

Handwriting Reveals Visual Memory Perceptual Changes
Through Whole-Brain Accelerated Learning Activation

Jan Kuyper Erland

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Abstract: This report documents rapid visual perceptual change that occurred after just ten, twenty, and twenty-four hours of daily, intensive, accelerated learning intervention applying prosodic choral speaking with puppet models over a period of years, beginning in 1981. Early, then routinely administered, versions of the Detroit Tests of Learning Aptitude, (versions 1 & 2) were the instrument measures. A series of standardized test measurement's written answers depicted higher mental organization revealed through handwriting samples.

This report documents visual perceptual changes with individuals of various ages, and at what incremental intervention points they occurred following intensive Accelerated Learning (AL) instruction. It is important to stress that penmanship, as such, was not being taught, but rather focus, visual patterning, visual-auditory sequential memory, and attentional modeling through Bandura's (1977) Social Learning Theory and Accelerated Learning practice (Lozanov, 1978, 1971).

The seven exhibits are a combination of assessment samples from The Detroit Tests of Learning Aptitude-1 and -2, (DTLA,-1, Baker and Leland, 1935, 1967; revised, DTLA-2, Hammill, 1985) They were outcome measures of verbal and written samples of the DTLA-1 Verbal Opposites/Antonyms #4 subtest (exhibit written samples #s 1 & 4), and the DTLA-2 Visual Memory for Fragments #10 subtest (exhibit written samples #s 3, 5, & 7). Exhibit samples #s 2 & 4 are class spelling written examples and letter sequences.

DTLA-1 subtest #4 (Verbal Opposites/Antonyms) was used as a testing instrument from 1981-1985, and the DTLA-2, with #10, (Visual Memory for Fragments) was used from the early research years 1981 to 2006. To maintain consistency with the on-going data base, the DTLA-2 tests were continued in application even as subsequent DTLA versions were developed.

The DTLA-1 subtest #4 Verbal Opposites/Antonyms was one of nine subtests measured and reported in mental age, then used to calculate intelligence up until the 1985 revision by Hammill. When the DTLA-2 #10 Visual Closure subtest became available, the DTLA-1 subtest Verbal Opposites subtest #4 was eliminated, as it was no longer included with the nationally standardized DTLA-2 cognitive skills battery.

Exhibit 1 is a 1983 referenced notation of the DTLA-1 scores converted to mental ages (M.A.), an early popular measure of age normed performance on an intelligence test (Fencher, 1990). The revised DTLA-2 measured performance on the subtests by standard scores, which was more reliable than converting to mental age scores used in the DTLA-1. Raw scores are transferred to standard scores that establish a common subtest mean score with a standard deviation. Because standard scores provide equivalent indices for each subtest, they are comparable. (Hammill, 1985, p. 50).

Instead of nine DTLA-1 subtests needing to be administered to obtain an intelligence profile, only four DTLA-2 subtests were now required to obtain an intelligence quotient (IQ). Subsequently, these four aptitude subtests were selected and administered at all research sites for all demographic and age groups, as they covered all four of the primary clinical domains recommended for clinical research: Linguistic, Cognitive, Attentional, and Motoric.: Word Fragments (#10), Memory for Auditory Words (#6), Visual Memory for Letters (#16) and Oral Directions (#18). Intelligence and subtest notations regarding these tests are itemized on exhibits 5 and 6.

The Word Fragments (#10) subtest is a representation of mutilated words, or by which visual elements are missing. Since simple words easily become over-learned, the person should automatically recognize them if parts are missing, a visual closure function, or the ability to see the right-brain figure against the background. A deficiency in this cognitive ability area is conducive to reading difficulties.

The student is asked to repeat them individually and privately aloud after the samples are presented, but in this research instance, they additionally wrote them on paper to create documenting hard copy of their verbal responses and the overt changes that were taking place.

