

Developmental Trends in Child Kaleidoblock Response

Gesell Institute of Child Development

By Louise Bates Ames and Janet Learned

A. Introduction

The Lowenfeld Kaleidoblock Test was first brought to our attention in the spring of 1948 by Dr. Lowenfeld. A set of the test blocks had lent us at that time by the Psychological Corporation. The test was not then being sold in this country and no set of instructions was available. However, the test was being lent to accredited psychologists that they might do exploratory work with it.

The test material consists of a box of 26 brightly coloured wooden blocks. These blocks are sized so that they bear a geometric relationship to each other.

The largest piece is a red, white and blue are $8\frac{9}{4}$ inches long, $1\frac{1}{31}$ inches wide, 1% inches high. Onto this a green and a yellow half are can be fitted to form a rectangle.

There are four green equilateral triangles, whose sides measure 1% inches, and whose base is $2\frac{5}{8}$ inches long.

There is a long blue rectangle, $3\frac{7}{8}$ inches long, a green rectangle $2\frac{1}{4}$ inches long, and a red and a yellow one each $1\frac{5}{8}$ inches long. All four of these are $\frac{3}{4}$ inches wide and $\frac{3}{4}$ inches high, each.

A red and a blue "flat," each $2\frac{1}{4}$ inches long, $\frac{3}{4}$ inches wide, and $\frac{3}{8}$ inches high, can be combined to equal in size the green rectangle.

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There are four $2\frac{1}{4}$ inch long "straws," one red, one yellow, one green, and one white. Two of these equal in size one of the flats: Four combined equal the green rectangle.

The remaining pieces are three cubes, one red, one white, one green— $\frac{3}{4}$ inches in each dimension. The three cubes combined equal in size the green rectangle.

And, finally, six "half-cubes," any two of which equal in size one of the cubes. There are two white half cubes and one each of red, yellow, blue, and green.

The test is given, by us, as follows: the 26 blocks are set out at the left of the examining table, before the subject enters the room, in the formation pictured in Figure.

The subject is seated at the examining table and is instructed as follows: "Here are some blocks, all different color, different sizes, and different shapes. You make something with them. Anything you like."

Subject then is allowed to build, with no further instructions, until he indicates that he is finished. He is then asked, unless he has already told, "What did you make?" Further comment may be elicited by the question, "What kind of a—————?"

As a rule the subject will talk spontaneously as he builds, and Examiner may converse with him so long as no suggestions are made which would influence or interfere with his spontaneous production.

It is possible for the Examiner to record, but since often the Examiner is kept busy conversing with the subject, it is preferable to have someone else do the recording. The recorder can as a rule sit beside the child. If the presence of two adults seems disturbing to

him, the recorder can sit behind a one-way-vision screen.

The recorder should note down stenographically every move the subject makes as well as his verbalization, and in addition should indicate diagrammatically as many of the different block combinations as possible. Photographic or other recording of the final product alone is not enough, since many subjects change plans and product repeatedly as they build.

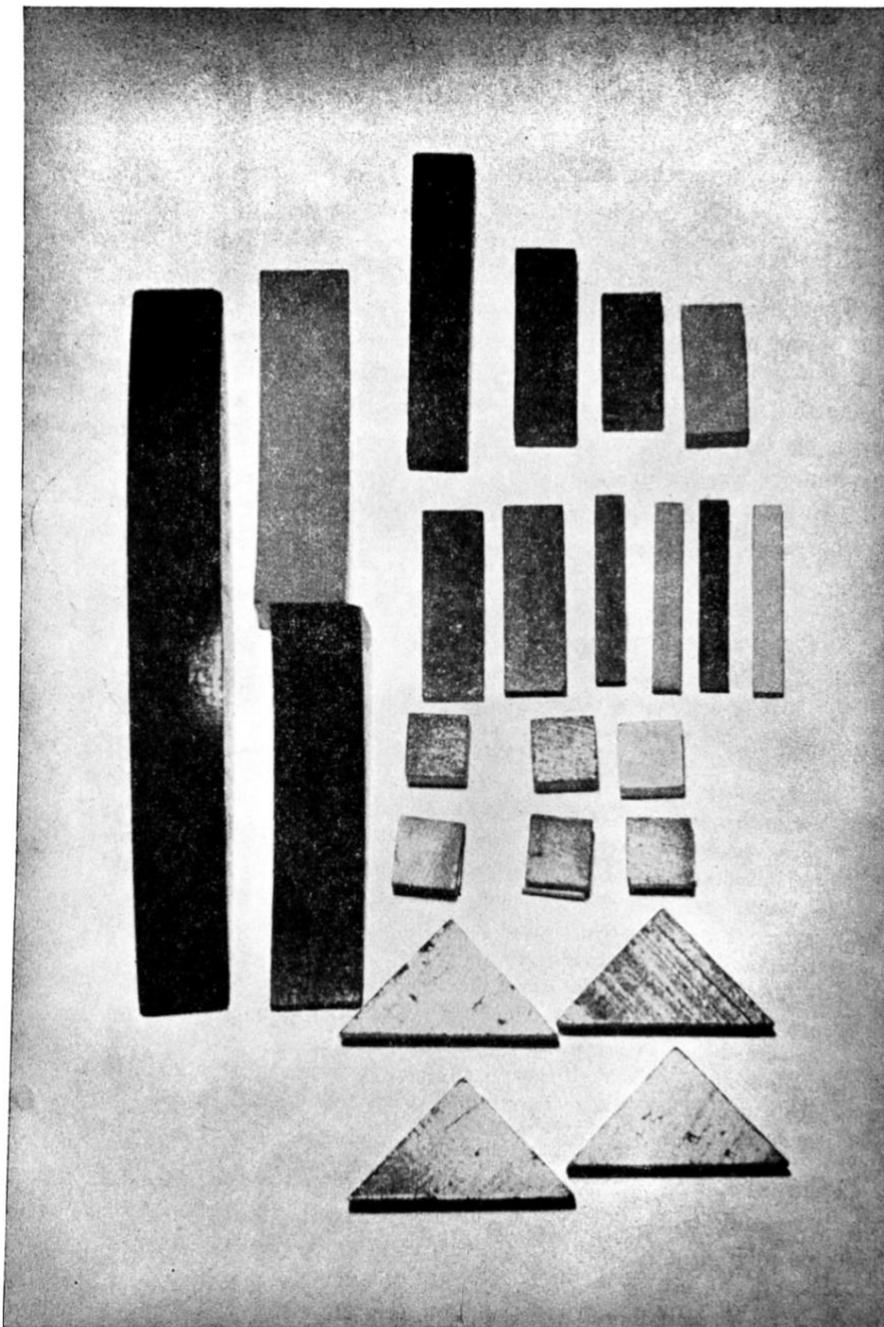


FIGURE 1
BLOCKS AS PRESENTED TO SUBJECT

Total building time should be noted for each, subject. However, since an occasional child may go on and on manipulating the blocks, using and reusing "the same ones endlessly, we followed the policy of stopping subjects arbitrarily at the end of 10 minutes of building time. Among our subjects only a few were still working by the end of 10 minutes.

B. Plan or Research and Subjects

The test was given by us to 350 children, 50 each (25 girls and 25 boys) at the following ages: 2, 2 ½, 3, 3 ½, 4, 5, and 6 years of age. In the 2-year-old group, subjects ranged from 24 to 29 months, in the 2 ½ year group from 30 to 35 months; in the 4-year-old group from 48 to 59 months, etc.

These subjects were mostly from our own "research" group of cases, supplemented by subjects from the Hamden Hall nursery school, kindergarten, and first grade; Miss Gailer's school; the Lincoln Street Nursery School, and the Betsy Ross Nursery School, all of New Haven.

Subjects were for the most part of upper socio-economic level and of above-average to superior intellectual level. All tests were given in the years 1948 to 1951.

This was an exploratory study. Dr. Lowenfeld and others in England have used the test widely as a clinical tool both with children and with adults, but to our knowledge there is no literature which deals with this test, nor has it previously been used as the basis for a systematic scientific study.

Our aim was, therefore, first of all to determine to what extent this was a useful test when applied to young children. Would children respond positively to it? Could it be recorded in such a way as to make the results usable for research? Would behaviour from child to child be similar enough that any sort of norms or age standards could be set up? Would any patterned sequence appear as to the type of manipulation characteristic of the several age levels?

We were also interested to note the extent and type of verbalization, dramatization, response to colour and shape of the blocks, types of structure built, as well as the child's manner of manipulation.

And lastly, would it be possible to determine individuality or personality differences by means of this test?

C. Findings

In order to condense the large amount of material which analysis of our raw data yielded, our findings are presented in tabular form in Tables 1 to 9 which follow. These tables should be consulted carefully by anyone wishing to put the Kaleidoblock test to practical use, since they contain many details which are not mentioned specifically in the text.

