Proceedings of the Iowa Academy of Science

Volume 64 | Annual Issue Article 57

1957

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By Barbara P. Behrens and Guy H. Miles

Miles, in a recent study (2), divided male undergraduate college students into two groups, analyzers and non-analyzers, on the basis of their verbal statements concerning their approach to the block design subtest of the Wechsler Bellevue Intelligence Scale. Ss who gave verbal statements indicating that they had conceptually divided the design pictures into blocks before moving the actual blocks into position were classified as analyzers while those whose verbal statements did *not* indicate a division of the pictures into blocks were the non-analyzers.

These Ss next practiced a complex perceptual-motor task where it seemed that an analysis by S of the underlying task features would result in a high level of performance. Analyzers performed at a significantly higher level on this task than did the non-analyzers.

Although the block design test is widely used as a measure of "ability to analyze and synthesize" (1), the block design scores based on time measures were not related to performance level on the complex motor task nor to Ss' classification as analyzers or non-analyzers.

When the distribution of time scores for each block design was normalized and converted into single digit standard scores having a range from zero to nine, a mean of 4.5 and a standard deviation of 2, it was found that scores on three of the designs were related to Ss' verbal statements. These three designs were alike in that each required parts of three or more blocks to complete a pattern within the design. In the designs *not* related to Ss' verbal statements, either the separate blocks were quite apparent in the picture or the design was very simple. It was conjectured that for these designs, the time scores reflected ability to manipulate the blocks quickly rather than ability to analyze.

The present study has two purposes: (a) to determine the consistency with which two trained observers independently classify Ss as analyzers or non-analyzers on the basis of their verbal statements concerning their approach to block design problems, and (b) to devise a block design test for college males, the time scores on which will discriminate between analyzers and non-analyzers.

A block design test consisting of six designs, shown in Figure 1, each requiring nine blocks, was devised. Included in this test were

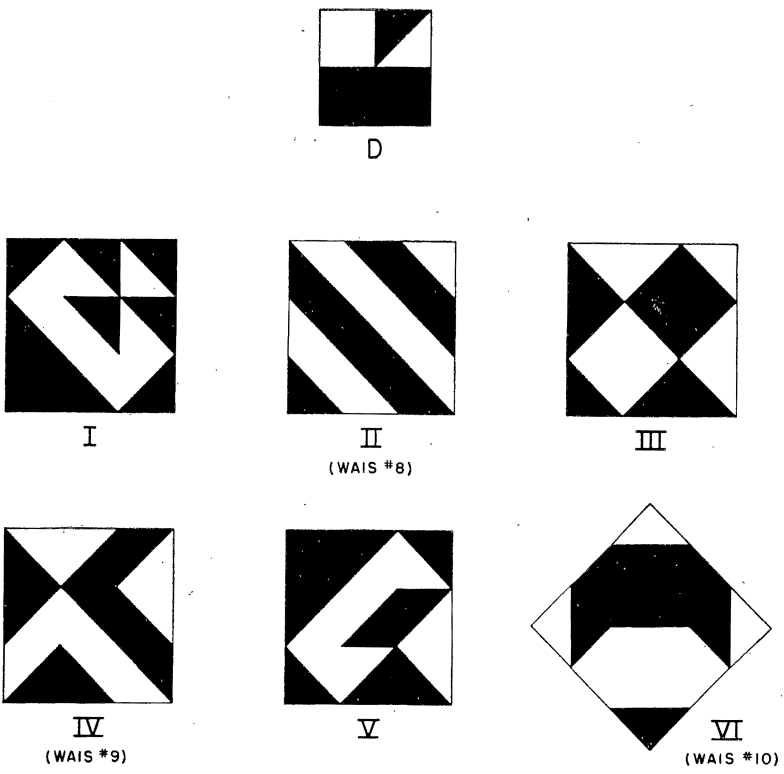

Figure 1. Block Designs (D = demonstration design).

designs 8, 9 and 10 from the WAIS subtest. The remainder of the test consisted of three designs devised by the experimenters. Time scores on these three designs appeared to differentiate analyzers from non-analyzers in a preliminary study.

Subjects and Procedure

Ss were sixty-one male volunteers enrolled in introductory psychology courses. The Iowa Picture Interpretation Test (IPIT) had previously been administered and the achievement imagery (AI) scores of these Ss fell in either the upper or lower one-fourth of such scores for the combined classes.

S was seated at the end of a table with the blocks and designs in front of him. Two trained observers were seated on opposite sides of the table and took turns conducting the testing sessions. After the instructions were given, S was asked to do a simple design involving four blocks. Following this practice design, the six test designs were presented singly in a standard sequence and the time required by S to complete each one was recorded. If S was unable to complete a design within 10 minutes, he was presented the next one.

At the completion of the last design S was told, "There is no right or wrong way to do these designs, but we are interested in finding out how people make the designs. Would you tell us how *you* go about making them?"

On the basis of S's verbal statement the two observers, using a checklist, made independent judgments and classified S as an analyzer or non-analyzer. If S gave a clear statement indicating that he had begun by conceptually dividing the several pictures into separate blocks, he was classified as an analyzer. Examples of such statements are: "I imagined lines on the pictures where the blocks belonged" or "I knew there had to be three blocks on a side since there were nine blocks, so I just figured out what the blocks would look like." S was also classified as an analyzer if, with his finger, he marked off the blocks on the design while saying, in effect, "I knew this block had to be half white and half red so . . .". However, if S said he "just twisted the blocks" or "tried the blocks until they looked right" he was classified as a non-analyzer. Any S who was observed attempting to make a design by using more than three blocks on a side was classified as a non-analyzer. If S made an uninterpretable statement such as "I started at the corner," he was asked to "tell me more about it" until his answer provided a basis for classification.

