

VISUAL SCREENING FOR ALLIED HEALTH PROFESSIONALS

Paul Harris, OD

CASE HISTORY

DOUBLE VISION OR THE CASE OF THE MOVING LETTERS/WORDS.

- Do you ever see double vision, two of something when you know there is only one?
Even when they say, “No” ask using the hand method or show them the sliding overhead demonstration.



THE HAND SLIDE DEMONSTRATION

Clap your hands together in front of you. Then, while keeping each opposing finger lined up turn the back of one your hands towards the patient. Then, spread the fingers slightly. Now slowly move the back hand side to side about the width of one finger and ask, “Do the words ever do this?”



TESTING – GENERAL THOUGHTS

- As we do each test or each part of a test we set a stage. On that stage we have some “props”. We then set the scene (instructional sets) and then we observe the behavior of the patient.
- Individual tests do not test specific aspects of “vision”.
- Any one test may be the key that helps us gain insight into that patient.



TESTING – GENERAL THOUGHTS (2)

- Get in and get out!
- Do it fast.
- What we do now affects what comes later.
- It may not be necessary to split hairs and find the exact level of development or the exact range of performance. Assess quickly if they have the necessary skills/abilities or not.
- In most instances the level obtained from a quick assessment will provide all the information necessary to derive the alternatives of care for that patient.



VISUAL ACUITY

- Present the paddle/occluder on the midline and ask them to cover their left eye.
 - This sets the stage to gain insight into the patient's laterality and directionality development.
 - Watch to see if they either enlist help/support of others or if others correct the patient. Be sure to let others know, if they help out, that this kind of thing is part of the testing and you would prefer them to just watch.

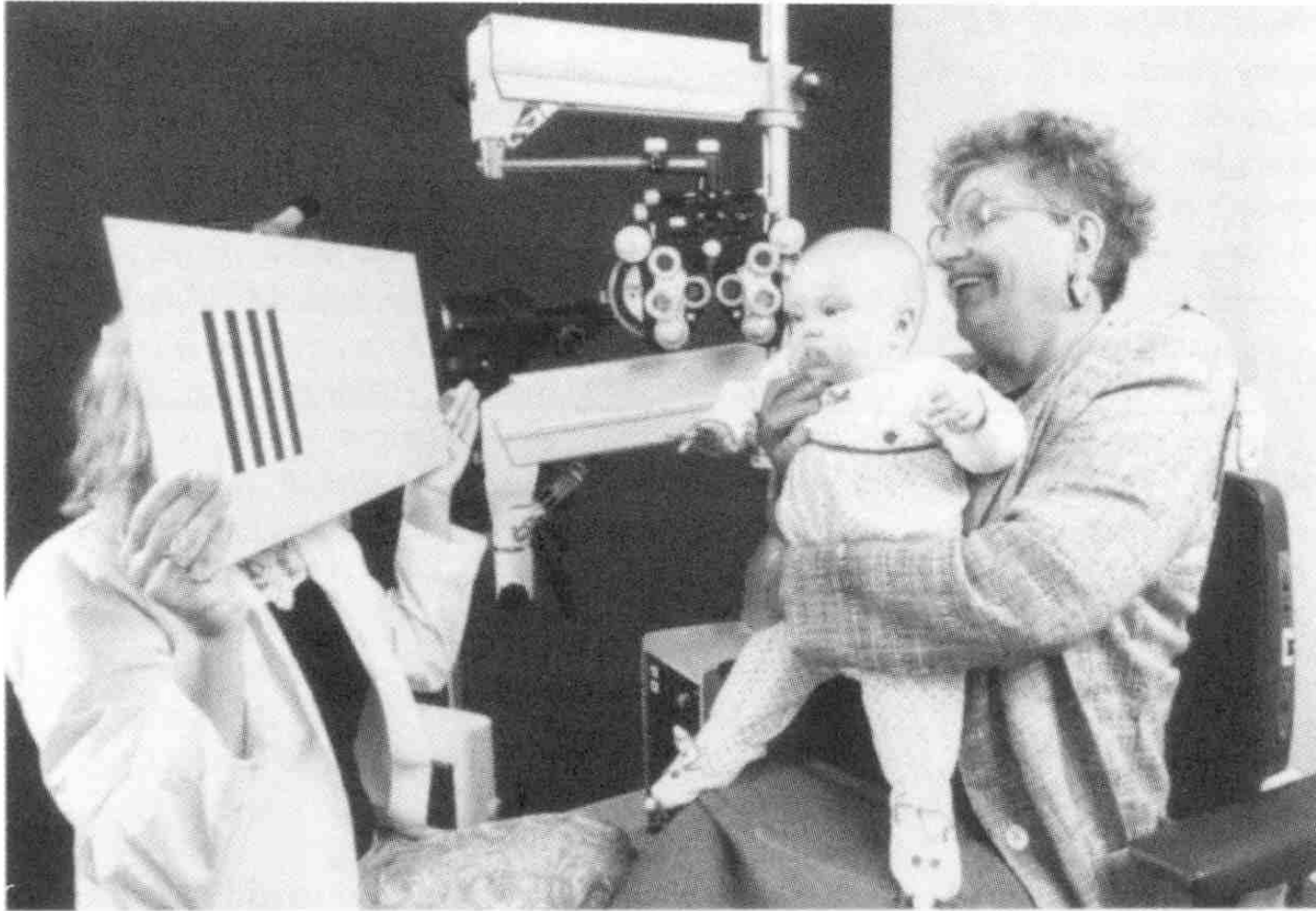


VISUAL ACUITY (2)

- Take distance VA's making sure to get right eye, left eye, and both together with and without compensatory lenses in place.
- Make note of anything out of the ordinary.



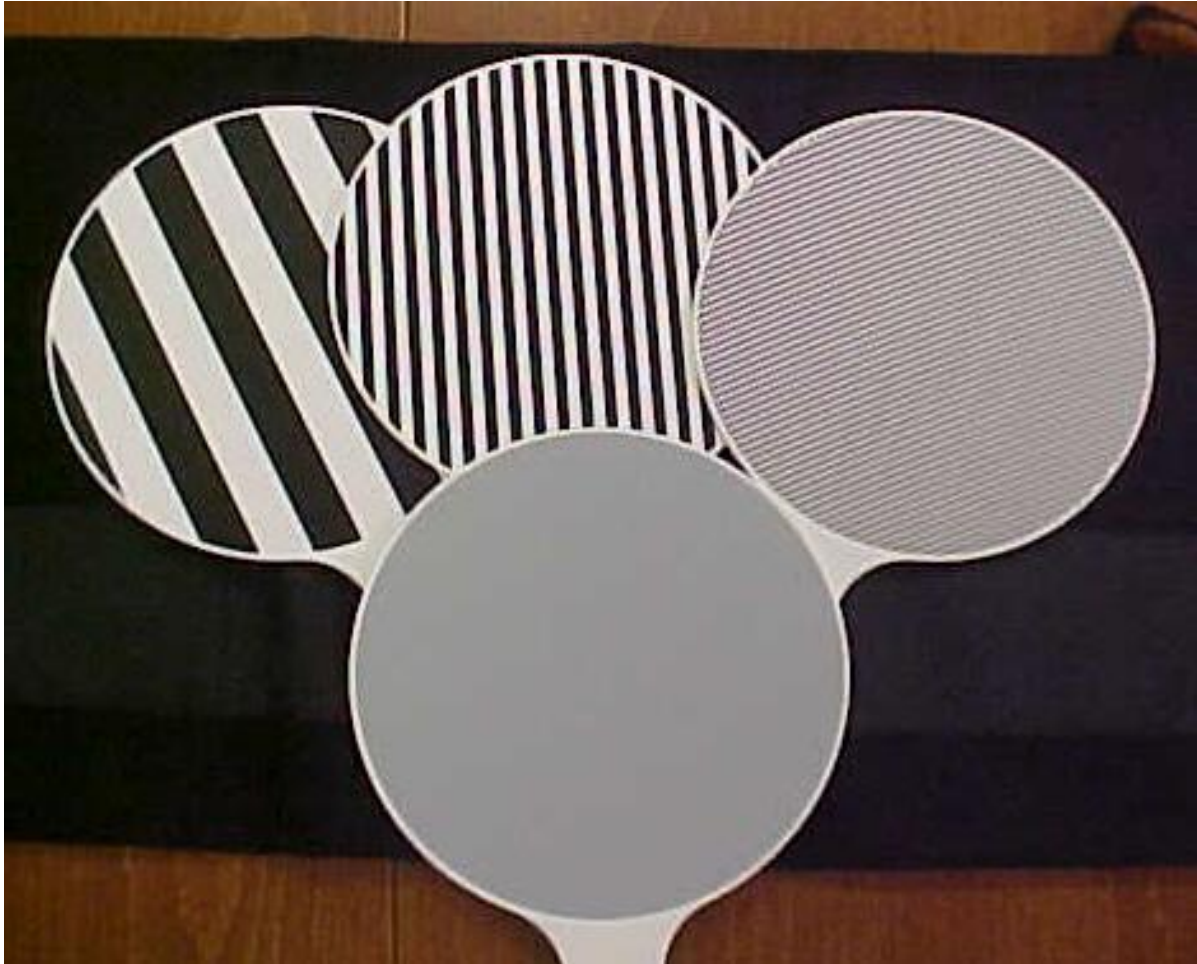
PREFERENTIAL LOOKING



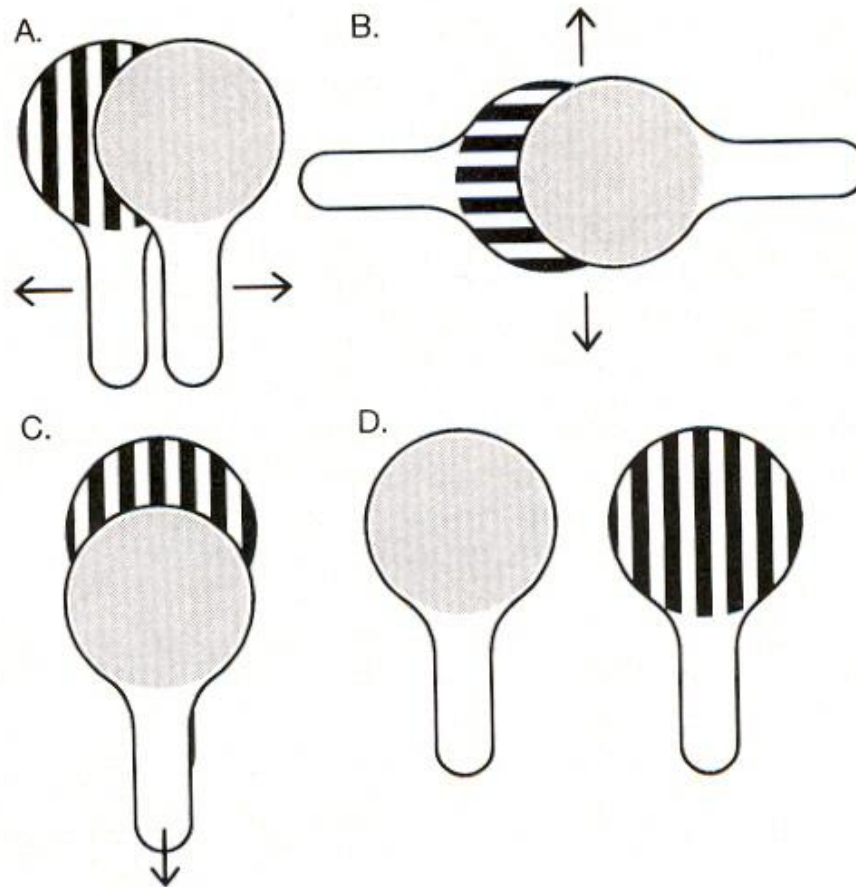
TELLER CARDS



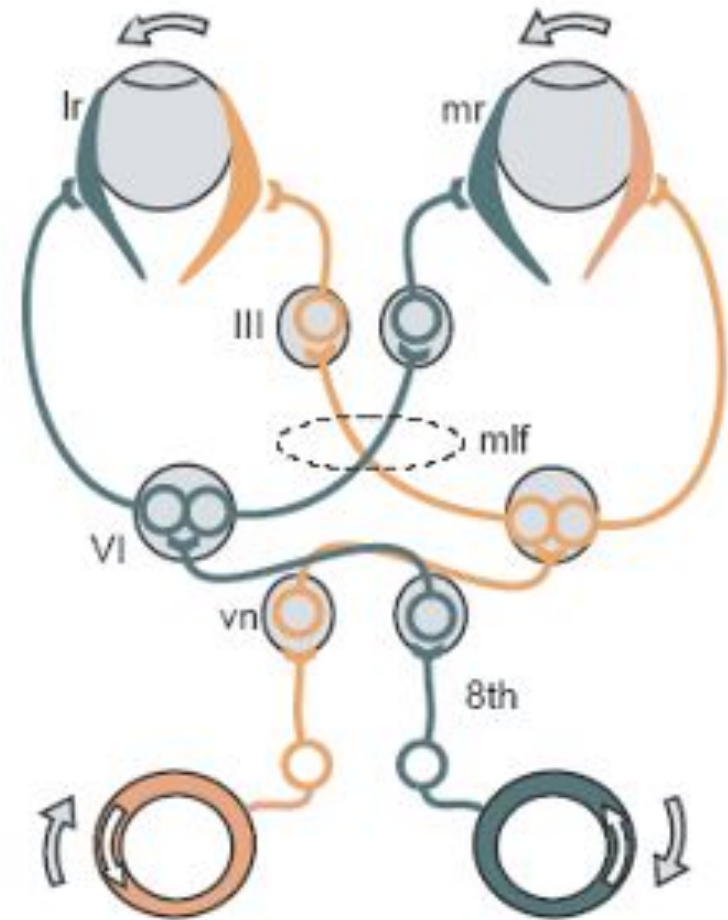
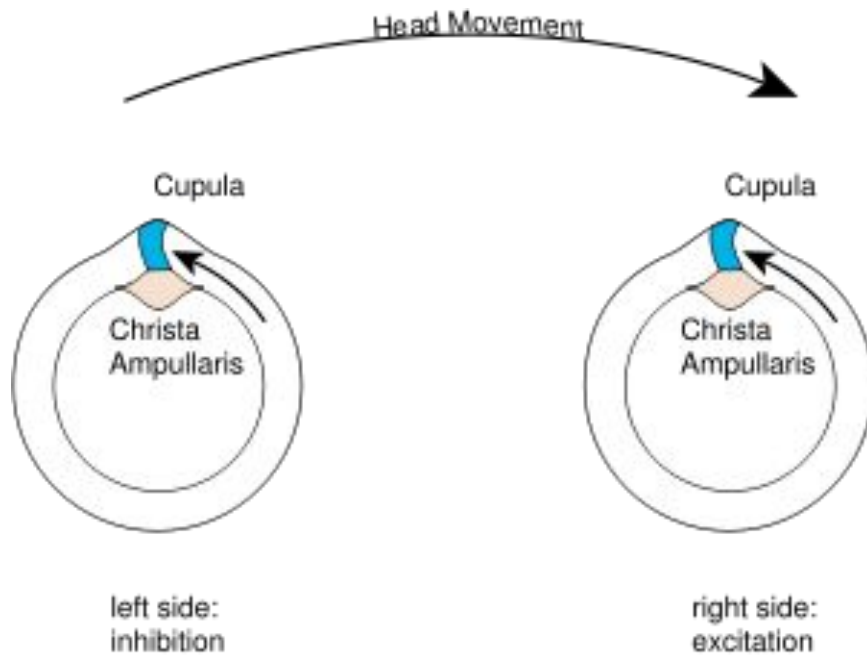
LEA GRATINGS



