

4-YEAR PSYCHOLOGICAL EXAMINATION GRAHAM-ERNHART BLOCK SORT TEST

2. NAME OF CHILD

3. DATE OF BIRTH
MO. DAY YEAR

4. AGE

5. SEX
 MALE FEMALE
1 2

6. RACE
 W N OR
 PR OTHER
1 2 3 4 8

7. EXAMINED BY

8. DATE OF EXAM
MO. DAY YEAR

9. LEVEL III

1. TRIAL 1 (RWBRWB)

COMMENTS

_____ RAW SCORE

DIAGRAM

2. TRIAL 2 (SMLSML)

COMMENTS

_____ RAW SCORE

DIAGRAM

3. TRIAL 3 (CSTCST)

COMMENTS

_____ RAW SCORE

DIAGRAM

4-YEAR PSYCHOLOGICAL EXAMINATION GRAHAM-ERNHART BLOCK SORT TEST

11. LEVEL II (ADMINISTER IF LEVEL III SCORE IS 2 OR LESS)

1. TRIAL 1: TABLE ORDER: RWB _____ RAW SCORE
PRESENT ORDER: BRW

COMMENTS:

2. TRIAL 2: TABLE ORDER: SML _____ RAW SCORE
PRESENT ORDER: SLM

COMMENTS:

3. TRIAL 3: TABLE ORDER: CST _____ RAW SCORE
PRESENT ORDER: STC

COMMENTS:

4-YEAR PSYCHOLOGICAL EXAMINATION GRAHAM-ERNHART BLOCK SORT TEST

13. LEVEL IV (ADMINISTER IF LEVEL III SCORE IS 3 OR MORE)

1. TRIAL 1: 9 CIRCLES WITH 1 OF EACH SIZE AND COLOR

_____ ERRORS

_____ RAW SCORE

COMMENTS:

DIAGRAM

2. TRIAL 2: 9 LARGE BLOCKS WITH 1 OF EACH FORM AND COLOR

_____ ERRORS

_____ RAW SCORE

COMMENTS:

DIAGRAM

3. TRIAL 3: 9 WHITE BLOCKS WITH 1 OF EACH SIZE AND COLOR

_____ ERRORS

_____ RAW SCORE

COMMENTS:

DIAGRAM

14. SUMMARY

1. LEVEL III: RAW SCORE (SUM OF ALL TRIALS) _____

2. LEVEL II: RAW SCORE (SUM OF ALL TRIALS) _____

3. LEVEL IV: RAW SCORE (SUM OF ALL TRIALS) _____

4. TOTAL RAW SCORE _____

**4-YEAR PSYCHOLOGICAL EXAMINATION
MANUAL FOR THE
GRAHAM-ERNHART BLOCK SORT TEST**

(For Form PS-21)

THE COLLABORATIVE STUDY OF CEREBRAL PALSY, MENTAL RETARDATION AND
OTHER NEUROLOGICAL AND SENSORY DISORDERS OF
INFANCY AND CHILDHOOD

August 1963

4-YEAR PSYCHOLOGICAL EXAMINATION
MANUAL FOR THE GRAHAM-ERNHART BLOCK SORT TEST
(For Form PS-21)

Introduction

The Graham-Ernhart Block Sort test has been included in the 4-year COLR battery as a supplement to the Stanford-Binet (Form L-M). It will increase our sampling of concept formation through the use of a sort where materials vary in color, size and shape. Dr. Graham's previous work with this test indicates that it not only provides a significant discrimination between brain damaged and non-brain damaged preschoolers, but also that it adds to the discrimination between these groups to a degree beyond that possible with the Stanford-Binet alone. (See Table of Reference).

The instructions presented here are a revision of Graham's procedure. The original manual has been altered when it was deemed that such revision would better serve the purposes of the COLR Project without distorting the essential characteristics of the test. We wish to thank Drs. Graham and Ernhart for their generous permission to permit COLR use of the test, and Dr. Graham for her review of this revision.

Materials

The materials consist of 26 10mm. thick plastic blocks in various combinations of three colors (white, red and blue), three forms (circle, square and equilateral triangle), and three sizes (small, medium and large). Areas of the three forms are approximately equal for each size level. The size levels are in the ratio of 1:2:3, the relevant dimension being the sides of the square and the triangle and the diameter of the circle. The exact dimensions are 22, 44 and 66 mm. for sides of the three squares; 33, 67 and 100 mm. for the sides of the three triangles; and 25, 50 and 75 mm. for the diameters of the three circles.

<u>Circles</u>	<u>Squares</u>	<u>Triangles</u>
2 large white	2 large white	2 large white
2 large red	1 large red	1 large red
2 large blue	1 large blue	1 large blue
2 medium white	1 medium white	1 medium white
1 medium red		
1 medium blue	1 small white	1 small white
2 small white		
1 small red		
1 small blue		

Materials for the Graham-Ernhart test and necessary replacement parts will be furnished by the Central Office.

