AN OBSERVATION OF THE GESELL DEVELOPMENTAL EXAMINATION AS AN INSTRUMENT FOR DETERMINING PROPER SCHOOL PLACEMENT

by

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CHAPTER I

INTRODUCTION

Education as a distinct entity grew out of the realization of a need for help in developing the whole person. The history of education describes the many tangents educators have taken from then to now: the agreements and disagreements; the changing emphases; the ebb and flow of ideas, occasionally seeming to obscure the fundamental person in education, the child.

The writer of this paper made the assumption that the primary objective of education was to discover some unifying method of viewing the child as a whole and to strive to develop methods which would allow each individual child to gain the most possible from his school experience.

The background material for this paper was based on studies made by the Gesell Institute of Child Development and related literature on school readiness behavior which consider the growth stages and capacity of the individual child the most important factor for educational consideration.

This study was concerned with the reading achievement test scores of first grade children in two Montana schools. The groups were from similar socio-economic backgrounds and were composed of children judged ready, questionably ready and unready on the basis of behavorial age ratings (the age at which they were performing) of the Gesell Developmental Examination.

The data consisted of test scores obtained from three sources: the Gesell Developmental Examination given to forty-eight children ranging in age from six to two and six to four prior to entering the first grade; the Metropolitan Readiness Test (Form B), administered October 30, 1968; and the Metropolitan Achievement Test (Primary Battery) given May 7, 1969.

The writer of this paper recorded and compared the results of a nine month's study of two first grade classes. The members of these classes were given the Gesell Developmental Examination and on the basis of the results were classified as ready, questionably ready, or not ready for the first grade. The Metropolitan Readiness Test was included in the study because it was already a part of the school testing program. It was correlated with the ratings of the Gesell Developmental Examination to discover, if any, their areas of agreement. The Metropolitan Achievement Test was used at the end of the school year as a basis for comparison.

The writer hoped to further the cause of the investigation of developmental age as an important factor in the learning process and to observe the usefulness of the Gesell Developmental Examination as an instrument for indicating that development.

CHAPTER II

REVIEW OF RELATED RESEARCH

Our Democratic form of government, frequent changes in the pattern of our economy, child labor and school attendance legislation, an increasing stress on the value of education, and the population explosion of the past decades represent but a casual summation of factors which have made education one of the biggest of businesses. The expanding school population has brought with it not only the need for more classrooms, better facilities, increased numbers of educational personnel, and improved curriculums; but also a greater proportion of school failures. Another aspect of the current preoccupation with education has been the diverse and extensive research conducted on all fronts.

One aspect of this research considered the concept of development--the idea that growth and development were gradual and continuous and sequential, and that developmental stages occurred in a fairly orderly pattern.

Four different lines of development were considered (physical growth, social growth, emotional growth, and mental growth) of which physical growth has been probably the most adequately traced.

Central to the idea of physical maturation was the observation of a pattern of fairly orderly change in behavior, independent of exercise and training because it was internally regulated.

Evidence also indicated that the rate of physical development was cyclic in nature and manifested itself in periodic acceleration, plateaus,

and retardations. These changes occurred in cycles of a fairly long duration rather than within definite years and had importance for gauging the expectations of physical attainments.

They acquired a greater significance when seen in the light of the fact that the rate and variations in physical development often were accompanied by variations in social, emotional, and intellectual development and, in a sense, determined which social and emotional adjustments could take place or were prevented from taking place.

Taba stated that

> "the patterns discovered in physical maturation have served as models for the concept of developmental sequence in in all other areas. Even though the sequences in social, emotional, and mental gowth have been studied less thoroughly, it is assumed that all growth and development (a) follows a sequence, (b) proceeds from less mature to more mature, (c) is cyclical, and (d) is organismic." (8:89)*

Olsen and Hughes described the organismic age as a "going togetherness" of physical growth and the other aspects of development. (6)

In the middle of the 1950's Dr. Arnold Gesell of the Yale Clinic of Child Development began observing and recording on film the behavior of thousands of children as they grew from infancy to ten years of age. Dr. Gesell and his staff documented the basic discovery that behavior developed in as patterned and predictable a way as did the physical organism itself. There were definite behavior patterns which could be expected at each age level.

