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ABSTRACT

Undertaken as a background paper for an early childhood education policy study intended to identify current issues in early childhood education and policy alternatives for consideration by the State Board of Education of Illinois, this report focuses on the effectiveness of early childhood education programs. Specifically addressed are (1) reasons commonly advanced for offering education at an early age, (2) indicators of program effectiveness, (3) types of programs and program characteristics in the light of their relative effectiveness, (4) the SES of children who benefit from programs, and (5) the developmental role of early childhood education programs in the child's learning environment. A review of research for each of the following topics is covered in the paper: rationale for early childhood education, indicators of program effectiveness (including IQ, scholastic achievement, scholastic placement, non-cognitive development, and social responsibility), types of characteristics of programs (including leadership, program duration, adult-child ratio, curriculum, continuity, program location, and parent involvement), the SES difference of children in relation to benefits from early childhood education, and the learning environment. (DST)

EFFECTIVENESS OF EARLY CHILDHOOD EDUCATION PROGRAMS: A REVIEW OF RESEARCH

ILLINOIS STATE BOARD OF EDUCATION

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FOREWORD

This paper on the effectiveness of early childhood education programs is one of several background papers written in conjunction with the Early Childhood Education policy study conducted by staff of the State Board of Education. The interpretation and conclusions expressed do not necessarily reflect the position or policy of the State Board of Education. The paper was prepared by Juergen Hoegl, M.A., M.P.A., Research and Statistics Section, Department of Planning, Research and Evaluation.

Ted Sanders
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EFFECTIVENESS OF EARLY CHILDHOOD EDUCATION PROGRAMS: A REVIEW OF RESEARCH

PURPOSE

In the last few years early childhood education has gained public interest as a means of helping children to become more successful both in learning environments provided by schools and in the larger social context of their communities. In shaping current public policy, a central question is: To what extent can early childhood education offer another possibility for improving the chances for educational success and, thereby, success in life?

The formation of public policy depends increasingly on solid research and careful planning. The State Board of Education has therefore undertaken a comprehensive Early Childhood Education Policy Study. The general purpose of that study is to analyze current issues in early childhood education and to identify policy alternatives for consideration by the State Board of Education. The purpose of this paper is to focus on one of these issues--the effectiveness of early childhood education programs. Specifically, the paper will (1) examine the reasons commonly advanced for offering education at an early age, (2) identify those indicators of program effectiveness revealed by research, (3) discuss types of programs and program characteristics in view of their relative effectiveness, (4) address the question of which children benefit, and (5) delineate the developmental role of early childhood education programs in the child's learning environment.

INTRODUCTION

Rationale for Early Childhood Education

Non-publicly funded early childhood education has generally been available to families that could afford to purchase these services. Economically disadvantaged families have fewer financial resources for their children, and these are used for the necessities of survival, such as food, clothing, and shelter. Early childhood education programs such as Head Start were undertaken to provide a similar educational opportunity for children from low-income families.

Offering education to young children to prevent the consequences of early adversity was based on the assumption that the quality of the earliest environment exercised a crucially formative influence on adolescent and adult characteristics. This belief was anchored in theories of learning and language development, and it was based on initial empirical evidence of the effects of early experiences on later behavior.

Critical Period of Development. Transformational linguistics holds that each child has an innate and acutely sensitive facility for language development during a critical period early in development (Chomsky, 1968). Further, researchers (e.g., Bloom, 1964) thought that, because infancy is a period of unusually rapid maturation and sensitivity, a high degree of environmental stimulation is needed for conceptual development and the building of social relationships in later life.

Cumulative Deficit. Smilansky (1979) summarizes the studies that show significant differences in IQ according to socioeconomic background of children. This gap, very evident by ages 3 and 4, was also found to increase during elementary education and to reach its widest span during adolescence. Thus, the adverse effects of deficits from certain early environments were seen to compound themselves, and it was thought that the remedy lay not so much in remediation in later schooling but in early childhood intervention in the form of an effective educational program.

Health Conditions. Another aspect of the rationale for intervention derived from evidence of the adverse effects of malnutrition on child development. Studies of the relationship between child nutrition and health care and intellectual and cognitive development, summarized by Smilansky (1979), have provided the evidence of need that led to the inclusion of health diagnosis and nutrition programs in Head Start and similar programs.

Limitations of the Evidence

Due to a paucity of initial planning for research design, many of the early education projects had components, methods, and measures so diverse as to compromise comparability. The Stanford-Binet test for IQ was the only standardized test used in large enough samples for longitudinal evaluation. The Perry Preschool Project (Schweinhart and Weikart, 1980, 1984), however, stands out as a carefully designed project allowing longitudinal evaluation. Still, the research design of the project did not include a variable on socioeconomic status. Studies that examined the effect of preschool education on middle-class children (e.g., McKinnon, 1982; Moon, 1975) relied on relatively less stringent evaluation measures, with attendant limitations on reliability and validity.

Further, initial research designs did not include the necessary differentiation of variables for a more precise understanding of the specific elements contributing to program effectiveness. When Bronfenbrenner (1974) reviewed the evidence, he found that only 12 programs met minimal criteria for evaluation, the most important criterion being random assignment to experimental and control conditions. Later evaluations attempted to solve the problem of generalizability by classifying projects according to defined features of their research design. Thus the Consortium for Longitudinal Studies first designated projects as either experimental or quasi-experimental according to the degree of rigor in program design (Lazar and Darlington, 1979). Then separate analyses of studies were undertaken before results were pooled, so that individual findings could be tested for stringency.

