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A Survey of the Literature of Intelligence Tests Being Used in Helping to Determine the Intellectual Abilities of Cerebral Palsied Children

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A SURVEY OF THE LITERATURE OF INTELLIGENCE TESTS BEING USED IN HELPING TO DETERMINE THE INTELLECTUAL ABILITIES OF CEREBRAL PALSIED CHILDREN

A Thesis

Presented to

the Graduate Faculty

Central Washington State College

In Partial Fulfillment

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INTRODUCTION

"Cerebral" means brain-centered and "palsy" describes the lack of muscle control. Cerebral palsy is a group of disorders caused by damage to one or more of the brain centers that control body movement (11:5-20; 28:28-29). According to Minear (40:814), cerebral palsy is not a progressive disease but that it effects the motor and other symptom complexes caused by a non-progressive brain lesion or lesions.

Perlstein defines cerebral palsy as ". . . a condition characterized by paralysis, weakness, incoordination or any other aberration of motor function due to pathology of motor control centers of the brain" (41:135). Cerebral palsy does not designate a disease in any usual medical sense. It is, however, a useful administrative term which covers individuals who are handicapped by motor disorders which are due to abnormalities of the brain.

The intellectual abilities of cerebral palsied children are difficult to measure because of speech, vision, handedness and muscular coordination. Parents and teachers need an accurate measurement of the child's intellectual ability so that plans for the child may be sensible ones based upon what he can honestly be expected to accomplish.

Premature discouragement of parents and others concerned with the child can be eased when it is possible to probe existing abilities by suitable intelligence tests in even the most severely involved child.

I. THE PROBLEM

Statement of the Problem

The writer found these intelligence tests currently and widely being used in helping to determine the abilities of cerebral palsied children: The Columbia Mental Maturity Scale, Ammons Full-Range Picture Vocabulary, Peabody Picture Vocabulary Test, Children's Picture Information Test, Raven's Progressive Matrices, Vineland Social Maturity Scale, Gesell Preliminary Behavior Inventory, Bender Visual Motor Gestalt Test, and the Goodenough Test. These tests permit the child to respond with a smile, a point, nod or otherwise clearly indicate a correct response.

It was the purpose of this survey to review the literature to find the intelligence tests used in helping to determine the intellectual ability of cerebral palsied children.

Importance of the Study

Phelps (43:770), estimated in 1941 that seven new cases of cerebral palsy occur per 100,000 population annually or seven new cases per 1,500 births. This is comparable to

the Schenectady survey of Levin, Brightman and Burtt (35:2793), in which an incidence of 5.9 cases occur per 1,000 births.

There are few conditions found in human beings which are more complicated than that of cerebral palsy. This classification by Cruickshank (8:16-22), attempts to give a fuller understanding of an already complicated problem, the implication of certain types of handicaps in the multiply handicapped cerebral palsied child.

Type I. This is the basic form of the disability with no other physical or psychological deviations.

Type II. Type II refers to cerebral palsied children who show defects of perception. There is no evidence of mental retardation. We know very little about this type and there is good educational and psychological prognosis, provided the child is educated in an environment which recognizes his basic learning problems.

Type III. This type refers to those who have no physical handicaps other than the basic ones and who are free of perceptive disabilities but whose intelligence is retarded. Their level of achievement is significantly limited.

Type IV. Type IV are those with secondary physical disabilities other than cerebral palsy. There is normal intelligence and no characteristics of perceptive difficulties.

Some of these secondary physical disabilities may be visual and auditory impairments. This type presents one of the most difficult educational and psychological problems. Prognosis is undetermined.

Type V. Type V refers to the person who has no secondary physical defects but does have both retarded mental development and psychopathological perceptive functions. Prognosis depends upon intellectual abilities and extent of cranial damage.

Type VI. This type refers to the person who has secondary physical defects, retarded mental development, but no perceptive malfunctions.

Type VII. This type refers to the person who has secondary physical defects and perception difficulty with normal intelligence. Because of better intellectual ability of the child, prognosis is better.

Type VIII. This type possesses all three defects--physical defects, mental retardation and perceptive difficulty. It is the most serious and presents educational, social and therapeutic problems.

Table I, located on page 5, shows the major variations of multiply handicapped cerebral palsied children (8:18).

Cardwell (5:23) found multiple disabilities included visual defects--about fifty per cent, hearing impairments--about twenty-five per cent and speech defects from fifty to seventy-five per cent.

TABLE I

MAJOR VARIATIONS OF MULTIPLY HANDICAPPED CEREBRAL PALSIED CHILDREN

Type	Presence of Cerebral Palsy	Presence of Other Physical Defects	Retarded Mental Development	Perceptive Pathology
1.	yes	no	no	no
2.	yes	no	no	yes
3.	yes	no	yes	no
4.	yes	yes	no	no
5.	yes	no	yes	yes
6.	yes	yes	yes	no
7.	yes	yes	no	yes
8.	yes	yes	yes	yes

There is a definite relationship between impaired vision and intelligence (63:99). Gruber (23:4-7), states that eye motor defects exist in fifty per cent of patients with infantile cerebral palsy.

Dunsdon (63:106), in 1951, found a ten per cent hearing loss in sixty per cent of the children in a small survey of cerebral palsied children. Perlsteing (42:166) noted in all surveys on cerebral palsy, the high incidence of speech defects. It has been estimated that seventy-five per cent of all children with cerebral palsy have speech defects and that from fifty to seventy-five per cent of these children can be benefited by speech training (48:209-218; 39:624-626; 52:237-240).

Only in recent years have constructive educational programs developed for cerebral palsied children. Enthusiastic parents and teachers, along with growing public interest has pushed this work forward for the thousands of deserving young people in our country (28:1). This paper will attempt to discover if suitable intelligence tests are available and are being used to help determine intellectual abilities of the cerebral palsied child.

Limitations of the Study

The intellectual abilities of cerebral palsied children are influenced by environmental factors such as family structure, motivation and cultural deprivation. Testing

the intellectual abilities of cerebral palsied children is only one part of the total program of educational planning.

