

Leavell Language-
Development Service

INSTRUCTION MANUAL

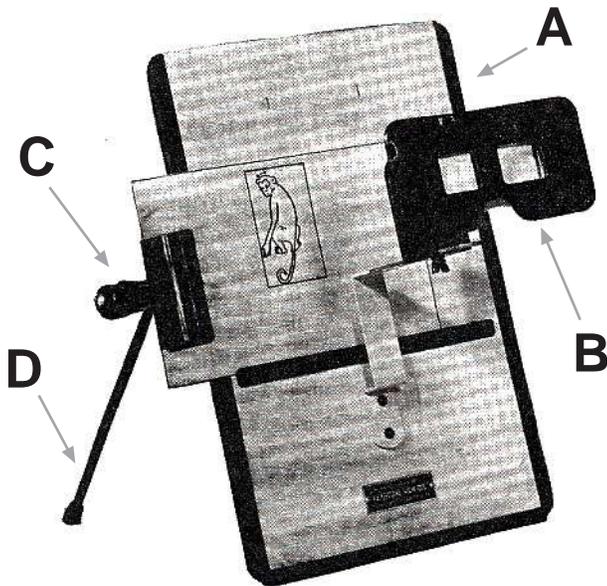
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THE LEAVELL LANGUAGE-DEVELOPMENT SERVICE

The Leavell Language-Development Service consists of the Keystone Stereo-Reader (replacing the Hand-Eye Coordinator), three pads of exercise sheets, and this manual of instructions.



**Keystone Stereo-Reader
Assembled for Exercises
for Left-Hand Subject**

DESCRIPTION AND FUNCTION OF THE STEREO-READER

- A. Keystone Stereo-Reader standing in position for use
- B. Assembled stereoscope in place.
- C. Drawing to be traced by left-hand subject.

NOTE: *When used by a right-hand subject, this drawing is pulled to the right half of the field of vision so that the left eye cannot see any part of the same.*

- D. One of the two supporting legs holding the instrument in correct position.

INSTRUCTIONS FOR ASSEMBLING THE STEREO-READER

1. Attach frame for holding stereoscope to board.
2. Attach stereoscope to holding frame.
3. Hold Leavell copy in place with the clip.
4. To use Delacato cards set card flush with top of board and even at side with line between yellow and dark areas.
5. Tighten knob on stand at back of board and keep tight.
6. Adjust stereoscope to position of comfortable vision.

THE STEREO-READER IN USE AS A HAND-EYE COORDINATOR

The Stereo-Reader is a chiroscopic type of instrument. In chiroscopic drawing, however, one eye looking through the stereoscope sees the drawing directly while the other eye sees a projected image of the drawing on its side of the field so that when one apparently traces before the off-pictures eye he/she is really drawing a separate picture in a different position. Each of the two eyes is apparently seeing a different picture, which indicates that the performance is essentially binocular. In using the Stereo-Reader, an actual tracing over the drawing in view of one eye is made while the other eye is projecting the drawing on its side of the area and, therefore, participating in a regular binocular manner.

When an individual is using the right eye and right hand in coordination, the design (picture, word, phrase, or digits) to be copied or traced should be placed in the right half of the field vision so that the left eye cannot see any part of the design. The stereoscope should be adjusted for clear vision. In order to stimulate left-hand, left-eye coordination, the design should be pulled to the left to a point at which the right eye cannot see any part of the design.

MATERIALS TO BE USED

Three pads of material have been prepared for the basic routines in this program of stimulation.

- 1.** The first pad (Pad A) contains one hundred exercise sheet, each with a picture of a familiar object in a boxed frame. Each pictures appears twice in the series. Upon the second appearance of each picture, the subject should be stimulated to work more carefully and with better detail than when working with the first copy of the identical symbol.
- 2.** The second pad (Pad B) contains two practice sheets add:
 - a.** Forty picture-word sheets, each containing a noun with an illustration of that word above it. In writing the names and other exercise with digits and words or phrases, the subject may first copy each configuration immediately below the printed form, and later write with pencils of different colors the symbols in columns to the right or left of the printed forms. The right-hand subject will use the space to the right of the printed symbols and the left-hand subject the space to the left.
 - b.** Ten sheets, each contain six nouns. All words, phrases, and digits are to be written, or printed, underneath each word and not traced as in the case of the pictures.
 - c.** Fifty-two sheets, containing in all 298 words from a basic vocabulary list consisting of the 300 words most frequently used in elementary language-arts materials in current use in the United States.
- 3.** The third pad (Pad C) consists of two practice sheets and:
 - a.** Thirty-three sheets of two-word phrases.
 - b.** Thirty-three sheets of three-word phrases.
 - c.** Thirty-three sheets of digits.

