

Recent Developments in Early Intervention Efficacy Research: Implications for Family Involvement in P.L. 99-457

Michael J. Guralnick, *University of Washington*

Contemporary developments concerning the effectiveness of family involvement in early intervention programs are described within the framework of P.L. 99-457 and illustrated with recent investigations focusing on children at biological risk, those with cerebral palsy, and children with general developmental delays. Studies emphasizing parental involvement are discussed in the context of the quality of research, the application of contemporary developmental principles, and the specificity of the experimental designs and approaches. The research and public policy implications of efficacy research following the implementation of P.L. 99-457 also are discussed.

The passage of P.L. 99-457 (1986) not only constituted landmark legislation for creating a system of coordinated services for at-risk and handicapped children, but, in many respects, stands as a public policy statement of confidence that early intervention services will indeed yield substantial benefits for children and families. Historians of early intervention will someday provide the field with a chronicle of how this public, professional, and political level of confidence was achieved, as well as recount the events that culminated in the strong provisions found in P.L. 99-457.

However, the scientific and political processes surrounding effectiveness issues related to P.L. 99-457 will continue for some time. Despite the current positive political climate, additional efficacy infor-

mation needs to be gathered to justify continued financial support for existing and expanded services, particularly at the state level. Research designed to establish the best and most efficient practices for specific populations of children and families is essential to both program planners and service providers. Moreover, evaluations of certain critical features of the law, such as its family-focused approach, also demand our attention. We know from the problems experienced by similar programs in the health and education areas that any complacency in constructing a sound data base and monitoring the perspectives of the public and professionals could place the scientific, clinical, and political integrity of the entire early intervention enterprise in jeopardy.

As described elsewhere (Guralnick, 1988), the early intervention studies available for professionals and decision-makers to assess prior to the passage of P.L. 99-457 were part of a first generation of efficacy research. Understandably, these studies did not form an exemplary data base, as the programs of this period were struggling to balance intervention and evaluation in a context of limited resources and experience. The rapid development of new curricula and teaching techniques, along with demands for staff training, also took its toll on the quality of evaluation efforts. As many reviewers have commented, there were numerous methodological problems, intervention approaches often did not consider contemporary developmental theory, subject samples were poorly defined and often highly heterogeneous, and outcome measures tended to have a narrow focus (Bricker, Bailey, & Bruder, 1984; Casto & Mastropieri, 1986; Dunst & Rheingrover, 1981; Ferry, 1981; Gibson & Fields, 1984; Guralnick & Bennett, 1987a; Simeonsson, Cooper, & Scheiner, 1982). Nevertheless, despite the difficulties that plagued this first generation of programs, there appeared to be a general willingness to interpret the evidence to arrive at the global, overriding conclusion that early intervention was of value to children and families.

We have now reached the point where it is both necessary and possible to take a more sophisticated approach to efficacy research in early intervention. To accomplish this, three important modifications must occur. The first is methodological: Researchers in the field must be responsive to demands for better science. Studies that adopt longitudinal prospective designs with random assignment, include appropriate control or contrast groups, document intervention compliance, and establish assessment approaches that are free of observer or examiner bias must occur with greater frequency.

Second, the conceptual bases and content of interventions must incorporate, in a more effective way, contemporary developmental principles, including those that relate to the special characteristics and circumstances associated with at-risk and handicapped children. This is not to say that developmental principles have been ignored by first-generation studies. In fact, the content of most early intervention curricula relied extensively on sequences derived from developmental milestones. Nevertheless, the press for action-oriented curricula and the rapid advances in our understanding of children and families that occurred during that period contributed to the seemingly inevitable lag between new knowledge and practice. Our knowledge of parent-child relationships is the area of child development that has changed most dramatically in recent years—a circumstance that has many implications for P.L. 99-457.

The third and final modification issue concerns the necessity to move towards greater specificity in the design and analysis of efficacy research. Figure 1 illustrates a model that can serve as a useful organizational framework for achieving this increased specificity. As can be seen, the model consists of a matrix composed of three major dimensions: (1) child and family characteristics (e.g., type of disability or risk status, severity, associated handicaps, family resources, and related demographics); (2) program features (e.g., timing and duration of intervention, nature of parental involvement, curriculum model); and (3) goals and outcomes (e.g., cognitive development, social competence, social support, long-term outcomes). Unfortunately, we simply do not know at this time how the majority of the variables relating to subject populations or features of intervention programs interact to produce outcomes of interest (see Guralnick, 1988).