The intent of this paper is to make a general survey of the literature of intelligence tests used with cerebral palsied children. The writer wished to gain knowledge of the tests' content and administration but a detailed analysis of these tests was not made. No attempt was made to evaluate the content or procedure of the intelligence tests nor was an examination made to determine the value, validity or fairness. Scoring procedures or prediction methods were not evaluated.

CHAPTER II

REVIEW OF THE LITERATURE

The cerebral palsied child can only improve through educational and therapeutic measures to the extent that his development and potentials allow him. In many cases it is very hard to determine a child's ability because of slowness of responses, lack of coordination, poor eyesight and hearing. Most intelligence tests require the child to respond verbally or with some motor movement (4:179). The child with cerebral palsy is often considered mentally retarded because of his physical appearance and lack of ability to make normal responses.

I. INTELLIGENCE

Deaver's (11:16) studies report that approximately thirty-three per cent of all cerebral palsied children are mentally retarded while cerebral palsy clinics report that from sixty to seventy per cent are mentally retarded (26:613). Phelps (44:10) found that thirty per cent of cerebral palsied persons are mentally defective and seventy per cent normal. Heilman's study disagrees with Phelps and quotes incidence of mental deficiency at approximately fifty per cent (24:11). Crothers and Paine (6:171) feel that we should abandon the suggested classification and rate the child in terms of his predicted ability to compete. This would be extremely

useful and would have the considerable advantage that it would necessarily lay a basis for discussion with the family about plans.

Denhoff and Robinault (12:311) report that intellectual assessment of the physically handicapped child has resulted in erroneous conclusions. They state that ninety per cent of all patients can easily be classified into such wide categories as superior, average, mentally retarded and mentally deficient. They state that ten per cent of the patients are non-testable by standardized tests. Denhoff and Robinault's summary of recent studies of intelligence test findings by thirteen different authors, using a combined series of 3,705 cases, showed the following distribution:

Mentally deficient (IQ below 71)	45%
Borderline-dull (IQ 70-89)	23%
Average or above average (IQ 90-119)	26%
Superior or very superior (IQ above 120) . . .	6%

(12:311)

This summary reports that intelligence is below normal as determined by the best tests available, used by the best testers available who work almost exclusively with cerebral palsied children.

Among cerebral palsied children whose disabilities are limited to the physical, a few have turned out to be superior in intelligence, some have been exceptional, many normally average. A more realistic picture shows that one-fourth to one-third of those having cerebral palsy may be

expected to be free of intelligence defects (28:9-11). Figure 1, located on page 11, shows a comparison of a normal distribution of intelligence as compared to a cerebral palsied population (12:315).

II. EDUCATIONAL DIAGNOSIS

The objective of a psychological examination of the child with cerebral palsy is not to determine brain injury but to determine realistic goals for the child so that he may develop his abilities and learn to accept his disabilities. According to Jewell and Wurstern (31:630-37), the psychologist is concerned with (1) how trainable is the child; (2) by what methods of training may best results be expected; and (3) in the case of retesting between intervals, has therapy been effective in increasing the child's adjustive capacity?

On such tests as the Stanford Binet, which gives an IQ score based on average levels of performance of different tasks, the score is of little use because it is not possible to determine the scope of the disability the child may have. The Wechler score is somewhat more helpful because it provides a verbal and non-verbal score. The sub-tests provide a wider range for testing the cerebral palsied child. There is a need for a systematic inventory of the child's level of development for educational planning (59:10-11).