As a consequence of the increasing rigor applied to research findings, a sufficient number of studies delineating a systematic trend are now available to justify basic generalizations that serve to indicate possible policy orientations.

INDICATORS OF PROGRAM EFFECTIVENESS

In initial evaluations of the effectiveness of early childhood education programs (e.g., Bronfenbrenner, 1974), IQ scores were taken as the major indicator of program effectiveness. However, it soon became apparent that other indicators of program effectiveness had to be included in longitudinal evaluations. For example, standardized achievements tests (Lazar and

Darlington, 1978), indicators of educational attainment such as rate of placement in special education classes (Vopava and Royce, 1978), and social effects such as delinquency and employment (Schweinhart and Weikart, 1984) were soon added. Today, there is an apparent consensus that, in order to assess the multiple effects of early childhood education adequately, evaluations should include multiple indicators of program effectiveness (Rutter, 1983; Clarke, 1984).

This paper discusses the following indicators of program effectiveness identified by research: (1) intelligence quotient, (2) scholastic achievement, (3) scholastic placement, (4) non-cognitive development, and (5) social responsibility.

Intelligence Quotient

The finding that preschool education leads to short-term gains in IQ scores of between 10 and 20 points for experimental groups in comparison to control groups is well established in research (Bereiter and Engelman, 1966; Karnes, 1969; Weikart, 1970). Even children from middle-income families show such gains, although generally in smaller increments than children from economically disadvantaged families. For example, Kohlberg (1968) found that middle-income children gained 10 IQ points (Stanford-Binet) after a one-year Montessori program while low-income children gained 17 points.

However, longitudinal evaluations (e.g., Bronfenbrenner, 1974; Lazar and Darlington, 1979. began to reveal a pattern of converging IQ scores. In this pattern, the control group gradually closes the gap toward the experimental group - by about half in the first grade, with no further significant difference remaining between the groups by second or third grade. For example, in their study of the Perry Preschool Project, Schweinhart and Weikart (1980) found that children in the experimental group exceeded children in the control group by 12 IQ points at the end of preschool, by 6 points at the end of kindergarten, and by 5 points at the end of first grade (age 7). The groups were equivalent by the end of second grade and thereafter.

The finding of converging IQ scores over time seemed to indicate a deterioration of the positive effects of preschool in the long term and led to a reexamination not only of intervention programs and their design, but also of the relative status of IQ scores in program evaluations. Questions arose concerning the validity and limitations of using IQ scores as predictor and sole indicator of academic achievement.

Social scientists disagree about the relationship between IQ and academic achievement or school performance. Zigler and Trickett (1978) held IQ to be the best available predictor of school performance, citing a correlation of about .70 found by McClelland (1973). In contrast, Lazar (1981) cautioned that IQ could not be considered a valid predictor of school performance since, as he estimated, the correlation between IQ and school performance is about .40. Based on the research findings of Crano, Kenny, and Campbell (1972), Clarke (1984) advanced the possibility of a reciprocal rather than a unidirectional relation between IQ and academic achievement; that is, for some children intelligence appears to lead to later achievement, while for others achievement seems to produce higher levels of intelligence. Chattin-McNichols (1981) questioned the validity of IQ scores as a measure

of cognitive growth by advancing the hypothesis that IQ gains after first school exposure may be due more to rapport and test practice effects than to cognitive growth. Schweinhart and Weikart (1981) advised even more strongly to be aware of limitations to the validity of IQ tests:

> Our present intelligence tests simply do not have the scope of theoretical definitions of intelligence. Until they do, it seems a dangerous expedient to equate the concept of intelligence with IQ.

These reservations about the use of IQ scores, added to recurrent evidence that IQ gains at school entry due to preschool intervention were not maintained in the long term, led to a reconsideration of the measures used to assess program effectiveness. Zigler and Trickett (1978) proposed that social competence, rather than IQ, should be the primary measure in evaluations of early childhood intervention programs. Recognizing the ambiguities inherent in a term as broad as social competence, Zigler and Trickett proposed as an indicator of program effectiveness a social competency index that would include measures of physical health, cognitive ability, school achievement, and motivation. Motivational variables to be measured could include responsiveness to reinforcement, mastery motivation, expectancy of success, self-image, attitude toward school, and similar factors. The New York State study (1982) argued that not IQ but the performance of children in school is a "real-life measure" of the effectiveness of their educational programs. In short, in evaluations of program effectiveness the focus was rapidly shifted from IQ scores to multiple measures of effectiveness. Schweinhart and Weikart (1980), expanding on the concept of multiple effects, perceived a complex network of causes and effects in which preschool intervention sets in motion ongoing consequences. Initial gains in IQ remain important because, they argue,

> cognitive ability at school entry is indeed a gateway to better school performance, with a higher cognitive ability at school entry leading to greater commitment to schooling, higher school achievement and fewer years spent receiving special education services.

