

THE DEVELOPMENT OF COGNITIVE
SKILLS IN THE PRESCHOOL CHILD

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ABSTRACT

The study attempted to evaluate the levels of cognitive skills of kindergarten children attending day care, and the apparent growth of cognitive skills over a period of time, using published tests as instruments of measurement. An informal evaluation of the tests was made.

The review of literature presented three points of view regarding approaches to the development of cognitive skills.

An analysis of the data, using t-tests, was carried out and conclusions were stated. Implications of the study were made, and questions concerning the growth of cognitive skills of kindergarten children attending day care centres were raised.

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CHAPTER I

THE PROBLEM

The study was concerned with an evaluation of the levels of cognitive skills of kindergarten children attending day care centres and was directed at answering two general questions:

1) What is the apparent growth in cognitive skills of children enrolled in day care centres attending public kindergarten when the instrument of measurement is the Boehm/Slater: Cognitive Skills Assessment Battery and the Letter Knowledge - Level One (Identifying) sub-test of the Murphy-Durrell Reading Readiness Analysis?

2) What is the evidence concerning the usefulness of the Boehm/Slater: Cognitive Skills Assessment Battery as an assessment instrument in such studies as the one described in this paper, and for evaluation of preschool children by teachers and supervisors?

BACKGROUND OF THE PROBLEM

Children's preschool years have long been acknowledged to be of prime importance for their later development. Traditionally, these years have been spent in the home, cared for by the mother of the family.

In recent years, however, more mothers, by choice or necessity, have been accepting employment outside the home and placing their children in day care centres. Initially these mothers were seeking custodial care for their children, and early day care centres were primarily concerned with providing a safe and healthful environment. Subsequently concern was expressed over the cognitive and

affective aspects of the children's development as well as their physical well being.

Unfortunately, the apparent dichotomy between cognitive and affective development has sometimes led to emphasis on one area to the detriment of the other. This situation need not be, as the two aspects should complement each other and, indeed, must complement each other. During the last few years it can be seen that such a division has in fact existed.

In reaction to authoritarianism and emphasis on structured learning found in public schools, preschools, including day care centres, nursery schools and kindergartens, tended to focus on the affective aspects of children's development. More recently, however, as parents became disturbed over academic inadequacies in their older children, attention in the preschools has been focused on cognitive skills and attempts have been made to avoid later school failures by programmes of early intervention.

The importance of the nurturing of cognitive growth in kindergartens and day care centres is, therefore, a subject which, though always topical, will begin to take on special importance as kindergartens and day care centres proliferate in Canada generally, and British Columbia specifically. The precise role of these institutions in the education of young children is bound to be increasingly called into question and some enquiries will be concerned more with cognitive than affective factors.

As enquiries begin to be made, some attention will be focused on definitions of cognitive development, with their implication for curricula and tests designed to measure the products of curricula.

Cognitive development has been defined as "the recall or recognition of knowledge and the development of intellectual abilities and skills."¹ Some authorities² also include gross and fine motor development under the general rubric of cognition, pointing out that muscle control is the basis for

much primary level learning.

General definitions are usually easier to agree upon than specific definitions, however, since specific statements tend to have implications for programmes designed to encourage growth in specified areas. Most current thought in curriculum development and test design, in fact, involves statements about objectives and how to achieve and assess them, rather than statements about general philosophy.

Basically there is agreement that children's cognitive growth is an important aspect of the development of their whole beings. It is in the approach to the nurturing of that growth that conflict of opinion arises. Three points of view seem to be reflected in the literature.

The first view, which could be called the "natural maturation" view, holds that children have within themselves a certain degree of potential which will naturally unfold, given enough time. Proponents of this view would advise waiting until the child matures. They would suggest that while one should not withhold stimuli, one should not actively provide catalysts to development.

The second view could be called the "continuous progress" approach, referring to the fact that each child is always ready; that is, ready for the next stage in his development. In this case there is no grand culminating point but a continuum along which the child moves, each at his own rate. The teacher would, then, supply continuous stimulus so long as it was appropriate.

The third view is the "skills acquisition" stance, which suggests that there are certain skills a child requires before he is ready for more advanced learning. These skills or traits could range from physical size to verbal facility and would, singly or in total, determine the child's readiness for further growth in a specific cognitive area. This implies a teacher-directed curriculum, with a clear outline of objectives, procedures and evaluative methods.

There seems to be no need to clarify the first point of view, but there seems to be a fine difference between the second and third points of view. In the case of the continuous progress approach, the teacher interacts with the children and provides a stimulating environment.

The teacher who advocates the skills acquisition approach structures the environment and directly teaches the skills she considers necessary to the children's development.

More interesting than the actual convergence or divergence of those views of how children's cognitive skills grow are the implications of such views for pre-school curricula. Much more information than at present exists is needed about current programmes and their results.

Kindergartens were made mandatory in British Columbia in 1972 and day care centres for three to five year olds are now publicly funded. This means that children may be entered in both day care and kindergarten at the same time. The changed educational situation suggests that some research would be appropriate on the status of children of equivalent ages in the programmes provided and the changes that occur in these children during their attendance at kindergartens and day care centres. Such assessment should be valuable in 1) evaluating existing programmes as a basis for new programmes or adjustments to existing programmes, and 2) evaluating assessment techniques.

QUESTIONS OF THE STUDY

The purposes of this study were 1) to evaluate the change in cognitive skills of children attending kindergarten and day care, using published tests in February and June and 2) to evaluate informally the suitability of the tests used for measuring the growth of cognitive skills in children of kindergarten age.

To fulfill the purposes of the study a number of specific questions were formulated. Those related to the

growth of cognitive development were:

1) Was there a significant difference between the results obtained on the test total of the Boehm/Slater: Cognitive Skills Assessment Battery in the February testing and the June testing?

2) Was there a significant difference between the results obtained at each testing on each subtest of the Boehm/Slater: Cognitive Skills Assessment Battery? The subtests were:

- a) Basic Information
- b) Identifying Body Parts
- c) Color Identification
- d) Shape Identification
- e) Number Knowledge
- f) Information From Pictures
- g) Picture Comprehension
- h) Story Comprehension
- i) Multiple Directions
- j) Large Muscle Coordination
- k) Memory
- l) Visual-Motor Coordination
- m) Vocabulary
- n) Symbol Discrimination
- o) Visual-Auditory Discrimination
- p) Auditory Discrimination

3) Was there a significant difference on the Letter Knowledge - Level One (Identifying) subtest of the Murphy-Durrell Reading Readiness Analysis on the February testing and the June testing?

The specific questions selected to be answered concerning the usefulness of the Boehm/Slater: Cognitive Skills Assessment Battery as in instrument for measuring the cognitive growth of kindergarten children were:

1) Did all subtests provide for a range of scores from a possible zero for very weak pupils to increasingly higher scores for stronger pupils?

2) Did the tests included as instruments of measurement

seem to measure the skills they purported to measure?

3) Were all instructions sufficiently clear for children of kindergarten age, or were modifications necessary to make them suitable?

IMPORTANCE OF THE STUDY

At the present time there are many children in British Columbia spending large portions of their days in kindergartens and day care centres, and large amounts of public funds are being spent to provide personnel, supplies and buildings for these children. Training of supervisors for the day care centres and teachers for the kindergartens is also costly. The question is, then, are the best possible programmes being provided for the funds expended?

The age range of children in day care centres for three to five year olds can, and in fact often does, pose a serious educational problem. The difference in developmental level between a three year old entering day care for the first time, and a five year old who has experienced two or three years in the centre can be expected to be significant, and the area for greatest concern is often that of the entering three year old. Indeed, if the older children seem able to cope adequately on their own, with the supervisors' time often at a premium, development of programmes adequately adjusted to the varied needs of the age groups may sometimes be considered to be of secondary importance.

Yet modern curriculum theory suggests that each child must be approached on his own actual level, not the level indicated by his chronological age. If this is to be done, assessment of each child's status, and programmes based on that assessment seem necessary. Otherwise we will not make optimum use of kindergartens and day care centres.

General developmental levels have been carefully tabulated in the medical and psychological literature.

However, individual children do not necessarily conform to those norms. If we are to assess children's levels of cognitive skills with reasonable accuracy, appropriate and sensitive instruments for measuring must be prepared or, alternatively, existing instruments must be tested and refined on varied age groups. Suitable programmes can then be based on the findings of these tests.

This study is intended to make a contribution to the literature on early childhood education by opening questions concerning the development of cognitive skills of kindergarten age children attending day care centres in British Columbia. Using two published tests, the study measured the amount of growth that took place over a four month period of time under existing programmes in kindergartens and day care centres. It also assessed the apparent strengths and weaknesses of the tests, which were developed as instruments for evaluating the cognitive development of preschool children.

DEFINITION OF TERMS

The following definitions were developed for the purposes of the study:

Day care centres. These are facilities for three to five year old children, funded by public funds, where children are cared for by trained supervisors and, in the case of cooperatives, by parents as assistants.

Kindergartens. These are half day classes held in the public school system for children who are five years old or will be five years old on or before December 31 following the opening of the fall term.