The answers were never disclosed or rehearsed at any time from pre-to posttest. Following the accelerated learning prosody and puppets training, there was consistent marked improvement in the students' ability to see and understand the right-brain detail and closure on the mutilated words. What they had not been able to read before, now they could.

It is important to document that these changes were occurring with the first original 1980s training sets, thereby indicating the original choral speaking and modeling paradigm methodology could be creating the outcome. This hypothesis was later verified by Erland's (1999) research report whereby a 7th grade gifted experimental classroom utilized the practice worksheets and written materials, but eliminated the video-tape puppets and rehearsal choral speaking, and outcome results were not obtained. An experimental average ability sixth grade class implementing the methodology correctly, received twice the academic achievement scores, over the gifted classroom.

The perceptual changes on the written auxiliary Visual Word Fragments (#10) subtests were immediately apparent, and came by surprise when the updated DTLA-2 testing was begun in 1985. Although visual memory cognitive skills improvement pre- to posttest changes appeared in nearly every case, the handwriting changes appeared intermittingly, yet often enough to motivate this researcher to continue applying and measuring this unique methodology. Interestingly, early mental reorganization changes appeared soon in the treatment phases, after just ten- to-twenty hours of consistent intensive application.

The investigative work encompassed a variety of ages from children age ten, to teens and adults. Four classrooms' of written samples of the DTLA-2 #10 Memory for Word Fragments

subtests formed a book of assessment outcome examples, which included three fourth grades and a fifth grade classroom plus some of these early individual samples.

The intervention included daily intensive rehearsal right- and left-brain verbal and visualization rehearsal (Bell, 1991; Erland, 1989, Paivio, 1986) with a variety of models (Bandura, 1977, 1971; Erland, 1989). Each exercise shifted multiple times from right to left to whole brain activity, which included rhythmic choral speaking and self-talk (Bandura, 1981, Erland, 1989, Meichenbaum, 1979). Without twenty-four hours of intensive training with this methodology, these changes would be most unlikely to occur, and have not been seen in other research studies. (see figure 1. Erland, 1986, 1988)

Not only visual closure improved, but visual memory for letter sequencing shows marked change in ten-twelve- to twenty hours' time in both the 15- and 48-day formats. The following seven examples are a small sampling of those in a wide data base.

Baker, H. J. and Leland, B. (1965, 1935). The Detroit Tests of Learning Aptitude-1. Indianapolis, IN. Bobbs-Merrill.

Bandura, A. (1977, 1971). *Social Learning Theory*. Palo Alto, CA: Stanford University Press.

Bell, N. (1991). *Visualization and verbalization for language comprehension*. Paso Robles, CA: NBI Pub.

Erland, J. (Fall 1999). Brain-based accelerated learning and cognitive skills training using interactive media expedites high academic achievement. Journal of Accelerative Learning and Teaching, 24, (3 & 4). 1-100

Erland, J. (Spring 1989) Retraining cognitive abilities: A report on thinking and memory improvement combining Suggestopedia with Cognitive Behavior Modification (CBM) for ages 10-55. The Journal of Accelerative Learning and Teaching. 14, (1). 3-42.

Erland, J. (1986). Step-by-step teacher's right and left-brain instructions, based upon the Memory Retainer. Lawrence, Kansas. Copyrighted February 22, 1988, Txu 319-625.

Fencher, R. (1990). *Pioneers of Psychology*. New York: Norton.

Hammill, D. D. (1985, 1998). Detroit Tests of Learning Aptitude-2. Austin, TX: Pro-Ed.

Lozanov, G. (1978, 1971) *Suggestology and outlines of Suggestopedya*. New York: Gordon & Breach.





Meichenbaum, D. (1991, 1978). *Cognitive behavior modification: An integrative approach*. New York: Plenum Press.

Paivio, A. (1986). *Mental representations: A dual coding approach*. New York: Oxford University Press.