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* Numbers in parentheses refer to numbered references in the bibliography; those after the colon are page numbers.

While the influential contributions of psychology to education did not answer directly how a child should be educated, it nevertheless provided a basis for determining what kind of education and training was desirable.

Gesell believed that after the preschool child came upon the education scene he attained vastly increased social stature. He said

> "...It would be a misforturne if in an uncritical way we attempted to apply to him the same short-cut psychometric methods which have proved none too adequate for the educational classification and guidance of children of school age. Over-simplified methods of mental measurements rest too heavily on a concept of general intelligence. They can not do justice to the rich variety of individualities and the diverse growth characteristics of children from 1 to 5 years of age." (3:28)

What had been termed an intelligence test did not and could not attempt to measure a child's level of maturity. A child who was of clearly superior intelligence yet was obviously behind his age mates in either physical or behavioral maturity had frequently been observed. This situation was found to occur often, particularly in boys. Gesell coined the term "superiorimmature", which indicated that a child was well above average intelligence but below average in behavorial maturity. (3)

These observations obligated us to seek a better appreciation of the ways in which individual preschool children matured. Neither age nor intelligence were adequate criteria of the correct time for a child to enter school.

Educators recognized the problem to a degree and became more concerned about a measuring instrument that would assess a child's readiness. Out of this concern came the readiness tests--most of them emphsizing a readiness

for reading such as the Metropolitan test which has been used extensively with a fair amount of success.

Gesell's awareness of this and his painstaking research resulted in the developmental examination. This was not so much concerned with the general ability of the child as with the relationship of several specific maturing abilities and the pattern of his individuality as reflected in his past history and his present status.

> "The total child ceased to be an academic abstraction as soon as we tried to ascertain the grouping of his behavior traits and the trends of his growth career.
>
> "As soon as the developmental examination is regarded in this broader light, it is no longer confined to the sharp and narrow grooves of mental scoring. It becomes a many-sided expedient for observing the facets of the child's personality, the modes and manners of his responses, his general demeanor, and his adjustments to the social demands of the entire situation." (3:43)

Observations and Experimentation

The utility of the developmental examination for estimating and predicting maturity was based on the assumption that the development course was consistent, one stage following the other in natural sequence. This was true only when the child had a normal physical and mental endowment and had had adequate opportunities for normal experiences.

It was still common in school to expect precocity in intellectual mastery, emotional control, and social conduct because of precocity in physical development. These expectations played havoc with an individual's self-concept and adjustment.

The fact was, of course, that no individual developed evenly. Some youngsters were physically mature but lacked a corresponding social and psychological maturity. Others combined a well-developed intellectual capacity with childish feelings and immature social behavior. This unevenness became a source of additional difficulty when the child was surrounded by cultural expectations which assumed an even development.

The interrelationships among the several aspects of growth were many, and during growth the pattern could shift. In the primary school intellectual maturity depended in part on the child's ability to read which in turn depended on the proper functioning of the eye, an indicator of physical maturation. Many intellectual tasks required an ability to concentrate which was controlled by emotional maturity. Erickson has pointed out that achieving any culturally valued capacity or performance also enhances the individual's self-esteem and ego-identity. Thus a child who can walk or read acquires a different cultural status than one who can not do these things. (1: Chap. 7)

It is evident that mental growth affects emotional development since we have determined that emotional factors facilitate or block such mental activities as language and reasoning. When physical changes are unusually delayed or occur unusually early, the individual is likely to find himself socially out of step with his fellows. This affected emotional maturity and in turn intellectual functioning. Taba said that in any group situation in school the inability to control one's temper is sure to reflect on a student's ability to read in groups and to block his functioning in other settings which require social contact.