The phrases represent a sampling of the 1286 words occurring most frequently in elementary-school vocabulary lists of ten basal readers in highest use in the elementary schools of the United States. The sheets containing digits contain three-, four-, five-, six-, seven-, and eight-digit configuration.

If consistent work is carried out and four or five of the sheets are used daily on an average of five days each week, this training program will span approximately two months. If this program is accompanied with the other types of remedial activity and guidance usually recommended, much benefit would be gained in orienting a left-to-right direction in relation to letter and word symbols of the English language. This procedure has been instrumental in improving silent reading but oral reading, spelling, handwriting, and number skills for pupils and students at all levels of education.

SUPPLEMENTARY EXERCISES

Having the subject write all spelling lists that are to be learned in connection with basic spelling assignments under the conditions used in this exercises with the practice sheets may extend the services of this instrument. (Use the backs of sheets or common white paper.)

Caution: No. 1. Always have paper of the same color as that on which the child is working in the field of vision of both eyes.

No. 2. After writing or tracing on the surface of a sheet never pull the tracing to the center of the easel but always away from the center so that the child can only see the object with the eye to be stimulated.

Other types of remedial activity and guidance should accompany this program. Most rapid advancement of skills will be realized in all of the language-arts fields, including silent reading, oral reading, spelling, handwriting, and speech function, when consistent work, as recommended, is carried out.

Tachistoscopic exercises with simple forms, digits, words, phrases, and sentences will be helpful in connection with the use of the Leavell Language-Development Service. (See catalog of Keystone View, for this device and available materials.) Where this is not available, the uses of phrase cards, phono-word wheels, and basic reading improvement books have been found to be helpful. (See Catalogue of Steck Company, Publishers, Austin, Texas for Reading Essentials Series, phrase cards, and phono-word wheels.)

UNIQUE FUNCTION OF THE LEAVELL LANGUAGE-DEVELOPMENT SERVICE

The purposes of exercises employing the Keystone Stereo-Reader different from those involving such technique as blindfolding or using a monocular black patch in tracing words and symbols, or tracing with the finger tips while both eyes are open. Such techniques are generally referred to as tactile or kinesthetic practices. They have in certain cases seemingly been helpful, but in many cases have proves to be of little or no benefit.

The reason for the difference in the use of the Stereo-Reader and the technique previously used is that in the use of the blindfold or monocular black-patch occlusion technique there is an arbitrary and physical blocking off of the function of the eye that is considered the unadjusted eye in visual function. Thus, when the occluding device is later removed, there has been no psychological change in function in binocular control.

In contrast, when the Stereo-Reader is used, the subject at all times is working with both eyes open. The eye to be stimulated is in definite control and in functional use, while the other eye may be said to be in sympathetic accommodation, but not in specific visual function.

This technique does not involve the change of monocular dominance from one eye to the other which, it is generally believed, cannot be effected regardless of training. Rather, it stimulates the development of controlled vision in the eye of the same side of the body as that of the dominant hand. Thus, a unilateral control function is established in the impression-expression syndrome in hand-eye coordination in relation to the area of language control in the nerve center. The language factor, therefore, is integrated in the same hemisphere of the brain as the function of the dominant hand, which is the normal neurological association and orientation.

It is a recognized fact that language function involving silent reading, oral reading, handwriting, spelling, and speech is, as a constellation of abilities, oriented in the same hemisphere of the brain that controlling the dominant hand. Therefore the retraining program involving the use of the Stereo-Reader is basically pointed toward the institution of associative function of hand and eye by changing the controlling eye function rather than changing hand expression. Methods of determining the controlling eye through brief testing technique are delineated in the following section on "Tests to Determine Possible Need for Training." This test can be administered in ten minutes, and the interpretation will give evidence of the presence or lack of mixed function in visual control, in visual imagery, and in preferred hand function.