Figure 1.
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CONTENT TITLE: Series of Unrelated Words MATERIALS NEEDED: Instruction Sheets

OBJECTIVE: To remember facts and names MEMORY RETAINER LESSON: 6, 7, 8

Rep. #	Directions	Time	Purpose And Modality To Improve	TV Mode Using Puppets	Brain Hemisphere
1.	Orally read series in the worksheet to form an imprint on the mind.	8 Min.	Visual-Sequential Memory		<u>RB-LB</u>
2.	Look at word series on the monitor. Lightly repeat overtly with the rotating faces. Focus on each chunk, "who said what". Do not scan forward. Speak into the audio enhancer reciting with the puppets.		Wholistic Gestalt (faces). Speech-language Area Synthesis Encoding Visualization	Parts, Puppet Faces & Voices 	<u>RB-LB</u>
4.	Each face represents a chunk. Focus on each segment, memorizing each component. Class role-plays using drama, repeating in unison, imitating the three voices.		Analysis Decode Auditory - Visual Integration	Parts again 	RB-LB
5.	Continue to covertly repeat to self, absorbing rhythmic beat of segments. Pull into a whole. The drum-beat accentuates the cluster.		Synthesis Auditory-verbal Memory, Auditory Closure	Wayne drum 	RB LB
6.	Repeat covertly and memorize the series, role-playing with the puppet characters.		Analysis Auditory-Sequential Memory	Wayne alone 	LB
7.	All repeat sequence in union without the video- or audiotape. Student models individually repeat the series, class covertly.		Synthesis Auditory - Sequential Memory	Place monitor on pause	RB-LB
8.	Write the series on paper, repeating covertly to self. Students check their work and repeat a positive self-affirmation.		Visual-Auditory Integration		RB-LB

Linda 32 yr old woman
 antonyms
 left brain
 longer
 vocal
 skill

#4 DTLA
 Linda
 Subtest
 +75
 17.9 M.A.
 dupan

Pre

+39	well done	simple
	kind	curse
	before	divide
	chill	
	day	loss
	night	superior
	enemy	perimeter
	denial	destroy
	time	resist
	private	
	safe	pass
	defect	
	and	
	challenged	gradually
	any	realization
	shorter	take away
	cheap	peer
	fair	begin
	not free	
	split	typical
	truth	
	pay back	definite
	hold	
	loss	
	hazy	year

Exhibit 1

32-year old woman's pre- to posttest change on DTLA-1 #4, Antonyms, after 30 hours of intensive cognitive skills training in 1983.

Linda
 antonyms
 Subtest
 -4 +91
 19.0 M.A.

Post #4
 +60°

bold	different
less	
present	lay out
horizontal	nocturnal
minimum	minimize
simple	slender
curse	agony
separate	
conscious	
liability	
superior	
perimeter	
destroy	
resistance	
hypocrite	
accept	
hurry	
itinerary	
build	
realistic	
control	
peaceful	
serious	
experience	

Note
 Change in writing to a less stressful more fluid style!

Progression Chg -

① Day 3

Day 3

Gumption
 Museum
 precise
 illogical
 decision

Ben
 age 17

Qualified
 Dyslexic
 Public Schools

**Exhibit 2,
 Days 3, 5 & 10**

A 17-year old Dyslexic male's perceptual change with letters and spelling words after 20 hours of AL intensive training

② Day 5

Day 5
 Decidual
 luteoed
 Decidual

quantity
 executive
 necessity
 opportunity

③ 10 Day

10th day
 in course

iga fa as
 30 n r g i
 1 g e f a o s
 Meddual
 Larberden
 effeminate
 Etanemffe
 resilient
 trellner

Exhibit 3

Pre

Pre-test

D.H.

Post

D.H.