Efficacy and Family Involvement

The centerpiece of P.L. 99-457 is its focus on family involvement. The Individualized Family Service Plan not only provides the educational/developmental framework for services but also acknowledges that successful intervention will require a meaningful parent-professional partnership (Dunst, 1985). Yet, despite conceptual support from evolving family systems theories, the empirical base for encouraging extensive parental involvement in early intervention programs for handicapped children and their families has not been a strong one. In fact, a comprehensive meta-analysis of the birth-through-5 popula-

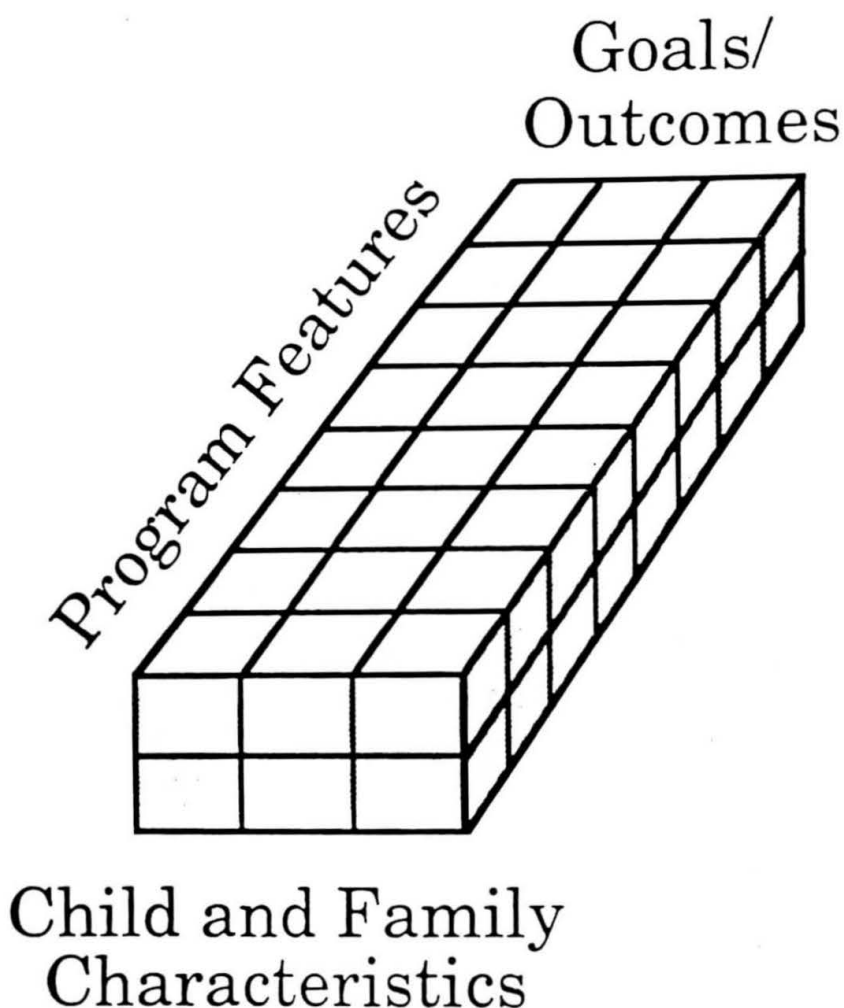


Figure 1. An organizational framework for designing and analyzing early intervention efficacy research.

tion of handicapped children with regard to this important program feature concluded the following:

The findings from the analysis of parental involvement suggest that parents can be effective interveners but that they are probably not essential to intervention success, and those intervention programs which utilize parents are not more effective than those that do not. (Casto & Mastropieri, 1986, p. 421)

These conclusions have not gone unchallenged (Dunst & Synder, 1986; Strain & Smith, 1986), and a subsequent meta-analysis of the data set focusing on the birth-to-3 population indicated that early intervention programs that contained extensive plans for parental involvement were more effective than those with limited parental participation plans (Shonkoff & Hauser-Cram, 1987). This analysis also revealed that programs in which children and parents participated together rather than separately appeared to be more effective.

Problems in interpreting these meta-analyses (Guralnick & Bennett, 1987b), concern over how parental involvement is actually defined, and the inescapable fact that the data set is based on the first generation of early intervention efficacy research studies suggest the need for studies that reflect an understanding of the three issues raised earlier, that is, improved methodological sophistication, the application of contemporary developmental principles, and a recognition of the value of specificity along the dimensions of child and family characteristics, program features, and goals and outcomes.

