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ABSTRACT

This report attempts to respond to a series of questions commonly asked about the nation-wide experiment to provide equality of educational opportunity to children born to families of poverty. The report focuses on the following questions: (1) Why did this program of experimenting with early childhood education happen to get launched midway in the early 1960s?, (2) What were the goals of the program, the hopes for it, and how realistic were these hopes? (3) What have been the accomplishments of Project Head Start and of the related investigations and developments that launching Head Start served to inspire?, (4) What have the public reactions been to what has been called the 'failure of Head Start'?, and (5) What have we learned that will be of use in the future? It is suggested that the challenge for the next decade in early childhood education rests on the construction of ordinal scales for assessing development taking place between the sensorimotor phase and the achievement of concrete operations. In total, this report is a comprehensive, descriptive, 'state of the art' analysis of the major early childhood programs of the sixties. (CS)

REFLECTIONS ON A DECADE OF EARLY EDUCATION[1]

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We in these United States are now emerging from a decade of experimenting with early childhood education. This experimenting has provided children of parents with low incomes and little or no education at ages of four, and sometimes only three years, with a summer, or a year, of preschooling. The purpose has been to give these children a head start in order to make up for what they had no opportunity to learn at home so that they might become able to perform more adequately in the elementary and secondary schools.

This nation-wide experimenting has included a number of federally-supported programs. The first was Project Head Start. It was launched in 1964, and it has been made available to a substantial portion of the children of poverty from a large share of the communities across the country. The second has been an extension up the age scale in what has been termed Program Follow-Through. This program has extended compensatory education continuously through grade three. The third program is an extension of Head Start down the age scale in the Parent and Child Centers that were started in the Office of Economic Opportunity and some of which are now continuing in the Office of Child Development. Fourth, and finally, is the newer program called Home Start. It was launched by the Office of Child Development under the leadership of Professor Edward Zigler of Yale during his term as director of that Office, and the focus of the program is on

parents as teachers of their infants and children of preschool age. Although these programs have fallen far short of including all children, they have been nation-wide. In addition, launching Head Start has also served to augment investigations of class differences in competencies and in opportunities to learn and developments in the technology of early education.

Many people have been curious about these programs. What I wish to do here is to provide what appear to me to be answers to a series of questions commonly asked.

First, why did this program of experimenting with early childhood education happen to get launched midway in the early 1960s?

Second, what were the goals of the program, what were the hopes for it, and how realistic were these hopes?

Third, what have been the accomplishments of Project Head Start and of the related investigations and developments that launching Head Start served to

Fourth, what have the public reactions been -- especially to what is called the "failure of Head Start?"

Fifth, what have we learned that will be of use in the future?

In attempting to answer these questions, I report as one who has been concerned with investigating the effects of early experience throughout most of his professional life and as one who has been concerned with early compensatory education since before Project Head Start was launched (Hunt, 1962).

WHY HEAD START WAS LAUNCHED

Head Start was launched in 1964 as part of the Kennedy-Johnson War on Poverty, but there is more to the story. Three kinds of considerations appear to have participated in the launching of Project Head Start. One was ethical. Our forefathers founded these United States on the ethical assumption of equality of opportunity for all. The second was the serious needs of children from families of poverty. It is the children of poverty who most commonly fare badly in school and drop out before they have achieved the credentials (Jencks, 1972) or the skills required for employment in our increasingly technological society. The third was the evidences of plasticity in psychological development (see Hunt, 1961). These evidences made the ethics of equality of opportunity relevant to the fates of the children born by accident to families of poverty. The combination of these three kinds of considerations produced a challenge with ethical compulsion behind it.

It takes a bit of history to explain why this ethical compulsion had failed to appear earlier. In the nineteenth century, Darwin's theory that evolution comes about through the survival of the fit got interpreted, especially by Herbert Spencer, Francis Galton, and William Graham Sumner, to imply that the characteristics of individuals and their development are essentially predetermined by heredity. The intelligence-testing movement derived from the anthropometric laboratory of Francis Galton in England, and from the work of Alfred Binet and his collaborators in France. Galton wanted the tests for eugenic purposes. Binet wanted the tests in order to provide a guide for helping the poor learners in the Paris schools to do

better. It was the hereditarian interpretation of Francis Galton that prevailed. After Wilhelm Stern (1912), of Germany, proposed dividing the mental ages of children by their chronological ages to obtain their intelligence quotients or IQs, the IQ came to be viewed as a measure of the essentially-fixed ability of individuals predetermined by their heredity. It was this belief that reinforced the claim for the constancy of the IQ despite evidence to the contrary. During the 1920s and 1930s, various studies showed the IQ to be less constant, especially during infancy and the preschool years, than supposed (see Hunt, 1961, Chap. 3). The IQ, or the DQ (Developmental Quotient, the counterpart of the IQ for infants) showed large modifications that got explained as inherited variations in roles of development. Various suggestive evidences of plasticity in psychological development emerged here and there. Such was the strength of the collective faiths in predetermined development and in fixed intelligence, however, that their suggestive value was explained away in methodological critiques. Skeels and Dye (1939), for instance, found gains of from 7 to 52 points following the transfer of 13 infants, mostly in their second year, from an orphanage to the ward for young moron women in a state institution for the mentally retarded. These infants had got little care and attention in the orphanage, but they became the pets of the women in the institution for the retarded. I recall all too well the derision heaped upon Skeels when he reported this evidence at a meeting of psychologists in 1938. About 30 years later, he, with Marie Skodak, received one of the Kennedy Awards for their pioneering studies of which this was one. At that time, however,

anyone who entertained the idea of trying to increase the "natural competence" of human beings with early educational procedures of any kind was put off as a "soft-headed do-gooder." The point is that so long as people believed that the rate of psychological development is predetermined and that intelligence is fixed by heredity, the ethic of equal opportunity had no force toward the provision of special educational opportunities for those children who, by chance, had been born to parents without education and without the skills that earn high incomes.

Following World War II, however, evidences of plasticity in behavioral development, and especially in early behavioral development, continued to accumulate. The neuropsychological theorizing of Donald Hebb (1949) inspired a variety of investigations indicating that the adult problem-solving abilities of animals vary substantially with the nature of their early sensorimotor experiences. Those reared as pets, or merely with an opportunity to look at a variety of patterns, proved to be better solvers of maze problems as adults than their litter-mates reared in laboratory cages (Hebb, 1947; Thompson & Heron, 1954). Moreover, the degree of superiority in the problem-solving ability of pet-reared Scottie dogs over their cage-reared litter-mates (Thompson & Heron, 1954) was found to be more pronounced than the degree of superiority found for pet-reared rats over their cage-reared litter-mates. Such evidence suggested at least that the importance of early experience for later competence increases up the evolutionary scale (Hunt, 1961, p. 315ff). Moreover, the neurochemical theorizing of Helgar Hydén (see 1959) led to a number of studies of the importance of early post-natal experience for both

the anatomical and chemical development of neural structures in the eye, the thalamus, and in the brain (see Brattgård, 1952; Wiesel & Hubel, 1963; Krech, Rosenzweig, Bennett, 1966; Valverde, 1967; Volkmar & Greenough, 1972). Thus, early experience appeared to be important not only for behavioral development, but also for neuroanatomical maturation.

Other investigations suggested also that effects of variations in experience associated with socio-economic changes influence adolescent and adult competence as measured by tests of intelligence. These studies that I am about to synopsize originated from concern over differential fertility or the fact that about two-thirds of each new generation comes from the bottom third of the population in socio-economic-and-educational status. This bottom third falls about one standard deviation below the mean in IQ, and has an average IQ of about 85. Raymond B. Cattell (1937) estimated from a negative correlation of (-0.30) between IQ and number of siblings that we could expect the IQ to drop a little over three points each generation, or about one point a decade. This he characterized as a "galloping plunge toward intellectual bankruptcy." The actual changes found, however, have been increases in IQ rather than decreases. Moreover, these increases have been of the order of 10 points for the eight years, beginning in 1934, associated with the socio-economic changes instituted by the Tennessee Valley Authority (Wheeler, 1942), between 10 and 15 points for the samples of Minnesota highschools, tested first in the 1920s and again in the 1940s, by Frank Finch (1946), and 20 points for the mean IQs of children in a sample of schools in Honolulu first tested in 1924 and again in 1938 by Smith (1942). (For summaries see Hunt, 1961, Pp. 337-346.)

Poverty and people of poverty, of course, have always been with us. But the debasing effects of poverty were markedly increased by the coming of the Industrial Revolution. The novels of Charles Dickens and the economic writings of Karl Marx dramatized this debasement as it was manifest in England during the 19th century. Important in the timing of the launching of Head Start is the fact that, following World War II, the Industrial Revolution came to the farms and mines of the United States. Its coming deprived millions of farm laborers and pick-and-shovel miners of their relatively unskilled sources of livelihood. The mechanical cotton-picker deprived blacks and poor whites of their livelihood on farms of the South. They migrated to the cities. De jure segregation directed the migration of blacks to the cities of the North. Mechanical corn-pickers and sugar beet toppers operated in similar fashion on the farms of the Middle West, and mining machinery took the jobs of miners in such coal-producing regions as rural Appalachia. The result was the crowding and the worsening plight of people in the slums of American cities. This was dramatized by Michael Harrington (1962) in his book entitled The Other America.

The situation was serious. It called loudly for action. Moreover, the evidences of plasticity in psychological development made our traditional value of "equality of opportunity" relevant to the preschool opportunities for learning of children born by chance to parents of poverty. This consideration made the call for action ethically compelling. Also, such evidence as I have just described made it seem reasonable to hope that a large-scale experiment in early education, such as Project Head Start, might succeed in

enabling the coming generation to achieve that level of competence required for employability in our highly technical culture. I believe this is a fair statement of the conditions that combined to produce the climate of opinion in the country and in the Congress during the early 1960s required to motivate the launching of Project Head Start as well as the other components of the War on Poverty. It was highly unfortunate that the Viet Nam War came simultaneously.

THE GOALS AND HOPES

In considering the question of the goals and expectations of Project Head Start, it is important to separate from the goals, strictly defined, the expectations and hopes which developed. The goal was to utilize pre-school experience to compensate for the effects of the opportunities for learning missing during the early years for infants and young children of parents of poverty with little educational background. The evidences of plasticity not only made the ethics of equal opportunity relevant to the pre-school period, they also justified this limited goal of Head Start. On the other hand, the pessimistic beliefs in predetermined development and fixed intelligence had previously discouraged extensive investigation of early childhood education during the preceding decades so that educators and students of child development were largely ignorant of how to go about compensating children for the opportunities they had missed at home. Studies of child development had been guided by the normative model of Gesell (1954). They revealed little about how to foster the intellectual and motivational

development underlying competence. Nevertheless, many of those who accepted the decision to launch Project Head Start fully expected that a summer or a year of experience in a nursery school might overcome any deficiencies in the family-based education of children of poverty and thereby enable them to compete on essentially even terms in the elementary schools with children from middle-class families.