SPECIFIC PURPOSES OF THE LEAVELL TECHNIQUES

The employment of this service has grown out of years of clinical study of children and applied methods of remedial instruction. Much experimentation has been carried out with various techniques recommended to help language-arts defectives, commonly referred to as mirror-writers, reversalists, nonverbal subjects, and reversal-speech cases. It has generally been known for many years that, because of the possible confusion and resultant manifestation of speech difficulty in the form of stuttering or stammering, the child who is naturally left-handed should be stimulated to write with his/her left hand upon school entry rather than that he/she should be forced to write with the right hand. Only recently has the differentiation between monocular dominant vision and binocular control in vision been studied and received any attention in relation to language-arts development. Even more recently has the mixed-control syndrome between eye and hand been associated with mixed or reversed visual imagery. The child who, though he/she does not stutter or stammers, displaces letters in words such as "paly" for play, who displaces digits within numbers as "5314" for 5134, or who calls was "saw" and no "on" is in all likelihood suffering from the same type of neurological confusion that is setup when adults arbitrarily directs a child to change handwriting function from the left hand to the right hand. General indifference is now frequently recognized as the result of neurological confusion in visual and manual control.

TESTS TO DETERMINE POSSIBLE NEED FOR UNILATERAL STIMULATION

The tests at the end of this manual, extra copies of which may be secured for individual test results, determine the motor-visual preferences in directional function of the organism on the basis of which recommendations for the use of the Keystone Stereo-Reader may be determined. The six sections, A, B, C, D, E, and F, of these tests survey function in relation to the general expression of the individual in eye, hand, and foot function as well as in visual imagery. The student should wear his/her usual prescription in taking these tests.

Instructions for Administering Tests in Sections A, B, C, D, E, and F On Pages I, II, and III.

Section A-Hand-Foot Preference Tests. The five tests in this section involve indications by the subject of the preferred hand and foot.

Test 1. Ask the subject, "Which is your right hand?" Indicate in the space on that paper whether the subject has given the correct response.

Test 2. Ask the subject to pick up a pencil and indicate the hand with which he/she writes. Record on the test sheet the response by using an R if the right hand was used.

Test 3. Ask the subject to indicate with his/her forefinger and the pencil that he/has just used how he/she would sharpen the pencil, using the forefinger as he/she would a knife. Record with an R if the right finger was used.

Test 4. Ask the subject to stand on the floor and hop across the room on one foot. Record the response with an R if he/she hopped on the right foot.

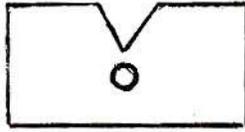
Test 5. Ask the subject to indicate with which foot he/she would kick a football, by imitating this activity. Note with an R if the response indicated the right foot as preferred.

To Score Section A. On the scoreboard indicate only the total number of "right" choices under this hand-foot preference test. No score for "left" choices.

Section B-Eye-Ear Preference Tests

Test 1. Use a desk blotter or a manila folder lengthwise to construct a tube from fifteen to twenty inches long and with an aperture on inch in diameter. Ask the subject to hold this tube in both hands and look through the hole with one eye at a pencil held in front of the examiner's face, when twelve or more feet removed from the subject. Record response with an R in terms of right-eye preference.

Test 2. Cut a hole one-half inch in diameter in the center of a manila folder with a V-shaped cutout at the middle of one side as illustrated.



Have the subject hold this card with both hands at arm's length and, when twelve feet or more away from the examiner, pull the card to the preferred eye in order to look through the hole at a pointed object, such as a pencil, held in front of the examiner. Note whether the right or left eye is used. Record the response with an R if the right eye was used.

Test 3. With a manila folder or desk-blotter material construct a flattened funnel or, manoptoscope, as illustrated here.



It should be at least ten inches long with the aperture at the small end of the funnel no larger than one inch in diameter. Have the subject hold the large end of the funnel to his/her head over both eyes and look through the small end at a pointed object twelve feet away, held in front of the examiner. Note the eye employed in sighting the object and record R if the right eye was used.