General Administration Instructions

1. This test is given as a whole. Other procedures should not be interposed between trials or levels. Such interposition, if practiced, might produce unknown interference with establishing the proper sorting set.
2. The Graham-Ernhart Block Sort test items are organized into four levels. Level III is always given first. Depending upon the child's performance on Level III, either Level II or Level IV, but not both, is given. Graham's Level I is not being used by the COLR Project, since it is anticipated that Level I is not needed to provide satisfactory discrimination between subjects at the lower ranges.
3. Throughout the test, the examiner should avoid the use of phrases relevant to concepts of size, shape, or color in giving his instructions; e.g., "little ones," "blue blocks," "circles." Stick to use of phrases and words such as "look alike," "alike," "same," and "belong together."
4. Since the same concepts are tested repeatedly, the examiner should not indicate that a correct response has or has not been made, except on the three trials of Level III. However, if the child, having made a correct sort, then proceeds to build or play at random with the blocks (thus destroying the

General Administration Instructions. (Cont.)

sort) the examiner should, if possible, say before the sort is destroyed, "Is that the way you want them?", or, "Have you finished putting the blocks that are the same together?", and proceed to score the sort in terms of the block placement at that point.

5. If a child requests help, the examiner should repeat the instructions or say, "Just do the best you can."
6. Blocks not in use should be kept out of sight.
7. In scoring, verbal recognition is not counted. Only the child's nonverbal sorting behavior contributes to his score.
8. To avoid supplying extraneous cues, the examiner should hold all the required blocks in his hand before placing any of them on the table.
9. At all levels, each trial is presented only once.

Administration and Scoring:

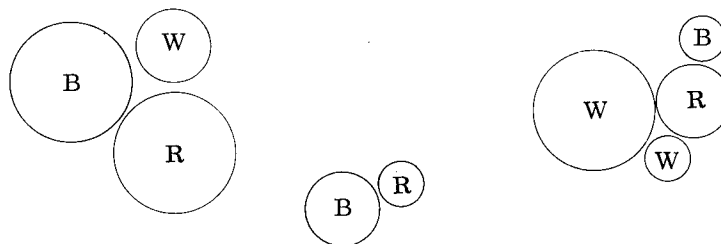
Definitions:

- A. A **group** is two or more blocks which are adjacent to one another (they may or may not actually touch), and are spatially separated from other blocks. All blocks included in a trial may form a single group. The definition of group demands only that two or more blocks are together in a stack, row, or laying together. On occasion a group of blocks may contain combinations of stacks or rows, i.e., be both horizontally and vertically arranged.
- B. A **subgroup** is two or more blocks **within a group** which are **alike** in size, form or color, whichever dimension(s) is (are) being varied on a given trial.

NOTE: The distinction in definition between a **group** and **subgroup** is critical to the scoring system and needs to be thoroughly understood. Blocks in a group may or may not be alike; the only essential requirement is that they be clustered. The definition of a **subgroup** implies that the group within which these like blocks are found includes other subgroups or misplacements. The blocks within a specific subgroup are **always** alike by definition. Blocks constituting a subgroup must also be clustered.

In Example I, the cluster of three blocks constitutes a **group**; the cluster of two blocks is also a **group**. Within the three block group is a **subgroup** of two circles which are alike in size. The two white blocks in the cluster of four form a **subgroup**. The cluster of four blocks forms an additional **group**.

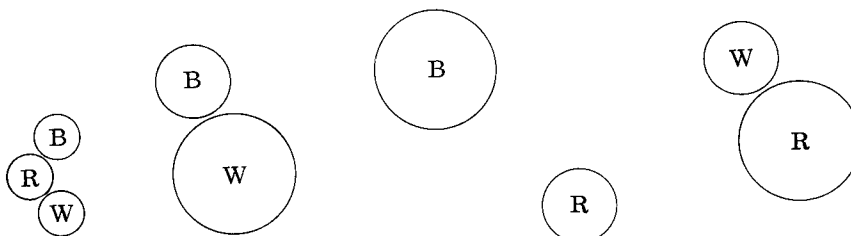
Example I:



B: Blue
R: Red
W: White

In Example II the cluster of three blocks is a **group**; so are the two clusters of two blocks each.

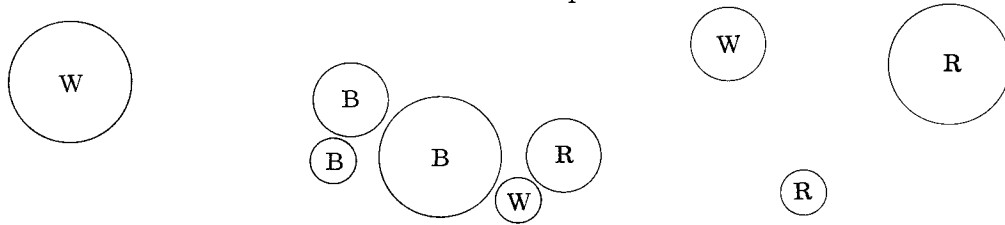
Example II:



Administration and Scoring. (Cont.)