LEA GRATINGS TESTING ORIENTATIONS



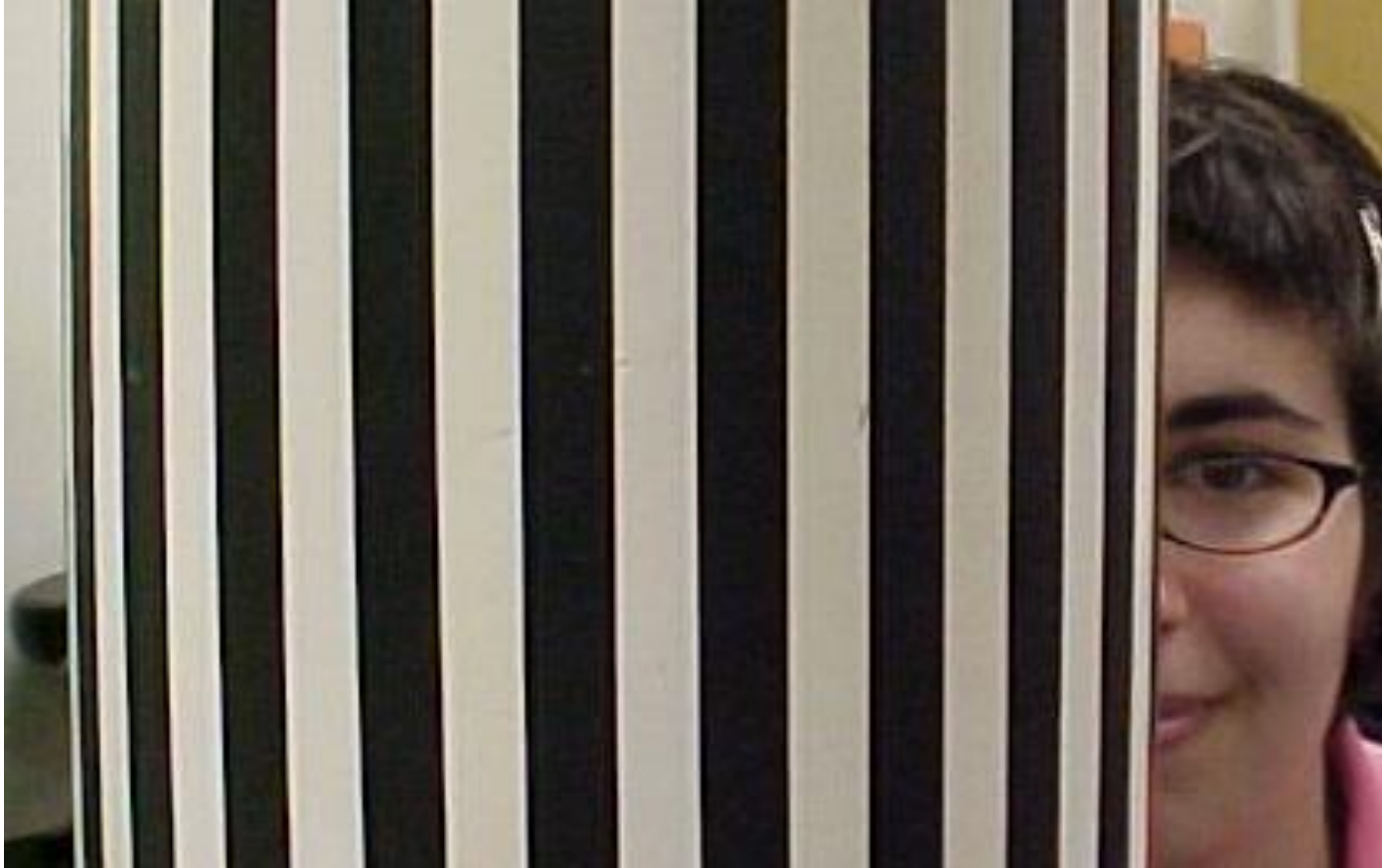
VESTIBULAR-OCULAR REFLEX (VOR)



OPTO-KINETIC NYSTAGMUS (OKN)

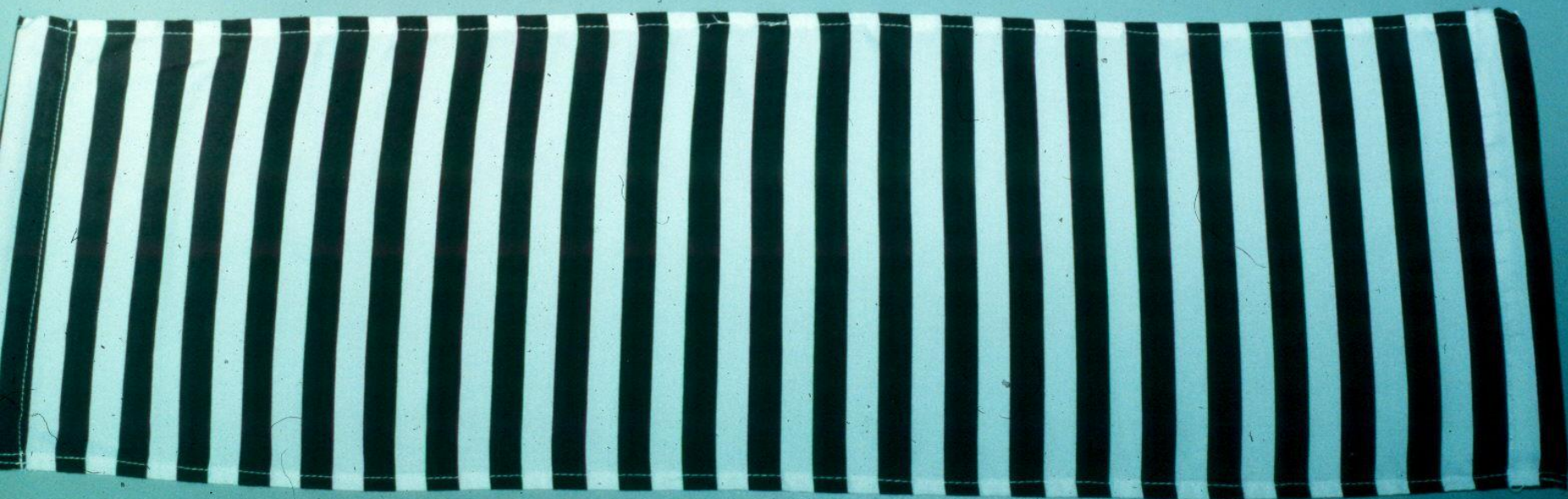


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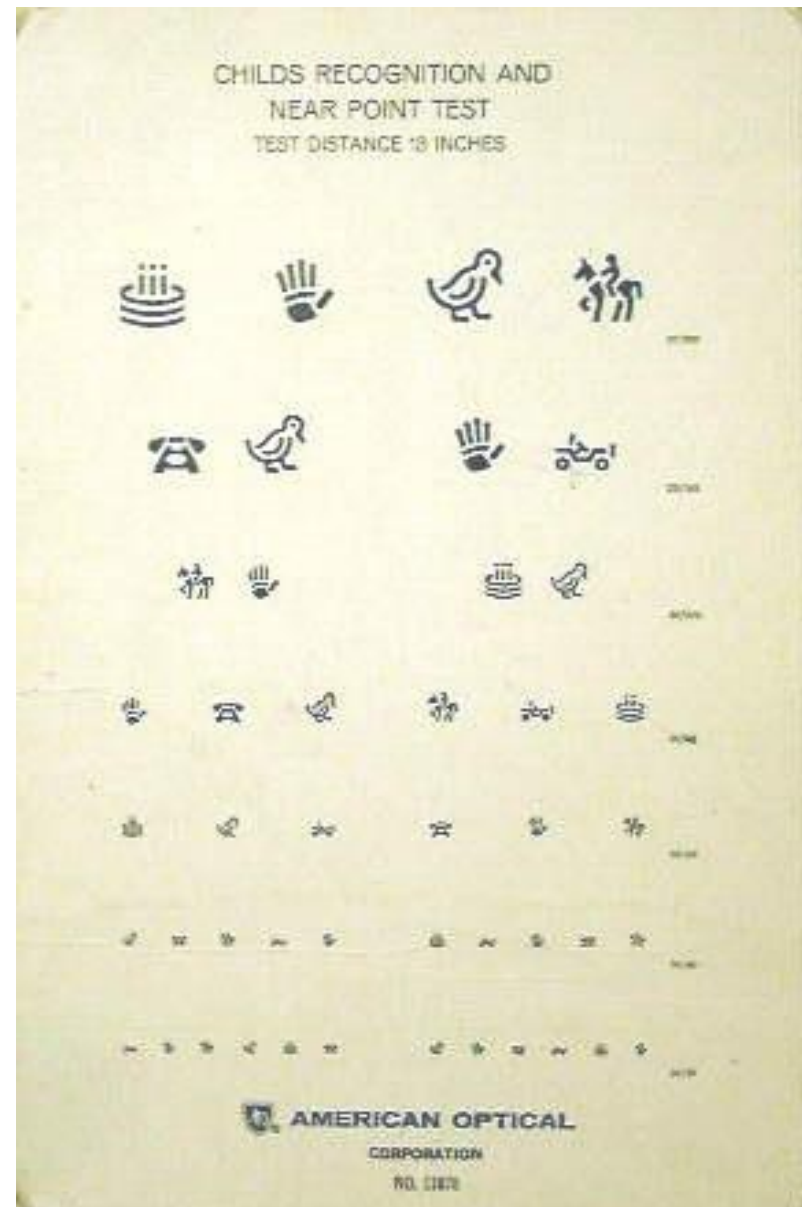


OPTO-KINETIC NYSTAGMUS (OKN)

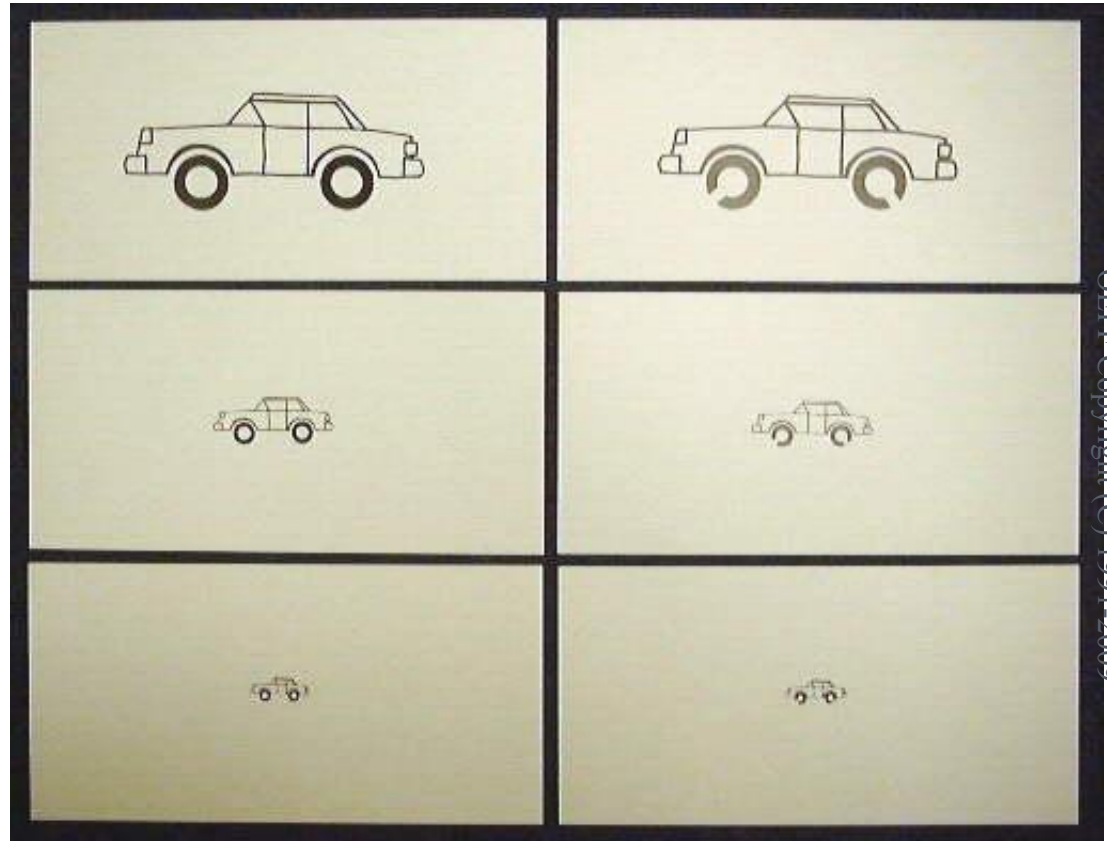




Picture Chart for working with children



The Broken
Wheel Test
from Bernell
Corporation
done by Dr.
Jack Richmond
of NEWENCO