Programmes. There are basic guidelines set out for curricula for both kindergartens and day care centres, in the first case by the Department of Education and in the second case by the Community Care Facilities Board. A great

deal of flexibility is allowed, and it is generally left to the discretion of the individual teacher in the kindergarten or supervisor in the day care centre to plan programmes.

Cognitive skills development. This term is used to describe children's intellectual growth and refers to the learning of particular "skills" deemed of the cognitive domain by the authors of the tests used in the study.

LIMITATIONS OF THE STUDY

The following are considered to be the limitations of the study:

1) The tests used were limited to existing instruments. The data are dependent on the validity and reliability of those tests.

2) The study was limited to a comparison of scores on selected subtests considered to measure certain cognitive skills. Those subtests did not necessarily measure all cognitive skills, nor did the scores obtained necessarily reflect the real range of differences in levels of cognitive development among the children.

3) The population was limited to kindergarten children attending ten day care centres on the University of British Columbia campus and its environs.

4) The study did not deal with sex, age, I.Q. differences or variations in socio-economic background.

5) The period of time between the tests was approximately four months, possibly too short a period of time to expect significant changes in levels of cognitive development.

6) The study concerned growth in cognitive skills from February to June. It could be speculated that greater differences in scores might have been obtained had the tests been given during the fall term.

ORGANIZATION OF THE PAPER

The first chapter of the thesis contains a statement and discussion of the problem, statements about the importance and limitations of the study, definitions of terms used in the study, and an outline of the organization of the study. The second chapter consists of a review of the related literature reflecting views on topics relevant to the study. The third chapter describes the design of the study: the subjects, materials and procedures. Chapter IV includes the presentation and analysis of the data. The summary of findings, conclusion and implications of the study are presented in Chapter V.

NOTES TO CHAPTER I

¹Benjamin S. Bloom (ed.), Taxonomy of Educational Objectives (New York: David McKay Company, Inc., 1956), p.7.

²A.E. Boehm, "Out of the Classroom," Exceptional Children, 37:523-527, March, 1971; see also J.W. Denison, "Perceptual Influences in the Primary Grades," Journal of School Psychology, 7:38-46, No. 3, 1968-69, and B.R. Slater, "Perceptual Development at the Kindergarten Level," Journal of Clinical Psychology, 27:263-266, 1971, and B.R. Slater, "Achievement in Grade 3 by Children Who Participated in Perceptual Training During Kindergarten," Perceptual and Motor Skills, 36:763-766, 1973.

CHAPTER II

REVIEW OF RELATED LITERATURE

The review of literature is presented under four headings: Interdependence of Cognitive and Affective Domains, Defining Cognition, Justification for Specific Training in Cognition, and Approaches to Cognitive Development.

INTERDEPENDENCE OF COGNITIVE AND AFFECTIVE DOMAINS

Throughout modern educational history there has been a controversy over the relative importance of the affective and cognitive aspects of a child's development. Currently, the controversy appears to have reached another of those apexes that develop regularly.

Whether there is really any need for such disputes is doubtful. As Piaget points out, there are no purely affective or intellectual acts. Each contributes to the functioning of the other.¹ Almy and Dewey agree that any cognitive activity should be carried out in social situations.² Frost plainly states that no dichotomy, in fact, exists in practice.³ One can assume, therefore, that any curriculum that accents either the cognitive or the affective strand of the child's development at the detriment of the other strand will surely meet with failure, for the goal, the development of the whole child, will remain elusive.

When "cognitive development" or "growth of cognitive skills" is discussed, one should understand that those objectives included in the affective domain (interest, attitude, values, appreciation and adjustment⁴) are also met within the structure of the curriculum.⁵

Psychomotor skills are separated by some authors from cognitive and affective skills.⁶ Other authorities seem to group psychomotor skills under the label of cognitive skills, often classified as precursors of more abstract learning.⁷ Because the relationship between psychomotor and cognitive development has not been clearly described in the literature, and because manipulation usually does precede more abstract learning,⁸ it may be assumed that there is sufficient connection, not necessarily causal, to justify the inclusion of motor skills within the general category of cognitive skills. Boehm and Slater quite clearly classify psychomotor skills under the general rubric of cognition.⁹

DEFINING COGNITION

There have been many definitions of cognition. However, a fairly comprehensive statement suggests that the cognitive domain "includes those objectives which deal with the recall or recognition of knowledge and the development of intellectual abilities and skills."¹⁰ It is important to note that the rote learning of facts is not what is implied by the word "knowledge." Rather it involves "the more complex processes of relating and judging."¹¹ Understanding and insight must be a natural product of knowledge; the utilization in a new situation of facts acquired is the proof of real learning.¹² As John Holt puts it, "The true test of intelligence is not how much we know how to do, but how we behave when we don't know what to do."¹³

The place of imagination in cognitive development has received some attention. It has been pointed out in a talk by Northrup Frye, an English professor at the University of Toronto, that man's ability to "compare what he does with what he can imagine being done"¹⁴ is the crux of all creativity. The title of the lecture, "The Educated Imagination," as well as its content suggests that imagination can and should be taught. McMillan agrees,

stating that imagination is necessary for advancement in all spheres of life. She goes on to say that it is something that occurs naturally in young children and is worth developing in school.¹⁵

Thus it may be concluded that imagination is not only an important part of the cognitive process, but perhaps its highest form.

What is commonly termed "cognitive development", then, would seem to involve the acquisition of knowledge, the ability to utilize that knowledge and to form new ideas or concepts from basic material.

JUSTIFICATION FOR SPECIFIC TRAINING IN COGNITION

What is the rationale for including specific training towards cognitive development in the general education of young children? The most basic justification is that acquisition of knowledge increases ones "acquaintance with reality," or at least reality in as far as it is knowable.¹⁶ Knowledge, in this sense, would help one deal with the pragmatic aspects of life.¹⁷

Another justification for cognitive training would involve its importance as a basis for further education. Problem solving, which must be based on some sort of knowledge, serves a cyclical purpose. The new knowledge, acquired through the problem solving approach, should help to prove or disprove the "antecedent knowledge," and so build up the store of knowledge in a given area. This sort of knowledge is important, not because of the facts themselves, but because of their relationship to other objectives.¹⁸

Knowledge is highly regarded in our society as a criterion of intelligence.¹⁹ It is perhaps this justification for knowledge that leads to the greatest amount of rote learning,²⁰ and teaching towards tests.²¹ Harris explains that some ethnic groups (he suggests the Jews

specifically) "value learning not only as a means of coping with and advancing in the external world, but also as a thing in itself."²² Jewish parents tend to penalize failure, and reward signs of love of learning.²³

A broader interpretation of the concept of intelligence might produce better curricula: understanding of principles based on the learning of facts and concepts and the ability to use those principles is a criterion of intelligence.

When stating the case for training in cognitive abilities, it is often valuable to examine the arguments against such training. One such argument suggests that all curricula should be "child-centred." The implication is that child-centred curricula must, per se, be affect-centred. However, educators who advocate a child-centred curriculum, depending on the child to take the initiative in determining what he would like to learn, might, through conscientiousness in his intentions, be asking the child to choose without a clear understanding of the alternatives. Arnold states this problem concisely:

Children choose neither wisely nor well until they have enough experience to equip them to make decisions on their own behalf. A permissive education that allows them decision-making without the required experience gives them no basis on which to choose. Children need informed adults who, mindful of the child's viewpoint and prior experience, can give them guidance that makes such prior²⁴ experiences useful.

One concludes that a foundation of knowledge seems to be necessary for deciding what one is really interested in knowing more about.

Another argument for an emphasis on the affective curriculum is based on what seems to be a current trend towards searching for one's "identity." The search may take the form of rap sessions with peers and may involve long discourses on the meaning of interpersonal relationships. It has been suggested that no such search would be needed if children had been exposed to less cognition and more affect

in their early years. John Holt, however, disputes the validity of the currently popular sort of identity-hunting. He suggests that we "find our identity by choosing, by trying things out, by finding out through experience what we like and what we can do."²⁵ Each experience, in fact, helps form our identity. Thus, he would suggest, discovering oneself involves a sound basis in knowledge and experience.

Finally, the "will to learn"²⁶ or the joy inherent in the learning process²⁷ is justification for the development of cognitive skills. From the time an infant first discovers his hands he delights in each new addition to his store of skills. It seems a natural conclusion that future learning should be rooted in the child's obvious native curiosity. Motivation surely does not have to be and should not be artificially imposed from without. For most small children, as well as for most adults, knowledge does not necessarily have to have practical applications; learning in itself is a rewarding experience.

James Hymes, Jr., discussing the knowledge explosion, states that the educator's main concern is to develop in the child a love of learning so that he will go on learning the rest of his life.²⁸ Dewey based much of his teaching on the same principle.²⁹

Justification for the development of cognitive skills, then, is based on the interests and needs of both the individual and society. Stated simply, humans would rather know than not know.