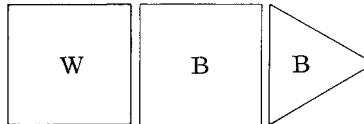
In Example III, the three blue circles within the group of five constitutes a subgroup of three blocks. Other blocks in the diagram are extraneous to this example.

Example III:



Finally, note that a particular block may belong to more than one subgroup. In Example IV, the middle blue square forms a subgroup of squares with the block on its left and also forms a subgroup of two blue blocks with the block on its right. In the first instance the subgroup is formed on the basis of shape, in the second on the basis of color.

Example IV:



- C. A **leftover** block is one not adjacent to any other block. The blocks called extraneous in Example III are leftover blocks.
- D. **Misplacements** are blocks within a group so placed that they form no subgroup. They are not similar to blocks next to them in the group, in terms of the concepts being sorted (shape, color, or size). In Example III, the white block and the red block in the 5 block group are misplacements.

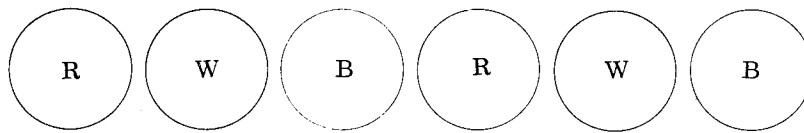
Level III: Administration and Scoring

1. The task is to sort six blocks into three groups of two identical blocks. The blocks used and the orders in which they are placed on the table before the child are given below. The order of placement is specified from the examiner's point of view as he sits opposite the child.

Trial 1: Six large circles

Red White Blue Red White Blue

Child

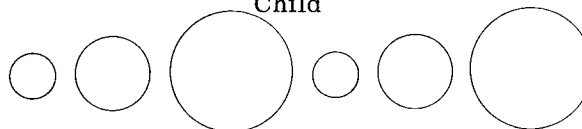


Examiner

Trial 2: Six white circles

Small Medium Large Small Medium Large

Child



Examiner

Trial 3: Six large white blocks

Circle Square Triangle Circle Square Triangle

Child



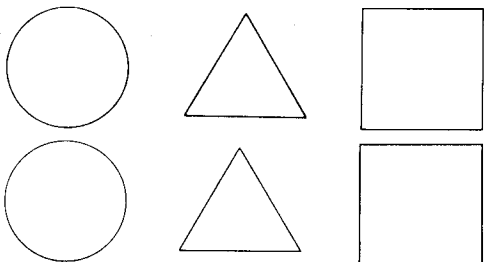
Examiner

Level III: Administration and Scoring. (Cont.)

2. After the blocks have been placed in a row on the table, say "Put the ones that (are alike, are the same, or belong) together." This instruction can be repeated as necessary.
3. A completely correct sort on a given trial consists of pairing the identical blocks with each other. Such a sort earns two points.
4. A partially correct sort on a given trial is one where the sort is incomplete but where the concept is apparent both in the sorting behavior and in the final arrangement. A sort with only one or two misplacements or leftovers or a sort in which two identical blocks are placed together but apart from the remaining blocks are examples of partial sorts. Note that the definition of a partially correct sort includes the specification that the examiner must see some evidence of concept control in the sorting behavior prior to the final arrangement. This clinical criterion has been added to avoid the crediting of final arrangements where two identical blocks happen by chance to end up closer to each other than they are to other blocks. A partially correct sort earns one point.
5. Examples of Level III, Trial 3 sorts.

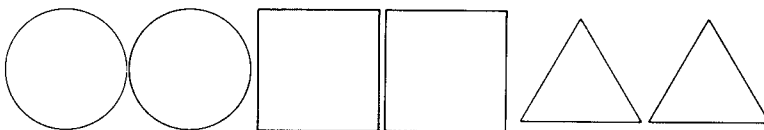
For the purposes of scoring, stacking or placing blocks in a row will be considered equally correct.

A.



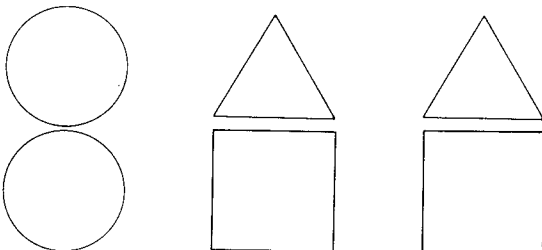
Correct sort; earns two points.

B.



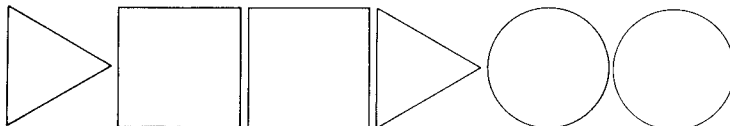
Correct sort; earns two points.

C.