Evidence of improved functioning in the school environment due to preschool education was therefore to be seen, beyond IQ scores, in such indicators as achievement test scores, special education and grade placement, scholastic achievement, and socioeconomic outcomes, such as decreased delinquency and increased employment.

Scholastic Achievement

Schweinhart and Weikart (1981) have proposed a plausible explanation of the effect on scholastic achievement of increased IQ scores at school entry due to preschool education. They interpret this initial improvement in cognitive ability as being significant in the child's introduction to the social and academic environment of the school. Since the IQ test bears a strong resemblance to the tasks children are assigned to do in kindergarten and first grade, the initially greater cognitive ability of preschool children manifests itself in more successful performance of these first scholastic tasks. In this way, "greater cognitive ability at school entry becomes almost literally the key to greater scholastic success."

The Consortium for Longitudinal Studies analyzed achievement scores from six of its studies. The pooled analysis found that preschool children scored higher than children not in preschool on mathematics achievement tests. In one of the projects, located in the middle in terms of effectiveness, preschool children were a half grade ahead of the controls by fourth grade. The verbal achievement scores showed a discernible trend in the same direction (Lazar and Darlington, 1979).

A longitudinal study of preschool education programs in Cincinnati, Ohio, found similarly significant differences in scholastic achievement, as measured by the Metropolitan Achievement Test (MAT), in mathematics and in reading at fourth and eighth grades (Nieman and Gastright, 1981).

In his review of the effects of Montessori preschool education, Chattin-McNichols (1981) concluded that Montessori training produced greater gains on measures of academic achievement, such as the MAT, than traditional nursery schools. This effect may be largely due to the ability of Montessori children to pay prolonged attention to school-related tasks, as indicated on measures of distractibility and persistence. The same factor is thought to underly the relatively greater resistance to decline over time of gains in IQ scores of Montessori children.

A study of the San Diego Home Start program for preschool children of low-income parents found that Home Start children performed at or above grade equivalence on mathematics and reading when tested in grades one, two, and three (Randel and Elovson, 1978). They also scored at the 48th percentile in reading on the Peabody Individual Achievement Test (PIAT) while other children in the same schools were at the 26th percentile. Although lacking a control group for comparison, Randel and Elovson nevertheless thought it highly significant that the Home Start children performed at the national average on achievement tests while being enrolled in schools where students' average scores were well below this level.

Most of the experimentally derived evidence of preschool effects on scholastic achievement comes from the study of the Perry Preschool Project (Schweinhart and Weikart, 1980, 1984). The study found that the differences favoring preschool children, as a percentage of items passed on all achievement tests, were from 5% to 7% from age 7 to 10, and a highly significant 8% at age 14. Expressed another way, at age 14 the achievement test scores of preschool children were 1.2 grade-equivalent units higher than those of non-preschoolers. Results from reading, mathematics, and language achievement subtests followed a similar pattern over time.

While the preschool children were found in the long term to differ significantly from the children randomly assigned to the control group on achievement test scores, they did not maintain initial differences in IQ scores. Hence, there was a simultaneous pattern of divergence for achievement and convergence of IQ scores between the experimental and control groups. A plausible explanation of this apparently anomalous disparity between IQ and achievement measures is advanced by Schweinhart and Weikart (1981):

> It is reasonable to state that intelligence encompasses both the IQ tests and adaptive functioning in one's actual environment. Using this definition, we can make the parsimonious assumption that quality preschool education

> positively affects intelligence. Its effect on IQ, however, is not supported by the post-preschool environment of poverty, so that effect withers away with time.
>
> At the same time, preschool may positively affect adaptive functioning in the actual school environment. This improved adaptive functioning creates a more positive social dynamic and thereby supports and maintains itself. Children who attend preschool actually do function better in school, are perceived and treated as functioning better, [and] therefore continue to function better.

In the cause and effect sequence postulated by Schweinhart and Weikart, an effect becomes the cause of another effect. Thus, preschool education produces the initial gains in IQ that lead to later improved functioning in the school environment, as evidenced by greater scholastic achievement and improved scholastic placement, among other benefits.

Scholastic Placement

In the longitudinal study through age 19 of children who participated in the Perry Preschool Program, Schweinhart and Weikart (1984) identified three measures of scholastic placement. They are rates of placement in special education, retention in grade, and dropping out of high school. In each case, scholastic placement was favorable to the group that had received early childhood education. In the Perry Preschool Program, 37% of program children as compared to 50% of control children were placed in special education. Only 35% of program children, compared to 40% of those not in the program, were retained in grade. And while 51% of the children not in the program dropped out of high school, only 33% of the program children did.

Percentages in other project studies vary, but all show more favorable placement for preschool children. The longitudinal study of the New York State Prekindergarten Program, which enrolled 5,245 four-year-old children in 1975 in school districts throughout the State, found that significantly fewer preschool children than children in control groups were retained in grade or placed in special education (New York State, 1982). The Consortium for Longitudinal Studies, listing percentages for specific projects showing some gains greater than those found in the Perry Preschool Program, concluded that program children were decidely less likely to be retained in grade or to be assigned to special education (Lazar and Darlington, 1979). The study of the San Diego Home Start Program, a home-based education program for low-income parents and their preschool children, found lower rates of special education placement and retention in grade for the Home Start children. Since the sample was small and results, absent a control group, were compared with the rates found in Lazar's initial Consortium Study (Lazar et al., 1977), conclusions about the effects of home-based education programs on scholastic placement still await the result of more rigorous research. However, initial findings are congruent with the pattern of improved scholastic placement of children from a variety of early childhood education programs.