Responses to any projective test are, inevitably, much more diversified than responses to other types of tests. Thus responses which may occur in even 10 or 20 per cent of subjects are often of considerable significance. Many responses shown in the tables to occur in even 10 or 15 cases may, nevertheless, represent significant trends in this kind of test situation. Frequently several subjects at any one age produce almost identical total structures. This similar behaviour does not show up to any marked extent in a tabular analysis but is nevertheless very striking.

Figure 2 presents pictorially behaviour characteristic of each of the age levels in question.

D. Characteristic of Behaviour

a. 2 years. All but seven subjects respond positively to the test. The largest number start with triangles (next most with a straw), and triangles are used more than any other block.

Most use only three, four, or five blocks.

TABLE 1
NUMBERS USED AND HOW USED

	2 yrs.			2½ yrs.			3 yrs.			3½ yrs.			4 yrs.			5 yrs.			6 yrs.					
	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All			
1 Responds to test	20	23	43	24	24	48	25	24	49	25	25	50	25	25	50	25	25	50	25	25	50	25	25	50
2 Uses 15 or more pieces in any type of building	5	3	8	13	16	29	17	17	34	22	20	42	20	22	42	14	23	37	20	21	41			
3 Uses from 15-26 pieces in one reasonably compact structure or scene, no other structure	0	2	2	3	2	5	4	2	6	7	7	14	10	11	21	12	15	27	17	21	38			
4 Uses all	1	1	2	1	2	3	10	4	14	9	8	17	9	12	21	7	13	20	13	14	27			
5 Uses all in unrelated objects	1	1	2	1	2	3	7	2	9	9	5	14	4	8	12	5	5	10	4	2	6			
6 Uses all in one compact structure or scene, no changing as builds	0	0	0	0	0	0	3	2	5	0	3	3	5	4	9	2	8	10	8	8	16			
7 Changes as builds	7	9	16	10	10	20	6	8	14	8	4	12	11	10	21	9	10	19	8	10	18			
8 One compact structure any size, no change as builds	0	0	0	0	0	0	3	2	5	0	3	3	5	4	9	2	8	10	8	8	16			
9 Blocks fall	4	6	10	10	6	16	9	12	21	11	11	22	10	4	14	8	7	15	9	8	17			
10 Purposely destroys	2	1	3	1	1	2	4	3	7	3	5	8	6	6	12	5	1	6	4	1	5			

TABLE 2
BLOCK STARTED WITH

	2 yrs.			2½ yrs.			3 yrs.			3½ yrs.			4 yrs.			5 yrs.			6 yrs.		
	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All
Starts with																					
Triangle	7	8	15*	10	7	17	12	10	22	13	11	24	13	6	19	10	4	14	11	14	25
Straws	6	3	9	6	4	10	5	3	8	4	5	9	6	2	8	3	2	5	4	1	5
Half-cube	4	5	9	1	4	5	4	4	8	1	3	4	2	6	8	3	3	6	1	0	1
Arc	1	3	4	3	4	7	2	4	6	4	3	7	2	4	6	2	10	12	2	2	4
Rectangle	0	3	3	1	1	2	0	1	1	2	1	3	0	3	3	2	1	3	3	2	5
Half-arc	1	1	2	0	1	1	1	2	3	0	0	0	1	1	2	1	3	4	4	6	10
Cube	1	1	1	2	2	4	1	0	1	1	2	3	1	2	3	3	0	3	0	0	0
Flats	0	0	0	1	2	2	0	0	0	0	0	0	0	1	1	1	2	3	0	0	0
Blocks Stood on End																					
Triangle	8	11	19	12	14	26	9	7	16	11	7	18	13	16	29	15	19	34	11	10	21
Arc	2	4	6	9	11	20	19	9	28	12	9	21	15	16	31	11	18	29	16	18	34
Half-arcs	1	1	2	4	2	6	1	4	5	5	6	11	3	2	5	1	4	5	3	6	9
Rectangles	1	2	3	3	9	12	5	4	9	7	7	14	5	10	15	8	11	19	6	4	10
Half-cubes	0	0	0	0	0	0	7	5	12	3	4	7	3	3	6	3	4	7	5	3	8
Straws	0	1	1	7	3	10	10	8	18	6	5	11	9	8	17	8	7	15	7	6	13
Flats	0	0	0	0	0	0	1	2	3	0	1	1	4	2	6	4	2	6	4	4	8
(Arc upside down)	1	1	2	0	2	2	1	3	4	3	1	4	0	1	1	2	3	5	1	0	1
(Flats on edge)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total: exclusive of last 2 items	12	19	31	35	39	74	52	39	91	44	39	83	52	57	109	50	65	115	52	51	103

*Italics denote predominant behaviors.

TABLE 3
ACTION AND NAMING*

	2 yrs.			2½ yrs.			3 yrs.			3½ yrs.			4 yrs.			5 yrs.			6 yrs.		
	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All
1 Names single blocks	5	7	12	9	4	13	4	2	6	1	2	3	4	5	9	0	0	0	3	1	4
2 Names product	5	7	12	15	13	28	18	16	34	21	20	41	25	25	50	18	22	40	24	24	48
3 Action of part but no verbal	5	6	11	3	6	9	3	5	8	1	3	4	2	3	5	0	2	2	2	2	0
4 Action plus dramatic verbalization	0	2	2	2	1	3	2	3	5	2	12	14	4	6	10	0	1	1	0	0	0
5 Dramatic verbalization re action but no real action	0	0	0	0	1	1	0	0	0	1	1	2	4	3	7	3	4	7	4	1	5
6 Scene described dramatically but no action and none mentioned	0	0	0	1	4	5	3	3	6	4	5	9	2	9	11	7	4	11	8	10	18
(Any action)	5	8	13	5	7	12	5	8	13	3	11	14	6	9	15	0	3	3	2	0	2

*No. of children, not number of times the behavior occurs.

TABLE 4
PRODUCTS NAMED

	2 yrs.			2½ yrs.			3 yrs.			3½ yrs.			4 yrs.			5 yrs.			6 yrs.			Total
	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All	
1 Train	1	2	3	3	5	8	1	4	5	1	1	2	2	3	5	1	0	1	0	1	1	25
2 House	1	1	2	7	4	11	10	9	19	13	7	20	14	9	23	10	6	16	10	10	20	101
3 Other bldgs incl. castle & church	0	3	3	2	3	5	3	2	5	3	5	8	6	4	10	4	7	11	4	4	8	50
4 Boat	1	1	2	2	2	4	4	4	8	4	4	8	1	7	8	0	1	1	3	6	9	41
5 Truck or car	0	1	1	0	4	4	2	3	5	1	4	5	0	3	3	0	1	1	1	1	2	21
6 Bridge	0	0	0	0	2	2	1	4	5	3	10	13	8	6	14	7	9	16	7	8	15	65
7 Nature	0	2	2	1	0	1	0	0	0	0	0	0	1	0	1	2	3	5	4	1	5	14
8 Road or RR track	0	0	0	2	2	4	3	1	4	3	3	6	2	1	3	2	2	4	2	1	3	24
9 Furniture	0	0	0	0	2	2	1	1	2	1	1	2	2	0	2	3	3	6	2	2	4	18
10 Food	0	0	0	1	0	1	3	0	3	1	0	1	0	0	0	0	0	0	0	0	0	5
11 Gate or fence	0	0	0	0	1	1	0	0	0	0	1	1	2	0	2	0	3	3	4	2	6	13
12 Tunnel	0	0	0	0	0	0	1	2	3	0	3	3	0	1	1	0	0	0	0	2	2	9
13 Town or scene	0	0	0	0	0	0	0	1	1	1	2	3	1	6	7	7	5	12	7	8	15	38
14 Person	0	0	0	0	1	1	1	2	3	1	2	3	1	0	1	0	0	2	1	3	11	11
15 Slide	0	0	0	0	0	0	1	0	1	1	0	1	3	3	6	2	0	2	0	0	0	10
16 Smokestack	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	1	1	2	7
17 Design	0	0	0	0	0	0	1	2	3	0	3	3	0	1	1	0	0	0	0	2	2	9

TABLE 5
TYPE OF STRUCTURE

	2 yrs.			2½ yrs.			3 yrs.			3½ yrs.			4 yrs.			5 yrs.			6 yrs.			Total		
	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All
Semi-compact or scattered	8	5	13	1	4	5	2	1	3	0	4	4	3	1	4	3	3	6	5	3	8	22	21	43
Small compact structures	5	11	16	6	10	16	15	14	29	14	3	17	4	1	5	2	1	3	0	0	0	46	40	86
One small compact structure	0	0	0	0	0	0	2	1	3	0	0	0	0	0	0	1	1	2	2	4	4	4	4	8
Several large compact	0	0	0	0	0	0	2	4	6	14	3	17	8	6	14	3	2	5	0	1	1	27	16	43
Several large semi-compact	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	6	0	1	1	4	3	7	7
One large compact	0	0	0	0	0	0	1	0	1	1	3	4	5	10	15	3	6	9	6	1	7	16	20	36
One large semi-compact	0	0	0	0	0	0	3	2	5	5	0	5	4	7	11	10	10	20	12	17	29	34	36	70
Scene* using all or nearly all	0	0	0	1	0	1	3	3	6	3	4	7	1	7	8	7	5	12	9	8	17	24	27	51
Scene using all	0	0	0	0	0	0	0	1	1	2	3	5	0	3	3	6	3	9	8	7	15	16	17	33
Any scene	0	0	0	1	1	2	3	3	6	4	5	9	2	9	11	7	5	12	9	8	17	26	31	57

*Scene may be compact or, more often, semi-compact.