Accordingly, in this article some recent empirical findings as well as conceptual developments that bear directly on these issues, and that have clear implications for parental involvement as envisioned in P.L. 99-457, will be highlighted. Studies focusing on children at biologic risk, children with diagnosed cerebral palsy, and those defined as developmentally delayed were selected for *illustrative purposes only*. However, their results provide important indicators of what can be accomplished as part of a second generation of early intervention programs.

Biologically At-Risk Children

Under P.L. 99-457, states have the option to allow children at biologic risk to become eligible for services. Each year approximately

200,000 premature/low birthweight children are born in the United States, many of whom are likely to exhibit substantial developmental delays (Bennett, 1987). Preventive intervention strategies have been extremely diverse for this group of children, ranging from various forms of sensory stimulation to more relationship-focused approaches (Bennett, 1987; Field, Sostek, Goldberg, & Shuman, 1979).

A recent study by Rauh, Achenbach, Nurcombe, Howell, and Teri (1988) provides an excellent example of a second-generation approach to evaluating the effectiveness of early intervention. Specifically, this investigation focused on a well-defined population of premature/low birthweight children, established clear exclusionary criteria (e.g., congenital anomalies, severe neurological defects), included relevant biomedical and demographic information, employed random assignment to intervention and control groups within a prospective longitudinal design, and controlled for examiner bias. Other significant features of the study were the use of a well-articulated developmental framework for intervention activities, that children and families were followed until the children were 4 years of age, and that both parent and child outcome measures were obtained.

The key to the intervention program was to improve the mother's ability to recognize and support her own infant's abilities in different domains. Establishing caretaking routines, building synchrony and reciprocity between parent and child, and generally improving the competence of the mothers were essential goals of the program. Although the intervention was not especially intense (only 11 one-hour sessions) and of limited duration (1 week prior to discharge from the hospital to 90 days postdischarge), substantial long-term benefits were obtained. Looking solely at cognitive development, the scores of the nontreatment premature/low birthweight control group gradually declined over the 4-year evaluation period, whereas those of the treatment group gradually increased until they were identical to the scores of a full-term control group. By 4 years of age, nearly 13 points on the McCarthy Scales of Children's Abilities separated the treatment and control groups, a very substantial and clinically significant difference. Although the groups did not turn out to be identical in terms of socioeconomic status, partial correlation analyses indicated that the treatment itself made a substantial independent contribution to cognitive development.

How was it possible for a straightforward, inexpensive, highly time-limited treatment to create such a substantial and sustained effect on children's cognitive development? The answer seems to reside in the ability of the intervention program to promote sensitive transactions between parent and child that continued to evolve naturally as growth

and development proceeded over the course of the 4-year period. In fact, at 6 months, direct measures of maternal self-confidence with respect to competent parenting and satisfaction with the mothering role revealed that treatment group mothers perceived themselves as more self-confident and were more satisfied with their roles than control group mothers. In addition, control group mothers perceived their children as being more difficult than intervention group mothers. It may well be that this initial positive orientation and confidence brought about by the intervention program, in conjunction with training on special concerns associated with premature/low birthweight infants, was sufficient to build a parent-child relationship that not only was a developmentally supportive one but also was able to be sustained over many years. As suggested by declines in the control group scores, the absence of these parenting skills and attitudes apparently leads to conditions that fail to provide the type of environment needed to promote typical developmental growth.

A related study, though of longer intervention duration (12 months) and including both parent-centered and infant-centered treatments (e.g., stimulation activities and exercise) but no follow-up beyond the end of treatment, produced similar outcomes on both child cognitive development and the quality of parent-infant interactions (Resnick, Armstrong, & Carter, 1988). Corresponding analyses suggested that changes in the children's cognitive development were strongly associated with the quality of parent-infant interactions.

These studies also speak to the issue of parental "empowerment." Commenting on intervention during the newborn period, Worobey and Brazelton (1986) noted, "Instead of an expert tutoring the parents as if they were unaware of their baby's uniqueness, our approach may be better served by focusing on an assessment of the family's interactive style and questions about the baby as a unique individual" (p. 1299). As a consequence, the major responsibility for and control of a child's development is seen as remaining with the parents, with professionals serving to support and encourage the development of these relationships. In many respects, the success of these interventions may well be dependent on our ability to engage and involve parents in this process (Belsky, 1986; Rauh et al., 1988).

