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SIGNIFICANCE OF PSYCHOLOGICAL TEST RESULTS OF EXOGENOUS AND ENDOGENOUS CHILDREN (ARTHUR POINT SCALE)*

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THE clinical psychologist recognizes during the examination of subjects the type of behavior termed organic or brain-injured, which is characterized according to Strauss by hyperactivity, distractibility, disinhibition and perseveration. While no one underestimates the necessity of considering such subjectively evaluated factors, it would be of considerable import could it be shown that test results or patterns were irrefutably pathognomonic of brain injury.

In a previous article, the present authors have reported on the results of matched groups of exogenous and endogenous mentally defective children on certain selected test items from the Binet.(2) This paper is an extension of that study and deals with performance on the Arthur Point Scale.(1)

The subjects for this comparison, residents of the Wayne County Training School, had been classified by the neuropsychiatrist according to the following criteria: (4)

For the brain-injured or exogenous subjects, no evidence of mental deficiency in the members of the immediate family, coupled with history of the prenatal, natal, or post-natal injury to the brain, either of a traumatic nature or due to an inflammatory process, or presence of neurological signs of brain lesion.

For the familial or endogenous subjects, presence of mental deficiency among the members of the immediate family, absence of significant factors in the birth and developmental history, according to the case record, and absence of neurological signs.

In the interest of the homogeneity of our groups, this study was limited to white males age 7½ to 15½ inclusive. All cases of mixed or questionable etiology were excluded as were all whose condition was complicated by motor disturbance or epidemic post-encephalitis. Furthermore, if the Binet I.Q. nearest the first administration of the Arthur appeared to be non-representative of the child's intellectual level, the case was not included. Such evidence as severe speech and hearing difficulties or a I.Q. decidedly below or above any ~~value~~ which the child had

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obtained was considered sufficient to disqualify the case for inclusion. From the remainder of our total enrollment of about 1,500 white boys we matched each exogenous mental defective with an endogenous mental defective who was within six months of his chronological age at the time of the administration of the Arthur Scale and who was within five I.Q. points on the Binet test given nearest the time of the Arthur. The I.Q.'s of each pair were based on the same test. Only nine pairs of subjects could be found who met all the selective requirements. Two pairs were matched on the basis of the 1916 Stanford-Binet, four pairs on Form M of the Terman-Merrill revision and three on Form L.

The data in Table I reveal the similarity of the two groups.

TABLE I
COMPARISON OF GROUPS WITH RESPECT TO
AGE AND I.Q.
(N=9 pairs)

	Exogenous	Endogenous
Chronological Age		
Range	7-11 to 15-1	7-11 to 15-0
Q Range	8-6 to 11-10	8-3 to 11-7
Mean	10-10	10-8
S.D.	2-2	2-2
I.Q.		
Range	58-78	60-73
Q Range	64-69	66-70
Mean	66.7	67.9
S.D.	5.3	3.8

With the groups thus equated with respect to similarity of age and verbal intelligence, examination was made of the scores earned on the Arthur Point Scale and of the various items comprising the scale. On the latter, measures were used which would not obscure differences in performance and which would, as far as possible, avoid

minus ratings. The t test for related measures was applied to determine the significance of the difference in the means; the F test to determine the significance of the variability of the two groups.(3) See Table II.

DISCUSSION

In this study, 9 white exogenous mentally defective boys were matched on a one-to-one basis with white, endogenous boys of similar age and I.Q., and a comparison made of their scores on the Arthur Point Scale. No statistically significant difference is indicated by the t test for related measures. Application of the F test reveals that only the scores on the Mare and Foal are of such variability as to lead to the conclusion that our samples for this item are drawn from different populations.

The difference in variability in performance of the two groups on the Mare and Foal and the extreme slowness of 4 of the exogenous, suggest that some factor may be operating in their cases which either is not operating, or is operating to a lesser degree, in the remainder of the group and in the endogenous group as a whole. Since there is no comparable slowness in either group on any other test scored on the basis of time, it appears to be a factor determined by the board itself. It may be that some of the exogenous children were distracted by the picture to a much greater degree than were others of their group, and were thus penalized because the score is based upon the time required for placement. Examination of the clinical records of the 9 exogenous subjects reveals the fact

TABLE II
COMPARISON OF GROUPS WITH RESPECT TO ARTHUR SCORES
(N=9 pairs)