TABLE 6
SUMMARY OF MANIPULATIVE BEHAVIOR

	2 yrs.			2½ yrs.			3 yrs.			3½ yrs.			4 yrs.			5 yrs.			6 yrs.					
	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All			
1 Coöperates	20	23	47	24	24	48	25	24	49	25	25	50	25	25	50	25	25	50	25	25	50	0	0	0
2 Just manipulates	5	5	10	1	1	2	1	1	2	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0
3 Just places around	2	2	4	1	1	2	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0
4 Stands on end	9	14	23	21	21	42	23	21	44	23	23	46	23	24	47	22	24	46	23	19	42	18	19	42
5 Piling	7	13	20	16	12	28	14	16	30	13	15	28	16	15	31	18	17	35	14	18	32	7	5	12
6 Train	10	10	20	9	9	18	11	9	20	10	10	20	8	15	23	4	7	11	7	5	12	9	9	18
7 Bridging	0	1	1	3	5	8	1	8	9	7	8	15	3	12	15	7	13	20	9	9	18	8	10	18
8 Fence or pen	0	0	0	1	0	1	6	3	9	3	3	6	3	5	8	4	6	10	8	10	18	4	5	9
9 Pieces inside	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	2	3	5	4	5	3	2	5
10 Roofed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	3	3	2	5	5
11 Spaced & patterned	0	0	0	0	0	0	0	7	9	16	0	6	6	9	7	16	8	6	14	11	11	22	11	22
12 Fitted	0	0	0	0	0	0	4	7	11	4	5	9	5	8	13	5	10	15	11	13	24	13	24	24
13 Symmetry*	0	0	0	0	0	0	2	2	4	8	7	15	11	7	18	8	11	19	8	15	23	8	15	23
14 Balancing	0	1	1	3	2	5	3	1	4	4	5	9	7	8	15	5	7	12	3	6	9	3	6	9
15 One large compact or semi-compact structure	0	0	0	0	0	0	4	2	6	6	3	9	9	17	26	13	16	29	18	18	36	18	18	36
16 Scene	0	0	0	1	0	1	3	3	6	4	5	9	2	9	11	7	5	12	9	8	17	9	8	17

*Bridges which are also symmetric.

TABLE 7
MANIPULATION SUB-TABLE

	2 yrs.			2½ yrs.			3 yrs.			3½ yrs.			4 yrs.			5 yrs.			6 yrs.				
	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All		
Piling																							
All same type	4	8	12	13	14	27	6	11	17	3	2	5	2	1	3	1	0	1	1	1	1	3	4
Selective	0	0	0	1	1	2	5	5	10	7	12	19	7	8	15	8	11	19	8	7	15		
Bridging & Piling	0	0	0	0	0	0	0	1	1	4	4	8	0	3	3	3	4	7	3	2	5		
Places 1 or 2 on base	2	3	5	6	7	13	11	4	15	7	9	16	6	14	20	11	9	20	11	13	24		
Total who pile any type*	7	13	20	16	12	28	14	16	30	13	15	28	16	15	31	18	17	35	14	18	32		
Train structure																							
Small trains, 5 or less	6	6	12	3	5	8	5	2	7	2	0	2	0	0	0	0	1	1	1	1	2		
Large compact	1	0	1	3	1	4	1	3	4	5	6	11	5	13	18	2	3	5	2	1	3		
Large spaced	3	4	7	3	3	6	5	4	9	3	4	7	3	2	5	2	3	5	4	3	7		
Turns corners	0	0	0	0	0	0	0	0	0	3	1	4	0	3	3	1	2	3	2	2	4		
Total	10	10	20	9	9	18	11	9	20	10	10	20	8	15	23	4	7	11	7	5	12		

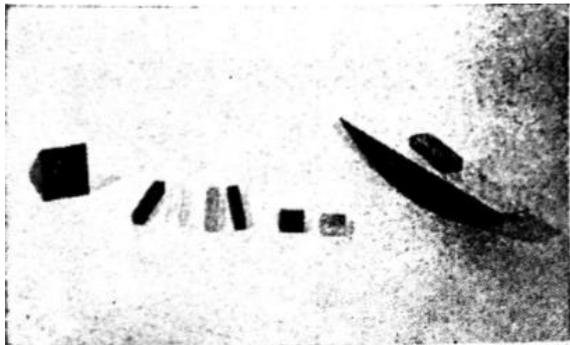
*One child may pile in several ways.

TABLE 8
MISCELLANEOUS DATA

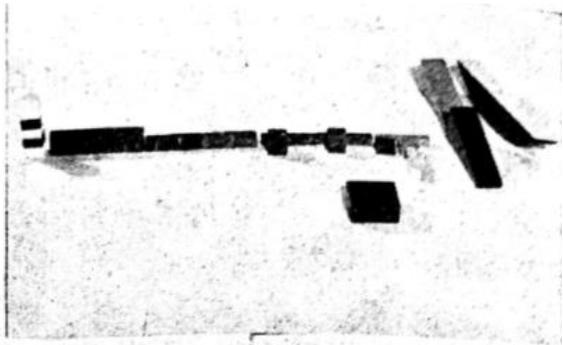
	2 yrs.			2½ yrs.			3 yrs.			3½ yrs.			4 yrs.			5 yrs.			6 yrs.			Total		
	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All
Lays 4 straws side by side	3	4	7	5	4	9	7	4	11	3	1	4	5	3	8	7	2	9	1	2	3	31	20	51
Forms triangles back to back	1	2	3	0	0	0	1	1	2	2	3	5	2	1	3	3	0	3	0	0	0	9	7	16
Combines triangles flat into square	0	0	0	2	4	6	1	4	5	5	5	10	3	5	8	2	5	7	0	6	6	13	29	42
Half arcs back to back	0	0	0	1	1	2	2	1	3	3	5	8	2	3	5	5	4	9	4	7	11	17	21	38
Straws laid across	0	2	2	2	2	4	2	4	6	3	4	7	5	6	11	5	4	9	6	4	10	23	26	49
Names or makes steps	0	1	1	1	0	1	0	0	0	3	2	5	0	1	1	2	0	2	1	3	4	7	7	14
Pieces under or between others	0	0	0	1	0	1	0	0	0	3	4	7	3	5	8	2	2	4	1	3	4	10	14	24
Pieces at an angle	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	4	6	10	6	6	12

TABLE 9
MISCELLANEOUS DATA

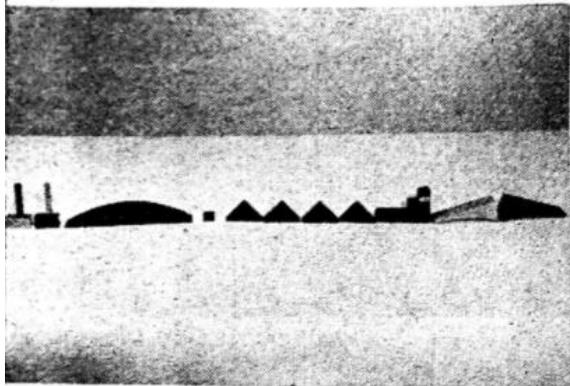
	2 yrs.			2½ yrs.			3 yrs.			3½ yrs.			4 yrs.			5 yrs.			6 yrs.			Total		
	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All	G	B	All
Color seems to determine choice	7	16	23	13	9	22	14	12	26	12	8	20	15	7	22	12	10	22	10	7	17	83	69	152
Choice alone indicates	5	11	16	7	7	14	10	9	19	9	6	15	6	3	9	7	7	14	5	5	10	49	48	97
Comments on this	2	5	7	6	2	8	4	3	7	3	2	5	9	4	13	5	3	8	5	2	7	34	21	55
Form largely determines selection	13	7	20	11	15	26	11	12	23	13	17	30	10	18	28	13	15	28	15	18	33	86	102	188
Comments on size of blocks of product	6	5	11	3	0	3	2	1	3	0	0	0	2	3	5	3	0	3	2	1	3	18	10	28
Comments on either size or color	8	10	18	9	2	11	6	4	10	3	2	5	15	17	32	14	4	18	7	3	10	62	42	104
Shows blocks to Ex.	3	4	7	8	3	11	5	9	14	2	0	2	1	1	2	0	1	1	1	0	1	20	18	38
Personifies block	0	0	0	0	1	1	1	1	2	1	2	3	2	1	3	1	2	3	3	1	4	8	8	16