Children with Cerebral Palsy

Cerebral palsy is a major developmental disability often occurring in combination with other handicaps (Thompson & O'Quinn, 1979).

One of its more prevalent forms is spastic diplegia, a disorder commonly associated with prematurity. Historically, the effectiveness of physical therapy in the treatment of cerebral palsy has been difficult to evaluate (Harris, 1987), and recent preventive intervention efforts for infants at risk for developing neurological problems have not been found to yield significant benefits (Goodman et al., 1985; Piper et al., 1986).

In a recent, well-controlled study evaluating the effects of neurodevelopmental therapy on 12- to 19-month-old children with diagnosed spastic diplegia (Palmer et al., 1988), a number of surprising and potentially important implications for family involvement emerged. Using carefully described inclusion and exclusion criteria for their subjects, examiners randomly assigned children (stratified by level of cognitive development) to one of the following two groups in which they received either (a) 12 months of neurodevelopmental therapy (Bobath, 1967) or (b) 6 months of comprehensive infant stimulation followed by 6 months of neurodevelopmental therapy. Individual therapy for both groups occurred once every 2 weeks for 1 hour, and parents were asked to carry out many activities in the home. Children were evaluated at 6-month intervals on an array of cognitive, neurologic, motor skill, and social measures as well as on recommendations for bracing and surgery.

Major findings for the 6-month comparison between the neurodevelopmental therapy and infant stimulation groups revealed a significant advantage on both motor and cognitive measures for the children receiving infant stimulation. For the motor measure, the neurodevelopmental therapy group actually tended to show a decline in rate of development over the 6-month period, while the infant stimulation group's score increased over time. As noted, following the 6-month assessment the infant stimulation group was switched to neurodevelopmental therapy for the next period. Nevertheless, this group continued to manifest its original advantage, as the children's motor development continued to improve over the next 6-month segment. In contrast, the group that received neurodevelopmental therapy in both 6-month segments continued its downward course in developmental rate (a 15.4 difference existed for the motor quotient of the Bayley scales). Cognitive differences between the groups were no longer evident at 12 months.

The major point of this study may not be the apparent ineffectiveness of early neurodevelopmental therapy in preventing a decline in the rate of motor development in comparison to a comprehensive

infant stimulation program. Rather, it is the fact that, for children with diagnosed cerebral palsy, a systematic but comprehensive program of infant stimulation, primarily parent mediated, appears to have a beneficial effect on motor development. Cognitive development was also at a higher level for the infant stimulation group as long as the program was in effect. Speculating as to why this may have occurred, despite some didactic features of the infant stimulation curriculum, the authors noted:

The positive effects of infant stimulation in this trial may be due to better or broader understanding by the parents of the infants' development and capacities, which may have improved their ability to cope and interact with their infants. (Palmer et al., 1988, p. 807)

Also suggested as a mediator of these gains was a greater level of motivation on the part of the infants due to parental encouragement and interaction, which, in turn, had a beneficial effect on motor development (see Note 1).

With regard to the value of neurodevelopmental therapy, it may well be that this treatment has an added positive effect on important aspects of motor development, when carried out in conjunction with a comprehensive infant stimulation program. Comparing infant stimulation with neurodevelopmental therapy may not be appropriate, since children with spastic diplegia are certain to require an array of developmental services beyond those focusing specifically on motor areas. Community programs under P.L. 99-457 would likely include numerous developmental domains as part of their intervention activities. As a consequence, a study to test this hypothesis would consist of a comparison between infant stimulation and infant stimulation plus neurodevelopmental therapy.

Children with Developmental Delays

Infants and toddlers with clearly established general developmental delays with a primary cognitive component (e.g., Down syndrome or Rett syndrome, or those with etiologies that are unknown but presumed to be prenatal in origin) have figured prominently in early intervention efficacy research (Guralnick & Bricker, 1987). As noted earlier, it is apparent that more accurate descriptions of the characteristics of any subject population are needed to yield meaningful assessments

of early intervention effectiveness. Nevertheless, the population of developmentally delayed children does display a number of common developmental patterns. The most significant pattern, for the purposes of this discussion, is the tendency of parents of delayed children, in comparison to parents of appropriately matched groups of nondelayed children, to be more directive and controlling in interactions (e.g., Cunningham, Reuler, Blackwell, & Deck, 1981; Mahoney, Fors, & Wood, *in press*). This style is presumed to be incompatible with sensitivity to a child's interests, although this remains a controversial issue (Crawley & Spiker, 1983). Without such sensitivity, harmonious, synchronous parent-child relationships, especially those that provide an appropriate stimulation level for the child, are likely to be difficult to establish. The relevant question for early intervention is whether the pattern of greater directiveness supports or interferes with a child's development. Unfortunately, little useful intervention data are available.