OEPE Copyright (C) 1991-2009

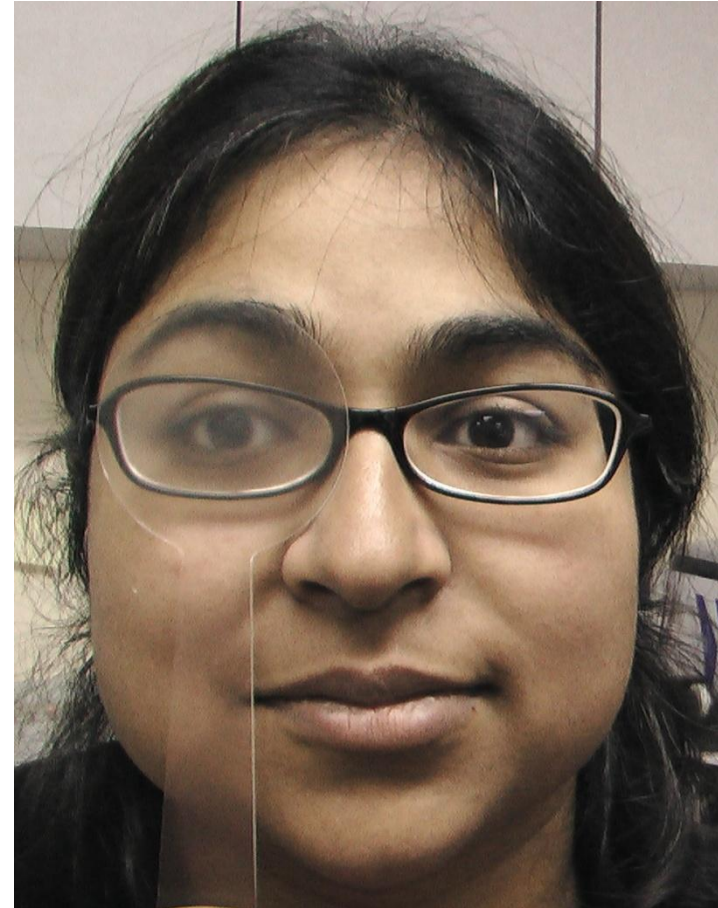


COVER TEST

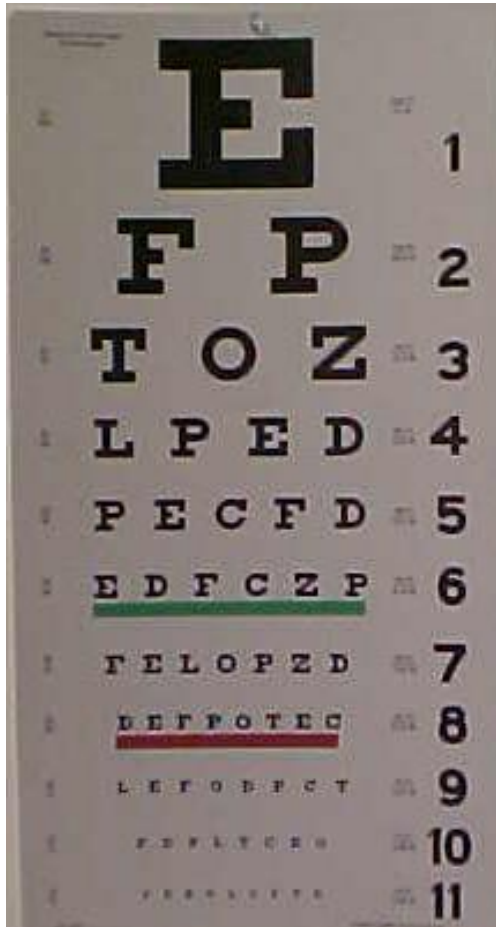
- There are two parts to this test the *alternate cover* and the *cover-uncover*.
- What questions does each part ask of the person?



COVER TESTING – TRANSLUCENT OCCLUDER



COVER TESTING – TRANSLUCENT OCCLUDER



COVER TEST (2)

- Cover-Uncover: This asks the question, “Are you a strabismic?” We should get the answer to this question first.
- We can look at the “uncover” and it can give us insight as to how long it takes to recover binocular fixation as well as the degree of fragility of binocularity.
- However, generally the “uncover” is something you need to do to be ready to observe the next “cover”.



COVER TEST (3)

- Alternate cover: Here we continue alternating, quickly moving the cover when we move it, and not allowing a period where both eyes are open as the cover moves from one side to the other.
- We watch for changes in the angle and continue until some steady state is reached. If none is, then record your observations.



COVER TEST (4)

- Repeat the entire sequence at near.
- Observations that are unusual may suggest modifying the testing procedure to get better insight into how the person is trying to use their eyes to derive meaning and direct action.



OCULAR MOTILITIES

- As observed in the examination we do not test as separate entities *pursuits* and *saccades*.
- We move the Wolff wand in a pattern that moves through the developmental stages of ocular motilities or tracking until we find their current level of development. The pattern evolves along the developmental lines.
- Observations are made of many things, including those not listed.



OCULAR MOTILITY TESTING

| Stages of Development | Type of Tracking |
|------------------------------|-------------------------|
| Early | No relation to target |
| | Whole body |
| | Upper body |
| Middle | |
| | Head |
| | |
| Late | Eyes only |

OCULAR MOTILITY TESTING (2)

| Stages of Development | Pattern |
|------------------------------|----------------|
| Early | Horizontal |
| | Vertical |
| | Diagonals |
| Middle | Circles |
| | Z-Axis |
| | Stop/Start |
| Late | Speed Change |

OCULAR MOTILITY TESTING (3)

| Stages of Development | Quality |
|------------------------------|----------------|
| Early | Poor (with #) |
| | Poor |
| | Fair |
| Middle | |
| | Good |
| | |
| Late | Excellent |

OCULAR MOTILITY TESTING

- By the age of 5.5-6.5 the person should have learned to use the eyes free of the rest of the body. This is a very important part of vision development.
 - If not differentiated this may affect the ability to know where they are in space, where the object is in space, or the ability to sustain visual attention.
 - May communicate to people using the concept of the attention sphere with changing sizes and shifts of accuracy.



NPC/CNP

- Depending on which school you went to this test might have been called:
 - Near Point of Convergence (NPC) or
 - Convergence Near Point (CNP)
- What is being asked of the patient?



NPC/CNP (2)

- How close to you can you continue using both channels to derive meaning and direct action?
- Slowly move the Wolff wand on the midline and at eye-level, towards the patient observing and mentally recording what you see.



NPC/CNP THINGS TO NOTE

- Break: distance from patient
- Recovery: distance from patient
- Subjective awareness of double: yes or no? Also, if they did report seeing double did it happen at the same time you observed the shift if relative eye position?
- Which eye turned?
- Any other comments by the patient: affect?



REACH GRASP RELEASE

- Z-axis saccade.
- There are different ramp/step functions in the neurology. CNP/NPC ability may or may not be reflected in the RGR distance. These are different neurologically.
- Record the closest distance the person could shift to from an intermediate distance.



REACH GRASP RELEASE (2)

- Also observe:
 - Which eye leads?
 - Does the same eye lead in both directions?
 - Do both eyes move in and out at the same speed?
 - What is the quality of the movements you observe?



The Worth 4 dot used at both distance and near to assess basic binocularity.



WORTH 4 DOT +/- 2.00 FLIPPERS



WORTH 4-DOT

- What question is this asking of the patient?
- How solid and accurate is the patient's sense of "where is it" in space and can they use both channels together simultaneously?
- Can they maintain their spatial references (Kraskin's *spatial computing*) in the face of challenges to Identification?

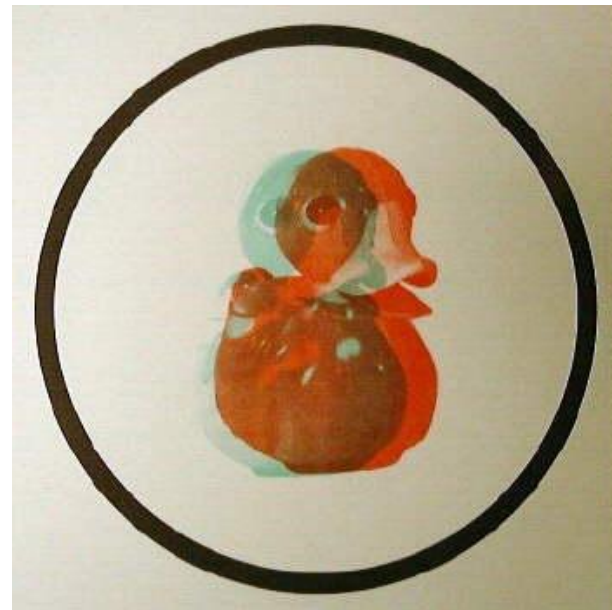
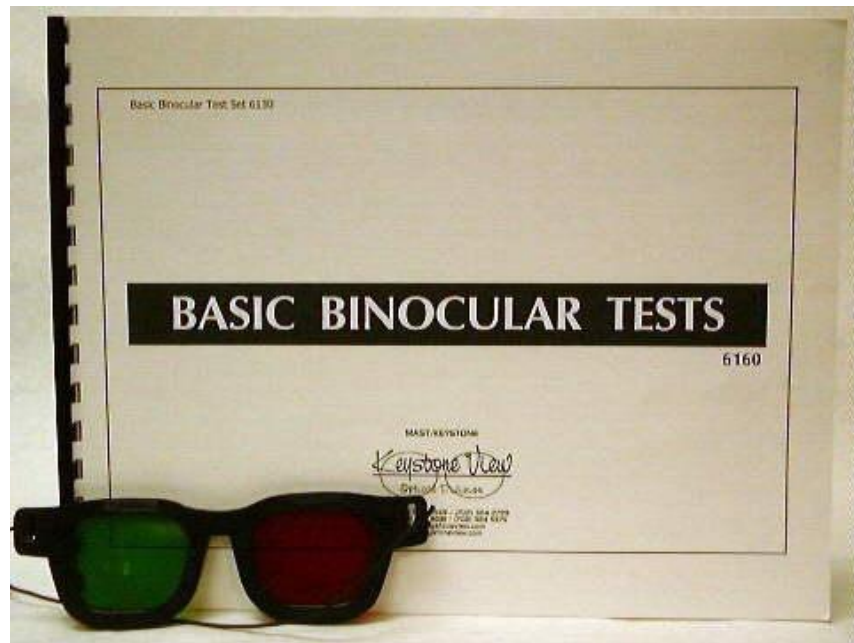


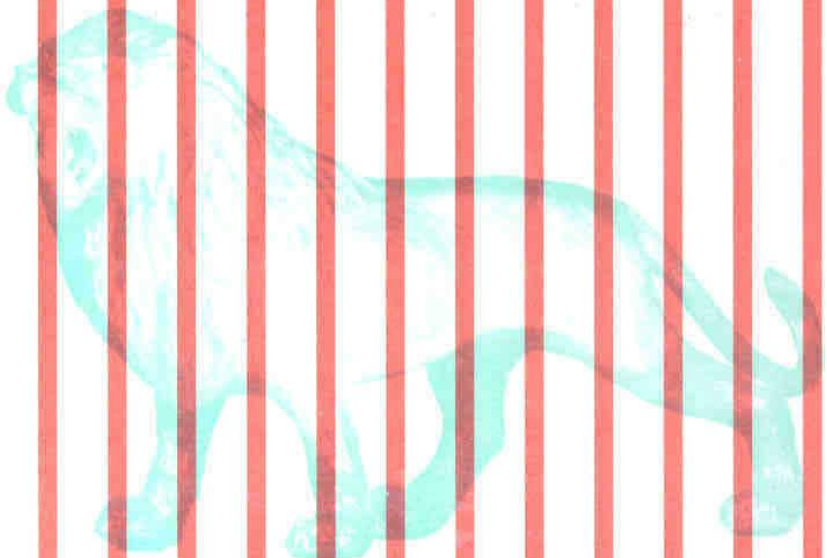
WORTH 4-DOT RESPONSES

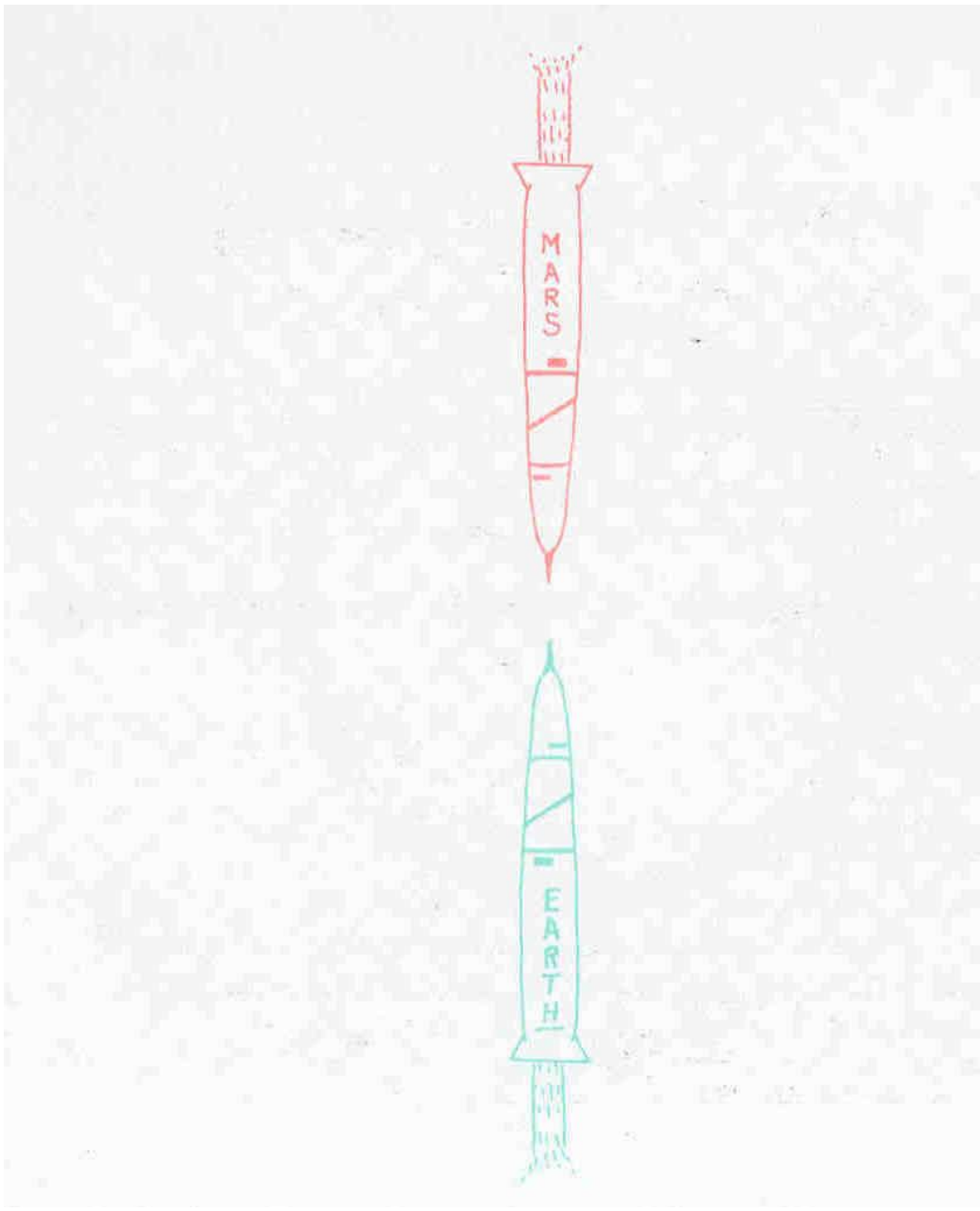
- 4 dots seen: both channels on and space computed accurately (unless they are a strabismic with AP!).
- 2 dots seen: functioning single-sided at that moment.
- 5 dots seen: both channels on but space is not being computed correctly. Patterns could be in, out, or vertically misaligned.

