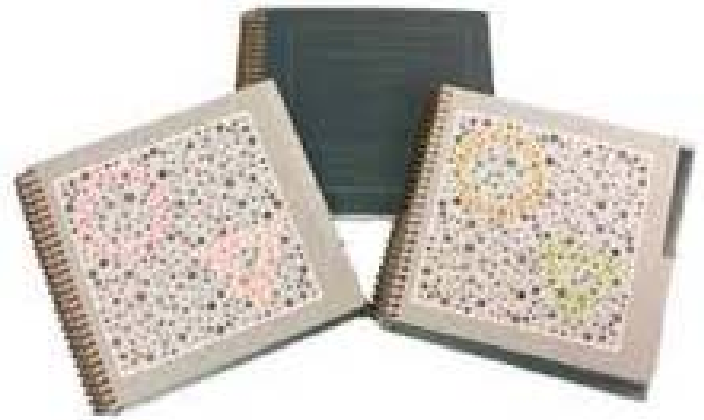
Ishihara Color Test

- **Aim** — This test is a color perception test for red-green color deficiencies
- **Specification** — The test consists of 38 colored plates each of which contains a circle of dots appearing randomized in color and size. Within the pattern are dots which form a number or shape
- **Age** — Children and adult
- **Time** — 15 – 20 minutes



AOHRR – American Optical Hardy-Rand-Rittler Color Vision Plates

- **Aim** — This test is a color perception test for red-green color deficiencies
- **Specification** — The test consists of 38 colored plates each of which contains a circle of dots appearing randomized in color and size. Within the pattern are dots which form a number or shape
- **Age** — Children and adult
- **Time** — 15 – 20 minutes



Objects

Overview

< 3y	3y – 6y	6y – 12y	12y – 18y	> 18y
• BSID-II • Bayley-III • G.CVI.Tods	• VOT • CVIT 3-6 • L94	• VOT	• VOT	• VOT • BORB • Poppelreuter-Ghent-s Overlapping Figures Test • VOSP • L-Post

VOT – Hooper Visual Organization Test

- **Aim** — This test assesses neurological impairment through a quick measure of visual integration, relatively unaffected by situational factors
- **Specification** — The test consists of 30 line drawings, each showing a common object that has been cut into several pieces. The subjects task is to tell you what the object would be if the pieces were put back together
- **Age** — 5y and older
- **Time** — 15 minutes

CVIT 3-6 (ongoing research)

- **Aim** — Newly developed computerized test battery to measure different aspects of visual perception

- **Specification** — The subtests can be divided in 4 domains:
  - Object recognition in scene
  - Degraded object recognition
  - Perception of movement
  - Local and global processing