Among the measures of scholastic placement, strongest results were produced by using the comparative rates of placement in special education. Such robust findings argue for using special education placement as a major

indicator of program effectiveness, a notion promoted by Vopava and Royce (1978) and by Schweinhart and Weikart (1980). Based on the results of a detailed cost-benefit analysis of the Perry Preschool Program, Schweinhart and Weikart (1984) conclude that improved scholastic placement, in the form of avoiding placement in special education programs, is a major contributor to the financial benefits of preschool education. According to cost-benefit analysis calculations on a per child basis, savings from reduced special education placements alone more than paid for the cost of one year of the preschool program (Schweinhart and Weikart, 1980).

Non-Cognitive Development

Studies of the effects of preschool education have found outcomes in addition to improved cognitive development as indicated in measures of I.Q. and scholastic achievement as well as scholastic placement. These additional outcomes are in the area of non-cognitive development: primarily in attitudinal, emotional, and social development.

One of the effects of relatively greater success in schooling for preschool children manifests itself as a generally more positive attitude toward school. In their longitudinal study of the Perry Preschool Program, Schweinhart and Weikart (1984) found a greater commitment to schooling as a result of preschool education, reflected in more favorable attitudes toward high school, in reduced absences, and in improved attitudes and behavior in class. Preschool attendance led to a more favorable attitude toward high school at age 19, as shown by a more frequently positive response for 14 of 16 items on an evaluation instrument designed similar to those measuring job satisfaction. Also, preschool children had fewer absences per year (12) than the control group (16) during elementary school.

In the study of the New York State Prekindergarten Program (1982), task orientation was included as a non-cognitive behavioral characteristic. Task orientation, defined as the tendency to concentrate on tasks and persist until they are completed, has elsewhere been found to have a positive effect on intellectual and cognitive achievement (Chattin-McNichols, 1981). Using the Classroom Behavior Inventory, the New York State study found that children with more exposure to pre-kindergarten education, defined in length of time in the program, tended to be rated higher on task orientation by their teachers at the end of the program.

In their consideration of the non-cognitive outcomes of preschool education, Lazar and Darlington (1979) examined the effect on achievement motivation and self-esteem of the children as well as on attitudes of the parents. They found that the older children had high, yet realistic vocational aspirations and that mothers' aspirations for their children were even higher than those of the children. Lazar (1981) concluded that the changes in parents' values and anticipations for their children were instrumental in promoting the long-lasting positive effects of preschool programs. Older preschool children also rated themselves as better students than their non-preschool peers and were more likely to give achievement-related reasons for being proud of themselves.

Rutter (1983) pointed out the interaction between self-esteem and achievement:

> Studies have shown that people with a positive view of their own worth tend to be more achieving and that people's self-esteem is much influenced by how they are treated by others (Helmreich, 1972).

Schweinhart and Weikart (1984) offer a description of the processes underlying school success that illuminates the interaction between self-esteem and achievement. Higher intellectual and cognitive ability at school entry influence students' initial performance on scholastic tasks presented by teachers in kindergarten and first grade. The feedback students receive from teachers on their first scholastic performance initiates the students' perception of success. Teachers were in fact found to rate children who had attended preschool as showing more academic potential and motivation than children who had not. Initial successes begin a pattern of successful scholastic performance recognized and encouraged by teachers, which in turn increases self-esteem and commitment to schooling.

The California Preschool Social Competency Scale (CPSCS), widely used as an instrument to measure social development, yields indications of behaviors in interactions with other children and with adults important for success in school and in later life. The study of the New York State program (1982) found that the longer children had been in pre-kindergarten programs, the higher were the ratings of social competency they tended to receive on the CPSCS. This effect seems to hold regardless of the child's socioeconomic level. Initial results from the rigorously designed study of the effects of preschool on educationally advantaged children, defined as children coming from socioeconomically advantaged backgrounds, indicated similar effects on the social development of these children (Larsen, 1983). The study revealed significant differences on the CPSCS between socioeconomically advantaged children who had attended preschool and those who had not.

The movement toward the use of measures of non-cognitive as well as cognitive development as indicators of program effectiveness in evaluations of preschool education was summarized concisely by Schweinhart and Weikart (1981):

> Although cognitive ability and preschool education have long been linked, an equally important benefit of preschool may be that it provides high-risk children with a more favorable entry into the success flow of the school, increasing their commitment to the institution as well as their ability to meet its task-oriented demands - in short, providing a social and emotional adaptation as well as an academic headstart.

Social Responsibility

In her incisive review of research evidence of the interrelation of childrens' early experience and cognitive development, Clarke (1984) posits a transactional model of development that sees continuous interactions across the years of development between the growing child and the social environment. Similarly, in their transactional approach Schweinhart and Weikart

(1984) view the development of particular traits in a child as an outcome of interaction with certain environmental opportunities. They see the development of social responsibility as a long-term outcome of the preschool child's favorable entry into school.