Late and early maturers behave as they do partly because of other people's expectations of them and their responses to these expectations. In many ways physical development affects emotional reactions because of the meaning the culture gives to particular aspects of physical maturity. (8)

Spitz believes that while physical maturity is a kind of pace setter, one can also note the reverse relationships. Mind influences the body, but the body also influences the mind. Emotional disturbances retard physical development. "Children in an institution in which they were cared for by their mothers and received love and emotional support showed different rates of physical development than did the children in another institution where they were under the care of overworked nurses." (8:18)

Gerard reiterated this thinking, saying that psychosomatic medicine showed that one's health could be affected by one's emotional state, and vice versa. (2)

Even in the face of this type of evidence some schools tended to disregard both the individual rate of growth and the unique constellations of factors operating in the progress of any individual child.

Generally the idea of sequential development had a salutary effect on curriculum. Educators were alerted to the fact that certain minimum levels of maturity were necessary before certain subjects could be taught with reasonable success and efficiency. While this was an acknowledged improvement over past thinking, the evidence is that the timing of appearance of the stages of development from child to child was ignored.

Hilgard states the chief principles of readiness and pacing, among which are the following:

> "1. Skills that build upon developing behavior are most easily learned. Thus it is difficult to master reading as a mechanical act ahead of a certain level of coordination.
>
> "2. The more mature the organism, the less training is needed to reach a given level of proficiency, at least in periods of high growth. Many experiments have shown that older children gain faster with the same amount of directed practice. Children who are taught to read when they are ready to read will read more books than those who are not ready. Those who are ready to do arithmetic problems solve more problems than those who are not.
>
> "3. Training given before the maturational readiness may bring either no improvement or only temporary improvement. Premature training often results in less of skill. Children fall back into the level natural for their development, as experiments with training children to cut with scissors, to recite digits, or to maintain balance have shown.
>
> "4. Premature training, if frustrating, may do more harm than good. A child exposed too early to an activity may lose his natural enthusiasm for it." (4:60-63)

Learning, to be effective, required effective pacing as experiences needed to be in line with developmental sequence. If the learning tasks were beyond the child's capacity to grasp or called for skill and motivation which his physical or emotional development could not support, effective cooperation on his part could not be expected.

Our units of evaluation were defined in static phrases such as age level, I.Q., or grade norms. It is relatively easy to determine a level of academic achievement at a given moment. It is much more difficult to assess what an individual can do in the light of his previous experience

and to fit the information about achievement into an historical or psychological perspective which takes into account his developmental sequence and timing.

Taba agreed that "...our age patterned curriculum with its uniform requirements often failed to accommodate persons whose developmental cycles defined them as slow maturers and those who were late in starting but who accelerate rapidly after they had started."

She added that this failure to provide a greater allowance for variations in the developmental cycles has increased the phenomenon of retardation.

> "Branding as retarded individuals who are only temporarily so actually causes those individuals to remain retarded. The current emphasis on ability grouping even in the early elementary years means that incorrect but irrevocable curriculum decisions may be made for children whose developmental cycles deviate from the so-called normal." (8:109)

Awareness of these occurrences brought Gesell to caution that "it cannot be emphasized too strongly that under atypical conditions, final judgments based on a single developmental examination are exceedingly hazardous. Repeated observations over an extended period during which the child is under the best possible conditions for development are necessary. These examinations should be supplemented by observations of the home behavior and by evaluation of the child's response to a carefully planned training program carried on over a period of months or years." (3:62)

Such evidence to the contrary, many curriculum decisions have been made on discrete measurements and standards. Reading ability alone was often the criterion for belonging to a given group. Since perhaps the most

important implications of the idea of development lay in the suggestion that the child and the adolescent were in the process of becoming, it became more important to gauge what the outcome of the current curriculum would be for a student at the age of 25 years than at the end of a particular grade.

Conclusions and Recommendations

In criticizing the current practices Taba says that "exclusive dependence on tests of intelligence or of reading for making decisions about ability grouping acceleration and retardation may be too narrow a basis for making decisions which have crucial consequences for a student's learning career. If each aspect of the development is contigent on another, a proper prediction of what a student can or cannot do should not be made without examining all significant dimensions of development, including something of his developmental history." (8:16)

The goal of this kind of thinking was a method of determining the child's developmental level--the age at which he was performing as a total organism.

Ilg and Ames summed it up very well when they said "the need for accommodation of the environment to both age and individual differences becomes evident from the moment of a child's birth.... The rate and method of growth of most children can be picked up in kindergarten. Some, however, do not reveal themselves clearly until the more demanding learning situations of first grade. And still others may not expose their difficulties in putting forth effort and completing their assignments until they meet the more rigorous demands of second and later.

