Two Tails of the Normal Curve

Similarities and Differences in the Study of Mental Retardation and Giftedness

Nancy M. Robinson — *University of Washington*
Edward Zigler — *Yale University*
James J. Gallagher — *University of North Carolina at Chapel Hill*

Professionals in the fields of mental retardation and giftedness have much to teach each other as well as the field of human development in general. Examining the commonalities and differences between the fields in social issues, definitions, developmental differences from the norm, values and policy issues, and educational and long-term implications deepens insights about both normal and deviant development. The authors stress the importance of individual differences in the differential design of educational strategies and the application of approaches developed with specialized populations to normally developing children. Current social inequalities affect both of these fields in particular ways. Finally, numerous research agendas can be enhanced by including representatives of both ends of the normal curve.

This article reports the reflections of three developmental psychologists whose interests have, for many years, encompassed both tails of the normal curve of mental ability. Far from being mirror images of one another, the fields of mental retardation and giftedness have some characteristics in common but diverge markedly in others. How do the two sets of understandings complement and enrich one another? How can professionals in these fields join forces to advance scientific knowledge as well as to enhance the welfare of both populations? The issues in these fields range from the theoretical to the practical and encompass a number of broad controversies, some of them highly political. Indeed, it is difficult to find, within our profession, any other topics that elicit as much emotion or generate as much adrenaline as do those related to these subgroups!

The Significance of Being Different in American Society

Individuals who are mentally retarded or gifted share the burden of deviance from the norm, in both a developmental and a statistical sense. In terms of mental ability as operationalized by tests of intelligence, performance that is approximately two standard deviations from the mean (i.e., IQ of 70–75 or lower or IQ of 125–130 or higher) is one key element in identification. Success at life's tasks, or its absence, also plays a defining role, but the primary classifying feature of both gifted and retarded groups is intellectual deviance. These individuals are out of sync with more average people, simply by their difference from what is expected for their age and circumstance. This asynchrony results in highly significant consequences for them and for those who share their lives. None of the familiar norms apply, and substantial adjustments are needed in parental expectations, educational settings, and social and leisure activities.

Of course, the outlooks for quality of life are more optimistic for gifted than for mentally retarded individuals. In terms of criteria such as adult independence, income, and breadth of life options, a gifted individual has advantages that a person with retardation does not. Yet, they have in common a desire, reinforced by well-meaning adults and peers, to "be like everyone else," that is, to be more like the norm. Mentally retarded persons may go to great lengths to hide their disabilities (Edgerton, 1967), while peer pressure often leads gifted children to adopt numerous strategies to mask (and often forsake) their gifts (Swiatek & Dorr, 1998). In addition, teachers' low expectations for mentally retarded persons and high expectations for gifted students may also affect life outcomes.

Editor's note. Sharon Landesman Ramey served as action editor for this article.

Author's note. Nancy M. Robinson, Halbert and Nancy Robinson Center for Young Scholars, University of Washington; Edward Zigler, Department of Psychology, Yale University; James J. Gallagher, Frank Porter Graham Child Development Center, University of North Carolina at Chapel Hill.

A preliminary version of this article was presented as the E. A. Doll Award Lecture at the 106th Annual Convention of the American Psychological Association, San Francisco, California, August 1998, and subsequently was published in the newsletter of Division 33 of the American Psychological Association: N. M. Robinson (1998), "Insights From Two Ends of the Normal Curve: Some Similarities and Differences in Issues Concerning Mental Retardation and Giftedness," *Psychology in Mental Retardation and Developmental Disabilities, 24*(1), 8–13.

Correspondence concerning this article should be addressed to Nancy M. Robinson, 5005 NE 45th Street, Seattle, WA 98105-3805. Electronic mail may be sent to capable@u.washington.edu.

 0003-066X/00/$5.00
Vol. 55, No. 12, 1413–1424 DOI: 10.1037//0003-066X.55.12.1413

Nancy M. Robinson
Photo by Mary Levin

Views of the Roles of Genetics and Environment

Both mentally retarded and gifted groups have served as foci for the time-honored nature–nurture controversy, and indeed continue to do so. Recently, however, with increasing recognition of the polygenic nature of intelligence, the interactive nature of the relationship between genetic potential and the environment, and children's own role in seeking stimulation appropriate to their genetic makeup (Plomin & McClearn, 1993), a more balanced view of genetic–environmental influences has been achieved for both populations.