Measures of social responsibility in the Perry Preschool study, the only study for which comprehensive data are available, include rates of delinquency, crime, welfare assistance, and teenage pregnancy on the negative side and rates of high school graduation, enrollment in postsecondary education, and employment on the positive side. Interviews, questionnaires, and police and social service records yielded the data, all of which were decidedly in favor of the preschool group. Schweinhart and Weikart (1984) found that preschool attendance altered performance by nearly a factor of two on three major variables of social responsibility at age 19. The rates of employment and participation in postsecondary education were nearly double for those with preschool, as compared to those without preschool. In the preschool group, the rate of teenage pregnancy was slightly over half the rate for the nonpreschool group. Further, preschool attendance led to a reduction of 20 percentage points in the detention and arrest rate and nearly that much in the high school dropout rate. While 67% of the preschool group attained high school graduation or its equivalent, only 49% of children in the control group reached that level of educational attainment. At age 19, 50% of preschool participants reported employment, compared to 32% of the nonpreschool group.

An apparently anomalous finding regarding delinquent behavior was reported earlier by Schweinhart and Weikart (1980). They found higher scholastic achievement in the preschool group to be related to more delinquent behavior, while improved commitment to schooling seemed to produce fewer delinquent offenses. For an explanation of this paradox, the finding of Jensen (1976) was cited. While the general relationship between achievement and delinquency was found by Jensen to be inverse or negative, there was a reversal of the pattern at the lowest levels of school achievement. Thus, persons who had raised their achievement from the lowest to the next lowest percentile may have been more capable of delinquent behavior, but when preschool education had a broader effect on their school experience and performance, their delinquent behavior decreased. This finding, Schweinhart and Weikart argue, underscores the importance of a systematic approach to the evaluation of preschool education that considers multiple and interrelated effects and therefore uses multiple indicators of effectiveness.

Taken together, these indicators of preschool effectiveness translate into measurable economic efficiencies. The cost-benefit analysis of the Perry Preschool project delineates the economic efficiencies derived from preschool education for socioeconomically disadvantaged children. Over the lifetimes of the participants, preschool is estimated to yield economic benefits with a present value of seven times the cost of one year of the program (Schweinhart and Weikart, 1984). There is as well the benefit of an improved quality of life for participating children, their families, and the larger community.

TYPES AND CHARACTERISTICS OF PROGRAMS

Early childhood education programs serve different populations and purposes and hence span a wide range of types, from traditional nursery school and day care through Head Start and Home Start to Montessori programs. Purposes range from primarily custodial care to academically oriented programs emphasizing cognitive development. Populations are comprised of children from socioeconomically disadvantaged environments to middle-class children to children from educationally advantaged environments. Some programs are based in a center or school, others are based in the child's home, and still other programs combine the two approaches.

In assessing the relative effectiveness of individual types and characteristics of early childhood programs, evaluation efforts have generally been limited because initial program designs did not include the necessary differentiation of variables for a more precise understanding of the specific elements contributing to program effectiveness. In his examination of the effects of the Montessori school experience, Chattin-McNichols (1981) encountered a paradigmatic situation. Finding that Montessori schools represent a wide range of program characteristics, he cited the need for future research to differentiate clearly among the various implementations of the Montessori model:

> When treatment and control conditions are not defined in sufficient detail, it is difficult to determine which aspects of the programs may be associated with specific effects.

Still, some general conclusions are indicated by findings in the literature. Guidubaldi (1974) cites a number of findings in favor of different program models affecting different areas of development. For example, Karnes (1969) found that children in highly structured, cognitively oriented programs performed significantly better on IQ and achievement measures than Montessori children. Dreyer and Rigler (1969) found Montessori children to be more task-oriented, while children in traditional nursery programs had significantly higher scores on creativity. In examining Montessori schools with a wide range of program characteristics, Chattin-McNichols (1981) concluded that programs emphasizing the development of language and other skills in academic areas produced greater gains on measures of academic achievement and school readiness. Such an emphasis may be in accord with parental expectations of preschool education programs which define the purpose of that education primarily in terms of the child's academic achievement. Thus, in the San Diego Home Start program, parents were found to place greatest importance on those program components that would contribute to the child's cognitive development (Randel and Elovson, 1978).

Vopava and Royce (1978) as well as Lazar and Darlington (1979) addressed the question of what kinds of preschool education programs were most effective. The measure employed in this determination was the reduction in special education placements in the children's later school years. However, Lazar and Darlington believe that this may not be the most sensitive variable for differentiating among programs at different sites, and they propose to use achievement test scores as a dependent variable in a future reexamination of the question. For the moment, there appeared to be insufficient evidence to determine which specific program characteristics distinguish effective from less successful programs.

Noting that early childhood education does not always produce the dramatic effects found in their study of the Perry Preschool Program, Schweinhart and Weikart (1984) examined a number of program elements in order to ascertain whether any could be said to guarantee long-term effectiveness. They concluded that program effectiveness cannot be guaranteed by the inclusion or exclusion of specific program features. Instead, "the best way to guarantee program effectiveness is to operate the program in such a way that a high level of program quality is assured." Essential ingredients for such program operations are a competent and committed staff, a director who provides both instructional and administrative leadership, and a high level of quality control of the delivery of services as scheduled and of staff development.