APPROACHES TO COGNITIVE DEVELOPMENT

Three basic points of view regarding approaches to cognitive development seem to be reflected in the literature. They are the natural maturation, continuous progress and skill acquisition points of view. Though divisions can also be made along other lines (e.g., the behaviourist and phenomenological views), the above classifications are

useful in providing a framework for studying curriculum designs which range from the "closed" to the "open" systems.

The three points of view are presented under these headings: Natural Maturation, Continuous Progress and Skill Acquisition. In each case a historical perspective is outlined and implications for curricula discussed.

Natural Maturation Point of View

The term natural maturation refers to the unfolding, sequential development observed in children, and includes all areas of development.

Historical perspective. The first definitive statement concerning maturation was made by Jean Jacques Rousseau in Emile³⁰ in which he proposed that "all development consists of internally regulated sequential stages, which are transformed one into the other in conformity with a prearranged order and design."³¹ Children are innately good and, unless interfered with, will remain virtuous.³²

Pestalozzi, who established an orphanage at Stanz, Switzerland, followed the philosophy set out by Rousseau. Contrary to the beliefs of educated men of the time, Pestalozzi argued that he could do his work without artificial means, using only the influence of Nature and the day's natural activities.³³

Froebel, too, believed that all things, including children, unfold to reveal their essence but he stressed, to a greater degree, the more religious aspects of education. The purpose of education was to develop an understanding of self, humanity, God and Nature and, in so doing, guide man to a pure and holy life.³⁴

Recognition was given by Rousseau, Pestalozzi and Froebel to the child's contributions to his own development and to the importance of a suitable climate for his growth. This point of view has influenced the theories which

advocate the nondirective, child-centred approach to the education of young children.³⁵

Gesell reiterated Rousseau's concepts of inner control, using the word "maturation" to describe the developmental sequences that are relatively invariable in all areas of growth. He taught that certain undesirable stages in behavior were inevitable and best handled by noninterference.³⁶ Stated briefly, "the child is in league with Nature and he does his own growing."³⁷

Piaget denied that maturation alone could account for the learning that takes place in the early years; maturation is never independent of experience.³⁸ In contrast to Rousseau's position on "negative learning,"³⁹ Piaget stated that actualization presupposes certain physical experiences and certain social conditions.⁴⁰ Beilin argued that in spite of the environmental aspects of Piaget's theory, however, he is, at least by implication, a maturationist. The reason for this conclusion was based on the fixed sequence of stages outlined by Piaget.⁴¹

Gesell's and Piaget's theories were based on a great deal of observation, and stages of development were clearly outlined. Their works evidenced less romanticism and a more scientific orientation than previous maturationists.

Montessori spoke of "inner formation."⁴² Education was, in her opinion, a natural process which develops spontaneously in the human being. She referred to the "absorbent mind"⁴³ which enables the child to absorb learning from the moment of birth and this learning remains fixed in the living organism, not in the memory.

Montessori, a feminist and a physician, began her work untrained in the field of early childhood education. Work with retarded children sparked her interest in education of young children and led to the establishing of casa dei bambini, consisting originally of a single room in a tenement.⁴⁴ Working long hours each day she developed materials and methods which allowed so-called idiot children

to pass primary level exams.⁴⁵

As a whole the maturationists appear to face the common problem of the apparent contradiction between the unfolding of the child's inner potential and the effects of environment. That contradiction is never fully resolved in the writings of the maturationists. There seems to be justification for Krogman's suggestion that the terms "maturity" and "maturation" are all things to all people.⁴⁶

Implications for curricula. Strictly speaking, the maturationist approach calls for no imposition from teachers and only indirect influence from the environment. In practice, however, curricula have evolved from the philosophies of the maturationists and the implementation of those ideas into actual classroom methodology and materials is often in apparent contradiction to the original theories.

Rousseau's influence was strongly felt by the men of his time,⁴⁷ and has since led to greater freedom and individuality in schools. A. S. Neill's Summerhill was founded on the principles espoused by Rousseau. Neill spoke of "self-regulation"⁴⁸ which, he said, implies a belief in the goodness of human nature.

In remarkable contrast to Rousseau, Pestalozzi was himself a teacher whose power came, not from his theories, but from his innermost self and was manifested in his tender concern for the children in his care.⁴⁹ His contention that formal education does not take into consideration the circumstances of family life⁵⁰ is reflected in the number of current programmes,⁵¹ especially compensatory ones, which stress parent involvement. Pestalozzi's emphasis on manual labour and insistence on perfection in the children's work,⁵² however, seem to have been eliminated entirely from pre-school education.

Froebel's system was characterized by the balance between the child's freedom to grow in his own way and society's obligation to impart skills, knowledge and values.

Influenced in large measure by Rousseau and Pestalozzi, nonetheless Froebel struck out on his own to systematize education; central to his plan was play as the mode of instruction for young children and curriculum was seen as representative of society.⁵³ Specifically, the content of Froebel's kindergarten consisted of "gifts" and "occupations"⁵⁴ which were, respectively, highly structured teaching materials and activities.

Froebel's method was slavishly followed in the nineteenth century,⁵⁵ though others saw greater meaning in Froebel's general educational philosophy than in the specific activities and methods derived from it.⁵⁶ The elements supported by those educators included the concept of development in the child, education as self-activity and the educational value of play.⁵⁷ The "occupations" were eliminated, large blocks replaced the "gifts" and play became freer. Modern traditional kindergartens occur in this revised version.⁵⁸

Gesell attempted to bring into harmony the natural growth characteristics of the infant with cultural pressures.⁵⁹ Child Development⁶⁰, in which Gesell lays out his ideas on the growth of children in a modern culture, encompasses the following topics: Growth and Culture, The Growing Child and The Guidance of Growth. Although Gesell clearly is a maturationist,⁶¹ he emphasizes the importance of the kindergarten⁶² and thoroughly describes methods, materials⁶³ and evaluation procedures.⁶⁴

Piaget is, by his own definition, not an educator but a "genetic epistemologist."⁶⁵ Thus his contributions have been intended, not for curriculum design, but for the study of knowledge. Pressed to make a statement about education, Piaget raised questions: What is the aim of teaching? What should we teach? How should we teach?⁶⁶ Piaget suggests that these questions will never be answered until experimental research provides decisive information.⁶⁷

Many current programmes are based on interpretations of

Piaget's teaching. They range from "'storefront' Piagetian theory utilization,"⁶⁸ as described in The Cognitively Oriented Curriculum,⁶⁹ to the Perry Preschool Project,⁷⁰ the New Nursery School⁷¹ in the United States, the British Infant School⁷² or open education⁷³ in general. Each programme promotes the "active school" as opposed to the one in which children experience "cognitive passivity."⁷⁴

Maintaining that the child has within him the capacity for his own development,⁷⁵ Montessori planned a programme that would support the general development of the child. The Montessori Method⁷⁶ is one of auto-education, the materials being, for the most part, self-correcting. Each area of the curriculum has a series of prescribed materials and activities. The teacher's role is non-intrusive.

Modern versions of Montessori's methods vary from the strict adherents to those which incorporate some aspects⁷⁷ of the original method.⁷⁸ Criticism seems to centre on the uselessness of some activities,⁷⁹ but proponents of the Method explain that her methods are meant to be constantly adapted to the culture in which they are being used.⁸⁰

Observation of the child, provision of a supportive environment and non-interference by adults are hallmarks of the maturationist view. Curricula, where provided, are child-centred and flexible.

The Continuous Progress Point of View

The continuous progress or "readiness" approach refers to the view that the child will learn best when he is "ready," if the environment is so ordered as to allow the appropriate learning to take place.

The maturationists and readiness proponents agree essentially on the basic maturation factors necessary before learning can take place; the difference lies mainly in the degree of emphasis placed on the environment as affecting learning. The maturationists would say the environment is supportive of learning; the continuous progress view holds

that the environment stimulates and promotes learning.

There is considerable overlap of educators into the readiness area who appear to be or profess to be maturationists. This is sometimes due to their admission that the environment, if not directly affecting learning, can, if deficient, retard learning, and sometimes due to their actual and open acceptance of the environment as a supporter, at least, of learning.

Historical Perspective. A brief review of the maturationists previously discussed shows the degree to which they can be classified as in agreement with the "continuous progress" view.

There are numerous examples in Emile in which Rousseau either takes advantage of situations or contrives them in order to teach Emile.⁸¹ Presaging the concept of critical moment, he also points out that there is a time for every kind of teaching, which should not be begun too soon nor postponed too long.⁸² Pestalozzi, in a system he called "so simple and so natural,"⁸³ actively taught children while they engaged in manual labour.⁸⁴ Froebel clearly ordered the environment with his "gifts" and "occupations," and said that development should proceed continuously from one point, and that this continuous progress should be guarded.⁸⁵ Gesell provided suggestions for materials to be used at each stage of development.⁸⁶ Piaget believed strongly in the interaction between the child and his experiences⁸⁷ but still contended that "development accounts for learning much more than the other way around."⁸⁸ Montessori devised a supportive environment which included lessons.⁸⁹

Comenius acknowledged that "the seeds of knowledge, of virtue, and of piety are...naturally implanted in us,"⁹⁰ but added that "the actual knowledge, virtue, and piety are not so given."⁹¹ By thus pointing out the relationship between the capacity for knowledge and its actual acquisition, Comenius expressed the need for instruction based on natural pro-

pensities.