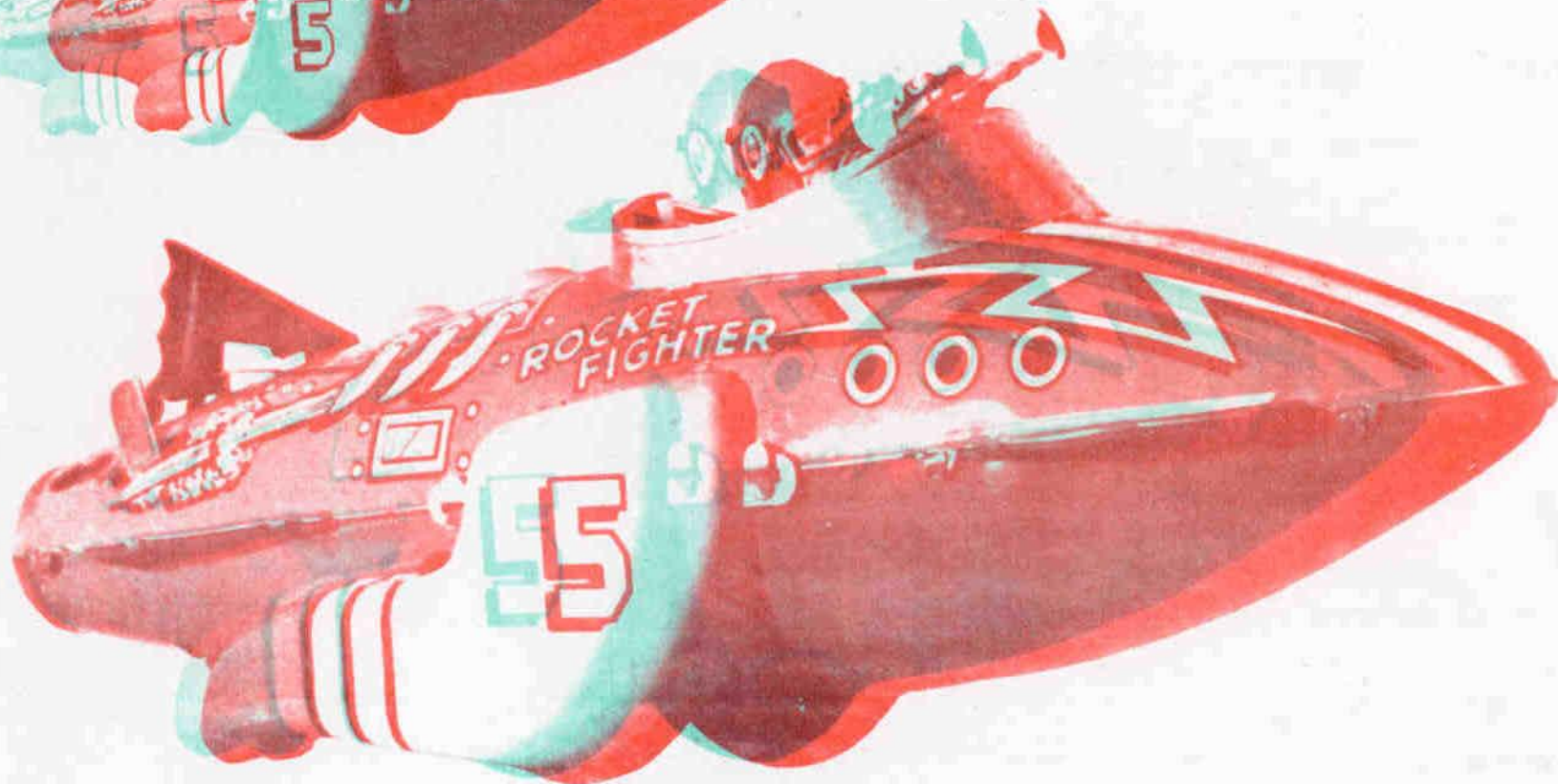


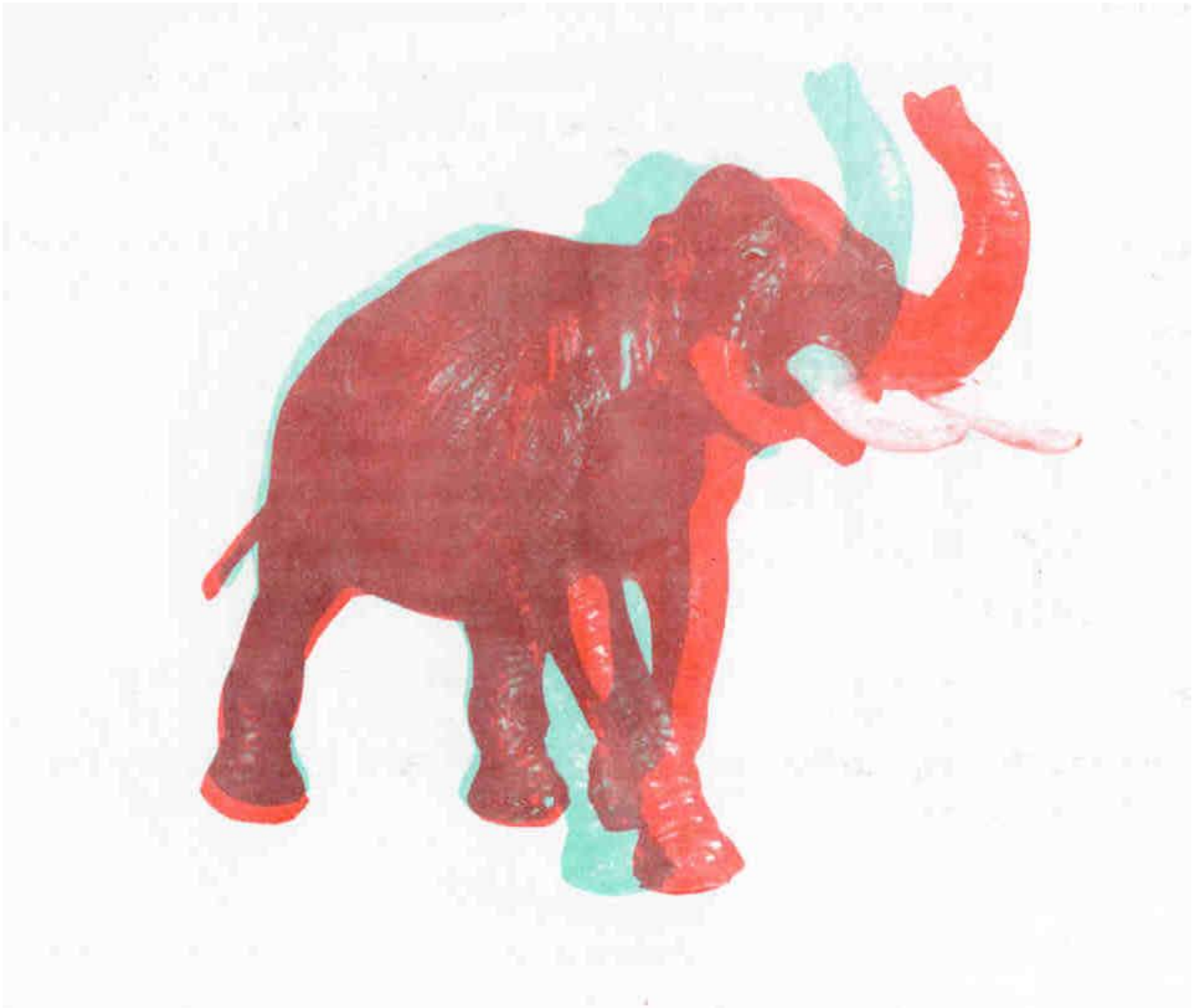
KEYSTONE BASIC BINOCULAR TEST



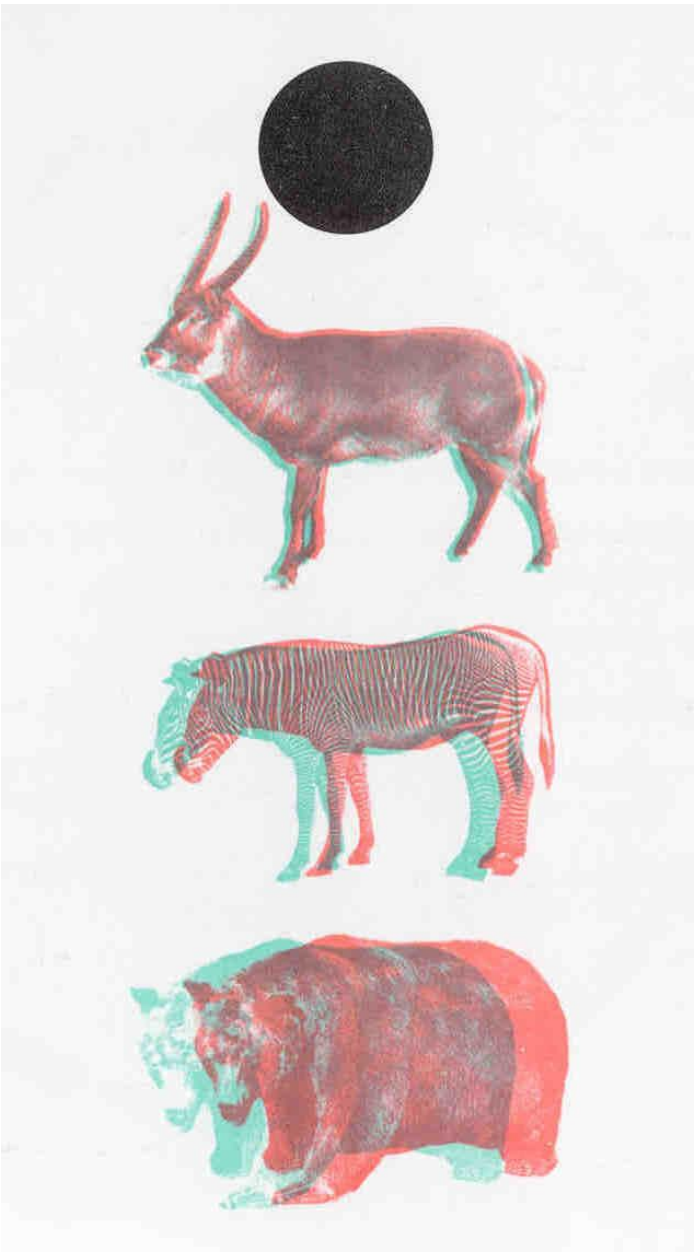


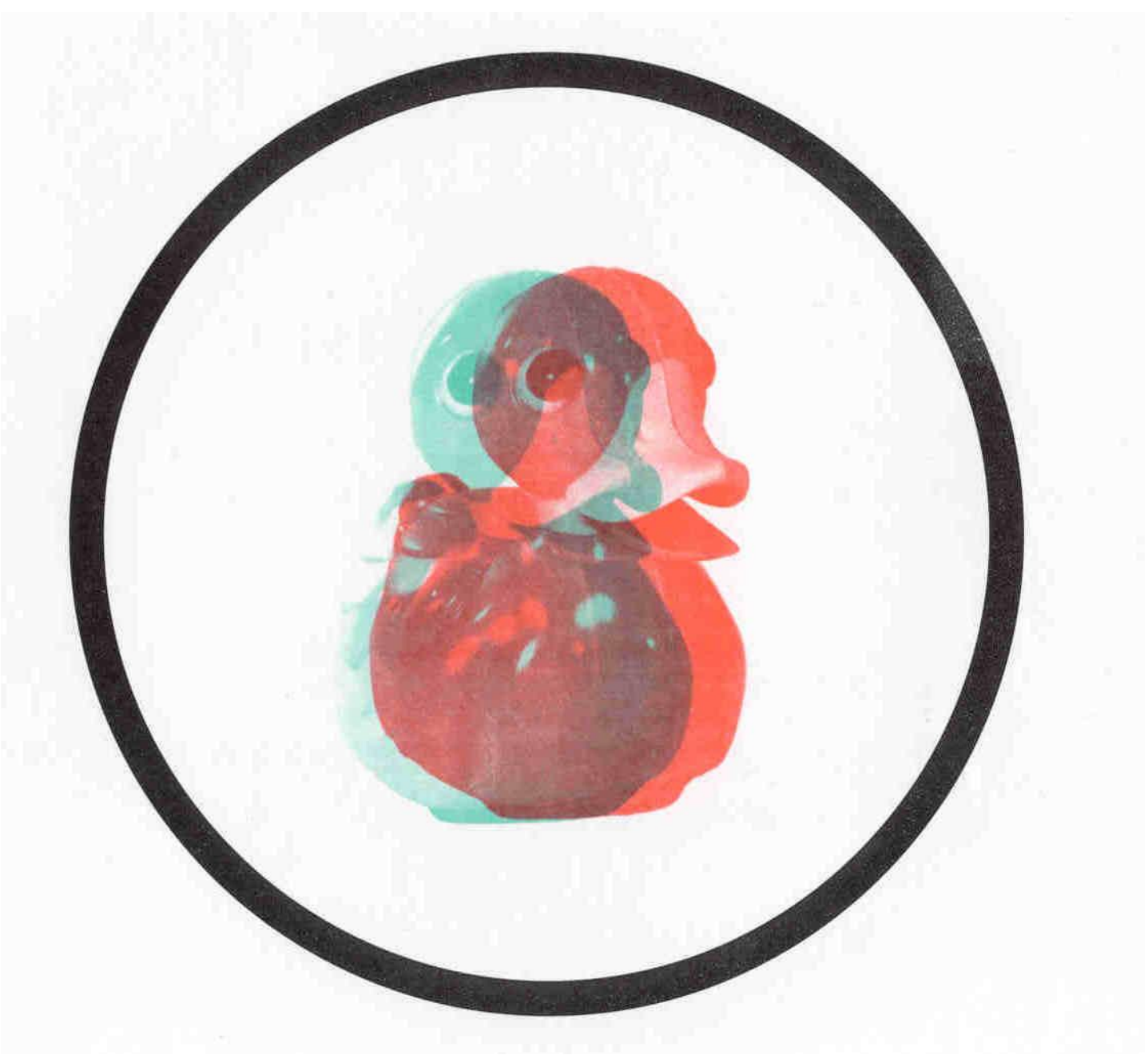






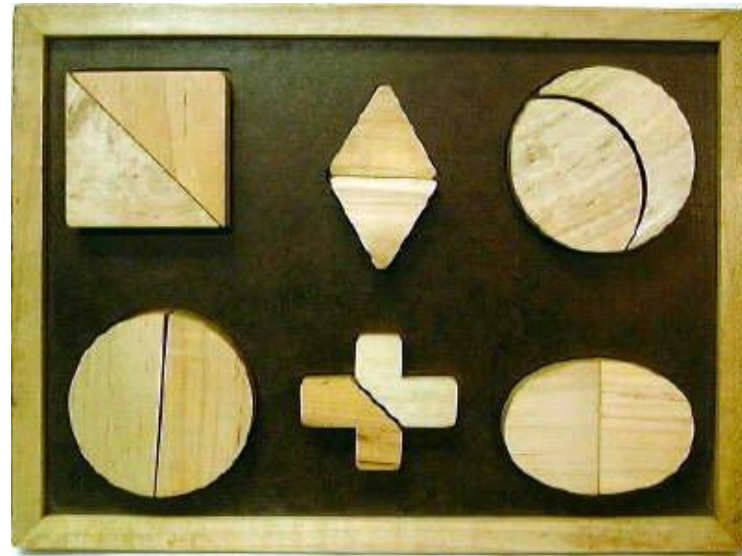
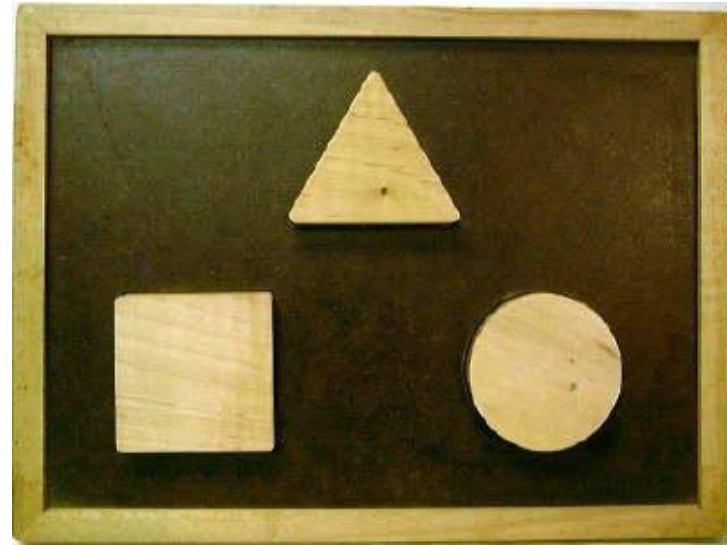
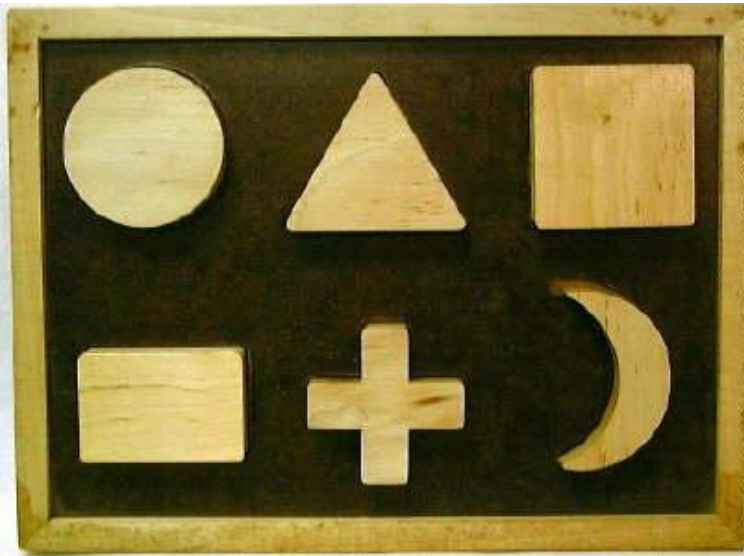




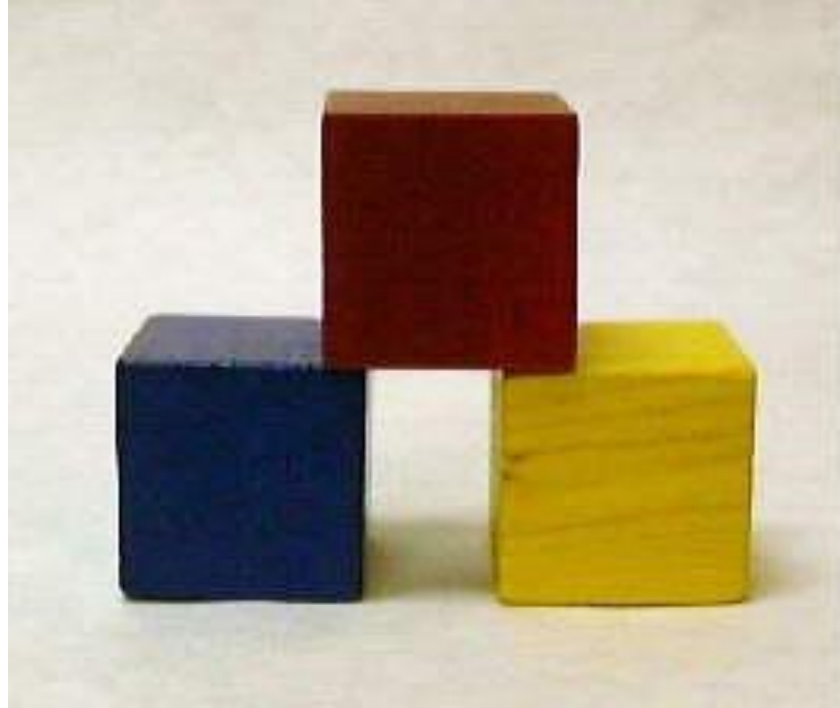




Form puzzles, 3,
6 & 12 piece
puzzles.



The Piaget 3-Block Bridge



COLOR VISION TESTING