It is important to note that this issue is quite central to the Individualized Family Service Plan developed within the framework of P.L. 99-457. Should parents be asked to pursue an instructional, didactic approach with their children as part of the intervention design, or will this simply exacerbate existing and perhaps counterproductive tendencies to assume directive and highly controlling modes of interacting, in which the child's interests are of lesser focus? Correlational analyses can only suggest possible relationships, but intervention research can help determine the existence of causal links between directive use patterns and developmental outcome.

A recent intervention study by Mahoney and Powell (1988) did examine this relationship between parental directiveness and developmental outcome for a heterogeneous group of moderately and severely delayed young children (mean CA = 17.6 months). However, it should be noted that this investigation would not qualify as a second-generation study from a methodological perspective, as the experimental design involved only pre-post comparisons without a control group. Nevertheless, it was valuable in that it attempted to translate a theoretical-developmental approach based on studies of parent-child interactions of both nonhandicapped and delayed populations (e.g., Mahoney, Finger, & Powell, 1985) into a curriculum designed to decrease the parents' directiveness and control while increasing sensitivity and responsiveness to their children's behaviors. The curriculum itself contained two main components: (1) *turntaking*—designed to reduce directiveness, increase responsivity, and create a more balanced

interaction between participants; and (2) interactive match—designed to bring parental behavior in closer correspondence to their child's behavioral style, complexity, developmental level, and interests. In contrast to many other approaches, direct instruction of their children by the parents was discouraged. Rather, the parents were encouraged to incorporate new strategies within a child's natural routines.

Parental participation in the curriculum varied from 5 to 24 months, with an average duration of 11 months. Over the course of the intervention period, on the average, the parents did reduce their dominance during interactions and became more responsive. Moreover, interactive style ratings of responsiveness and sensitivity seemed to be related to the implementation of the curriculum's strategies. Finally, developmental gains made by the children were associated with the use of the curriculum strategies.

Although Mahoney and Powell (1988) concluded that their results challenge the validity of those early intervention practices that foster a directive, instructionally oriented approach by parents, the correlational nature of the data do not warrant such strong statements. Studies using experimental designs involving appropriate control groups will be required to firmly address this complex issue. Nevertheless, the implications of this work, however tentative, suggest not only the vital role parents may play in promoting the development of children with established and significant disabilities through intervention activities, but also that the intervention itself should be designed to encourage more natural parent-child relationships.

Discussion

Family involvement has been conceptualized as the foundation of P.L. 99-457's service commitment to at-risk and handicapped infants and toddlers. Second-generation research on the effectiveness of early intervention is beginning to provide an important empirical base for evaluating this policy. Moreover, the expectations of the field for improved quality and specificity of efficacy research has allowed a more sophisticated examination of the issues and meaning of parental involvement.

The studies reviewed in this article were selected only to illustrate emerging trends in the field and do not constitute, in any sense, a review of the effectiveness of parental involvement in early intervention. Nevertheless, the potential for long-term impact, the well-articulated develop-

mental framework, and the translation of contemporary parent-child principles into curricula that characterized these studies suggest important future directions. Specifically, despite earlier global analyses to the contrary, strong consideration must be given, in my view, to the potential of parent-mediated early intervention for yielding clinically significant benefits. By enhancing natural parenting skills and providing the conditions for families to become more competent and confident in their unique relationships with their children, conditions for optimal child development may well be created. A common element appears to be the child-oriented nature of the relationship, which allows a harmonious, sensitive, and stimulating interactive match to develop. It is important to emphasize that these principles are likely to apply across children's risk or disability status.