Though Watson claimed to be an extreme environmentalist, he also believed that the basic response repertoire had to come via maturation before learning could take place and warned against overstimulation of children by parents.⁹¹

Currently, proponents of the readiness approach tend to fall into three sub groups: there are 1) those who advocate postponement or delay of teaching, 2) those who look for a fit between the child and the material to be learned, and 3) those who would intervene and attempt to teach in those areas found lacking. It may be noted that the views of these groups fall somewhere between the maturationists and the proponents of skills development, while still basing their curricula on the child's readiness level.

Members of the group who advocate waiting, the "Committee of Seven," listed two components of readiness: mental age and knowledge of requisite subskills.⁹³ These obviously refer to readiness for specific tasks, rather than an overall readiness level. Buswell disputed the findings of the "Committee of Seven" which proposed postponing the teaching of certain topics in arithmetic, on the grounds that other methods and materials had not been tried.⁹⁴ Using a similar argument, Brownell points out that young children in English schools are learning arithmetic that American educators know children of that age are unable to learn.⁹⁵

Gesell's classic study on the stair-climbing abilities of co-twins attests to the necessity of the passage of time for the development of certain skills.⁹⁶ Ilg, Ames and Harris also maintain that the maturity required for certain tasks is acquired only by waiting.⁹⁷ These conclusions have been questioned, however, on the grounds that in most cases physical abilities rather than mental abilities were being examined.

Dolch and Bloomster proposed that a mental age of seven years was necessary before a child could be expected to use

phonics in learning to read.⁹⁸ Harris predicted that much failure in reading could be averted by postponing formal reading instruction.⁹⁹

On the other hand, one study on school readiness showed that delayed entrance of children termed "not ready" for school gave no advantage to those who waited over a comparable group who entered kindergarten. Only on the copying test did the Wait group perform as well as the Kindergarten group. The conclusion was drawn that psychomotor factors seem to be dependent on maturational processes, but other factors are amenable to teaching.¹⁰⁰

Bruner's two books, The Process of Education¹⁰¹ and Towards a Theory of Instruction,¹⁰² urged that there is a way of communicating ideas to children that is appropriate to a particular age and that it is futile educationally simply to wait passively for the child to grow into readiness. More succinctly, Bruner stated that "the foundations of any subject may be taught to anybody at any age in some form."¹⁰³ Downing talked of the "gap" that exists between the state of the individual and the conditions of the task to be mastered. This gap can be narrowed, continued Downing, by changing the individual, by modifying the task or by doing both of these things.¹⁰⁴

Durkin agreed that readiness depends not only on the level of the child's abilities but also on the skills to be mastered and the kind and quality of instruction offered.¹⁰⁵ She went on to say, however, that the best way to assess readiness is to give the child ample and varied opportunities to begin to read.¹⁰⁶

Hunt referred to the "match"¹⁰⁷ between the child and what is to be learned; this match maximizes learning "when the child encounters circumstances which so match his already assimilated schemata that he is motivated by them but can cope with them."¹⁰⁸ Baldwin concurred: "Maturation is stimulated when the child meets challenges that are not too severe."¹⁰⁹ Prescott, in discussing preschool programmes,

described this theory as "goodness of fit."¹¹⁰

Integral to the theory of readiness is the idea of "critical periods" which can be defined as "a certain stage of limited duration during which a particular influence either from another area of the developing organism, or from the environment, evokes a particular response."¹¹¹ Fore-shadowing modern concepts of readiness, Pestalozzi urged that subject matter be "presented at the psychological moment in order, on the one hand, not to hold him back if ready, and on the other, not to load him and confuse him with anything for which he is not ready."¹¹² Montessori cautioned that "it is never possible to obtain, in its fulness, a development which missed its proper moment."¹¹³

Experience was fundamental to Dewey's theory of education. He pointed out that it is both the means and goal of education, but cautioned that not all experience is educative.¹¹⁴ According to Dewey, the criterion for determining whether or not an experience is educative or mis-educative is the degree to which it influences future activity.¹¹⁵ Dewey warned against continuous stimulation which stirs up interest without directing it toward definite achievement.¹¹⁶ A list of criteria for assessing the quality of activities, based on Dewey's teaching, is provided in Early Childhood Education¹¹⁷ by Ruby Minor.

Dewey complained of misinterpretations of his work and wrote extensively to try to correct some of the misunderstandings that arose.¹¹⁸ One area in which there was controversy concerned the role of the teacher. Dewey explained that the teacher should not feel guilt for intruding upon the children; a suggestion from a person who has a larger experience should be as valid as one from an accidental source.¹¹⁹

Almy and Arnold agreed with Dewey in disputing the theory that children need only be left alone, unhindered by adults. Floundering aimlessly before making the discovery does not make that discovery more meaningful.¹²⁰ Rather,

the implication is that materials should be so arranged as to organize information so that it is within the grasp of the child. In such a situation the teacher, one can assume, may give direct instruction or supply organized information.

William James suggested following nature by observing and acting upon the needs of the child. "Feed the growing human being, feed him with the sort of experience for which from year to year he shows a natural craving."¹²¹ It seems to follow that a series of experiences be provided to satisfy the needs of the child.

In speaking of reading readiness, Russell stated that "reading readiness does not suddenly appear in first grade. It is based upon a number of factors associated with readiness and is an expansion of abilities acquired earlier rather than an abrupt step upward."¹²² It may be assumed that these abilities, if lacking, can be taught directly or materials can be presented in such a manner as to encourage interest and, consequently, learning.

In several articles Fowler stressed the importance of optimizing stimulation using methods which minimize risks from the wrong kind of pressure. He cautioned that, if children fail to learn effective problem-solving styles at the beginning, they will acquire non-productive modes of coping which are difficult to alter. The need for structuring knowledge cannot be eliminated.¹²³

Head Start and other programmes point out the need for early intervention and instruction in specific skills deficient in the children who generally come from underprivileged homes.¹²⁴ The uneven results of Head Start¹²⁵ attest to the necessity of reevaluating those programs and the test procedures used.¹²⁶

Educators advocating the continuous progress approach deal quite adequately with the problem of reconciling the influences of maturation and experience. The solutions include delay of instruction, searching for a match between the child and the material to be learned and direct inter-

vention.

Influences on curriculum design. Because of the broad range of philosophies based on the general readiness approach, many diverse curricula would be expected and such is, in fact, the case. Though the educators seem to be in general agreement about the validity of presenting material at the so-called critical moment, they diverge in their opinions regarding what to do if the necessary readiness is not present.

Regardless of the specific interpretation of readiness, the actual learning environments in which the children are placed are basically uniform, and suggestions for curricula are outlined in numerous texts.¹²⁷ The difference between the three approaches appears to involve teacher attitudes and methods rather than the actual curricula, per se.

Teachers who espouse the delay tactic should, according to Ilg and Ames, check continually on the child's abilities and adjust instruction to the child's developmental level.¹²⁸ Johnson and McCandless agree.¹²⁹ Gesell summarizes the logic behind postponement of instruction: "Environmental factors support, inflect, and specify; but they do not engender the basic forms and sequences of ontogenesis."¹³⁰ It would follow that teachers should organize the environment so as to support development, and when readiness occurs, they will instruct at the child's level.

Proponents of the match or fit theory would recommend constant evaluation of the child's level coupled with instruction geared to that level.¹³¹ As Downing has pointed out, the problem of achieving a match can be alleviated by adjusting the task to fit the child as well as by providing a range of activities which help develop sub skills.¹³²

Dewey discussed the nature of subject matter in Democracy and Education.¹³³ It was made clear that teachers have distinct responsibilities in the process of learning because of their larger experience and ability to com-

municate relevant ideas and facts.¹³⁴

Educators who call for systematic attention to cognitive learning do not underestimate the value of play and learning by discovery. They do, however, consider that the risks of understimulation are as great as the dangers of overstimulation and recommend that a portion of time each day be spent in guided activity.¹³⁵

The greatest undertaking in the area of intervention is, of course, Head Start which involves many experimental projects.¹³⁶ Follow up programmes currently under way will attest to the overall efficiency of this massive undertaking.

The difficulty of clearly delimiting the proposed three areas of readiness is best exemplified by a look at James Hymes, Jr. who tended to vacillate from one point of view to the other. He adopted the waiting approach to reading, in particular, saying that time, not practice is the answer.¹³⁷ Later, however, Hymes maintained that readiness means that the child is always ready to learn,¹³⁸ and the challenge is to find the content and methods of teaching that fit the young child.¹³⁹ He then decried passivity and stated that the teacher should sensitively know when to reinforce sound learnings and to avert miseducative happenings.¹⁴⁰ Obviously the problem of delimiting oneself is a real one.