Test 4. Have the subject make a ring with the forefinger and thumb of each hand, overlapping the two rings. Direct him/her to pull the rings to the head and with one eye look through the same at a pointed object in front of the examiner while standing twelve feet away. Note and indicate with an R if the preferred eye in this function was the right eye.

Test 5. Have the subject pick up a watch or an interval timer and put it to his/her ear. Note and record with an R if the preferred ear was the right ear.

To Score Section B. Indicate only the total score of right-eye and right-ear preference. No score for "left" choice.

Section C-Hand Dexterity Preference Test. With a watch or an interval timer with a second hand, note the number of squares that the subject can mark with an X in thirty seconds, using first one hand and then the other. The hand with which the subject makes more X's is considered the preferred, or dominant, hand.

To Score Section C. If the larger number of squares was marked with the right hand, indicate with a score of five the right hand as the preferred hand function in the X cross-out test. No score for left superiority.

Section D-Visual Imagery, Pointed Objects. Have the subject draw the five pointed objects indicated under "Objects To Be Drawn," page II. Direct the child to draw the design in a horizontal fashion rather than in a vertical pattern. If necessary this direction should be repeated for any design, which the child initiates in a vertical pattern.

While the subject designs the first object (a knife), note the direction in which the first dominant strokes are made. When the subject has completed the design, indicate with a pencil the direction in which these initial strokes were made. Follow the same procedure in having the subject draw each of the five symbols.

To Score Section D. Pages II and III. To score the test, first count the numbers of initial strokes made in a left-to-right directions. Count next the number of objects with the significant or beginning point (as, the point of the knife blade, the head of the arrow, the bowl of the spoon, the head of the hammer, and the point of the scissors) drawn at the left end of the configuration. Add the number of initial left-to-right strokes to the number of objects with the beginning point at the left and place that total on the scoreboard. No score for right-to-left initial strokes.

Section E-Visual Imagery, Incomplete Objects. Have the subject complete the five symbols on this test sheet. After the subject has drawn the sail on the mast and the handle on the cup, note the side on which the subject first draws the limbs on the tree, the bottom of the piggy bank, and the top of the ice-cream cone. Indicate with an arrow in each case the side of the configuration from which the first dominant stroke was made.

To Score Section E. Pages II and III. To score the test, note whether the subject has drawn (1) the sail at the right side of the mast; (2) the handle at the right side of the cup, has drawn (3) the limbs of the tree first on the right of the tree trunk and (4) has completed the bank and (5) the ice-cream cone by drawing left to right. For each one so drawn records a score of 1 for "right" on the scoreboard for this test. No score for "left".

Section F-Visual Imagery, Moving Objects. Have the subject draw the first object designated. As indicated above (Section D), when the subject has complete each symbol, indicate with an arrow the direction in which the initial stroke was made.

To Score Section F. Pages II and III. There will be two points scored to each drawing. However, where two wheels are shown, instead of assigning a point for the "significant or beginning points", the wheel to the left is to be the important indication of L-R significance. Regardless of whether the wheel is drawn clockwise or counterclockwise, if the wheel to the left is the first one drawn, this indicates one point in the L-R score. The other point relates to initial stroke.

When all scores have been tabulated, add the column of numbers and secure total for right hand-foot or right-eye responses.

INTERPRETATION AND IMPLICATIONS

If the total score of a right-handed person is thirty-two or less, then the subject may be considered to be a confused subject and should benefit from the Leavell Language-Development Services exercises. Likewise if the total score of a left-handed person is eight or more, then he/she may be considered to be one who would benefit from the Leavell exercises.

In the case of subjects with consistent left-side coordination (hand and eye expression) and where there is, nevertheless, grave difficulty in one or more of the language arts, particularly if accompanied by functional speech deficiencies, the employment of the Leavell Language-Development Service has been found to be beneficial in the correction of deficiency in these language arts skills.

HOW TO USE THE KEYSTONE STEREO-READER

The Stereo-Reader makes possible the coordination of the dominant hand and the association of the eye on the same side of the body in controlled function to develop language-arts skills through sympathetic (psychomotor) association of the impressive and expressive functions of eye and hand.