It is one thing, however, to have evidence that something is possible, and quite a different thing to have the technological know-how to achieve that possibility. Thus, despite the hope-justifying evidences of plasticity in development, the expectations that a summer or a year of nursery-schooling would enable children of poverty to catch up and to compete on equal terms with children of middle-class was entirely unrealistic. Those of us most concerned with investigations of the effects of early experience and most convinced of the plasticity in early psychological development were fearful that the hopes for Project Head Start were being set unrealistically high. Although we were making some educated guesses, we knew that a tested educational psychology for infancy and early childhood was lacking. Some of my own early guesses, such as the idea that the noise and the variety of experiences associated with the crowding of families of poverty might help to foster development in early infancy, proved to be very wrong (Hunt, 1962; Wachs, Uzgiris & Hunt, 1971). Although those of us concerned with early experience hoped we were wrong, the idea of overcoming the effects of four years of experience poorly calculated to foster psychological development sufficiently to enable children of poverty to compete on equal terms with

children of middle-class in the public schools seemed highly unlikely. Moreover, we were concerned that over-selling early childhood education with unrealistic expectations might lead in turn to an over-kill of federal support for such an enterprise.

THE ACCOMPLISHMENTS

One can answer the question concerning accomplishments in several ways. There are even differing ways of assessing the direct results of Project Head Start. One may proceed directly to a test of the unrealistic hopes for the whole, nation-wide project by comparing the scholastic achievements, scholastic performances, and test performances of the children of poverty who participated in a Head Start program with those of children from middle-class families. Even with the experience of Head Start, the children continue to score well below the children from families of the middle-class -- on the average. For those expecting Head Start to achieve a catch up for the children of poverty, it clearly failed.

Even without such a catch up, Head Start could have accomplished a great deal. One may assess such direct accomplishment in the performances of children by comparing the gains in scores during participation in a Head Start program by participants and non-participants from similar backgrounds. Most of the studies employing this approach reported larger gains for participants than non-participants. By the end of a year in the public schools, however, this difference between the performances on tests of achievement

and intelligence had typically diminished or disappeared.

Thus, the findings of such large-scale surveys as that by the United States Commission on Civil Rights (1967) and by the Westinghouse Corporation (Cicarelli, 1969) indicated not only that Head Start had failed to fulfill the unrealistic hopes for catch up, but had produced only temporary gains. Although investigators attempted in some degree to individualize the findings from various programs, only the nation-wide average effect got across to the public. These nation-wide averages failed to take into account the fact that some programs were well planned and well run and got substantial effects which persisted, although in diminishing degree, for at least two years while other programs were too frought with problems of planning and management to permit children to participate in them with profit. In their book entitled Head Start: A Tragicomedy with Epilogue, Payne et al. (1973) contend that "persons involved directly in Head Start programs as employees, volunteers, and parents realize that the 'real' purpose of Head Start is community action . . . . attempting to operate . . . under . . . 'grass roots' administrative philosophy (p. 1)." In consequence, curricular planning lacked even the expertise available at large; paraprofessionals were inadequately trained and supervised to aid teaching; transportations services became a "nightmare on wheels;" and parents proved a highly mixed blessing in both administration of the program and the teaching of the children. The main purposes of this book are to call into question the "'grass roots' administrative philosophy," and to promote recognition that the administrative system for community programs like Head Start should be one "that is directive enough to get the job

done yet at the same time encourages the employees to mature (Payne et al., 1973)." In similar fashion, evaluative operations should evaluate separately the several aspects of programs. The performances of children in those that failed in ways that destroyed the possibilities of providing an acceptable educational program should not figure in the averaged results of the nation-wide program.

The awesome size of Project Head Start served also, however, to augment greatly a number of related enterprises that were already underway on a small scale and to set in motion still others. It greatly increased the concern of investigators with the nature of class differences in various aspects of competence and motivation. Second, it greatly increased their concern for class differences in the opportunities to develop the cognitive abilities and the motives underlying competence and the values that help to control conduct. Third, it motivated the development of a variety of educational innovations designed specifically to compensate children of poverty for the opportunities missed within their families. Fourth, the various attempts to involve parents in compensatory education produced findings that suggested modification in earlier approaches to the modification of child rearing and set off new kinds of attempts to teach parents of poverty to be more effective educators of their infants and young children. Since the results of these several investigative and developmental efforts may in the long run be more important than any directly resulting from Head Start programs, it is essential to summarize them.

Investigative Accomplishments

One can well summarize the class differences in abilities, motives, and values together with differences in the opportunities to acquire them. Concern for these class differences led first to reviews of the already-existing literature. These brought out the higher incidence of nutritional deficiences and emotional stress in mothers of poverty at the time of conception and during pregnancy than among those with average or higher than average incomes. Higher incidences of nutritional deficiency were associated with higher incidences of infant mortality, prematurity, and birth defects among the poor than among the more affluent (for sources, see Hunt, 1969, p. 204).

Reviews of the already-existing literature also brought out that children of poverty are typically acquainted with a less complex variety of objects, places, and persons than are children from middle-class backgrounds. It is hardly surprising, therefore, to find children of poverty falling substantially below the norms for tests of recognition vocabulary, and vocabulary of use. New studies brought out that parents of poverty typically spend less time in verbal interaction with their children than do parents of the middle-class. Even while communicating with their children, parents of poverty verbalize in sequences substantially shorter than do parents from middle-class backgrounds. Moreover, when children of the poor ask questions or "talk up," their parents are all too likely to respond with, "Shut up" without even saying why. Middle-class parents also tell their children to "Shut up," but they typically follow this command with such explanations as, "Can't you

see I'm on the telephone?" or "Can't you see I'm busy getting dinner?" The difference is substantial. From the evidence of such differences in opportunity to learn language, it is hardly surprising that the length of remarks and the complexity of sentences from children of poverty are below those from children of middle-class families. Also, living in crowded circumstances where the objects of communication are visible to all permits pointing and obviates the necessity for developing collective vocal signs for communication about them. The result, again as might be expected, is the "limited linguistic code" of the poor so well described by Basil Bernstein (for sources, see Hunt, 1969, Pp. 204-208).

Opportunities to acquire motivational competence are also wanting. Since there is seldom enough of anything to satisfy all, and little hope that there will ever be enough of anything in the future, children in families of poverty get reinforced for taking all they can get while they can get it. It is hardly surprising, therefore, that children of poverty prefer immediate reinforcement over delayed reinforcement even when the rewards to be obtained with delay are obviously larger than those to be obtained immediately, whereas the opposite is true for children of middle-class background. Neither is it surprising that children of the poor will work harder at tasks bringing such concrete rewards as M-and-Ms while children of families of middle-class background work harder for social approval. Inasmuch as children of poverty seldom experience any reward for persistence of effort, moreover, they have little opportunity to develop a feeling of responsibility for what happens to them. Thus, it is not surprising that Battle and Rotter have found considerably

less evidence of inner control of one's fate in children of the poor than in children of the middle-class (for sources, see Hunt, 1969, Pp. 208-214).

Opportunities for acquiring civilized values are also wanting. With both parents all too often absent from the home much of the time, the peer groups in neighborhoods of poverty typically go unsupervised. Despite the affluence of America, hundreds of thousands of her children under five years of age spend a large share of each day with little or no adult supervision (Reid, 1966). From these unsupervised peer-groups, then, the children of the poor learn their standards of conduct and their values. During their preschool years, they copy pre-adolescents in various kinds of delinquent behavior. As pre-adolescents, they copy the adolescents of the local delinquent gangs. Adolescents model their behavior after those gaining notoriety in professions of crime. The values and standards of conduct concerned here are no mere matters of middle-class taste. They are basic for a constructive and peaceful operation of any society.

Developments in the Technology of Early Education

One reason Head Start was less successful than it might have been was the nature of the nursery schooling deployed. Early education began shortly after the turn of the century with the work of Maria Montessori (1909) in Italy and of Margaret McMillan in England. The intention of both of these pioneers was to give children of the poor opportunities to learn what they had typically missed in families of poverty. Real estate developers of the San Lorenzo district of Rome had financed Montessori's Casa de Bambini to

keep the preschool children of working parents from destroying the structures in which they had invested. But when enabled to bring her system of early education to America, no financial support was available to provide schooling for children of poverty. Thus, even Montessori schools got adapted for children from families of the well-to-do. The influences of the Child Study Movement of G. Stanley Hall, of John Dewey, and of Freudian psychoanalysis predominated through the early years of this century, so nursery schools came to focus on social adjustment and free play. For many, the goal was to release the children for several hours each day from over-controlling mothers. Children from families of poverty need opportunities to play and can learn much from games of appropriate design, but more immediately, for the purposes of compensatory education, they need to learn the skills and motivational systems missing from their home experiences that are most relevant to profiting from school. Project Head Start deployed the nursery schooling available at the time. This schooling could hardly have been less well adapted for the compensatory educational function demanded by the hopes for Head Start.

A number of the students of early child development and education gleaned the outlines of this situation almost as soon as Project Head Start was launched. Well before the disappointing results from the large evaluative studies of the results of the project had been reported, various university-based innovators in early education had devised programs to teach children of poverty various relevant aspects of what they had no opportunity to learn at home. Some of these were started several years before Head Start was launched. Martin Deutsch

organized a Center for Research on Learning Disabilities in the Department of Pediatrics of the Downstate Medical Center in New York about 1960. Susan Gray and Rupert Klaus of the George Peabody College for Teachers in Nashville, Tennessee, started a demonstration-research program of compensatory education for children of poverty that involved their mothers. A variety of these programs sprang up at about the time that Head Start got launched. Since their contributions to the early education of the future is probably more important than Head Start per se, it will be well to synopsize their varied natures.

Investigative Programs of Compensatory Education

Very early in the game, Bereiter and Engelmann of the University of Illinois devised a curriculum focused on teaching children of poverty the kinds of skills on which superior performances in school and on norm-referenced tests of school readiness and intelligence are based. They emphasized especially clear pronunciation of words and standard English syntax, semantic mastery of the names of objects and their qualities, and the recognition of the letters and numerals needed in reading. They reduced the child-teacher ratio to about 5 to 1, and suffered no nonsense. Even the recesses between half-hour sessions were devoted to singing songs designed to teach. They sometimes referred to their approach as the "pressure cooker" because they believed children of poverty had to make up for lost developmental and learning time.

Not unlike the Bereiter-Engelmann approach in focus on the academic skills of language, mathematics, reading and writing was the Behavior Analysis Program developed by Donald Bushell at the University of Kansas. In this program, the teacher's role is that of a behavior modifier. The aim was to inculcate not only the academic skills but also taking the social role of the student: knowing when to talk, when to be silent, staying with assigned tasks, and responding appropriately to praise. Skinnerian behavior theory explicitly underlay this program, so the task of teachers was to make reward contingent upon each improvement in academic and social behavior. Bushell used such rewards as recess, snacks, art, and stories. Since the effect of such reinforcement decreases with delay, it is maximized by the use of tokens and praise that can be given immediately whenever a child shows an improvement. These can later be exchanged for the rewards for which they are symbolic. Tokens also provide a record of students' functioning. When a child has earned too few tokens, a teacher is reminded that something must be wrong: she may have paid insufficient attention to the child, she may have assigned tasks too difficult, or the available rewards may not have been sufficiently attractive to the individual student. Bushell's program also involved parents who, two at a time, participate in each classroom at varying periods of time to help reduce the teacher-student ratio. Through this participating they are introduced to positive reinforcement procedures and invited to become active participants in their children's education. In another version of the behavior-analysis program, Ralph Wetzel of the University of Arizona has added to parental involvement the feature of having teachers provide notes of special achievements that each child takes home to show

his parents. One measure of the influence of these can be seen in parent participation in parent-teacher meetings. Where Mexican-American parents typically absent themselves from such meetings, the notes gradually bring nearly all of them to the school for these meetings.