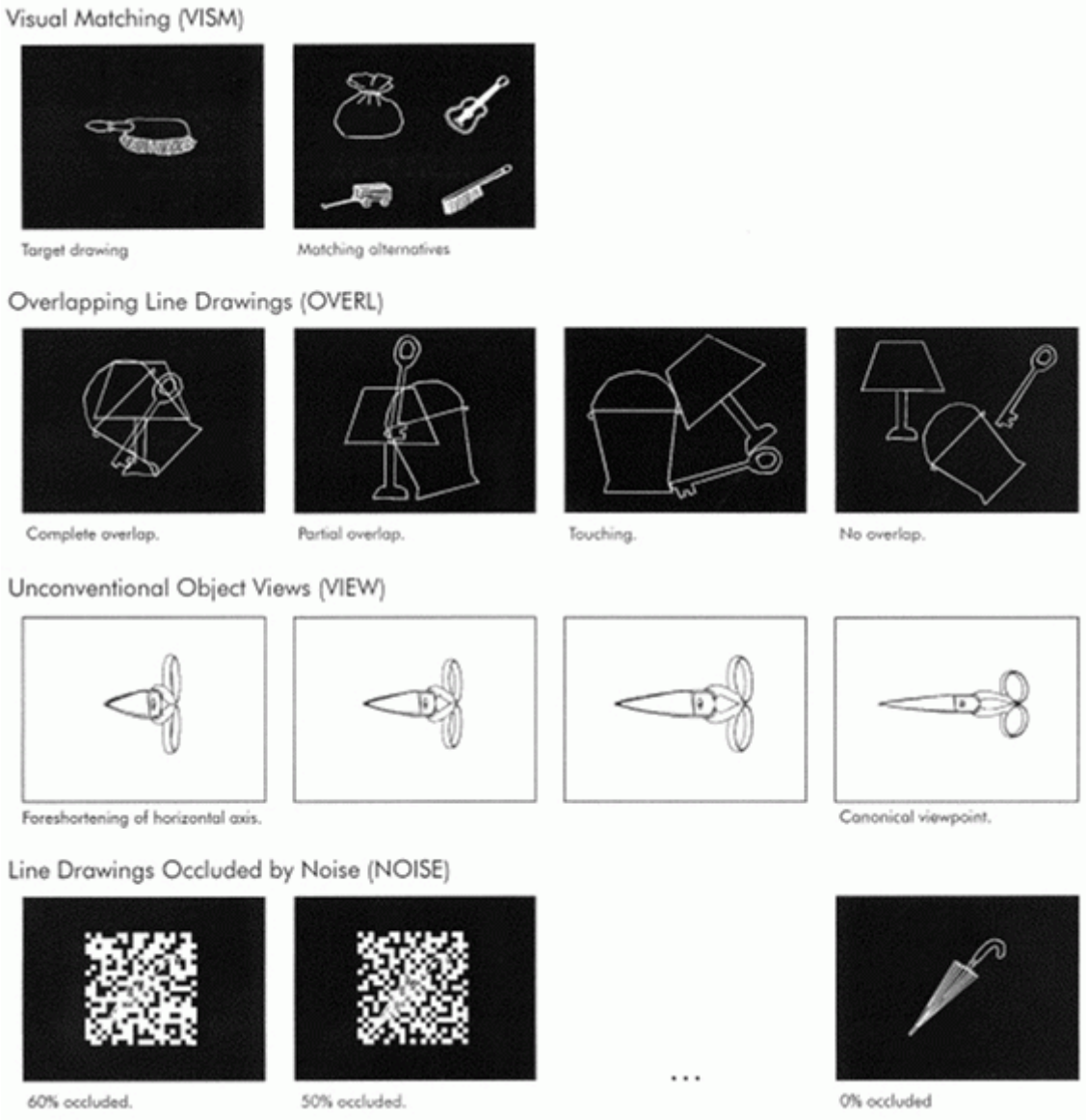
- **Age** — 2y 9m – 6y 3m

- **Time** — 30 – 45 minutes

L94 visual perceptual battery (1)

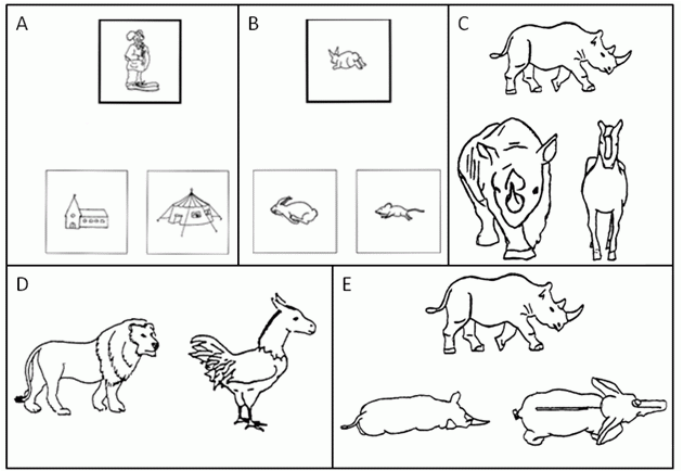
- **Aim** — This computerized test examines visual perceptual abilities
- **Specification** — The test consists of 5 subtests: the VOS-task, figures in noise, overlapping figures, visual matching, and non-conventional viewpoints
- **Age** — 2y 9m – 6y 3m
- **Time** — 45 minutes

L94 visual perceptual battery (2)



