
Early Intervention for Children with Intellectual Disabilities: Current Knowledge and Future Prospects*

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The field of early intervention is vibrant, generating expectations that systematic, comprehensive, experientially based interventions will alter developmental trajectories and prevent secondary complications. In this article, the existing knowledge base in the field is reviewed. It emphasizes the importance of an overall developmental framework, what is known through intervention science and the emergence of guiding principles for programme design and development. This is followed by a discussion of future prospects for improving early intervention outcomes in four areas. First, the importance of designing studies that provide information about carefully defined subgroups is discussed. This issue of specificity of outcomes is crucial in order

to determine boundaries for effectiveness and to direct attention to areas of special concern. Second, prospects for translational research are discussed with particular reference to our knowledge of the core developmental processes affected. Third, the need to focus on the increasingly apparent mental health and social competence difficulties of even young children with intellectual disabilities is considered. Finally, the complex problems and potential solutions associated with the transfer of model intervention programmes to communities as part of early intervention systems are described.

Keywords: early intervention, developmental framework, specificity of outcomes.

Introduction

Early intervention is playing an increasingly prominent role in the field of intellectual disabilities, and I am pleased to have this opportunity to discuss our current knowledge on this topic and to consider prospects for the future. Before doing so, however, it is important to put the early intervention enterprise in context and to consider the challenges it faces. The extraordinary potential of intellectual disabilities in young children worldwide is clearly a major concern. Realistic estimates suggest that approximately 780 million children may be affected between birth and 5 years of age (Olness 2003). This figure represents the increasing number of identifiable biological and environmental factors associated with intellectual disability as well as those conditions that place children at risk. Beyond the

increasing number of genetic and infectious causes of intellectual disabilities that are now recognized, the list of well-documented biological conditions that can lead to intellectual disabilities includes malnutrition, especially micronutrient deficiencies, head injuries, lead poisoning, low birth weight, malignancies, and numerous others. The corresponding list of potential environmental causes of intellectual disability is equally extensive and includes the pernicious effects of poverty, child abuse and child neglect (see Guralnick 2000). Although these environmental causes can and do make independent contributions to intellectual disability, they often operate in conjunction with biological conditions (Msall *et al.* 1998; Fujiura & Yamaki 2000; Park *et al.* 2002). Moreover, when considering potential causes or risk factors, it is the cumulative effect that produces the greatest threat to young children's intellectual development (Sameroff *et al.* 1987; Burchinal *et al.* 2000).

The number of young children likely to be affected by intellectual disability worldwide is eclipsed only by the

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diversity and complexity of the developmental patterns. Nevertheless, the expectations are quite high that much can be accomplished during the first 5 years of life through the thoughtful implementation of systematic, comprehensive, experientially based early intervention programmes (Guralnick 1997a, 1998). More specifically, it is anticipated that early intervention will enhance the development of young children already exhibiting intellectual delays (of known or unknown aetiology) both by altering their developmental trajectories and by preventing secondary complications from occurring. For children at risk of intellectual delays because of a variety of biological and/or environmental conditions, it is expected that these delays can be prevented entirely or their magnitude minimized.

These admittedly high expectations on the benefits of early intervention rest on a number of grounds. Certainly, compassionate and pragmatic rationales can be invoked, especially given the central roles parents play in the development of their young children. Clearly, it is essential to be able to address the needs of families during this most stressful period and to focus on issues that support the adaptations that are and will be necessary to strengthen those families and to maximize child development (see Bailey *et al.* 1998; Guralnick 1998). Recent advances in the scientific underpinnings of early childhood development have also provided a rationale for these high expectations, suggesting that the early years may well constitute a unique window of opportunity to alter children's developmental trajectories. A number of neurobiological and behavioural mechanisms have been identified in support of this rationale (Nelson 2000; Bailey *et al.* 2001). Taken together, it is anticipated that a substantial investment in systematic and comprehensive early intervention will generate long-term benefits for children and families, benefits which will be sustained over time and are cost-effective (see Guralnick 2004a).

