

# Chapter 10

## Early Intervention for At-Risk and Handicapped Children: Current and Future Perspectives

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### INTRODUCTION

Since the late 1960s, we have witnessed the emergence of a complex array of intervention programs designed for young children at risk for developmental problems and for those with documented handicaps. This period has truly been a remarkable one, marked by an enormous creative output, a willingness to experiment, and a resourcefulness that has altered permanently our concepts and expectations regarding the nature of the development of young at-risk and handicapped children. Equally impressive changes have occurred with regard to the provision of services to meet the special needs of these children and their families.

Although the field has struggled with a relatively limited information base and some restrictive developmental models, especially during the early phases, the experience of a generation of involvement with early intervention has yielded a strong commitment that these efforts should be pursued from many directions and across many dimensions. Encouragement at the federal level, state mandates, local support for services in many communities, the growth of specialized multidiscipline personnel preparation programs, the rapid expansion of research

365

interests in all aspects of early childhood, and advocacy by parent and professional groups are only partial reflections of the vigorous efforts on behalf of these children.

At this same time critics have emerged asking for justification of these programs and questioning the extent of the accomplishments that actually occur as a direct result of involvement in the various forms of early intervention. The questions that have been raised seem both fair and appropriate and, of course, comprehensive programmatic efforts such as early intervention must be responsive to issues concerning their effectiveness. In fact, the necessity for and interest in evaluating programs of this nature should not require prompting from critics. Evaluation, especially efficacy evaluation, is a process that should occur as part of the normal course of events, utilizing many different approaches and being carried out at many different levels. Accordingly, an analysis such as the one presented in this volume should only be considered as part of a continuous process of evaluation, re-direction, and re-evaluation.

We would contend that at this point in time a meaningful appraisal of the effectiveness of early intervention for at-risk and handicapped children must occur in a broad context—one that has as its goals the presentation and analysis of viable hypotheses and recommendations based on existing evidence, the refinement of significant questions that need to be addressed, the identification of patterns and trends, and the establishment of future directions for research and program development. Global or absolute declarations of success or failure do not fit within this framework and, frankly, cannot adequately reflect an understanding of both the restrictions imposed on research in this area and the complex interactions occurring among the types and characteristics of the intervention programs themselves, the children involved, family factors, and numerous other variables. Those seeking global answers are certain to be disappointed; those drawing global conclusions are certain to be easily challenged.

How one interprets the information contained in this volume will depend to some extent upon who is doing the interpreting. As has been stressed in the previous chapters, we must be wary of simplistic approaches and interpretations and recognize at the outset that we are all subject to biases that work to filter selectively some information and amplify other information. Our chapter authors themselves are not free of this bias and we have encouraged them to present their views and to make their recommendations. Although keeping track of outcomes with a scorecard is of minimal value, we hope that the tabular format in each of the chapters has at least helped to establish a clearer perspective for the reader of the available data base.

No attempt will be made here to arrive at statements regarding the effectiveness of early intervention that extend across its many domains based on the information contained in the preceding chapters. That, of course, would run counter to a major theme of this book. However, it is possible to extract issues,

principles, and directions that are applicable across the various early intervention efforts. Accordingly, in this final chapter, general topics and issues that may be particularly valuable in interpreting current findings and pointing toward future directions will be discussed. Specifically, topics focusing on the following will be considered: (1) the role of parents, (2) expectations of outcomes, (3) best practice models, (4) motivational, social, and emotional factors, (5) training issues, and (6) the significance of developmental continuity and the evaluation of long-term effects. Finally, a brief section on biomedical and specific nonstandard approaches to early intervention will be included, even though the focus of this volume has been on experiential approaches. However, given the visibility of many biomedical interventions in the media, the potential for radical and dramatic change, and the existence of enthusiastic and vigorous supporters for one or another treatment, we felt our volume would be incomplete if these approaches were omitted.

### THE ROLE OF PARENTS

Parent involvement in most early intervention research reviewed in this volume focused primarily on their role as adjuncts to developmental and educational instruction. In some instances parents carried major instructional responsibilities, first receiving training themselves and then providing intervention to their child along with maintaining progress records. In other cases, parents extended center-based activities into their home, reinforcing learning activities that were part of the intervention curriculum. Parents were also the recipients of counseling in some form in existing programs, but this appeared to be a much less well developed component. Advice on community services and information on the development of at-risk or handicapped children were provided as well, usually in a group format.

