

The Efficacy of Early Intervention: Why Are We Still Asking This Question?

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Although data concerning the efficacy of early intervention have been available for more than two decades, questions concerning the effectiveness of these programs continue to be raised. This paper examines four basic assumptions of intervention programs that must be clarified before the global question of efficacy can be meaningfully addressed: the implicit theory of human development, the conceptualization of the specific interventions, how developmental change is measured, and the strategies used for selecting program participants. A final discussion highlights the role played by the child's family in effective intervention programs.

The importance of early childhood for the intellectual, social, and emotional growth of human beings is probably . . . one of the most revolutionary discoveries of modern times (Bruner, 1980).

More than 10 years ago Urie Bronfenbrenner raised the question, "Is Early Intervention Effective?" In his now-famous monograph, Bronfenbrenner (1974) analyzed the research and practice of the preceding decade concerning intervention with young handicapped and at risk children. He focused on how to measure IQ change, whether the effects of intervention programs persist longitudinally, whether earlier rather than later intervention is better, what types of intervention pro-

grams are most effective, and how to select subjects who might benefit most from particular kinds of programs.

Much additional data about these issues have since become available. In the face of evidence spanning more than two decades, it is worth considering why the effectiveness of early intervention is still in question.

Is It One Question, or Several?

Data concerning the efficacy of early intervention with poor, at risk, and/or handicapped children have been presented by numerous authors (for reviews see Beller, 1979; Brown, 1978; Clarke-Stewart & Fein, 1983; Lazar & Darlington, 1982). The most comprehensive analysis of the longitudinal effects of early intervention on children from low income families consists of a re-analysis of data from 15 early education programs, some of which began as early as 1961 (Lazar & Darlington, 1982). Known as the Consortium for Longitudinal Studies (1983) this re-analysis included new follow-up data collected on more than 1,000 children. The pooled findings from this re-analysis of early intervention programs showed that preschool programs had long lasting effects in several areas: Arithmetic and reading achievement scores of program graduates were found to be higher than those of controls; preschool graduates were less likely to be placed in special education or remedial classes than their controls; preschool graduates demonstrated higher self-esteem and valued achievement more than controls; and preschool graduates demonstrated increased labor market participation in late adolescence and in early adulthood.

Given these findings, as well as efficacy data from intervention programs with children born at risk for psychopathology (e.g., Cass & Thomas, 1979; Sander, 1983) and children who are otherwise disabled (e.g., Fraiberg, 1977; Meisels, 1979), it is paradoxical that the effectiveness of early intervention is still in doubt. The solution to this paradox lies in the realization that the efficacy question is not one question, but several. Far too often conclusions are drawn about efficacy without consideration first being given to the internal consistency, within and between, of assumptions underlying these programs. Chief among these assumptions are the program's (a) implicit theory of human development, (b) conceptualization of specific interventions, (c) method of measuring developmental change, and (d) strategies for selecting participants. Phrasing these four assumptions as research ques-

tions to be investigated, I will demonstrate why they require clarification before the global question of efficacy can be meaningfully addressed.

Developmental Model

The first question to answer before efficacy questions are posed is the following: *What is the underlying developmental model or theoretical rationale for the early intervention program?* One's theory of how development occurs influences the choice of intervention strategy as well as the data used to support the effectiveness of the intervention. Two major theoretical orientations dominate the field of early intervention. If one views development as simply the unfolding of hereditary factors, or as the causal effect of unitary environmental forces on an organism, one is subscribing to the single-factor or main-effect view of development. The assumption of a single-factor model is that the developmental outcomes of an at risk child (a) are either established at birth or fixed after birth and (b) are predictable in a causal and efficient manner (Sameroff & Chandler, 1975). Such an approach is not supported by recent evidence concerning child development (Meisels & Anastasiow, 1982).

The transactional model, by contrast, views development as considerably more complex than does the single-factor approach. In this model development is accessible to bi-directional modification, remediation, and amelioration in interaction with events and people in the environment (Gottlieb, 1983; Sroufe, 1983; Werner & Smith, 1982). Sameroff (1975) and other researchers (e.g., Kopp & Parmelee, 1979; Thoman, 1979) have shown that children's development does not occur in a linear manner but results from mutual transactions between children and their social and caregiving environments. The specific characteristics of the individual child transact with a caregiver's mode of functioning in a particular type of setting to produce an "individualized, ongoing miniature social system" (Sameroff, 1975). Children and their caregiving environments are inseparable in matters of development.

But when children are studied in isolation from their caregiving environments, and when the effects of intervention are sought in single-factor, causal terms, a great deal of confusion can be generated. For example, Piper and Pless (1980) reported no differences resulting from intervention with a small sample ($n = 22$) of Down Syndrome infants (all under 2 years of age) when these infants were compared with other

Down syndrome infants ($n = 17$) who were not enrolled in the program. The intervention in this study was delivered for only 1 hour every other week for only 6 months in a center based program without parental involvement. Change was evaluated by means of a single IQ measure.