- 1. stop
- 2. the
- 3. why
- 4. there
- 5. around
- 6. people
- 7. always
- 8. every
- 9. high
- 10. play
- 11. today
- 12. little
- 13. morning
- 14. to
- 15. night
- 16. some
- 17. what
- 18. sex
- 19. while
- 20. sure
- 21. door
- 22. should
- 23. of
- 24. funny
- 25. no
- 26. good
- 27. and
- 28. no
- 29. did
- 30. something
- 31. together
- 32. which
- 33. laugh
- 34. do
- 35. because
- 36. pretty
- 37. in

- 37. yellow
- 38. pretty
- 39. in

DTLA #10
Word Fragments
Subtest
39
-3
+36

- 1. stop
- 2. the
- 3. why
- 4. there
- 5. around
- 6. people
- 7. always
- 8. every
- 9. high
- 10. play
- 11. today
- 12. little
- 13. morning
- 14. to
- 15. night
- 16. some
- 17. what
- 18. sex
- 19. while
- 20. sure
- 21. door
- 22. some
- 23. of
- 24. funny
- 25. no
- 26. good
- 27. and
- 28. did
- 29. something

- 32. together
- 33. which
- 34. laugh
- 35. do
- 36. because
- 37. yellow
- 38. pretty
- 39. in

DTLA #10 subtest
Word Fragments
Visual Closure
39
-2
+37

16-year old male,
24-hours of intensive
drilling creates fluid left-
brain sequencing ability
on the DTLA-2 #10
Word Fragments subtest

Exhibit 4

Pre

Post

Page 1
DTLA-1
#4 subtest
Antonyms

Pre

+65-66
16.6

age 27.8
Dan
pre

#34 base

- ugly
- Fresh
- Blanket
- Vacant
- different
- cooked
- good
- before
- dull
- day
- Enemy
- divide
- same
- Arvive
- Passive
- Failer
- after
- Shallow
- easy
- Length
- cheer
- Freedom
- exit
- truthful
- borrow
- agressive
- Horizontal
- mini
- Simple

#4 Antonyms
+84
18.6 M.A.
0.9 27.8

Da

Post

- true
- hate
- forget
- slightly
- fractal
- Bramette
- Present
- different
- cooked
- spad
- before
- dull
- morning
- enemy
- divide
- same
- passive
- balance
- end
- shallow
- easy
- shorter
- cheer
- fail
- free
- exit
- truthful
- borrow
- aggressive
- loss
- present
- Horizontal
- simple
- curse
- separate
- concave
- falter
- superior
- optimistic
- destroy
- aggressive
- sitacay
- except
- morning

A 27-year old
male college
student after 15
days of intensive
training, 1984,
on the DTLA-1,
#4, Antonyms
subtest.

Name _____

Date: Sept 21

Circle: Pretest or Posttest **8**

Visual Closure

1. stop
2. the
3. why
4. there
5. around
6. people
7. always
8. every
9. high
10. play
11. today
12. little
13. morning
14. to
15. night
16. some
17. what
18. six
19. while
20. sure
21. door
22. of

RAW SCORES: 67

23. ~~off~~

24. ~~he~~

25. mo

26.ahr

27. me

28. which

29. recave

30. ~~he~~

31. ~~he~~

32. ~~he~~

33. ~~he~~

34. ~~he~~

35. ~~he~~

36. ~~he~~

37. ~~he~~

38. pretty

39. in

40. ~~he~~

67
39
33

25%
39/160

KX 25%
DUV
PM-

Letter Sequences
mzemh
dbxecun
ztrbr
yfpgg
hdesk
banit

Vis Closure (16)
+

Day 1 at left

A 10-year old 4th grade male student after 12 days of intensive training. Note below: +33 IQ pts. improvement on the DTLA-2, #10 Word Fragments subtest. Pretest = 92; posttest = 125.

#8

Pretest IQ 92 Post IQ 125 + 33 pts!