"...It is through developmental thinking and the use of certain tools that reveal the developmental process that we have reached our present point of view. It is through this same developmental examination that we hope the child will be enabled to reveal himself as a total individual, tell us about his level and method of growing and his state of readiness for the different states of the educative process.... Possibly the greatest single contribution which can be made toward guaranteeing that each individual child will get the most possible out of his school experience at what for him is the 'right' time. This should be the time when he is truly ready and not merely sometime arbitrarily decided upon by custom or by law." (5:6)

CHAPTER III

PROCEDURES AND METHODOLOGY

The objective of this study was to determine if the Gesell Developmental Examination could be an effective tool in the grade placement of children. Data was obtained from the Belgrade and Ennis Elementary schools and was used in a statistical model to evaluate the usefulness of the Gesell Developmental Examination.

The Statistical Sample

The statistical sample consisted of 40 children enrolled in the first grades of two Montana second-class school districts, Belgrade and Ennis, during the academic year 1968-69. These children were from similar socio-economic backgrounds.

Statistical data consisted of the results of three administered tests plus the chronological ages of the students. The first of the three tests was the Gesell Developmental Examination. This test attempted to measure the developmental age of the student as distinct from his chronological age. Thus a student might have shown a developmental age of 5½ while his chronological age was perhaps 6½ or 7. All students in the population ranged from a minimum developmental age of 4A to a maximum developmental age of 7B, while chronological ages ranged from 5 years, 3 months to 8 years old.

The second administered test was the Metropolitan Reading Readiness test. The results of this test, given in percentiles,

attempted to measure the child's ability to undertake the first grade experience as compared with all other children who had taken this examination.

The third administered test was the Metropolitan achievement test. This test consisted of three sub-tests: (a) Word Knowledge, (b) Word Discrimination, and (c) Reading Ability. These tests measured the child's grade placement in these three areas at the end of the academic year as compared with all children who had taken them.

The Statistical Models

The basic statistical models utilized to analyze the data were regression and correlation models. Several variations of these models were employed. In the regression models, the dependent variables were the grade placement according to one of the Metropolitan Achievement sub-tests. In the correlation models the scores of the Metropolitan Reading Readiness tests were correlated with the Gesell Developmental Examination scores. A list of the models used and the relevant variables is given in Table I.

Hypotheses

In order to guide the statistical analysis, two hypotheses were formulated. They are as follows:

1. The results of the Gesell Developmental Examination are not useful in predicting the level of achievement that will be attained by the first-grade student.

2. No relationship exists between the student's scores on the Gesell Developmental Examinations and the Metropolitan Reading Readiness Test.

TABLE I. STATISTICAL MODELS USED IN THIS STUDY.

Model Number	Variables*	
	Dependent	Independent
I (regression)	Y_1	X_1, X_2, X_3
II (regression)	Y_2	X_1, X_2, X_3
III (regression)	X_3	X_1, X_2, X_3
IV (regression)	Y_1	X_2
V (regression)	Y_2	X_2
VI (regression)	Y_3	X_3
VII (correlation)	X_2	X_3

* The variables are defined as follows:

X_1: chronological age

X_2: Gesell Developmental Examination Score

X_3: Metropolitan Reading Readiness Score

Y_1: Metropolitan Achievement Test-Word Knowledge Score

Y_2: Metropolitan Achievement Test-Word Discrimination Score

Y_3: Metropolitan Achievement Test-Reading Ability Score

The test of the first hypothesis centers around the Betas of the regression models. The form of the regression model is

$$Y = B_1X_1 + B_2X_2 + B_3X_3 + \ldots + B_nX_n + e,$$

where each of the B's is a measure of the effect of one of the independent variables. Any B_i not significantly different from zero would indicate that the associated X_i was not a significant indicator of success on the Metropolitan Achievement test.

The test of the second hypothesis was the value of the correlation coefficient of the correlation model. Correlation coefficient not

significantly different from zero would indicate that no relationship exists between the Gesell Developmental Examination score and the Metropolitan Reading Readiness test scores.