Directions for Use

- 1.** Place the Stereo-Reader on a flat-topped table, desk, or card table at a convenient height so that the subject using the device can work without having to reach up or bend down in an uncomfortable position.
- 2.** Place the shaft that holds the stereoscope at the position where clear vision is at its maximum. As necessary, move the shaft back and forth slightly until clearest vision is attained.
- 3.** When a right-hand subject uses the Stereo-Reader, the picture or other copy should appear before the right eye. The paper on which the designs are printed should be positioned on the ledge provided for the purpose.
- 4.** For a left-hand subject the picture or other copy should appear before the left eye-with the right side of the configuration even with and just above the left edge of the shaft.
- 5.** The writing surface should be slanted at a convenient angle so that the elbow of the person writing will rest on the surface of the table on which the instrument is placed, thus giving him/her relatively free hand movement for the copying and writing activities.
- 6.** *NOTE: IN ALL WORK THE SUBJECT SHOULD BEGIN AT THE LEFT OF EACH PICTURE OR CONFIGURATION AND TRACE OR WRITE FROM LEFT TO RIGHT. VERTICAL LINES SHOULD BE TRACED FROM THE TOP DOWN.*
- 7.** The subject should trace each drawing several times by using pencils of different colors-red, blue, lead, etc. From memory he/she may then attempt free-hand drawing of the printed picture, while still looking through the instrument, by turning the exercise sheet over and using the blank page for his/her free-hand expression. The subject should wear his/her glasses, if he/she needs glasses for ordinary purposes.

RATIONALE

I. Introduction

It may be well to state briefly the background and purposes of the Leavell Language-Development Service. The employment of this service has grown out of years of clinical study of children and experimentation with various techniques recommended to overcome language-arts deficiencies and consequent difficulties.

II. The "Reversal-Speech" Problem

For many years observations have been made of individuals who wrote in reversed pattern (in "mirror fashion") or who jumbled letters within words and displaced digits in numbers that were written or copied. Another dramatic form of expression has been found among children who were by natural expression left-handed and who were changed to right-handed expression in writing, and then, for the first time, began to show some speech deficiency.

In 1940 Bryngelson¹ reported the results of his study of manual dominance in normal speech causes and stutterers. He found the following contrasting percentage in the two types.

PERCENTAGES		
<i>Dominance</i>	<i>Normal Speakers</i>	<i>Speech Defectives</i>
Right-handed	94	69
Left-handed	6	6
Ambidextrous	0	29
Shifted handedness	1	58
Left-handedness in family	42	49
Stutterers in family	6	53

Thus it was shown that fewer speech defectives are right-handed than normal speakers; that more speech defectives are ambidextrous than normal speakers; and that left-handedness and stuttering is found more often in the families of speech defective than in normal speakers. Many other studies support the conclusion that manual dominance and speech function are in the some way associated with favor on total right-or left-sidedness.^{2,3}

III. THE HAND-EYE RELATIONSHIP TO LANGUAGE FUNCTION

Until recent years little attention has been given to the significance expressions of the related factors of (1) hand and eye preference, together with (2) visual imagery and direction dominance. Recent research has revealed that a lack of unilateral control and expression in either or both of these relations are symptomatic of language difficulties, namely: (i) a lack of unilateral control and preference in hand and eye function, or (ii) a lack of consistent left-to-right designing of symbols (as the patent expression of drawing from right to left when designing common objects).

A study of these phenomena in 749 children of school age was made.⁴ This study showed that deficiencies in language arts manifested themselves significantly in more cases where hand-eye confusions or visual imagery

reversals (or both) were present than was true of cases where such expressions were not found. Further (1) the left-handed and right-eyed subject was found to be more challenged in language-arts development than were either the (2) right-handed but left-eyed cases, (3) the unilaterally left-sided group, or (4) the unilaterally right-sided group. The achievement in language skills of these groups, when compared in terms of average scores, indicated that group 1 was lowest 41.6 percent of the time; group 2 was lowest 37.8 percent of the time; group 3 was lowest 12.5 percent of the time, and group 4 was lowest 8.33 percent of the time. When the achievement scores on oral reading, silent reading, and spelling were averaged and compared, it was found that the mixed-dominance groups (1 and 2) ranked lowest 66.67 percent of the time when compared with the unilaterally dominant groups.