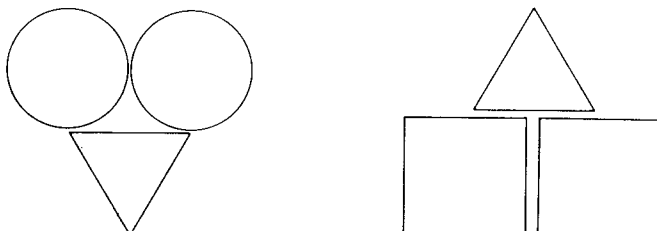
Partially correct sort; earns one point. Partly correct because one group pairs identical mates, even though there are four misgrouped blocks.

D.



Partly correct sort; earns one point. There are only two misplacements (the two triangles).

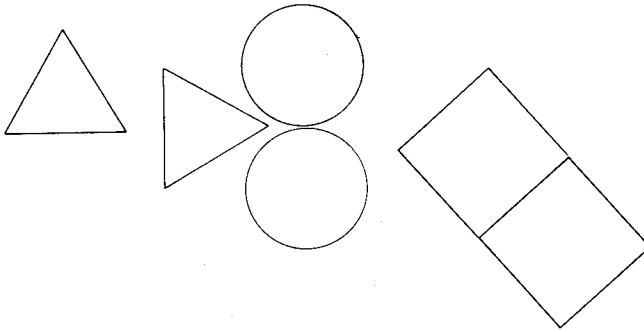
E.



Partly correct sort; earns one point. There are only two misplacements (the two triangles).

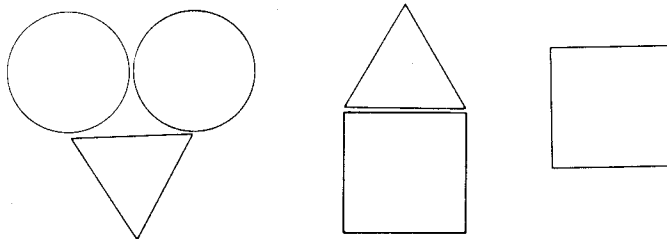
Level III: Administration and Scoring. (Cont.)

F.



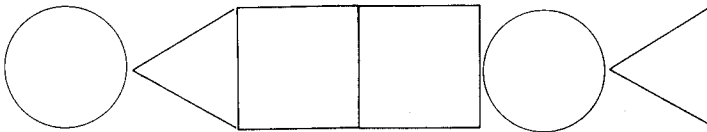
Partly correct sort. There is one misplacement and one left-over (the two triangles).

G.



Incorrect sort; zero points. Three blocks are misplaced and one is leftover.

H.



Incorrect sort; zero points. There is a joined identical pair, but they are not spatially discrete from the other four mis-grouped blocks.

6. To encourage more discrete grouping on subsequent trials at this and other levels, additional instructions and demonstration are given following each of the trials at this level:
 - A. If the child achieves a two-point sort and has arranged the blocks into three discrete groups say, "Fine," and go on to the next trial.
 - B. If the child achieves a two-point sort but has not arranged the blocks into three discrete groups (for example, stacking all six blocks into a single pile, or a single row) say, "Fine, these two are alike, and these two are alike, and these two are alike" as you separate the groups.
 - C. If the child achieves partial or no credit say, "Let me show you. These two are alike, and these two are alike, and these two are alike," as you rearrange the blocks into three separate groups. Do not allow the child another try at the same trial after it has been demonstrated.
7. Maximum score on Level III is six points.

Administration Choice-Point

1. If the child's score on Level III is two points or less, administer Level II. In this case Level IV is not administered and no credit for it is given.
2. If the child's score on Level III is more than two points, administer Level IV and give the child an automatic credit of 9 points for Level II.

Level II: Administration and Scoring

1. The child's task at this level is to choose the mate to the block held by the examiner from the three blocks placed before him. The block the child is to match is held about one foot above the middle of the three blocks on the table, and the examiner says, "Point to the one that looks just like this one."

Level II: Administration and Scoring. (Cont.)

2. The order of the blocks placed on the table for each trial are specified from the examiner's point of view as he sits opposite the child facing him.

Trial 1: On the table: 3 large circles; Red White Blue
Examiner's order of presentation: Blue Red White

Trial 2: On the table: 3 white circles: Small Medium Large
Examiner's order of presentation: Small Large Medium

Trial 3: On the table: 3 large white blocks: Circle Square Triangle
Examiner's order of presentation: Square Triangle Circle

3. Every effort should be made to ensure having the child's attention before each request for him to point. Once given, an incorrect point should be accepted at face value.
4. Each correct match earns one point, making a maximum score of three per trial and a total maximum of nine points for Level II.
5. If child is credited with the full 9 points on Level II, administer Level IV as part of the test. However, the points earned on Level IV should not be included in the score for summary sheet purposes, but will be analyzed at a future date.

Level IV: Administration and Scoring

1. The task for each trial of Level IV is to sort the nine blocks, which on any given trial vary along two of three possible dimensions (size, color, and form) into groups of like blocks.

General Instructions

The instructions are the same for each of the three trials. The blocks used in a given trial are spread out on the table in random order. The blocks should be spread over a roughly oval area, not in a row. The examiner says, "Now put the ones that (are alike, are the same, or belong) together."