Partly in response to concerns over the limited impact on child development that early intervention programs have been able to demonstrate as a result of parent involvement (Casto & Lewis, 1984; Halpern, 1984), this relatively narrow role of parents in early intervention programs is now being carefully reconsidered. Contemporary models are far more comprehensive, focusing on family systems that emphasize the mutually interacting network of forces that influence all involved (e.g., Bronfenbrenner, 1977; Friedrich, Greenberg, & Crnic, in press). Moreover, such models have helped prompt research seeking to identify variables that can mitigate the effects of the additional stresses created by children with handicaps or those at risk. The promotion of coping strategies and the role of family resources including social support networks add important dimensions to early intervention programs (Bailey & Simeonsson, 1984; Gallagher, Beckman, & Cross, 1983).

Within this framework the family truly becomes a more prominent and direct focus of the early intervention program. In the simplest sense it is recognized that sound family functioning is essential for providing a supportive and developmentally appropriate environment for the child with special needs. Accordingly, effective intervention with families is likely to yield developmental benefits to children. Crucial questions in the future will be concerned with how to translate and integrate family interaction models into early intervention programs, how to develop useful instruments to assess the factors of interest, and how to establish the network of services and identify professionals capable of assisting families to develop effective coping and adaptive strategies.

A second contemporary direction suggests that a rigid emphasis on the teaching roles of parents found in many early intervention programs may well be a questionable practice. It has been argued that the approach to training parents to carry out curriculum-based intervention activities can run counter to the establishment of adaptive parent-child relationships (Affleck, McGrade, McQueeney, & Allen, 1982). In contrast, a relationship-focused model is put forth as an alternative in which the promotion of warm, reciprocal, and supportive parent-child relationships are the primary goals. Within this approach, parents do receive technical information and skills training from professionals such as that regarding the special characteristics of their children (e.g., expected delays in smiling, the need to wait for a response, strategies to enhance communication with visually impaired children). However, the information and assistance is provided to parents in a framework designed to ensure that they remain the key solvers of problems and are encouraged to build relationships with their children in as natural a manner as possible.

Recent theoretical developments and research in the area of the long-term implications of adaptive parent-child interactions support the importance of this approach (Sroufe, 1983). As noted in the first chapter in this volume, one basis for children's socially competent functioning can be found in these early parent-child relationships. Accordingly, strategies that promote secure attachments are likely to yield important developmental benefits. Once again, however, early intervention programs are challenged to develop models and techniques to bring this relationship-focused approach into the mainstream of early intervention services.

All of these perspectives lead to the inevitable conclusion that a much more sensitive and clearly *individualized* approach to parents and families will be required of early intervention programs in the future (Turnbull & Winton, 1984). Many parents are willing to serve as therapists and can do so in a very effective manner (e.g., A. M. Gross, Eudy, & Drabman, 1982). For many parents, adopting an instructional role places them in an activist position of promoting development—a role in which they feel comfortable. It does not necessarily follow that the parent-child relationship will be damaged as a consequence. The

critical point here is the need to consider these and related perspectives within a broader context. This individualization can only be accomplished by a thorough understanding of contemporary approaches to family functioning.

### EXPECTATIONS OF OUTCOMES

Evaluations of the effectiveness of early intervention programs have considered a wide array of developmental domains. However, the malleability of cognitive development has been the principal interest of researchers for many of the disability and at-risk populations addressed in this volume. When these studies are aggregated to allow statistical analyses using the technique referred to as meta-analysis (Glass, 1976), overall gains of about one-half to one standard deviation for environmentally at-risk (Casto & White, 1985) and handicapped children (Casto & Mastropieri, 1986) are obtained. In fact, even where more specific disability information is available as seen in the previous chapters, including the prevention of the decline in cognitive development for children with Down syndrome and those at risk due to environmental factors, it appears that on the average a gain of one-half to one standard deviation on standard intelligence tests during the life of the intervention is the best we can expect on the basis of existing data. Of course, speculation such as this contains numerous pitfalls and flaws. Meta-analysis is certainly not free from statistical and conceptual problems (Jackson, 1980), nor are any of the analytic approaches to this issue. Moreover, we have argued at various points in this volume that such global efforts provide only very limited information that is useful in determining the efficacy of early intervention. The primary value of this actuarial or aggregate approach may reside in its ability to provide a framework within which to interpret reports which vary markedly from this range (e.g., Lovaas, 1982) and alert us as to whether or not our programs are having an impact that is consistent with this pattern.