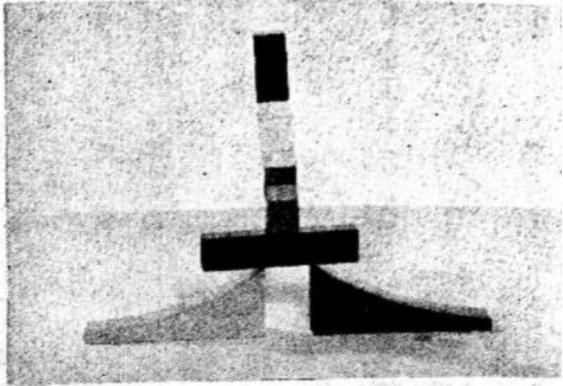
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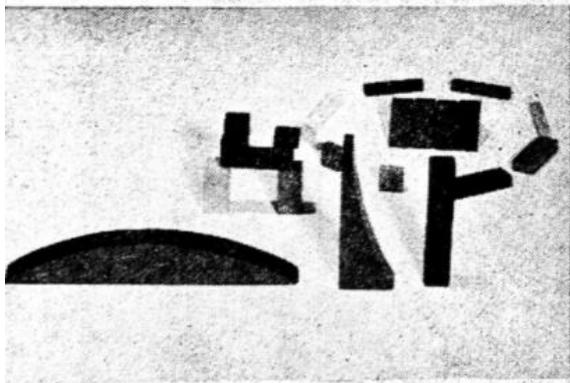
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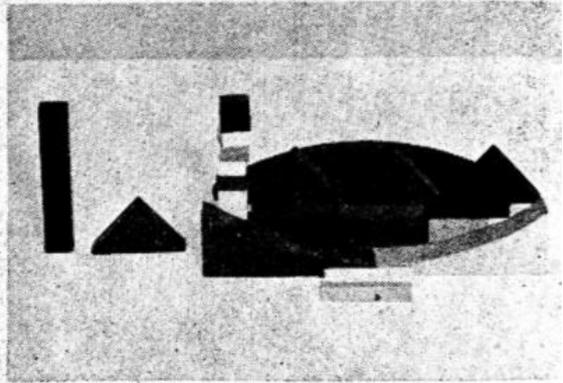
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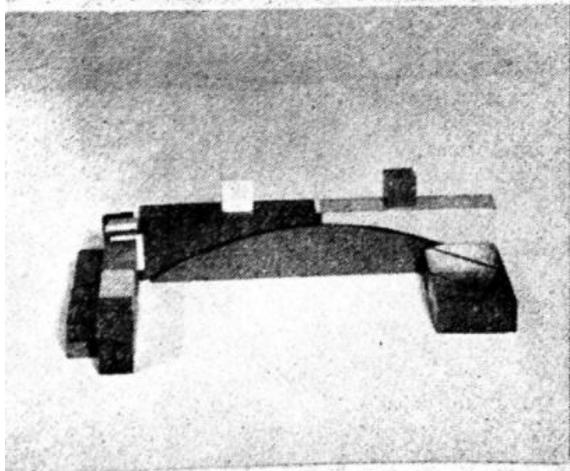
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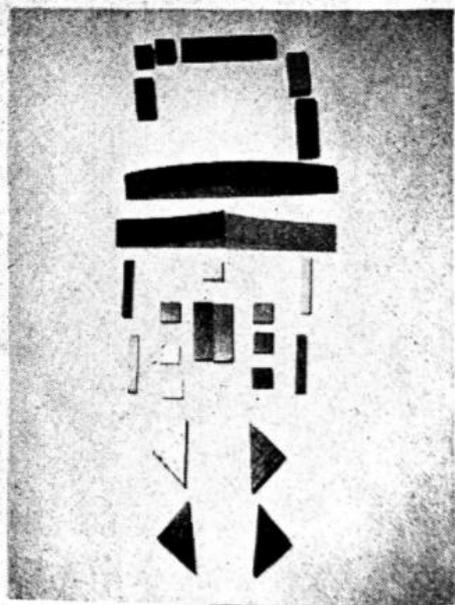
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F



G



H

Figure 2: Age Changes in Kaleidoblock Response

Key to Figure 2

A. 2-year-old boy, T.W.

Handles blocks in gross motor way—bunching straws, twiddling and rocking arc. Combines two triangles and puts green half-arc by them. Then removes it. Red flat on surface of arc. Names product “house.”

B. 2 ½-year-old girl, J.L.

Train and tower structures. Arc in “rocking boat” position. Matching of colours and shapes. Two triangles combined into a square. Names “rocking boat,” and “high step.”

C. 3-year-old girl, J.P.

Horizontal structure. Beginning of putting blocks together. Stands straw on end on rectangles. Names “airplane, building, track.”

D. 3 ½-year-old girl, K.D.

Combination of bridging, balancing and piling typical of this age. Names product “truck.”

E. 3 ½-year-old boy, J.P.

Uses all blocks in a quick business-like fashion. Piles in four grouped triangles, saying, “Little round fence’.” A bridged and fitted structure, named “fireplace.” Arc, half-arc and blue rectangle—“a tunnel.”

F. 4-year-old girl, D.K.

Combination of horizontal and vertical in one structure. "A building." Rather complex piling on top of train. Some symmetry. One compact structure using all blocks.

G. 5-year-old boy, D.T.

Good constructive fitting of blocks, utilizing their geometric relationships.

H. 6-year-old boy, D.G.

Spaced symmetric placement of all blocks in a scene. "House with chimney, hedges down the walk, mountain in back of the house, way far away, that's why it's so little. Backyard." Whole thing is flat so that you look down on it as on a drawing. Excellent perspective and good planning except that backyard is behind the distant mountain. five blocks. Ten subjects merely manipulate the blocks and four just place them around at random. Action rather than structure seems to be the main interest: children push blocks, rock them, saw with them, pound with them.

Sixteen subjects do make at least one and usually several small compact or semi-compact structures, mostly simple piling of cube on cube, or horizontal alignment in a small train structure. Twenty children in all pile blocks. Horizontal alignment, .i.e., a train structure, occurs in 10 girls and 10 boys. *Thus horizontal alignment and piling occur equally and are the predominant type: of manipulation.*

Standing objects on end occurs in a few: the triangles are frequently stood upright on their bases, and occasionally the half arcs are stood up on their longest base. Two children stand the half cubes on edge and one tries to stand a straw. Three stand a rectangle. But for the most part structures are flat and do not get up into the second dimension; and balancing and bridging have definitely not come in yet.

No scenes are made and only two children use all the blocks. Twelve children name single blocks, seven name products. Single blocks are most frequently called "boat";

products are most named “house.”

Colour determines at least some choice of blocks in about half the cases. Many show an interest in size and some in their choice of blocks select first the largest and then the smallest.

Blocks are moved about somewhat dramatically but there is little verbalization about this.

Seven boys and nine girls re-use the same pieces, changing their structure as they proceed. Four girls and six boys make products which fall. Only three children purposely destroy their structure.

The average time of building is 4.55 minutes; 4.63 for girls, 4.47 for boys.

As to sex differences—boys build in a more complex and detailed manner than do girls. More respond; more respond above the level of sheer manipulation. Girls mostly build semi-compact or scattered structures; boys semi-compact or compact. More boys than girls name blocks and products.

b. 2/12 years. All but two cases now respond positively to the test. However, most 2/12-year-olds seem to have no overall plan and generally no overall structure. There is a good deal of mere manipulation. For instance, bunching of straws in hand without actually using them in a structure, or pushing blocks over from original formation to a position in front of self without actually using them. Others slide or push pieces along the table, often pushing them instead of lifting them into place. Also the child often just pushes aside pieces he is not going to use. Many children combine blocks in hand only. Others pick blocks up and then replace them without having used them. Some merely pick up the blocks, show them to Examiner, and ask, “What’s this?” Fifteen subjects do a great deal of manipulating though only two merely manipulate.

