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By Vinnie Crandall Hicks.
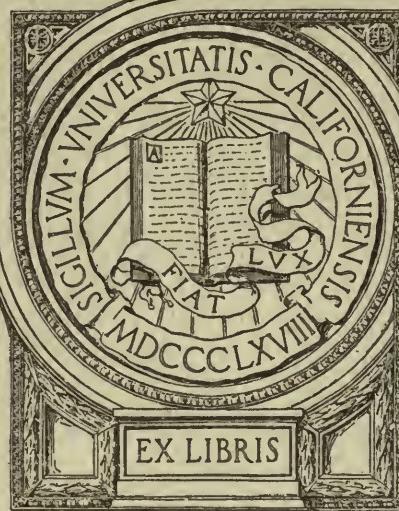
THE VALUE OF THE BINET MENTAL AGE TESTS FOR FIRST GRADE ENTRANTS.

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In May and June of 1913 the entire membership of a certain Oakland kindergarten were given Terman's adaptation of the Binet mental age tests. The purpose was to discover whether there was any correlation possible between such tests and the progress of the subjects during their first year of school. If such tests proved to be prophetic, could they be rendered of service in fitting school entrants to their environment?

The school in which the kindergarten was located was a large school in one of the worst parts of town, where there is a mixture of Portuguese, Italians and colored, where poverty is considerable, and where moral conditions are bad.

The following were the results secured, together with information concerning nationality, families, employment of fathers, etc.:

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TABLE I.

		Mentality.	Nationality.	Father's employment.	Family, etc.
		Age.			
1.	Lawrence P......	5.71 + 1.7	American.	Bridge inspector.	Good.
2.	Lilian McM......	5.6 + 1.59	Irish-American.	Foundry.	Good.
3.	Rosa V..........	5.17 + 1.59	Port. Isl.	Secretary.	
4.	Joe M..........	5.66 + 1.08	Port.	Laborer.	Two older girls subnormal. Poor.
5.	Gladys P........	5.47 + 1.01	Colored.	Porter.	
6.	Frances T.......	6. + .96	Colored.	Cook.	
7.	Agnes F........	5.46 + .42	?	?	
8.	Freda N........	5.97 + .36	German Jew.	?	
9.	Norman C.......	5.15 + .32	?	?	
10.	Dorothy L......	5.5 + .29	Swedish.	Carpenter.	
11.	Manual J.......	5.77 + .08	Syrian.	Storekeeper.	Older children subnormal.
12.	Emily D........	5.46 + .06	?	?	Dirty.
13.	Helen D........	5.92 — .02	Polish.	Carpenter.	
14.	Chas. T.........	5.7 — .23	Austrian.	Butcher.	Older brother quite subnormal.
15.	Cardwell T......	5.33 — .32	Colored.	Porter.	Very bad boy.
16.	Katie V.........	5.93 — .44	Austrian.	Janitor.	
17.	Fulvia V........	4.83 — .55	Italian.	Cannery.	
18.	Robert L........	5.5 — .6	American.	Retired.	
19.	Frances W......	5.51 — .69	?	?	
20.	Dunco M........	5.4 — .93	Austrian.	Car cleaner.	
21.	Mary B.........	5.93 — .98	Italian.	Laborer.	
22.	Ethel G.........	5. — 1.	English.	Father divorced.	Mo. insane; one brother f. m.; one bad.
23.	Angelina F......	7. — 1.28	Italian.	Laborer.	
24.	Catherine P.....	6.6 — 1.36	Unknown.	(Instit. child.)	
25.	Ionella L........	6.54 — 1.49	American.	Railroad clerk.	
26.	Geo. Gardner....	6.84 — 1.6	(See No. 22.)		
27.	Joe P...........	7.17 — 1.87	Port. Isl.	Saloon.	
28.	Manuel F........	7.16 — 1.97	Port. Isl.	Railroad yards.	
29.	August R........	6.3 — 2.	Port. Isl.	Laborer.	
30.	Tony F.........	6.95 — 2.49	Port.	Railroad.	
31.	Joe F...........	6.77 — 3.14	Port.	Carpenter.	
32.	Joe S...........	7.17 — 4.05	Port.	Mo. in cannery.	Poor and dull.
33.	Katherine Van...	7.	Sent to home for f. m.; father insane; brother f. m.		
34.	Lew S..........	6.2	Had not enough English to answer anything, but would have tested above age.		

From the first two columns the mental quotient[1] was computed, as follows:

TABLE II.