There is, of course, a range of effectiveness across children that this actuarial approach does not address. Some children are extremely responsive; for others a particular program will have minor effects. In turn, these effects will vary for different developmental domains. Unfortunately, as the reviews of the preceding chapters have indicated, the field has only a limited ability to predict responsiveness for cognitive or any other measure at the individual child level, thereby hindering empirically based clinical and programmatic decision making. Sufficient evidence is available to suggest that factors such as the type and severity of a child's handicap, family factors, available social supports, the presence of behavior problems, child temperament, and related variables all interact with early intervention program dimensions (e.g., type, quality, duration, or intensity) to govern the eventual outcomes. A sign of progress in the field will be our increas-

ing ability to predict variations in effectiveness. Once that occurs strategies can be developed to help guide the design of specific early intervention programs to maximize their effectiveness for individual children.

How then can future research studies move closer to this goal? One approach is to define and describe our research samples more systematically and carefully. This has been one of the weakest areas in efficacy research, limiting our ability to relate child characteristics and associated factors to outcomes, as well as providing an additional threat to the validity of the studies themselves. Progress, however, does require that researchers attempt to provide more conscientiously relevant information about the sample or samples under investigation (see Kopp & Krakow, 1982). Developmental and chronological age, family characteristics and educational levels, health factors, and particularly accompanying disabilities and related marker variables (e.g., cognitive dysfunctions, language delays or disorders, sensory impairments, motor difficulties, prematurity, and birth weight) are among the important types of information that should be provided. Unfortunately, the information available from existing intervention studies is often inadequate.

A second and parallel approach is to provide a more detailed description of the interventions themselves. The tables in each of the preceding chapters reflect the fact that critical information is often omitted, and readers are frequently left with only meager descriptions of the actual events that occurred as part of the early intervention program. Clearly, more adequate descriptions and even objective data regarding actual compliance with a program's objectives are needed. One major task for the future will be the development of categories and coding systems that reflect the richness and complexity of the interventions but yield useful qualitative and quantitative descriptive data.

### **BEST PRACTICE MODELS**

Ideally, of course, experimental designs that allow random assignment of subjects on a prospective basis to contrast or control groups and to intervention groups would provide the most appropriate and valid information. Experiments in this form are a real possibility for certain at-risk groups and can provide the needed information. For children with documented handicaps, however, only relatively rare occasions will exist to allow truly comprehensive experiments of this type to be carried out, although limited questions typically focusing on the timing of early intervention or comparisons between treatment and no-treatment options prior to age 3 years can be effectively and ethically conducted (e.g., use of wait list controls, comparisons to children being closely monitored but not receiving interventions, or taking advantage of the absence of services for very young children in certain localities).

Even in the absence of controlled investigations, however, as more studies are conducted, more detailed information from samples and from programs can be gathered to determine if any patterns or trends exist. Such patterns, of course, can only suggest possible combinations of variables that produce the best outcomes. Because there are so many variables involved, even numerous studies may not allow isolation of sample-by-program factors that may be having the most influence on the outcome measures. As noted, variability of subject samples is usually quite extensive, even when focusing on children with well-defined disabilities. In fact, even where important distinctions among subgroups within a disability category exist (see chapter on communication disorders, Chapter 6 in this volume) intervention programs have not adjusted to these variations.

How then is it possible to eventually identify early intervention practices that are likely to consistently produce superior results, that is, outcomes that fall above the average gain for effective programs for that disability? Despite numerous difficulties, a process that seeks to detect patterns of change based on diverse sources of information may be the best available strategy. By integrating existing information, by generating hypotheses regarding the most probable best practices, and by systematically developing a series of smaller scale experiments, a best practice models approach can be established, which may ultimately provide the most meaningful and useful tests of the effectiveness of early intervention.

When establishing such a best practice model, one source of information is the intervention strategies that appear to correspond to the best outcomes based on previous studies. Within data sets numerous correlations with outcomes exist that can be used to generate hypotheses about those approaches to be included in a best-practice model. A second source of information is the large number of studies using single-subject designs that intensively apply intervention techniques. Although the sample is a limited one, in this context intervention strategies can be tested and replicated quite carefully and, in many instances, experimental control over those strategies can be maintained. Of equal importance is the fact that this approach can be readily carried out within the context of a service program. This type of research-service model has been available for some time (Guralnick, 1973) and can be used as one framework for a best practice approach.