This study exemplifies the single-factor model. It ignores the potentially positive effects of transactions between children and their caregiving environments, and it utilizes a unitary measure of developmental change. Ferry (1981) cites the Piper and Pless study as evidence for the lack of scientific support for early intervention efficacy. Ferry also appears to be committed to a single-factor model. She notes, "Inadvertently, staff members in intervention programs may subsidize the false hope that improvement will occur, thus delaying the parents' emotional adaptation to the problem" (Ferry, 1981, p. 40). This view of development and intervention is inconsistent with evidence concerning the effects of child-caregiver interactions on development. In other words, both Ferry and Piper and Pless suggest that an interactional or transactional phenomenon—change in development—should be significantly affected by a brief, discontinuous stimulation program without parent involvement. But such an approach does not account for one of the major mechanisms of change and growth: child-environment transactions.

Other researchers have studied development and intervention with high risk children from a transactional viewpoint and have arrived at very different conclusions. For example, Hanson (1981) studied the effects of a weekly home based intervention program with Down Syndrome infants. She found that the infants in her study who received intervention scored approximately 20 points higher on both the Bayley mental and motor scales and displayed positive changes in dyadic interactions when compared with Down syndrome infants not in an early intervention program. Hanson attributed this difference to her program's multidimensional intervention—an intervention that focused on interactions between infants and their caregivers.

Efficacy data from other studies that utilize a transactional model also exist. Epstein and Weikart (1979) analyzed the data from eight parent-infant intervention programs that met the following criteria: The programs focused on parents as teachers of their young children, the programs began before the child was 2 years of age, the programs assessed both the parent-child interaction process and children's performance on standardized cognitive measures, and the infants—who were all developmentally delayed—were from low income families.

In every instance the immediate outcomes of these projects demonstrated more optimal child effects for the intervention group compared to the control; in three of four projects that collected longitudinal data these effects persisted over time. The analysis showed that the parent-child relationship was an even better predictor of children's development than social class. The longitudinal data from these studies demonstrated that mothers who interacted with their infants and children in verbally supportive and responsive ways raised children who were better at problem solving and more successful in school.

Interactive goals were central to these studies as well as to other successful intervention programs for preschool children (Goodman, Cecil, & Barker, 1984; Ispa, 1981). Hawkins (1974) has noted that "under the rug of technique lies an image of man." One can add that under the guise of intervention strategy lies one's developmental theory and fundamental beliefs about how development is altered or ameliorated. An interactive developmental model most closely approximates the dynamics of change and growth in children. Intervention programs based on this model thus have a high probability of effectively resulting in positive child change.

Description of the Intervention

Another area that must therefore be clarified before global efficacy questions can be meaningfully posed concerns characteristics of the specific intervention. *What is the intervention—and how does it relate to a theory of development?* When there is lack of comparability among intervention strategies, generalizations about efficacy are misleading at best.

The area of neonatal intervention provides an example of the problems that result from diversity in intervention strategies. The research regarding neonatal intervention is confusing, inconclusive, and lacking in comparability (Meisels, Jones, & Stiefel, 1983). Of the approximately 25 studies published between 1960 and 1980, most lack a clear or consistent theoretical focus, contain numerous methodological problems, subscribe to a wide range of intervention models, and report virtually no longitudinal follow-up data. Without some agreement on purpose and methodology for intervention, the question of efficacy for infants in neonatal intensive care units cannot be answered.

Similarly, generalizations across studies of preschool handicapped children cannot be made unless there is comparability concerning inter-

vention strategies. Some programs (e.g., Fredericks, Baldwin, Moore, Templeman, & Anderson, 1980; Hayden & Haring, 1977) utilize a directed teaching approach and a data based model that relies upon task analyses of skills to be learned. Other programs (e.g., Goodman et al., 1984; Ispa, 1981) focus on general developmental processes rather than on skill acquisition. Positive or negative findings from one type of curriculum model do not necessarily imply the likelihood of similar findings for children who are exposed to a different model. Without a clarification of which programs utilize which generic type of intervention, it is impossible to generalize across programs.

Measurement of Change

The third factor that contributes to the general confusion about global early intervention efficacy is captured in the following question: *How is change in early intervention programs measured?* This question requires that one clarify *what* is measured as well as *how* it is measured. Single-factor models of development favor a unitary index of change and usually select the IQ score as the best measure of program efficacy. But IQ is a very poor measure of change resulting from early intervention.

This point is best illustrated in the longitudinal data from the Perry Preschool Project (Schweinhart & Weikart, 1980). Also known as the High/Scope Project, it consisted of a longitudinal experiment designed to study the effects of early intervention on 123 very poor children who were initially found to have IQs below 80. Begun in 1962 in Ypsilanti, Michigan, the study compares a randomly selected experimental group that received a daily preschool program and weekly home visits with a control group that received no intervention. Data show that preschool intervention improved children's cognitive ability during preschool, kindergarten, and first grade, but by the end of second grade and thereafter experimental and control group IQs were equivalent. Does this mean that early intervention is not effective? Or does it mean that IQ is neither an efficient measure nor a useful index of change resulting from early intervention?