1...	1.29	7...	1.07	13...	.99	19...	.87	25...	.77	31...	.53
2...	1.28	8...	1.06	14...	.96	20...	.82	26...	.76	32...	.43
3...	1.30	9...	1.06	15...	.95	21...	.83	27...	.73		
4...	1.19	10...	1.05	16...	.92	22...	.80	28...	.72		
5...	1.18	11...	1.01	17...	.88	23...	.81	29...	.68		
6...	1.16	12...	1.00	18...	.88	24...	.79	30...	.64		

We find that numbers 3 and 23 show a discrepancy with the mental acceleration and retardation in column 3. Number 3 is markedly younger than those just above her, and so her percentage of advance on her actual age is necessarily greater. Similarly, number 23 is much older than the child just above her, and her retardation is less in proportion to her years.

In general, the following facts are noticeable from the original examinations as given in the first three columns:

1.   Out of 34 children, 13 tested mentally above their phys ical age.

2.   Making allowance for foreign birth and poor environment, one may safely say that half of the class were of right mental age or over.

3.   Calculating by the mental quotient, we find that half of the class showed a mental efficiency of over 90 per cent.

4.   If we take all children as normal who tested within one year of their right mental age, we find one-half of the class normal, one-half either below or above normal.

5.   But the one-half above and below are not equally divided. They are in the relation of, above: below::5:12. That is, the distribution of the level of intelligence hardly corresponds with the results of Binet, Bobertag and Goddard. The comparison would be as follows:

TABLE III.

Bobertag	Above	:	below	::	25	:	22	:: 1 :	.88
Goddard	Above	:	below	::	27	:	31.5	:: 1 :	1.17
Binet	Above	:	below	::	21.5	:	27.5	:: 1 :	1.28
Hicks	Above	:	below	::	5	:	12	:: 1 :	2.40

[1]See WILLIAM STERN. *The Psychological Methods of Testing Intelligence.* Baltimore: Warwick & York, 1914.

This discrepancy might arise from the conditions of poverty and wrong living represented in this particular kindergarten class.

6.   Figures on sex agreed with the usual fact of a majority of males among the exceptional. Of 16 boys and 18 girls in the class, 5 boys were mentally in advance of their age, and 8 girls. Of the 12 children more than one year retarded 7 were boys.

7.   Nationality did not seem to be of particular importance. Of the American, 3 were above age (counting number 7 and number 9), and 4 American or English were below. However, there is a larger number of Portuguese represented among the ones far down on the scale, and also a larger number of day laborers.

8.   The limiting age in our kindergartens is supposed to be 6 years. Every child more than 1 year retarded mentally was over 6; and of all the children who were over 6, all but 2 were more than 1 year retarded. One of these two was the Chinese boy who did not speak English, number 34.

9.   At the time of examining it was agreed by teacher and psychologist that number 15 was of the moral imbecile type; that numbers 18, 25, 26, 30, 32 and 33 were feeble-minded, and that number 22 was questionable. The mother of number 18 has probably falsified his age record. Last year he was recorded as 6.5 years, but this year she has dropped a year.

The above were the facts apparent from the first study of the class. Now, a year later, they have been investigated again, to discover just what progress they have made, and whether that progress corresponds with results of last year's examination. The first column gives the child's number; the second, his acceleration or retardation; the third, his present grade; the fourth, the date on which he entered his present grade; the fifth, the date on which, according to his physical age, he should have entered his present grade; the sixth, the teacher's judgment on his progress.

Numbers 12, 19, 22 are eliminated for lack of recent data, and numbers 33 and 34 because the former entered a State institution and the latter did not have English enough to be tested a year ago,—leaving 29 children.

TABLE IV.

