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CHILD PSYCHOLOGY AND THE NEW EDUCATION

A STUDY

IN INDIVIDUAL DIFFERENCES IN CHILDREN

AND THEIR EFFECTS ON

SCHOOL

ADMINISTRATION

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An efficient system of public instruction must take into account the mental, moral, and physical differences of children. These differences are far more pronounced than one who has not investigated the subject would believe. One of the most harmful popular fallacies is "all men are created equal." Yet it seems that the educational system of our country has been founded on this assumption. As a matter of fact, there is no sense in which all men, or any two men for that matter, are equal. Every individual is the product of two fundamental factors - heredity and environment. From the nature of the case these can never be the same at any two periods in the lives of forebears or offspring, consequently no two men can be equal intellectually, morally, or physically.

Realizing the importance of this truth, the author has conducted an extensive series of tests in his school consisting of pupils ranging from eight to twenty years of age. These tests involve reason, judgment, memory, perception, rapidity of forming concepts, rapidity of muscular co-ordination, variety of interest in the things of life, etc.

The results should be of much interest to all students of education.

Test No. 1.

This test was given to measure the rapidity of the formation of concepts of numbers in simple addition. Twenty problems of two or three figures each were written on prepared sheets and handed to the pupils. The following will serve as a sample: 486 413 what?

40 pupils three minutes 5th grade

1 pupil	solved	5	problems	correctly
2 pupils	"	6	"	"
3 "	"	9	"	"
8 "	"	10	"	"
5 "	"	12	"	"
4 "	"	13	"	"
6 "	"	15	"	"
5 "	"	16	"	"
4 "	"	18	"	"
2 "	"	20	"	"

Observations. Average number of problems solved by the class, about 12. Two pupils solved nearly twice the class average; three pupils fell below half the class average; two pupils did more than four times the amount of work that was done by three other members of the class. In this test the girls did better work than the boys. The poorest work in the above test was done by a boy over age for his class.

Test No. 2.

This test was similar to the first except it involved problems in both addition and multiplication. The problems were more difficult as the class was more advanced.

35 pupils three minutes 7th grade

1 pupil	solved	4	problems	correctly
2 pupils	"	5	"	"
1 pupil	"	6	"	"
6 pupils	"	9	"	"
4 "	"	10	"	"

Test No. 2.

5 pupils	solved	12	problems	correctly
2 "	"	13	"	"
4 "	"	15	"	"
5 "	"	16	"	"
2 "	"	18	"	"
1 pupil	"	19	"	"
2 pupils	"	20	"	"

Observations. Two members solved five times as many as one member, and four times as many as three members; half the class solved twice as many as the other half. All problems with errors were thrown out. Test taxed the utmost capacity of the class. Many of the differences noted were due to native powers of mind; others, however, were plainly traceable to the habits, training and interest of the pupils.

Test No. 3.

This test was given to ascertain the rapidity of muscular movements, or rather, the muscular co-ordination of the arm in making simple marks such as a cross, letter or figure.

43 pupils	three-fourths minute	4th grade
1 pupil	made 16 crosses	
3 pupils	" 21 "	
1 pupil	" 27 "	
2 pupils	" 30 "	
1 pupil	" 32 "	
4 pupils	" 35 "	
6 "	" 37 "	
7 "	" 42 "	
5 "	" 45 "	
3 "	" 51 "	
1 pupil	" 52 "	
3 pupils	" 60 "	
2 "	" 62 "	
1 pupil	" 63 "	
2 pupils	" 69 "	
1 pupil	" 70 "	

Observation. It will be seen that the average for the class is about 40. The lowest was 16, made by a boy very slow in all bodily and mental movements, taking him two years to complete a grade. A test of this kind reveals

the absurdity of a teacher requiring the same amount of written work from each pupil in the same class in the same length of time. It is not unusual for one pupil to do twice as much written work as another. The girls received a little higher average in this test than the boys.

Test No. 4.

This test was given to determine the time necessary to perform the mechanics of pronunciation and to get the thought from the printed page. The time required for reading a printed page of an ordinary book intelligently, first aloud, then silently, was carefully noted. Twenty pupils tested.