A summary discussion of specific program elements follows.

Leadership.

There is evidence that competent leadership, including supportive supervision, is essential to overall program quality and effectiveness (Schweinhart and Weikart, 1984).

Program Duration.

Program duration beyond two years does not appear to be essential for program effectiveness (Schweinhart and Weikart, 1984).

Adult-Child Ratio.

Generally, the fewer children there are per adult in the program, the more effective the program (Vopava and Royce, 1978; Lazar, 1981). Specifically, program effectiveness relative to adult-child ratio may vary depending on program setting and goals, type of child served, and degree of parental involvement. At least two adults, regardless of size of group of children, are recommended by Weikart for a quality program. For a group of children with few or no special needs, an adult-child ratio of 2:16 is recommended. The two adults should be a teacher licensed in early childhood education and a paraprofessional adult (Weikart, 1985).

Curriculum.

Different emphases in curriculum affect different areas of development -- e.g., cognitive, creative, or social development (Guidubaldi, 1974; New York State, 1982; Larsen, 1983). However, overall program effectiveness appears to be unaffected by type of curriculum, being much more dependent on the quality of program operation than on a specific curriculum (Schweinhart and Weikart, 1984).

Continuity.

Research evidence of the effects of follow-through programs was initially ambiguous, but with time inclined in favor of program continuity. Seitz, Apfel, and Rosenbaum (1981) reported no consistent improvement in academic achievement and concluded that the complex problem of discovering the factors determining program effectiveness remains to be resolved. Becker and Gersten (1982) found that students who had participated in an instructional follow-through program appeared to retain the knowledge and problem-solving skills learned in primary grades 1-3 in fifth and sixth grade. Without a continuing program, achievement test scores declined. Becker and Gersten concluded that the preschool children are likely to lose ground against their middle-income peers unless instruction continues to build effectively on skills acquired in the early and intermediate grades.

In his historical review of Head Start, Zigler expressed his belief that follow-through is essential for program effectiveness (Zigler and Valentine, 1979). To address this issue, the New York State Experimental Prekindergarten Program was designed to investigate the impact which program continuity may have in producing lasting effects on the children's development. A central feature of that project was intensive staff development for the purpose of increasing the continuity of children's experiences in preschool through grade 3. In the program evaluation, staff development to increase continuity was found to account for more lasting effects both on cognitive measures at the first grade level and on the quantitative subtest of the cognitive abilities test (CAT) for some students at the second and third grade levels. The New York State study (1982) believed these findings to be solid enough to recommend that the staff development for continuity component should be a mandatory part of an early childhood education program.

Program Location.

There is no evidence of the relative effectiveness of center-based compared to home-based early childhood education programs. There was neither a control group nor a center-based comparison group for the Home Start project (Randel and Elovson, 1978). Because of limitations of the sample, a meaningful analysis of the effectiveness of home-based as an alternative to school-based programs could not be made for the New York State program (1982). Although a descriptive differentiation between home-based and center-based programs was made by the Consortium for Longitudinal Studies, there was no such evaluation variable (Lazar and Darlington, 1979).

Home visits are a related question. There is a consensus that the more home visits, the better, especially when the purposes of these visits are to provide parents with information on child development and nutrition, to encourage parents to see themselves as first and most important teacher, and to involve them in the child's educational process both at home and in school (Vopava and Royce, 1978; Lazar, 1981).

Parental Involvement.

Program activities involving parents can consist of staff visits to the home, parent visits to the school, parent education on child development and care, employment of parents in the program, and parent participation in program decisions (New York State, 1982; Smilansky, 1979). A solid consensus emerges from the research literature that parental involvement is essential for program effectiveness (Zigler and Valentine, 1979; Smilansky, 1979; Lazar, 1981; New York State, 1982). The New York State study (1982) urges that parental involvement should be a mandatory component of any early childhood education program. Such strong recommendations are based on persuasive evidence of significant effects obtained from the program participation of parents.

The New York State study (1982) found that the more time spent by parents in program participation, the higher the children scored on each of three measures of cognitive development. Smilansky (1979) summarizes results produced by parental involvement in a number of earlier studies (e.g., Karnes, 1970b; Weikart, 1970; Gray, 1974). Accelerated cognitive development, as reflected in IQ scores, was a consistent finding relative to the child. There were also significant positive attitudinal, social, and communicative effects on the mother. As a result of her direct participation in the preschool program, the mother gained awareness of her role as educator vis-a-vis the child. Her self-esteem was improved and her aspirations for her own education were raised. Her communication with the child showed greater cognizance of the affective needs and cognitive dimension of the child's development. The mother also continued her direct involvement in the child's educational progress after the program had ended.

It may be that once parents see themselves as effective agents in their children's early education, they are more inclined to continue in this role even after the program ends (Randel and Elovson, 1978). Certainly the conclusion seems warranted that long-lasting effects of early preschool programs are due in large part to changes in the values and anticipations parents hold for their children (Lazar, 1981). A simultaneous result of preschool intervention in the Perry Preschool Project was that children had a more positive attitude toward school and achieved higher levels of scholastic attainment while parents were also more satisfied with the school performance of their children and had higher aspirations for their educational attainment (Schweinhart and Weikart, 1981). Preschool programs can assist parents in becoming supportive of their children's development by involving the parents as much as possible in the educational process of their children in school and at home (New York State, 1982).