No.	Accel.	Grade.	Entered.	Should have entered.	Progress.
1	1.7	1B	Jan. 14	Aug. 14	Good beyond average.
2	1.59	1B	Jan. 13	Aug. 13	Good beyond average. (Has gone to another school.)
3	1.59	Kdg.	Jan. 13	Aug. 13	(Despite high mental rating, this little colored girl has had to remain in kindergarten over a year. She has now barely reached the place where she can progress into 1A—where she belongs by physical age.) A liar.
4	1.08	1A	Jan. 14	Jan. 14	Very slow, but intelligent. Will pass into 1B by giving him special attention.
5	1.01	1A	Jan. 14	Jan. 14	Very slow, but intelligent. Will pass into 1B by giving him special attention.
6	.96	1A	Aug. 13	Aug. 13	Must stay in 1A all this year because of marked lack of application.
7	.42	?			Moved out of town, but entered 1A in August 13, and progressed normally as long as in school.
8	.36	1B	Jan. 14	Jan. 14	Thoroughly good progress.
9	.32	?			Same as No. 7.
10	.29	1A	Jan. 14	Jan. 14	Normal progress, not brilliant.
11	.08	1A	Jan. 14	Jan. 14	Will pass into 1B at end of year only with special help.
12	.06 Ret.	?			(Sent home for pediculosis before Christmas and has never returned. Fair progress while in school.)
13	.02	1B	Mar. 14	Jan. 14	Capable, but pretty slow.
14	.23	1A	Jan. 14	Jan. 14	Normal progress.
15	.32	1A	Jan. 14	Aug. 14	Better behaved. Has made some progress, but cannot pass without special help.
16	.44	1A	Jan. 14	Aug. 13	Irregular. Does poor work. Will not be promoted.
17	.55	Kdg.	Jan. 13	Aug. 13	Has progressed little in kindergarten in 1½ years, but will be promoted to 1A.
18	.6	1A	Jan. 14	Jan. 14	This boy was in the special class for some months in the fall, making little progress. His mother is deeply mortified at his being classed with defectives, so he has been allowed to try 1A work. He has done nothing and cannot possibly be promoted. His real age is probably one year more than indicated, which would change his place on the list from 18 to 26.
19	.69				(Has gone into convent school; no record.)
20	.93	Kdg.	Jan. 13	Jan. 13	Apparently no progress during his first half-year in kindergarten, but this year has done well and will enter 1A.

21	.98	1A	Aug. 13	Aug. 13	Teacher reports normal progress at present, yet she will have spent a year in doing 1A work.
22	1.				Out of school most of this year with Hawaiian itch. The insane mother has little idea of care for the children. While in kindergarten the child was below normal in progress, yet impressed one with the probability of better work if she were in a different environment.)
23	1.28	1A	Aug. 13	Aug. 12	Has been reported as normal and will be promoted in June. But has taken a whole year to do one term's work. According to physical age, she should now be finishing 2B. Parents may have lied about age, making her a year too old. She is very tiny, and this is common with Italians.
24	1.36	1A	Aug. 13	Jan. 13	Less than normal progress even yet. May not leave 1A even in June.
25	1.49				Has been out of school most of time because too feebleminded even to improve by kindergarten instruction.
26	1.6				(See No. 22. This boy is lower grade than No. 22; undoubtedly feebleminded.)
27	1.87	1A	Aug. 13	Aug. 12	Has spent whole year in doing one term's work, and has just a chance of promotion.
28	1.97	1B	Jan. 14	Jan. 13	The only one who tested below mental age who entered the grades regularly and has progressed regularly. He is reported as normal by his teacher.
29	2.	1A	Jan. 14	Aug. 13	This boy has a chance to be promoted this June if his teacher gives him special attention, but not without.
30	2.49	1A	Aug. 13	Aug. 12	Just a bare possibility of his being promoted in June after spending one year doing one term's work. Age?
31	3.14	1A	Aug. 13	Jan. 13	Vocabulary difficulties keep him below grade, yet he will probably be promoted in June, after a year in 1A.
32	4.05	Spec.	Aug. 13	Aug. 12	Undoubtedly feebleminded. Progress poor, yet better than No. 18 while in the special class, and better than would have been at all possible in regular class work.
33					Moral imbecile. Sent to State home for feebleminded as impossible.
34	?	1A	Jan. 14	Aug. 13	Perfectly normal progress since he acquired enough English to get along.

TABLE V.

In the following table are given the dates at which each child by physical age should have entered 1A, 1B and 2A; the dates at which he should have done so according to mental age, and the dates at which he actually did so:

No.	Dates of entering 1A, 1B, 2A by physical age.	By mental age.	Actual dates of entering.
1.	Jan. 14—Aug. 14—Jan. 15	Jan. 12—Aug. 12—Jan. 13	Aug. 13—Jan. 14—Aug. 14
2.	Jan. 14—Aug. 14—Jan. 15	Aug. 12—Jan. 13—Aug. 13	Aug. 13—Jan. 14—Aug. 14
3.	Aug. 14—Jan. 15—Aug. 15	Jan. 13—Aug. 13—Jan. 14	Aug. 14
4.	Jan. 14—Aug. 14—Jan. 15	Jan. 13—Aug. 13—Jan. 14	Jan. 14—Aug. 14 (spec. help)
5.	Jan. 14—Aug. 14—Jan. 15	Jan. 13—Aug. 13—Jan. 14	Jan. 14—Aug. 14 (spec. help)
6.	Aug. 13—Jan. 14—Aug. 14	Aug. 12—Jan. 13—Aug. 13	Aug. 13—Aug. 14
7.	Jan. 14—Aug. 14—Jan. 15	Aug. 13—Jan. 14—Aug. 14	Aug. 13—Jan. 14—Aug. 14
8.	Aug. 13—Jan. 14—Aug. 14	Jan. 13—Aug. 13—Jan. 14	Aug. 13—Jan. 14—Aug. 14
9.	Aug. 14—Jan. 15—Aug. 15	Jan. 14—Aug. 14—Jan. 15	Aug. 13—Jan. 14—Aug. 14
10.	Jan. 14—Aug. 14—Jan. 15	Jan. 14—Aug. 14—Jan. 15	Jan. 14—Aug. 14
11.	Jan. 14—Aug. 14—Jan. 15	Aug. 13—Jan. 14—Aug. 14	Jan. 14—Aug. 14 (spec. help)
12.	Jan. 14—Aug. 14—Jan. 15	Jan. 14—Aug. 14—Jan. 15	?
13.	Aug. 13—Jan. 14—Aug. 14	Aug. 13—Jan. 14—Aug. 14	Aug. 13—Mar. 14
14.	Jan. 14—Aug. 14—Jan. 15	Jan. 14—Aug. 14—Jan. 15	Jan. 14—Aug. 14
15.	Jan. 14—Aug. 14—Jan. 15	Aug. 14—Jan. 15—Aug. 15	Jan. 14—Aug. 14 (spec. help)
16.	Jan. 14—Aug. 14—Jan. 15	Jan. 14—Aug. 14—Jan. 15	Jan. 14
17.	Aug. 14—Jan. 15—Aug. 15	Aug. 15—Jan. 16—Aug. 16	Aug. 14
18.	Jan. 14—Aug. 14—Jan. 15	Aug. 14—Jan. 15—Aug. 15	Jan. 14 X (Institutional)
19.	Jan. 14—Aug. 14—Jan. 15	Aug. 14—Jan. 15—Aug. 15	?
20.	Jan. 14—Aug. 14—Jan. 15	Jan. 15—Aug. 15—Jan. 16	Aug. 14
21.	Aug. 13—Jan. 14—Aug. 14	Aug. 14—Jan. 15—Aug. 15	Aug. 13—Aug. 14
22.	Aug. 14—Jan. 15—Aug. 15	Aug. 15—Jan. 16—Aug. 16	?
23.	Aug. 12—Jan. 13—Aug. 13	Jan. 14—Aug. 14—Jan. 15	Aug. 13—Aug. 14
24.	Jan. 13—Aug. 13—Jan. 14	Aug. 14—Jan. 15—Aug. 15	Aug. 13—Aug. 14 (spec. help)
25.	Jan. 13—Aug. 13—Jan. 14	Aug. 14—Jan. 15—Aug. 15	? X
26.	Aug. 12—Jan. 13—Aug. 13	Aug. 14—Jan. 15—Aug. 15	Aug. 13 X ?
27.	Aug. 12—Jan. 13—Aug. 13	Aug. 14—Jan. 15—Aug. 15	Aug. 13—Aug. 14 (spec. help)
28.	Aug. 12—Jan. 13—Aug. 13	Aug. 14—Jan. 15—Aug. 15	Aug. 13—Jan. 14—Aug. 14
29.	Aug. 13—Jan. 14—Aug. 14	Aug. 15—Jan. 16—Aug. 16	Jan. 14—Aug. 14 (spec. help)
30.	Aug. 12—Jan. 13—Aug. 13	Jan. 15—Aug. 15—Jan. 16	Aug. 13—Aug. 14 (spec. help)
31.	Jan. 13—Aug. 13—Jan. 14	Jan. 16—Aug. 16—Jan. 17	Aug. 13—Aug. 14
32.	Aug. 12—Jan. 13—Aug. 13	Aug. 16—Jan. 17—Aug. 17	Aug. 13 X
33.	Aug. 12—Jan. 13—Aug. 13	X	X
34.	Aug. 13—Jan. 14—Aug. 14	?	Jan. 14—Aug. 14

TABLE VI.—SUMMARY.