Zigler and Trickett (1978) argue that IQ should not be the primary measure of the success of intervention programs. They suggest, instead, that social competence be used as an index of efficacy. Their analysis of social competence includes measures of physical health, intellectual ability, school achievement, motivational and emotional

factors, and such social expectancy variables as school attendance and incidence of juvenile delinquency. In other words, in place of IQ, they propose other ways that they consider to be more meaningful for measuring developmental change resulting from early intervention.

Both the Perry Preschool Project and the Consortium findings (which include the Perry data) utilize similar multiple measurement strategies. In addition to IQ these studies point to significant longitudinal effects for early intervention in achievement, pride in activity, occupational aspiration, self-concept, lack of special education placement, and reduced grade retention. These findings demonstrate that more than a single factor must be explored in order to document change in early intervention. Evidently, as seen in results from the early phases of the Perry Project, gains in IQ have only a precipitating effect on a variety of other factors. Longitudinal results show that children who attended preschool had, by age 15, a stronger commitment to schooling; greater pride in achievement; higher scores in reading, mathematics, and language achievement tests; a 50% reduction in need for special services; and less tendency to display delinquent or antisocial behavior outside of school (see Schweinhart et al., this issue, for an analysis of the Perry data to age 19).

Thus, before asking whether early intervention is effective, one must decide upon both an operational definition of and appropriate measures of efficacy. IQ, taken alone, does not appear to represent a meaningful operational definition of early intervention, nor can it measure many of its effects. Rather, a multi-factorial set of outcomes that samples a wide range of variables appears to be more appropriate.

Sample Characteristics

The final assumption to be clarified before efficacy data within and across studies can be meaningfully interpreted concerns sample characteristics. *What are the neurological, biological, and social-environmental characteristics of the infants enrolled in early intervention programs?* This question stems from the recognition that no single intervention is appropriate for every child. Rather, one must ask, "Early intervention for whom?"

Every population of high risk and handicapped young children is composed of individuals who differ significantly from one another according to neurological, biological, and social-environmental characteristics. Yet many researchers ignore these important facts of indivi-

dualization—studying a specific group in a specific way and then generalizing their findings across a widely differing population. When this occurs, it becomes impossible to evaluate the results of efficacy studies.

Premature infants represent an excellent illustration of the effect that differences in sample characteristics can have upon interpretation of outcomes. Prematurity, as is true of other biological phenomena, is a spectrum condition. It can be subdivided by birth weight, birth weight/gestational age concordance, and medical problems. Yet many practitioners and researchers treat all infants born below the conventional criteria for preterm birth (i.e., less than 2,500 grams and 37 weeks gestation) as a unitary population.

Investigators who do not differentiate among subgroups of preterms implicitly assume the existence of a “prematurity syndrome.” Such a view begs the question of which outcomes are associated with which perinatal, postnatal, and family/environmental variables. Studies of preterms that do not subdivide the spectrum of risks of prematurity are bound to be inconclusive and to contribute to confusion regarding efficacy.

The need for specification of child characteristics applies to all risk conditions at all ages. Children who differ from one another by type or severity of handicapping condition, or who are raised in different socioeconomic backgrounds should not be treated as if they comprise a unitary group. When this occurs within or between studies, findings become meaningless, and efficacy data remain inconclusive.

Conclusions

Why are we still asking the efficacy question? Because too many observers of early intervention as well as too many investigators have failed to ask critical questions about the theoretical rationale of intervention programs, their intervention strategies, measurement techniques, and participant selection criteria. These questions of design must first be addressed within and across studies before the effects of early intervention can be meaningfully evaluated.

Another reason the efficacy question continues to be raised is that the primary target of intervention is often overlooked or misunderstood. Evidence exists to support the view that the primary intervention target should not be the child, but the child within the context of the family. Research of the past decade has demonstrated repeatedly that the efficacy of early intervention is dependent upon patterns

established in child-caregiver interactions (Brachfeld, Goldberg, & Sloman, 1980; DiVitto & Goldberg, 1979; Field, 1977; Greene, Fox, & Lewis, 1983). The family and its sociocultural and economic context is the crucible in which forces for good and ill are transformed into developmental patterns for high risk and handicapped children in the first years of life. The evidence from a whole generation of research demonstrates that the quality of parents' behavior as caregivers and as teachers makes a difference in the development of infants and young children.

Bronfenbrenner (1974) suggested that the family is the most efficacious and economical system for fostering and sustaining the development of the child. Involvement of the child's family as active participants is critical to the success of any intervention program, and without family involvement the effects of intervention erode quickly. Involvement of parents has the potential for establishing an ongoing system that can reinforce the effects of a program and that can help sustain them after the program ends. Thus, the family appears to be a key target on which to focus intervention efforts.

In order to assess the efficacy of such efforts, investigators must explicitly clarify and take into account four major (but often overlooked) assumptions of the intervention program: its theory of human development, specific intervention strategies used, method of measuring change, and criteria used for selecting participants. Without at least this much clarification, confusion will continue to reign in the arena of early intervention efficacy.

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