Blocks to be used for specific trials are as follows:

- Trial 1: Color and size vary with form held constant. Use nine circular blocks with one of each size and color.
- Trial 2: Color and form vary with size held constant. Use nine large blocks with one of each form and color.
- Trial 3: Size and form vary with color held constant. Use nine white blocks with one of each size and form.

Scoring of Level IV takes only final arrangement into account. By following the rules below, the number of errors on a given trial can be determined. Since it is unlikely that the examiner will have these rules well enough in mind, especially in his early use of the test, it is mandatory that the examiner sketch the final arrangement on each trial, and then score it later.

Scoring Rules

- A. Any group of blocks which are all alike on one of the varied concepts is considered correct.
- B. Any subgroup of three blocks is always correct.
- C. Subgroups of two blocks are counted as errors (one point per block) if:

Level IV: Administration and Scoring. (Cont.)

1. the group contains a misplacement, or
2. the group which contains the subgroup of two blocks is composed of only three blocks.

Note: Groups of three blocks which are not all alike and which contain two subgroups of two blocks per subgroup are errors by rule C₂. They constitute three error points, one for each block. (see Example C, p. 8).

- D. Subgroups of only two blocks are correct if all other blocks in the group also form subgroups, and the group consists of more than three blocks.
- E. Leftovers and misplacements count one error per block.
- F. Typically, sorting by four-year-olds is on the basis of one varied concept or the other, or some use of both concepts. Thus, one group may be formed having blocks of the same color, and another group in the same trial will contain blocks of the same form or size. It is possible but rare for a child to produce a perfect sort on both concepts. To do so, every block must participate simultaneously in two subgroupings. This can be achieved with a 3 x 3 matrix in which blocks of one concept form the rows, and blocks representing the other concept form the columns. It can also be achieved with three stacks formed on the basis of one concept with the second concept demonstrated by uniform positions within stacks in all three stacks.
- G. Errors on a given trial may range from 0 to 9. They should be converted to points toward the total raw score by use of the table below. Maximum raw score points possible on a given trial is ten. Maximum raw score contributions of Level IV to total raw score is 30.

	<u>Errors on a trial</u>	<u>Raw Score for the trial</u>
(2-concepts sorted simultaneously)	0	10
(Ordinary perfect sort)	0	9
	1	8
	2	7
	3	6
	4	5
	5	4
	6	3
	7	2
	8	1
	9	0

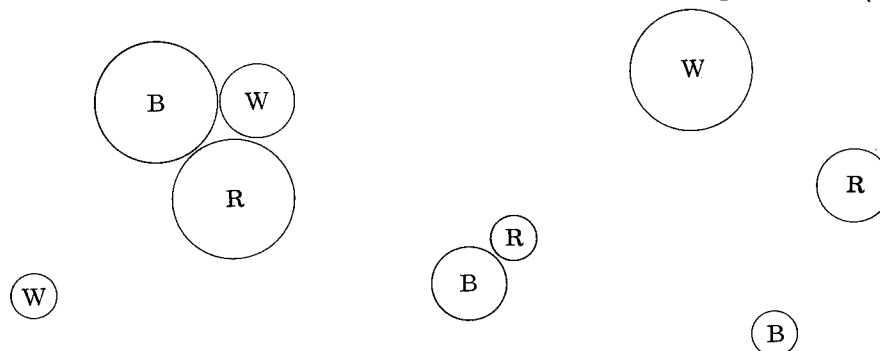
Scoring Examples

This section of scoring examples should be studied carefully prior to scoring of actual protocols. You may find it helpful to color the sketches. Additional examples of difficult scoring problems with commentary will be added as our project experience with this test accumulates.

In the examples below, the letters R, W, and B are used for the three colors — red, white, and blue. Large, medium and small size is indicated by the relative size of the drawings. All examples are drawn as if arranged on a horizontal plane, but these arrangements may be produced by stacks or by a three dimensional pattern involving both horizontal and vertical groups.

Example A. Color and Size Problem. Nine errors.

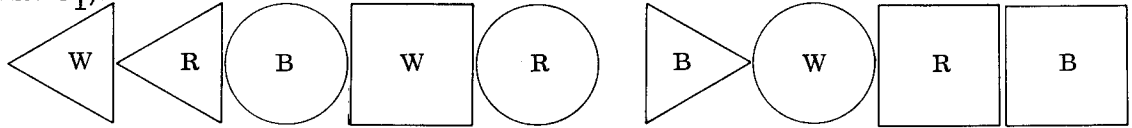
The subgroup of two within the three group is not considered correct (rules C₁ and C₂). Other errors are four leftovers and a paired misplacement (rule E).



Level IV: Administration and Scoring. (Cont.)

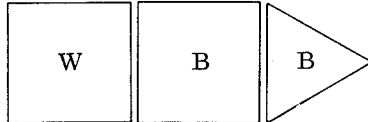
Example B. Color and Form Problem. Nine errors.