	Time in seconds		difference
	Reading aloud	reading silently	
Boy	170	150	20
Girl	166	148	18
Boy	160	140	20
Boy	148	108	40
Girl	143	125	18
Boy	128	101	27
Boy	122	116	6
Girl	117	95	22
Girl	115	94	21
Girl	112	75	37
Boy	110	80	30
Girl	109	78	31
Boy	104	65	39
Boy	101	68	33
Girl	97	66	31
Girl	95	54	41
Girl	91	48	43
Boy	90	50	40
Girl	88	46	42
Boy	83	45	38

Observations. No. difference of any consequence is noticed between the boys and girls. Where there is little difference between the times, it is evident that the reader goes through about the same mechanical process whether the reading is done aloud or not. By observing the column of differences, those who imaged the thought can be readily

pointed out. They read silently in about half of the time required for oral reading. It will also be observed they are the fastest oral readers. A 6th grade class.

Test No. 5.

This test was given to a 6th grade class to determine their ability to notice mis-spelled words. A mimeographed type-written copy containing words spelled both correctly and incorrectly was placed in the hands of the class with directions to mark each mis-spelled word.

37 pupils fifteen minutes

1	pupil noticed	19	mis-spelled words	
6	pupils noticed	20 to 24	mis-spelled words	
5	"	"	25 to 29	" "
8	"	"	30 to 34	" "
7	"	"	35 " 39	" "
3	"	"	40 " 44	" "
2	"	"	45 " 49	" "
2	"	"	50 " 54	" "
1	"	"	55 " 59	" "
2	"	"	60 " 64	" "

Observations. The results of the above test are grouped in fours for brevity. The test not only involves a knowledge of spelling but it determines visualizing power as well. Two pupils noticed about four times as many mis-spelled words as one other, and three times as many as three others. The last three detected every misspelled word. The average for the class was a little less than half of the mis-spelled words.

Test No. 6.

This test was given to determine the ability of children in different grades to write words of opposite meaning. A list of 20 words was given each class with instructions to write opposite each word its antonym.

4th Grade list - ten minutes 6th grade list - ten minutes

cold	narrow	properly	moving
true	living	something	natural
light	little	obey	contract
large	busy	learn	noble
slow	earliest	win	same
right	down	bought	neat
noisy	sharp	correct	much
high	best	love	everyday
bright	asleep	general	careful
weak	clear	add	assert

Results:

Lowest 13

Highest 20

Average 16

Results:

Lowest 12

Highest 20

Average 16

Test No. 7.

This test was given to a second-year high school class in English history to determine logical memory. The two parts were dictated to the class separately, no one being permitted to write before the close of the reading. Selection as follows:

"In many respects the civilization of the East was far superior and in advance of that of the West. One result of the Crusades was to open the eyes of Europe to this fact. When Richard and his followers set out they looked upon the Mohammedans as barbarians; before they returned, many were ready to acknowledge that the barbarians were chiefly among themselves.

"At this time England had few Latin and no Greek scholars. The Arabians, however, had long been familiar with the classics, and had translated them into their own tongue. From the teachers of the East England not only got her first knowledge of Plato and Aristotle, but also from them came arithmetic, algebra, geometry, and astronomy."

This is the best paper received.

"The Eastern civilization in many ways was better than that in the west. The Crusades opened the eyes of Europe to this. Richard looked upon the Mohammedans as barbarians, but before they came back he thought they must be the barbarians themselves.

"At this time England had no Latin and Greek scholars, but the Arabians had some knowledge of the classics. From them England received her knowledge of arithmetic, Algebra, and Geometry, and also got her first knowledge of Plato." This is perhaps the worst paper received.

"The east had more civilization than the west had. Richard found this out when he got there. The mohamedans are the people over there.

"England had no schools then and got arithmetic algebra and some other books over there. It done England good."

A study of these two papers reveals the fact that the first contains nearly every thought found in the dictation. Its author is probably the best student in his class. He possesses a very strong, logical mind. The second paper shows confusion of thought. The dictation left no clear ideas in the student's mind. It also shows mistakes in spelling and the use of English.

These two papers represent the extremes. The average paper approached the best rather than the worst.

Similar tests were given to lower grades, and in each test the results showed the widest range of ability.

Test No. 8.

This test was given to determine the reasoning power of a first-year high school class of about twenty-five students. Two papers, - the best and the worst, - have been selected and placed side by side for comparison. There was no time limit.

1. If money were more plentiful, would people need to work so hard to make a living? Explain.

(A) I do not think it would make much difference. People can not live off of money, only from what they can buy with it and we would have to work to get the money anyhow. If money were more plentiful things would likely be higher.

(B) No not so much for they would have plenty of money without work.

2. Is it true that the more a child eats the more it grows?

(A) No. It might eat too much, become sick and not grow at all. Of course it must eat enough to live.