The field of mental retardation is a good deal farther along than giftedness in understanding both genetic and environmental etiologies, in part because it is easier to discover what is wrong than what is right about chromosomal and genetic transmission as well as brain structure, brain function, biochemistry, and the effects of suboptimal environments. Inquiries into possible specific polygenes determining high levels of ability are just beginning (Chorney et al., 1998; Plomin, 1997). Of potential interest in the eventual elucidation of these relationships are the speed-of-reaction studies of Jensen (1982), which have demonstrated faster neural transmission in brighter individuals, and inquiries into the worldwide phenomenon of rising IQ and similar scores (Neisser, 1998), suggesting many possible explanations, including the increasing complexity of the environments in which we live (Sackett, Novak, & Kroeker, 1999; Schooler, 1998). At the same time, there is increasing information about family influences on the development of both high ability and creativity (Bloom, 1985; Csikszentmihalyi, Rathunde, & Whalen, 1993; Moon, Jurich, & Feldhusen, 1998).

Definitions

One difference between the fields of mental retardation and giftedness is in the matter of diagnostic schemes and definitions. There are defined diagnostic schemes for judging the presence and degree of mental retardation (American Association on Mental Retardation, 1992; American Psychiatric Association, 1994; Masling & Mulick, 1996), although these have been modified over the years. According to these criteria, mental retardation is currently defined as intelligence test performance two or more standard deviations below the mean, accompanied by limitations in adaptive functioning (i.e., significant failure to cope with the common tasks of daily living appropriate to one's age and situation). In the real world of educational placement, however, such guidelines are often ignored or judged to be irrelevant (Forness, Keogh, MacMillan, Kavale, & Gresham, 1998; MacMillan & Forness, 1998), and indeed, some states severely limit the use of intelligence testing for this purpose.

In the field of giftedness, such published definitions do not exist. There is no official manual or place in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; American Psychiatric Association, 1994) or its predecessors for gifted individuals. Many writers use terms like *gifts* and *talents* in opposite ways, one for the general phenomenon and the other for more specific abilities. An imprecise definition contained in a report on national excellence (P. O. Ross, 1993) has had rather wide use. It stresses performance, or potential for performance, "at remarkably high levels of accomplishment when compared with others of their age, experience, or environment" (P. O. Ross, 1993, p. 26). Within the field, there is virtually no consensus on threshold levels of ability (Gagné, 1998). Although intellectual and academic abilities are emphasized, potential domains of giftedness are in a sense unlimited and may (or may not) include leadership, artistic talent, and knowledge of self (Ramos-Ford & Gardner, 1997; P. O. Ross, 1993; Sternberg & Davidson, 1986). States, districts, and specific schools differ one from another not only in criteria such as IQ levels but also in whether additional personal attributes such as a child's creativity, motivation, and actual school achievement are taken into account. None of the efforts to rectify this confusing situation (e.g., Feldhusen, 1998; Gagné, 1999) have met with much success. There is widespread dissatisfaction in both fields with the ambiguities in the current situation.

The matter of definition has legal ramifications, especially with regard to mandated services. Educational and other services are federally mandated for mentally retarded persons under the Individuals With Disabilities Education Act, and approximately half the states have some mandate for educational services to gifted students, even though the majority of gifted students remain unserved or underserved (Passow & Rudnitski, 1993).

Terminology systems also affect both fields. Every new set of terminology eventually accumulates unwelcome connotations. Older readers will recall that terms such as *idiot, imbecile,* and *moron* were quite acceptable as profes-

Edward Zigler

sional designations of severity of *feeblemindedness* several sets of terms ago, although the terms are considered opprobrious today. The unwanted connotations of *gifted* have to do with elitism and unearned privilege as well as the implications of genetic bases for intelligence (Gallagher, 1991). This may be why descriptors of people at the low end of the IQ scale have followed the politically correct trend of removing defining adjectives (*individuals with mental retardation* is now the preferred label), but there has been no move to revise the terminology to *individuals with high intelligence*. As we learn more and our values change, we tend to change terminology. The American Association on Mental Deficiency has become the American Association on Mental Retardation and currently is considering yet another name change. The appropriateness of the term *gifted* has also been a topic of discussion, but so far the term has survived. Some states have experimented with new terms (e.g., *highly capable*), but in fact those terms carry no greater clarity of definition.