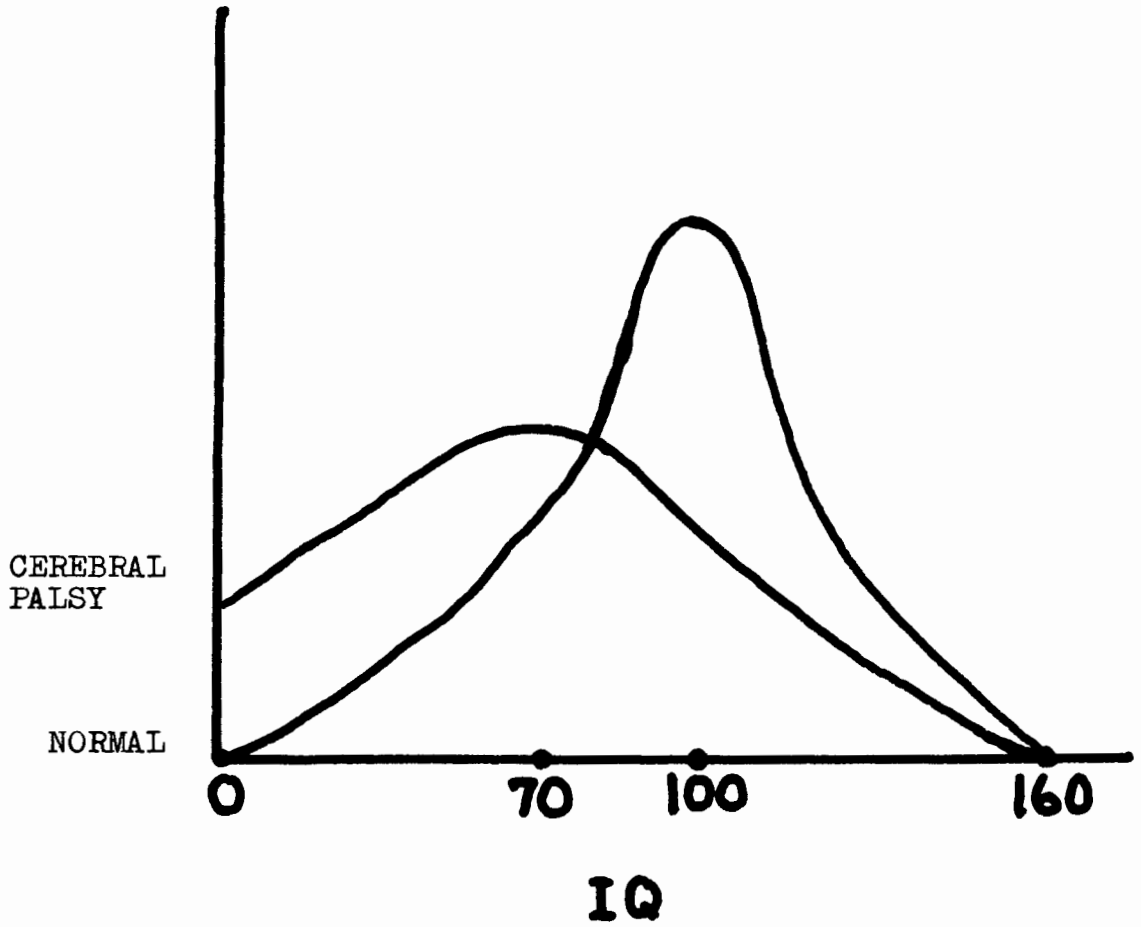

FIGURE 1

PROPOSED IQ DISTRIBUTIONS OF NORMAL AND CEREBRAL PALSIED POPULATIONS

The Illinois Test of Psycho-Linguistic Abilities, developed by Kirk and McCarthy (2:33-34, 33:399-412), is an example of a new test designed to measure language difficulties in children and children with brain damage. Haeussermann's work in recent years is seeking to establish areas of strength as well as weakness in the language area (47:54-56, 32:332).

Phelps, Hopkins and Cousins (45:67-68) emphasize that among cerebral palsied children there often exists a problem in which psychologists need to be aware. In response to a question or a stimulus there may be a time lag. This is because of the extra time it takes for the proper muscles to contract to make the response. The child's mental response may be immediate but because of poor muscle control, he can't speak or signal with an arm movement within normal limits of time. They give the example of a child who hears a word and knows the meaning of the word immediately, but a time lag of fifteen to twenty seconds may pass before the child can respond. This lag can easily be confused with slow thinking. Knowledge of this time lag is very important to parents and teachers and especially important to the psychologist who evaluates a child's mental ability.

Psychologists are trying to evaluate the cerebral palsied child on a more comprehensive basis now than in the past. Russ (51:51-53) agrees that the child should be seen several times before any testing is conducted. More emphasis

is being placed upon careful observation both in a clinical and home setting. Specialists are working toward facilities which will encourage parents to bring their young cerebral palsied children to the psychologist early, thereby permitting observation and evaluation of the child through the development period.

The examiner should take the position that "intelligence will out," and be aware of the slightest clue which shows the presence of intelligence. For example, a severely physically retarded five year old French speaking child was asked in French, "What is a ball and what do you do with a ball?" He was unable to speak clearly but responded with a throwing motion. This is an example of how "intelligence will out" (12:312-316).

It is the opinion of Denhoff and Robinault (12:314) that in probably ninety per cent of all cases of cerebral palsy, at least an estimate of the general level of ability can be predicted through careful observation of the child's responses.

III. FLEXIBILITY IN USING STANDARDIZED TESTS

According to the United Cerebral Palsy Educational Advisory Board (49:12), the standardized test should be used. All intelligence tests try to determine what capacity the child has to adjust to in the demands of life. The advisory

board also advises that the place of testing is very important. A quiet, pleasant room with suitable colors and furniture for the cerebral palsied child will make the evaluation session a less demanding experience for the child. Too often, testing has been conducted in a small corner or closet. Some children may need to be examined in their homes and with the very young, one parent may need to be present during the testing (49:12).

It may be necessary to modify test materials and procedures and allow the child to respond in a manner suitable to his handicap (10:90). Controlled flexibility may be necessary when the standardized test is first given according to standard procedure and then later given with modifications. This may help in determining the mental condition. The United Cerebral Palsy Association reports that a modification that has proven useful with the Binet Form Board is placing small knobs on the blocks which make it easier for the child to place the blocks. The child who can't talk and lacks verbal comprehension can usually choose an appropriate card or object and hand it to the examiner, making it easier for the child and at the same time giving some information about his ability (49:12-18).

There are many adaptations or modifications of nonverbal tests (49:16). Many pictures are made of thin paper which makes it difficult for cerebral palsied children to handle. The pictures can be mounted on heavy paper or even

cardboard for easier handling.

Psychologists agree that the child should complete the test without modification if he can. They recommend that if he can't complete the test, let him complete the parts he can without modifications. Psychologists should try to devise new ways to learn how much the child understands. An effort should be made to give full credit when earned and to form estimates, acknowledging that they are estimates (49:16; 32:332; 12:314; 51:52).

Katz (12:312-316) suggested leaving out non-usable test items of the Revised Stanford Binet Test and more time can be spent on items within the child's capabilities. For the children who have difficulty seeing small objects or small letters, the substitution of large letters and objects will often aid them and prevent them from becoming discouraged. The use of large plastic letters and numbers for the children who can't talk or coordinate will be helpful in reaching a level of their understanding. The cerebral palsied child can usually knock down or move the letters if no other means of communication is present (12:318).

In testing cerebral palsied children, the psychologist must be aware of the emotional factors which can complicate the testing procedure. The United Cerebral Palsy Association (49:12-18) suggests several aids for the children. Replacing small rolling crayons with large square ones is often a

help to the child. Anchoring a paper firmly will aid the child who is drawing or writing. Substitution of large solid color cards in the place of small black and white ones on the four year level of the Binet Test yields interesting results. Many children who could not match black and white forms at all, matched the colored forms much easier. Time limits must often be disregarded and the tester may find it necessary to skip around, alternating easy items with hard ones (32:332).

Results of intelligence tests are only useful if they are reasonably reliable. The reliability of tests for cerebral palsied children has been questioned in recent years (25:291-292; 47:16).

Holden (27:92-3) suggests that no testing be conducted with cerebral palsied children under the age of three. Others suggest preliminary testing, evaluating motor performance, coordination, hearing, vision and verbal ability before psychological testing (47:9; 28:24-26).

Deaver (11:25) recommends that the cerebral palsied child have a complete medical examination and report of medical history before evaluation of intellectual ability is started.