THE CHILDREN

The number of three- and four-year-olds enrolled in early childhood education programs across the nation, excluding custodial day care, increased from 1.5 to 2.3 million between 1970 and 1980, which represents an increase in the participation rate from 20% to 37% (Schweinhart and Weikart, 1984). Most of the research in this area of education applies to socioeconomically disadvantaged children. But middle-class and advantaged children have also been studied, and increasingly rigorous research designs are yielding meaningful initial findings on these children.

Socioeconomically Disadvantaged Children

Early childhood education programs were conceived as a means of countering the adverse effects of certain early environments. Children from these environments were considered at risk for failure in school. Children who, live in conditions of poverty face deficits that are considered to be predictors of later academic difficulties (Schweinhart and Weikart, 1981): low educational attainment of the parents, low occupational and income status of the parents, initially low cognitive ability, and relatively low achievement expectations of the parents for the child. These are the children whose families usually cannot purchase the early childhood education services available to children from more socioeconomically advantaged families. To some extent, depending on child and family characteristics, financial resources translate into developmental outcomes (Schweinhart and Weikart, 1984). Children from socioeconomically disadvantaged families are therefore the most at risk for special education placement, comparatively less academic achievement and attainment, school leaving, unemployment, welfare, and delinquency.

They are also the children who benefit the most from early childhood education. Participation in preschool education has both immediate and long-term benefits for these children and their families. Preschool education produces significant improvement in early cognitive performance and in academic achievement during the school years of these children. Their noncognitive development and social responsibility are promoted. Their levels of scholastic attainment, postsecondary education and employment are increased while their rates of teenage pregnancy and delinquency are decreased. The achievement expectations of the parents, both for their children and for their own continuing education, are raised. These attitudinal and motivational changes occur simultaneously with improvements in cognitive development, as an outcome of early childhood education. These changes give these children, and their families, an opportunity for school success that eventually becomes life success.

Middle-Class and Advantaged Children

It has traditionally been assumed that socioeconomically advantaged children do not normally confront the kind and extent of environmental deficits faced by their peers living in poverty. Early studies of preschool children from middle and upper-middle socioeconomic levels, finding no significant differences between experimental and control groups in various measures of academic and social development, generally concluded that the enriched middle and upper-middle income environment tended to outweigh any advances that may occur as a result of preschool education (Pendergast, 1969; Guidubaldi, 1974; Chattin-McNichols, 1981; McKinnon, 1982).

However, the lack of rigor in the experimental design of these studies compromises the potency of the findings and conclusions. More rigorously designed studies were needed to test the view that all children, whether formally classified as disadvantaged or not, are to some extent understimulated in their earliest years and can benefit from a preschool environment that has been carefully constructed to meet their needs.

Initial findings indicate that this may be so. In her study of the effects of preschool on "educationally advantaged" children, Larsen (1983) reports early findings of significant differences in cognitive development and social competency between experimental and control children at the end of preschool. Educationally advantaged children are defined in the study as having initially high cognitive ability and coming from families with high levels of education, occupation, and income and with high achievement expectations for the child. While these children may not be considered at risk of educational and social failure, preschool education may provide for them valuable experiences that enhance the varied dimensions of their development. Ultimately, as Swift (1964) proposed long ago, the effectiveness of any given preschool program for any given child may be largely derived from its provision of experiences which supplement rather than just duplicate experiences the child is receiving elsewhere.

THE LEARNING ENVIRONMENT

Present thinking about growth and development in childhood posits continuous interactions across the years of development between the child and the social environment (Clarke, 1984; Schweinhart and Weikart, 1984). Consequently, the learning environment provided by a child's socioeconomic setting on the one hand and by schooling on the other differentially influences the child's development. Deficits in cognitive, attitudinal, motivational, and social stimulation encountered by the child in a particular socioeconomic and familial setting during the early preschool years can be supplemented by appropriate experiences in the preschool educational environment constructed to meet the child's particular needs. Hence, early childhood education programs have a central role in the child's total learning environment in preparing the child for successful school performance and thereby creating a foundation for life success.

SUMMARY

This paper has (1) examined the reasons commonly advanced for offering education to young children, (2) identified those indicators of program effectiveness revealed by research, (3) discussed types of programs and program characteristics in view of their relative effectiveness, (4) addressed the question of which children benefit, and (5) delineated the developmental role of early childhood education programs in the child's learning environment.

Offering education to young children to prevent the consequences of early adversity is based on the belief that the quality of the earliest environment exercises a crucially formative influence on child development and later adolescent and adult characteristics. Many social scientists believe infancy to be a critical period of unusually rapid maturation and sensitivity, requiring a high degree of environmental stimulation for the child's cognitive and social development. Such stimulation, as well as adequate nutrition and health care, usually absent in the earliest environment of socioeconomically disadvantaged children, could be provided effectively, it was thought, in early education programs designed to meet these needs and to prevent the cumulative deficits of later years.