There is much building and then changing and re-building, using and re-using of blocks; At least 20 children re-use the same pieces, changing their structure as they proceed. Often there is no complete structure, but many small combinations. Children seem to feel no need to leave a structure up after having built it but may dismantle it and then reuse the pieces. Products of 16 children fall. The average time of building is 4.48 minutes.

Twenty-nine do a great deal of piling, though only three girls and two boys merely pile. Mostly they pile the same type of block. Some pile straws on end. Some pile straws on end. Some pile messily as if piling jackstraws. One boy piles in a patterned way, by colour and form.

Eighteen make good train structures. These trains now include more pieces, of different shapes and are becoming almost compact. Bridging is coming in strongly.

Standing up pieces is new and strong, especially the triangle, arc, and straws.

The largest number, as before, start with the triangle, arc, or straw. Only three subjects use all the blocks, but the majority do use 15 or more. Thirteen children make a single structure, and five use 15-26 blocks in this structure. Sixteen subjects, make small compact structures. Five children make and describe a scene.

Thirteen children name individual blocks—mostly “boat” or “rocking boat.” Twenty-eight name products, mostly “house” and “train.” At least 14 children select some blocks on the basis of colour. Action, of parts is still strong and far exceeds verbalization about action. Twelve children move blocks about dramatically.

As to sex differences: Six girls, only two boys, verbalize interest in colour. Nine girls, only four boys, name individual blocks. Eight girls and only three boys show pieces to Examiner.

c. 3 years. All but one subject; now respond to the test. Fifteen, sub— jects manipulate blocks but only two merely manipulate. Forty-six children make combinations

more complex than just piling the blocks or placing them around singly. Trial and error predominates—idea of structure does, not seem to precede building—and there is much changing of, structure and reusing of the same pieces, though less than at 2 ½.

The largest number, as usual, start with the triangle. Piling, simple or selective, predominates, and train structures come next in frequency. However there are many other types of good, neat, constructive activity. Children make bridges and four-sided pens. Sixteen make spaced and patterned structures, 11 fit blocks neatly onto other blocks. Many stand up blocks, especially the arc, triangle, straws, half cubes. Small compact structures predominate. Fourteen children use all the pieces—a marked advance over 2½ years. All except 16 use 15 pieces or more, and six use from 15-26 blocks in a single reasonably compact structure.

Six make and describe scenes: "Bench. Big old street. Railroad track," or "Seesaw near garage. Gas station." Thirty-two children now name their products—"house," "boat," "bridge," "train," "car" predominating in that order. There is considerable action of parts still, 13 children activating blocks. Five subjects combine action with dramatic verbalization about action.

Colour is a strong determinant of choice at this age, influencing at least some choices in over half the cases. The average time of building is 4.87 minutes; 5.00 for girls, 4.74 for boys.

Ten girls, only four boys, use all the pieces.

d. 3/1; years. All subjects now respond except one boy and one girl. Seventeen children use all the blocks—a few in a neat purposeful structure but most make several small structures. However, there is a marked change in the quality of behaviour here. Placement is much less sure than at 3 years, partly because of 3/12's hand-tremor and partly because efforts at balancing and piling are over-ambitious and exceed the child's ability. Blocks fall more than at any other age. All of this is quite typical of the uncertainty and incoordination which we see in other behaviours at 3½ years of age. Behaviour is

difficult to classify at this age because it is so individual and messy. However, many seemingly over-ambitious structures do stay up and there is some good balancing, fitting, symmetry.

Piling and train building occur conspicuously, about as much as at surrounding ages. Twenty-nine subjects pile though only two merely pile. Piling is for the most part complex: rectangles on end, pile of cubes on one which itself is bridged on something else; or piling as part of a horizontal structure. Some blocks single, some piled. Five merely pile blocks of the same type; 18 pile selectively; five make just a messy pile.

Twenty children make horizontal train structures. Now more complex than formerly—may employ all the blocks, turn corners, be two in depth.

Two make one small train of five blocks or less; seven make a large compact train; seven a large spaced train; four make a large train more than one high.

Bridging occurs much more than at preceding ages and there is more balancing and more symmetry than at three years but spaced and patterned and fitted structures occur less than at surrounding ages. There appears to be an interest in many dimensions. Pens enclose other pens, pieces are placed under or between others, and there is balancing, bridging, turning corners.

The largest number make several compact structures, though many make one large semi-compact structure, largely horizontal. Eight make one large compact structure. Nine children now make and describe a scene: "Toll house, bridge, street, light," "Houses next to each other," etc.

This is; the high point for activation and dramatization. Fourteen children activate blocks. Two girls (+ one who merely verbalizes) and 12 boys (+ one who merely verbalizes) now dramatize. An abbreviated record of the behaviour of one 3/12-year-old boy is given as characteristic of this dramatization:

Stands up three triangles with a half cube at the base of the centre triangle. "Make these colours." Half cube at the base is blue, and he stands that on one side. Rearranges his triangles and adds a fourth. . . . He takes a big arc and places a half arc at each end. Uses one to push the other and says, "Push it." Then says, "Comes right through the doorway." He rebuilds his main structure. Leans a straw against one of, the triangles. "That's no good. Now that one." Slides triangle around on arc some. "And then it turns back up." Asked what it is, says, "A dark thing. You can't see it. Going over a bridge." Says that little straws which he has placed nearby are "Stones from the bridge."

He starts a new structure: arc with two rectangles lying on top and a triangle standing up on top and a tall blue rectangle standing behind the whole thing. Says, "That's the telephone, then you can listen with this. . . . Now the boat has to go out."

Is manipulating objects faster and faster and talking faster and faster about what they are all supposed to be doing. Stands up two half arcs and says they are people standing up and walking. "She goes up to the other tower and they are listening." Builds and tells Ex. she can't peek. "Supposed to be: the big thing. Close your eyes. You can't look. You can't see."

Now has built four triangles standing on top of arc. Red and white cubes between the triangles. "You jump right up there; all the men fell down." He uses half arcs to jump around the table. Then he bangs their ends together and says he is slapping their heads together.

For the first time, most dramatic activity of the blocks is accompanied by verbalization about such action. In fact verbalization about What is being built tends to be ahead of construction. Several just pile blocks together messily, calling their structures "houses," and describing "rooms," though structures resemble neither houses nor rooms. Forty-one children now name their product—home leading in girls, bridge in boys, and boat coming next. Personification occurs in three children.

Interest is definitely shifting from individual blocks to the total product. Colour still influences at least some choices in one-third of the cases. Average time of building is now 4.74 minutes; 4.95 for girls, 4.53 for boys.

As to sex differences: eleven boys, only three girls, activate the blocks and 12 boys and only two girls dramatize. Girls build in a more scattered way than boys. More boys build spaced patterned figures. More boys make horizontal productions. Boys are more positively constructive than girls.

e. *4 years*. All now respond positively, and 21 children now use: all the blocks. Nine of these make one unchanging structure, no changing as builds. This is by far the largest number to date. However, No. 4 often looks better than he is because of his speed, his rapid changing of plan and structure, and because of his daring attempts at balance, only some of which are successful. These daring attempts at building are expressions of, the “out-of-bounds” behaviour characteristic of, this age.

All but one child build more complexly than merely piling or placing blocks around or manipulating them. Twenty pile, mostly selectively; 23 make horizontal structures, mostly large and compact and often with a tower at one end. Some of these structures turn corners and become pens as they proceed. More at this age than at any other stand blocks on end. Fifteen make bridges.

Spaced and patterned structures occur here the most of any age. Fitting, symmetry, and balancing are strong. One or several large compact structures predominate, and 11 children make scenes. Many children boast about the bigger blocks which they have at home.

Structures are neater and better patterned than at 3 ½ years, and more blocks are combined in one structure. Buildings are less high, and horizontal structures predominate.

Blocks fall less than at 3 ½ but more children purposely knock buildings over. There is much changing of structure as building proceeds—building is very fluid. Children build and

rebuild, using the same blocks.

A few more children dramatize than at 3 ½ years though action is perhaps a little less dramatic. Action plus dramatic verbalization occurs in 10 cases. At this age for the first time a scene is described dramatically by a large number of cases (11) but there is no action of parts and none mentioned.

As at other ages, the largest number start with a triangle. Next most start with a straw or half-cube.

All children now name their product, girls using house most, *bridge* next. Boys use *house* most, *boat* next. Fourteen children make and name a single structure which may or may not include all the blocks. At least 22 children are influenced in their choice by colour of block and more comment on this than at any other age.

The average time of building is 5.18 minutes—the longest of any age. Girls average 4.80 minutes, boys, 5.56.