Some of the programs were less constrained by the skills demanded by existing schools and tests of scholastic readiness and intelligence. They took their goals from theories of what is important in early development. David Weikart and his collaborators at the High/Scope Educational Research Foundation in Ypsilanti, Michigan, developed a cognitively oriented curriculum inspired by the developmental theory of Piaget (Weikart, et al., 1971). This program focuses on three component concerns; these include orienting the curriculum to cognitive and language development, encouraging the teacher to take an active innovative role in developing the program for her class, and encouraging parents, especially mothers, to promote the cognitive growth of their children at home. The curriculum assumed that the child must first show what he knows in actions, proceeded to the preconceptual phase wherein he labels what he is doing and experiencing, and then on to a symbolic level, where, through familiarity with objects and object representations, he develops the concrete operations and the skills required for abstract thought. To compensate for the language deficiency so common in children of poverty, his teachers demonstrate the uses of language for the child by labeling, using prepositions, naming and interpreting actions, and explaining causal relations. To promote the development of a sense of competence and a positive self-concept, Wiekart encourages his teachers to treat each child as a self-directing

individual who can make choices. In order to involve the home in the educational process, he has home visitors to encourage the mothers whom he presumed to have the language and concepts necessary to teach their preschool children, to talk to their children about what they are doing and to become concerned about their cognitive growth.

In Tucson, Professor Marie Hughes of the University of Arizona organized an educational program for Mexican-American children that are numerous there and that have commonly been problems for the schools. Through "program assistants," she got the program to operate on about 70 first grade classes. The program emphasizes training in the English language and improvement in a sense of time through enlargement of the temporal present to include memories of the recent past and plans for the near future. A large variety of materials were made available in the classroom environment. The program assistants helped teachers to avoid insisting that a child perform as she wishes and to become a consultant in learning who helps the child to perform correctly, and lets him know when he is progressing. Although Arizona law required first-grade classes of thirty, these were broken into sub-groups of six. For these sub-groups, or combinations of them, the teacher selected projects of ready-made interest for the children. The groups were encouraged to choose and plan a project with the discussion in English, then, on another day, to revise and replan the project. Then, to execute it on a later day, and on a still later day to draw a picture of the project and tell the story of its execution. These stories got taperecorded and transcribed. Then the children had a day or two at a listening post where each heard his own

story and that of each of the other five in his group while each watched and read the transcripts in poster-type. Thus, the program aimed at overcoming several of the deficiencies besides that of language.

Several of these compensatory programs emphasized self-direction and autonomy in motivation as much as or more than they emphasized the academic skills.

At the Education Development Center in Newton, Massachusetts, David Armington modeled his program on the New Infant Schools in England. His fundamental educational aim was for children to assume responsibility for their own learning. He provided a rich variety of educational materials for the children to explore. The teachers encouraged each child to choose what he wished to do and then asked him questions to maintain and to intensify and deepen his interests in his chosen activity. The time schedule is flexible, and children are permitted their own individual rhythms of engagement and disengagement. The materials available include workbooks, and facilities for programmed learning. But this approach resists strongly a standardized curriculum. Skills like those of language and reading readiness are presumed to develop naturally if they are part of the communication induced by the educational materials and facilities. The approach of this center also emphasizes an advisory team that functions by responding to the demands of each situation and helps teachers to regard themselves as innovators in the classroom.

A somewhat similar program with more of a mental-health emphasis is that of the Bank Street College of Education in New York. There, development and

learning are viewed as intertwined components of a single process in which the teacher is highly important. Her function is to be a consistent adult, one who can be trusted, and one who helps to mediate children's interactions with the materials of the classroom to bring out their qualities of feeling, sight, and sound, as well as their functional and positional interrelationships. To these qualities, she gives names. At Bank Street, they believe that any compensatory program that concentrates on cognitive development and the learning of specific skills would be doomed because disadvantaged children, whose backgrounds are typically chaotic, need primarily to experience predictability in the school environment that they can come to trust, and then to learn the effects of their own actions within this environment. Only then can the disadvantaged child become able to show persisting interest and to profit from his own work. The academic skills are acquired within the context of children's engagement in classroom activities. Language and cognitive development are seen as products of children's experiences in communicating with people.

Somewhat related to these two foregoing approaches is that of the New Nursery School developed at the University of Northern Colorado in Greeley by Glen Nimnicht, John Meier, and Eleanor McAfee. Although there is a concern for skills, the leading goal of the New Nursery School is to help young children to develop the confidence to attack problems and the ability to solve them on their own. Thus, the program concentrates as much on developing the child's sense of autonomy and his self-concept as on fostering his intellect. The classroom provides a variety of learning materials, located by category,

and arranged to invite children to explore them. Moreover, the classroom environment is made to be responsive to the child so that it gives him immediate feedback from his attempts to solve problems. Responsiveness is even built into children's interaction with adults in the classroom. Only the head teacher in any classroom can initiate interaction with a child. On the other hand, teacher-aides are taught to make themselves available and to be responsive to any request from children. Because Nimnicht is committed to the theory of intrinsic motivation, he avoids extrinsic rewards partially because he believes they distract the child from his goal as a learner and partially because he believes that they inevitably imply differential reward in that a gold star for one child becomes a failure experience for the child who does not get one. Nimnicht believes that children learn because they want to and because they find learning itself to be fun.

Lassar Gotkin, who began his concern with compensatory education on the staff of Martin Deutsch's pioneering program that got started about half a decade before Head Start, developed a program based upon instructional games. The goal is to teach language, classification skills, and concepts. The teaching method utilizes games and game formats in which children of poverty have ready-made interest. One of the game formats depends upon picture matrices consisting of four rows and four columns with some item unique to each row and to each column. The teacher illustrates the game by giving a child an instruction, then children playing in groups of two or three learn to trade off in giving instructions and responding to them. The cognitive requirements of the matrices increase in complexity as children grow in facility and understanding.

In developing his matrix of games, Gotkin took advantage of such principles of program instruction as clear specification of instructional objectives, careful sequencing from simple to complex, small steps that virtually insured errorless learning, active participation by the learner, and feedback on the correctness of response. Having a group of children play the games enables them to manage themselves because the rules are clearly defined and each child knows what is expected of him. Playing the learning games in a group also has the advantage of teaching children to assume leadership roles and to organize their own learning. Meanwhile, the teacher becomes free to devote attention to the difficulties of individual children or to getting other groups started. The game format also facilitates the use of paraprofessional teacher-aides. Gotkin was impressed by the wide range of learning abilities among children of poverty, so he arranged his non-competetitive games to be sufficiently flexible to permit children of widely varied abilities to play together with each learning at his own pace.

At least two of these innovative programs put a major share of their emphasis on providing parents with the skills needed to become better teachers of their children in order to continue or to improve their support of the child's school learning in the home. Several others of those described above also involved parents to some degree. Susan Gray and Rupert Klaus at the George Peabody College for Teachers in Nashville, Tennessee, aimed at interesting children in matters scholastic and in inculcating a motivational concern for achievement as well as those language and cognitive skills required to do well in school. This program pioneered also in involving mothers in homes in

the early educational process. The idea of modifying the child-rearing of parents to foster mental health and to prevent mental disorders was far from new. Various demonstrations had attempted to modify the child-rearing practices of parents through lectures, group discussion, or psycho-therapy-like interviews. Many of these came under a study committee of the National Institute of Mental Health of which I was chairman for three years. From site visits, I gleaned that they had failed completely with parents of poverty who lacked the educational background required for effective verbal communication. Gray and Klaus had a new approach. They brought the mothers into the classroom, first as observers, and then as teacher-aides. The mothers watched the teachers working with their children, then the teachers talked with the mothers about what the mothers had seen them do in various interactions with the children and explained why they did it. This brought a basis for imitative learning that could be transferred into the homes, and home visitors helped the transfer along. This combination brought results. These results included improved performance not only in the target children who attended the classes, but also in the other children of the families, particularly those younger than the target child, in what was called "vertical diffusion." These new found practices also got communicated to nearby neighbors. Their effects were evident in the superiority of the test performances of the children of nearby neighbors over the performances of children from similar families living in another community. This Gray and Klaus termed "horizontal diffusion," Moreover, many of the parents in this program got a new lease of ambition. They upgraded their skills, got new jobs, and became active in community reforms.

Ira Gordon at the University of Florida initiated an intervention program with mothers that started when the children of the mothers concerned were still in infancy. According to Gordon's analysis of the deficit in disadvantaged children, their language typically shows a lack of comprehension of abstract and causal relationships, evidence of low self-esteem, and a lack of control. The children are impulsive and distractable. Gordon attributed these deficits to the failure of mothers of poverty to provide proper language models for their infants and young children, to the difficulties these mothers have in organizing their own existences in their homes, and to the low esteem they feel because they have so little control over their fate. Teaching occurs in both the home and day-care centers or preschools. A parent-educator, who comes from the same population as the mothers, serves in day-care centers and classrooms as a teacher's aide. She then takes into the home of each child for which she is responsible the materials and procedures and demonstrates them for the mothers. Through this procedure, the mothers are supposed to learn the kinds of activites they should encourage in their infants and young children. As the children learn, the mothers find out that they can influence their children's development. Evidence of the success in her educational efforts becomes a source of pride and self-esteem, so here again a substantial portion of the mothers upgrade their skills and become more active in their communities. Gordon's curriculum is far from standardized, but his materials and tasks are progressively sequenced according to the stages described by Jean Piaget. The teachers and their aides regularly use language to describe what the child is doing, and the home-visitors teach the mothers to use language

in similar fashion. The Gordon program uses no shaping procedures or rewards because Gordon feels that mastery is its own reward.

All of these programs of compensatory education have shown some degree of success. For the most part, the success has had to be measured in the terms of norm-referenced tests of achievement and intelligence. Even though the goals of a majority of these innovators lay outside of what such tests measure, the lack of instruments made assessment of their success exceedingly difficult. In Tucson, Marie Hughes employed a sorting task for evaluative purposes. The seven-year-old children who had completed a year in her program sorted the dolls and objects in more different ways than did the Anglo children of middle-class background who had completed the traditional first grade. It was hard to interest educators in this finding, however, because they had no basis for knowing whether such an achievement would enable the children in the program to do well in school thereafter. Despite the questionable relevance of the standard norm-referenced tests of achievement and intelligence to certain of the goals and practices of many of these programs of compensatory education, the children in nearly all of them gained on the average more than a year of achievement age or mental age on the norm-referenced tests during their year or two or participation. For four-year-olds, the largest gains in terms of IQ were reported for the Bereiter-Engelmann program from comparative studies by Weikart (1969) in Ypsilanti, Michigan, and by Karnes and her collaborators (1969) at the University of Illinois. These were gains of somewhat more than 20 points, and were sufficient to bring children entering the program at four with IQs of the order of 80 up to the normative average or somewhat

above. For three-year-olds, the gains found in the Weikart study were of the order of 30 points, and the gains from the cognitively oriented curriculum (see Weikart, et al., 1971) averaged only two points less, and that for a more traditional program but another point less. This finding has suggested an advantage of starting compensatory education at three rather than four (for references see Hunt, 1969, pp. 176ff). The evaluative comparison of three compensatory preschool programs by Karnes, et al., was longitudinal in nature and concerned only children aged four at the beginning. The Bereiter-Engelmann program endured for two consecutive years; then the children were followed with testings through the first grade. The Karnes program endured complete for but a single year, then, for a second year, the children attended public kindergarten in the morning and, for one hour each afternoon, they participated in an additional compensatory session divided into two periods, one concerned with language development and reading readiness, the other concerned with arithmetic concepts. Those children in the traditional preschool, designed to promote their motor, personal, social, and general language development enrolled during the second year in kindergarten and were solely under the supervision of the public shool. Those in the Bereiter-Engelmann program gained some 24 points during the two years of compensatory education. Those in the Karnes and traditional programs, on the other hand, gained only 14 and 8 points, respectively, but they lost only an average of 5 and 2 points of IQ during the first grade year, whereas those children in the Bereiter-Engelmann program lost an average of 11 points. Despite this greater loss, those in the Bereiter-Engelmann program remained at the end of first grade an

average of 5 points ahead of those in the Karnes program and 10 points ahead of those in the traditional program. As might be expected, such results indicate that when the results of compensatory education are assessed through school performance and norm-referenced tests of scholastic achievement and intelligence, the size of the gains are a function of the degree to which the program is focused upon scholastic skills. The gains relevant to the focus of the programs with other goals simply do not get assessed. There are also hints that the size of the gains are inversely related to the ages of the children when the programs began. The tendency for gains to fade with entry into regular schools might also have been expected. Insofar as rapid compensatory achievement is based upon the external motivation and pressure during the program, it is likely to slack off when this special external motivation and pressure is removed for under the ordinary school conditions, those who have acquired the internalized motivation to achieve then learn more rapidly than those dependent upon the pressure and so catch up and pass. Such considerations also help to explain why those children in programs concerned with building autonomous motivation for achievement might maintain the gains from their experience in compensatory education longer than those put under pressure in programs focused on scholastic achievements.