In initial evaluations of early childhood education programs, IQ scores were taken as the major indicator of program effectiveness. The finding that preschool education leads to short-term gains in IQ scores of between 10 and 20 points for experimental groups in comparison to control groups is well established in research. However, longitudinal evaluations also revealed a pattern of converging scores, leaving experimental and control groups equivalent by the end of second grade and thereafter. This "wash-out" effect of IQ scores induced an initial perception of a deterioration of the positive effects of preschool in the long term. But growing reservations about the validity and limitations of using IQ as predictor and sole indicator of academic achievement led to the inclusion of scholastic achievement, scholastic placement, non-cognitive development, and social responsibility as other indicators of effectiveness. Today there is an apparent consensus that evaluations should include multiple indicators of program effectiveness in order to assess adequately the multiple effects of early childhood education.

The notion of multiple preschool effects posits a complex network of causes and effects in which preschool intervention sets in motion ongoing multiple consequences. In this process, initial IQ gains, and the higher cognitive ability they reflect, trigger better school achievement and performance. In the long term this school success is also transformed into life success.

School success for children who have participated in preschool education begins with higher cognitive ability. It continues with improved scholastic achievement, as measured in standardized reading, mathematics, and language achievement tests. Significant improvement in these areas was found by the Perry Preschool study as late as age 14, which was interpreted as evidence of measurable long-lasting effects of early childhood education.

Measures of scholastic placement include special education placement, retention in grade, and high school dropout rates. All indicate consistently favorable outcomes for preschool children.

Areas of non-cognitive development affected positively by early childhood education include a more positive attitude toward school; reduced absences; and increased task-orientation, achievement motivation, self-esteem, and social competency. When parents were involved in the program, there were equally beneficial changes in parents' attitudes and achievement expectations - an effect considered instrumental in promoting the long-lasting positive outcomes of preschool programs.

In the transactional model of development, the emergence of particular traits in a child is seen as an outcome of interaction over time with certain environmental opportunities. In this view, the development of social responsibility is a long-term effect of the preschool child's favorable entry into the school success flow. Measures of social responsibility in the Perry Preschool study, the only longitudinal study to collect such comprehensive data, indicated lower rates of delinquency, crime, welfare assistance, and teenage pregnancy as well as higher rates of high school graduation, enrollment in post-secondary education, and employment for preschool children followed through age 19.

Taken together, these multiple indicators of preschool effectiveness translate into measurable economic efficiencies. A cost-benefit analysis of the Perry Preschool Program for socioeconomically disadvantaged children estimates economic benefits over the lifetime of the participants to have a present value of seven times the cost of one year of the program. Savings from reduced special education placements alone, calculated on a per child basis, paid for the cost of one year of the preschool program.

In assessing the relative effectiveness of individual types and characteristics of early childhood programs, generally different program models are found to affect different areas of development. For example, children in structured, cognitively oriented programs do better on IQ and achievement measures. Parental expectations of a particular program may help define the purpose of that education primarily in terms of the child's academic achievement.

Specific program features contributing to effectiveness are difficult to assess, given present limitations of research designs. However, it is believed that program continuity and parental involvement are essential to the long-term effectiveness of any early childhood education program. Further, beyond the inclusion or exclusion of specific program features, most important for program effectiveness may be the quality of program operation, sustained by instructional and administrative leadership and by a competent, committed staff. Program continuity, which includes a staff development component, is intended to assure that current instruction builds effectively on skills children have acquired in preschool. It thus counters possible redundancy when children, regardless of individual ability level, are taught the same basic skills at school entry. There are indications that parental involvement improves the child's level of achievement and attitude toward school. It also increases parents' expectations of the educational achievement and attainment of their children and improves parent-child communications on the affective and cognitive levels. It is thought that once parents see themselves as effective agents in the early education of their children, they are more inclined to continue in this supportive role after the program ends.

Children from socioeconomically disadvantaged families have been found to be the most at risk of educational and social dysfunction. They are also the children who benefit the most from early childhood education. There are some initial findings that socioeconomically advantaged children, although generally not considered at risk for educational and social failure, may nevertheless benefit from preschool education. If programs are designed to provide experiences that supplement rather than duplicate experiences the children are receiving elsewhere, preschool education may effectively enhance the varied dimensions of their individual development.

There are continuous interactions over the years of development between the child and the learning environment, comprised of the child's socioeconomic setting and its school setting. Any deficits in cognitive, attitudinal, motivational, and social stimulation encountered by the child in a particular socioeconomic and familial setting during the early preschool years can be supplemented by appropriate experiences in the preschool educational environment designed to meet the child's particular needs.

Due to a paucity of initial planning for rigorous research designs, specific results of early evaluations have often been ambiguous and sometimes contradictory. There has not yet been a satisfactory differentiation of variables for a more precise understanding of the specific elements contributing to program effectiveness. Also, early studies of socioeconomically advantaged children lacked stringency, and recent, more rigorously designed studies, while yielding favorable short-term results, can not yet provide indications about long-term outcomes.

Nevertheless, the Perry Preschool project stands out as a carefully designed study allowing longitudinal evaluation. Its findings are potent and persuasive, but the project must be considered exemplary rather than representative. Still, its findings can be compared to those of other studies with sufficiently rigorous program design so that relative stringency can be assigned to individual findings. Taken together, these findings, even at present, delineate a systematic trend that serves to indicate possible policy orientations.

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