With this as the background, I address the following topics. I begin by discussing what appears to be a general acceptance, by our field, of an overarching developmental framework that helps us understand the actual mechanisms through which various forms of early intervention operate to produce their effects. This overarching developmental framework provides guidance for implementation approaches and, importantly, is relevant to children with and without disabilities. I follow this by discussing the current status of intervention science in this area. This analysis is intended to tell us what we can reasonably expect to accomplish through early intervention programmes given our current knowledge,

drawing primarily on information provided by randomized clinical trials. Finally, I consider the future prospects for early intervention focusing on four areas. First, I address how the specific impact of early intervention may relate either to certain elements of the programme or to specific subgroups of children and families. This 'specificity' issue is one which is receiving considerable attention in the field and holds promise for dramatically increasing both our knowledge base in general and our ability to reduce the wide variability that occurs in response to early intervention programmes. Second, building on the emerging knowledge from neuroscience and developmental psychology, I consider the prospects for 'translational research' with an emphasis on incorporating this knowledge into various curricular approaches. Third, I address the challenge posed by the mental health and social competence needs of young children with intellectual disabilities, an often underemphasized and overlooked domain. Fourth, I consider the complex issue of systems development in early intervention as a means of ensuring that all communities have the ability to implement state-of-the-art early intervention programmes.

Current Knowledge

Overarching developmental framework

A coherent portrayal of the factors influencing various aspects of a child's development, including intellectual development, has emerged in the past decade as a consequence of numerous conceptual and empirical advances in the general field of child development (e.g. Collins *et al.* 2000; Sameroff & Fiese 2000; Guralnick in press a). Despite the fact that some disagreements remain and not all approaches converge, the developmental science of normative development has identified a number of family patterns of interaction that can produce a substantial impact on the intellectual development of young children. Three such patterns have been especially well documented. The first is the quality of parent-child transactions, a domain that is perhaps best captured by the construct referred to as 'sensitive responsiveness' (see Guralnick in press a). Embedded within this construct are the familiar parent-child patterns of contingent responsiveness and scaffolding as well as being discourse-based and non-intrusive. The key here is that a number of development-enhancing dimensions of parent-child transactions have been identified that operate jointly or independently to enhance a child's intellectual devel-

opment (see Bornstein & Tamis-Lemonda 1989; Wood 1998; Landry *et al.* 2000).

The second family pattern of interaction is referred to as family-orchestrated child experiences. During the early childhood period, in particular, parents take responsibility for organizing home and community experiences that can substantially influence a child's development. These range from ensuring that home environments contain appropriate toys and materials (Bradley 2002; Bradley & Corwyn 2004), that the language environment is diverse, stimulating and engaging (e.g. Hart & Risley 1995), and that community experiences, such as the selection of child care, has many developmentally enhancing features (see NICHD Early Child Care Research Network 2003). Again, each of these and numerous other experiences selected and organized by parents have the potential to enhance a child's intellectual development.

Finally, ensuring the child's health and safety constitutes the third family pattern of interaction. Providing proper nutrition (e.g. Georgieff & Rao 1999) and maintaining preventive health regimens (e.g. immunizations, well baby care) are two of the dimensions that fall under this family pattern of interaction. In many respects, these dimensions allow children to take advantage of the developmentally enhancing features of other family patterns of interaction. Ensuring children's safety and protecting them from violence or even witnessing violence is, of course, also essential for maintaining optimal child development (see Koenen *et al.* 2003). As a consequence of these many developmentally enhancing patterns within families, children are more likely to develop vital competencies such as those related to self-regulation and exploration, and to highly productive strategies that foster learning and development (see Haley & Stansbury 2003). Optimal or near-optimal development is the consequence.