Results

Using the criteria listed above as a basis for their independent judgments of Ss' verbal statements, the two observers agreed in their classification of sixty of the sixty-one Ss.

The distribution of time scores on each design, for the sixty Ss on whom there was agreement in classification, was normalized and converted into single digit standard scores ranging from zero to nine. Time scores falling within each standard score interval are shown in Table I. The standard scores for each of the six designs were then added for each S to determine his total test score. The total test scores for the individual Ss ranged from 5 to 47 with a median score of 27.

For the sixty Ss, a biserial correlation coefficient of .767 was found between total test scores and the analyzer-non-analyzer dichotomy.

The table of standard scores derived from the performance times of the first sixty Ss was used in scoring the performances of a second group of sixty-two undergraduate males who solved the six designs under the same experimental conditions. For this second group, the observers agreed in their classification of sixty of the sixty-two Ss.

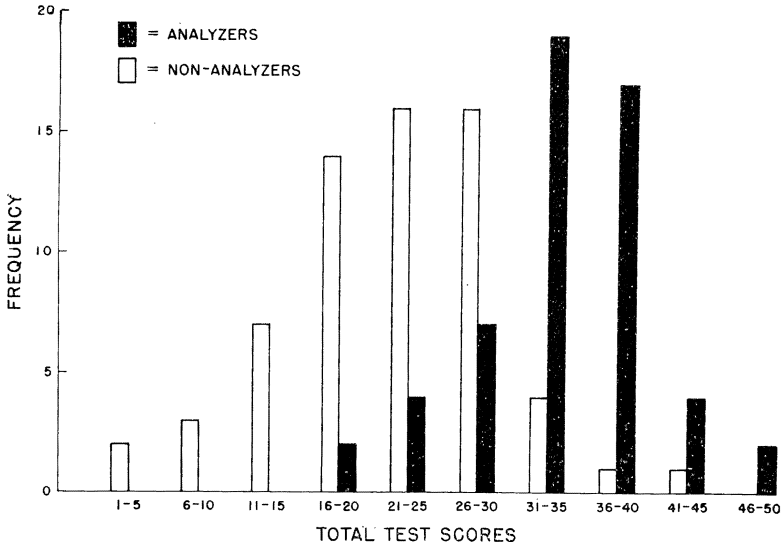

Figure 2. Frequency distribution of total test scores for 54 Ss classified as analyzers and 66 Ss classified as non-analyzers on the basis of their verbal statements concerning their approach to the block design problems.

For the sixty Ss about whom there was agreement, a biserial correlation of .837 was obtained.

The frequency distribution of total test scores for Ss in both experimental groups is shown in Figure 2. The distribution of scores for 54 analyzers is represented by the solid bars and for 66 non-analyzers by the open bars.

Since the 120 Ss had all scored in either the upper or lower one-fourth on the AI scale of the IPIT, a four-fold contingency table was formed and a chi-square test of independence was made. This obtained value of chi-square ($x^2 = 1.09$, df $= 1$) was non-significant indicating that the hypothesis of no relationship between tendency to analyze and achievement imagery is tenable.

Discussion

The study indicates that trained observers can consistently classify Ss as analyzers or non-analyzers on the basis of their verbal statements concerning their approach to block design problems.

In a majority of the cases, scores on the block design test successfully discriminated between analyzers and non-analyzers. It was observed that the verbal statements of those non-analyzers who received *high* test scores indicated that many of them were very adept at noticing spatial relationships among the design patterns.

Table 1

Table of standard scores assigned for time (in seconds) taken to complete each design.

Score / Design	9	8	7	6	5	4	3	2	1	0
I	0-20	21-25	26-32	33-39	40-54	55- 67	68-125	126-215	216-399	400
II	0-22	23-27	28-33	34-43	44-60	61- 89	90-169	170-219	220-589	590
III	0-24	25-30	31-36	37-44	45-62	63- 90	91-113	114-161	162-339	340
IV	0-31	32-34	35-44	45-52	53-65	66- 88	89-129	130-189	190-319	320
V	0-30	31-37	38-42	43-54	55-75	76- 95	96-149	150-274	275-419	420
VI	0-27	28-32	33-48	49-63	64-84	85-110	111-239	240-493	494-599	600

This suggests that a correction factor for the test score based on ability in spatial relations might be useful.

Whether time scores on this test are more meaningful than classification based on verbal statements depends on their usefulness in predicting other behavior. Further study is necessary in order to determine the usefulness of each approach. It seems reasonable to assume that classification based on S's verbal statement is indicative of the approach S uses to complex problems while the time scores are a measure of the effectiveness of this approach.

Summary

A test consisting of six block-designs, each involving nine blocks, was devised and administered to 123 college male volunteers. Two trained observers, making independent judgments, agreed in their classification of 120 of the Ss as either analyzers or non-analyzers on the basis of each S's verbal description of his approach to the block design problems. Using the distribution of time scores on each design for the first sixty Ss, about whom there was agreement, a system of standard scores was devised. For this group of Ss, a biserial correlation coefficient of .767 was found between test scores and classification according to verbal statement. A second group of sixty-two undergraduate males solved the designs under the same experimental conditions and the same table of standard scores was used in scoring the performance times of the sixty Ss on whom there was agreement. For this group, a biserial correlation coefficient of .837 was obtained.

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