Item	Scoring Method	Mean		S.D.		t	%	F	%
		Exog.	Endog.	Exog.	Endog.				
P.Q.		68.56	76.67	12.39	10.01	2.04	8	1.54	>5
P.Q. minus I.Q.		+1.88	+8.78	13.15	10.94	1.59	17	1.44	>5
Mare and Foal	Time	76.33	38.44	61.28	14.43	2.00	8	18.03	<1
Seguin	Raw Score	23.56	21.00	8.91	4.74	0.91	31	3.53	5
Kohs Block	Raw Score	8.56	12.00	8.57	13.88	0.647	54	2.63	>5
Knox Cube	Raw Score	4.39	5.39	1.68	1.07	1.72	13	2.44	>5
Casuist	Weighted Score	2.07	2.79	1.51	1.27	1.20	27	1.43	>5
Manikin and F. Profile	Weighted Score	2.11	2.19	1.75	1.52	0.136	90	1.31	>5
Porteus Mazes	Porteus C.A. (Revised)	8.00	9.44	3.18	3.00	2.46	4	1.12	>5
Healy Picture Completion I	Raw Score	238.56	227.22	181.26	129.76	.155	88*	1.95	>5
Use of Blanks	Number	1.11	0.56	1.89	0.88	0.776	46	5.09	2

* Exogenous superior. Endogenous superior on all other items.

that only the 4 who had earned the extremely poor scores on the Mare and Foal were described as distractible. They are also the subjects who show positive neurological signs. The t (+3.36) which results from the comparison of the scores of these 4 subjects and their mates still lacks in significance, falling at the 5 per cent level of confidence.

On Healy Picture Completion I, which also offers color and contextual cues, the exogenous rate above their endogenous mates rather than below, as on the Mare and Foal. Is this due to the fact that the Picture Completion test is scored primarily on correctness rather than on speed since the 5 minute time limit is more than adequate for the great majority of subjects? In other words, can the exogenous, given sufficient time, overcome his initial handicap of distractibility?

Although there is no statistically significant difference between the total scores of the two groups on the Healy Picture Completion, testing experience suggested the examination of block selection. Exogenous children have been observed to select solid color blocks more often than have the familial. They are apt to call these blank pieces grass or sky and this raises the question of whether they are attending to the background of the picture rather than to the activity portrayed: a reaction of the exogenous demonstrated by Werner and Strauss.(6)

When the number of blanks used by the exogenous and their endogenous mates are compared, the difference is not found to be significant. That the selection of blanks is not peculiar to the

brain damaged is more apparent when it is observed that in these groups 4 endogenous selected this type of block as compared with 5 exogenous.

In the interest of later discussion it should be noted that 3 of the 4 exogenous subjects who are responsible for the longer time scores on the Mare and Foal are among the 5 who selected blanks.* One of these used 5 blanks in his solution. No other subject in either group used more than 2.

This study has failed to demonstrate a statistically reliable difference between the brain damaged and familial mentally defective children on the Arthur Point Scale. Strauss has reported a difference in the reaction of the exogenous and endogenous on performance tests.(4) Although the present experimental group is too small to warrant drawing any positive conclusions, the authors wish to point out differences in methodology in the two studies as a possible basis for the contradictory results.

These two studies approached the problem from opposite directions. We used all exogenous, mentally defective, white boys who could be matched with endogenous subjects of similar color, sex, C.A., and I.Q.; and attempted to differentiate between their test patterns. In the previous study, the selection of subjects was made on the basis of extreme discrepancies between mental and performance ages, e.g., P.A. one

* Comparison of scores made by the 4 exogenous subjects having neurological signs with those of their endogenous mates on the items covered by this study (see Table II) show a level of confidence as high as 3 and 5 per cent for Performance Quotient, P.Q. minus I.Q., Seguin, Knox Cubes and Mare and Foal: the endogenous tending to be superior on each.

or more years below M.A. or P.A. three or more years above M.A. These subjects were then classified. There was no attempt to match their subjects on a one-to-one basis with the etiological classification as the single variable, as was done in the present study. Finally, their data were obtained from results of any one of three different tests, the Ferguson Form Boards, the Pintner Patterson or the Arthur, with no attempt made to equate the scores. We used only one test as a measure of performance ability.

These essentially negative results are likewise not in agreement with Wechsler's statement that subjects with organic brain disease generally score higher on the verbal than on the performance tests of the Wechsler-Bellevue scale. However, it must be kept in mind that discrepancy between scores on the Binet and the Arthur are not exactly comparable with that of the verbal and performance quotients of the Wechsler-Bellevue test. Furthermore, there is no method by which the groups can be equated with respect to severity or extent of brain damage. The adult who has been diagnosed as brain-injured is more likely to be handicapped by severe brain damage since finer discriminations can be made in the case of the child. Neurological signs present in childhood may no longer be evident in adulthood. Also, an adult, who sustains a mild brain injury has at his disposal methods of substitution or circumvention which conceal his handi-

cap. These the undeveloped child does not possess, so while he may reveal the behavioral and personality patterns of the exogenous, his actual damage may be so slight that his quantitative test performance may not differ from that of the endogenous.

CONCLUSION

This study, comparing the scores made by carefully matched exogenous and endogenous mentally deficient boys on the Arthur Point Scale has shown no statistically reliable differences. Cognizance is taken of the fact that the experimental groups are small and of the probability that the brain damage in some of the cases is slight. The results are offered, not as a final contribution to our knowledge of the reactions of the brain injured child but as a stimulus for more extensive study and as a warning against indiscriminate use of quantitative test patterns as pathognomonic of brain injury.

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