Limitations

The major limitation of this study lay in the relatively small size of the sample, further complicated by the fact that it was taken from two schools. A larger sample would have provided a greater amount of data and would therefore provide a better basis for evaluation of the results.

A second limitation of this study was the difference in the quality of instruction received by the students in the two schools. No two teachers would have exactly the same quality of teaching ability, but there was no way to incorporate the quality of instruction received by the students into the statistical model.

CHAPTER IV

RESULTS

The summary of the results of the statistical analysis of the regression models is shown in Table II.

Statistical Results: Models I, II, and III

Models I, II, and III were regression models where the scores of the three sub-tests of the Metropolitan Achievement Test were respectively regressed on three independent variables. The independent variables were (1) chronological age, (2) behavioral age, measured by The Gesell Developmental Examination, and (3) readiness, as measured by the Metropolitan Readiness Test. These models indicated the predictive qualities of the independent variables with respect to achievement.

In Model I, where Word Knowledge was the dependent variable, the only significant indicator of success was the Metropolitan Readiness Test. The regression coefficients of the variables chronological age and developmental age were not significant at the 95 percent level.

In Model II, word discrimination was the dependent variable. In this model, the regression coefficients of both chronological age and readiness were statistically significant at the 95 percent confidence level. As in Model I, developmental age was not a significant variable.

Reading ability was the dependent variable in Model III. The results of Model III are similar to those of Model II. Chronological age and readiness were statistically significant variables while developmental age was not.

TABLE II. SUMMARY OF STATISTICAL RESULTS: REGRESSION MODELS.

Model	Variables* Dep.	Ind.	Regression Coefficients $\hat{B}$	Standard Error	Confidence Interval Limits of $\hat{B}$ lower	upper
I	Y_1	X_1	.302355	.169331	-.029534	.634244
		X_2	-.044721	.422541	-.872901	.783458
		X_3	.132428**	.046577	.041137	.223719
II	Y_2	X_1	.726062**	.212843	.308889	1.143233
		X_2	-.625032	.531119	-1.666023	.415960
		X_3	.122895**	.058545	.008146	.237644
III	Y_3	X_1	.717133**	.196688	.331625	1.102641
		X_2	-.377533	.490806	-1.339511	.584446
		X_3	.220362**	.054102	.114323	.326402
IV	Y_1	X_2	.887493**	.355242	.191220	1.583766
V	Y_2	X_2	.770140	.469087	-.149270	1.689549
VI	Y_3	X_2	1.428334**	.489431	.469049	2.387619

* Variables are defined as follows:

Y_1: Score of Metropolitan Achievement Test-Word Knowledge

Y_2: Score of Metropolitan Achievement Test-Word Discrimination

Y_3: Score of Metropolitan Achievement Test-Reading Ability

X_1: Chronological age

X_2: Developmental Age as determined by the Gesell Developmental Examination

X_3: Score of Metropolitan Reading Readiness Test

** Significantly different from zero at the 95 percent confidence level.

Interpretation of Statistical Results: Models I, II, and III.

All three models indicated that the Metropolitan Readiness Test results were a significant predictor of achievement. This was a reasonable conclusion in view of the nature and the purpose of the test. Readiness includes such factors as chronological age, emotional maturity, and physical condition and maturity, to name but a few. But these results do not denigrate the usefulness of the Gesell Developmental Examination, as will be shown in the next section.

Statistical Results: Models IV, V, and IV.

The three models in this section were designed to isolate the predictive qualities of the Gesell Developmental Examination. The dependent variables were again the scores of the three sub-tests of the Metropolitan Achievement test. The independent variable in all three models was the developmental age of the student.

Model IV indicated that developmental age is a significant predictor of success in the acquisition of work knowledge. The correlation coefficient of this model was $r = .375602$, indicating that, while the regression coefficient was statistically significant, there was considerable scatter in the regression plane.

The results of Model V indicate the developmental age was not a significant predictor of the child's ability to discriminate between words.

Reading ability, the dependent variable of Model IV, appears to be very much dependent upon developmental age. The regression coefficient

was the highest of all models included in the study. The correlation coefficient is r = .427891, showing relative closeness of fit in the regression plane.