The two two-member subgroups of like form are part of a group containing misplacements (rule C₁).



Example C. Color and Form Problem. Nine errors.

Two two-block subgroups in a group of only three blocks are not considered correct by rule C₂.

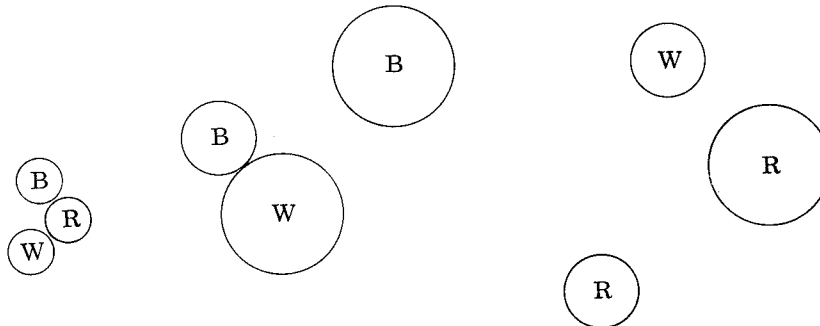


Remaining blocks scattered.

Example D. Color and Size Problem. Six errors.

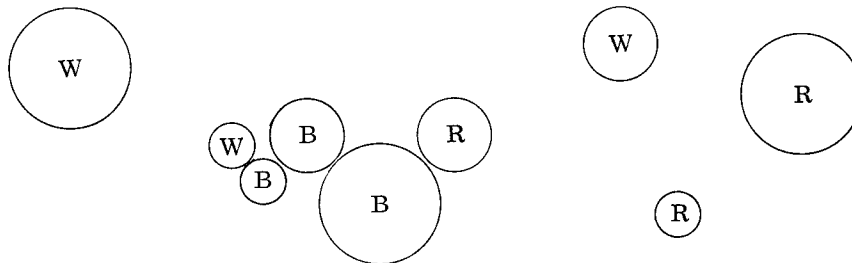
The group of three is considered correct by rule A.

The remaining blocks are leftovers (rule E) or paired misplacements (rule E).



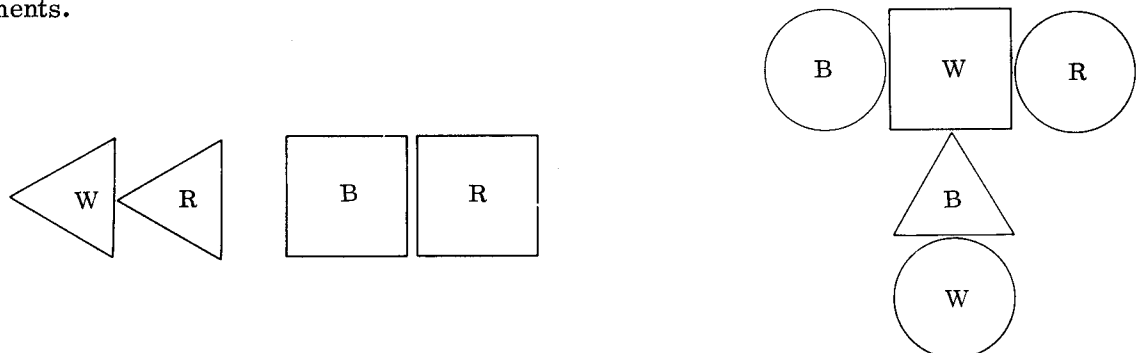
Example E. Color and Size Problem. Six errors.

Four leftovers and two misplacements. The subgroup of three blue circles is correct by rule B.



Example F. Color and Form Problem. Five errors.

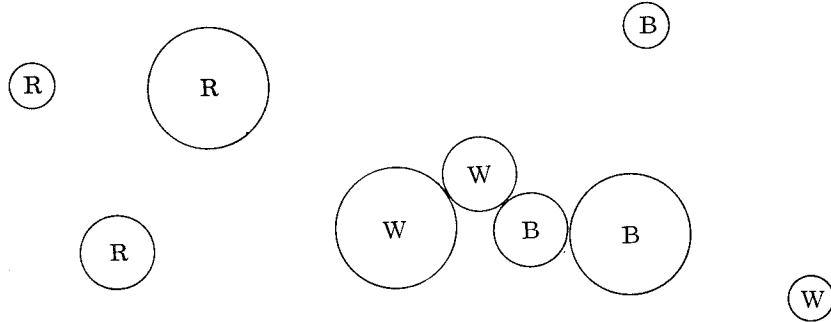
The two groups of two are correct by rule A. The errors are the group of five misplacements.



Level IV: Administration and Scoring. (Cont.)