Developmental science of biological risk and disability

Parallel advances have occurred in the developmental science of biological risk and disability revealing that these family patterns of interaction are as relevant to vulnerable children as they are to typically developing children. Evidence for the importance of the dimensions of sensitive responsiveness for the family pattern of parent-child transactions is most notable (Barnard 1997; Landry *et al.* 1997; Spiker *et al.* 2002). As expected, however, related studies have indicated that children at biological risk (such as those born prematurely at low birth weight) or those with an established disability, pose

considerable challenges to those optimal family patterns of interaction identified by the developmental science of normative development (Guralnick 1998). For example, the various challenges and uncertainties presented by children with established disabilities make it extremely difficult for many parents to match their interactions properly to their child's developmental level (see McCollum & Hemmeter 1997) and to establish joint attention routines so essential for optimal child development (Kasari *et al.* 1995; Mundy & Stella 2000; Guralnick 2002). With respect to family-orchestrated child experiences, numerous barriers to providing optimal developmental opportunities exist as well, such as those related to finding proper child care (see Booth & Kelly 1998). A range of similar challenges to optimal family patterns of interaction also exist for children at biological risk (see Minde 2000).

As a consequence of these difficulties, children's intellectual development can be unnecessarily compromised. As an example, although the development of most children with Down's syndrome is substantially affected and apparent early on, the continued decline in intellectual development that occurs during the first 5 years of life in the absence of early intervention may, in part, be attributed to non-optimal family patterns of interaction (see Guralnick 1998). Similarly, although development is not nearly as compromised initially for children born prematurely at low birth weight in most instances (Infant Health and Development Program 1990), a pattern of decline in intellectual development occurs over time as well; again a pattern that is evident in the absence of systematic and comprehensive early intervention.

Stressors to optimal family patterns of interaction

Accordingly, the developmental science of biological risk and disability reveals that children's characteristics associated with their vulnerability can create stressors that are capable of perturbing optimal family patterns of interaction. In turn, these stressors adversely affect children's intellectual development. Four types of stressors can be identified (see Guralnick 1998). First, children create information needs on the part of families. Information at all levels, ranging from details of their child's diagnosis and long-term prospects through specific guidance regarding day-to-day interactions (e.g. managing sleep-wake cycles, maximizing understanding of their child's cues to index their needs and developmental status, managing behaviour problems) to information as to the most effective intervention programmes, child

care arrangements, or individual professionals are to be collected. This complex task of gathering information relevant to their child's health and developmental characteristics and then integrating that information is essential in order to maximize all three family patterns of interaction.

Second, interpersonal and family distress is frequently noted and can potentially perturb one or more of the three family patterns of interaction. Beyond perceived specific parental stress, such as depression or role restriction (Roach *et al.* 1999), and overall psychological distress (Singer *et al.* 2003), families must often consider a re-evaluation of family goals and routines. As a consequence, this interpersonal and family distress can become isolating and debilitating. Again, it has the potential to perturb one or more of the three family patterns of interaction.

Third, a child at biological risk or one with an established disability often creates resource needs. The financial domain is often of most concern as expenses mount for health and developmental services. Even with private insurance and the availability of public programmes, including early intervention, out-of-pocket expenses can be considerable (Shannon *et al.* 2003). Additional resources are often needed as well to help families accommodate to changes required in work and recreational schedules and to coordinate activities and services related to the special needs of their vulnerable child (Gallimore *et al.* 1993). Unless those resources are available, family patterns of interaction may not be optimal.

Finally, the complex, difficult and often unpredictable nature of the numerous stressors that can arise can collectively contribute to a crisis of confidence for families with respect to competently carrying out their parenting role. It is critical that families maintain a sense of control as they are the ones responsible for gathering and integrating so much information and maintaining balance in the lives of all family members (see Gallimore *et al.* 1993). In the absence of this confidence, family patterns of interaction are likely to be compromised at one point or the other.