BORB – Birmingham Object Recognition Battery

- **Aim** — The BORB provides a set of standardized procedures for assessing neuropsychological disorders of visual object recognition
- **Specification** — The test consists of 14 subtests: drawing from memory, copying, length match task, size match task, orientation match task, position of gap match task, overlapping figures
- **Age** — Adults
- **Time** — 60 minutes



Poppelreuter-Ghent's Overlapping Figures Test

- **Aim** — This test measures visual recognition
- **Specification** — Subjects need to name and point out each of the overlapping figures (multiple choice)
- **Age** — Adults
- **Time** — 20 – 30 minutes

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Faces

Overview

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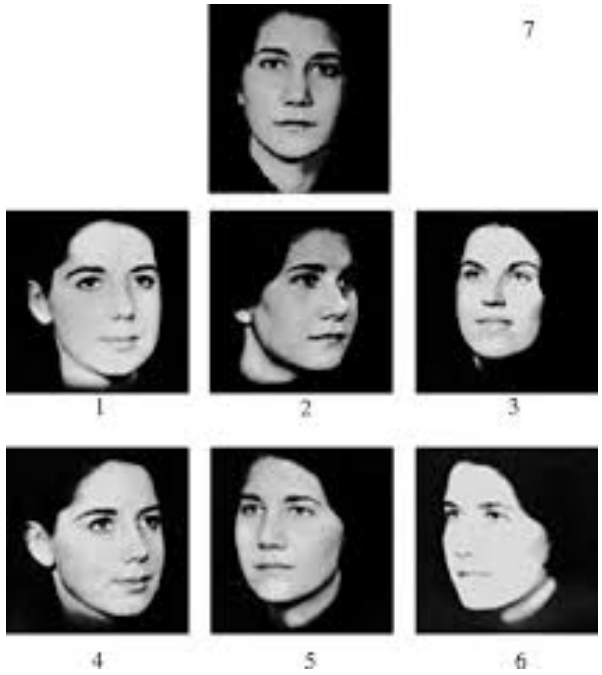
< 3y	3y – 6y	6y – 12y	12y – 18y	> 18y
• BSID-II • Bayley-III	• NEPSY-II • CMS	• NEPSY-II • CMS • BFRT	• NEPSY-II • CMS • BFRT • WMS-IV	• Mooney closure faces test • BFRT • WMS-IV

CMS – Children Memory Scale

- **Aim** — This test is a comprehensive learning and memory test for children
- **Specification** — The test measures learning in a variety of memory dimensions: attention and working memory, verbal and visual memory, short- and long-term memory, recall and recognitions, and learning characteristics
- **Age** — 5y – 16y
- **Time** — 60 minutes

BFRT – Benton Facial Recognition Task

- **Aim** — The test assesses face perception
- **Specification** — The subject has to recognize faces by matching a target face with the identical face out of 6 options
- **Age** — 6y – 99y
- **Time** — 30 minutes



WMS-IV – Wechsler Memory Scale, 4th edition

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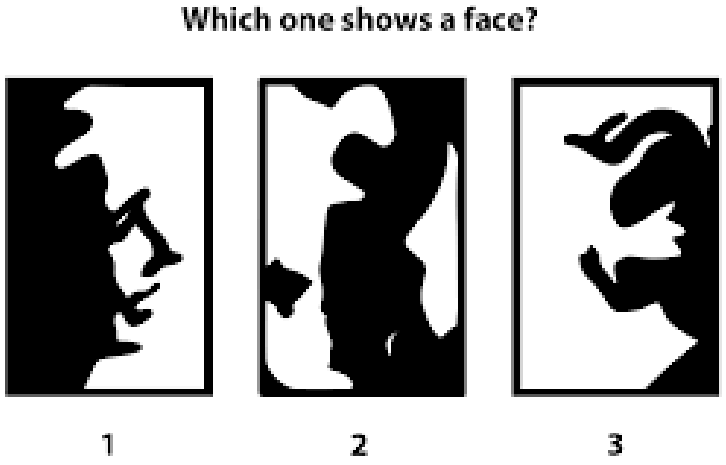
- **Aim** — The test measures the ability to learn and remember information presented verbally and visually
- **Specification** — The test measures a variety of memory dimensions: auditory memory, visual memory, visual working memory, immediate memory and delayed memory
- **Age** — 16y – 90y
- **Time** — 45 – 60 minutes