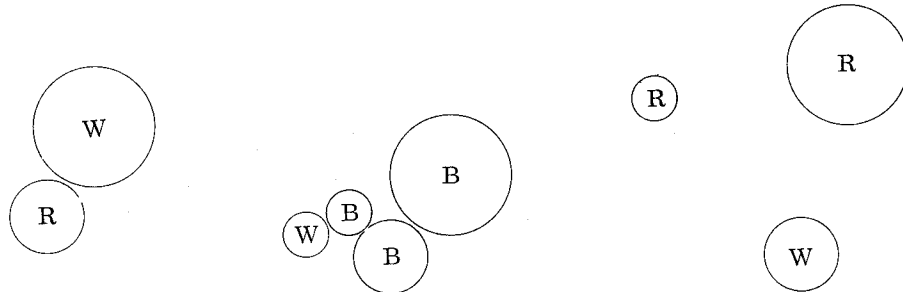
Example G: Color and Size Problem. Five errors.

Five leftovers. Note that the group of four blocks has been arranged into two subgroups each containing two blocks of like color and one subgroup of two blocks of like size. The two middle blocks have been sorted simultaneously on both concepts. Group of four correct by rule D.



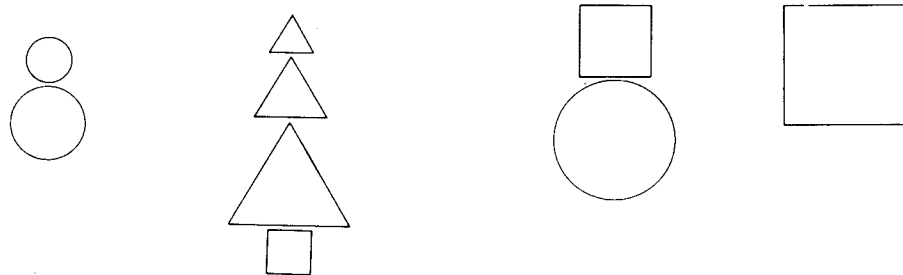
Example H. Color and Size Problem. Five errors.

Three leftovers and a pair of misplacements. The middle group of four blocks is correct by rules B and D. This group involves one subgroup sorted by color, another subgroup sorted by size, and one block sorted simultaneously on both bases.



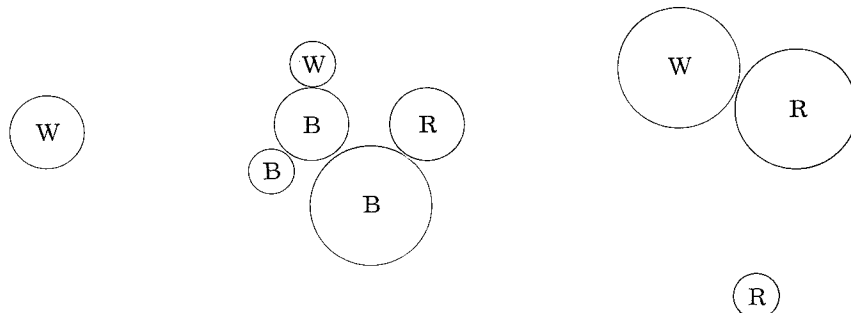
Example I: Form and Size Problem. Four errors.

One leftover, one misplacement, and one paired misplacement. The correct group of two qualifies by rule A; the correct subgroup of three by rule B.



Example J: Color and Size Problem. Four errors.

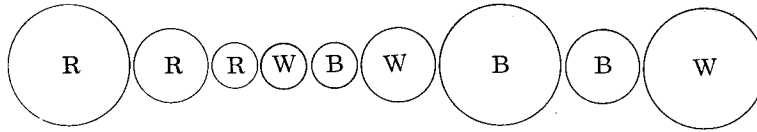
Two leftovers, two misplacements, Rules A and B make the other five blocks correct.



Level IV: Administration and Scoring. (Cont.)

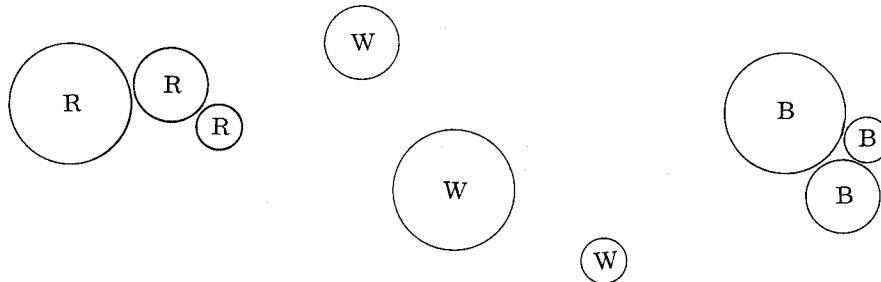
Example K. Color and Size Problem. Four errors.

The two subgroups of three on the left side of the row (with one block sorted simultaneously on both concepts) are correct by rule B. The two-member subgroup of blue circles is incorrect by rule C and the other two blocks are misplacements (rule E).