As to sex differences: More boys than girls make trains but more girls than boys name houses. The structures of girls fall more than those of boys. Twice as many boys as girls make one large compact structure, and many more boys than girls make scenes. Many more girls than boys are influenced in their choice by colour and conversely, many more boys, by form.

f. 5 years. All respond positively to the situation with construction more complex than just piling or placing around. Twenty children use all the pieces—though actually fewer pieces are used than at 4 years. Nine children use all in one compact structure, no changing as builds, and 27—more than ever—make one unified structure or scene using 15-26 pieces. It fits with our knowledge of No. 5's personality that he uses fewer pieces and is more focal in his building than is No. 4. One of the biggest advances at this age is that many children, boys especially, seem to know before they pick up a block just what they are going to do with it, whereas earlier many would pick up a block and then look to see what they could do

with it.

Nearly half the subjects go right to work and work rapidly and effectively till they have used all the blocks. Structures are becoming more complex, though less daring and more conservative than at four. There are relatively larger semi-compact and fewer large compact structures than at four. Structures are often less high and involve fewer pieces. There is a good deal of changing of structure. Nineteen children change structures as they build. Products of 15 children fall, and six purposely destroy their structures.

Thirty-five (the highest number at any age) pile blocks, but now only 11 make train structures. Bridging, however, occurs here more than at any age and other types of symmetric and fitted building are very prominent. Several, especially boys, produce large bold structures made of arcs and half arcs. Girls more characteristically make compact or semi-compact scenes.

Spaced and patterned structures occur conspicuously. Balancing, though not quite as prevalent or daring as at 4 years, is strong. One large semi-compact structure is the most prominent type of building (20 children).

Eighteen make scenes, more than ever before. There is less dramatic action than at four, but 10 children do carry out dramatic scenes. In six of them, dramatization is merely verbal. Three children personify blocks: "Minister praying" "Tugboat captain," "People buying baloney."

No children now name single objects, but 40 name their product- *house* and *bridge* leading in girls and boys respectively. Twenty-two subjects are influenced in their choice by colour, but fewer than at 4 years comment on this choice. The average time of building is 4.54 minutes, the same for boys and girls.

As to sex differences: More advanced building occurs in boys than in girls: boys bridge more and do more fitting and more symmetric building. More boys make large bold structures of arc and half-arcs. Girls are more interested in sizes of blocks and products.

Many more pieces are used by boys than by girls, and many more boys make one compact structure.

g. 6 years. All respond positively to the situation with construction more complex than merely piling or placing around. Twenty-seven children, the most of any age, use all blocks, and 16 (also the most to date) use all in a unified structure, no changing as build.

Many major behaviour trends reach" their peak at age, as for instance spaced and patterned building, fitting pieces neatly together symmetric placement, roofing over pens, naming scenes, making one large semi-compact structure. Piling and bridging are still strong, though piling is much less high than earlier. Only 12 make trains. There is less balancing than earlier- only nine cases. Eighteen children make pens of which give have roofs and nine have pieces inside.

Twenty-two make spaced patterned structures. Twenty-four fit blocks together neatly. Twenty-three place blocks symmetrically balanced.

Even more than at 5 years, the child gets right to work, and quickly, neatly, playfully, and efficiently builds a single semi-compact structure or scene, using all the blocks. However, building efforts are more daring than at 5 years, when they are relatively conservative and the products of 17 children fall at some point in the building. When structures fall, subjects are persistent and rebuild. Even when quite complex structures fall, they are still able to remember their plan, and to reconstruct it. Some start to make one thing and then change their plan as they proceed.

Perspective comes in: "House and mountain behind and the sun in front." Several build at an angle.

Forty-eight name their products—*house* leading in both sexes and *bridge* and *scene* coming next. Several children praise their own building ability.

"I knew this was going to turn out good," or "Pretty complicated. I don't think any other child could make this."

Scenes are made and described by 16 children. Seven children dramatize, but in five of these dramatization is merely verbal. Blocks are not actually activated. There is obviously less interest in dramatization and more in the complicated details of accurate construction than earlier. Only 17 children appear to be influenced in their choice by colour of the blocks.

Four children personify blocks. The average time of building is 4.43 minutes; 4.27 for girls, 4.60 for boys.

As to sex differences: Nearly twice as many boys as girls build symmetrically. Many more boys than girls build one large compact structure. Girls show more interest in size and colour. More girls than boys purposely destroy their products. Boys work more playfully and more compactly and are more apt than girls to know what they are doing and to build a good complete structure. Girls are more hesitant, clumsy and insecure.

2. By Topic:

a. Number responding. Even at 2 years of age, 43 of the 50 subjects respond positively to the test. At 3 years, all but one respond, and from 3 ½ years on, all of our subjects respond positively (see Table 1).

b. Block started with. There is only a slight age change as to the block started with. At every age (see Table 2) more children start with a triangle than with any other block.

Straws and half cubes come next in popularity through 4 years. At 5 years, the arc is a close second to the triangle as, a favourite starting block; and at 6 years, the half arc holds a strong second place.

c. Number of pieces used and how used. At 2 years of age, only eight children use as many as 15 of the 26 pieces. At 2 ½ years, this number has increased to 29; at 3 years to 34.

By 3 ½ years and after, approximately 40 of the 50 subjects use 15 or more pieces.

Only two 2-year-olds use all the pieces. By 6 years of age, 27 subjects use all pieces.

At 2 years, two children use 15 or more pieces in a single reasonably compact structure or scene, no others built. By 6 years, this number has increased to 38. At 2 years of age no children use all the blocks in a single scene but by 6 years the number who do so has increased to 16.

There is at all ages a great deal of changing of structure as the child builds. This occurs in approximately 20 of the subjects at each age. At every age until 6 years, of those who build a compact structure, more change it as they build than build consistently without changing. At 6 years, 18 change as they build their single structure, but nearly as large a number (16) build a single compact structure with no changing as they build.

Blocks fall a good deal as the child builds at all ages, falling most at 3 ½ years, an age when motor incoordination has been demonstrated to be at a peak (Ilg, 3). Purposeful and intentional destruction of own product occurs most at 4 years. This behaviour, too, fits in with the individuality earlier shown to be characteristic of the 4-year-old (Gesell & Ilg, 2) (see Table I).

d. Naming of product. At 2 years of age, 12 children name single blocks, 12 name their product. At 2 ½ years, 13 children name single blocks, but after that age the naming of single blocks almost disappears. Naming of the product, however, increases sharply until at 4 years all subjects name their products.

More children name their products a house than any other single category, and house leads at 2 ½, 3, 4, and 6 years and ties for first place with bridge at 5 years.

Train leads at 2 years; bridge at 3/21 years. . For the total age range, bridge is the second leading category and boat comes third. Table 4 gives the distribution of other leading categories. At 2 years, 11 children comment on the size of individual blocks, but

none comment on size of product. By 3 ½ years this situation has reversed itself. Eleven children comment on size of product and none on size of single blocks. Thereafter at every page more children comment on size of product than of blocks.

Comments on colour of blocks occur minimally at all ages—most at 4 years of age with 13 subjects making such comment.

Showing separate blocks to Examiner with or without comment occurs in seven subjects at 2 years, in 11 at 2 ½ years, in 14 at 3 years, and scarcely at all thereafter.

Personification occurs to a very limited extent at any age—most at 3 ½ to 5 years when, at each age, three children personify; and at 6 years when four do so. Two children at 6 years (and at 6 years only), actually build the outline of a person or animal (see Tables 3, 4, 9).

e. Action, dramatization and verbalization. The 2-year-olds activate blocks but do not verbalize about this movement. Eleven 2-year-olds thus activate blocks without verbalization. At 2 ½ years and at 3 years, actual action continues to predominate over verbalization about action.

At 3 ½ years and at 4 years, however, dramatic action is most often accompanied by verbalization about this action. Fourteen subjects thus verbalize while they act.

By 5 and 6 years of age, however, dramatic verbalization of action predominates over actual action or movement of blocks.

Verbalization which describes a scene dramatically even though it does not mention action as such, occurs conspicuously at 3 ½ years and thereafter, in 9, 11, 11, and 18 cases respectively. From 4 years on, this dramatic verbalization which does not actually mention action occurs more than action or verbalization about action (see Table 3).

f. Colour and form. At the earliest ages, colour seems to influence choice of blocks to be used even more than does their shape. At both 2 and 3 years of age more children select blocks by colour than by form, and at 2 ½ years only a few more select on the basis of form than of colour.

The shift comes at 3 ½ years when 30 subjects seem to make their choices largely on the basis of form—only 20 on the basis of colour. Thereafter form definitely predominates as a basis of choice.

Of those who choose on the basis of colour, some at every age verbalize about this, but at every age except 4. years, choice alone rather than verbalization chiefly indicates this stimulus value of colour (see Table 9).

g. Type of structure. As to type of structure built, there is a very clear-cut shift with age. At 2 years of age the child builds either scattered or semi-compact structures; or several small compact structures. Small compact structures definitely predominate at 2/12 and at 3 years. At 3½ years an equal number of subjects (17 each) build several small compact structures, and several large compact structures. By 4 years, several large compact structures or one large compact structure prevail.