The contrasting directional expressions of the left-and the right-handed children are traditionally known. Benders says, "We already know that the first drawings of children are scribbling that represent pure motor play...They are performed by large arm movements in a dextrad, clockwise, whirl or pendulum waves if the child uses its right hand in sinistrad, counterclockwise, whirls if the left hand is used."⁵ Only in recent years, however, has a distinction been made between (1) the dominant eye in monocular function and (2) the controlling eye in binocular functional expression. Neither has the confusion that exists when a child has a dominant hand on one side and a controlling eye on the other side of the body been clear so far as the impression-expression function in language is concerned.

IV. HOW LANGUAGE IS DEVELOPED THROUGH HAND-EYE-BRAIN COORDINATION

One fact should be clearly understood. If the right hand is dominant, the neural control of that hand is in the left lobe of the brain; if the right eye is dominant, its control is also in the left lobe. The language function is normally located in the same lobe of the brain as that which controls the dominant hand.

Confusion or frustration may result when this unilaterality is not maintained-for example, if the controlling eye is left and the controlling hand is right. In addition, emotional and other human and social relations may be affected when there is a lack of unilaterality in hand and eye coordination.

The older conceptions of such deficiencies as "word-blindness" and "sound-deafness" were based on the assumption that deficiencies in the brain caused such difficulties or inabilities. The more recent interpretations relate to the conflict of impressions within the two hemispheres of the brain or a lack of cerebral dominance. ^{6,7}

V. SIGNIFICANT RELATED STUDIES

For the past twenty-five years, studies have been made of the relationship of language difficulties or deficiency to hand and eye preference. Most workers have found that in cases with strong consistent right dominance, without other evident causes, reading disability rarely occurs. Further, "failure to establish consistent dominance by school age leads to confusion in acquiring psycho-motor skills and it affects speech. It is reasonable to suppose that in such cases reading skills would also be affected." ⁸

Dearborn made one of the earlier studies of objective nature in 1931. "In comparing 76 severely mentally challenged readers referred to the Harvard Psycho-educational Clinic with 124 other cases without reading disability, Dearborn found 14 percent more left-eyedness and 17 percent more crossed-dominance among the reading cases" than among the normal or superior readers.⁹

Eames reported in 1940 that he had studied lateral dominance anomalies comparatively with 100 cases

of reading disabilities and 100 unselected cases. The anomalies, according to Eames, occurred much more frequently in children with reading problems than in unselected cases.¹⁰

Helen Robinson made certain observations as reported in 1946, of thirty reading disability cases. Of this number four of the cases, or 13 percent of the total, were left-handed, which is almost three times the percent of left-handedness among children of the same age group as found in the general population.¹¹

Smith's study, which was reported in 1950, consisted of a critical analysis of fifty mentally challenged readers and the same number of normal readers. They were matched according to chronological age and intelligence. Among her findings, she reports that "Change of handedness has been experienced by more mentally challenged readers than reading achievers...Mentally challenged readers made significantly more reversals than did reading achievers...On the basis of the Van Riper Test of 'Central' Dominance, a significant difference was found between mentally challenged reading achievers."¹²

Berner and Berner make a point of significance in their discussion of research in regard to the relation of the monocularly dominant eye and the binocularly controlling eye. They state that an investigation of more than 500 patients with and without symptoms of reading difficulty, defects of speech, and allied visual-motor disorganization justifies the following *conclusions*:

1. "When the controlling eye in binocular vision is on the side of the handedness, no chain of symptoms referable to eye-hand confusion is likely to occur."
2. "When the controlling eye in binocular vision is on the side opposite the handedness, some part or all of the chain of symptoms is likely to occur."
3. "When the two hands are used, the stronger the relative control of one eye (if the controlling eye is on the side opposite the more commonly used hand) the more likely symptoms are to occur."¹³

In supplement to this article, Berner and Berner say, "It is probably most important that we summarize the difference between dominance and binocular vision control.

1. "Dominance is preference for sighting and is essentially a monocular act. Control is a mastery of the fused image formed in binocular vision."
2. "Dominance is established very early in life and is not changed, so far as is now known, throughout life. Control is not necessarily permanent. The mastery of binocular vision patterns can shift with refractive changes and can be reversed by training."
3. "Crossed dominance does not necessarily produce motor disabilities as the development of corresponding control will result in normal visual-motor patterns even when crossed dominance is present." (Note: There is evidence of disagreement with the implication of this statement in many cases of educationally mentally challenged children unless specific training is given to develop corresponding control. This can be affected through the stimulation of this function as stated in the following and final sentence of the conclusions drawn).