CHAPTER III

REVIEW OF TESTS

The selection of intelligence tests will depend upon the child's receptive and motor ability. Intelligence tests most often used with cerebral palsied children fall into four catagories: (1) Type I, (2) Type II, (3) Type III, and (4) Type IV (1:9-11). Type I tests are designed for testing the child who understands oral instructions and the child who does not need to manipulate materials in responding to a test. Type II tests are used to further verify findings of Type I tests and to provide information about the child's development in the areas of living. Type III are parts of many different standardized tests. Examiners will often devise techniques of their own in testing the cerebral palsied children. Type IV tests are paper and pencil tests often used with cerebral palsied children.

I. TYPE I TESTS

Columbia Mental Maturity Scale

This test was designed specifically for estimating the intellectual level of children with serious motor or verbal impairment. This test is now offered as a rapid screening device for all children between the ages of three to twelve (3:272).

This test consists of one hundred plates, measuring nineteen inches by six inches in size. Each plate has from three to six pictures of which all but one are related. Some pictures are in color and others are in black and white. Some pictures are of abstracts and some are pictures of things the child would see in his daily activities. There is a progression of difficulty and many children wouldn't be expected to finish the test (18:111-13).

The child is to pick the picture that doesn't belong with the others. For example, plate fourteen shows three teddy bears and a horse. The child would point to or say "horse." Directions may be presented orally and demonstrated for the subject. The directions may also be pantomimed if the child's speech and hearing are impaired. The pointing technique may be employed, and the tester must touch all pictures in a standard order. The testing is continued until the child misses twelve in a sequence of sixteen plates. The raw score is translated into mental age. Vision is necessary for taking this test (1:22-25).

Berko (12:312-16) has used the Columbia Mental Maturity Scale and the Revised Stanford-Binet Scale on a group of thirty cerebral palsied children ranging from five to twelve years of age, with a varying degree of speech and motor impairments. On the Binet Scale the mean IQ was 67.9 and on the Columbia Mental Maturity Scale

the mean IQ was 52.9. The lower score on the Columbia Mental Maturity Scale was probably due to heavy weighting on visual perception, a handicap many cerebral palsied children suffer (5:23; 63:99). The Binet test measures a wider variety of mental functions.

It is clear that many of the plates may be confusing to the child (15:70-74). Many plates have the possibility of more than one principal working. For example, card number fifty-nine shows a pig, a member of the cat family, a monkey, a girl and a squirrel. The correct choice is the girl. If the child points to the outline of the pig and says it is the only one without hair, how is the examiner to score this response? More than one valid answer may be possible on many plates. All children should be given the chance to explain their answers (10:105-113).

Ammons Full-Range Picture Vocabulary Test

The Ammons Full-Range Picture Vocabulary Test was developed in 1948 and is somewhat similar in principle to the Peabody Picture Vocabulary Test (29:263). It was developed primarily to assess the intellectual capacities of children and others, such as cerebral palsy, and it has proved to be of value in evaluating mentally retarded children. It requires no reading, writing or speech. It is especially desirable if the child has a speech problem (7:265-66).

This test contains sixteen plates, eight and one-half by eleven inches with four pictures on each plate. The pictures are line drawings in black and white. For example, plate one shows a picture of a pie, a thief, a window and an ear of corn. The examiner pronounces words from a list, one at a time, to be defined by one of the pictures. The examiner asks the question and then points to each picture. The examiner always starts with the picture in the upper left hand corner and must wait for a yes or no signal. Next, he moves to the upper right hand corner and lower right. Then he records the child's choice. The examiner presents the next word and follows the same techniques until three words are missed in a row. The examiner must point to all four pictures. This test allows the child to respond with only eye movement, or a slight finger or arm movement and can be given in about ten minutes (15:70-74; 27:92-99).

Allen and Jefferson (1:11-15) studies show this test to have a high correlation with the Revised Stanford-Binet and Wechsler Tests.

The Ammons Full-Range Picture Vocabulary Test was used on thirty-two cerebral palsied children and the following correlations were obtained by Kogan (34:54-56) in relation to the Revised Stanford-Binet and the Raven's Progressive Matrices:

	Stanford-Binet		Raven's Progressive Matrices		Ammons Full-Range Picture Vocabulary
FORM:	A	B	A	B	A with B
Ammons Full-Range Picture Vocabulary	.88	.90	.64	.63	.94

Peabody Picture Vocabulary Test

This test was developed by Dunn (29:262-263) in order to assess the intellectual capacities of handicapped persons. The test is not timed, and only requires ten to fifteen minutes to administer to the usual subject. It was designed to test the physically or verbally handicapped subject, and is of particular value in assessing the intellectual potentials of persons who have difficulties in a prolonged testing situation.

The Peabody Picture Vocabulary Test permits the child to respond with a yes or no, and the child with severe handicaps can respond with a point or by a shake of the head or by a coded message of raising the eyelids for yes and closing them for no.

The test consists of three examples and one-hundred fifty test cards. Each card has four pictures and is numbered. The examiner calls out the object and the child is asked to put his finger on the object.

Dunn (1:15) suggests starting at a point comparable to the child's learning ability and age. Basal and ceiling points must be established. The lower point is where the child can successfully identify eight correct pictures in succession. The test continues until the child fails six in a row of eight consecutive words. The score is the difference between the last word failed and the number of errors.

Little research is available on this test since it is a new test. Allen and Jefferson (1:18) report a study that showed a correlation of .90 between the Peabody Picture Vocabulary Test and teachers' ratings of arithmetic achievement and .87 between the Peabody Picture Vocabulary Test and teachers' ratings of reading achievement.

The examiner must always start with picture number one on each plate and he should always show the whole card and be observant of the child, looking for responses. The test words should not be written, spelled or defined for the child (15:70-74).

Children's Picture Information Test

This test was designed for use with pre-school children. The task requires the child to indicate which picture out of four belongs with the key picture. For example, a page may have pictures of a clock, tire, shirt and a pair

of shoes in the column. The key picture is an automobile. The child selects the tire, as it belongs with the automobile.

There are thirty-four items in all. The pictures are of common, household items with which the child is familiar. The pictures are mounted on large pages in book form. The pictures are in color and are child-oriented.