Taken together, these four forms of potential stressors act in a cumulative fashion to influence family patterns of interaction. Even if each stressor has limited impact, their combination can produce a more significant effect on child development. Although more direct tests of this hypothesis are needed, this developmental framework suggests that successful early intervention programmes require a comprehensive approach, thoughtfully addressing the many potential

threats (i.e. stressors) to optimal child developmental outcomes.

Developmental science of environmental risk

Studies of the developmental science of environmental risk indicate that an array of adverse family characteristics are also associated with non-optimal child development. As noted earlier, these factors are often so problematic that they are quite capable of producing substantial declines in children's intellectual development. Poverty, particularly if it occurs during a child's early years and is chronic and pervasive, can clearly produce adverse child developmental outcomes of considerable magnitude (McLoyd 1990; Duncan *et al.* 1994; Yeung *et al.* 2002). Other adverse family characteristics or risk factors associated with poor child outcome are low intellectual level of the parent, particularly the mother (Feldman 1997), the relative absence of social supports to families in its many and varied forms (Melson *et al.* 1993; Crnic & Stormshak 1997), parental mental illness, particularly depression (Cicchetti & Toth 1995; NICHD Early Child Care Research Network 1999; Seifer & Dickstein 2000), and parental neglect or abuse (Barnett 1997). Some family risk factors are transmitted across generations (e.g. through maternal attachment history), although continuity of negative parenting practices is far from inevitable (Phelps *et al.* 1998). Moreover, difficult child temperament can also serve as a risk factor (Lee & Bates 1985; Sameroff & Fiese 2000).

Two important features of these family environmental risk factors should be noted. First, evidence from the developmental science of environmental risk indicates that these risk factors can act as stressors, adversely affecting one or more of the three family patterns of interaction discussed earlier (see Guralnick 1998, 2005b). As a consequence, the resulting non-optimal family patterns of interaction are considered to be factors that are directly responsible for (i.e. mediate) the negative effects of these risk factors or stressors on child outcomes. The impact on parent-child transactions has been most thoroughly documented, as many of the dimensions of parental sensitive responsiveness are adversely affected by these family risk factors and contribute to poorer child outcomes (e.g. Phelps *et al.* 1998; NICHD Early Child Care Research Network 1999; Yeung *et al.* 2002). Second, as suggested earlier, the greater the number of these family environmental risk factors, the larger the negative impact on children's intellectual development (Sameroff *et al.* 1987; Liaw & Brooks-Gunn 1994;

Burchinal *et al.* 2000; Belsky & Fearon 2002). In fact, many individual family risk factors may only exert an adverse impact on child development in the presence of other risk factors. Even the relative absence of sensitive responsiveness does not necessarily have a negative effect unless other family risk factors co-occur, suggesting that other, more optimal family patterns of interaction can have buffering or compensatory influences on child development (Belsky 1984; Guralnick 1998). In a real sense, then, certain family characteristics at normative levels, again operating through the influence of family patterns of interaction, can serve as protective factors moderating the effects of various family risk factors (see Werner 1995). In contrast, a particularly devastating scenario occurs when these stressors to optimal family patterns of interaction caused by environmental factors occur in conjunction with stressors caused by biological risks, so called 'doubly vulnerable' children (Bradley *et al.* 1994). This concept of double vulnerability can be extended to children with established disabilities as well.

Figure 1 summarizes the pathways potential stressors take because of either the characteristics of children at biological risk or with an established disability or because of adverse family characteristics (environmental risk factors). The four types of potential stressors resulting from child disability or biological risk are also noted in the figure. A critical point here is that stressors from either major source are capable of influencing the same three family patterns of interaction which are responsible for child developmental outcomes.