The educational implications of the principle of readiness were nicely summarized by Ausubel. He advised meticulous research in a school setting to answer questions concerning methods, to assess readiness and to increase readiness wherever necessary and desirable.¹⁴¹

The readiness approach is characterized by a close observation of the individual child, a stimulating environment, and interaction between adults and children. Carefully thought out, activity-centred curricula provide for varying amounts of instruction, depending on the bias of the individual teacher.

Skills Acquisition

The skills acquisition approach refers to the view that there are certain skills that young children should possess and that those skills can be and should be taught directly.

Historical perspective. Locke, probably best known for his "tabula rasa" approach to learning, suggested that humans are born with the capacity for knowledge but without practice they will not attain perfection. He cautioned against engaging the mind in tasks beyond its strengths because this might promote an aversion to such tasks,¹⁴² and added that all instruction be tempered with love so that the child will enjoy his lessons.¹⁴³

The influence of the maturationists prevailed until the beginning of the twentieth century when psychologists in the United States, particularly, began to question the maturationist theories and to conduct experiments to investigate the effects of environment on learning.

Watson speculated that the most important thing about man is what he does and suggested that he be studied in order to predict how he would act in a given situation. The real goal of behaviourism is to provide the basis for the prediction and control of human beings.¹⁴⁴

It has been suggested by Thorndike that intellect, character and skill are the product of original tendencies and training.¹⁴⁵ He further stated that the only forces that account for anything in man's work are repetition and reward, and explained the connections between S, any situation to which man could become sensitive, and R, any thought, feeling or act. Desirable connections should be rewarded or reinforced, but undesirable connections should never be punished.¹⁴⁶

Tolman rejected both the conditioned reflex theories of Pavlov and the connectionist theories of Thorndike. He asserted that numerous experiments had suggested that

learning is not a matter of direct connections between stimuli and responses, but that there are intervening variables to be considered.¹⁴⁷ Hull, Spence and Guthrie carried on the work begun by Tolman.¹⁴⁸

Skinner agreed that the stimulus-response model was not convincing. He pointed out that what the environment does to an organism after it responds to a stimulus must also be taken into account. Two results of this thinking were the conclusions 1) that operant behaviour can be studied by arranging environments in which specific consequences are contingent upon it and 2) that the environment can be manipulated. Skinner went on to suggest that a technology of behaviour is the only way to solve our problems, but that such a solution will continue to be rejected until certain moral questions are adequately dealt with.¹⁴⁹

A study by Skeels and Dye on the effects of environment on mentally retarded children¹⁵⁰ had considerable impact on educational psychology. On the grounds of American principles of democracy, Bloom urged that optimum environmental conditions be provided for all children.¹⁵¹

Bereiter stated quite clearly that children must be educated. It is sheer romance, he went on to say, to imagine that they can grow into adequate adults without some influence from outside of themselves. Children must be encouraged to express, through their activities, the best that is in them, and it is the duty of those who care about children to impose that value.¹⁵²

In France Binet studied individual differences and developed an intelligence scale. He postulated that intelligence shows change in relation to shifts in the environment and was surprised and concerned at the prejudice against the concept of the modifiability of intelligence.¹⁵³ He termed the idea of fixed intelligence "brutal pessimism"¹⁵⁴ and maintained that it is, indeed, possible to increase the capacity to learn, to improve with instruction.¹⁵⁵

The literature clearly reflects the behaviourists'

interest in research as opposed to the maturationists' reliance on observation.

Those who advocate the skills acquisition approach appreciate the basic contribution of heredity, but emphasize the role played by environmental stimuli. They believe that the answer to the problems of education lies in experimental research and technology.

Influence on curriculum design. The effects of behaviourism can be seen in three general approaches to learning in the early years. They include 1: the well-defined objectives, 2) the earlier ages at which teaching takes place, and 3) the use of teaching machines.

The Developmental Task Instructional System was devised to provide the "tools necessary to help young children develop and strengthen the skills they must possess to function successfully in a learning environment."¹⁵⁶ Developmental objectives are clearly defined, instructional activities are described, and evaluation procedures are planned.

Another program, Distar, is focused on the elimination of problem behaviour and the induction of skills that are needed for a full life in our society. Teachers using Distar are trained to use methods which include the use of signals, specific instructions and reinforcers.¹⁵⁷

Other programs based on principles similar to those discussed previously are Behaviour Analysis, DARCEE and TEEM, all described in Spodek's Early Childhood Education.¹⁵⁸

Glenn Doman recommended the teaching of reading to children as young as one year old, the rationale being that these are the years of insatiable curiosity. Doman suggested, furthermore, that children who have not learned to read early at home tend to associate the unhappiness of being separated from their mother with education and thus will be hampered throughout their school years by psychological stress.¹⁵⁹

Felicity Hughes, in the same vein, cited the gap between what a child understands and what he can read as

a cause of reading failure and as a reason for teaching reading early when the gap is narrow. An older child reading far below his comprehension abilities level, she reasoned, will be bored with the material and consequently become frustrated with reading. On the other hand, Hughes suggested that understanding a new book can be taught a child before he attempts to read that book.¹⁶⁰

Skinner recommended teaching machines with appropriate reinforcers and adequate programming to make education more efficient.¹⁶¹ In the preschool machines have been used to teach reading. The advantages of such machines include the one to one attention from the machine, the non-threatening impersonality of the machine, the immediate feedback and the pleasure inherent in learning to read.¹⁶² One such programme used the computerized typewriter devised by O. K. Moore.¹⁶³

Experimental research, technology and structure imposed by the teacher are characteristics of the skills acquisition approach. Curricula are standardized and include clear statements on objectives, methods and evaluation criteria.

SUMMARY

A review of the effects of early group experience has indicated that cognitive development has not always been enhanced by attendance at preschools.¹⁶⁴ Goodlad found little relationship between professed goals for early education and the actualities of the preschool programmes, especially in the areas of cognitive and motor development.¹⁶⁵

History has provided us with models upon which to build viable and effective curricula designed to meet the needs of children, teachers and society. The growing recognition of the value of cognitive development in the early years will, it may be assumed, accelerate the drive toward more research into all areas of early childhood education and toward better quality teacher training.

Mauritz Johnson has pointed out: "No program is as good as its proponents hope it is, nor as bad as its opponents fear it is. This applies to both the conventional program and its innovative rival."¹⁶⁶ The literature seems to lead one to the conclusion that an objective look at all programmes and their possibilities would be in the best interests of everyone concerned with the education of young children.

NOTES TO CHAPTER II

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CHAPTER III

DESIGN OF THE STUDY

The purpose of the study was to measure the change in the levels of cognitive skills of children attending both kindergarten and day care centres on the University of British Columbia campus and its environs and to evaluate the test used as a tool in assessing levels and changes in children's cognitive development.

In this chapter, the description of the nature of the sample, the materials used to collect the data and the procedures followed are discussed under the headings: Subjects, Materials and Procedures.

SUBJECTS

The children were drawn from ten day care centres on the University of British Columbia campus and its environs and attended kindergartens in the same general areas during the 1974-75 school term. The total population of kindergarten children attending day care was used, a number that amounted to 49 children.

Forty-nine children, 31 boys and 18 girls were tested in February. Thirty-nine children, 24 boys and 15 girls, were available for retesting in June. Reasons for absences were moves or vacations at the time of retesting.

The mean chronological age of the children at the time of the February testing was 67.08 months, with a range from 61.70 to 73.36 months.

MATERIALS

Evaluation of the children's level of cognitive skills was based on the subtests of the Boehm/Slater: Cognitive Skills Assessment Battery and a subtest from the Murphy-Durrell Reading Readiness Analysis.

The subtests included in the Boehm/Slater: Cognitive Skills Assessment Battery were:

- a) Basic Information
- b) Identifying Body Parts
- c) Color Identification
- d) Shape Identification
- e) Number Knowledge
- f) Information From Pictures
- g) Picture Comprehension
- h) Story Comprehension
- i) Multiple Directions
- j) Large Muscle Coordination
- k) Memory
- l) Visual-Motor Coordination
- m) Vocabulary
- n) Symbol Discrimination
- o) Visual-Auditory Discrimination
- p) Auditory Discrimination

Very little data are available about tests of either validity or reliability in the test material provided. The test manual makes the general statement that the "competencies included in the battery are those deemed relevant to success at the kindergarten and grade one levels by teachers in the field,"¹ but cites no specific bases for making such judgments.

Field testing was carried out on 383 pre-kindergarten and 515 kindergarten children, a total of 898 children, at the beginning (October to early November) and the end (May to early June) of the school year. According to the manual, "Classes were selected in rural, suburban, and urban

locations across the United States. No attempt was made to be representative of all pre-kindergarten and kindergarten children. Socio-economic level of the population served by school areas was a further consideration."² There is no evidence to suggest that any attempt was made to develop reliability data.

Since the study was considered exploratory, the tests were used despite the weakness in the areas of validity and reliability. It was assumed that the study itself would yield information that might lead to improvement in the test manual.

The subtest selected from the Murphy-Durrell Reading Readiness Analysis was the Letter Knowledge Test - Level One (Identifying).