			Normal.	Slow—not ret.	Retarded.	Failed.
Entered at right physical age 13	By mental age should have entered	Before 6	2	3	1	0
		Same 3	2	1	0	0
		After 4	1	1	1	1
Entered at right mental age 5	By physical age should have entered	Before 1	0	0	0	1
		Same 3	2	1	0	0
		After 1	1	0	0	0
Entered at neither right physical nor mental age 14	Entered between mental and physical age 13		5	1	5	3
	Entered before either mental or physical age 1		1			

The header "—Progress.—" spans Normal, Slow—not ret.

Calculating these figures in per cents., it appears that:

TABLE VII.

	Normal progress. Per cent.	Less than normal progress. Per cent.
Entering at right physical age................	37 6/13	62 7/13
Entering at right mental age.................	60	40
Entering at neither age.....................	35 5/7	64 2/7
And of the whole class.....................	44 24/29	55 5/29

A few facts may be gleaned even from these small numbers. It is apparent that when an entrant into first grade does not correspond either mentally or physically with the commonly accepted age of 6 years, his chances of normal progress are about as 1:2. If he enters at the right physical age, his chances are not greatly increased, whereas if he enters at the right mental age his chances are as 3:2. (The only child of this group who failed is number 16, a case of great irregularity of attendance.)

Suppose, for the sake of the argument, that this class of 34 children had been divided according to the judgment of the examining psychologist and the teacher and given such training as they seemed to demand. Then in August of 1913 there would have entered the grades (1A) the following: numbers 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14. Under ideal conditions the following would have been sent to institutions for the feeble-minded: numbers 25, 26, 32, 33. Numbers 3, 17, 20, 22 would have remained in kindergarten. Numbers 15, 16, 18, 19, 21, 23, 24, 27, 28, 29, 30, 31, 34 would have been put into a special class.

If this plan had been followed, certain errors would have developed. Six out of the 13 would not have been able to make the progress expected of them when they were allowed to enter first grade. Of those relegated to kindergarten, the year's experience has proved that all were wise choices. There can have been no question about the feeble-minded, though so far only 1 has been sent. Now, of the children designated for the special class, 28 and 34 would soon have shown that they could carry grade work, language difficulties being overcome, and would have been placed in first grade without any retardation. Of the others, there would have been a good chance that the stimulation of a special class would have made nearly normal progress possible for numbers 16, 21, 23, with a fighting chance for number 31. The others may need special class work for a long time to come.

Let us compute the comparative expense of the ideal plan for this past year and the one actually followed. Suppose that the unit expense of a child in a regular class is 1/42. There were 13 cases of taking double time for a term's work, or 13/42. With an attendance of 14 in the special class, the unit

of expense is 1/14. There would have been an average of 9/14 for the year. Roughly, the expense for the first plan would have been about one-half that of the ideal condition. But this does not take into account the frequency of extra help to those who went into the regular classes. This was recorded by teachers for 13 cases. All of such extra assistance must be calculated as taking just so much of the teacher's time and energy from the average pupils, and has a money value which is no less real because it is hard to compute.

Now, the actual distribution at the present time is as follows:

Class A (1B)—Numbers 1, 6, 8, 13, 28. (Moved, but of same progress—numbers 2, 7, 9.)

Class B (1A)—Numbers 4, 5, 10, 11, 14, 15, 29, 34.

Class C (1A)—Numbers 16, 18, 21, 23, 24, 27, 30, 31 (and in this same class is another group of subnormals who do not appear in the kindergarten list, so that the teacher is actually endeavoring to teach nearly three times as many subnormals as would be placed in a special class, and mixed in with a few normal children as well).

Class D (Kdg.)—Numbers 3, 17, 20.

Institution—Number 33.

Special class—Number 32.

Out of school—Numbers 12, 22, 25, 26, 19.

CONCLUSIONS.

1. The school examined is marked by unusual conditions of mental deficiency of varying degrees.

2. The Binet tests given to entrants to first grade would not result in any unjust labeling of them as mental defectives.

3. The most evident fault of the tests if used as prognosticative of school progress is over-optimism.

4. The chief value of giving the tests would be in having them productive of proper distribution of entrants according to ability, into regular classes, classes for the slow but intelligent, special classes for subnormal, expulsion for feeble-minded.

5. Where such considerable mental deficiency is found among first grade entrants, the school curriculum should be elastic, and should contain much industrial training, coupled with effort to reach the school children socially.