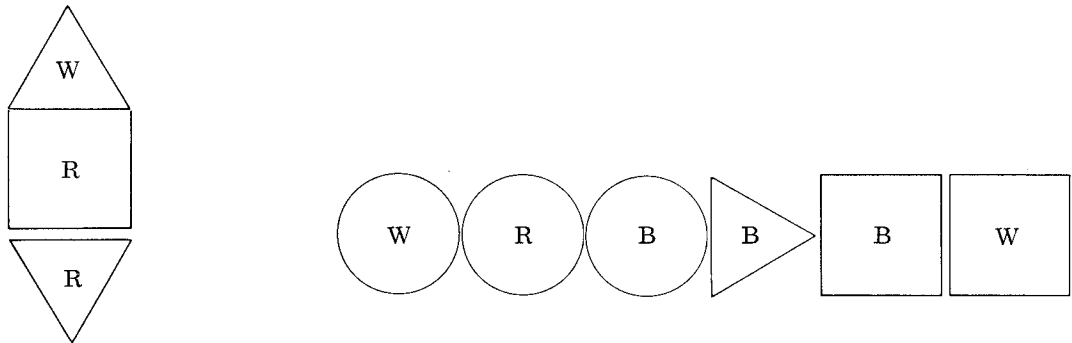
Example L. Size and Color Problem. Three errors.

All leftovers. The groups of three are correct by rule A.



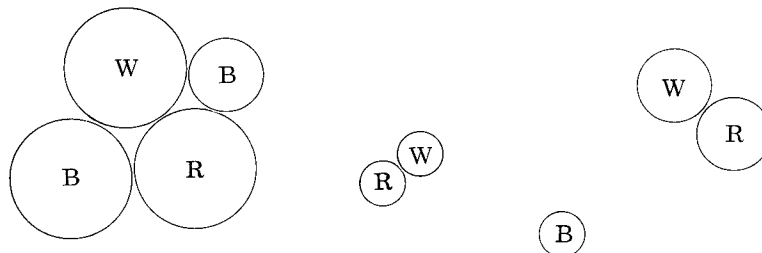
Example M: Color and Form Problem. Three errors.

The errors are represented by a group of three which contains a subgroup of two and a misplacement (rule C₁). The row-group of six blocks contains two subgroups of three, and one subgroup of two, with two blocks in the row sorted simultaneously on two concepts and hence having representation in two subgroupings. The entire row-group is correct by rules B and D.



Example N. Color and Size Problem. Two errors.

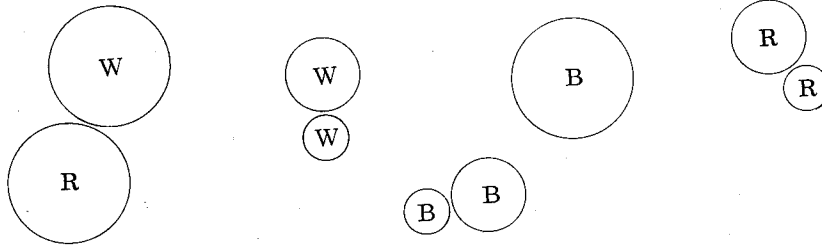
A misplacement and a leftover. The two-member groups are correct by rule A; The three-member subgroup by rule B.



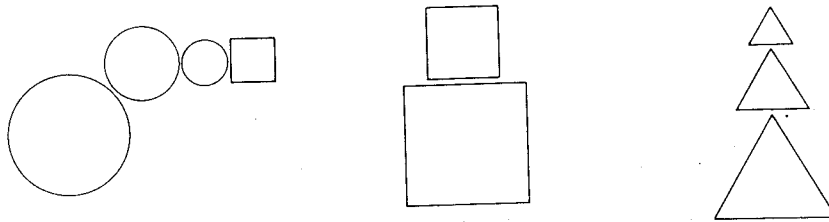
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Level IV: Administration and Scoring. (Cont.)

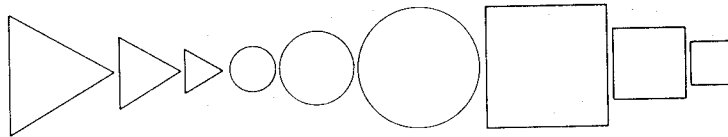
Example O. Color and Size Problem. One error.
(Rule E). The others correct by rule A.



Example P. Form and Size Problem. Zero errors.
The two-member square group and the three-member triangle group are correct by rule A. The row of four blocks is correct by rules B and D. It includes a subgroup of three circles and another of two blocks of like size.



Example Q. Form and Size Problem. Zero errors.
Three-block subgroups are always correct (rule B) and two-block subgroups are correct in this case because they fit rule D.



Example R. Color and Size Problem. Zero errors.
An example of a perfect sort involving sorting simultaneously on both concepts. There are six subgroups of three blocks, all correct by rules B and F.

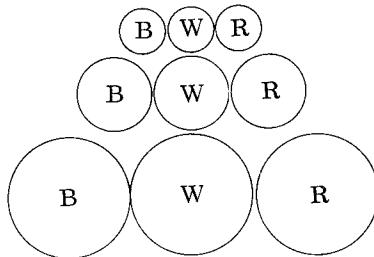


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