Developmental Differences From the Norm

Deviations in intelligence are best understood in terms of pace and level of development, a contrast in slopes from the 1:1 trajectory expected of the conjunction of mental age (MA) and chronological age (CA). Part of our concern with the state of affairs regarding individuals who are different is that the current mainstream literature about the development of children furnishes so little normative information about the pace of mastery of life skills (most of such information is currently available from standardized assessments developed by test publishers) and so little attention to individual differences in general. For example, in child development journals, mental ability is generally absent from the matrix of variables under examination. The fields of mental retardation and giftedness serve as a reminder that individual differences are to be reckoned with.

Cognitive Issues

Intellectual or academic ability is at the forefront of defined differences, as we have seen, but the accomplishments of both groups of children are measured largely in terms of performance and aptitude in educational settings. Reference is sometimes made to "schoolhouse giftedness" (Gallagher & Courtright, 1986) or to the "six-hour retarded child," referring to the length of the school day (President's Committee on Mental Retardation, 1970). Leaving school experience aside, however, tested intelligence also plays a role in determining success or failure in a wide array of life tasks (Gottfredson, 1997). This defining dimension leads to a common interest in cognitive matters. As a result, many of the most respected leaders in both fields are cognitive psychologists.

Redrawing the normal curve. One consequence of simultaneously looking at populations of gifted and mentally retarded persons is to call into question the bell-curve distribution of intelligence. Children with mental retardation who are presumed to be free of organic pathology seldom fall much farther below the mean than the range of mild mental retardation (two standard deviations below the mean). Virtually all children with IQs lower than 65–70 tend to have organic factors that have interfered with their developmental potential, producing a "blip" in the severe-to-profound range of retardation (Dingman & Tarjan, 1960; Zigler, 1967). In contrast, a few gifted students may demonstrate development that is six or more standard deviations above the mean (Gross, 1993), and despite their rarity, there seem to be more of them than would be predicted by the normal curve (Silverman, 1995). These findings suggest that we now need to reevaluate our concept of intelligence as necessarily conforming to the expected normal curve distribution.

Increasing divergence. A striking difference between the groups lies in their increasing dissimilarity of MA scores across the age span, with uncharted but continued divergence during adulthood. For a hypothetical youngster with an IQ of 70 and another with an IQ of 130 (i.e., the highest IQ among the retarded group and the lowest IQ among the gifted group, respectively), at 3 years of age, the disparity is already 1.8 years of MA; by age 6, at school beginning, the disparity is 3.6 years; and by age 12, it is 7.2 years.

This trajectory of increasing divergence has several implications. First, any intervention instituted at 6 years of age that might enable these students to attain equal MAs by age 9 would require the retarded individual to gain 7.5 years of MA in 3 years, an unattainable rate equivalent to an IQ of 250. For a good 35 years, psychologists and educators have been making concerted efforts to modify the developmental trajectory of children at risk for mild mental retardation. Special projects such as the Abecedarian Project (Campbell & Ramey, 1994; Ramey et al., 2000) and the Ypsilanti Project (Schweinhart & Weikart, 1997)