At 5 years comes another shift in type of building. Now one large semi- compact structure definitely prevails. This type of building continues to prevail at 6 years.

Scenes. which may be of any of the above types, occur increasingly, being built first at 2/12 years by two children. Six at 3 years, nine at 3 ½, 11 at 4, 12 at 5, and 17 at 6 years build scenes.

These scenes increasingly include all the blocks. Even at 3 years one does so; five at 3/12 years; three at 4 years; nine at 5 years; and 15 at 6 years (see Table 5).

h. Manipulation summary. At 2 years of age, all but seven subjects respond positively to the blocks. At 2/12 years, all but two respond and at 3 years, all but one respond. Thereafter all subjects respond positively.

However, at the earliest ages, some of those who do respond merely manipulate or handle the blades-10 at 2 years, two each at 2 ½, 3, and 3 ½ years. Others at the earliest ages just pick up the blocks from their standard position and place them elsewhere—four at 2 years, two at 2 ½, and one each at 3 ½ and 4 years.

Standing blocks on end occurs conspicuously at 2 years and at all ages thereafter. This is a rather natural type of manipulation. Blocks rather inevitably have to be either laid on their sides or stood up}, so that actually this type of manipulation is not particularly noteworthy. ”

There is, however, a slight age gradation in kind of block which most frequently stood up (see Table 2). Of all the blocks, at 2 and 2 ½ years, triangles are most frequently stood up, and the arc next most frequently. By 3 years and at every age thereafter (except at 5 years when triangles slightly lead), the arc is stood up most.

None of the following predominate at any age, but of the ages when they do appear strongly, half—arcs are stood up more at 3 5/; years than at any other age; half cubes most at 3 years; straws most from 3% to '6 mum; Imps tangles from 3 to 5 years; flats from 4 to 6 years. Flats are stood on edge only at 6 years; the arc is placed upside down most 3, 3 ½ and 5 years.

The most primitive type of manipulation appears to be *piling*. This behaviour actually predominates over every other single type of behaviour.¹ through 3 ½ years. . Within piling, there is a rather clear-cut developmental sequence, as follows:

¹ Our knowledge of the behaviour of 19-monthers leads us to believe that piling would have been even strong at 18 months than at the ages considered here. However so far as this test is concerned, the behaviour of the 2-year-olds was so primitive as to suggest that the test would not be useful at months.

First, the subject's piles pieces all of the same type, 2-3 types.

Piling then is selective, from 3 ½ years ff.

A few children balance and then pile on top of balanced pieces, 3 ½ years ff.

Piling is restricted in many to merely placing single blocks on larger base blocks, at all ages but especially at 4 years ff.

Train structures, like piling, occur conspicuously at every age. They are strongest, relatively, at 2 years when they share first place with piling. But they continue very strongly through 4 years.

Here again there is a definite developmental change in type of structure with age:

A small train, consisting of five or even fewer blocks, predominates at 2 and 2 ½ years.

A large spaced train shares first place with the large compact train at 5 years and leads at 6 years.

Trains first turn corners at 3 ½ years (in four cases) and comic: in do so in a few cases at each age thereafter.

The next type of construction to appear is *bridging*. This is first seen conspicuously at 2 ½ years and continues thereafter. It is relatively conspicuous; at 2 ½, 3 ½, and 5 years, of age.

The making of a little fenced-in pent comes in abruptly at 3 years, with nine children making such a product. About the same number; continues with this at every age till 6 years when the number rises to 18.

Pieces are placed inside these pens from 3% to 6 year-sir by an increasing number of children ranging from one at 3 ½ to nine at 6 years. At 5 and 6 years a few children place roofs on their pens.

The next three trends which come in after bridging often occur all together, but there is a slight age, gradation among: them.

Spacing and patterning of blocks comes 1nE strongly at 3 years of age and continues thereafter, becoming increasingly complex.

Fitting together of block: (in accurate geometric relationship) occurs increasingly from 3 years on.

Symmetric placement of block², to' balance each other in a total, pattern, occurs strongly at 3 ½ years and increasingly from then on.

Balancing of blocks, which usually involves piling and which often involves very delicate and precarious balance (i.e., straw on end placed on top of a first straw on end, etc.) first comes in strongly at 3 ½ years and occurs increasingly thereafter. Balancing is not here used in terms of symmetric placement.

The construction goal toward which the child's earlier efforts appear to be leading is the production of one large compact or semi-compact structure utilizing all or nearly all of the blocks. No 2 or 2 ½-year-olds achieve this goal, but by 3 years of age six children attain it. This number increases to nine at 3/12 years and then increases sharply to 26 at 4 years, 29 at 5 years, and 36 at 6 years.

The production of scenes, also using all or a large part, of the blocks, occurs increasingly with age. One child builds a scene at 2 ½ years, six at 3 years, nine at 3 ½ years, 11 at 4 years,, 12 at 5 years, and 17 at 6 years.

In addition to the types of building just described, a few minor trends have been discerned as follows: One of the earliest behaviours is to lay out the four straws side by side.

² Exclusive of combination of two triangles flat into a square, which is also a form of fitting, and which occurs from 2 ½ years following.

Seven children do this at 2 years and about this number at every age.

All four triangles are stood up back to back by three 2-year-olds and by about an equal number of children at nearly every age thereafter.

Two triangles are laid down flat to form a square as early as 2 ½ years (six children). This behaviour, which is the simplest and earliest-seen form of fitting blocks together, reaches its peak of occurrence in 10 children at 3 ½ years, eight children at 4 years.

Half-arcs are stood up back to back by 2 ½ -year-olds. This behaviour increases steadily at increasing age levels till it occurs in 11 6-year-olds.

Straws are laid across other blocks by two 2-year-olds. The number doing this increases steadily till a peak of 11 at 4 years, then maintains about this level.

A few children name or make steps, mostly at 3 ½ years, when five do so.

Pieces are tucked under or fitted in between other pieces most at 3 ½ and 4 years when this behaviour occurs in seven and eight children respectively.

Pieces are placed down at a sharp angle, instead of in a straight horizontal train, only conspicuously at 6 years when 10 children so place them (see Tables 6, 7, 8).

E. Growth Gradients³

a. 2 years.

Responds positively to flu test (6 years)

³ Item is noted when it first occurs and thereafter until it reaches its peak age which is starred. Items are placed in italics at the first age when they reach the 50th percentile. Age in parentheses indicates how long the behaviour continues to any extent.

Only a few of these items actually reach the 50th percentile, as can be seen from the tables.

Mostly manipulates
Picks up pieces and releases in new position*
Simple piling, all same type (3 years)
Small train, 5 or fewer pieces* (3 years)
Stands up triangle (6 years)
Lays out 4 straws side by side (5 years)
Names single blocks (2% years)
Selects blocks on the basis of colour (3 years)
Places blocks in a scattered or semi-compact pattern, or makes small compact structures*
Activates block, without verbalization (3 years)

b. 2 ½ years.

Simple filing all were type* (3 years)
Places single small blocks on base blocks (6 years) Bridging (6 years)
Stands triangle or are upright (6 years)
Names single blocks*
Names product (6 years)
Names train" (4 years) or house (6 years)
Uses 15 or more piece: in any type of building (6 years)
Lays out 4 straws side by side (5 years)
Combines 2 triangles flat into square (6 years)
Selects blocks on the basis of colour (3 years)
Builds small compact structures (3 ½ years)

c. 3 years.

Places single blocks on base blocks (6 years)
Train: large and spaced (6 years)
Bridging (6 years)
Pen (6 years)

Spaced patterned building (6 years)
Pieces fitted together (6 years)
Fifteen or more pieces used (6 years)
Stands up triangle, arc, half cubes, straw* (6 years)
Names house (6 years), bridge (6 years), boat (4 years), car* (4 years)
Four straws side by side (5 years)
Combines triangles flat into squares (6 years)
*Selects blocks on the basis of colour**
Small compact structure* (3 ½ years)

d. 3 ½ years

Selective piling' (6 years)
Places single blocks on base blocks (6 years)
Bridging plus piling* (6 years)
Train: large and compact (4 years)
Bridging (6 years)
Pen, with or without pieces inside (6 years)
Spacing and patterning (6 years)
Fitting (6 years)
Symmetry (6 years)
Balancing (6 years)
Action, with verbalization about action* (4 years)
Fifteen or more pieces used* (6 years)
Uses from 15-26 pieces in one reasonably compact structure or scene, no other structure (6 years)
Stands up arc, triangle, rectangle (6 years)
Names bridge (6 years), house (6 years), boat (6 years), car* (4 years), road* (6 years)
Combines triangles flat* or arcs back to back (6 years)
Pieces between or under others (4 years)
Several large compact structures. (4 years)

e. 4 years

Selective piling (6 years)

Places single blocks on larger been blocks (6 years)

Train: large compact*

Bridging (6 years)

Stands up triangle, arc, rectangle on end (6 years)

Spacing and patterning (6 years)

Fitting (6 years)

Symmetry (6 years)

Balancing (6 years)

Pen, with or without pieces Inside (6 years)

Verbalization about action without action* (6 years)

Names bridge (6 yearn), house* (6 years), boat (6 years) or ocean (6 years)

Lays straws across other pieces* (6 years)

Pieces placed under or between others*

Fifteen or more pieces used* (6 years)

Uses from 15-26 pieces in one reasonably compact structure or scene, no other structure (6 years)

Half arcs back to back (6 years)

One large compact structure* (6 years)

Scene (6 years)

*Comments: on size or colour**

f. 5 years.