Intervention science

Given this framework, the question of importance is whether we are capable of altering this downward trajectory of intellectual development through early intervention programmes. Decades of both small- and larger-scale studies indicate that an unequivocally affirmative answer is warranted (see Guralnick 1997a). Considerable confidence in this overall positive conclusion is justified by the results of the various randomized clinical trials that have been conducted. As major examples, support for the benefits of early intervention has been obtained in preventive intervention studies for children at environmental and biological risk (Rauh *et al.* 1988; Infant Health and Development Program 1990; Campbell & Ramey 1994) and in intervention studies for children with autism (Lovaas 1987). In another approach, consistent evidence has been found indicating that comprehensive early intervention pro-

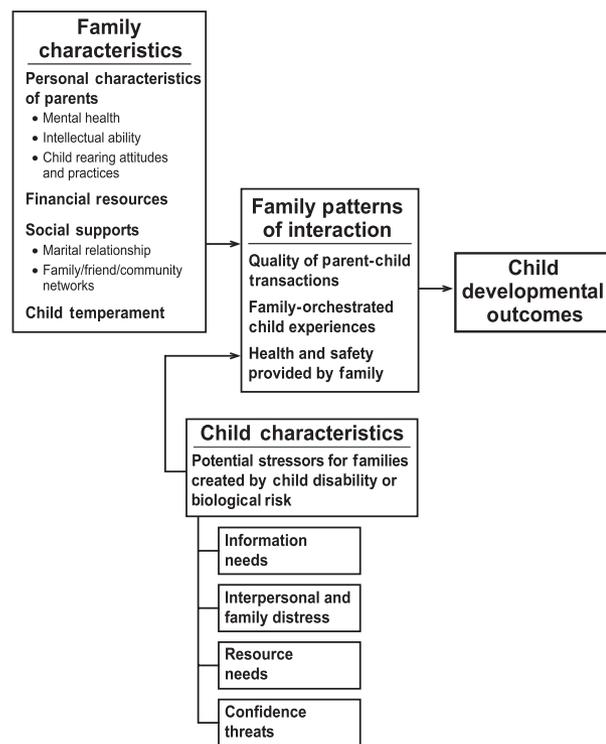


Figure 1 Factors influencing developmental outcomes for children (adapted from Guralnick 1997a,b). Second-generation research in the field of early intervention (Guralnick 1997b; reprinted by permission).

grammes are able to prevent much of the decline in intellectual development for children with Down's syndrome that typically occurs during the first few years of life (e.g. Berry *et al.* 1984; Woods *et al.* 1984; Sharav & Shlomo 1986). Of course, these children continue to exhibit substantial lags in development, but further declines in intellectual development can be prevented.

In addition to the effects of early intervention programmes that have successfully minimized or even prevented declines in intellectual development during the intervention period itself or immediately thereafter, longer-term effects have also been obtained. Although presenting a number of significant methodological challenges, long-term outcomes, some many years later, have been observed for children at biological risk (Achenbach *et al.* 1993; Hill *et al.* 2003), environmental risk (Campbell & Ramey 1994), autism (McEachin *et al.* 1993), and for children with heterogeneous developmental delays including Down's syndrome (Thomaidis *et al.* 2000).

Components of successful early intervention programmes

It is important to highlight the strong connection that exists between the overarching developmental framework and the intervention science discussed in the previous section. This becomes apparent when the various components comprising successful early intervention programmes are analysed (see Guralnick 1998, 2005b). It turns out that the intervention components themselves are closely linked to the stressors to family patterns of interaction that are part of the overarching developmental framework (see Figure 1). That is, successful programmes typically identify stressors (e.g. information needs, interpersonal and family distress) and then design and implement a coordinated and comprehensive early intervention programme to mitigate those stressors. In general, those intervention components can be organized into three categories: resource supports, social supports, and information and services. Details of each of these components can be found elsewhere (Guralnick 1997a, 1998), but together they comprise highly individualized programmes that are capable of enhancing family patterns of interaction. This is accomplished in large part by ensuring consistency with a family's goals, values, priorities and routines.