Small-scale group studies focusing on certain issues, approaches, models, instructional strategies, and so on within certain disability or at-risk groups provide a third important source of information for a best practice model. Direct comparisons of one or another approach avoid ethical concerns regarding the need for control samples not receiving any systematic intervention. Significant issues that have appeared throughout this volume that are amenable to this strategy include the intensity of intervention debate, comparisons between highly structured and less structured programs, and the effects of different forms of parental involvement. Consistent and educationally or clinically useful outcomes

generated by these smaller scale interventions can make invaluable contributions to best practice models.

The importance of conducting small-scale studies of components of early intervention is underscored by the fact that the vast majority of the early intervention programs reviewed in the various chapters of this volume were highly experimental in nature. That is, they were often speculating as to what the best practices might be—relying on existing models of development and family functioning, devising and revising curricula while delivering services, training a relatively inexperienced staff, and trying to figure out how best to work with and utilize the information provided by professionals from multiple disciplines. The reader need only consider the oral-only versus total communication approaches to serving hearing-impaired children, the problems now detected in the area of peer relationships, recent results on information-processing strategies employed by young developmentally delayed children, and current views of the influence of social ecologies and family systems models to appreciate the rapid changes that best practice models will need to incorporate.

The next 10 years will, it is hoped, provide a more accurate assessment of the magnitude of effects that can be expected from participation in early intervention programs through such a best practice approach. The intent of this approach is to maximize the value of early intervention practices through progressive refinements of programs. For this to be feasible, not only is careful documentation of samples and descriptions of actual interventions needed as discussed earlier, but it is also essential to establish criteria for documenting change related to comprehensive models that have made a concerted effort to incorporate the various sources of information described earlier. Clearly, consistent positive changes compatible with program goals and objectives as well as changes that are at the upper ranges of those expected on the basis of previous efforts are important. Moreover, we suggest that improved *predictability* of outcomes for children and families should be a critical criterion for this best practice approach. Once a sufficient level of sophistication has been achieved to allow reasonable predictability of outcome, special procedures and corresponding small-scale experiments can be designed to focus specifically on one or another of the least responsive subgroups. Successful efforts here will, in turn, be incorporated into a best practice model.

In a real sense, the best practice approach is consistent with the natural course of events. Researchers and program developers typically build upon prior work and refine their efforts in a long, difficult, but needed process. Unfortunately, the field has developed in many, often unrelated, directions with rationales for specific approaches difficult to justify. What is called for here, however, is a much more systematic and planful approach to this process—one that requires the thoughtful development of programs and a careful allocation of resources.



### MOTIVATIONAL, SOCIAL, AND EMOTIONAL FACTORS

The call to consider assessments of motivational, social, and emotional factors as significant indices of the impact of early intervention programs has been compelling in its logic (Taft, 1983; Zigler & Trickett, 1978), but has not as yet found a clear role in efficacy studies. In part, these delays reflect the relatively short history of these constructs, especially those related to aspects of social competence (Anderson & Messick, 1974) and to difficulties in devising appropriate assessments. Moreover, even when defined and measured, only limited intervention strategies have been available to address these factors. Best practice models will certainly need to consider these important domains.

Fortunately, there are signs that this field is undergoing rapid change. Not only are advances occurring in clarifying concepts in this area, but recent interest has stimulated the development of instrumentation that is now capable of providing valuable assessments of important aspects of motivational, social, and emotional development. For example, advances have occurred in assessing overall emotional development of infants and young children (Greenspan & Porges, 1984; Sroufe, 1979; Sroufe, Schork, Motti, Lawroski, & LaFreniere, 1984), temperament (Carey, 1981), mastery motivation (Yarrow & Messer, 1983), relationships with peers (Rubin & Ross, 1982), broad aspects of social competence (Kohn, Parnes, & Rosman, 1979), and the identification of behavior problems in young children (Behar & Stringfield, 1974).