This test is new and little research is available. The work of Allen and Jefferson (1:21) shows that the Children's Picture Information Test correlates .89 with the Stanford-Binet mental age for normal children and .80 for cerebral palsied children. Kogan's results show that the severely handicapped child, untestable by other tests, has the same intelligence range as larger groups on the Picture Information Test. Other tests should be used with the Children's Picture Information Test when possible (34:54-56).

Raven's Progressive Matrices

The Raven's Progressive Matrices was developed in England by Raven (3:261-263). It consists of sixty matrices, or abstract designs, from each of which a part has been removed. For a sample item, refer to Figure 2, located on page 24. The child is to choose the missing part from the six to eight different designs. The patterns are arranged in booklet form and is administered with no time limit. It can be given individually or in a group (10:104-105).

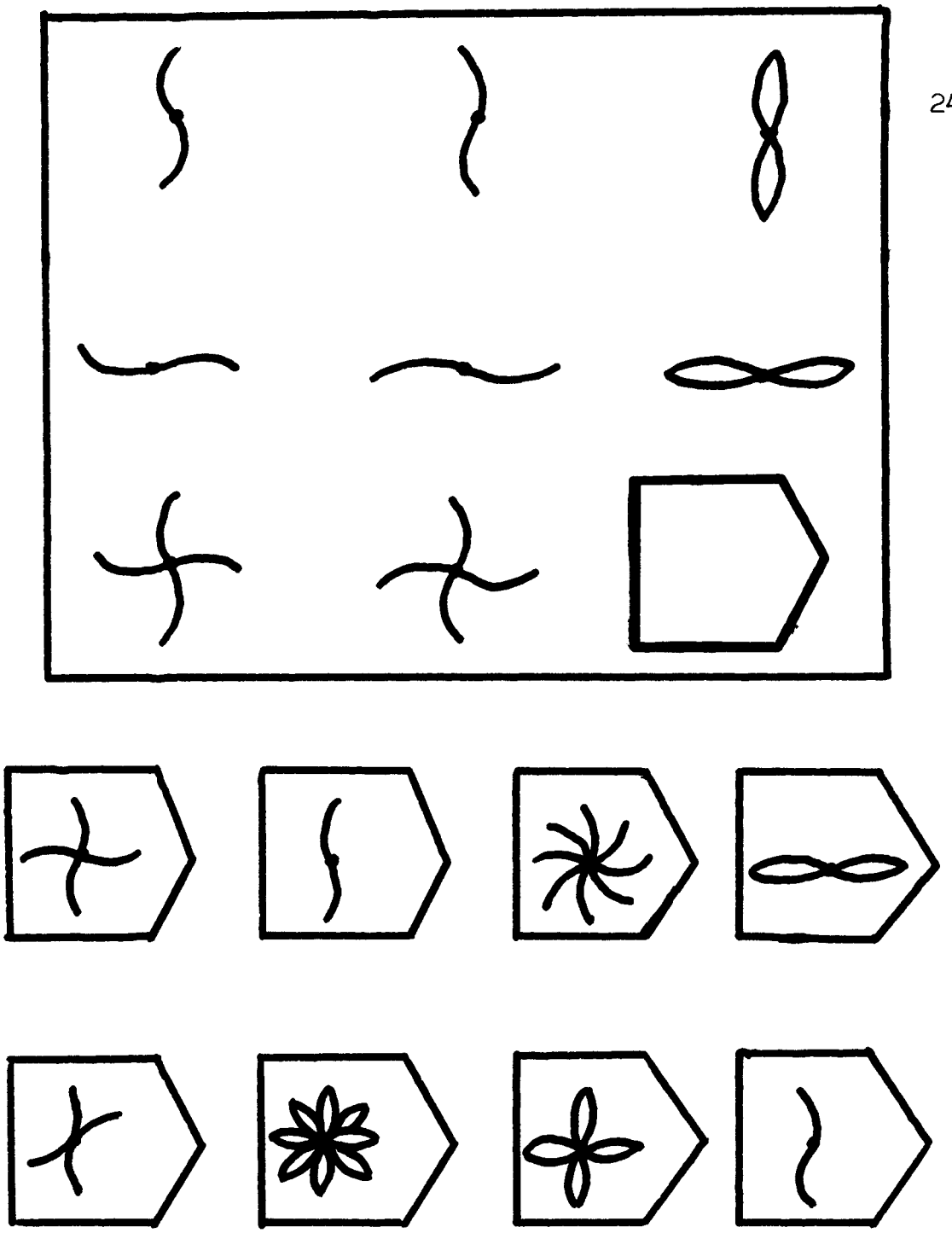

FIGURE 2

SAMPLE ITEM FROM THE RAVEN PROGRESSIVE MATRICES TEST

The child may use a pointing or sound response. The psychologist may pantomime the instructions by pointing to the empty section of the pattern and then to each of the choices. For all but the correct choice the psychologist shakes his head no, and yes for the one right choice. The psychologist must be sure the child understands the procedure before starting the test. Vision is necessary for this test.

The test ranges from simple patterns, numbers, and abstract principles in space, to shape concepts. The Raven's Progressive Matrices has been found to be especially suited for testing cerebral palsied children and of practical value (34:54-56, 1:25-26, 27:92-99).

Recently, an easier colored form of the Raven's Progressive Matrices has been used with children between the ages of five to eleven. The test is available in both book and board form. The board form requires the child to insert the right piece into the design (3:261-263).

Green and Ewert (22:139-142) administered the Raven's Progressive Matrices by slides to 1,214 children from ages 6-0 to 12-5. Very little difference was found between scores obtained by the slide form of administration and those obtained by the booklet form of the test.

II. TYPE II TESTS

The following tests measure the child's development in the areas of living. These tests should not be considered intelligence tests. It is valuable for parents, teachers and psychologists to know how a child has lived his life and met his problems.