Concerning the validity of the test, Murphy and Durrell state that a correlation between the total score on Murphy-Durrell Reading Readiness Analysis and the total score on Metropolitan Readiness Test was found to be .80, and on Pintner-Cunningham Primary Test was found to be .64. The three tests were administered during the same testing period, September 1964. The correlations were based on all pupils in the standardized sample, N=12,231. Further correlations with a reading test administered at the end of first grade supports the validity of the test.³

Odd-even reliability coefficient and standard errors of measurement for the test total and subtest scores are stated as .90. The reliabilities of the subtest scores, while lower than that of the total test, are sufficiently high to allow the test user to make relatively clear distinctions between different individuals on the basis of subtest scores.⁴

PROCEDURES

A number of stages was involved in carrying out the study, which was conducted between February and June 1975.

Initial contact

In January each day care centre was visited by the researcher and permission was asked to test the children who were attending both kindergarten and day care during the 1974-75 school year. Generally speaking, day care supervisors made the necessary arrangements.

February testing

Each child was tested individually at the day care centre he attended. Testing was carried out in a separate room where there was a minimum of distraction and extraneous noise.

Testing was conducted during the period from February 16 to February 27, 1975.

The Boehm/Slater: Cognitive Skills Assessment Battery was administered according to the directions set out in the accompanying manual, followed by the Murphy-Durrell Letter Knowledge - Level One (Identifying) subtest. Because the children seemed to enjoy the first test given and did not become restless or appear tired, the letter knowledge test was administered immediately without a rest period.

The total time involved per child was about twenty-five minutes.

June testing

Conditions were the same as for the February testing.

Testing was conducted during the period from June 1 to June 11, 1975.

The same procedures for administering the tests were used in June as were used in February.

Test correction and scoring

All of the tests were hand scored by the investigator at the time of testing, according to directions set out in the manuals. The scores for all tests were entered on master sheets presented in Appendices A and B.

NOTES TO CHAPTER III

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CHAPTER IV

ANALYSIS OF DATA

In this study of the growth of cognitive skills of kindergarten children attending day care centres, attention was focussed on cognitive skills as assessed by the Boehm/Slater: Cognitive Skills Assessment Battery and the Letter Knowledge - Level One (Identifying) subtest of the Murphy-Durrell Reading Readiness Analysis.

Information concerning cognitive skills was gathered from tests administered by the investigator. The skills tested were subsumed under the following titles: Basic Information, Identifying Body Parts, Color Identification, Shape Identification, Number Knowledge, Information from Pictures, Picture Comprehension, Story Comprehension, Multiple Directions, Large Muscle Coordination, Memory, Visual-Motor Coordination, Vocabulary, Symbol Discrimination, Visual-Auditory Discrimination, Auditory Discrimination and Letter Knowledge. These tests made a total of 76 items.

To test the significance of difference between the subtest scores obtained in February and June, t-tests were computed.

RESULTS OF t-TEST ANALYSES

The results of the test for significance of the difference in means in the Boehm/Slater test are shown in Table I.

TABLE I
RESULTS OF t-TESTS TO ANALYSE SIGNIFICANCE OF DIFFERENCE
OF MEANS ON SUBTESTS AND TEST TOTAL OF THE BOEHM/SLATER:
COGNITIVE SKILLS ASSESSMENT BATTERY

Subtest	Feb. \bar{X}	June \bar{X}	t
Basic Information	3.6	4.4	4.01**
Identifying Body Parts	7.7	8.0	2.69*
Color Identification	5.8	5.8	1.67
Shape Identification	7.1	7.2	0.48
Number Knowledge	11.3	12.2	2.72**
Information from Pictures	5.9	6.2	1.45
Picture Comprehension	2.9	2.9	0.57
Story Comprehension	3.3	3.7	2.02
Multiple Directions	2.3	2.6	2.40*
Large Muscle Coordination	5.4	5.6	1.10
Memory	4.5	5.6	2.82**
Visual-Motor Coordination	5.5	5.8	2.35*
Vocabulary	7.6	8.1	1.56
Symbol Discrimination	7.8	8.1	1.87
Visual-Auditory Discrimination	3.6	3.6	0.93
Auditory Discrimination	3.9	4.3	1.51
Test Total	88.5	93.7	5.94**

** denotes significant at .01 level

* denotes significant at .05 level

As Table I shows, the differences between means were significant at the .01 level, as computed by the t-test, on the following subtests of the Boehm/Slater: Cognitive Skills Assessment Battery: Basic Information, Number Knowledge and Memory.

Differences between means were significant at the .05 level, as computed by the t-test, on the following subtests: Identifying Body Parts, Multiple Directions and Visual-Motor Coordination.

No significant differences between means were found on the following subtests: Color Identification, Shape Identification, Information From Pictures, Picture Comprehension, Story Comprehension, Large Muscle Coordination, Vocabulary, Symbol Discrimination, Visual-Auditory Discrimination and Auditory Discrimination.

The difference between means was significant at the .01 level on the Test Total.

Table II shows the results of the test for significance of the difference between means in the February and June testing on the Letter Knowledge subtest of the Murphy-Durrell Reading Readiness Analysis.

TABLE II

RESULTS OF t-TEST TO COMPARE DIFFERENCES BETWEEN MEAN
 SCORES ON THE LETTER KNOWLEDGE - LEVEL ONE (IDENTIFYING)
 SUBTEST OF THE MURPHY-DURRELL READING READINESS ANALYSIS

Subtest	Feb. \bar{X}	June \bar{X}	t
Letter Knowledge - Level One (Identifying)	16.3	17.3	1.72

** denotes significant at .01 level

* denotes significant at .05 level

As Table II shows, t-test statistics on the Letter Knowledge - Level One (Identifying) subtest of the Murphy-Durrell Reading Readiness Analysis revealed no significant difference between means.

RESULTS OF TEST EVALUATION

Following is an evaluation of the subtests of the Boehm/Slater: Cognitive Skills Assessment Battery.

Range of scores

The Memory and Story Comprehension subtests provided for a range of scores.

No range of scores was provided for on the Basic Information, Identifying Body Parts, Color Identification, Shape Identification, Number Knowledge, Information From Pictures, Picture Comprehension, Multiple Directions, Large Muscle Coordination, Visual-Motor Coordination, Vocabulary, Symbol Discrimination, Visual-Auditory Discrimination and Auditory Discrimination subtests.

Validity

Fourteen of the sixteen subtests appeared to measure the skills implied by the subtest title. These were Basic Information, Identifying Body Parts, Color Identification, Shape Identification, Number Knowledge, Information From Pictures, Story Comprehension, Multiple Directions, Large Muscle Coordination, Memory, and Symbol Discrimination.

In the judgment of the examiner, Visual-Auditory Discrimination, Vocabulary, and Auditory Discrimination did not appear to measure the skills implied by the subtest title.

Clarity of Instructions

Instructions which seemed clear for children of kindergarten age were provided for in the following subtests: Basic Information, Identifying Body Parts, Color Identifi-

cation, Shape Identification, Number Knowledge, Picture Comprehension, Story Comprehension, Multiple Directions, Large Muscle Coordination, Auditory Memory, Visual-Motor Coordination, Symbol Discrimination, Visual-Auditory Discrimination and Auditory Discrimination.

Instructions for Information From Pictures, Vocabulary and Visual Memory were judged inadequate for children of kindergarten age.

The judgments about the range of scores, validity of the subtests and clarity of instructions are summarized in Table III.

TABLE III
RESULTS OF TEST EVALUATION OF SUBTESTS OF BOEHM/SLATER:
COGNITIVE SKILLS ASSESSMENT BATTERY

Subtest	Range of Scores	Validity	Instructions
Basic Information		*	*
Identifying Body Parts		*	*
Color Identification		*	*
Shape Identification		*	*
Number Knowledge		*	*
Information From Pictures		*	
Picture Comprehension		*	*
Story Comprehension	*	*	*
Multiple Directions		*	*
Large Muscle Coordination		*	*
Memory	*	*	
Visual-Motor Coordination		*	*
Vocabulary			
Symbol Discrimination		*	*
Visual-Auditory Discrimination			*
Auditory Discrimination			*

* denotes adequacy in the area

CHAPTER V

SUMMARY AND CONCLUSIONS

The purpose of the study were 1) to assess the amount of growth of cognitive skills in kindergarten children attending day care centres, and 2) to evaluate the effectiveness of the Boehm/Slater: Cognitive Skills Assessment Battery as an instrument of measurement.

The data were analysed to determine whether there was a significant difference between the results of a first testing in February, 1975 and a second testing in June, 1975.

Individual test items of the Boehm/Slater: Cognitive Skills Assessment Battery were studied to assess 1) their ability to provide a continuum upon which to place children whose cognitive skills range from very weak to very well developed, 2) their usefulness as measures of certain cognitive skills, and 3) the clarity of the instructions for kindergarten age children.

SUMMARY OF FINDINGS

T-test analyses were carried out to determine the amount of growth in cognitive skills of the children tested, and a critical evaluation of the test used was made by the investigator.