Mooney Closure Faces Test

- **Aim** The test assesses face perception
- **Specification** The subject needs to indicate a face
- **Age** Adults
- **Time** 30 minutes



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Memory

Overview

< 3y	3y – 6y	6y – 12y	12y – 18y	> 18y
	• NEPSY-II • CMS • TVPS-3	• NEPSY-II • CMS • TVPS-3 • RCFT • CMVT • BVRT	• NEPSY-II • CMS • TVPS-3 • RCFT • BVRT • WMS-IV • CMVT	• CMVT • BVMT-R • WMS-IV • RCFT • BVRT

CMVT – Continuous Visual Memory Test

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- **Aim** — The test measures visual learning and memory
- **Specification** — The test consists of 3 tasks:
  - The acquisition task
  - The delayed recognition task
  - The visual discrimination task
- **Age** — 7y – 80y
- **Time** — 45 – 50 minutes

BVMT-R – Brief Visuospatial Memory Test - revised

TEACH
ERAVS
MUSI+

- **Aim** — The test measures visuospatial memory
- **Specification** — The test consists of 3 subtests:
  - Learning trial
  - Delay trial
  - Copy trial
- **Age** — 17y – 79y
- **Time** — 45 minutes

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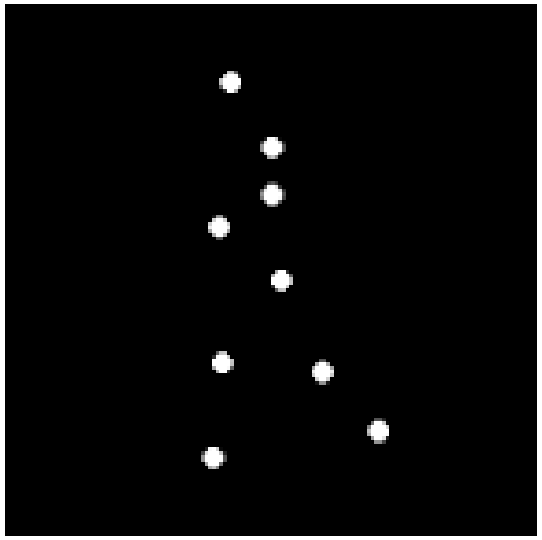
Motion

Overview

< 3y	3y – 6y	6y – 12y	12y – 18y	> 18y
• G.CVI.Tods	• CVIT 3-6 • Biological motion • Motion speed • Form from motion • Motion Coherence			• L-Post

Biological motion

- **Aim** — The test measures the perception of movement
- **Specification** — There are two patterns of moving dots presented on the screen. One of them seems like a walking man. The child has to indicate this pattern of dots
- **Age** — 4y 0m – 6y 11m
- **Time** — 10 – 15 minutes



Motion speed

- **Aim** — The test measures the perception of movement
- **Specification** — There are moving dots presented in two cars. One car seems to move faster because of faster moving dots. The child has to indicate this car
- **Age** — 4y 0m – 6y 11m
- **Time** — 10 – 15 minutes

Form from motion

- **Aim** — The test measures the perception of movement
- **Specification** — There are three levels per item:
  - Level 1: in a square of moving dots there are several coherent moving dots that form a figure
  - Level 2: in a square of moving dots a figure is shown (not moving dots)
  - Level 3: in a square of moving dots a figure is shown in black
- **Age** — 4y 0m – 6y 11m
- **Time** — 10 – 15 minutes

Motion coherence

- **Aim** — The test measures the perception of movement
- **Specification** — There are two squares with moving dots presented on the screen. In one square there is a stripe with coherent moving dots moving to the right and left. The child has to indicate the square with the moving stripe
- **Age** — 4y 0m – 6y 11m
- **Time** — 10 – 15 minutes

Final thoughts

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- Please note that provided information are not exhaustive
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- Find more information about the TeachCVI project on the website: http://www.teachcvi.net
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