In the fall of 1966, the White House appointed a multidisciplinary Task Force, of which it was my privilege to be the chairman, to examine the role of the federal government in early child development. This task force produced a report entitled A BILL OF RIGHTS FOR CHILDREN. The report recommended the establishment of a federal office for children in the Department of Health,

Education, and Welfare with a director reporting directly to the Secretary. It appealed for an increase in the priority of children's needs in community and state governments. In a more practical vein, it recommended two extensions of Project Head Start. Interpretation of the tendency for the gains made during participation in compensatory educational programs to wash out gradually with time after the participants entered the public schools prompted this task force to recommend an extension of Head Start up the age range in the Follow-Through Program. The promise of the evidences of diffusion of gains when parents are taught to be educators of their young children in the pioneering approach of Susan Gray and Rupert Klaus motivated the suggestion of Parent and Child Centers. These Centers were to constitute an extension of Head Start down the age range that would focus on modifying the child-rearing practices of parents. In his message to Congress on Children and Youth in February of 1967, President Johnson noted, "Head Start occupies only part of a child's day and ends all too soon. He often returns home to conditions which breed despair. If these forces are not to engulf the child and wipe out the benefits of Head Start, more is required." The "more" that President Johnson recommended included both the Follow-Through Program and an experimental program of Parent and Child Centers. In December of 1967, the Congress included authorization of both Follow-Through and the Parent and Child Centers in amendments to the Economic Opportunity Act. President Johnson did not accept the task force's recommendation for a federal office for children, but later President Nixon did establish administratively the Office of Child Development with a Director who reports to the Secretary of HEW. Nixon's administration also transferred the Follow-Through Program from the Office of Economic

Opportunity to the Office of Education, and transferred the Parent and Child Centers from the Economic Opportunity Office to the Office of Child Development. When Edward Zigler became Director of that office, he started another experimental program called Home Start.

Thus, the great social experiment of Project Head Start was launched with hoped unrealistically high and without either adequate knowledge of how to foster early child development or a tested educational technology of early education to achieve them. The experiment has failed to achieve those unrealistic hopes. Nevertheless, it has inspired a series of investigations which have yielded a substantial gain in what we know about the psychological deficiencies of children of poverty and about the rearing conditions from which these deficiencies derive. It has also motivated innovations and substantial improvement in the technology of compensatory preschool education. Despite these improvements, however, compensatory education beginning at age three or four seldom enables children of poverty to achieve a standard quality of performance in the public school if that compensatory education lasts no more than a summer or a year or two. Results from the Follow-Through Program and the Parent and Child Centers are beginning to be reported, and I shall return to them.

PUBLIC AND PROFESSIONAL REACTIONS

Public and professional reactions to the results of Project Head Start have been mixed. Some see the achievement to be as much as should have been expected from the status of our knowledge of early child development and our technology of early education when Head Start was launched. They feel that if our impatient society does not lose hope and faith in a positive approach too soon, these United States of America can bring a major share of the children of the persistently poor into the mainstream of our society. In 1967, I thought and said that this could happen within a generation (Hunt, 1969, p. 233), but I suspect that I underestimated our ignorance, the limitations on our technology of early education, and how little we understand what is required to make a substantial modification in the child-rearing and teaching practices of families and schools.

Revisiting the Belief in Heritability

The reactions of others are far less hopeful. Despite the fact that Head Start deployed a kind of nursery-schooling poorly calculated to compensate children of poverty for what they failed to learn in their homes, and despite the evidence of genuine gains from the improved forms of compensatory education, Arthur Jensen (1969) opened his well-known paper entitled, "How Much Can we Boost IQ and Scholastic Achievement" with this sentence: "Compensatory education has been tried and it apparently has failed." He went on to devote a major share of his paper to the heritability of the IQ and of scholastic achievement and to an explanation of the theoretical and empirical bases

for the proposition that variance in intelligence, defined in terms of the IQ and Spearman's general factor, has its chief basis in heredity. This, he claims, explains why compensatory education "apparently has failed." He goes on to revisit the explanation of class differences and race differences in terms of biological inevitability that was traditional before World War II.

This paper of Jensen's has had wide circulation in influential quarters. I am told that it has been discussed at meetings of President Nixon's cabinet. These discussions may well have something to do with the increased difficulty of obtaining federal funds for the support of programs concerned with early childhood. Thus, it is important to deal directly with this issue in any discussion of the prospects of early education.

Heritability is defined as that portion of the total variance, within a specific population, in the measures of a phenotypic characteristic that is determined by the genetic variation within that population. By a population, I mean a community of potentially breeding individuals which share a common gene pool and a locality with a given set of environmental conditions. By a phenotypic characteristic, I mean one that is observable and measurable (see Rieger, Michaelis & Green, 1968). Scores on tests of intelligence, or ability, or achievement, are measures of such phenotypic characteristics.

Heredity does influence the IQ. This is clearly evident in the correlations between the IQs for pairs of relatives for they have regularly been found to increase with the degree of genetic relatedness. Before World War II the figure of 80 per cent for heritability got wide currency. It became such a dogma that the Iowa group led by George D. Stoddard, of which Skeels

and Skodak were members, was considered soft-headed for contending, even with highly suggestive evidence, that enrichments of experience could raise the IQs of children (see e.g., Goodenough, 1939). Shortly before he wrote his well-known paper, Jensen (1967) adapted a general formula for assessing heritability from two degrees of genetic relatedness and applied it to the correlations for all the pairs of monozygotic (all genes in common) and dizygotic (half of the genes in common) twins that he could find in the literature of the behavior sciences. By a process that resembles averaging the indices of heritability from these many samples, he estimates the heritability of scores on tests of intelligence to be about 80%. If 80% of the variance in measures of intelligence is a matter of heredity, he contends, then only 20% can be a matter of variations in the environment. That portion of the total variance in IQ resulting from variations in the environment is implicitly equivalent to educability. In this sense, Jensen derives his estimate of educability from his averaged estimate of heritability. Actually, each estimate of heritability holds only for the specific population of individuals, with the environmental variations available to it, on which that index of heritability is based. As Hirsch (1970, 1972), a behavior geneticist, has pointed out repeatedly, such indices say nothing about educability defined as how much the measures of any phenotypic trait might be changed through being reared under different environmental circumstances. Thus, such an index of heritability is completely irrelevant to whether or how well Head Start succeeded or failed.

The Range of Reaction

Determining how much measures of any phenotypic trait can be modified by changes in the environmental circumstances within which infants and children develop calls for an entirely different concept, namely, one that geneticists term the "norm of reaction." First defined by Woltereck in 1909, this norm refers to the range of phenotypic reactions which a given genotype is able to produce in response to variations in the environment. By the genotype, I mean the hereditary constitution of an individual (Rieger, Michaelis, & Green, 1968). Where educability is at issue, it is estimates of the range of reaction in measures of information, information-processing ability, the IQ, and other test scores that should be considered. Estimating this range calls for an investigative strategy radically different from that used to estimate heritability. The range of reaction must be estimated from the difference between the means of phenotypic measures for samples of individuals, derived from a given population, who have developed under different environmental conditions. No general estimate of the range of reaction for the IQ, nor for the measure of any trait, is possible. Just as the generality of the index of heritability is limited to the population and the particular set of environmental conditions on which it is based, so is any given estimate of the range of reaction limited to the population and to the two environments on which it is based. Yet, the ultimate range of reaction for measures of ability must be at least as large as the difference obtained between the mean values for the measures for samples of individuals, from the same population, who have been reared under given environmental conditions that differ. The strategy of determining the range of reaction for the IQ in this fashion

is infinitely more relevant to educability than whatever is left over when a percentage estimate of heritability is subtracted from 100.

Illustrative Examples of the Range of Reaction

This strategy can be used for indications of the range of reaction for the age of achieving object permanence. Object permanence is probably as purely cognitive as any of the achievements of the sensorimotor phase in psychological development. Piaget has considered it to be the first basic concept in knowledge of reality. My collaborators and I have recently put together data from three studies to obtain indications of the range of reaction in the age of achieving top-level object permanence (Hunt, Paraskevopoulos, Schickedanz & Uzgiris, 1974). This level is indicated by the infant following and retrieving a desired object which has been hidden in a container after that container has been made to disappear successively under three separate covers and come back empty. For this level of object permanence, the infant also shows reversability in his search by going to where the container disappeared last and proceeding backwards through the order of the container's disappearances. A cross-sectional study of three samples of infants, largely from working-class families in Athens (Greece) constituted one study. One sample came from the Municipal Orphanage where the infant-caretaker ratio approximates 10/1. A second sample came from the Metera Baby Center in Athens where this ratio was of the order of 3/1, and the third sample of children were home-reared, and came largely from a day-care center in Athens for the children of working-class families. At the Municipal Orphanage, the mean age for the seven infants at the top level of object

construction was 195 weeks, for those at the Metera Center, the mean was 154 weeks, and for the home-reared infants, it was 129 weeks. The difference between the mean ages for the children of the Municipal Orphanage and for those home-reared yields a range of 66 weeks for this particular set of conditions. These 66 weeks represent only the loss or retardation associated with orphanage-rearing as compared with home-rearing in working-class families of Athens, Greece.

Our other two studies show how the object construction typical of home-rearing can be hastened with appropriate intervention. In Worcester, Massachusetts, Professor Uzgiris has done a longitudinal study of twelve infants predominantly from middle-class families to test the ordinality of the landmarks in the scales that we have constructed to assess early psychological development (Uzgiris & Hunt, 1974). The average age at which these infants achieved top level object permanence was 98 weeks. In the Parent and Child Center at Mt. Carmel, Illinois, eight consecutive infants, born to the parents of poverty participating in the program of this Center, have also been followed with these scales in a longitudinal study by David Schickedanz and myself. Our purpose has been to assess the effects of a Mother's Training Program organized and taught to some of the mothers, who function as paraprofessional caretakers in the day-care program of the Center, by Earladeen Badger. The average age at which these infants achieved top-level object permanence was 73 weeks. Thus, this educational intervention served to advance the age at which the children of parents of poverty achieved object permanence some 25 weeks, or nearly 6 months, ahead of those reared in predominantly middle-class

families of Worcester, Massachusetts. This finding, incidentally clearly calls into question the idea that the environment acts in threshold fashion and that there is little hope of improving upon the child-rearing of middle-class families.