- Testing should be done monocularly. Asymmetries in color perception may be a subtle indication of pathology.
- Types
 - Ishihara
 - Dvorine
 - D-15 regular & desaturated
 - D-100 regular & desaturated
 - CVT computer interactive color testing



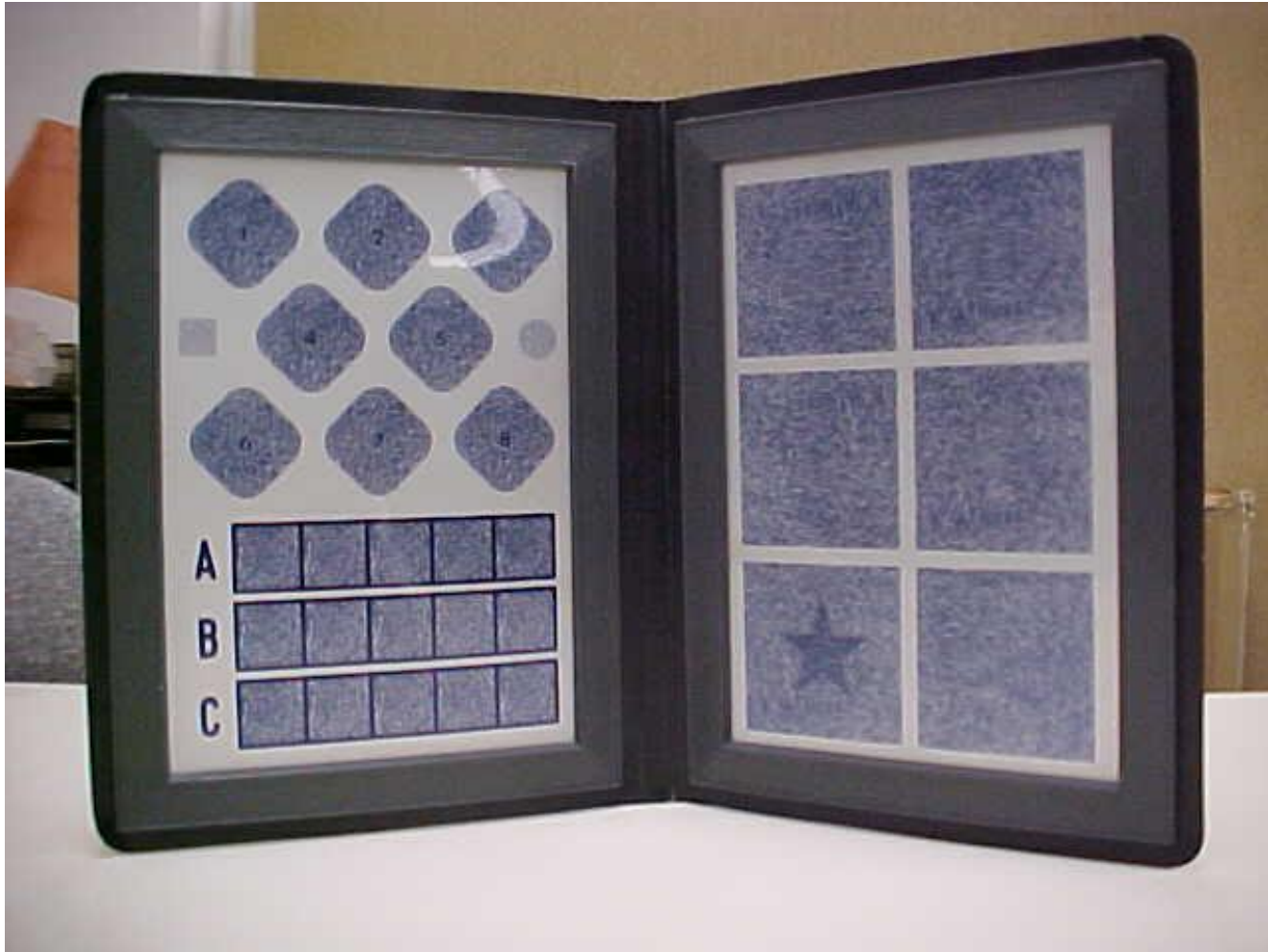
STEREO ACUITY TESTING

□ Different types:

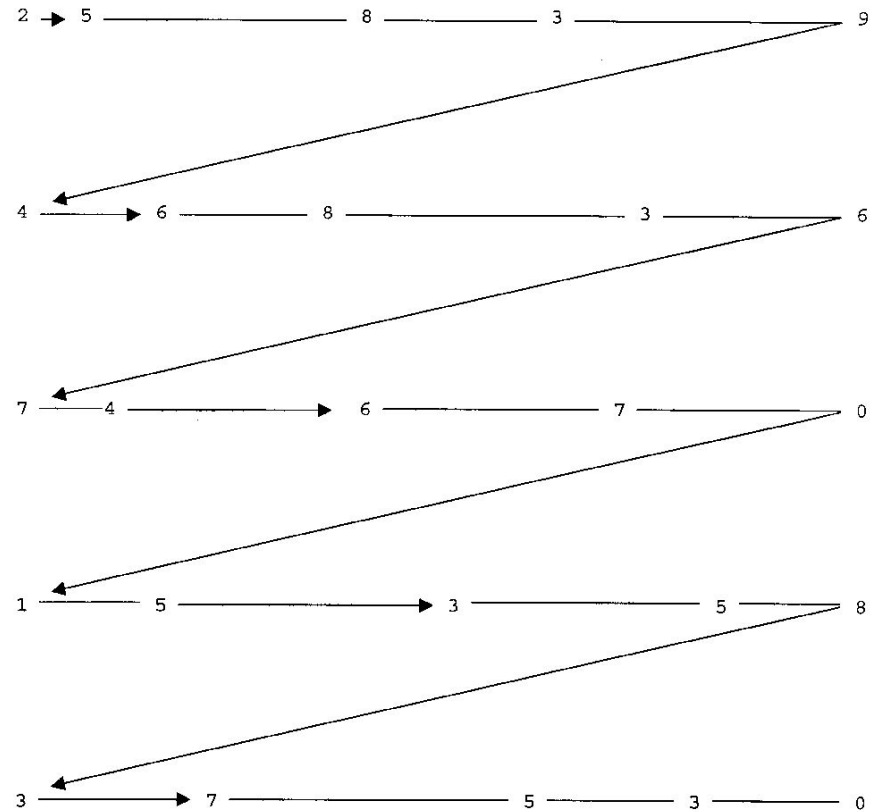
- Global vs. Local
- Randot vs. Contour
- Randot everything vs. Randot background only
- Wirt circles
- Viewer free