When at-risk and handicapped populations are evaluated with these and related instruments, it becomes readily apparent that special attention must be given to these developmental domains. For example, overall, young handicapped children exhibit major deficits in their relationships with peers (Guralnick, 1986) and various groups of children exhibit substantial behavior problems even during the early years (Escalona, 1982; Thompson, 1984). In addition, certain groups of children have unusual difficulties in displaying affect (Emde, Katz, & Thorpe, 1982) and in gaining self-control (Kopp, Krakow, & Vaughn, 1983).

Clearly, major advances have occurred in our understanding of these variables and their importance to development as a whole. However, resolutions of many ambiguities regarding the constructs involved need to occur, and assessment instruments, at least for experimental purposes, must be developed. Considering the now well established unique and unusual problems at-risk and handicapped children experience in motivational, social, and emotional domains, the challenges for the next generation of early intervention programs to provide effective services in these areas are considerable. Primary among the problems that must be addressed is the development of assessment instruments that can be easily utilized by educators, pediatricians, psychologists, and child development spe-

cialists in general that provide a framework and direction for intervention. For the most part, existing instruments are too cumbersome for use in this manner and provide only limited information as to the intervention strategies that might be most effective.

In fact, there are very few systematic intervention programs that can be called upon in the motivational, social, and emotional areas. Those that are developed in the future will, ideally, recognize that to be effective they must be truly comprehensive in nature. A meaningful understanding of parent-child relationships, interactions with other family members, and an ability to integrate motivational, social, and emotional issues into virtually all activities of the intervention program will be essential.

### TRAINING

Properly preparing personnel to work in the array of early intervention programs remains an essential issue for the future. At one level, the need for professionals from virtually every discipline thoroughly grounded in developmental principles, having the knowledge and clinical skills of their own discipline, expressing a willingness and ability to work within the multidisciplinary or interdisciplinary process, and exhibiting a special knowledge of children at risk and those with documented handicaps, continues to increase with the growing number and diversity of service programs. Preparing personnel for the provision of services to infants is particularly perplexing, however. Do we need to train a new cadre of infant specialists? Will professionals emerge from downward extensions of training programs for teachers in early childhood and special education? Are certain health disciplines (such as nursing) more appropriate, given the special needs of this population? As our service models evolve for these very young children, we will be in a better position to establish the credentials and training programs for professionals in this field.

As noted in the first chapter of this volume, physicians, especially pediatricians, have played a very important but complicated role in early intervention. Some physicians have been highly critical of the evidence supporting the effectiveness of early intervention and have raised concerns about the potential harm of such interventions (Ferry, 1981). At the same time, however, primary care pediatricians in particular have historically been criticized by parents and professionals for failing to detect problems at the earliest reasonable time and making appropriate referrals, lacking general technical knowledge of the medical and developmental issues facing at-risk and handicapped children, and being insensitive to the plight of families and children with special needs (see Guralnick & Richardson, 1980, for review).

Not surprisingly, existing research, although very limited, suggests consider-

able ambivalence and wide variations with regard to physicians' referral practices and attitudes toward early intervention (Adams, 1982; Esposito, 1978). It may well be that, for pediatricians in particular, these varying views can be traced in part to insufficient or inadequate training in relation to at-risk and handicapped children. In fact, existing surveys have clearly shown that practicing pediatricians perceive their training during residency to be inadequate in these and related biosocial areas (Dworkin, Shonkoff, Leviton, & Levine, 1979; The Task Force on Pediatric Education, 1978). Other surveys of residency training programs themselves prior to 1980 support these views, indicating that pediatric residents rarely received systematic clinical training experiences with at-risk or handicapped children (Becker, 1978; Guralnick & Richardson, 1980).

In a recent national-in-scope effort to alter this state of affairs, a carefully defined and tested curriculum for residents in the field of developmental pediatrics has been developed (Bennett, Heiser, Richardson, & Guralnick, in press) and thoroughly evaluated (Bennett, Guralnick, Richardson, & Heiser, 1984; Guralnick, Bennett, Richardson, Heiser, & Shibley, in preparation). Designed for at least a 1-month rotation, over 40 pediatric residency programs across the country are currently utilizing the curriculum. Ten interrelated units constitute the core of this rotation in developmental pediatrics: (1) basic principles of child development and screening, (2) knowledge of developmental disorders, (3) aspects of prevention, (4) developmental diagnosis and assessment, (5) interdisciplinary process and team functioning, (6) families, (7) management of handicapping conditions, (8) attitudes, (9) community services and resources, and (10) controversial research issues. Topics related both directly and indirectly to early intervention are prominent features of many of these curricular units. It is hoped that as pediatric residents move into practice, improvements in their knowledge, clinical skills, and attitudes towards at-risk and handicapped children gained as part of their experience in this developmental pediatrics rotation will be reflected in the decisions that are made with regard to early intervention.