The total range of reaction for the age of achieving this top-level of object permanence is the difference between the mean age for the children at the Municipal Orphanage of Athens and the mean age for the children at the Parent and Child Center. Since the cross-sectional method exaggerates the age of achievement, however, a correction is required in the mean age of the children from the Municipal Orphanage.[2] Once this correction is made, this difference becomes an approximate range of reaction of 109 weeks for the age of achieving top-level object permanence. This is more than two years.

Since most of us have little experience in using age as a dependent variable in this fashion, it may be useful for purposes of communicative impact to transform this range of reaction into the terms of an IQ-ratio for object permanence. When this is done, the range is of the order of 90 points with the upper limit of 150 and the lower limit of 60.[3] Even though these children do not come from what can strictly be called a single population, there is little reason to believe that the genetic potential of Greek children is less than that of American children, and this represents one of the few estimates available of the possibilities for living under differing environmental circumstances.

Other data are to be found in a cross-cultural study by Dennis (1966). Because his study is cross-cultural, the children who served as his subjects

did not come from a single population, and the findings are therefore, by definition, defective as a rigorous indicator of the range of reaction. Nevertheless, they suggest that the range of reaction found for top-level object construction may not be outside the ball park for measures of cognitive functioning at later ages. Dennis got mean IQs from giving the Goodenough Draw-A-Man test to samples of healthy children, aged between six and nine years, who were living in typical family environments in some 50 cultures over the world. The variation in the mean Draw-A-Man IQs of these samples ranged from a high of 124 to a low of 52. The high mean IQ of 124 came from samples of suburban children in America and England, from a sample of poor children growing up in a Japanese fishing village, and from a sample of Hopi Indian children. The low mean IQ of 52 came from a sample of children in a nomadic Bedouin tribe of Syria, and a similar mean IQ of 53 came from children growing up in a nomadic tribe in the Sudan. In the four cultures with the highest mean IQ, the children grew up in almost continuous contact with representative, graphic art that was important in their everyday living. On the other hand, the cultures with the lowest mean IQs were not only nomadic, but they embraced the Moslem religion. This religion has always been more effective in prohibiting contact with graphic art than either Judaism or Christianity. Although the children do not come from a single population, even among groups of Arab Moslem children, the mean IQs from the Draw-A-Man test ranged from a low of 52 for the Syrian Bedouins to a high of 94 for the children of Lebanese Arabs in Beirut who see television and have considerable

contact outside their homes with the graphic art of Western Civilization. Here the range of reaction for the Draw-A-Man IQ is 72 points, and this range is only 18 points short of the variation in individual IQs from standard tests. This Draw-A-Man test probably calls for a considerably less complex set of abilities as these are assessed by factor analysis, than either of the more standard scales. Yet, for American children, IQs from the Draw-A-Man test correspond about as well with the IQs from the Stanford-Binet test or the Wechesler-Bellevue test as IQs from either of these more standard scales correspond with each other.

One can also combine the results from several studies employing standard tests of intelligence to obtain estimates of the range of reaction for the IQ. Two of these, one by Skeels and Dye (1939), and a very recent one by Dennis (1973) indicate independently that orphanage-rearing results in a loss of the order of 50 points. On the other hand, a report on the Milwaukee project under the direction of Garber and Heber (1973) of the University of Wisconsin claims that educational day-care has increased the average Stanford-Binet IQ for children from the poverty sector to 125. This project started with a sample of 40 mothers of new infants with Wechsler IQs of 75 or less. These mothers were assigned to either a treatment condition or a control condition. For the 20 treated families, the home-visitor saw and played with each infant until each was approximately 6 months old. Thereafter, each infant was brought 5 days a week to a day-care center and was cared for by a woman who had been selected for articulate speech and been trained to provide appropriate educational experiences for infants. For the twenty control families, the

program was limited to routine counseling visits with the mothers. Tests were administered to the children in both groups at three-month intervals. Gesell schedules were used from age 6 months to 21 months. Cattell and Stanford-Binet tests were given beginning at 24 months of age, and Stanford-Binet tests alone were given at six month intervals beginning at 48 months of age. The difference between the means of the IQs for the treated and the control groups ranged from a minimum of 23 points at age 24 months to a maximum of 34 points at age 66 months. Thus, by the school-age of 66 months, the IQs of the treated group averaged 125 while those of the untreated group averaged 91. Unfortunately, there is a paucity of results from such interventions. Those from this Garber-Heber study may not be reproducible. Ellis Page (1972), with access to a report I have not seen, notes differences in height between the treated and untreated groups at age 24 months which call into question whether the groups are from the same population. Moreover, the reports I have seen do not describe the treatment in detail. Nevertheless, if the mother's IQs were as reported, these results deserve some credence. They suggest that a treatment of some kind has served to foster in the offspring of mothers with IQs of 75 or below a mean IQ that is 25 points above the norm. Combining damaging effects of orphanage rearing with the advances reported for this intervention, one gets an estimate of the range of reaction of 75 points, and this approximates that obtained by Dennis in his cross-cultural study with the Draw-A-Man test.

I have contended on logical grounds that indices of heritability say nothing about educability. Evidences of educability should come

from the investigative strategy that I have been using to assess the range of reaction. Despite the fact that heredity undoubtedly makes a substantial contribution to individual differences in potential, such findings as I have synopsized here appear to imply that all but a very small fraction of human beings have the hereditary potential to achieve the various competencies required for full participation in our culture despite its advanced technology. It is highly important for those in a political position to control the support for research on psychological development and for the development and testing of innovations in the technology of early childhood education to recognize this fact.

LEARNINGS FOR THE FUTURE

Head Start failed to fulfill the unrealistic hopes set for it, but the direction of the goals were right, and the investigations and developments in educational technology stimulated by Head Start have been informative. What was learned is already being put to use, albeit in extralegal fashion, in the Follow-Through Program, but much remains to be learned about child development during the preschool years and about how to foster it.

Learnings Utilized in Follow-Through

President Johnson's Task Force on early child development recommended the extension of Head Start up the age scale in Follow-Through, and the President passed this recommendation on to the Congress in his message of February, 1967, on Children and Youth. An amendment to Title II of the

Economic Opportunity Act, passed by the Congress in December of 1967, legalized Follow-Through as a community-action program with focus on children of the poor. This legislation explicitly related Follow-Through to Head Start in both program content and in the children to be served. Moreover, it called for their parents to be involved in planning and decision making. Even though the Economic Opportunity Act put responsibility for the administration of Project Head Start in the Office of Economic Opportunity, the amendment put Follow-Through into the division of compensatory education of the Office of Education because the children concerned were already in the public schools. Moreover, Title I of the Elementary and Secondary Education Act had given this division responsibility for grants to states for special programs for "educationally deprived" children. Thus, Follow-Through became legally a part of community-action; the legislation made no mention of research objectives.

When Congress finally appropriated funds, it committed none to specific programs, and the demands of the Viet Nam war reduced appropriations for agencies. Thus, instead of the $120,000,000 expected, Follow-Through got but $15,000,000. Such a limitation on funds prompted the collaborating individuals from the staffs from the Offices of Economic Opportunity and Education to change the primary purpose of Follow-Through from "service to children" to "finding out what works." This change of basic purpose was never communicated to the Congress nor formalized legally, and this failure has been a source of administrative problems. Despite this failure, the new emphasis permitted Follow-Through to focus on extending, refining, and

evaluating that variety of approaches developed for compensatory education of disadvantaged preschool children to children in kindergarten and through the third grade. Committees of individuals from the relevant behavioral and educational sciences, some of whom had participated in the original Presidential Task Force that recommended Follow-Through, developed a plan whereby each variety of early education would be represented and led by a "program sponsor." Programs sponsors were chosen for each of the varieties of early education described synoptically above, except that of Gray and Klaus. Others were added to increase the total to 20 for 1969-70. These others included the Pittsburgh model of Lauren Resnick, who became its sponsor, and sponsors from a state education agency, from two minority colleges, and from a profit-making company.

The Bereiter-Engelmann program was transferred from the University of Illinois to the University of Oregon with Sigfried Engelmann and Wesley Becker as sponsors, and the curriculum was extended from preschool through the second grade. Like the programs of Bushell in Kansas and the Engelmann-Becker program in Oregon, that of Lauren Resnick has its central focus on academic skills, yet, despite this focus, Lauren Resnick also considers three classes of propaedeutic skills to be essential. First, a child must be able to follow directions and attend to a task. Second, a child must be able to distinguish and label such elementary abstractions as colors, shapes, and positions. Third, a child must develop the conceptual-linguistic skills involved in classification, reasoning, memory, language, and the early mathematical concepts. Moreover, in Resnick's program, a child is supposed

to learn by working with materials and interacting with other children. Resnick constructed her curriculum through component analysis. Accordingly, each component skill is definitely specified and then analyzed to ascertain what lower-level skills are demanded by it. Each lower-level component is in turn analyzed for its prerequisites to generate a hierarchy of concrete educational objectives based on a combination of logic, Piaget's observations, and information from developmental psychology. Component analysis also includes tests with which to ascertain the mastery of each component skill. These criterion-referenced tests determine when the child has achieved mastery of a given component skill. The function of teachers is to monitor the learning with diagnostic tests, to make sure each child gets the assistance needed, to reinforce the child's progress and to provide criterion-referenced tests to tell when specific learning tasks are done. In order to wean children of the need for reinforcement, moreover, her teachers are taught to use the least powerful reinforcement required to keep each child working.

The idea of program sponsors was chosen as a means of obtaining planned variation that would also give communities an opportunity to choose the kind of program they wished to implement. At meetings of representatives of communities selected to participate in Follow-Through, the sponsors had the task of presenting their programs. Once a program had been selected for implementation, it was the responsibility of the sponsor to guide the local implementation of his approach, to train the teachers who would implement it, and to exercise a kind of "quality control" by repeatedly monitoring the progress of implementation. These responsibilities made of the sponsor an

agent of social change within the school and community who would help keep the objectives and the requirements of his program continually in view to assure an impact on the lives of the children. The functional unit of Follow-Through has been the classroom. Thus, classroom teachers in Follow-Through become collaborators with their sponsor to implement his programs in their schools and communities.

Evaluation has been recognized as a component of Follow-Through from the start. Its task is less to provide answers to specific questions than to yield information on what educational outcomes could be expected from the various programs. The strategy of evaluation has been to compare the performances of children within Follow-Through classes with the performances of children from similar background not in Follow-Through classes. Since an effort has been made to concentrate children of poverty in Follow-Through classrooms, however, those in comparison classes from the same community tend to come from families of somewhat higher socio-economic status and have a smaller proportion of members of minority groups than do the Follow-Through classes. The policy of planned variations, with differing educational goals, called for new instruments of assessment designed to be relevant to these differing goals of the various programs. Certain of these instruments have been observational in nature, and designed to determine whether classroom teachers actually perform as the sponsor has specified. Others have been designed to assess in the children changes in such behaviors as independence, question-asking, task persistence, and cooperation in order to determine whether the changes are constant with the goals of the several programs

(Stallings, 1974). The Follow-Through sponsors agree that the basic skills of reading and computing are important, but they attribute varying degrees of importance to such motivational characteristics as ability to attend, inquiring initiative, independence, and task persistence.