(B) Yes because it has to eat to grow.

3. If two plus two make six, what would three plus three make?

(A) If two and two make six then two must equal three. If two equals three, then three would equal four and one-half; then three and three equals nine.

(B) If 2 plus 2 equals six it would be too much by 2. Then the three and three with the 2 added in make 8.

4. Does the scarcity of anything always make it worth more? Explain your answer.

(A) I think it does. At least I can't think

of anything but what costs more if it becomes scarce.

(B) Yes for diamonds are scarce and cost a whole lot.

5. A certain lawmaker is reported to have said,—"The more laws we have the less crime will be committed." Was he right or wrong? Why?

(A) I do not think that laws have much to do with making crimes or keeping people from crimes. Besides most of the laws deal with other things and do not have anything to do with crimes, so I think the lawyer was wrong.

(B) Yes, laws keep people from doing bad things and the more laws the better we are off.

6. Which could we more safely dispense with, school-houses or battle-ships? Could we have either without the other?

(A) Battle-ships. People did not have battle-ships before the school-houses were built. They had to know how to build them first and we have to have schools and colleges to learn how to make them. The schools are older than the battle-ships, but we could not have the battle-ships without any schools to learn to make them.

(B) Battle-ships. I don't know the rest.

7. Does whipping help a child to tell right from wrong?

(A) No. after he had done wrong it might help him not to do wrong again. Most teachers think so anyway. Sometimes it does good and sometimes it don't.

(B) Yes or they would not whip them.

8. A boy has little talent for arithmetic but much talent for history, should he study arithmetic more and history less? why?

(A) We all ought to know our arithmetic. So I think he should work more at his arithmetic and less at his history. He would not know how to run a business if he had no arithmetic. It is not a better study than arithmetic.

(B) No answer.

9. (1) Are all men either good or bad? (2) Tall or short?

(A) (1) Yes. (2) No, for some might be neither short nor tall.

(B) (1) Yes. (2) Yes.

10. Would people be religious if we had no churches or preachers?

(A) No, they would not know anything about religion if they never heard anything about it. That is what missionaries go to heathen countries for.

(B) No.

Test No. 9.

This test was given to determine the things most interesting to a class of children nine years old. The class was asked to make careful drawings of two things they liked or had interest in. The exercise also affords a study of the mode of expression.

32 pupils

no time limit

4th grade

Animals	29per cent	Drawings were made of horses, cows, dogs, sled, strings of beads, dolls, gun, hatchet, baby-sister, rubber boots, etc.
Flowers	17per cent	
Fruit	11 per cent	
Birds	10 per cent	
Dolls	8 per cent	
House	2 per cent	

Observations.

As a test in interest the exercise may be said to represent fairly well the natural interests of children. Animals head the list, followed by flowers, fruits, and birds in the order named. The mention of individual things as hatchet, gun, etc., show individual likes rather than interests, although a boy may have great interest in such things at certain times. As a study in expression the drawings showed that about 15 per cent of the class attempted to express the thought only; the remainder used ornamentation.

Test No. 10.

As a further test in interest, the following list of things was submitted to a high school class with directions to mark their first choice (1), second choice (2), etc.

Go skating	Play games
Attend a party	Accept an invitation to dinner
Wear nice clothes	Do some useful work
Read a book	Rest in easy chair
Attend school	Travel
Listen to music	Stroll through woods.

The following table shows the results of two selections - the poorest and the best - although the selections were not easily made. The poorest list occurs first with figures before to show the order of interest; the best with figures following to show the same.

1 Attend a party 12	7 Wear nice clothes 10
2 Dinner invitation 8	8 Listen to music 5
3 Play games 3	9 Travel 6
4 Rest on couch 9	10 Attend school 1
5 Go skating 7	11 Do useful work 2
6 Read good book 4	12 Stroll through woods 11

Observations.

A study of this table reveals two individuals almost opposite in desires and interests. We might draw a picture of the first somewhat as follows: she (for it was a girl) likes to go to a party, eat dainty lunches, play cards, rest on a couch reading a light love story, dressed in fine apparel. Attending school or doing some useful work were outside of her sphere.

The other student may be thought of as one who likes to attend school, does his work well, enjoys out-of-door sports, delights in reading good books or hearing good music, would enjoy traveling and a good meal after work.

Test No. 11.