#### CONTINUITY AND LONG-TERM EFFECTS

The absence of systematic attempts to evaluate the long-term effects of early intervention is a major source of concern in the field. In fact, any form of follow-up beyond the intervention period to determine how children progressed was a rare occurrence in the early intervention literature. The significance of evaluating the long-term impact of early intervention is self-evident, and if research with disadvantaged children is any indication for other at-risk and handicapped children (Lazar & Darlington, 1982; Bryant & Ramey, Chapter 2 in this volume), its public policy implications can be far reaching.

Despite the apparent appeal of judging the effectiveness of early intervention

in terms of its longer-term outcomes, the relationship between early and later effects is quite complex (see Emde & Harmon, 1984). In part, the expectations of long-term impact are tied to individual researchers' conceptualizations as to whether developmental continuity or developmental discontinuity best characterizes the course of human development. For example, if one subscribes to a strong continuity position, believing that intervention during the early years will govern subsequent developmental progress to a substantial degree, then the absence of long-term effects would be devastating. Those who contend that children are highly vulnerable to inadequate developmental support at various points in the life cycle would not be surprised if short-term effects gradually eroded over time unless equally specialized programs were available. In essence, this latter position requires that continuity of programming must occur in order to assure continuity of outcomes. Moreover, how long-term effects may manifest themselves—in what form, over what time period, and under what conditions—are only a few of the questions that must be considered.

The understanding of continuity and change is certainly a core issue in human development. Our developmental models are only now beginning to yield a framework that allows us to understand the processes and transactions that occur across time. Through such approaches (e.g., Sroufe & Rutter, 1984) it may be possible to understand ultimately the numerous direct and indirect effects of early experiences in general, and perhaps even to predict the forms, patterns, and timing of later outcomes (Clarke & Clarke, 1984; Horowitz, 1980; Rutter, 1980). A crucial task in the future for those involved in early intervention programs for at-risk and handicapped children will be to monitor these developments and incorporate those concepts that seem useful in promoting our understanding of the long-term impact of early intervention.

#### **BIOMEDICAL ISSUES AND NONSTANDARD INTERVENTIONS**

Although this volume has intentionally focused on the effectiveness of experiential developmental interventions, it is worth noting in this concluding chapter that an ever-increasing array of controversial therapies, dietary hypotheses, and biomedical approaches continue to be advocated and advertised for at-risk or handicapped infants and young children (Golden, 1980). These unproved, and frequently unusual, interventions often attract widespread media interest and acclaim despite their total lack of investigative support or even research effort. Thus, vulnerable parents of vulnerable children are bombarded with personal testimonials and promises of great developmental gains (even cures) and must attempt the difficult process of distinguishing sound, worthy early interventions from questionable, possibly dangerous, recommendations. Certainly, more than ever, today the primary health care provider and child development specialist

must function as a scientific consumer-critic for families with at-risk or handicapped children.

Examples of popular, controversial therapies include "patterning" as advocated by Doman and Delacato (see chapter on children with motor handicaps, Chapter 5 in this volume), sensory integration according to Ayres, and developmental optometry consisting mainly of visual tracking exercises (see Silver, 1975, for discussion of these therapies). Each of these approaches attempts to reorganize and retrain the central nervous system by means of primitive, repetitive, intensive movements and postures. Unfortunately, this type of neurophysiological retraining has not been found to fulfill proponents' extensive claims and, particularly in the case of patterning, incorporates questionable biomedical practices such as rebreathing (breathing under a bag to increase the ambient carbon dioxide content) into the overall treatment program.

The attractive hypothesis that dietary eliminations or supplementations can rapidly and dramatically improve childhood development and behavior is quite widespread in contemporary society. Avoidance of artificial food colors and additives (Feingold diet), refined sugar, and a variety of potentially allergenic foods (e.g., cow's milk, eggs, nuts, chocolate, wheat, corn, or strawberries) by at-risk or handicapped children continues to be strongly recommended by many despite the extreme paucity of documentation of significant benefit (M. D. Gross, 1984; Stare, Whelan, & Sheridan, 1980). Of even greater concern is the popular use of very large, potentially toxic, amounts of vitamins and minerals (the orthomolecular hypothesis) for infants and young children with many different types of developmental disabilities. This approach has been rejected for children with Down syndrome by several investigations (Bennett, McClelland, Kriegsmann, Andrus, & Sells, 1983; Smith, Spiker, Peterson, Cicchetti, & Justine, 1984). Additionally, supplementation of individual metabolites such as 5-hydroxytryptophan or pyridoxine to children with Down syndrome has been found to be ineffective (Pueschel, Reed, & Cronk, 1984).