The results from the early evaluative studies show promise. In a synopsis of the results of a study by the Stanford Research Institute, based on 102 first-grade classrooms observed and tested in the spring of 1973, various interesting relationships between the classroom processes used by teachers and the observable behaviors of children appeared (Stallings, 1974). For instance, "independent behavior," defined as children being engaged in a task without adult supervision, is found to be more common in those classrooms where a wide variety of activities are available and where teachers allowed children to select their own activities, and groups part of the time. In classrooms where textbooks and workbooks constitute the curriculum, where adults praise children a lot, the children are less likely to show independence. "Task persistance," defined as a child engaged in self-instruction, occurs most often where teachers set tasks individually so that a child can get his directions clarified and where the curriculum is based on textbooks and workbooks. "Cooperation," defined as two or more children working together on a joint task, are most likely where a wide variety of activities and exploratory materials are available and where children can choose their own group, but most unlikely where a curriculum consists of textbooks and workbooks.

A summary by Becker (1974) of findings from an evaluative study of ten

sponsors in 137 Follow-Through schools, and 117 comparison schools, by Abt and Associates indicates that those programs most sharply focused on academic skills (those of Engelmann and Becker, of Bushell, and of Resnick) tend to show the largest gain in the Wide Range Achievement Test and in the Metropolitan Achievement Tests of listening, reading, and numbers. The performances of the children under these three "academic sponsors" are not only exceeding those of the children in the comparison groups, but they are exceeding the national norm for Primary I of the Metropolitan Achievement Test. Becker (1974) also presents some results from the University of Kansas showing that the performances of children of comparison classes without Follow-Through fell progressively at each successive grade level till they were 1.2 years below the grade-level norm at the fifth grade, whereas the performances of the children in the Follow-Through classes averaged from .2 to .3 of a year above grade-level norms. He also reports relations like those found in the study summarized by Stallings.

These early results appear to indicate that many of these sponsors are achieving to a substantial degree their intended goals. For instance, children in the classes for which Weikart is the sponsor have not only demonstrated superiority over those in comparison classes in reading and math; they have also scored higher than children in classes without Follow-Through on tests of self-esteem and approval of their schools. Children in Armington's Open Education Program, in Nimnicht's Responsive Environment Program, in Arizona's Early Education Mode, and in Weikart's cognitive oriented program have shown not only gains in academic achievement but also more independent and more

cooperative behavior.

It is readily apparent from these early results that the innovations in early educational technology stimulated by Head Start are now being deployed on a substantial scale in Follow-Through with promising results. Instead of falling progressively behind, children of poverty in the Follow-Through programs are keeping up with the norms or surpassing them. Whether these children will maintain this greater progress once they leave their Follow-Through programs remains to be seen. On the other hand, it should be noted that these Follow-Through programs are changing the programs of the public schools. These early signs of the success of these changes strongly suggest that institutional modifications in the school programs may be far more profitable than attempting to push children of poverty through compensatory educational programs aimed at making them immune to the defects in traditional public schools.

Reforming the programs in the schools, moreover, may even provide a means of changing some of the serious defects of urban life. Milton Goldberg (1974) has reported inklings of evidence suggesting that Follow-Through may be influencing far more than the scholastic achievement of children of poverty in Philadelphia. Since Follow-Through attempts to consider the influences from the family, and the culture on the child as well as his instruction, parents become critical to implementation. In Philadelphia, each school has a parent advisory-committee with average attendance of at least 25 members at meetings. This participation has given parents the feeling that they have some control over their children's education as shown in an evaluative report

where 96% of Follow-Through parents claimed the program helped them to develop a greater interest in their children's education and where morethan 80% felt confident that their opinions were respected by school personnel. Goldberg reports that the rate of teacher turnover in Philadelphia's Follow-Through program is lower than that for the system as a whole. Teachers remain with their Follow-Through classes because they feel they are improving their classroom performance. Follow-Through also appears to reduce family mobility. Where a study by the Office of Education found 40% of pupils moving during a single year, the Philadelphia study of Follow-Through shows 72% of the pupils in Follow-Through classes continuing through a four-year period, and of those pupils who also had the benefit of Head Start of an equivalent experience, 76% continued. This marked reduction in mobility may result in part from the social services made available in the neighborhoods of the Follow-Through schools, but it also results in considerable part from wishing to remain where their children are enjoying school and they feel they have an influence on the school.

These early evaluative results of Follow-Through are signs of real progress. They add evidence against the view that the poor academic performances of children of poverty are biologically inevitable. Support for Follow-Through deserves to be expanded as rapidly as sponsors competent to establish new programs can be developed. Whether Follow-Through can become a social movement capable of making major improvements in the quality of life in the inner cities remains to be seen.

Parent and Child Centers

The Parent and Child Centers were recommended by the same Task Force that recommended the Follow-Through program. They were legally authorized by the same amendment to the Economic Opportunity Act that authorized Follow-Through.

The Report of the President's Task Force recommended the Parent and Child Centers as a new kind of social institution to be organized at the level of local neighborhoods. This Report also recommended the establishment of Community Commissions for Children with the function of coordinating the schools with the agencies of health, public welfare, the poverty program, and perhaps with the police as well. The Report charged these Community Commissions with the responsibility for determining the standards under which grants might be awarded for the Parent and Child Centers. These Parent and Child Centers in the neighborhoods were (1) to integrate the now fragmented existing services for parents and children available through a single door, (2) to help rebuild the social fabric by involving parents in the planning programs, (3) to provide new programs of day-care and preschool facilities aimed at enhancing the development of competence in children, and (4) teach both parents and adolescents how to do better for their children through participation in the operation of the day-care and preschool facilities. The Report recommended that federal grants for these Parent and Child Centers would b made through the Community Commissions for Children. Although the Centers were expected to vary in size, it was considered that many would serve perhaps 1000 families and offer directly as many of the traditional

health and welfare services as feasible, and offering in satellite facilities such services as day-care and a preschool program. The Task Force recommended starting with a total of approximately 100 such Centers.

The legislation authorizing the Parent and Child Centers located their administration in the Office of Economic Opportunity. The Office of Economic Opportunity made the grants to the local community action agencies. The locus of administration was later changed to the Office of Child Development. The number of these Centers organized and funded was of the order of only 40. These got organized at various times during the years of 1968 and 1969.

An evaluation of the program was arranged through Kirschner and Associates, but I have had no access to their report. The evaluative statements I am about to make derive from my own observations from visits to about a dozen of these Centers and from conversations with visitors to others.

In reprospect, it is clear that the responsibility of the Centers was originally conceived too broadly by both the Presidential Task Force and the staff directing the program in the Office of Economic Opportunity. The emphasis on coordination of services distracted the organizers from focusing on the parents and their infants and young children. After the program was moved into the Office of Child Development, the staff of the program in that Office restricted the focus to the training of parents for fostering early child development. With this restriction, some of them have done a creditable job that is yielding information of importance. It is important to have learned that the art of teaching parents to be effective educators of their infants and young children can be taught to paraprofessional workers. One of the

most successful programs of this kind is the Mothers' Training Program of Mrs. Earladeen Badger (1971a). From the original demonstration of an early version of this approach (Karnes, et al., 1970), despite its efficacy, it was unclear whether Mrs. Badger could teach others to recruit and involve mothers in the education of their infants and young children. The fact that infants of mothers taught by paraprofessional interveners at the Parent and Child Centers in Mt. Carmel, Illinois, and Summerville, Georgia, have shown substantial developmental gains demonstrates that the art of teaching mothers can be taught.

In retrospect, it is also evident that the size of the scale of organization for Parent and Child Centers recommended in the Report of the Task Force and implemented by the original OEO staff for the Parent and Child Centers was too large. Where Parent and Child Centers have been organized in large cities, so much of the energy of the staff has been devoted to integrating the fragmented services of the community that they had little opportunity to involve parents in the program of the Centers or to teach parents to be better educators of their infants and preschool children. Unless the Centers that I have observed are very untypical, those that have been most successful in involving parents in the education of their infants and preschool children have been those organized in small towns or within housing projects within cities. It would appear that a strategy of starting with a relatively small number of families in small communities or limited neighborhoods and then expanding as personnel with requisite skills are developed would have been more effective than trying to set up community commissions to organize

programs on the larger scale.

The nature of the task of organizing smaller groups of parents in neighborhood centers has not been adequately analyzed. It is quite clear that the standard graduate courses in education, clinical psychology, and social work fail badly to guarantee effective leadership for such programs. In fact, the two best leaders that I have encountered had no graduate training whatever. They came from families who had coped very effectively with near poverty. There they had learned practical skills to pass on to those participating in the Parent and Child Centers they organized and led. These organizer-leaders did not feel the standard professional's need for an office to which their clients would come. According to my observations, the more space devoted to offices, the fewer the parents and children with more than nominal participation in the program of the Center.

Neither do the most successful organizer-leaders consider the classroom as the way to teach parents. In one Center that I visited, there were three sewing machines. During the two days that I was about the Center, these machines were in constant use. When I remarked to the director that she must have had a very successful class in sewing, she remonstrated: "That's not the way to teach people." When I asked how so many mothers of this Center, both black and white, had learned to use the sewing machines so well, she recalled that one of the mothers had complained that her eight-year-old daughter needed a new dress, but she did not have enough money to buy it. This was used as an occasion to show how little it would cost to buy the goods for a dress that could be made there at the Center with the help of a sewing

machine. The director taught this woman to sew, and made sure that the resulting dress was very attractive. This woman and the director combined to teach a few others to sew, and thereafter, those that had already learned taught those that wanted to learn. Anthropologists have long known that imitation is one of the most common ways to disseminate skills from one culture to another. Book learning was not the basis for this young woman's choice teaching strategy. Her choice came naturally.

No ready-made method for the selection and training of directors for such Centers exists. I suspect we need to follow the approach of William Hall and Donald Clifton, the founders of Selection Research, Inc., in Lincoln, Nebraska. Their approach is to investigate with projective interviews the attitudes, the backgrounds, the beliefs, the motives, and the skills of those who prove successful in the domain to see how they differ from those who fail. In these interviews, they present thumbnail situations to get their interviewees to express their beliefs and motives. This selective task may be especially difficult because what is required of leaders may well differ from situation to situation. Success in a small town need not imply the ability to succeed in organizing the parents in a unit of subsidized housing or a slum neighborhood within a city. Success with homogeneous neighborhoods, either black or white, need not imply ability to succeed with an integrated organization.

Recruitment Problems and a Promising Strategy

Recruiting parents for such Centers or for organizations and services aimed at modifying their child-rearing practices to provide better education of their infants and young children has a number of problematic aspects.

The Parent and Child Centers aimed to utilize the love and concern that parents of poverty, like all parents, have for their children in motivating them to organize, with the help of professional leadership, to foster the development of competence in their own children. The demonstration projects of Gray and Klaus (1965), of Merle Karnes, et al. (1970), or Phyllis Levenstein (1970) and of Weikart, et al. (1971), as well as the more successful Parent and Child Centers have shown that at least some of the parents from the poverty sector can be recruited and taught to be quite effective educators of their infants and very young children.

This recruitment, however, is no simple process. Parents of poverty are not simply waiting to be invited. Once they have been recruited, and their trust won, many of these parents gain a great deal from the experience. They show their own gains by upgrading their educational and employment skills and becoming more active within the community. On the other hand, a great many are inclined to drop out. Moreover, in the Parent and Child Centers I know, those who participate regularly gain considerably, but the participation of a substantial proportion is highly limited. Whether these gain at all is questionable.