Vineland Social Maturity Scale

This scale is a list of activities which lead from infancy to the mature adult level. It has been found most useful at the younger ages. Much of the information is obtained from the parents, usually the mother (7:305-306). The psychologist may only observe the child in a clinical situation. The information is difficult to evaluate and no writing of answers should take place until the scale is completed. The examiner must keep in mind the ways in which the entire family is involved. The scale is made up of one-hundred seventeen statements descriptive of daily activities, arranged on an ascending scale from year one to twenty-five. The activities of daily living covered by the Vineland Social Maturity Scale are: (1) self help, general; (2) self help, eating; (3) self help, dressing; (4) locomotion; (5) occupation; (6) communication; (7) self direction; and (8) socialization (1:32-34).

The examiner should encourage the person to answer questions as fully as possible, not with just a "yes" or "no." The examiner should ask as few questions as possible. Each item is given one of five scores and the total score gives a social age (SA). The social age divided by the chronological age provides a social quotient (SQ) (3:300-1). When parents realize and admit that their six year old is more like a child of three or four, the way is prepared for the realistic planning of his education and training (28:33-34).

Gesell Preliminary Behavior Inventory

The Gesell Inventory is a behavioral scale which measures maturation in four areas essential to normal living. The inventory covers the short span from birth to three years of age. Most of the information is obtained from the parents or others who are familiar with the child's habits. Much can be learned about the child by observing him in a playroom or in the tester's office. Here again, as in the Vineland Social Maturity Scale, information is hard to evaluate and complete acceptance of parent's reports needs support by observing the child (1:36-38).

The four areas surveyed are: (1) motor, which refers to the first skeletal movements to motor activities of early childhood; (2) adaptive, which provides a measure of

the child's ability to participate in daily activities; (3) language, the development from vocal sounds to meaningful speech; and (4) personal-social, which measures the child's personal relations in his society (3:278-283).

Unlike other tests, no total score is obtained. The informal test makes it suitable for infants and has been very useful in assessing the development of cerebral palsied infants and young children. This test gives a good mental picture of the child and at the same time gives information about specific handicaps and abilities (55:69).

III. TYPE III TESTS

Taylor (60:295-467), in recent years has used parts of many different standardized tests or devised techniques of her own in testing the cerebral palsied child. These methods have been used to determine if the child can perform certain tasks at his age level. The test atmosphere is often more informal than with some of the standardized tests. This may permit the severely handicapped child to perform more realistically. The following techniques are suitable for use with cerebral palsied children from six to ten years of age.

Revised Stanford-Binet Scale, Form L and M

The Revised Stanford-Binet is well known and widely

used by psychologists. Katz (1:44-50) made several formal adaptations of forms L and M for use with cerebral palsied children. He classified the test according to the physical ability each form required to complete a task. With the young child, items are adaptable if pointing and response cues can substitute for the arm-hand use. Many parts of the test require vision, hearing or oral speech abilities. Many psychologists suggest selecting parts of the Stanford-Binet to fit the child being tested (60:295-467; 1:44-50). It is recommended that this test only be used in second place to intelligence tests that are designed for testing young cerebral palsied children without oral speech and motor difficulties (1:44-50; 3:270; 29:254-257).

Wechsler Scale

The Wechsler Scale has been used in the past for testing cerebral palsied children. It is generally recommended for use with cerebral palsied children who are sixteen years old and older. Like the Stanford-Binet, the Wechsler can be adapted in some cases if the child possesses vision, hearing or oral speech. Many parts require reading ability and arm-hand use. Modification of test materials must be approached carefully and ultimate recommendations need to be anchored in research findings rather than in convenience (1:51-53).

Judgement and Reasoning

Picture absurdities can often provide information as to how a child understands a certain unrealistic situation and how the child's thought develops. Material from the Revised Stanford-Binet, Forms L and M, for example, show: (1) a man sitting on the limb he is cutting; (2) a man on a scales carrying books; and (3) a man sawing a log with an inverted saw. The examiner presents each picture and asks the question, "What is funny about this picture?" He must note all responses, whether right or wrong. Special attention must be paid as to how the child understands the question. Does he find it funny or does he seriously try to describe the situation without humor? He may even find fault with the artist. The examiner must also note on what evidence the child bases his judgement.

Normal children are able to understand the picture situations on the level that test scales place them. Caution is a must when working with handicapped children on this test. It is often difficult to distinguish between lack of experience and faulty reasoning (60:455-56).

Using Blocks

Blocks are often used in determing the child's non-verbal comprehension. Blocks can be used without verbal instructions and without necessary motor skills to handle

the blocks properly. In working with serial patterns, the examiner sets the blocks in loose order before the child and asks the child to make something different. The examiner may say, "I will take a green one, a red one, a green one, a red one and a ....., which one do you think comes next?" He may encourage the child to make a train of green and red blocks across the table. The examiner may help correct errors two or three times, then let the child continue on his own. It should be noted how much attention is paid and how interested he is. Does he understand immediately or learn gradually (60:295-300)?

Following, Finding, Retrieving

In retrieving hidden objects after delay, the Revised Stanford-Binet Scale Form M, two-year level can be used. This material consists of three boxes and a toy cat. The examiner presents the material and says, "I am going to hide the kitty and see whether you can find it again." The examiner hides the toy under one of the boxes which are lined up in a row. The boxes are screened while he counts to ten and then asks the child to find the toy. He repeats this three times, hiding the toy each time under a different box. Two successes are required to pass the two-year level. A seriously motor handicapped child may follow the toy with his eyes and signal his choice with his eyes. This is a

test of comprehension of spatial relationship and proves useful in the evaluation of a child's ability to learn from his contacts and his environment. Even children with serious handicaps and no speech, but with potentially adequate mental capacities, will show comprehension in this test on about a three to three and one-half year level (60:358-59).

Matching, Sorting, Grouping

The task in this test is to match objects with the printed words. The tester prints in large letters, in a column, the words car, spoon, cat, cup, block and key. He gives the child a box containing the corresponding objects together with other objects. The child is asked to find the objects to match the words. The tester may demonstrate and the child's interest should be on matching, not reading. It should be noted if the child seems secure or hesitant with his placements. This test may help get an initial impression of the child's reading comprehension and involves tasks that are concerned with language and communication development (60:378-79).