This test in interest was made on a class of high school students. Each one was supplied with a magazine, as *Cosmopolitan*, *American*, etc., with the direction to study the advertising pages rather carefully for half an hour or more, passing by all advertisements in which they had no interest, and noting more closely those in which they had some interest. The magazines were then put aside and lists of advertisements of most interest were recorded.

Selected lists are given, two from girls and two from boys. They represent extremes.

Test in interest in commercial product, etc.

Girls list.

Poorest

The Angeleus Pianos
 Sorosis Shoes
 Gorham's Bon-Bon Spoons
 Congress Playing Cards
 Eastman Kodaks
 Ostermoor Mattresses

Best

Automatic Vacuum cleaners
 Vose Pianos
 Oliver Typewriters
 Libby Cut Glass
 Ladies Home Journal
 Lessons in China Painting Free

Girls' list (continued)

Poorest

Pompeian Massage Cream
 Sam Jones's Widow Ad.
 Felt Romeo Slippers
 Lowney's Chocolates

Best

Roger's Silverware
 Heinz's Pickles
 Rubyfoam & Beautiful Teeth
 Old Carpets Make New Rugs.

Boys' list

Poorest

Franklin Automobiles
 Regal Shoes
 Winslow's Skates
 California Limited Train
 Ward's Safety Razors
 Winchester Rifles
 Stein Block Clothes
 Congress Playing Cards
 Ed Pinaud's Hair Tonic
 Tiffany Jewelry & Diamonds

Best

Gunn's Sectional Book Cases
 Underwood Typewriters
 Banking by Mail
 Packard Automobiles
 Waterman Fountain Pens
 200 Eggs Per Hen Per Year
 International Correspondence School
 Nature Color Photography
 Hart, Schaffner & Marks Clothes
 37 cts a Day Buys a Home in Fla.

Observations.

A study of the above lists clearly indicates a marked distinction between the interests of boys and girls. The difference is so wide as not to have much in common, at least as far as this test applies. Furthermore the articles selected represent such a wide difference, indicating to some extent the natural desires and characteristics of the individual, that they may be taken as a fair guide of the student's attitude toward life.

The list of the first girl is evidently that of a pleasure seeker, somewhat characteristic of the modern society girl. Her father is in somewhat comfortable circumstances and the family spends the summer at the sea. The list of the second girl would indicate a much more matter-of-fact and dependable individual. This conclusion tabs with the facts in the case. She is one of the strongest characters in the school, a hard worker and a young lady who will make her mark in life.

The same conclusion could be made in the boys' case.

Test No. 12.

The following table gives the examination grades of our high school for the first semester of the year 1910. The highest and lowest grades of each class are given.

Subject	Grades in Percent	Subject	Grades in Percent
1st Year Latin	98 - 25	Physics	90 - 55
1st " Eng.	96 - 14	Solid Geometry	98 - 60
Phys. Geo.	92 - 49	Plane "	90 - 16
Caesar	95 - 50	Civics	88 - 40
Cicero	92 - 75	1st Year Alg.	100 - 37
Ancient Hist.	94 - 31	2nd " "	90 - 57
Physiology	100 - 65	Comp. & Rhet.	95 - 60
English Lit.	93 - 60	American Lit.	90 - 50

Observations.

The results shown in this table are a fitting climax to the argument presented in this Thesis - that children possess widely different innate capabilities and tendencies, - and that they live in extremely different environments, and that these are the determining factors of their social life and attitude toward education. Any attempt, therefore, to compel them to conform to any set scheme of instruction must end in failure.

This, then, is the greatest problem of the educational world of today - How can we best reach the individual student and administer to his best needs? Not only what plan or system of classification and promotion, but what kind of instruction will meet the specific requirements of each student?

Up to the present time there has been a notorious waste of time and energy in education due in a large measure to the fact that we have not sufficiently considered the individual differences in children. According to a so-called plan long in vogue children began school at the age of six; bright, mediocre, and dull were classed together; annual or semi-

annual promotions prevailed; rarely was a pupil permitted to make two grades in one year; those failing in one or more branches were required to take the whole year's work over; a certain state course of study was pursued by all without serious consideration of its adaptability to any; "the child must yield to the system."

These strange customs are due to a number of causes chief among which are the nature of the origin of our public school system, and financial economy. But happily we approach the time when public instruction will be measured by training for individual efficiency, and not by tradition or gold. Pupils will be grouped into classes according to their ability and interest in the affairs of life; no barriers will be thrown about them; the course of study will be automatically flexible; "the system will yield to the child."