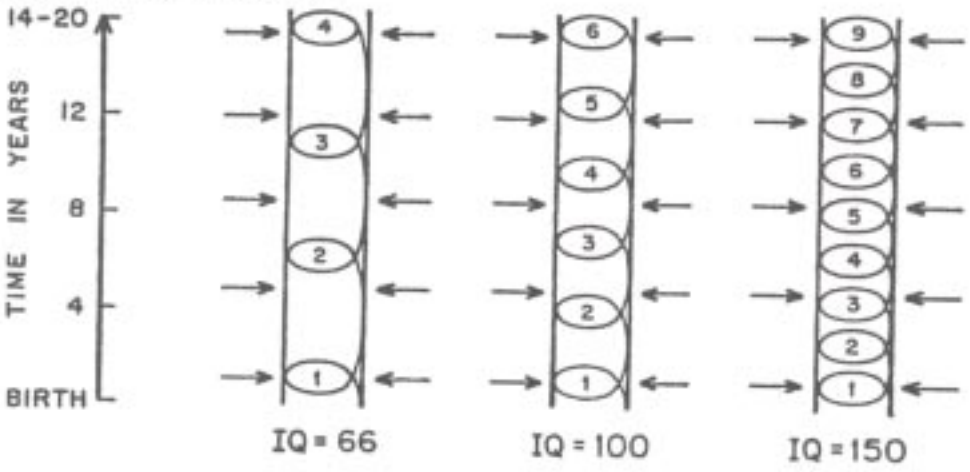
James J. Gallagher

and programs such as Head Start began with the notion of modifying and improving intellectual and social development (Zigler, 1988). These interventions have yielded some changes in efficiency of learning and school adaptation but only modest, if any, long-term gains in the intellectual realm. Although debate remains about the malleability of intelligence, a reasonable optimal estimate of the ultimate effectiveness of intervention efforts is one-half to one standard deviation (Guralnick, 1996; Lipsey & Wilson, 1993). Intervention is thought to be more likely to improve motivation and particular skills, and hence performance, than it is to achieve lasting IQ differences (Lazar & Darlington, 1982; Zigler, 1973, 1988; Zigler & Trickett, 1978). Indeed, social competence may affect a child's immediate performance on an intelligence test, presumably without affecting underlying abilities (Zigler & Butterfield, 1968).

Second, as a consequence of these increasing differences in MA, the presence of both gifted and retarded students in the same classroom creates formidable instructional difficulties for the teacher (and the rest of the class), and these difficulties increase with age. Third, there are some cognitive functions, such as formal operations and advanced metacognitive processes, that gifted students attain much earlier than their average classmates and, indeed, that those with mental retardation may never attain. These differences are depicted in Figure 1, which shows hypothetical stages of cognitive growth for a retarded, an average, and a gifted student. As development proceeds at different rates and through more or fewer cognitive stages, the differences in their abilities become ever more pronounced, and the challenges to the teachers of their heterogeneous classes become ever greater. For this reason, educational goals clearly need to be formulated (and reformulated) differently for the two groups.

Degrees of difference in cognitive domains. Looking at cognitive issues from another point of view, the more striking the contrast between the performance of mentally retarded persons and gifted persons, the more central that function appears to be to the basic concept of intelligence. Greater differences are found in domains in

Figure 1
Developmental Model of Cognitive Growth



Note. The single vertical arrow represents the passage of time. The horizontal arrows represent environmental events impinging on the individual, who is represented as a pair of vertical lines. The individual's cognitive development appears as an internal ascending spiral, in which the numbered loops represent successive stages of cognitive growth. From "Developmental Versus Difference Theories of Mental Retardation and the Problem of Motivation," by E. Zigler, 1969, *American Journal of Mental Deficiency, 73*, p. 538. Copyright 1969 by the American Association on Mental Retardation. Reprinted with permission.

which mentally retarded persons typically have more trouble than predicted by their MA and gifted persons exceed expectations based on their MA (with MAs simply representing average scores derived from a heterogeneous intelligence test). Another way to express this contrast is to compare domains in which the correlations with intelligence or IQ are higher or lower. Some of the lower correlations are found, for example, in classical conditioning and learning of simple responses but not in extinction of learned responses, the latter being slower in mentally retarded individuals (L. E. Ross & Ross, 1973; Sackett et al., 1999); some kinds of reaction time (Jensen, 1982); and memory for pictures and for time and place (Brown, 1972, 1973).

Reading is particularly interesting in this respect because early reading is often taken as a sign of giftedness. Most very early readers are, indeed, reasonably bright but are not necessarily as intellectually advanced as one would assume from their reading precocity (Jackson, 1992; Jackson & Klein, 1997). In contrast, the decoding skills of mildly retarded children often are more competent than one would expect from their MAs alone (Schwarz & Cook, 1971).

Larger differences, in contrast, appear in the more central aspects of intelligence. Children with higher levels of intelligence are, for example, more adept at the kinds of tasks represented by simultaneously handling multiple sources of information (Spitz & Nadler, 1974), whereas mentally retarded persons tend to respond to fewer components of a complex stimulus and even to stop responding as the number of components increases (Burke, 1991, as cited in Sackett et al., 1999). Compared with children of average intellectual ability, gifted children excel at verbal–abstract tasks such as expressing similarities, detecting latent as opposed to explicit meanings, defining vocabulary words, and interpreting metaphorical language such as proverbs (Gallagher & Lucito, 1961; McClelland, 1982; Thompson & Finley, 1962). Executive control skills including working memory, cognitive flexibility, management of learning strategies, and the complex skills known as metacognition (Borkowski & Peck, 1986; Kanevsky, 1992) also fall into this category.

A 6-year-old whom Nancy M. Robinson asked to define a series of words inquired, "Do you want me to tell you the complicated way or just the simple way?" By "complicated," he said he meant giving examples and more than one meaning. It requires little stretch of the imagination to point to such self-awareness and management skills as representing the central core of intelligence.