RANDOT STEREO



KING-DEVIC NYSOA SACCADIC TEST



Demonstration Card



KD NYSOA TEST 1

2 ----- 5 ----- 8 ----- 0 ----- 7

3 --- 7 ----- 9 ----- 4 ----- 6

5 ----- 3 ----- 1 ----- 6 --- 4

7 ----- 9 ----- 7 ----- 3 ----- 5

1 --- 5 ----- 4 ----- 9 ----- 2

6 ----- 5 ----- 5 ----- 7 ----- 3

3 --- 1 ----- 8 ----- 6 ----- 4

5 ----- 3 ----- 7 ----- 5 ----- 2



KD NYSOA TEST 2

| | | | | | |
|---|---|---|---|--|---|
| 3 | 7 | 5 | 9 | | 0 |
| 2 | 5 | 7 | 4 | | 6 |
| 1 | 4 | 7 | 6 | | 3 |
| 7 | 9 | 3 | 9 | | 0 |
| 4 | 5 | 2 | 1 | | 7 |
| 5 | 3 | 7 | 4 | | 8 |
| 7 | 4 | 6 | 5 | | 2 |
| 9 | 0 | 2 | 3 | | 6 |



KD NYSOA TEST 3

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 5 | | 4 | | 1 | | 8 | | 0 |
| 4 | | 6 | | 3 | | 5 | | 9 |
| 7 | | | 5 | | 4 | 2 | | 7 |
| 3 | | 2 | | 6 | | | 9 | 4 |
| 1 | | 4 | | | 5 | | 1 | 3 |
| 9 | | | 3 | 4 | | | 8 | 5 |
| 5 | 1 | | | 6 | | | 3 | 1 |
| 4 | | 3 | | | 5 | 2 | | 7 |

Test III



KD NYSOA SCORE SHEET

NYSOA K-D TESTS

Sample Score Sheet

I
2-5-8-0-7
3-7-9-4-6
5-3-1-6-4
7-9-7-3-5
1-5-4-9-2
6-5-5-7-3
3-1-8-6-4
5-3-7-5-2

II
3-7-5-9-0
2-5-7-4-6
1-4-7-6-3
7-9-3-9-0
4-5-2-1-7
5-3-7-4-8
7-4-6-5-2
9-0-2-3-6

III
5-4-1-8-0
4-6-3-5-9
7-5-4-2-7
3-2-6-9-4
1-4-5-1-3
9-3-4-8-5
5-1-6-3-1
4-3-5-2-7

| | | Average Time (by age) | | | |
|-----------|----|-----------------------|-------|-------|--------|
| | | I | II | III | Total |
| Time | 6 | 30.98 | 37.05 | 51.00 | 119.03 |
| Deviation | 6 | 10.10 | 12.96 | 19.39 | 40.92 |
| Time | 7 | 26.71 | 31.12 | 43.06 | 100.89 |
| Deviation | 7 | 5.97 | 8.75 | 15.36 | 25.16 |
| Time | 8 | 22.98 | 24.89 | 31.26 | 79.13 |
| Deviation | 8 | 6.37 | 7.75 | 11.59 | 27.35 |
| Time | 9 | 21.02 | 22.89 | 29.53 | 73.44 |
| Deviation | 9 | 7.20 | 7.50 | 10.82 | 26.03 |
| Time | 10 | 19.72 | 20.79 | 27.76 | 68.27 |
| Deviation | 10 | 6.08 | 7.37 | 10.21 | 26.22 |
| Time | 11 | 17.58 | 18.95 | 20.39 | 56.92 |
| Deviation | 11 | 4.60 | 4.51 | 7.45 | 13.85 |
| Time | 12 | 16.94 | 17.68 | 19.42 | 54.04 |
| Deviation | 12 | 3.60 | 4.43 | 5.31 | 13.51 |
| Time | 13 | 16.29 | 16.96 | 18.98 | 52.23 |
| Deviation | 13 | 2.52 | 2.72 | 3.26 | 7.50 |
| Time | 14 | 14.86 | 16.87 | 18.73 | 50.46 |
| Deviation | 14 | 2.40 | 2.33 | 2.49 | 5.84 |

| | | | |
|--|--|--|--|
| | | | |
|--|--|--|--|

TIME

I

II

III

Total

| | | Average Errors (by age) | | | Total |
|--|--|-------------------------|------|-------|-------|
| | | I | II | III | Total |
| | | 1.32 | 3.81 | 10.84 | 16.97 |
| | | 1.12 | 2.10 | 8.75 | 11.97 |
| | | .34 | .53 | 2.48 | 3.35 |
| | | .28 | .45 | 2.02 | 2.75 |
| | | .28 | .43 | 1.12 | 1.83 |
| | | .25 | .33 | .62 | 1.20 |
| | | .18 | .21 | .44 | .83 |
| | | .12 | .12 | .36 | .59 |
| | | .07 | .07 | .33 | .47 |

| | | | |
|--|--|--|--|
| | | | |
|--|--|--|--|

ERRORS

I

II

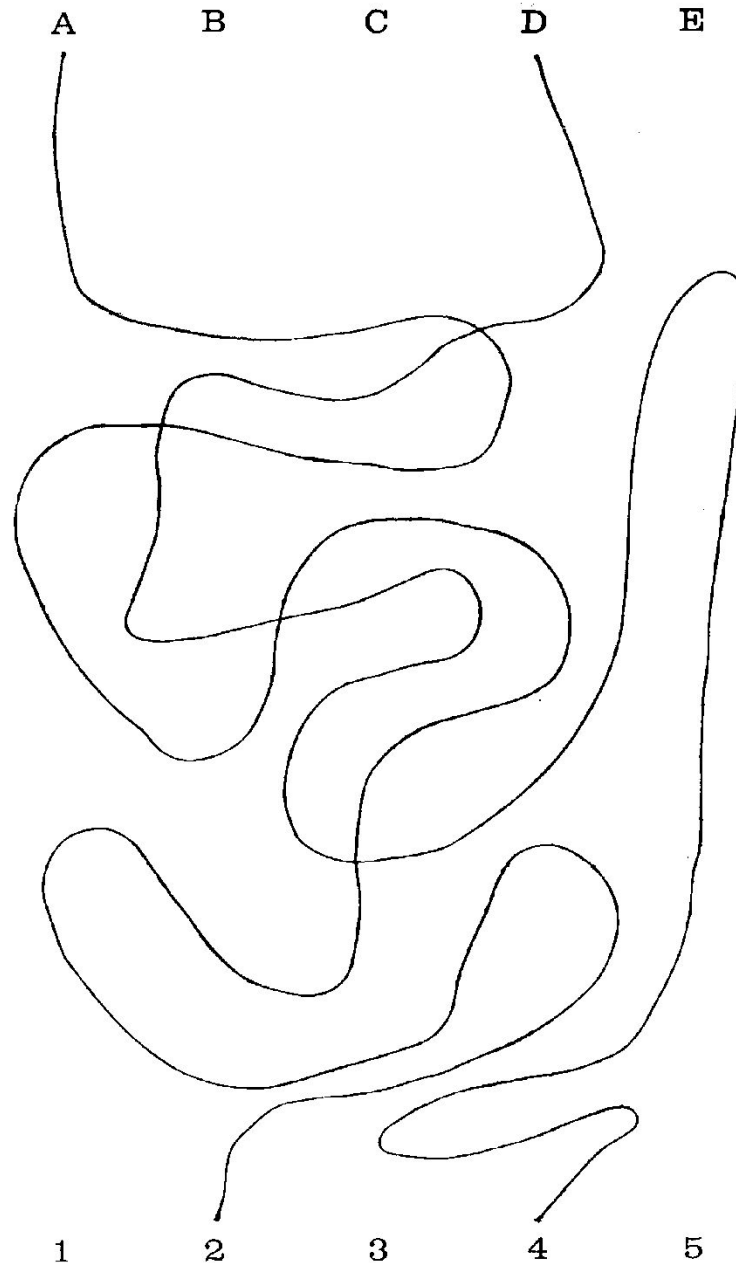
III

Total



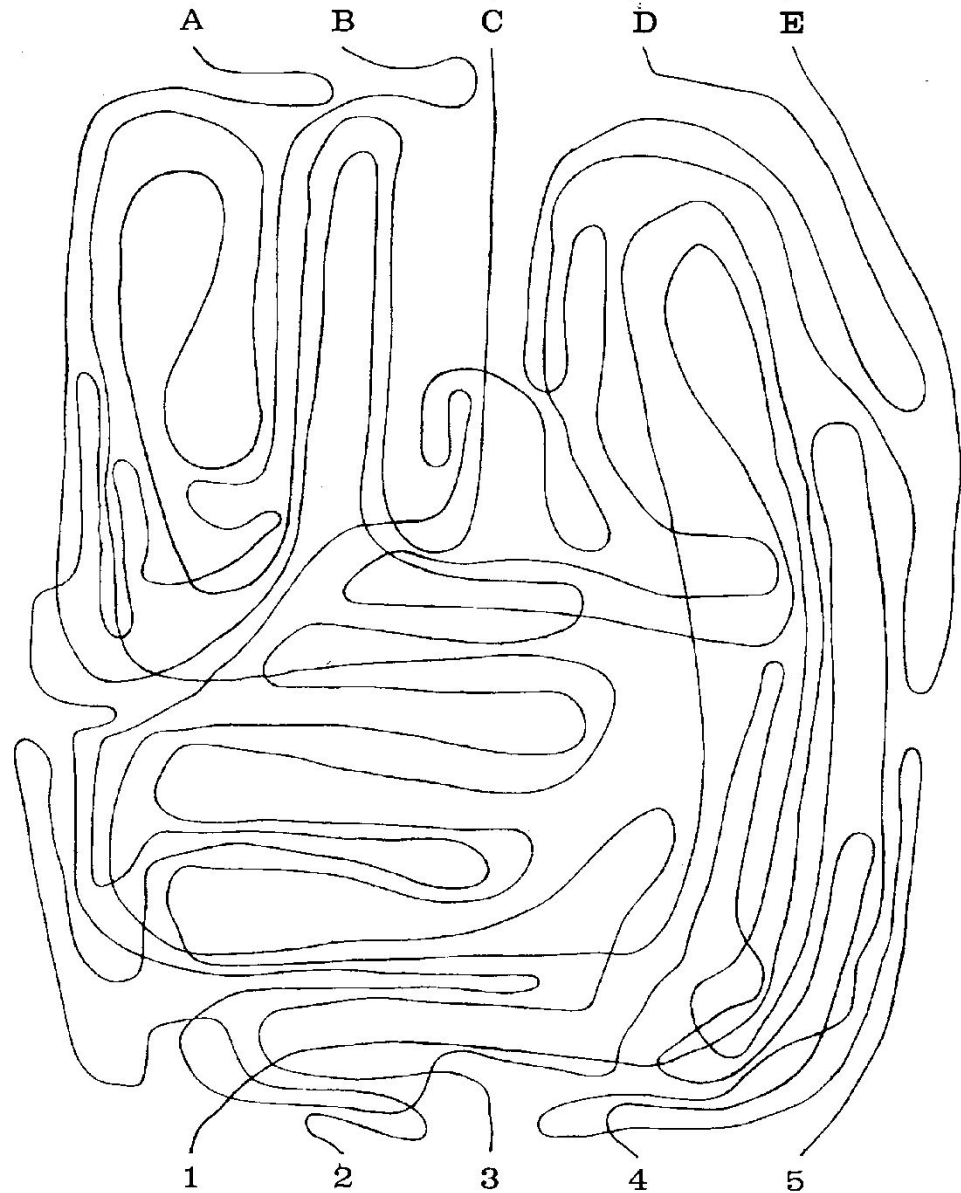
GROFFMAN VISUAL TRACING

Demonstration Card



GROFFMAN TEST 1

Visual Tracing Test Form "A"



GROFFMAN SCORING 1

GROFFMAN VISUAL TRACING TEST

Name: _____ Date: _____ Code: _____

Chronological Age: _____

Test Score: _____

Performance Age: _____

Rating: _____

Test Form "A"

| | | | | | | Seconds | Points |
|---|---|---|---|---|---|---------|--------|
| A | 1 | 2 | 3 | 4 | 5 | _____ | _____ |
| B | 1 | 2 | 3 | 4 | 5 | _____ | _____ |
| C | 1 | 2 | 3 | 4 | 5 | _____ | _____ |
| D | 1 | 2 | 3 | 4 | 5 | _____ | _____ |
| E | 1 | 2 | 3 | 4 | 5 | _____ | _____ |
| | | | | | | Score: | _____ |

Test Form "B"

| | | | | | | Seconds | Points |
|---|---|---|---|---|---|---------|--------|
| A | 1 | 2 | 3 | 4 | 5 | _____ | _____ |
| B | 1 | 2 | 3 | 4 | 5 | _____ | _____ |
| C | 1 | 2 | 3 | 4 | 5 | _____ | _____ |
| D | 1 | 2 | 3 | 4 | 5 | _____ | _____ |
| E | 1 | 2 | 3 | 4 | 5 | _____ | _____ |
| | | | | | | Score: | _____ |



GROFFMAN SCORING 2

SCALE FOR SCORING TESTS:

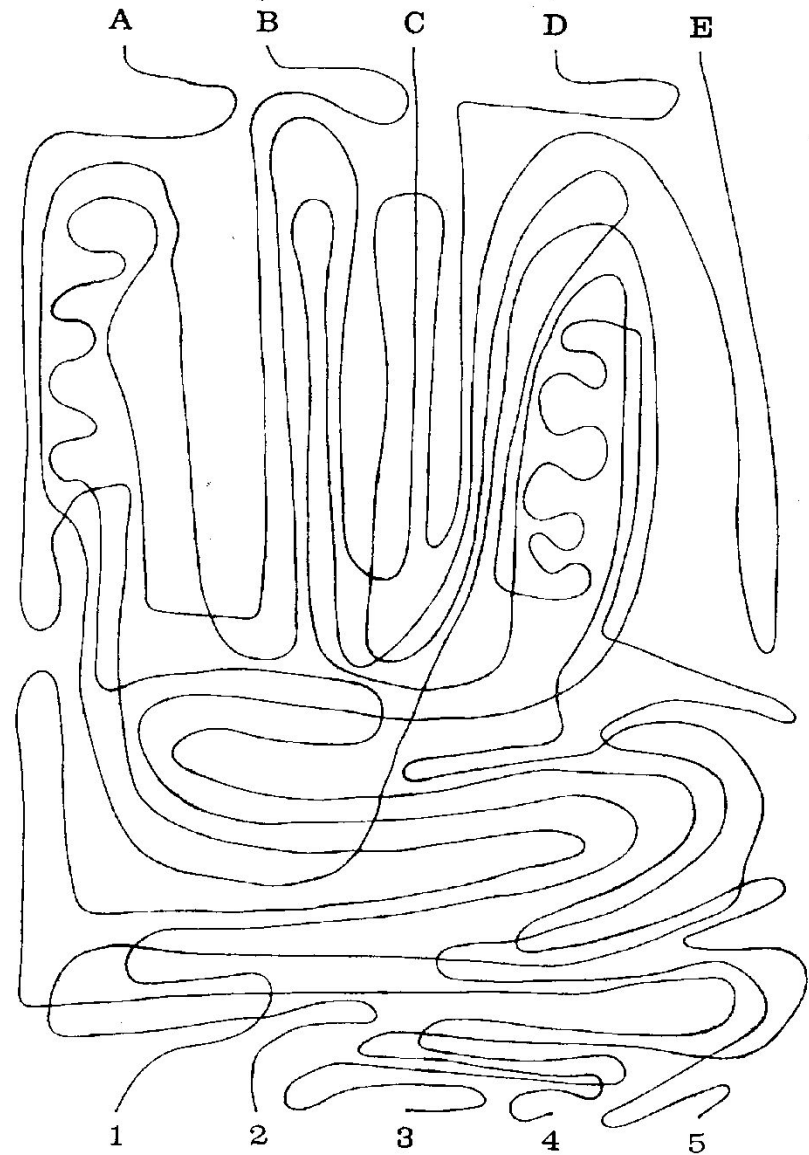
| <u>Seconds Elapsed</u> | <u>Number of Points</u> |
|------------------------|-------------------------|
| below 16 | 10 |
| 16-20 | 9 |
| 21-25 | 8 |
| 26-30 | 7 |
| 31-35 | 6 |
| 36-40 | 5 |
| 41-45 | 4 |
| 46-50 | 3 |
| 50-60 | 2 |
| over 60 | 1 |

TEST SCORES:

| <u>Age</u> | <u>Mean Score</u> | <u>S.D.</u> |
|------------|-------------------|-------------|
| 7 | 10 | 3.5 |
| 8 | 17 | 3.0 |
| 9 | 22 | 2.0 |
| 10 | 26 | 2.5 |
| 11 | 28 | 3.0 |
| 12 & Over | 32 | 4.0 |



Visual Tracing Test Form "B"



GROFFMAN
TEST
SAMPLE B



WOLD SENTENCE COPY TEST

Four men and a jolly boy came out of
the black and pink house quickly to see
the bright violet sun, but the sun was
hidden behind a cloud.

Name _____ Age _____ Time _____

2 166.3 3 157.0 4 144.1 5 130.6 6 121.1 7 113.7 8 105.0



JORDAN
LEFT/RIGHT
REVERSAL
TEST PART I

Level I (ages 6-12)

N P A H S E J M R

X C T D B O V L

S W G J U F I K Q

Letter Error Score

7 0 3 2 5 7 9

1 P 4 8 3 2 6

Number Error Score




Level I Total Error Score




Stop


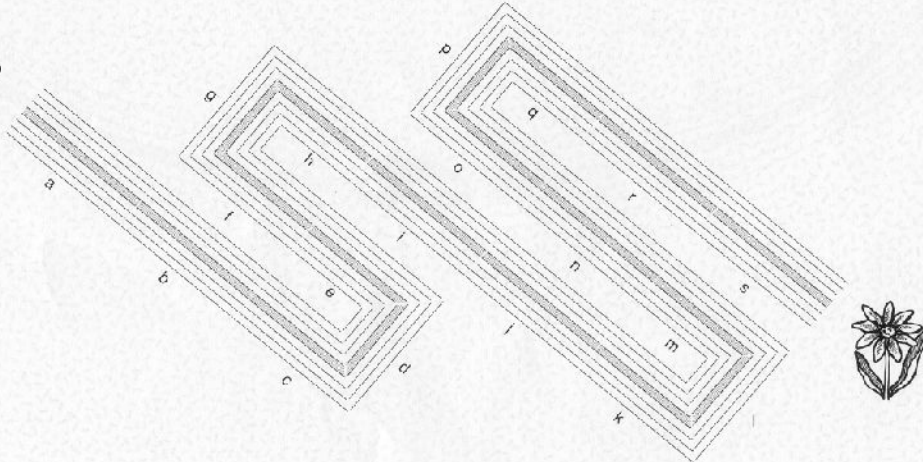

DEVELOPMENTAL TEST OF VISUAL PERCEPTION II

Subtest 1: Eye-Hand Coordination

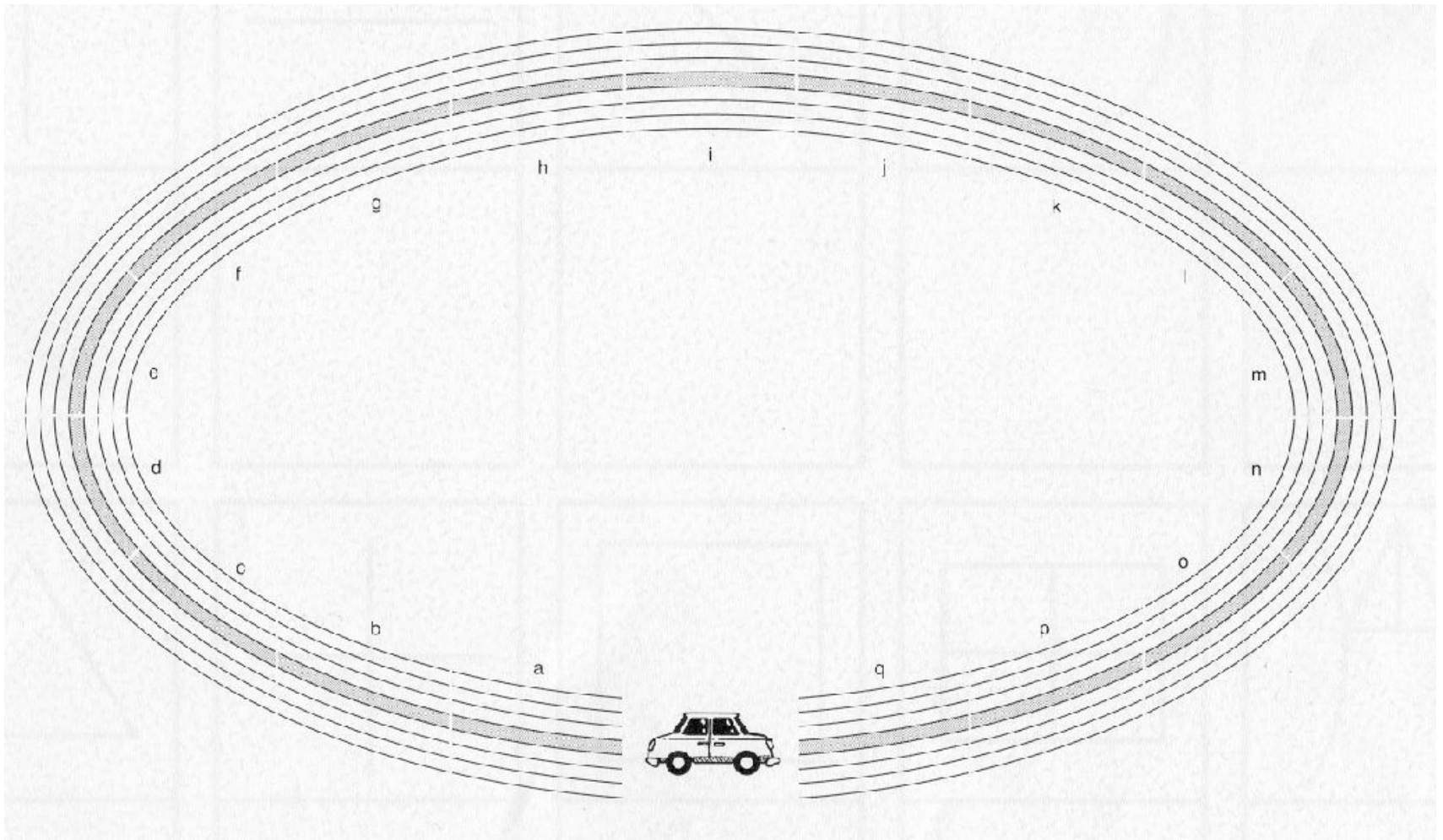
Example

1.   

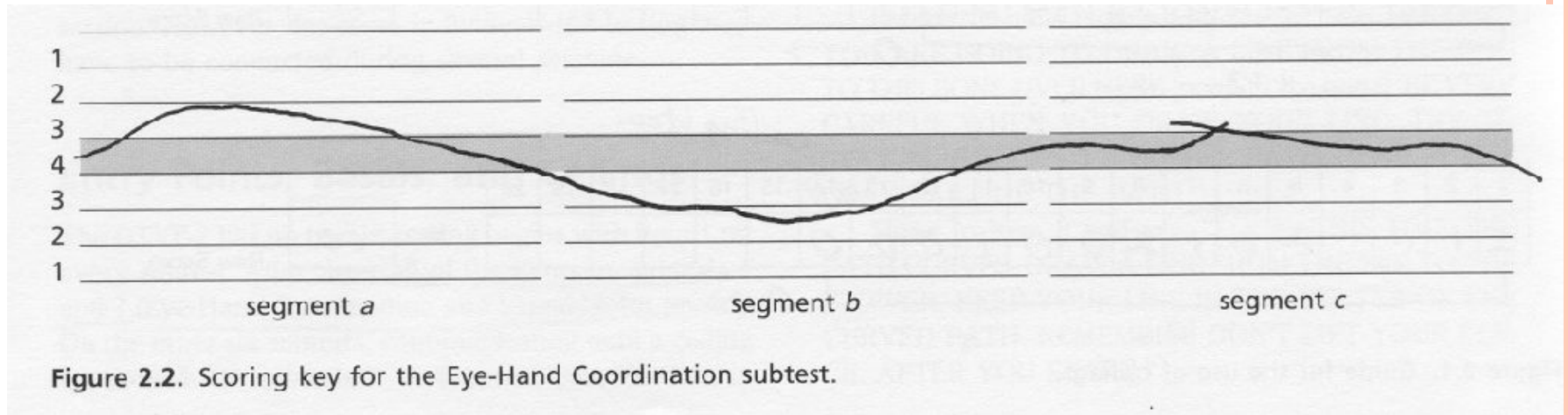
2.   

3.   

DEVELOPMENTAL TEST OF VISUAL PERCEPTION II



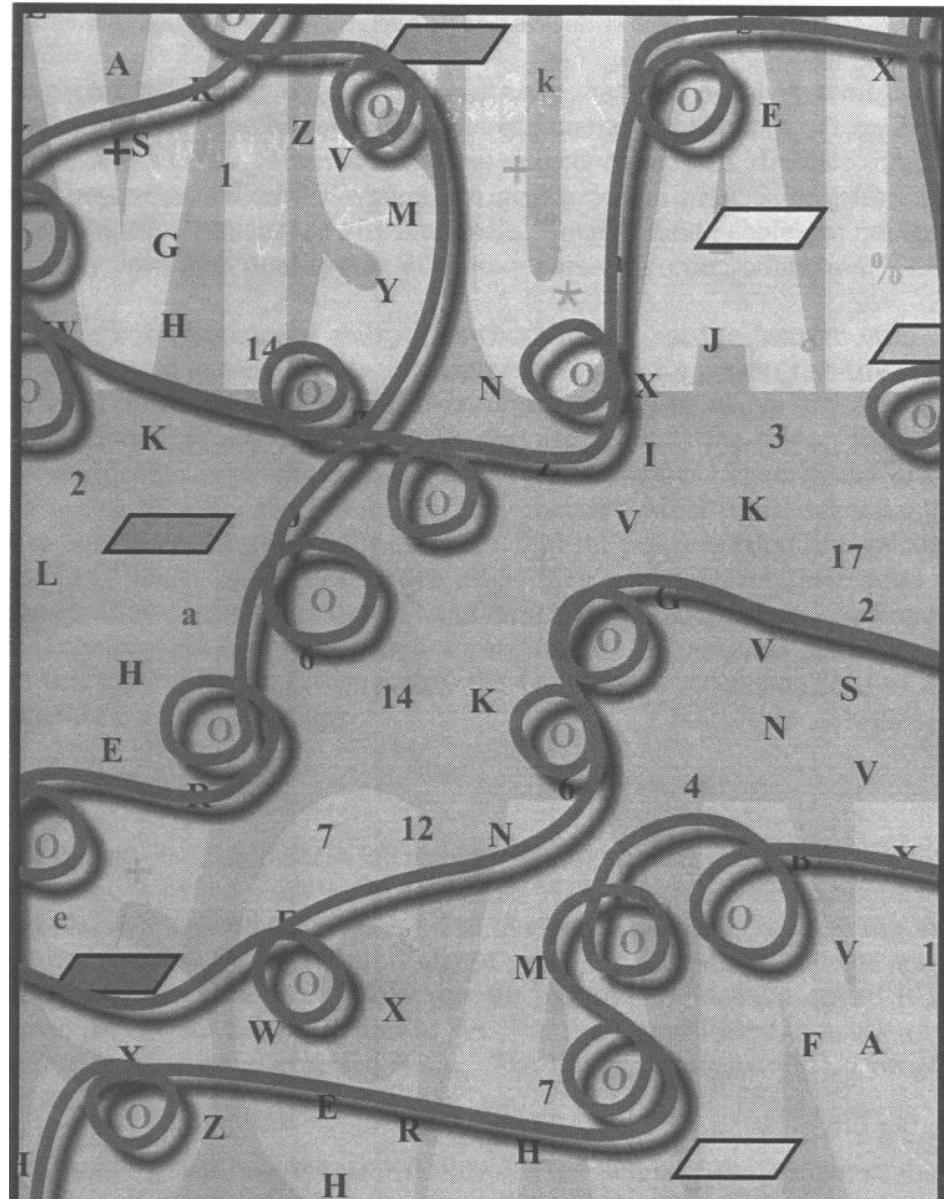
DEVELOPMENTAL TEST OF VISUAL PERCEPTION II