Statistical analysis for cognitive skills

In the analysis of results a significant difference at the .01 level was found between means of the Test Total.

In the analysis of the results from the Boehm/Slater: Cognitive Skills Assessment Battery, significant differences at the .01 level were found between means of the following subtests: Basic Information, Number Knowledge, and Memory.

Significant differences at the .05 level were found between means of the following subtests: Identifying Body Parts, Multiple Directions and Visual-Motor Coordination.

No significant differences were found between means of the following subtests: Color Identification, Shape Identification, Information from Pictures, Picture Comprehension, Story Comprehension, Large Muscle Coordination, Vocabulary, Symbol Discrimination, Visual-Auditory Discrimination and Auditory Discrimination.

No significant difference was found between means of the Letter Knowledge - Level One (Identifying) subtest of the Murphy-Durrell Reading Readiness Analysis.

Critical evaluation of the Boehm/Slater test

Subtests which provided for a range of scores were the following: Memory and Story Comprehension.

Subtests which did not provide for a range of scores were the following: Basic Information, Identifying Body Parts, Color Identification, Shape Identification, Number Knowledge, Information from Pictures, Picture Comprehension, Multiple Directions, Large Muscle Coordination, Visual-Motor Coordination, Vocabulary, Symbol Discrimination, Visual-Auditory Discrimination and Auditory Discrimination.

Subtests that seemed to measure the skills they purported to measure were the following: Basic Information, Identifying Body Parts, Color Identification, Shape Identification, Number Knowledge, Information from Pictures, Story Comprehension, Multiple Directions, Large Muscle Coordination, Memory and Symbol Discrimination.

Subtests that did not seem to measure the skills they purported to measure were the following: Vocabulary, Visual-Auditory Discrimination and Auditory Discrimination.

Subtests with clear instructions were the following: Basic Information, Identifying Body Parts, Color Identification, Shape Identification, Number Knowledge, Picture Comprehension, Story Comprehension, Multiple Directions,

Large Muscle Coordination, Auditory Memory, Visual-Motor Coordination, Symbol Discrimination, Visual-Auditory Discrimination and Auditory Discrimination.

Subtests with unclear or vague instructions were the following: Information from Pictures, Vocabulary and Visual Memory.

CONCLUSIONS

From the findings of the study some general conclusions may be drawn.

1) Over a period of approximately four months there was significant growth in the cognitive skills of the children used in the study, as reflected in the Test Total of the Boehm/Slater test. The scores of individual subtests, however, revealed that there was growth on only seven of the seventeen skills measured. Either growth was limited to only seven of the areas tested or the tests provided were not sufficiently sensitive to growth that might have occurred.

2) There was no significant growth on the Letter Knowledge - Level One (Identifying) subtest of the Murphy-Durrell Reading Readiness Analysis. Although it might be argued that the pre-test score on letter knowledge was adequate, it can be seen that there was, at least in some cases, the need for intensive teaching of letters. It can be concluded, therefore, that the teaching of letters is either not considered appropriate for children of this age level, or the methods of teaching are inadequate.

3) The effectiveness of the subtests appeared to be limited by their lack of range of scores, their failure to measure the skills they were meant to measure and/or the ambiguity of the instructions given.

SUBJECTIVE REACTIONS TO TEST AND ANALYSIS CARRIED OUT

The fact that there was evidence of significant growth in cognitive skills among the children used in the study suggests that attendance at kindergarten and day care centres may contribute to that growth. Alternate explanations would include parental influences and general maturation.

The actual value of the Boehm/Slater test as an appropriate set of subtests of particular cognitive skills can be questioned in the light of the difference between the totals and subtest scores. It seems that a disproportionately small number of subtest scores skewed the t-test of the Test Total. It might, therefore, be more useful to examine the contribution made by each subtest to the usefulness of the test as a whole. It might be advisable to evaluate each subtest, omit some altogether or make the test a longer, more comprehensive one in which children have more opportunity to display the extent of their knowledge. Such a test might have to be given in two or more sessions.

The Boehm/Slater test seemed aimed at pointing out extreme weakness. A more useful goal would be to attempt to establish a continuum along which to place children of widely differing abilities.

IMPLICATIONS OF THE STUDY

It was felt by the investigator that a number of implications from the study could be useful to preschool educators.

- 1) If preschool teachers feel that the cognitive skills measured should improve during a year in kindergarten and day care, they may wish to consider carefully the implication of the "no growth" finding on many tests. It may be they will wish to examine their objectives and programmes more closely.

2) Careful evaluations of tests should be made before one is selected for widespread use as a basis for assessing children's cognitive levels and for establishing programmes for those children.

3) If evaluations are to become practice in early childhood programmes, many more evaluation measures and procedures will be needed.

FURTHER QUESTIONS TO BE INVESTIGATED

From the present study certain questions concerning the growth in cognitive skills of kindergarten children attending day care centres have arisen.

1) Was the evident growth in cognitive skills due primarily to preschool curricula, parental guidance or general maturation?

2) What would an assessment of three year olds, four year olds and five year olds on the Boehm/Slater test show about the growth of cognitive skills of young children?

3) What in the preschool curriculum contributes most to cognitive growth?

4) Are cognitive skills seen by preschool educators as an integral part of the curriculum? If so, are the skills considered desirable actually taught, either directly or more indirectly by such methods as the "discovery" method?

5) What improvements in the Boehm/Slater: Cognitive Skills Assessment Battery would make it a useful test for preschool teachers in assessing cognitive growth?

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APPENDICES

APPENDIX A

APPENDIX A

SCORES ON INDIVIDUAL TESTS

OF THE BOEHM/SLATER:

COGNITIVE SKILLS ASSESSMENT BATTERY

AND THE

LETTER KNOWLEDGE - LEVEL ONE (IDENTIFYING)

SUBTEST OF THE MURPHY-DURRELL

READING READINESS ANALYSIS

FEBRUARY 1975 TESTING

KEY TO APPENDIX A

BASIC INFORMATION

- A - Print Name
- B - Address
- C - Birthdate
- D - Telephone Number
- E - Total

IDENTIFYING BODY PARTS

- A - Boy-girl
- B - Arm
- C - Leg
- D - Neck
- E - Total

COLOR IDENTIFICATION

- A - Blue
- B - Brown
- C - Red
- D - Total

SHAPE IDENTIFICATION

- A - Rectangle
- B - Square
- C - Triangle
- D - Circle
- E - Total

NUMBER KNOWLEDGE

- A - 3
- B - 5
- C - 7
- D - 4 Rabbits
- E - 6 Balloons
- F - 8 Flowers

- G - Symbols 3
- H - 9 Apples
- I - $2 + 5 = 7$
- J - Total

INFORMATION FROM PICTURES

- A - Sitting-ball
- B - Painting
- C - Swinging
- D - Blocks
- E - Total

PICTURE COMPREHENSION

- A - Rains
- B - Ride in
- C - Hold together
- D - Total

STORY COMPREHENSION

- A - Dog did
- B - Jean put on last
- C - Jean didn't wear
- D - Joe--end of story
- E - Joe gave kitten
- F - Total

MULTIPLE DIRECTIONS

- A - Ball and doll
- B - Tall and red flowers
- C - Dog, box and doll-chair
- D - Total

LARGE MUSCLE COORDINATION

- A - Jump
- B - Hop

- C - Skip
- D - Total

MEMORY

- A - Cow-pie-bed
- B - The boy played ball
- C - Visual memory
- D - Total




VISUAL-MOTOR COORDINATION

- A - ○
- B - □
- C - Δ
- D - N
- E - R
- F -
- G - Total

VOCABULARY

- A - Apple
- B - Rain
- C - Elbow
- D - Whisper
- E - Chase
- F - Injure
- G - Total

SYMBOL DISCRIMINATION

- A - 
- B - 
- C - 
- D - A
- E - W
- F - e
- G - d
- H - n

I - B
J - g
K - Total

VISUAL-AUDITORY DISCRIMINATION

A - coat (initial)
B - sun (initial)
C - lamp (end)
D - house (medial)
E - Total

AUDITORY DISCRIMINATION

A - Flower-Flower
B - Hand-Sand
C - wreath-wreath
D - pet-pit
E - Kart-Karp
F - Total