Those who have attempted to focus their interventions on parents of the lowest socio-economic-educational status have tended to presume that little can be gained by attempting to teach the parents, so they have exposed the target children to educational day-care (Garber & Heber, 1973). At this point in history, no one can say what proportion of parents can be taught to be effective teachers of their infants and very young children. The matter deserves investigation.

When to intervene is another matter. The Parent and Child Centers were designed as a new kind of institution, and a number of them failed to solve the recruitment problem. In the Follow-Through Program, the school has provided a natural institutional base for recruiting the parents. According to Goldberg (1974), the modifications in school programs in Follow-Through have succeeded in recruiting a fairly substantial proportion of parents. Unfortunately, this recruitment comes after five years of opportunity to foster development when the child is most plastic have been lost.

A recent demonstration-experiment under the auspices of the Department of Pediatrics at the University of Cincinnati suggests that the lying-in hospital may provide another ready-made institution for recruitment. Moreover, it provides an approach when the concern of a mother for her newborn infant can be utilized to motivate her to plan for participation in a group organized to improve child-rearing practices. This experiment concerned teen-age mothers. Previous pediatric experience had indicated that the infants of such mothers fair badly with respect to both health and education. Yet, Mrs. Badger reports finding it less difficult to recruit the 36 girls she visited in the lying-hospital than any others she has tried. Moreover, she has been able to hold all but two of these 36 girls in a program of weekly meetings, regular home visits, and bi-weekly baby testings. Moreover, the infants of those trained have shown more rapid development on the Uzgiris-Hunt Ordinal Scales than have those in the group that merely got toys for their infants to play with. The rather startling findings of this demonstration-experiment suggest that the lying-in hospital and pediatricians might profitably

be induced either to take some responsibility for the early education of their patients or to lend an institutional hand to those recruiting mothers of poverty for such parent education.

Basic Knowledge of Development and Early Education

What to teach parents about fostering the development of their infants and young children is still far from established and agreed upon. Despite the abundant evidences of plasticity in early development, the evidences of class differences in child-rearing practices, and the evidences that children do profit from what is now taught, there are still those in the various professions concerned with early development who contend that intervention is futile. One of the dangers in revisiting the beliefs in fixed traits and predetermined development is the felt justification they give for discontinuing the support for the investigation and the development of technology in early education. Even those who support intervention for children of parents of poverty tend to believe that child-rearing in families of the middle-class approximates the optimum despite experiments showing that the development of various achievements can be hastened in children of such families. If one takes seriously the conception of development in which achievement builds upon achievement, the results of these studies imply that middle-class child-rearing falls far short of the optimum, and that probably no society has ever maximized the biological potential of its children.

Elsewhere, I have contended that very little is known of how the adaptive accommodations of the ready-made behavioral organizations that infants and very young children bring to the situations that they encounter build one upon

another to produce cumulative effects on competence. Also little is known of the kinds of experiences that foster the various behavioral transformations, and of how the effects of environmental encounters depend upon the ready-made organizations that the infant or young child brings to them. There I have also contended that part of this ignorance probably results from the relative inaccessibility of infancy and early childhood to trained observation and experimental investigation, that part of it derives from such blinding misconceptions as the beliefs in fixed intelligence and predetermined development, and that a third part derives from the lack of appropriate tools for the investigation of early development. When Binet and Simon (1905) hit upon their substitutive mode of averaging the ages of achieving several landmarks of ability to obtain the metric of mental age, they invented an instrument of assessment in which the averaging fell like a blanket over structure of developing abilities. Wilhelm Stern's (1912) IQ-ratio of mental age to chronological age is an additional metrical blanket. Yet the concern of clinicians for the phenomenon of "scatter" on the IQ scales shows that the structural aspect of developing abilities could not be completely obscured (see Hunt, 1973, for an expansion of this argument). Investigating the details of the epigenesis in the structures of intelligence and motivation during the preschool years constitutes one of the major challenges of developmental psychology within the next decade.

Our ignorance of the details of the epigenesis in the behavioral organizations, structures, of the preschool years need not stand in the way of interventions in child-rearing during these years. The fact that a variety of

these interventions (Badger, 1971b, 1971c; Gordon, Guinach, & Jester, 1970; Gray & Klaus, 1965; Levenstein, 1970; and Weikart, et al. 1971, Ch. 3), have all managed to intervene with desirable results for both the children and their parents clearly justifies a continuation of intervention. In terms of size of effect on the performance of children, the Mothers' Training Program of Earladeen Badger is outstanding, yet what she endeavors to teach mothers is quite simple. First, the mothers, who were also the caretakers in the Parent and Child Center of Mt. Carmel, Illinois, were encouraged to believe that how they interact with their infants makes an important difference in the future competence of their children. Second, while their infants are very young, they were encouraged to be responsive to their behavioral indications of distress. Third, they were taught a practical solution to what I like to call "the problem of the match" (Hunt, 1961, pp. 267ff; 1966, pp. 118ff). The mothers were taught to observe their infants in their interaction with models and play materials for behavioral indications of interest and surprise, of boredom, and of the distressful frustration that comes when infants encounter situations with which they cannot cope. Fourth, the mothers were encouraged to provide their infants with materials and models eliciting behavioral signs of interest and to remove those that either bored or threatened their infants. This is the practical solution to "the problem of the match." Finally, the mothers were shown enough about the sequences of developing abilities and interests to enable them to use the current materials of interest to enable them to know what kinds of things to prepare for their infant's choice in the near future. Little in the way of solid sequencing information

exists, however, beyond the sensorimotor phase of the preschool years. As I see it, we need to discover the sequentially ordered landmarks in psychological development occurring from ages 2 to 6 years.

Experimental interventions are not only justified by their educational results, they constitute a major source of information about how to foster early development. For instance, when the intervention program at Mt. Carmel, served to hasten the average age of achieving top-level object permanence (73 weeks) nearly six months ahead of the average age (98 weeks) than it was achieved by infants from predominantly middle-class homes, but left the Mt. Carmel infants well behind in vocal imitation, the evaluation of this intervention brought out the need for greater emphasis on ways to foster the development of vocal imitation. Interventions with proper evaluative assessment can constitute a major source of information about psychological development for improving the technology of early education.

Although this is not the place to elaborate still hypothetical improvements in the technology of early education, it may be worthwhile to mention synoptically the nature of a few of these. Opportunities to use sensorimotor organizations serve to hasten infant development. Thus, having a mobile to look at hastens the development of visual accommodation and thereby permits the blink response to appear earlier (Greenberg, Uzgiris & Hunt, 1968). Such use also hastens the development of eye-hand coordination (White, 1967). In an Iranian orphanage, human enrichment with caretakers allowed to do whatever came naturally, resulted merely in earlier sitting and standing with little or no effect on object construction and vocal imitation, apparently because what

came naturally was to carry the infants about and thereby giving them an opportunity to use their postural musculature and their balancing mechanism (Hunt, work in progress).

Inanimate materials that are responsive to an infant's manipulative efforts and human beings that respond to his behavioral and vocal signs of distress encourage persistance in goal striving (Watson, 1967; Yarrow, Rubenstein, & Pedersen, 1971). The infant-caretaker ratio in group care appears to be of importance for all lines of behavioral development (Paraskevopoulos & Hunt, 1971). In the day-care program of the Parent and Child Center at Mt. Carmel, Illinois, a shape-box proved to be of great interest to infants as soon as they were sitting up. Moreover, it retained interest well into the second year, and may well have been an important factor in the early average age at which these children achieved top-level object construction (Hunt, et al., 1974). The opportunity to hear music and mother talk through loud speakers activated by infants encourages the early, pseudo-imitative steps in the development of vocal imitation (Hunt, work in progress at an Iranian orphanage). These are illustrative examples of the kind of suggestive information that can be gleaned from experimental interventions with evaluation. With replication, the tentativeness of such gleanings from small-scale interventions can be reduced.

At the present time, our ignorance is greatest for the development of symbolic processes taking place between the sensorimotor phase and the achievement of concrete operations. Ordinal scales for assessing development during this preconceptual phase do not exist, and despite the claims that this is

the most advantageous time for intervention, very little is known about how better to foster development during this phase. Here is another challenge for the next decade.

To close these reflections, let me repeat what I said in 1967: "At this stage of history, it is extremely important that our political leaders and our voters understand the limited status of our knowledge, understand t he basis for our justified hopes, and understand the need for support for research in child development and for the development of more adequate technology [for modifying the early child-rearing practices of parents and] for an early education (Hunt, 1969, p. 141)."

References

Badger, Earladeen. 1971a. A mother's training program -- the road to a purposeful existence. Children, 18 (5), 168-173.

Badger, Earladeen. 1971b. Teaching Guide: Infant Learning Program. Paoli, Pa.: The Instructo Corporation, A subsidiary of McGraw-Hill.

Badger, Earladeen. 1971c. Teaching Guide: Toddler Learning Program. Paoli, Pa.: The Instructo Corporation, A subsidiary of McGraw-Hill.

Becker, W. C. 1974. Early indications of positive outcomes. Washington, D.C.: National Follow-Through Sponsor's Presentation, Educational Staff Seminar, 14 February.

Binet, A., & Simon, T. 1905. Méthodes nouvelles pour le diagnostic du niveau intellectuel des anormaux. Année psychol., 11, 191-244.

Brattgård, S. O. 1952. The importance of adequate stimulation for the chemical composition of retinal ganglion cells during early post-natal development. Acta Radiologica, Stockholm, Suppl. 96, 1-80.

Cattell, R. B. 1937. The fight for our national intelligence. London: King.

Cicarelli, V. G., et al. 1969. The impact of Head Start: An evaluation of the effects of Head Start on children's cognitive and affective development (2 Vols.) Bladensburg, Maryland: Westinghouse Learning Corporation (Distributed by Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151).

Dennis, W. 1966. Goodenough scores, art experience, and modernization. Journal of Social Psychology, 68, 211-228.

Dennis, W. 1973. Children of the Crèche. New York: Appleton-Century-Crofts.

Finch, F. H. 1946. Enrollment increases and changes in the mental level of the highschool population. Applied Psychological Monograph, 10, 75.

Garber, H., & Heber, R. 1973. The Milwaukee project: Early intervention as a technique to prevent mental retardation. Storrs: The University of Connecticut, National Leadership Institute, Teacher Education/Early Education.

Gesell, A. 1954. The ontogenesis of infant behavior. In L. Carmichael (Ed.), Manual of child psychology. New York: Wiley. Ch. 6.

Goldberg, M. 1974. Hopeful signs for urban education. Washington, D.C.: National Follow-Through Sponsor's Presentation to the Educational Staff Seminar, 14 February.

Goodenough, Florence L. 1939. A critique of experiments on raising the IQ. Educational Method, 19, 73-79.

Gordon, I. J., Guinach, B., & Jester, R. E. 1970. Children learning through child play. New York: Mt. Martins Press.

Gray, Susan W., & Klaus, R. A. 1965. An experimental preschool program for culturally deprived children. Child Development, 36, 887-898.

Greenberg, D. J., Uzgiris, Ina C., & Hunt, J. McV. 1968. Hastening the development of the blink-response with looking. Journal of Genetic Psychology, 113, 167-176.

Harrington, M. 1962. The other America. New York: Macmillan.

