

APPENDIX A

Age stabilization for certain perceptual skills

Visual Memory: maturity around age 12 (Reid & Drake, 1990)

Position-in-Space: complete at age 9 (Menken et al., 1987)

Spatial Relations: improve through age 10 (Menken et al., 1987)

Visographic: at age four, inability to introduce angular inflexion

Oculomotor: age 3-large scanning movements

age 6-systematic scanning strategies in place (Vurpillot, 1972)

age 7+-visual search improves only slightly (Enns & Cameron, 1987)

Filtering: age 7-substantial improvement occurs ignoring irrelevancies

Form Constancy: ages 6-7 have dramatic improvement

ages 8-9 stabilization occurs (Menken et al., 1987)

Body Awareness: ages 6-7 established

Visual Discrimination tends to proceed from general to specific; from whole to its parts; concrete to abstract; and known to novel (Todd, 1993).

ages 5-11 response generally is the whole figure rather than fine details (Menken et al., 1987)

age 6 is the beginning of rule and attribute understanding

APPENDIX B

Sequence for distinguishing the following position in space characteristics

(Vurpillot, 1972):

Vertical

Horizontal

Diagonal

Sequence for visual field differentiation (Hanft & Marsh, 1993; Belmont & Birch, 1963)

Top

Bottom

Two sides but not labeled left or right (ages 6-7)

Right/Left on themselves (ages 8-9)

Right/Left on objects (Age 11)

APPENDIX C

Approximate age level for comprehension of spatial language (Todd, 1993):

2.0-2.6 years	in, off
2.6-3.0 years	on, under, out of, together, away from
3.0 -3.6 years	up, top, apart, toward
3.6-4.0 years	around, in front of, high, in back of, next to
4.0-4.6 years	beside, bottom, backward, forward
4.6-5.0 years	down, low
5.0-5.6 years	behind, ahead of, first, last

Approximate age level for copying figures:

2 years	Vertical Stroke
2 years 6 months	Horizontal Stroke
3 years	Circle
4 years	Cross
4 years 6 months	Square
4 years 11 months	Oblique Cross
5 years/5 years 3 months	Triangle
6 years	Diamond

APPENDIX D

Sequence of developing visual closure discrimination (Vurpillot, 1972):

Age 4-Inability to recognize incomplete forms

Age 6-Ability to place imaginary lines

APPENDIX E

Acquisition sequence for figure-ground discrimination (Vurpillot, 1972)

Ages 2-3: Identification of simple non-overlapping forms

Age 4: Identification of simple overlapping forms that do not share a common segment

Age 4+: Identification of simple forms that share a common segment such as the triangle and square shape in a simple house drawing.

Ages 6-7: Stabilization of figure-ground skills

APPENDIX F

Behaviors seen with selected perceptual deficits (Dodds et al., 1993; Schneck, 1996; Schneck & Lemer, 1993; Seiderman, 1984; Crealock & Kronick, 1993; Todd, 1993)

VISUAL ATTENTION

Deficits

Overattention, underattention, and sustaining attention

Difficulty ignoring irrelevant information

Difficulty focusing on relevant information

High activity level and distractibility may be present

Remediation

Usually compensatory

Hand over hand brings attention back

High contrast, such as bright mats on a table

VISUAL SEQUENTIAL MEMORY

Deficits

Assignments are forgotten

Forgets steps that are shown in an activity

Cannot remember the alphabet in correct order

Difficulty in spelling words

Writes a word in the wrong order even if verbal spelling is correct

Retrieval of words with reversals or out of order

Difficulty with Math problems

Difficulty remembering order of events after reading

Writes letters incorrectly

Difficulty with dot-to-dot activities

Difficulty with pattern completion

Remediation

Work on bead and block patterns

Assist in completion of a recipe or block building

Cut up newspaper comics and place in order

Use magnetic or other type of letters to spell or put in alphabetical order
beginning with the left side

Simple Origami

Construct simple paper projects like football or airplanes

Dot-to-dot

Weaving and braiding activities

POSITION IN SPACE

Deficits

Inconsistent symbol reversal

Transposes number or letters

Difficulty differentiating between b,d,p,q

Loses place on page

Difficulty finding what is being looked for

Difficulty putting age-appropriate puzzles together

Difficulty attending to task

Cannot remember left from right

Forgets where to start reading

Difficulty with math computation if more than one digit

May get lost if enters from a different direction

Distribution of work on the page may be inappropriate

Remediation

Bead patterns

Practice left-right on individual, then other people, then objects

Simon Says using positional words such as "Put your hand under your chin"

Ball activities rolling, throwing, kicking, catching

Obstacle course

Many puzzle books have activities for identifying differences and similarities

Reconstructing a three dimensional block design

SPATIAL RELATIONS

Deficits

Trouble with right/left

Design copying difficulty

Difficulty with spacing within and between words.

Difficulty writing in a given space such as application lines

Miscalls words when reading

Difficulty with reproducing block designs and pegboard designs

Difficulty reproducing shapes in relation to one another

May knock over items

Remediation

Discuss picture object relations such as the car is in front of the garage.