Summary of current knowledge

Early intervention for children at risk and for those with established intellectual disabilities is now firmly embedded in the context of general early childhood development. An overarching developmental framework has been advanced and has achieved a high level of consensus; one that is relevant to typically developing children and to those vulnerable to a range of developmental problems, particularly intellectual disability. The importance of the convergence of the developmental science of normative development, the developmental science of risk and disability, and intervention science cannot be overstated (Guralnick 2001a). We now have a framework to understand how and why early intervention produces its impact and can serve as a basis for subsequent refinements. Moreover, we have unequivocal evidence for both the short- and long-term effectiveness of early intervention, with effect sizes in the modest range (from 0.50 to 0.75 SD). It is important to note that most of these results were produced by 'model' programmes with considerable resources and highly skilled staff. The extent to which community programmes can achieve

similar outcomes is a concern and will be discussed shortly. Finally, our knowledge base also includes general agreement with respect to the practice components of early intervention in the form of resource supports, social supports, and information and services. Taken together, our current knowledge clearly reflects the important advances that have taken place in the field of early intervention and have created meaningful prospects for preventing or minimizing intellectual disability.

Future Prospects

These important advances have provided an excellent foundation and critical direction to further improve the early intervention field. In this section, I discuss four important directions for future research and practice: (1) the issue of specificity; (2) translational research; (3) mental health and social competence; and (4) systems development. To be sure, each future direction will require a major, long-term effort, with an investment of considerable resources. In addition, as will be seen, these directions are linked to core issues both in the field of early intervention and the general field of intellectual disabilities.

Specificity

One of the most daunting tasks is to achieve a better understanding of why outcomes of early intervention vary so dramatically across children and families. The existence of such extensive variability in response to early intervention is not surprising given the enormous heterogeneity found in the biological and environmental causes of intellectual disability discussed earlier and the corresponding heterogeneity in developmental and behavioural patterns.

Information that can inform specificity has many advantages as it will lead to a more judicious allocation of limited intervention resources, produce a better match between intervention strategies and the needs of children and families, minimize false expectations and, perhaps of most importance, stimulate new approaches and thinking to improve outcomes for those who have been essentially unresponsive or minimally responsive to existing intervention efforts.

One approach to address this issue of specificity is to consider well-defined subgroups of children and families in research and evaluation studies. Subgroups can be based on children's characteristics and take the form of aetiologic subgroups (e.g. genetic specificity such as

Down's syndrome or fragile X syndrome; see Dykens *et al.* 2000; Hodapp *et al.* 2003), categorical (diagnostic) subgroups [e.g. autistic disorder, pervasive developmental disorder-not otherwise specified (PDD-NOS)], or phenotypic subgroups (e.g. based on developmental profiles or functional neuroimaging patterns). Subgroups can also be based on family characteristics such as degree of environmental risk, as this factor can exert substantial constraints on the ability of early intervention programmes to be properly implemented and to engage families (see Gavidia-Payne & Stoneman 1997).

An excellent example of the importance of specificity based on subgroups can be found in a randomized clinical trial of the effectiveness of early intervention for children within the autistic spectrum (Smith *et al.* 2000). The categorical subgroups of children with autism disorder and PDD-NOS were identified using standard diagnostic criteria and matched closely except for their different classifications. One of the most interesting findings of this study was the high level of responsiveness in terms of gains in intellectual development to the widely used intensive intervention programme for the PDD-NOS subgroup, but with very little impact on children in the autism disorder subgroup. Should these findings be replicated, it opens important, entirely new directions for research and practice.

In addition to specificity based on subgroups, identifying the specific components of intervention responsible for producing desired effects will further advance our understanding of variability in responsiveness. Early intervention programmes contain numerous components, and it is extremely difficult to identify which of those components or cluster of components are associated with outcome effectiveness. The intensity of an early intervention programme is perhaps the most well-studied feature (see Guralnick 1998). In fact, recent research has indicated that intensity may well be the most critical feature responsible for the long-term effectiveness of early intervention for children born prematurely at low birth weight (Hill *et al.* 2003). Measuring the effects of an intervention that ended at age 3 years again at age 8 years revealed only a small and disappointing overall difference in comparison with children not receiving the intervention. Further analyses of intervention intensity, however, carefully accounting for possible confounding factors, clearly suggested that intensity, as defined by attendance in the intervention-oriented child care portion of the comprehensive intervention, mattered a great deal. Effect sizes for verbal IQ scores, for example, ranged from 0.50 to nearly 1.00 SD when intensity was considered.