Hebb, D. O. 1947. The effects of early experience on problem-solving at maturity. American Psychologist, 2, 306-307.

Hebb, D. O. 1949. The organization of behavior. New York: Wiley.

Hirsch, J. 1970. Behavior-genetic analysis and its biosocial consquences. Seminars in Psychiatry, 2 (No. 1), 89-105.

Hirsch, J. 1972. Genetics and competence: Do heritability indices predict educability? In J. McV. Hunt (Ed.), Human intelligence. New Brunswick, N. J.: Transaction Books, Pp. 7-29.

Hunt, J. McV. 1961. Intelligence and experience. New York: Ronald Press.

Hunt, J. McV. 1962. The psychological basis for using preschool enrichment as an antidote for cultural deprivation. In J. McV. Hunt, The challenge of incompetence and poverty. Urbana: The University of Illinois Press, 1969, P. 41.

Hunt, J. McV. 1966. Toward a theory of guided learning in development. In R. H. Ojemann & Karen Pritchett (Eds.), Giving emphasis to guided learning. Cleveland, O.: Educational Research Council. Pp. 98-160.

Hunt, J. McV. 1969. The challenge of incompetence and poverty: Papers on the role of early education. Urbana: University of Illinois Press.

Hunt, J. McV. 1973. The utility of ordinal scales derived from Piaget's observations. Urbana: University of Illinois, Department of Psychology (Mimeographed). Paper presented on a symposium organized by Ina C. Uzgiris on "Infant Development from a Piagetian Approach," at the meetings of the American Psychological Association on 27 August in Montreal, Canada.

Hunt, J. McV., Paraskevopoulos, J., Schickadenz, D., & Uzgiris, Ina C. 1974. Variations in the mean ages of achieving object permanence under diverse conditions of rearing. To appear in Friedlander, B. L., Kirk, G. E., & Sterritt, G., (Eds.) The disadvantaged child (Vol. 3). New York: Bruner/Maezel.

Hyden, H. 1959. Biochemical changes in glial cells and nerve cells at varying activity. In F. Brücke (Ed.), Proceedings of the 4th International Congress on Biochemistry. Vol. 3. Biochemistry of the central nervous system. London: Pergamon. Pp. 64-89.

Jencks, C. 1972. Inequality: A reassessment of the effect of family and schooling in America. New York: Basic Books.

Jensen, A. R. 1967. Estimation of the limits of heritability of traits by comparison of monozygotic and dizygotic twins. Proceedings of the National Academy of Science, 58, 149-157.

Jensen, A. R. 1969. How much can we boost IQ and scholastic achievement? Harvard Educational Review, 39, 1-123.

Karnes, Merle B., Teska, J. A., & Hodgins, Audrey S. 1969. A follow-up of three of the five preschool interventions: Evaluation over three years. In: Research and Development Program on Preschool Disadvantaged Children. Pp. 147-183. Bethesda, Md.: ERIC Document Reproduction Service, Vol. I, ED 036 663.

Karnes, Merle B., Teska, J. A., Hodgins, Audrey A., & Badger, Earladeen. 1970. Educational intervention at home by mothers of disadvantaged infants. Child Development, 41 (4), 925-935.

Krech, D., Rosenzweig, M. R., & Bennett, E. L. 1966. Environmental impoverishment, social isolation, and changes in brain chemistry and anatomy. Physiology and Behavior, 1, 99-104 (Pergamon Press, Great Britain).

Levenstein, Phyllis. 1970. Cognitive growth in preschoolers through verbal interaction with mothers. American Journal of Orthopsychiatry, 40 (3), 426-432.

Montessori, Maria. 1909. The Montessori Method: Scientific pedagogy as applied to child education in "The Children's Houses," with additions and revisions. (Anne E. George, Transl., with Introduction by J. McV. Hunt). New York: Schocken Books, 1964.

Page, E. B. 1972. Miracle in Milwaukee: Raising the IQ. Educational Researcher, 1 (10), 8-16.

Paraskevopoulos, J., & Hunt, J. McV. 1971. Object construction and imitation under differing conditions of rearing. Journal of Genetic Psychology, 119, 301-321.

Payne, J. S., Mercer, C. D., Payne, Ruth A., & Davison, Roxana G. 1973. Head Start: A tragicomedy with epilogue. New York: Behavioral Publications.

President's Task Force.[4] 1967. A Bill of Rights for Children: Report of the President's Task Force on Early Child Development. Austin, Tex.: The Lyndon B. Johnson Library.

Reid, J. H. 1966. America's forgotten children. Parent's Magazine, 41 (2), p. 40ff.

Rieger, R., Michaelis, A., & Green, M. M. 1968. A glossary of genetics and cytogenetics: Classical and molecular. (3rd edition, Engl.). New York: Springer-Verlag.

Skeels, H. M., & Dye, H. B. 1939. A study of the effects of differential stimulation of mentally retarded children. Proceedings of the American Association on Mental Deficiency, 44, 114-136.

Smith, S. 1942. Language and non-verbal test performance of racial groups in Honolulu before and after a fourteen year interval. Journal of Genetic Psychology, 26, 51-93.

Stallings, Jane. 1974. Is compensatory education working? Stanford, Calif.: Stanford Research Institute (Unpublished paper presented at the Conference on the Research Committee of the American Association of Elementary-Kindergarten-Nursery Educators, 19 January .)

Stern, W. 1912. The psychological methods of testing intelligence. G. M. Whipple, Transl. Baltimore: Warwick & York, 1914.

Thompson, W. R., & Heron, W. 1954. The effects of restricting early experience on the problem-solving capacity of dogs. Canadian Journal of Psychology, 8, 17-31.

United States Commission on Civil Rights. 1967. Racial isolation in the public schools, Vol. 1. Washington, D. C.: U. S. Government Printing Office.

Uzgiris, Ina C., & Hunt, J. McV. 1974. Assessment in Infancy: Ordinal Scales of Psychological Development. Urbana: University of Illinois Press.

Valverde, F. 1967. Apical dendritic spines of the visual cortex and light deprivation in the mouse. Experimental Brain Research, 3, 337-352.

Volkmar, F. R., & Greenough, W. T. 1972. Rearing complexity affects branching of dendrites in the visual cortex of the rat. Science, 176 (no. 4042) 1445-1447.

Wachs, T. D., Uzgiris, Ina C., & Hunt, J. McV. 1971. Cognitive development in infants of different age levels and from different environmental backgrounds: An exploratory investigation. Merrill-Palmer Quarterly, 17, 283-317.

Watson, J. S. 1967. Memory and "contingency analysis" in infant learning. Merrill-Palmer Quarterly of Behavior and Development, 13 (1), 55-76.

Weikart, D. P. 1969. Comparative study of three preschool curricula. (Paper presented at the biennial meeting of the Society for Research in Child Development, Santa Monica, Calif., March) Ypsilanti, Mich.: Ypsilanti Public Schools, Department of Research and Development.

Weikart, D. P., Rogers, Linda, Adcock, Carolyn, & McClelland, Donna. 1971. The Cognitively Oriented Curriculum. Urbana: University of Illinois Press.

Wheeler, L. R. 1942. A comparative study of the intelligence of East Tennessee mountain children. Journal of Educational Psychology, 33, 321-334.

White, B. L. 1967. An experimental approach to the effects of experience on early human development. In J. P. Hill (Ed.), Minnesota Symposia on Child Development. Minneapolis: University of Minnesota Press. Pp. 201-226.

Wiesel, T. N., & Hubel, D. H. 1963. Effects of visual deprivation on morphology and physiology of cells in the cat's lateral geniculate body. Journal of Neurophysiology, 26, 978-993.

Yarrow, L. J., Rubenstein, Judith L., & Pedersen, F. A. 1971. Dimensions of early stimulation: Differential effects on infant development. (Papers presented on a symposium at the meetings of the Society for Research in Child Development, Minneapolis, Minne., 4 April 1971). Bethesda, Md.: National Institute of Child Health and Human Development (Mimeographed).

Footnotes

1. This paper was commissioned at the request of Professor Lilian G. Katz by the Clearinghouse on Early Childhood Education of the Educational Resources Information Center (ERIC). Special permission has been granted by the Clearinghouse for presentation of the paper at the Mediax Conference and for publication in the Proceedings of the Conference with the understanding that the original source be acknowledge and that the copyright belongs to the ERIC Clearinghouse on Early Childhood Education. The preparation of this paper and any results from investigations by the author in it have been supported by grants from the U. S. Public Health Service (MH-K6-18567, MH-11321, and MH-16074).

2. Since the results from the cross-sectional study give the ages of children <u>at</u> the several levels of object permanence, a reasonable way of estimating the mean of the ages at which they achieved these levels consists in dividing the distance between the mean ages for those at successive levels. Thus, to estimate the mean of the ages at which children at the Municipal Orphanage achieved top-level object permanence, we have simply to split the difference between the mean age of those at the top-level (195 weeks) and the mean age of those at the next-to-top level (169 weeks). (See Paraskevopoulos & Hunt, 1971, Table 1, for the source of these figures.) The result is 182 weeks as the estimated mean age of achieving top-level object construction.

Another factor is also of importance. In the cross-sectional method, the ages of the children are based on the first time they encounter the test of object permanence. In longitudinal methodology, they encounter the

test situations many times determined by the frequency with which the tests are given. In Worcester, this was once each month; in Mt. Carmel it was every other week. It so happens, however, that the repeated examinations constitute opportunities for experience that fosters the development of object construction and does not, therefore, damage the evidence concerning the range of reaction for the age of achieving object permanence.

3. For the purpose of this transformation, I am using as the norm (the equivalent of mental age), the average of the mean ages at which the home-reared children of Athens and the home-reared children of Worcester, Massachusetts, achieved top level object permanence. The 129 weeks given for the mean age of the children from the working-class homes of Athens at top-level object permanence becomes 121.48 weeks when corrected by dividing the distance between this mean age and that of the mean age for those at the next-to-top level of object permanence (See Table 1 in Paraskevopoulos & Hunt, 1971). Thus, the norm becomes the average of 121.48 and 98.31, which rounds off to 110. If, for the lower limit of the range in terms of this IQ-ratio for object permanence, one divides into this norm of 110 weeks the estimated age of 182 weeks at which children of the Municipal Orphanage in Athens achieve this top-level of object permanence, one gets an IQ-ratio of 60. If for the upper limit, one divides into this norm of 110 the mean age of 73 weeks at which the infants of Mt. Carmel achieved this same top-level of object permanence, one gets an IQ-ratio of 150. Subtracting the lower limit (60) from the upper limit (150) yields the range in IQ-ratio for object permanence of 90 points. It is interesting that 90 points also describes the variation

(100 - 3 S.D.s of 15 points each) in individual IQs for all but a fraction of a percent of the IQs derived from standard batteries. Such a comparison does obvious violence to the concept of IQ, for the IQ-ratio for object permanence is based on but a single line of development whereas the IQ is a substitutive average for a number of test items presumably involving several such lines.

4. The personnel of this multidisciplinary Task Force included: J. McVicker Hunt, Chairman; from Anthropology: Oscar Lewis; from Education: John Fischer and John Goodlad; from Pediatrics: Robert E. Cooke; from Psychiatry: George Tarjan; from Psychology: Urie Bronfenbrenner, Jerone S. Bruner, Edmund W. Gordon, Susan Gray, Nicholas Hobbs, Lois Barclay Murphy, and Halbert B. Robinson, and from Social and Child Welfare Administration: Marie Costello and Joseph H. Reid.