The studies reviewed above are also relevant to the current debate surrounding the relative merits of relationship-focused (Affleck, McGrade, McQueeney, & Allen, 1982) and parent empowerment (Dunst, 1985) models compared with those approaches that encourage parents to adopt a primary, didactic, instructional role as part of the intervention program. Although it is beyond the scope of this article to discuss this issue in detail (see Bailey & Simeonsson, 1988), it should be noted that evaluations of the effectiveness of parental involvement in early intervention programs that focus primarily on criteria related to the instructional activities of parents may provide only a narrow and misleading perspective with regard to potentially valuable parental activities. It may well be that previous global analyses of the parental involvement dimension (e.g., Casto & Mastropieri, 1986) have greatly underestimated the impact of this program feature by including less effective forms of parental involvement.

It is important to recognize that didactic activities carried out by parents to support aspects of an intervention program can play a significant role in promoting development (see Guralnick, 1988). However, it is reasonable to suggest that efforts designed to build and strengthen the abilities of families to confidently and competently nurture the development of their child may be the essential ingredients for success, and that instructional activities, when properly placed in this context, may add an additional dimension to intervention effectiveness. Furthermore, this approach does not suggest that intensive clinician-child developmental activities following a specific curriculum model should be discouraged. On the contrary, it is hoped that appropriate and systematic developmental activities for children will be provided in infant and toddler day care settings and in center-based interven-

tion programs. Interestingly, many contemporary trends in clinician-organized intervention approaches for young handicapped children are consistent with more spontaneous child-directed and child-paced models that approximate the parent-child relationships and interaction patterns that have been discussed. The clinician's role in providing direct child-focused intervention programs and the parents' role can be seen as complementary.

An important contribution of the methodologically sophisticated studies emerging from second-generation research activities is their role in filling in some of the cells of the child and family characteristics \times program features \times goals and outcomes matrix. This framework encourages researchers and clinicians to recognize the specific conditions under which their outcomes have been generated and to become sensitized to potential limitations of each investigation. Such limitations are evident in the studies reviewed in this article. For example, the vast majority of families in the studies that have been discussed were not from significantly disadvantaged or stressed populations. Whether the forms of parental involvement described would be equally successful for families stressed by financial circumstances, the absence of meaningful social support networks, or limited education is a question that remains for future research. Similarly, certain populations of children, such as those classified as autistic, may benefit substantially from more directive and structured approaches (see Lovaas, 1987). Extensive variability is a common feature of investigations with at-risk and handicapped children and their families. Hopefully, the matrix will point to an organized way of understanding those elements that contribute to this variability.

Finally, it should be noted that, despite appeals from many observers to include aspects of children's social competence as major goals of early intervention programs (e.g., Taft, 1983; Zigler & Trickett, 1978), outcome measures continue to emphasize cognitive, language, and motor domains. This is unfortunate since interventions focusing on strengthening families and building parent-child relationships may have powerful effects on children's later social competence. As Worobey and Brazelton (1986) point out:

If the goal for intervention is for empowerment of parents rather than "changing" them, the effect on the baby might be in the area of social competence or future coping skills. Perhaps our present measures are unable to reflect these influences. (p. 1299)

In fact, there now exists an important literature linking early parent-child relationships to later competence, particularly social competence with peers (Guralnick, 1986). Interventions that enhance parent-child relationships and prevent or minimize the unique stresses associated with the presence of a handicapped or at-risk child in a family are likely to have a beneficial influence on important aspects of the child's later social competence (Guralnick, in press).

It now appears that in the field of early intervention we can safely herald a new era of efficacy research. Increasing efforts to utilize experimental designs that minimize threats to their validity, that include careful documentation of procedures and outcomes, and that are more thoroughly integrated with the concepts and approaches of the general field of child development have established new levels of sophistication. Subsequent efficacy research will be judged in terms of these new standards. As research moves toward a greater level of specificity in terms of subject samples and program and related curriculum specifications, and toward a more reasoned and perhaps comprehensive approach to the anticipated outcomes of interventions, it will increasingly serve as a source of information to help guide the decisions that practitioners must make on a daily basis. Of equal value is the contribution of this emerging data base to public policy decisions. In an enterprise as important as this is to the well-being of handicapped and at-risk children, the value of sound documentation of the benefits and limits of our interventions should never be underestimated.

Note

1. Technically, the Palmer et al. (1988) investigation did not include a no-treatment control group. It is possible, although not likely, that neurodevelopmental therapy had an adverse effect on development and that infant stimulation really did not produce unusual effects. Nevertheless, the upward course of motor development for the infant stimulation group suggests a positive impact.