Accordingly, the pursuit of specificity constitutes an important and potentially fruitful area for research and practice in the field of early intervention. Progressive refinements in our understanding of the interaction between subgroups based on child and family characteristics and intervention programme components in relation to outcomes such as intellectual development, not only address important research questions but also have major theoretical and practical implications. This 'second-generation research' (see Guralnick 1997b) can easily be accomplished in the context of randomized clinical trials applying statistical techniques and approaches designed to evaluate moderators (subgroups) and mediators (programme features) of early intervention outcomes (Hinshaw 2002; Kraemer *et al.* 2002; Guralnick 2004b).

Translational research

Translational research represents the application of advances in basic science knowledge to practice. This process, of course, is a long and arduous one, but has the potential to achieve dramatic results. Although customarily thought of as being primarily within the realm of biomedical science, translational research is also quite relevant to the behavioural sciences and, more specifically, to experientially based early intervention efforts. In recent years, knowledge has been rapidly accumulating with respect to the psychological processes underlying many aspects of intellectual and related disabilities. Even more recently, the processes identified by basic behavioural science laboratory investigations have been buttressed by *in vivo* neuroimaging work. As a consequence, we are gaining important insights into processes that can inform translational research.

Interestingly, the major advances in basic science relevant to early intervention are occurring in conjunction with identifiable subgroups of children. Consequently, this future prospect for early intervention is entirely compatible with efforts to address the specificity issue. In general, work in basic science is seeking to identify core processes that are characteristic of each subgroup and that may substantially contribute to the developmental problems identified. Examples of possible core processes are face processing and emotion recognition deficits that have been found for children with Down's syndrome and autism (Wishart & Pitcairn 2000; Dawson *et al.* 2002) and reinforcement uncertainties and instabilities for children with Down's syndrome (Wishart 1996). Relationship core processes, such as attachment (Pianta *et al.* 1996), are also relevant in this context. The

challenge here is to translate this basic science knowledge into intervention-specific activities designed to strengthen those core processes of concern or to develop compensatory strategies by encouraging children to build on specific strengths (also identified through basic science work) to circumvent core deficits. From a developmental perspective, if core problems can be addressed at a sufficiently early developmental period to prevent the cascade of subsequent adverse developmental events, rather dramatic effects may result.

An alternative and more conventional way translational research operates in early intervention is through application of knowledge gained from the developmental science of risk and disability. By more carefully specifying the developmental profiles (strengths and weaknesses) of subgroups of young children (child characteristics) and gaining a better understanding of their impact on one or more of the three family patterns of interaction, both assessments of stressors to non-optimal family interaction patterns and intervention strategies can be more thoughtfully organized. An excellent example of this approach for young children with autism can be found in Rogers' (1999) summary of directions in research-to-practice for this population.

Mental health and social competence

Approximately 25–35% of adults with intellectual disabilities have co-occurring mental health problems (Borthwick-Duffy 1994; Wallander *et al.* 2003). This so-called 'dual-diagnosis' population faces unusual restrictions in life activities, generally experiencing severely impaired social relationships. Evidence now indicates that a similar percentage of young children with intellectual delays exhibit some form of a behavioural problem, although the precise nature of these behavioural or psychiatric problems evolves over time. Given their young age and assessment limitations, the behavioural problems of these children are more undifferentiated but are generally characterized by a range of internalizing and externalizing disorders (Baker *et al.* 2002, 2003). As might be expected, these problems create high levels of caregiver stress and often limit a child's full participation in family and community activities (Gallimore *et al.* 1999; Baker *et al.* 2003; Crnic *et al.* 2004).