Interpretation of Statistical Results: Models IV, V, and IV

Model V indicated that developmental age was not a significant predictor of a child's skill in word discrimination. The ability to discriminate between words is more a function of intelligence than it is maturation. Therefore, the results of Model V were to be expected.

Word knowledge, the ability to obtain meaning from the written symbol, depends upon developmental age. As the child matures, word knowledge is increased.

Model VI shows that reading ability was predicted by developmental age. As the child attained higher levels of maturity, reading ability increased. Reading ability includes word discrimination and work knowledge, this Model IV reinforced the results of Model IV.

Statistical Result: Model VII

It seemed intuitive that there would be a correlation between the results of the Metropolitan Readiness Test and the Gesell Developmental Examination. Both of these tests were concerned with the child's ability to achieve. Model VII was designed to test the hypothesis that the Metropolitan Readiness Test and the Gesell Developmental Examination yielded similar results. The model was a linear correlation model which yielded the following results.

Correlation Coefficient: r = .535701

95 percent confidence interval for r: .24, .68

Interpretation of Statistical Results: Model VII

The statistical results indicate that scores of the Metropolitan Readiness test and the Gesell Developmental Examination were correlated to a fairly high degree. These tests are not intended to measure the same factors, therefore perfect correlation was not expected.

Conclusions

The statistical models used in this study were designed to test two hypothesis. The hypotheses were:

1. The results of the Gesell Developmental Examination are not useful in predicting the level of achievement that will be attained by the first grade student.

2. No relationship exists between the student's scores on the Gesell Developmental Examination and the Metropolitan Readiness Test.

Models I through VI were used to test the first hypothesis. Based on the analysis of these models, the Gesell Developmental Examination does predict a child's ability to achieve. Therefore, the first hypothesis must be rejected.

Model VII was designed to test the second hypothesis. The statistical analysis of Model VII indicates that a relationship does exist between the Metropolitan Readiness Test and the Gesell Developmental Examination. Therefore, the second hypothesis is rejected.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

After reviewing the available literature related to the philosophy of developmental expressions of age and participating in a Gesell Institute workshop conducted by Frances L. Ilg, M.D. the writer observed and recorded the progress of two first grade classes.

The children were tested and their behavorial age ratings from the Gesell Developmental Examination and scores on the Metropolitan Readiness Test and Metropolitan Achievement Test were evaluated to determine what if any, reltionship existed among them. Tables were constructed to reveal information relative to the study.

Conclusions

The Gesell Developmental Examination is a useful method for evaluating a child's ability to achieve. Used in conjunction with other information about the child, developmental age enables the teacher to properly place the student so that he will be able to progress in the most satisfactory manner.

Recommendations

1. The particular children involved in this study should be re-examined in August, 1969 to determine their behavorial age at this time to discover what growth may have taken place in the interim.

2. Screening tests of these same children should be done each spring and fall through at least the fourth grade.

3. Observations similar to those used in this study, should be recorded on each of these same children and continued and evaluated throughout their elementary school attendance.

4. A year by year compilation of anecdotal records for the individual children could be an informative addition to further study.

LITERATURE CITED

1. Erickson, E. H. Childhood and Society. Norton, 1950.

2. Gerard, M. W. "The Psychogenic Tic in Ego Development," International University Press, 1946.

3. Gesell, A. (Assisted by C. S. Amatnda and H. Thompson) Infant Behavior; Its Genesis and Growth. McGraw-Hill, 1934.

4. Hilgard, E. R. Theories of Learning, 2nd Edition. Appleton, 1956.

5. Ilg, Frances L. and Ames, Louise Bate. School Readiness Behavior Tests Used at the Gesell Institute, Harper 1965.

6. Olson, W. C. and Hughes, B. O. Growth of the Child As A Whole. University of Chicago Press, 1946.

7. Spitz. R. A. "The Role of Ecological Factors in Emotional Development in Infancy." Child Development, 20 (Sept. 1949) pp. 145-55.

8. Taba, Hilda. Curriculum Development Theory and Practice. Harcourt, 1962.