References

- Affleck, G., McGrade, B.J., McQueeney, M., & Allen, D. (1982). Promise of relationship-focused early intervention in developmental disabilities. *The Journal of Special Education*, 16, 413-430.
- Bailey, D.B., Jr., & Simeonsson, R.J. (1988). Home-based early intervention. In S.L. Odom & M.B. Karnes (Eds.), *Early intervention for infants and children with handicaps: An empirical base* (pp. 199-215). Baltimore: Brookes.

- Belsky, J. (1986). A tale of two variances: Between and within. *Child Development*, 57, 1301-1305.
- Bennett, F.C. (1987). The effectiveness of early intervention for infants at increased biologic risk. In M.J. Guralnick & F.C. Bennett (Eds.), *The effectiveness of early intervention for at-risk and handicapped children* (pp. 77-112). New York: Academic Press.
- Bobath, B. (1967). The very early treatment of cerebral palsy. *Developmental Medicine and Child Neurology*, 9, 373-390.
- Bricker, D., Bailey, E., & Bruder, M.B. (1984). The efficacy of early intervention and the handicapped infant: A wise or wasted resource. In M. Wolraich & D.K. Routh (Eds.), *Advances in developmental and behavioral pediatrics* (Vol. 5, pp. 373-423). Greenwich, CT: JAI Press.
- Casto, G., & Mastropieri, M.A. (1986). The efficacy of early intervention programs: A meta-analysis. *Exceptional Children*, 52, 417-424.
- Crawley, S.B., & Spiker, D. (1983). Mother-child interactions involving two-year-olds with Down syndrome: A look at individual differences. *Child Development*, 54, 1312-1323.
- Cunningham, C.E., Reuler, E., Blackwell, J., & Deck, J. (1981). Behavioral and linguistic developments in the interactions of normal and retarded children with their mothers. *Child Development*, 52, 62-70.
- Dunst, C.J. (1985). Rethinking early intervention. *Analysis and Intervention in Developmental Disabilities*, 5, 165-201.
- Dunst, C.J., & Rheingrover, R.M. (1981). An analysis of the efficacy of infant intervention programs with organically handicapped children. *Evaluation and Program Planning*, 4, 287-323.
- Dunst, C.J., & Snyder, S.W. (1986). A critique of the Utah State University early intervention meta-analysis research. *Exceptional Children*, 53, 269-276.
- Ferry, P.C. (1981). On growing new neurons: Are early intervention programs effective? *Pediatrics*, 67, 38-41.
- Field, T.M., Sostek, A.M., Goldberg, S., & Shuman, H.H. (Eds.). (1979). *Infants born at risk: Behavior and development*. New York: SP Medical & Scientific Books.
- Gibson, D., & Fields, D.L. (1984). Early infant stimulation programs for children with Down syndrome: A review of effectiveness. In M. Wolraich & D.K. Routh (Eds.), *Advances in developmental and behavioral pediatrics* (Vol. 5, pp. 331-371). Greenwich, CT: JAI Press.
- Goodman, M., Rothberg, A.D., Houston-McMillan, J.E., Cooper, P.A., Cartwright, J.E., & Ven der Velde, M.A. (1985). Effect of early neurodevelopmental therapy in normal and at-risk survivors of neonatal intensive care. *The Lancet*, 2, 1327-1331.
- Guralnick, M.J. (1986). The peer relations of young handicapped and nonhandicapped children. In P.S. Strain, M.J. Guralnick, & H.M. Walker (Eds.), *Children's social behavior: Development, assessment, and modification* (pp. 93-140). New York: Academic Press.
- Guralnick, M.J. (1988). Efficacy research in early childhood intervention programs. In S.L. Odom & M.B. Karnes (Eds.), *Early intervention for infants and children with handicaps: An empirical base* (pp. 75-88). Baltimore: Paul H. Brookes.