| Age Equiv. | EH |
|------------|---------|
| <3-11 | <87 |
| 3-11 | 87-88 |
| 4-0 | 89-90 |
| 4-1 | 91 |
| 4-2 | 92-94 |
| 4-3 | 95-97 |
| 4-4 | 98-99 |
| 4-5 | 100-102 |
| 4-6 | 103-105 |
| 4-7 | 106-108 |
| 4-8 | 109-110 |
| 4-9 | 111-113 |
| 4-10 | 114-115 |
| 4-11 | 116-118 |
| 5-0 | 119-120 |
| 5-1 | 121-123 |
| 5-2 | 124-125 |
| 5-3 | 126-127 |
| 5-4 | 128-129 |
| 5-5 | 130-131 |
| 5-6 | 132-133 |
| 5-7 | 134-135 |
| 5-8 | 136-137 |
| 5-9 | 138-139 |
| 5-10 | 140-141 |
| 5-11 | 142-143 |
| 6-0 | 144-145 |
| 6-1 | 146-147 |
| 6-2 | 148-149 |
| 6-3 | 150 |
| 6-4 | — |
| 6-5 | — |
| 6-6 | 151 |
| 6-7 | 152 |
| 6-8 | — |
| 6-9 | 153 |
| 6-10 | — |
| 6-11 | 154 |
| 7-0 | 155 |
| 7-1 | — |
| 7-2 | 156 |
| 7-3 | — |
| 7-4 | 157 |
| 7-5 | — |
| 7-6 | 158 |
| 7-7 | 159 |
| 7-8 | — |
| 7-9 | 160 |
| 7-10 | — |
| 7-11 | 161 |
| 8-0 | — |
| 8-1 | 162 |
| 8-2 | 163 |
| 8-3 | — |

DEVELOPM ENTAL TEST OF VISUAL PERCEPTIO N II

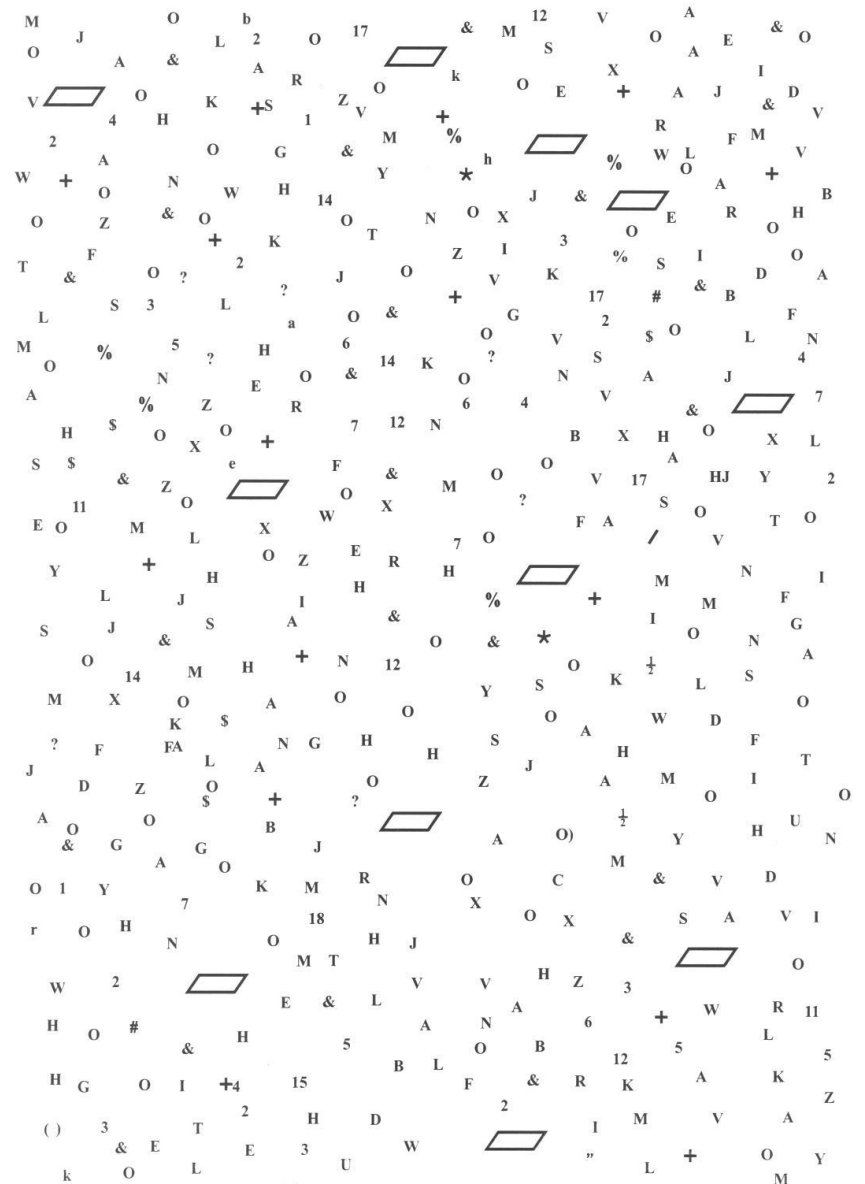
| Age Equiv. | EH |
|------------|------|
| 8-4 | 164 |
| 8-5 | — |
| 8-6 | 165 |
| 8-7 | — |
| 8-8 | 166 |
| 8-9 | — |
| 8-10 | — |
| 8-11 | — |
| 9-0 | 167 |
| 9-1 | — |
| 9-2 | 168 |
| 9-3 | — |
| 9-4 | — |
| 9-5 | — |
| 9-6 | 169 |
| 9-7 | — |
| 9-8 | 170 |
| 9-9 | — |
| 9-10 | — |
| 9-11 | 171 |
| 10-0 | — |
| 10-1 | 172 |
| 10-2 | — |
| 10-3 | — |
| 10-4 | — |
| 10-5 | 173 |
| 10-6 | — |
| 10-7 | — |
| 10-8 | 174 |
| 10-9 | — |
| 10-10 | — |
| 10-11 | — |
| 11-0 | 175 |
| 11-1 | — |
| 11-2 | 176 |
| >11-2 | >176 |



DAVIS SCAN TEST

THE TEST FORM

INSTRUCTIONS:
CONNECT AS MANY
“O’S” AS YOU CAN IN
ONE MINUTE.



29

AGE 9

32

AGE 10

35

AGE 11 38

AGE 12

41

AGE 13

44

AGE 14

47

AGE 15

50

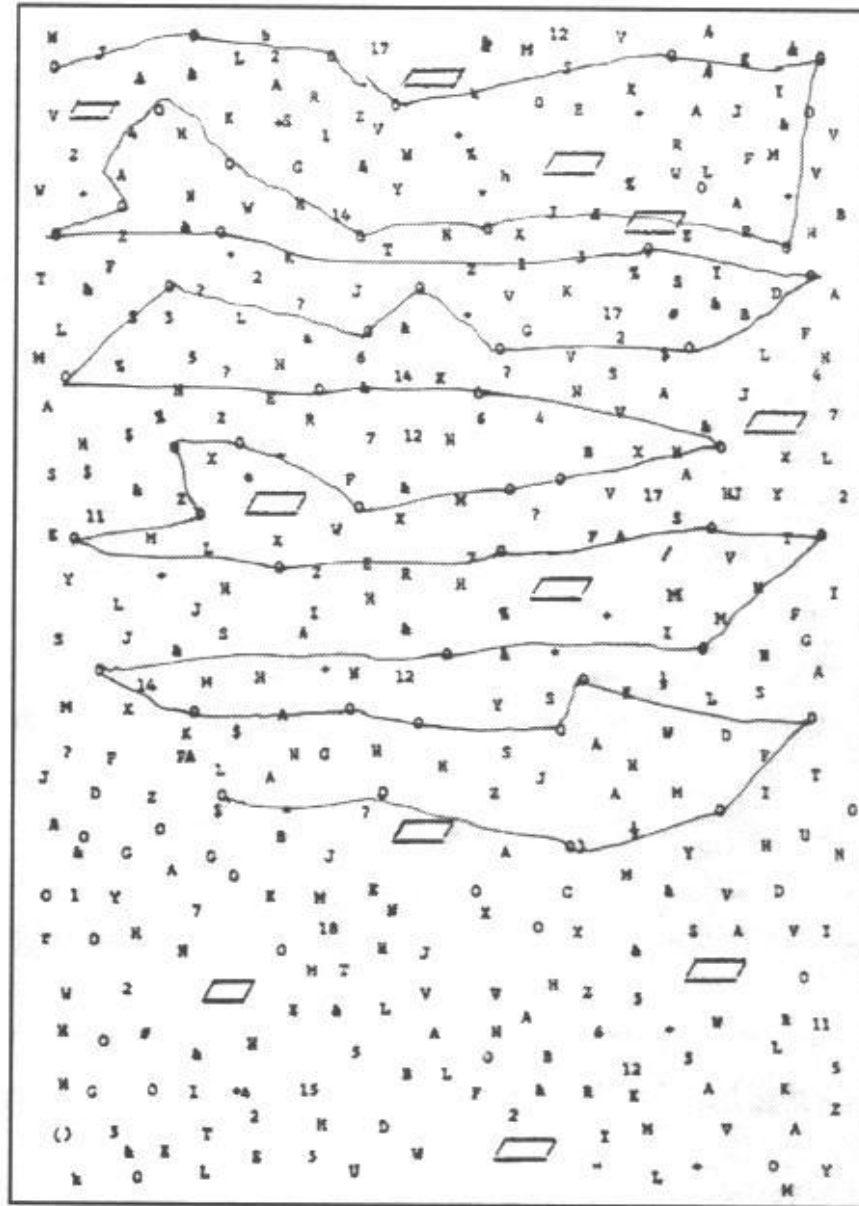
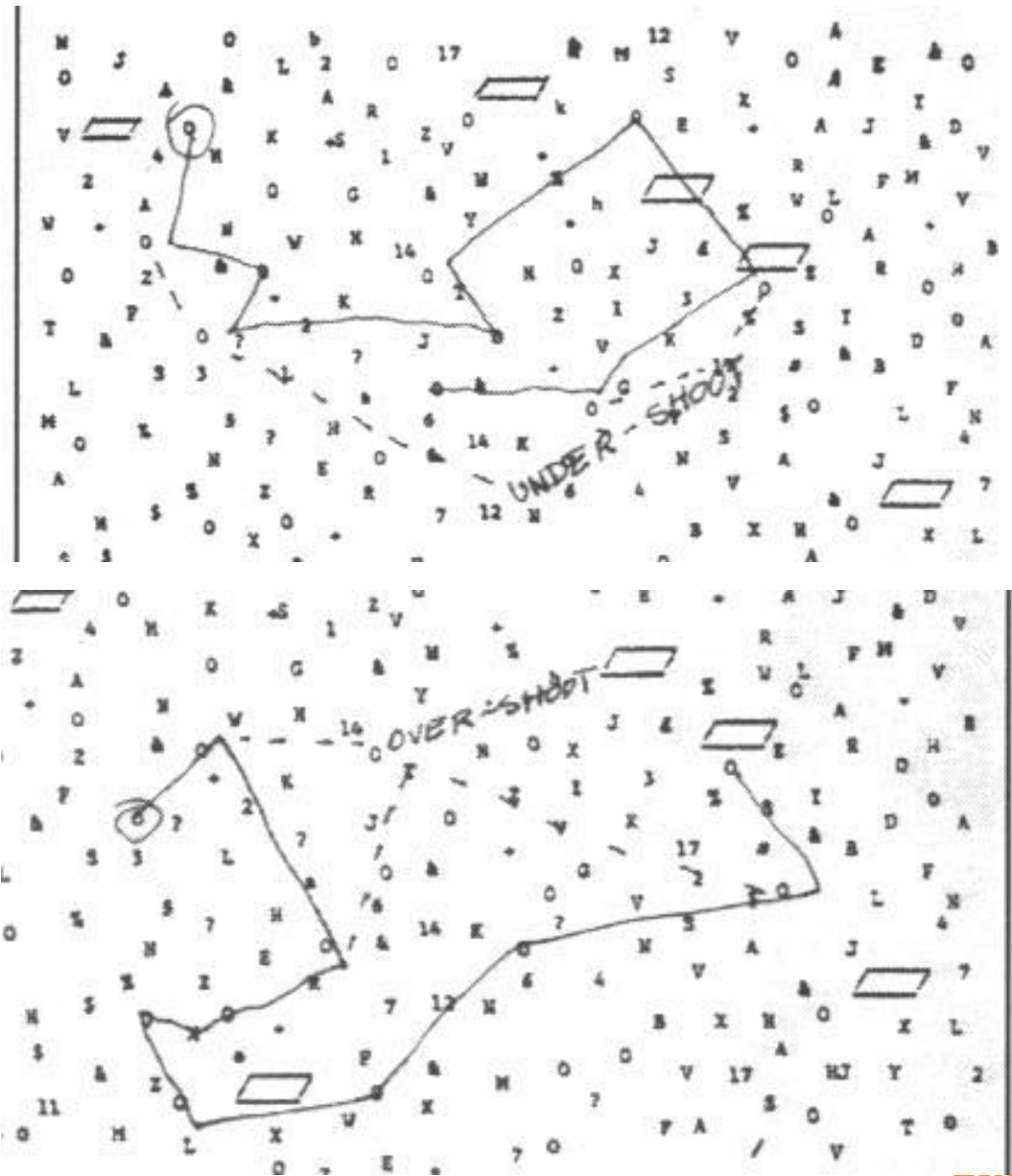


Figure 2

EXAMPLES OF OVER AND UNDER SHOOT



MOTOR FREE VISION PERCEPTION TEST



THANK YOU

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