Age appropriate puzzles

Simple peg designs

Dot-to-dot

Simple grid designs

Practice throwing to different distance targets

VISUAL DISCRIMINATION

Deficits

Matching and sorting difficulties

Size discrimination may be impaired

Fails to recognize similarities and differences in objects

Difficulty matching two dimension to three dimensional such as alphabet letters

Remediation

Sorting tasks initially with color, size, then discrete differences

VISUAL TRACKING OR OCULOMOTOR CONTROL

Deficits

Loses place in reading

Trouble catching balls

Depth perception difficulties

Scanning difficulties

Loses moving objects

Does not always start at top or the left

Energy is expended on tracking and detracts from comprehension, assimilation

Fatigue

Difficulty transitioning from near point to far point

Remediation

Mazes or pathways

Large print scanning tasks

Playing catch with a suspended or rolling ball

Some computer games promote tracking

Scan for hidden pictures systematically-top to bottom, left to right

VISUAL MOTOR COORDINATION

Deficits

Difficulty drawing geometric symbols

Difficulty in copying

Decreased legibility in handwriting

Difficulty with simple connecting of pictures or dot-to-dot

Trouble lacing or stringing beads

Difficulty remaining within boundaries

Needle threading difficulties, will usually bring needle to thread

Difficulty with mazes and dot-to-dot

Difficulty in construction tasks

Trouble catching or hitting a ball

Tracing difficulties

Remediation

Lacing activities

Cutting out straight line figures, gentle angles, tight angles, curves, and then combinations

Block building tasks

Practice fastenings on toys then on self

Tracing activities (multiple colored lead pencils, and "Changeable

Colors/Markers" can be very motivating

Simple mazes then progress to more difficult ones

Outline small spaces before coloring

Dot-to-dot

Simple crossword puzzles that are age appropriate

Play tic-tac-toe remaining in the edges

Play ball games beginning with bouncing directly to, progress to thrown directly to, and progress to throwing to either side

FIGURE-GROUND

Deficits

Difficulty with hidden pictures

Difficulty finding or tracing shapes in a picture

Difficulty sorting objects into categories

Cannot focus on one word on a page

Difficulty copying from a board

May appear disorganized or careless in work

Difficulty with word recognition

Difficulty with locating one object within a group

Trouble finding place on the page

Does not notice punctuation

Skips pages and sections

Misses important details

Trouble finding arm holes in dark shirts

Trouble finding objects in cluttered closets, drawers, toyboxes

Remediation

Workbooks from discount stores often have hidden picture activities

In coloring books, trace all squares in the picture before coloring

In the newspaper, the section of "What is wrong with this picture"

Sorting tasks

Find certain shapes in drawings such as the squares in the foundation and windows

Find certain color clothes in the closet, solids versus prints

VISUAL CLOSURE

Deficits

Cannot complete partially drawn pictures or stencils

Trouble completing age appropriate puzzles

Difficulty in spelling

Leaves out parts of word or entire words

Leaves out parts of worksheets

Trouble completing assignments

Trouble figuring out poorly reproduced pages

Remediation

Have child complete pictures

Work on sequencing of pictures

Puzzles

Dot-to-dot

Hidden pictures

Cut a symmetrical picture in half, glue it on a piece of paper and complete the other side

Color by number

VISUAL MEMORY

Deficits

Trouble remembering sight words

Difficulty transferring learned words from one medium to another

Copies only one letter or number at a time from the board

Needs a copy for reproduce numbers or the alphabet

Trouble remembering what is read

Cannot reproduce figures from memory

Difficulty drawing a person

Difficulty in completing his name

Remediation

Encourage multi-sensory learning for writing numbers and alphabet: saying it, drawing it with chalk, constructing near replicas with sticks and curves

May need a copy at desk

Simple memory games using cards, numbers, pictures

What is missing game after seeing a whole picture

DIRECTIONALITY

Deficits

- Difficulty understanding right\left concepts
- Reverses letters without seeing them as being incorrect
- Draws circles clockwise
- Trouble beginning on left or the top
- Reads words backwards
- Trouble with up, down, left, right, in, out, and other positions
- Gets lost with directions

Remediation

- Practice left\right on self, then others, then objects
- May need visual cues for left side for reading and writing
- Practice drawing left to right, top to bottom
- Stickers to show where to begin
- Happy faces to show where to begin
- Establishment of handedness helps
- Play Simon Says or Hokey Pokey with right\ left instructions

APPENDIX G

Classroom Strategies (Boyle & Korn-Rothschild, 1993; Schneck & Lemer, 1993)

Stand near student when giving instructions so that instructing voice carries the most power

Touch to the shoulder may bring attention back to task

Avoid multiple directions if possible

Contrasting cues such as a highlighted text

Spacer between words

Mark the beginning place

Cue position of paper for writing tasks especially highly contrasting

Appropriate desk and seat to decrease fatigue

Heavier weight paper for beginning scissor skills

Near point copying if possible by a desk copy

Computer when writing is too laborious

Use of magnetic letters for spelling

Model of letter and numeral formation/sequence

Referral to appropriate sources such as speech, physician, special educator

Do not time task if possible

Use of a carrel or quiet, visually calming area for task completion

Use of a mouse