Medical management and interventions for at-risk or handicapped young children include both respected and proved as well as controversial and unproved strategies. These children, of course, require quality, competent primary health care supervision including regular, periodic developmental assessment to facilitate the recognition and early identification of developmental and behavioral abnormalities. This population of children has an increased incidence of both acute and chronic health problems (e.g., infectious diseases, nutritional inadequacies, impaired growth, seizure disorders, congenital malformations) and, thus, generally requires more frequent and intense medical assessment and intervention in such forms as physical and neurological examinations, laboratory tests, radiological procedures, and a wide variety of appropriate medications (e.g., antibiotics, anticonvulsants, bronchodilators, and decongestants). Similarly, handicapped children in particular have an increased likelihood of requiring a variety of surgical interventions such as palliation and/or repair of major birth

defects, orthopedic correction of deformities and contractures associated with physical impairments, shunting of excessive cerebrospinal fluid, correction of strabismus, and placement of tympanostomy tubes in the management of chronic otitis media with conductive hearing loss.

An increasing number of psychotropic medications have proved to be selectively and cautiously indicated and effective for some of the commonly encountered dysfunctional behaviors of young children with aberrant development. It is beyond the scope or intent of this volume to explore this expanding treatment modality in detail, but the reader should recognize the potential utility of such agents as major tranquilizers for severely disturbed and disruptive handicapped children, stimulant medications for severe attentional deficits and impulsivity, antidepressants for a variety of indications, and, of current research interest, fenfluramine for some of the cardinal behaviors associated with autism (Ritvo et al., 1984). It should be emphasized that these medications are most appropriately and effectively used in conjunction with available experiential interventions—not in isolation as the sole management approach, but rather as one piece of a comprehensive, individualized intervention plan.

Finally, unusual and unconventional biomedical interventions abound for developmentally disabled infants and children, just as they do for any chronic disorder. Two such approaches, in particular, merit mention because they are currently receiving increased attention and publicity, principally as applied to children with Down syndrome. Cell therapy, which involves the intramuscular injection of fresh fetal lamb brain tissue into the infant or young child, has been offered in parts of Europe and now the United States. Its proponents claim to alter dramatically many of the morphologic and developmental characteristics of Down syndrome. However, these claims have been completely undocumented by clinical investigations, and this treatment places the child at potential risk for serious anaphylactic allergic reactions (Pruess & Fewell, 1985). Reconstructive facial surgery has recently been advocated by several European and North American centers for cosmetic and self-esteem purposes; to improve lip, tongue, and oral function and thereby aid speech; to diminish nasal obstruction and reduce the frequency of upper respiratory infection; and to increase the child's general developmental level by normalizing appearances and minimizing any negative environmental expectations (Rozner, 1983). Unfortunately, none of these worthwhile goals has, as yet, been convincingly demonstrated. Clearly, a cautious, conservative, informed posture regarding nonstandard interventions that offer simple, rapid solutions to complex, chronic problems seems most appropriate.

### CONCLUDING COMMENTS

In this final chapter, we have highlighted six major issues likely to alter the future impact of early intervention for children and families as well as affect our

ability to adequately document outcomes. Although other topics are certain to emerge, such as biobehavioral approaches (Gibson & Fields, 1984), these six issues may well provide important directions for future program development. In fact, the comprehensive assessment of the state of the effectiveness of early intervention presented in this volume has clearly suggested that future research efforts must become more systematic. It is hoped that a consideration of the concepts, issues, and outcome patterns described in the preceding chapters will provide a useful framework in this regard. To be successful, however, this effort will require a new level of collaborative relationships among service providers, community support systems, researchers, and practitioners from numerous disciplines. How well early intervention can improve the outcomes for different groups of at-risk and handicapped children and how well we can document its effectiveness is in the hands of the next generation of early intervention programs.

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