"Our experience suggests that crossed control always causes some visual-motor disability, which can be relieved by training that succeeds in producing corresponding control."14

Thus, from the evidence cited, it appears that there is a vital relation between difficulty in language-skill development and confusion in the hand-eye-brain syndrome, or constellation.15,16,17

RESULTS OF THE USE OF THE LEAVELL LANGUAGE-DEVELOPMENT SERVICE WITH GROUPS AND INDIVIDUAL CASES

The table which follows present data showing the average improvement in months of achievement or growth in language-arts ability for a group of children, ages 8-14, who used the Hand-Eye Coordinator in remedial therapy for an average period of two and a half months.

The employment of the Hand-Eye Coordinator constituted the one significant variation from previous instruction through the use of reading, spelling, and language-arts texts and workbooks as usually employed in public-school instruction and in tutoring procedure on either the individual or group basis. It will be noticed that the data indicated are considered statistically reliable as revealed through the application of statistical formulae.

Test	Morrison-McCall Spelling	Gray Oral Reading	Sangren-Woody Diagnostic Test		
			Word Meaning	Para. Meaning	Rate
Number of Cases Used	39	52	52	52	23
Average Improvement in Months (Grade Scores)	6.3	9.9	3.7	9.8	8.2
Are Improvements Significant?	Yes P=.99	Yes P=.99	Yes P=.99	Yes P=.99	Yes P=.99
Extremes -- Gains and Losses	24.0 to -4.0	32.0 to -1.0	38.0 to -16.0	55.0 to -12.0	38.0 to -5.0

The following brief reports indicate the results of the use of the Leavell Language-Development Service with pupils and students of different grade levels as reflected by change in status in the language-arts skills. These individuals were not in the group reported above, but their cases are typical of the individuals in that group in general background and educational records of failure and frustration.

Case One. Allie, a boy of twelve years, was referred to the clinic with a record of failure, social maladjustment, and grave difficulties in reading and spelling. Nevertheless, he gave the appearance of being

normal, healthy boy of 58 1/2 inches in height, weighing 93 pounds, the son of an industrialist in a city of 75,000 populations. He had an older sister in the first year of high school, which was succeeding in all aspect of her school program.

This boy scored on the Wechsler-Bellevue Intelligence Test for Adolescents and Adults full-scale value of 97 I.Q. with 102 on the verbal section and 91 on the performance scale, but a potential I.Q. of 120. Observations noted during testing situation were: "He is confused and nervous, quite fidgety...everything is done while he hold his breath and expels his breath in puffs or slight explosions. High-strung, nervous. Has wonderful receptive power and retentive power of facts."

Allie has a history of mirror writing and reading as a younger child in the first and second grade. He wrote with his left hand in all-but-illegible scrawl, though he preferred his right hand for many acts, such as throwing, and he always took a right-hand stance while batting. He indicated consistent left-eye preference in visual control, though in designing symbols of pointed objects he constructed them with their points, or head ends, as a right-hand subject would do. Yet he consistently began the design at the right end and drew or sketched to the left, the reverse of the manner in which normal writing of words is done.

Because of Allie's nervousness and difficulties in human relations, he had been taken out of school and was working under a private tutor at the time of his first visit to the clinic. He had been in the sixth grade and was dealing with content in basic texts at that grade level. The comparative scores made on March 11, 1953, and on May 25, 1953, at the first and second visit to the clinic are as follow:

<i>Skill</i>	<i>3-11-53</i>	<i>5-25-53</i>
Oral Reading	5.4	6.4
Spelling	5.1	5.8
Word Meaning	3.10	8.4
Rate of Reading	4.2	7.9
Fact Material	6.1	6.6
Total Meaning	3.3	5.10
Average	4.7	6.8

The routines that were instituted during the interval between the two dates given above involved school attendance of a half day and work with a remedial therapist for two hours with exercises on the Hand-Eye Coordinator daily plus remedial exercises in reading and spelling, beginning at the fourth-grade level.