Fitting and Assembling

Materials from the Wechsler-Bellevue, Pintner-Paterson and the Merrill-Palmer Scales have been used (60:350-52). The materials consists of six pieces of wood or cardboard

representing a man. Wood has been found more practical for use with handicapped children. The pieces are put before the child in a prescribed order. The child is told to put the pieces together as quickly as he can or that if they are put together correctly they will form something.

The examiner notes the procedure the child uses. Does he recognize the pieces and immediately start to join them or does he handle them as any piece of wood? Does he see the difference between arms and legs? Very few younger children receive a perfect score on this task but much can be learned about the child by observing the procedure he uses. Young children will often recognize the pieces but will only put the head with the body. The Pintner-Paterson scoring is shown on Table II, located on page 34 (60:352). This scoring method is simple and provides a quick summary of the child's maturity level.

TABLE II

PINTNER-PATERSON SCORING SYSTEM FOR MANIKIN

	POINTS
Perfect performance	5
One or both arms up or out, i.e., not exactly fitting in joints	4
One reversal, i.e., right arm for left arm and vice versa or right leg for left leg	3
Two reversals, i.e., both arms and both legs reversed	2
Failure to see that it is a man	0

AGE (YEARS)	PERCENTILE		
	75	50	25
4	2	1.5	0
5	4	3	2
6	5	4	3

Everyday Sense, Common Knowledge, Comprehension

This is a simple test to determine how the child comprehends what goes on around him. Simple questions are asked about sports, television programs, current events, or political figures. Does he recognize familiar figures and can he tell about events in his neighborhood? This type of test has been used with the severely handicapped children over ten years of age. With their daily experiences, their hobbies, and their interests as test material, one may be able to judge their maturity of reasoning by the manner in which they have understood what comes their way, regardless of how seriously limited their environment may be in scope (60:467-470).

Learning and Memory

This is a visual verbal-learning test consisting of learning fifteen pictures. The child is shown each of the pictures one by one and is told that he will be asked to explain the pictures he remembers. The cards from the Revised Stanford-Binet Scale, Form M are used. Some of the pictures are of a hat, key, airplane, ball and a knife. The child may study the pictures and even say the names of the pictures as the examiner shows him each of the pictures. After all fifteen pictures have been seen by the child he is asked to name each picture from memory as best he can.

He does not have to name them in the order he viewed them. The test continues in the same manner until the cards have been shown five times. This experience furnishes valuable information on how children learn a set of factors presented to them repeatedly (60:428-29).

IV. TYPE IV TESTS

Paper and pencil tests are often used with handicapped children in testing ability. The child should have enough arm and hand coordination in order to use a pencil. Two of these tests are the Bender Visual Motor Gestalt Test and the Goodenough.

Bender Visual Motor Gestalt Test

This test consists of a series of eight designs on cards. The child is shown the designs one at a time and asked to copy each one on a single piece of paper in a definite arrangement as best he can. See Figure 3, located on page 37 (60:292). While the child is working, the tester should be aware of his working habits and approach. The tester should note how the child procedes and how satisfied he seems with the finished drawings. Special attention should be paid as to how the child organized the page. This test is designed to study visuo-motor performances by means of drawings (60:390-392).