TEST TOTAL

LETTER KNOWLEDGE

CHILD	SEX	BIRTHDATE	BASIC INFORMATION					IDENT. BODY PARTS					COLOR IDENTIFICATION				SHAPE IDENTIFICATION											NUMBER KNOWLEDGE											INFORMATION FROM PICTURES					PICTURE COMPREHENSION				STORY COMPREHENSION						MULTIPLE DIRECTIONS				LARGE MUSCLE COORDINATION				MEMORY				VISUAL-MOTOR COORDINATION							VOCABULARY											SYMBOL DISCRIMINATION											VISUAL-AUDITORY DISCRIMINATION					AUDITORY DISCRIMINATION						TEST TOTAL	LETTER KNOWLEDGE
			A	B	C	D	E	A	B	C	D	E	A	B	C	D	A	B	C	D	E	F	G	H	I	J	A	B	C	D	E	A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F	G	H	I	J	K	A	B	C	D	E	A	B	C	D	E	F																																										
1	M	30/9/69	2	1	1	1	5	2	2	2	2	8	2	2	2	2	6	2	2	2	1	7	2	2	2	2	2	2	2	2	2	2	1	1	1	1	15	1	1	2	2	6	1	1	1	3	1	1	1	1	1	5	1	1	1	3	2	2	1	5	3	2	3	8	1	1	1	1	1	1	6	2	2	2	2	2	2	12	1	1	1	1	1	1	1	1	1	1	1	1	1	10	1	1	1	1	1	4	1	1	1	1	1	5	108	23	
2	M	4/2/69	2	2	2	1	7	2	2	2	2	8	2	2	2	2	6	2	2	2	2	8	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	14	2	2	2	2	8	1	1	0	2	1	1	1	0	4	1	0	1	2	2	2	2	6	0	1	3	4	1	1	1	1	1	1	6	2	2	1	2	2	2	11	1	1	1	1	1	1	0	0	8	1	1	1	1	1	4	1	0	1	1	1	4	102	23						
3	M	24/5/69	2	1	0	0	3	2	2	2	2	8	2	2	2	2	6	2	2	2	2	8	2	2	2	2	1	1	1	1	1	1	1	1	1	1	12	2	1	2	1	6	1	1	1	3	1	1	1	0	4	1	1	1	3	2	2	2	6	1	2	2	5	1	1	1	1	1	1	6	2	2	2	1	2	2	11	1	1	1	1	1	1	0	0	7	1	1	1	1	1	4	1	1	1	1	1	5	97	20							
4	F	1/11/69	2	0	2	1	5	2	2	2	2	8	2	1	2	5	2	2	2	2	8	2	2	2	2	2	2	1	1	0	1	1	1	0	10	1	2	2	7	1	1	1	3	1	1	1	3	1	1	1	0	4	1	1	1	3	2	2	2	6	0	0	3	3	1	1	1	0	0	4	2	2	1	0	2	0	7	1	0	1	1	1	1	1	1	9	1	1	0	1	3	1	1	1	0	0	3	88	19								
5	F	19/10/69	2	0	1	1	4	2	2	2	2	8	2	2	2	6	2	2	2	2	8	2	2	2	2	2	2	2	2	2	2	2	1	0	0	13	2	1	2	1	6	1	1	1	3	0	1	1	1	0	3	1	1	1	3	2	2	1	5	3	1	2	6	1	1	1	1	1	1	6	2	1	1	1	1	0	6	1	1	1	1	1	0	7	1	1	1	1	4	92	20																
6	M	28/6/69	2	1	1	0	4	2	2	2	2	8	2	2	2	6	2	2	2	2	8	2	2	2	2	2	2	2	2	2	2	2	1	0	0	11	1	2	2	7	1	1	1	3	1	1	1	3	1	1	1	0	4	1	1	1	3	2	2	1	5	1	0	0	1	1	1	6	2	1	0	1	1	2	7	1	1	1	1	1	1	0	5	1	1	1	1	1	4	79	8																
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8	F	22/10/69	2	0	0	0	2	2	2	2	2	8	2	2	2	6	2	2	2	2	8	2	2	2	2	2	2	2	2	2	2	2	1	0	0	12	1	2	2	2	7	1	1	1	3	1	1	1	3	1	1	1	0	4	1	1	1	3	2	2	1	5	1	0	0	1	1	1	6	2	1	0	1	1	2	7	1	1	1	1	1	1	0	5	1	1	1	1	1	4	94	21															
9	M	17/5/69	2	1	0	0	3	2	2	2	2	8	2	2	2	6	2	2	2	2	8	2	2	2	2	2	2	2	2	2	2	2	1	0	0	9	1	1	1	6	1	1	1	3	0	1	0	0	1	1	1	1	3	2	2	1	5	1	0	0	1	1	1	6	2	1	0	1	0	5	1	1	1	1	1	1	0	9	1	1	1	1	1	5	83	21																					
10	M	10/1/69	2	1	0	0	3	2	2	2	2	8	2	2	2	6	2	2	2	2	8	2	2	2	2	2	2	2	2	2	2	2	1	0	0	9	1	1	1	4	1	1	1	3	1	0	0	0	1	1	0	0	1	1	0	0	1	1	1	6	2	2	2	2	2	0	10	1	1	1	1	1	1	0	6	1	1	1	0	1	1	1	0	6	1	1	0	1	3	76	18																
11	M	14/12/69	2	2	0	0	4	2	2	2	2	8	2	2	2	6	2	2	2	2	8	2	2	2	2	2	2	2	2	2	2	2	1	1	1	0	8	1	1	2	1	5	1	1	1	3	1	0	1	1	0	3	1	1	1	3	2	2	2	6	3	0	1	4	1	1	1	1	0	5	2	1	1	0	2	0	6	1	1	1	0	1	1	1	5	78	6																				
12	M	19/2/69	2	0	2	0	4	2	2	2	2	8	2	2	2	6	2	2	2	2	8	2	2	2	2	2	2	2	2	2	2	2	1	1	1	0	13	1	2	2	1	6	1	1	1	3	1	0	1	1	0	3	1	1	1	3	2	2	0	4	3	0	0	1	4	1	1	0	0	3	2	1	0	2	0	6	1	1	1	0	1	1	7	0	1	0	1	2	1	1	1	5	82	15													
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14	F	25/8/69	2	0	2	0	4	2	2	2	2	8	2	2	2	6	2	2	2	2	8	2	2	2	2	2	2	2	2	2	2	2	1	1	1	0	11	1	2	2	1	5	1	1	1	3	1	1	1	0	4	1	0	0	1	1	1	3	2	2	1	1	1	0	3	2	2	1	1	1	1	8	1	1	1	1	1	1	0	7	1	0	1	1	3	86	8																				
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16	F	24/5/69	2	0	0	1	3	2	1	1	2	6	2	2	2	6	2	2	2	2	8	2	2	2	2	2	2	2	2	2	2	2	1	1	1	0	11	1	2	2	1	6	1	1	1	3	1	0	0	1	1	0	2	1	0	0	1	1	1	6	2	1	0	1	1	0	5	1	1	1	1	1	1	0	9	1	1	0	0	2	1	1	1	3	77	18																					
17	M	16/8/69	2	0	1	0	3	2	2	2	2	8	2	2	2	6	2	2	2	2	8	2	2	2	2	2	2	2	2	2	2	2	1	1	1	0	11	1	1	2	1	5	1	1	1	3	1	0	0	1	1	0	3	1	0	0	1	1	1	6	2	2	2	6	0	0	3	3	1	1	1	1	1	6	2	1	1	1	0	2	7	1	1	1	1	1	0	8	1	1	0	1	3	89	13												
18	F	8/5/69	3	2	2	1	8	2	2	2	2	8	2	2	2	6	2	2	2	2	8	2	2	2	2	2	2	2	2	2	2	2	1	0	0	6	1	1	2	2	6	1	1	1	3	1	0	1	1	4	1	0	0	1	1	0	0	1	1	0	0	1	0	1	2	4	1	0	1	1	0	4	1	1	1	1	1	5	109	25																											
19	F	4/6/69	3	2	2	1	8	2	2	2	2	8	2	2	2	6	2	2	2	2	8	2	2	2	2	2	2	2	2	2	2	2	1	1	1	0	15	2	2	2	1	7	1	1	1	3	1	0	1	1	4	1	1	1	3	2	2	2	6	3	1	2	3	7	1	1	1	1	1	6	2	2	1	2	1	2	10	1	1	1	1	1	0	1	1	9	1	1	1	1	1	4	97	14													
20	F	11/12/69	2	0	2	1	5	2	2	2	2	8	2	2	2	6	2	2	2	2	8	2	2	2	2	2	2	2	2	2	2	2	1	1	1	0	10	2	2	2	2	8	1	1	1	3	1	1	1	0	4	1	0	1	1	2	1	0	1	1	0	1	2	1	0	1	2	2	2	6	1	1	1	1	1	6	2	2	1	2	0	8	1	1	1	1	1	0	8	1	1	1	1	1	4	84	16										
21	M	2/4/69	2	0	0	0	2	2	2	2	2	8	2	2	2	6	2	2	2	2	8	2	2	2	2	2	2	2	2	2	2	2	1	1	1	0	8	1	1	2	1	6	1	1	1	3	1	0	1	0	3	1	0	1	2	1	0	1	1	6	2	2	1	2	1	0	7	1	1																																						

APPENDIX B

APPENDIX B

SCORES ON INDIVIDUAL TESTS

OF THE BOEHM/SLATER:

COGNITIVE SKILLS ASSESSMENT BATTERY

AND THE

LETTER KNOWLEDGE - LEVEL ONE (IDENTIFYING)

SUBTEST OF THE MURPHY-DURRELL

READING READINESS ANALYSIS

JUNE 1975 TESTING

KEY TO APPENDIX B
IS THE SAME AS KEY TO APPENDIX A

[illegible]