The following excerpts are taken from a report on Allie's status on September 17, 1953, two weeks after the beginning of school following the remedial work. In regard to homework, independently done, "It was clean, it was neat, it was legible..." In regard to the new basic anthology for seventh grade, Allie said, "We used our new reader today. Best reader I've ever had. All the other kid thinks so, too."

Case Two. The headmistress of her school referred Nancy, the daughter of an insurance executive in a state capitol, to the clinic. This girl was an attractive girl of fourteen who was in the eighth grade and failing notably. She had repeated the fourth grade on account of " poor reading and spelling" but had continued to "drag

in her studies," although she had been studied in guidance clinic and had received unnumbered hours of tutoring and coaching.

Nancy scored 102 I.Q. point score on the Wechsler-Bellevue Intelligence Test with 98 on the verbal and 105 on the performance scale. Observations were similar to the following: "The extreme scatter is indicative of maladjustment. Intra-scatter analysis of individual subtests indicates temporary inefficiencies due to blocking and confusion. The confusion has grown out of MIXED DOMINANCE. By careful re-education we should be able to bring her whole mental picture into somewhat of a balance in a year or two. Her psychomotor speed is slow, naturally (left-handed, mixed dominance). She is socially intelligent and seemingly well adjusted. Her attitude is good. If she responds to remedial treatment as I feel she should, I would predict a rise in I.Q., both verbal and performance, but especially the verbal."

As indicated, Nancy was mixed in dominant psychomotor function. In manual activities she was both indifferent and inconsistent in functional expression. Yet there was better coordination in left hand than in right as manifested in crossing out boxes. In designing ten symbols, six initial strokes were made in a left-to-right direction and four in a right-to-left direction. When these symbols had been structured, nine of the ten were drawn, as the normal right-handed subject would be expected to design them.

Further evidence of her confusion was manifested throughout the diagnostic routines. When referred to right and left sides, she reversed the reference often. When she was asked to put the earphone to her right ear, she placed it on the left. When she was asked to put a card over her left eye in the Snellen test, she placed it over the right eye; but after some hesitation she changed it to the other eye.

As indicated above, it was not anticipated that Nancy would make immediate and complete adjustment in coordination and marked improvement in language skills. It was felt that was regular and forceful therapy gradual change would be realized through the use of the Hand-Eye Coordinator and supporting remedial exercise. The following skills were made on tests on the date indicated.

<i>Skill</i>	<i>3-17-53</i>	<i>6-4-53</i>	<i>4-11-54</i>
Oral Reading	5.1	7.3	7.7
Spelling	5.2	6.2	5.8
Rate of Reading	7.9	9.7	12.7
Paragraph Comprehension	7.9	8.6	11.2
Alphabetizing	8.8	8.1	12.4
Use of Index	6.5	7.5	11.3
<i>Average</i>	<i>6.9</i>	<i>7.9</i>	<i>10.1</i>

Case Three. D.N.C., a college student in his fourth year of attendance at a state university, was studied in the clinic because of very grave difficulties in reading and spelling abilities. He had a record of mirror writing in early elementary school, failure in language courses in high school, and many "repeat in language courses in colleges." He had made excellent grades in all mechanical and scientific courses, and the mental tests administered in the clinic produced a point score of 131 I.Q.

The first test on spelling ability administered in the clinic, on June 9, 1952, based on a high-school test, scored 70 percent error.

On October 15, 1952, after remedial reading had been employed for three months but without the use of the Hand-Eye Coordinator, the next spelling test, comprised of a different list of words but of comparable difficulty, produced the same score, namely, 70 percent error.

Between October 1952, and January 1953, the Hand-Eye Coordinator was used thirty minutes daily and on the next test in January 1953, the percentage of error in spelling was reduced to 45 percent. In June 1953, the next spelling test produced an error pattern of 35 percent, this after continued use of the device in daily therapy. Between January 15, 1953, and June 9, 1953, percentile rank on the Iowa Silent Reading Test, Advanced Form, changed from 37th percentile to 48th percentile. This student is now enrolled for the fifth and final year in an architectural school and, for the first time in his educational history, is passing, with meritorious achievement, and work undertaken.

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