Selective piling' (6 years)

Placing single email pieces on larger pieces (6 years)

Bridging* (6 years)

Stands on end triangle*, arc, rectangle* (6 years)

Spacing and patterning (6 years)

Fitting (6 years)
Symmetry (6 years)
Pen, with or without pieces inside (6 years)
Names a bridge* (6 years), scene (6 years), boat (6 years)
Places half arcs back to back (6 years)
Straws laid across other pieces (6 years)
Verbalization about action but no action* (6 years)
One large semi-compact structure (6 years)
Scene (6 years)
Uses from 15-26 pieces in one reasonably compact structure or scene, no other structure (6 years)

g. 6 years.

Places single pieces on larger bump pieces*
Stands are upright*
Spaced and patterned building*
Fitting*
Symmetry*
Pen with or without fielder inside and/or roof*
Names boats*, scene*
Uses all pieces*
Half arcs back to back*
One large semi-compact structure*
Scene*
Uses 15-26 pieces in one reasonably compact structure or scene, no other structure

2. By Types of Behaviour

a. Manipulation

- A. Refuses to cooperate (2 years)
- B. Merely manipulates (2 years)
- C. Merely places around (2 years) ‘
- D. Stand on end (2-6 years)
- E. Pile: (2-6 years)
 - All same type (2-3 years)
 - Selective (3 ½ years ff.)
 - Bridging and piling. (3 ½ years ff.)
 - Placing one or ma singly an others? (4 years ff.)
- F. Train (2-6 years)
 - Small, five blocks or less (2-3 years)
 - Large compact (3 ½, 4 years)
 - Large spaced (3-6 years)
- G. Bridging (2½-6 years)
- H. Fence or pen (3-6 years)
 - Pieces inside (3 ½ -6 years)
 - Roofed (6 years)
- I. Spacing and patterning (3-6 years)
- J. Fitting (3-6 years)
- K. Symmetry (3 ½-6 years)
- L. Balancing (3 ½-6 years)
- M. One large compact structure or semi-compact structure (4-6 years)
- N. Scene (4-6 years)

b. Type of structure.

- Semi-compact or scattered (2 years)
- Small compact structure (2-3 ½ years)
- Several large compact structures (3 ½, 4 years)
- One large compact structure (4-6 years)
- One large semi-compact structure (4.6 years)
- Scene (4-6 years)

c. Action and verbalisation.

Names single block: (2, 2 ½ years)

Name: product (2 ½-6 years)

Action of part without verbalization (2-3 years)

Action plus verbalization about action (3 ½, 4 years)

Verbalisation about action but no action (4-6 years)

F. Discussion

The Kaleidoblock test, like any other projective technique, is theoretically planned to reveal individual differences and to throw light on the personality of the individual subject, rather than to provide a normative evaluation of intelligence or maturity status.

However, before any projective technique can be optimally useful in revealing individual differences, normative data about the developmental stages through which children normally pass in responding to such a test are needed.

In the present instance, for example: choice of blocks on the basis of colour alone is considered to be a more “emotional” response than choice based solely on the form of the blocks. If a subject should show marked responsiveness to colour, ignoring form, certain deductions about his or her personality might be drawn. However, these deductions would be different depending on whether 100 per cent, 50 per cent or only 10 per cent of other normal sub- jects at the age in question made such a response.

Similarly, if a child responds positively to the Kaleidoblock test and quickly utilizes all blocks in a single compact structure, certain conclusions about his individuality will be drawn. Again, the individual significance of such constructive behaviour will be different depending on whether all other normal children of his age group perform in such a fashion, or, say, only 5 per cent of them.

On the basis of our observations, the Kaleidoblock test appears to be an extremely useful instrument for revealing individual differences.

In a subsequent study (Ames and Learned, 1) we shall set forth preliminary findings on individuality differences in preschool children as revealed by this test. The present study does not discuss individual differences, but presents normative data describing the developmental stages in responses to this test.

G. Summary

The present paper reports an exploratory study in the use of the Lowenfeld Kaleidoblock test as applied to 350 American children of above average intelligence and of upper socio-economic level, between the ages of 2 and 6 year —50 subjects (25 girls and 25 boys) at each age level.

Since no literature on this test is available, the test material is described in detail as well as our method of giving and recording the test.

Present findings indicate that the test is useful when applied to very young children. Most preschool subjects react positively in a manner which allows responses to be evaluated normatively as clues to the child's developmental level. It is anticipated that further research will indicate ways in which the Kaleidoblocs can be used as a projective test to reveal individuality patterns.

Behaviour of children in response to this test can be easily classified as to type of manipulation and related behaviour, nature of verbalization and product, at the different age levels. Age summaries are presented which define behaviour typical of each age level. This behaviour agrees with that observed heretofore by means of other types of tests.

Simple suggestive growth gradients are presented for use in evaluating the behaviour of any subject in response to this test situation.

Further research might reveal the extent to which the present standard arrangement of blocks for presentation influences the subject's choice of block to be used first, and the extent to which such a choice is independent of the way in which the blocks are presented.

1. All of our subjects responded positively to this test at 3 ½ years of age; 86 per cent of them as early as 2 years when the test was first given.

2. At 6 years of age, 54 per cent of subjects use all the blocks in building, but before that time less than half use all blocks.

3. At no time during this age range do even half the subjects use all blocks in one compact structure or scene, no changing as builds; and at no time do even half the subjects build one compact structure or scene of any size, no changing as builds.

4. The triangle is, throughout, the most popular starting block. At every age but 5 and 6 years, one of the straws is second most popular starting block. At 4 years the half-cube ties with one of the straws as a starting block; at five years the arc is second most popular and at 6 years the half-arc.

5. Clear-cut age changes do take place as to type of manipulation.

6. As to action and dramatization, and verbalization about such action or dramatization, it appears that at the earliest age levels action occurs without accompanying verbalization. By 3 ½ years, action is most often accompanied by dramatic verbalization and at 4 years and thereafter, dramatic verbalization about action exceeds any real action of blocks.

7. *Houses* are built and named more than any other product except at 2 years when *train* leads, at 3 ½ years when *bridge* leads, and at 5 years when they tie with *bridge*. By 5 and 6 years there is a definite shift toward the producing of scenes rather than of single objects.

8. As to type of product, at first children build scattered, semi-compact or small compact structures. By 3 ½ years, several large compact structures predominate. By 4 years one large compact structure. Thereafter one large semi-compact structure (often a scene).

9. By 3 years of age, six of the subjects. build scenes, and this number has increased to 17 of the 50 subjects by 6 years of age.

10. Colour influences at least some choices, in nearly half the subjects at most ages, especially in girls.

11. Personification of blocks occurs very minimally, though to some extent at each age after 2 years.

12. Sex differences occur conspicuously from 2 years of age on. Boys definitely make an earlier start in response to the test, and throughout tend to build more skilfully and in a more advanced manner. At 2 years, more boys than girls respond positively, and boys build in a more mature manner than do girls. At most ages, and especially at 6 years boys work more playfully and compactly than do girls and build more complete structures. Girls are more hesitant and clumsier, and products are less good.

More boys make bridges from 2-3 years of age; fitting occurs more in boys from 3 years on. Spacing and patterning occur more in boys than in girls at 3 and 3 ½ years. Scenes occur more in boys than in girls except at 5 years.

There is a marked sex difference in products made and named. Trains, trucks, cars, bridges, and boats are made most by boys; houses by girls. More girls than boys name blocks at every age except at 2 and 5 years. At every age but 2 years, more girls than boys use colour as a hash of selection. Conversely, at every age but 2, more boys use form.

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Gesell Institute of Child Development

310 Prospect Street

New Haven 11, Connecticut