Nature of intellectual differences. Questions remain as to whether either group presents a distinctive qualitative set of intellectual characteristics beyond those derived from the sort of distribution represented by the normal curve. This debate has occurred in both fields but with rather different conclusions. Older theorists in the field of mental retardation tended to postulate specific characteristics of retarded persons (e.g., in the case of Lewin [1936] and Kounin [1941], diminished differentiation of cognitive structures together with reduced permeability of boundaries between the structures). Although the assumption of inherent qualitative differences, beyond MA differences, has been seriously questioned (Zigler, 1969), it retains some modern-day advocates (see Bennett-Gates & Zigler, 1998).

For the gifted group, however, the argument is much farther from resolution. Some authors who find unusual numbers of individuals with extraordinarily high IQs (Gross, 1993; Morelock & Feldman, 1997; Silverman, 1995) postulate a familial effect or even a genetic mutation at work. Of course, errors of test standardization may also be involved (Flynn, 1998) because it is extremely difficult to assess sizable populations representative of the tails of the curve. Many professionals assume, without clear data, that true intellectual giftedness carries with it some sort of difference beyond a simple maturity variable, something "special" that requires, for example, a qualitatively different curriculum than that provided for older students of comparable MAs. Others, such as Jackson and Butterfield (1986), emphasize that no qualitative differences have been demonstrated over and above those inherent in higher MAs. As we noted previously, gifted young children demonstrate some mental functions not yet found in average and retarded peers. There are some understandings accessible to older gifted students, such as the intricacies and applications of DNA or the subtleties of the writings of James Joyce, that will never be attained by students with average or retarded development. Do such discrepancies produce a qualitative difference even if the problem-solving abilities of the persons involved can be measured on a quantitative achievement scale or set of IQ norms? So it would seem.

One way to explore the qualitative–quantitative question is to use that mainstay of mental retardation research, the MA–CA match paradigm (e.g., Bennett-Gates & Zigler, 1998; Zeaman & House, 1966; Zigler, 1969, 1982). Such a design compares the performance of persons of a given MA with that of older (for gifted) or younger (for retarded) persons matched with the original group for MA. Their performance may also be compared with normally developing peers of the same CA. In the field of giftedness, for example, Kanevsky (1992) used the MA–CA paradigm to investigate metacognitive strategies in gifted 5-year-olds, comparing them with average (MA-matched) and gifted 7-year-olds, and indeed found qualitative behavioral similarities between the gifted groups, whose behavior differed from the average group.

Degrees of asynchrony. Variation among individuals and groups is of interest in both fields, but asynchronies in development within individuals are of interest as well. The degree of asynchrony across domains appears to correlate substantially with IQ throughout the entire range (Deary et al., 1996; Legree, Pifer, & Grafton, 1996). One related issue is the reliability of measures: Higher IQs are less reliable than lower IQs in individuals of the same age (McNemar, 1942). The issue goes beyond reliability, however. One consortium of experts (Morelock, 1996) actually defines giftedness as asynchrony. Although highly capable individuals sometimes appear superficially to have

balanced abilities and find it difficult to make choices because of what is termed *multipotentiality*, this appearance of even balance is often created by ceiling effects of the measures used. In fact, when such individuals are tested with more difficult tests, they almost never present flat profiles (Achter, Lubinski, & Benbow, 1996). With IQs of 70 and below, however, there simply is not room for the kind of variation that is possible at higher levels.

Ability and experience. Another contrast between the fields is the nature of the interaction of experience and ability. For highly capable children, limits are often imposed by a simple lack of exposure. On one intelligence test, bright preschoolers often encounter a question about fire drills. Few preschools have fire drills. Gifted young students can often cope intellectually with advanced mathematics courses such as calculus but need accelerated preparatory experience to do so with excellence. Highly capable students are quickly impatient with the familiar, yet extended practice occupies a central role in the development of talent or expertise (Ericsson, 1996), which may therefore demand even more self-discipline for gifted than for other persons. Many individuals with mental retardation can acquire and practice useful skills because they do have the extended years for such practice, are more tolerant of the familiar, and can thereby exceed in performance what would ordinarily be expected of a person with their mental ability.