DTLA pre 53 16 24 12 DTLA post 51 30 16 57

Week 3 Day 12

Warmups

1) today, way, what, they, really,

2) card, business, gates, happeness recording

1) 94/386 2) 432972 3) 687514
683149 279234 415786
941386 432972 687514

Exhibit 5, progression, Days 1, 12, 46

The same 4th grade male student's academic achievement pre- and posttest standard and G. E. scores after 24 hours of intensive training. Note science improvement from 4.8 to 12.5 G.E. in one semester's time. Two year's improvement shows on the composite.

Name _____

Date: _____

Circle: Pretest or Posttest **8**

Visual Closure Words

1. stop
2. the
3. why
4. there
5. around
6. people
7. always
8. every
9. high
10. play
11. today
12. little
13. morning
14. to
15. night
16. some
17. what
18. six
19. while
20. sure
21. door
22. of

Achievement IBS Scores 1996-1997

G.E.	Pre	Post
Reading	4.3	5.8
Math concepts	4.2	5.2
G.E. Science	4.8	12.5
SS	199	282

RAW SCORES: 39

24. he

25. funny

26. mo

27. ~~he~~

28. ~~he~~

29. we

30. did

31. ~~he~~

32. ~~he~~

33. which

34. ~~he~~

35. do

36. ~~he~~

37. ~~he~~

38. ~~he~~

39. in

75%
39/52

+30

91%
39/43

Letter Sequences

Exhibit 6, Day 1

Ryan

5th Grade

Day 6
The BTA Program

DTLA Pre	59	33	17	45
DTLA Post	67	38	20	55

3 CCP
1 cp
2 pcc
6 cb

Cold, comfort, social
Knowledge, playing

3 cb
1 cc
1 smt
3 lg Sprites
6 ch secks
all togo

4 ps
Borgel
1 straw co
3 hard bc
4 coc to go
1 ham Ed
4 chcks on

44351
15344
44351

3 straw gel
2 coff-bk
1 mt
all togo

Exhibit 7, pre

Nam _____

Date: Sept 30

Circle: Pretest or Posttest

Visual Closure

- stop
- the
- why
- there
- around
- people
- always
- every
- high
- play
- today
- little
- morning
- to
- right
- some
- what
- six
- while
- door
- should

23. of	RAW SCORES:
24.	
25. formally	+
26. no	
27.	Vis Closure (27)
28. and	40
29.	+
30. did	
31.	
32. together	63!
33. with	39
34.	- 12
35.	+ 27
36. because	
37. yellow	
38. pretty	
39. in	
40.	

Letter Sequences
KZ-RJ
dnv
Pmkt
btzrc
4f pze
b vanc
h xntvwb
f pely
mrz fys
dbrxgun
67
24
73
50!
dhts / dbrxgun

Exhibit 6, Day 28

Day 28
Half way
Through
BTA

factor with despite besides knowle
circum:

problems confederate demonstrate ana

1100876
678001
1100276

1123746
6473211
1123746

9012217
7122109
9012217

4812 15
1038 12
3153 12
2395 19
1585 19

A 5th grade 11-year old boy's notable change after 14-16 hours of intensive training. +23 pts. IQ increase on the DTLA-2, #10 subtest. Raw pre-post scores for four subtests are on the top left page.

Exhibit 7, post

Nam _____

Date: Jan 24 '97

Circle: Pretest or Posttest

Visual Closure Words

- stop
- the
- why
- there
- around
- people
- always
- every
- high
- play
- today
- little
- morning
- to
- right
- some
- what
- six
- while
- door
- should
- of

24. be	RAW SCORES:
25. funny	Vis Letters ()
26. no	+
27. good	
28. and	Vis Closure (58)
29. we	+
30. did	
31. something	
32. together	795!
33. which	
34. laugh	
35. do	
36. because	
37. yellow	
38. pretty	
39. in	

Letter Sequence

63

A 4th grade 10-year old female's pre- to post-test change on the DTLA-2 #10 Word Fragments subtest after 48-hours of peer modeling and prosodic choral speaking training.