16. TOPICS IN EARLY CHILDHOOD SPECIAL EDUCATION 9:3

- Guralnick, M.J. (in press). Peer interactions and the development of handicapped children's social and communicative competence. In H. Foot, M. Morgan, & R. Shute (Eds.), *Children helping children*. Sussex, England: Wiley.
- Guralnick, M.J., & Bennett, F.C. (Eds.). (1987a). *The effectiveness of early intervention for at-risk and handicapped children*. New York: Academic Press.
- Guralnick, M.J., & Bennett, F.C. (1987b). Early intervention for at-risk and handicapped children: Current and future perspectives. In M.J. Guralnick & F.C. Bennett (Eds.), *The effectiveness of early intervention for at-risk and handicapped children* (pp. 365-382). New York: Academic Press.
- Guralnick, M.J., & Bricker, D. (1987). The effectiveness of early intervention for children with cognitive and general developmental delays. In M.J. Guralnick & F.C. Bennett (Eds.), *The effectiveness of early intervention for at-risk and handicapped children* (pp. 115-173). New York: Academic Press.
- Harris, S.R. (1987). Early intervention for children with motor handicaps. In M.J. Guralnick & F.C. Bennett (Eds.), *The effectiveness of early intervention for at-risk and handicapped children* (pp. 175-212). New York: Academic Press.
- Lovaas, O.I. (1987). Behavioral treatment and normal educational and intellectual functioning in young autistic children. *Journal of Consulting and Clinical Psychology*, 55, 3-9.
- Mahoney, G., Finger, I., & Powell, A. (1985). Relationship of maternal behavioral style to the development of organically impaired mentally retarded infants. *American Journal of Mental Deficiency*, 90, 296-302.
- Mahoney, G., Fors, S., & Wood, S. (in press). A qualitative analysis of maternal directive behavior. *American Journal of Mental Retardation*.
- Mahoney, G., & Powell, A. (1988). Modifying parent-child interaction: Enhancing the development of handicapped children. *The Journal of Special Education*, 22, 82-96.
- Palmer, F.B., Shapiro, B.K., Wachtel, R.C., Allen, M.C., Hiller, J.E., Harryman, S.E., Mosher, B.S., Meinert, C.L., & Capute, A.J. (1988). The effects of physical therapy on cerebral palsy. *New England Journal of Medicine*, 318, 803-808.
- Piper, M.C., Kunos, I., Willis, D.M., Mazer, B.L., Ramsay, M., & Silver, K.M. (1986). Early physical therapy effects on the high-risk infant: A randomized controlled trial. *Pediatrics*, 78, 216-224.
- Public Law 99-457, Education of the Handicapped Act Amendments of 1986.
- Rauh, V.A., Achenbach, T.M., Nurcombe, B., Howell, C.T., & Teti, D.M. (1988). Minimizing adverse effects of low birthweight: Four-year results of an early intervention program. *Child Development*, 59, 544-553.
- Resnick, M.B., Armstrong, S., & Carter, R.L. (1988). Developmental intervention program for high-risk premature infants: Effects on development and parent-infant interactions. *Journal of Developmental Behavioral Pediatrics*, 9, 73-78.
- Shonkoff, J.P., & Hauser-Cram, P. (1987). Early intervention for disabled infants and their families: A quantitative analysis. *Pediatrics*, 80, 650-658.
- Simeonsson, R.J., Cooper, D.H., & Scheiner, A.P. (1982). A review and analysis of the effectiveness of early intervention programs. *Pediatrics*, 69, 635-641.
- Strain, P.S., & Smith, B.J. (1986). A counter-interpretation of early intervention effects: A response to Casto and Mastropieri. *Exceptional Children*, 53, 260-265.

- Taft, L.A. (1983). Critique of early intervention for cerebral palsy. In T.B. Brazelton & B.M. Lester (Eds.), *New approaches to developmental screening of infants* (pp. 219-228). New York: Elsevier Science.
- Thompson, R.J., Jr., & O'Quinn, A.N. (1979). *Developmental disabilities: Etiologies, manifestations, diagnoses, and treatments*. New York: Oxford University Press.
- Worobey, J., & Brazelton, T.B. (1986). Experimenting with the family in the newborn period: A commentary. *Child Development*, 57, 1298-1300.
- Zigler, E., & Trickett, P.K. (1978). IQ, social competence, and evaluation of early childhood intervention programs. *American Psychologist*, 33, 789-798.

Notices

The Orton Dyslexia Society's Annual Outstanding Dissertation Award

Application guidelines for the Outstanding Dissertation Award are available by contacting The Orton Dyslexia Society. Deadline for submission to the Committee is March 1, 1990. The Award will be presented at the Society's 41st Annual Conference in Washington, DC, November 1, 2, 3, 1990. For a copy of the guidelines write or phone:

The Orton Dyslexia Society
The ODS Dissertation Award
724 York Road
Baltimore, MD 21204
1-800-ABCD-123 or (301) 296-0232