Given an awareness of the magnitude of this problem, a major challenge for the early intervention field is to incorporate mental health issues and generally raise the priority of socioemotional development within these programmes. Without question, important conceptual and practice problems remain to be addressed by both

the early intervention and mental health communities for this to occur (Weston *et al.* 1997; Gilkerson & Stott 2000). Nevertheless, clearly integrating the established programmes of early intervention with the emerging field of infant mental health (Zeanah 2000) will be an essential task for the future.

These problems in socioemotional development and corresponding difficulties in social relationships of all kinds for young children with intellectual delays are further compounded by recent research indicating that relationships with peers are even more widely affected (Guralnick 1999b, 2001c). As many as 65% of young children with even mild intellectual delays experience substantial social isolation from their peers in school and community settings (see Guralnick 1999b). This circumstance exacerbates existing relationship difficulties and produces long-term adverse consequences in socioemotional development (see Guralnick, *in press b*). These peer relationship and friendship difficulties can be traced to both problematic emotional regulation processes (as manifested in behaviour problems) and problems with regard to various social-information processes and related difficulties common to children with intellectual delays (Guralnick 1999a, *in press*). This combination creates what is best referred to as problems in peer-related social competence.

This larger problem of social isolation from peers created primarily by peer social competence difficulties has not been effectively addressed by the field of early intervention, despite both short- and long-term negative effects on children's socioemotional development and quality of life. What limited intervention science is available in this area has produced only minor success (Guralnick 2001c), and there are many policy and practice issues that must be addressed. An important challenge for the future development of early intervention programmes is to successfully develop models and approaches that can effectively focus on this underemphasized area. It will require an unusual level of integration and understanding of the linkages between cognitive and social development and how to translate that information into feasible early intervention programmes. Clearly, these issues related to children's socioemotional development could benefit from translational research. One effort focusing on peer social competence issues utilizing both translational research and specificity approaches has now been carried out (Guralnick, Connor, Neville & Hammond, unpubl. data). However, this randomized clinical trial constitutes only the beginning of a long process to ultimately achieve success in this highly

complex core area in early intervention and early childhood development.

Systems development

The existence of a generally agreed upon developmentally oriented framework for early intervention with accompanying principles for practice discussed earlier has been effectively applied in a number of highly sophisticated 'model' programmes which have been evaluated through equally sophisticated intervention science. Yet, when the components and functioning of more typical community-based programmes in the US are examined, large variations in quality are found (see Spiker *et al.* 2000; Guralnick 2005b). Similar variations in early intervention programmes have been described for numerous other countries (Guralnick 2005a).

Consequently, one of the most complex problems facing the field of early intervention is to determine how to enhance the quality and breadth of community-based systems. Without question, this cannot be accomplished in the absence of adequate resources and meeting professional training goals. Even so, this is not likely to occur unless communities identify a series of early intervention system components along with corresponding protocols, assessment tools, and decision-making processes that represent an agreed upon conceptual framework for early intervention principles and practices. A clear framework to guide community-based development is essential. One such approach, the developmental systems model (Guralnick 2001b; 2005a), has recently been put forward and reached a level of development and specificity to enable communities to begin to apply the structural and practice approaches provided by that model to their local situations. This difficult and long-term process will require not only commitment and perseverance, but a willingness by all involved to work towards the common goal of improving systems for early intervention.

Agenda for the Future

Even considering the high expectations for the benefits of early intervention, it is evident that the concepts and practices of early intervention have made important contributions to understanding and promoting the development of children with intellectual disabilities. Developmentally oriented approaches, in particular, have provided a rich and stimulating framework. Clearly much remains to be accomplished, and the issues of spe-

cificity, translational research, mental health and social competence, and systems development at the community level constitute a demanding agenda for the future. Should we take this agenda seriously and achieve even modest degrees of success, we may well be able to fulfill the high expectations for early intervention.

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