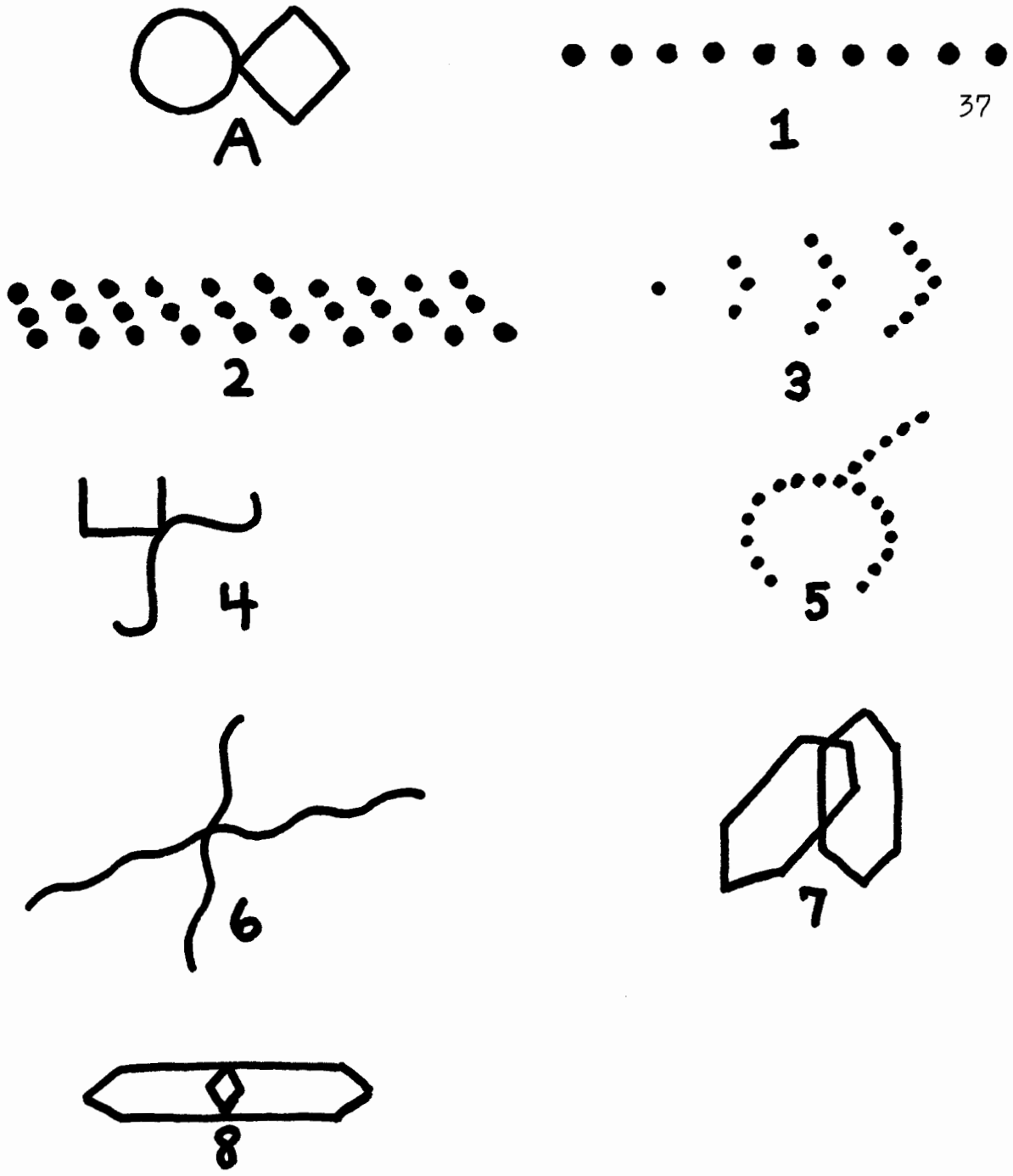

FIGURE 3

DESIGNS FROM BENDER VISUAL MOTOR GESTALT TEST

The Bender Visual Motor Gestalt Test is based on theories that as the child develops with age, so does his ability develop to reproduce these designs accurately (3:342-345). The test is easy for the child and helps establish rapport. Children may have difficulty reproducing visually perceived forms, which is a characteristic of brain-injured children (7:327; 10:134).

Taylor (60:290-292) found that clinicians have used the Bender Visual Motor Gestalt Test extensively and find it very difficult to interpret, especially if it is suspected the child has brain damage or is retarded. Since the average normal child isn't able to draw these designs with accuracy before the age of eight years, it is best used on children over ten years of age.

The Goodenough

The Goodenough is a paper and pencil test in which the child is asked to draw a picture of a man. The child is encouraged to make the very best picture he can and is told to take his time and work carefully. The instructions stress that the child should be encouraged to do his best. The test results should give the tester an idea of the child's maturity level. The tester may ask questions of the child and encourage him to add parts, or to think of what has been left out. Such questions may result in a more

detailed drawing and a better performance (60:325-28).

The Goodenough has been widely used with children, if nothing more than a rapport-gaining device (7:262-265).

The score, used with caution, may help determine the range in which the child might perform if motivated. Points are scored if the child has included in his drawings such things as a head, arms, mouth, correct number of fingers and eyes. A scoring system of fifty-one points was developed (3:264-65).

V. REPORTING TEST RESULTS

Reporting the findings of intelligence tests to parents should certainly receive great emphasis. Correct interpretation of test results should provide evidence of what a child may be expected to accomplish in the future. There have been too many examples of misinterpretation which are a disservice to the patient and his family (12:311). For example, the parents of a cerebral palsied boy, age two, with an IQ of twenty, were told that the boy would never walk. He began to walk at the age of six years, consistent with his developmental level of fifteen months at that time. It is of prime importance that the report be an honest one, no matter what the test results are. There is always need for verbal interpretation. This information can also be of great importance to teachers, and to physical,

speech and occupational therapists. The interpretation should be suited to the persons who are to make use of the information which effects the child's school adjustment. The United Cerebral Palsy Association (49:19-21) states that too often, psychologists' reports are only significant to other psychologists. The reports should be in simple language so that all concerned can understand.

Psychologists must not allow the presence of a physical handicap to color or prejudice their thinking in dealing with cerebral palsied children and their parents. Major attention should be directed toward helping the parents see their child with a degree of realism which will enable them to provide appropriate day-by-day care and plan ahead wisely for such programs as habilitation, treatment, special schooling or even institutionalization (30:60).

CHAPTER IV

SUMMARY AND CONCLUSIONS

I. SUMMARY

Major physical disabilities together with various sensory defects and lack of social experience make it difficult to test the cerebral palsied child. Hopkins, Bice and Colton's New Jersey Study (28:51) showed that approximately fifteen per cent of cerebral palsied children present some problems in testing.

Increasing attention is being paid to the evaluation of the whole child. By carefully studying the physical, intellectual, emotional and social points of view of the child, a comprehensive and more accurate evaluation is produced. With this information, a much more logical program can be planned.

Intelligence tests are available for use with cerebral palsied children. Many intelligence tests used with cerebral palsied children can be used without modification and results give an indication of future achievements. The IQ score alone is not an adequate indication of the educational plan that should be developed for the child and is not an adequate basis on which to exclude a child from school (63:9; 47:16; 45:64).

Four catagories of intelligence tests were reviewed in this study. Type I tests are designed specifically for testing cerebral palsied children. Type II tests are used to gain background information about the child and his family relations. Type III tests are parts of other tests often used and ones psychologists devise themselves. Type IV tests are ones in which the child must be able to use a pencil.

Analysis of a test often reveals the reason for low intelligence quotients, and that reason need not be inadequate learning capacity. This could be illustrated by the child whose test results showed good ability to understand logical abstract relationships and to reach practical conclusions to concrete problems, yet he had an inferior fund of general information such as most children secure in school or on the playground.

II. CONCLUSIONS

Adequate evaluation of the cerebral palsied child is not mainly a problem of developing new tests, but a problem of providing more refined clinical training and background experiences for the people who are going to work in this area (27:99).

One of the unsolved problems is the cerebral palsied child that cannot be tested to determine his intellectual

abilities. Some cerebral palsied children cannot take any kind of test even with modifications. Many psychologists believe it is possible to make predictions as to the educability of these children (12:315). There are many observations and clues that enable psychologists to make these predictions, such as the child's reactions to his surroundings and awareness of environment. The parents can be helpful by observing the child in the home and reporting their observations.

With increased interest and better understanding of the needs of the cerebral palsied child, many problems can be corrected. Above all, in a program of intelligence testing the cerebral palsied child, the findings should contribute something to the practical planning directed toward the best future the child can attain. The psychological findings should provide data for the physician in future plans of treatment, assurance for the parents, and information for teachers so that educational programs can be planned effectively.

There is further need for the development of tests for intelligence testing cerebral palsied children and further need for evaluation of these tests as to their usefulness. Persons testing cerebral palsied children must keep in mind each child's social, emotional and physical handicaps when evaluating and using the test results.

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