Motivation and Social–Emotional Development

Both fields emphasize the several domains of social–emotional development, attributions, self-concept, and motivation and their effects on how well individuals use the intellectual abilities they possess. As we have noted, such domains and their effects are considered more malleable than changes in intellectual abilities (e.g., Rimm, 1997; Zigler, 1988; Zigler & Trickett, 1978). The establishment of these patterns is seen as residing, initially at least, in interactions with parents, teachers, other caregivers, and peers and in experiences of success or failure in dealing with challenges.

There are also some differences in the views of motivation and performance in the two fields. For example, *underachievement* is not a term often applied to individuals with mental retardation, even when the use of their abilities is suboptimal. Social comparison theory (e.g., Marsh's [1987] discussions of the big fish–little pond vs. little fish–big pond) is more explicitly discussed with regard to gifted students, whose self-concepts depend in part on whether they compare their own performance with that of their classmates in regular classes or ability-grouped classes. In any event, there has been considerable effort in both fields to take into account a variety of ecological factors and to attend to the influence of proximal and distal settings on motivation and ultimately on performance.

Zigler (e.g., 1967), indeed, has argued forcefully that, for persons whose limitations of intelligence represent merely the lower end of the normal curve rather than organic factors, motivation may prove to be the more important factor determining performance. Particularly for those who have experienced a long string of failures in life tasks, discouragement and expectations of failure in new tasks undermine the willingness to try new skills and attenuate performance in multiple ways. He argued that anyone, whatever his or her ability, who meets with consistent failure is likely to develop self-protective mechanisms such as lowered aspiration and diminished engagement. The effects of social deprivation that were once seen in institutionalized retarded individuals (e.g., excessive desire for social reinforcement, wariness of adults, and outer directedness) are less common today because of the substitution of other forms of care, but inappropriate child rearing, successive foster homes, or both may have similar effects. Furthermore, retarded individuals may be exposed to even more failure now that they are more often integrated with higher achieving peers.

In contrast, the success of the gifted student who has had the opportunity to master challenges creates a positive self-image and sense of efficacy, particularly as it relates to academic tasks. When frustration or failure occurs, the gifted student is more likely to assume that the problem can be overcome with reasonable effort and will spend more time seeking solutions. Problems of avoidance and self-doubt are more likely to occur, however, if gifted students are chronically underchallenged and then confronted with more difficult tasks (Dweck, 2000).

As a related matter, investigators in both fields are increasingly aware of dual diagnoses, that is, possible concomitant exceptionalities. The heightened presence of emotional disorders as well as sensory and other physical problems in some retarded persons has long been recognized. For a long time, highly gifted individuals were seen as being prone to insanity, but since the days of L. M. Terman (e.g., L. M. Terman & Oden, 1947), the opposite myth—that gifted individuals are invulnerable—has held sway. It has recently been recognized that gifted persons, like others, are subject to psychological disorders despite some advantage in resilience (Silverman, 1995). Three areas receiving particular attention in gifted children at this time are learning disabilities, which are often masked by compensatory abilities (Coleman, 1992; Yates, Berninger, & Abbott, 1995); attention deficit disorders, which are often accompanied by basic disorganization that may mimic low motivation (Reis & McCoach, 2000); and bipolar affective disorder, which appears to have a higher than expected incidence among creative persons, especially authors (Andreason, 1987; Jamison, 1993; Ludwig, 1995). Differential diagnosis is often difficult when any of the three is suspected. For example, how many energetic, capable children in underchallenging environments are mistakenly thought to be hyperactive? Conversely, how many highly capable children cover up the underlying disorganization of attention deficit disorder because their underchallenging environments do not demand the degree of focus that other children require to succeed?

Educational Issues

Homogeneous Versus Heterogeneous Classroom Settings

Both fields share an obsession with determining the most appropriate classroom setting in which to educate children who are so significantly different in ability from their classmates. There is passionate controversy in both fields about the value of inclusion versus separate classes (Hocutt, 1996; Kulik & Kulik, 1997; Styfco, 1999) and, in the case of the latter, about how much of the day is best spent with students of like abilities. There is convincing evidence about gifted children that even the most well-intentioned regular classroom teachers are unable to modify curricula more than about 20% of the time (Archambault et al., 1993; Westberg, Archambault, Dobyns, & Salvin, 1993). From the standpoint of instructional strategies, the grouping together of students of similar abilities allows for the necessary differentiation of curriculum to meet the special needs of each group. Such educational strategies sometimes run afoul of social policies (see discussion in the *Differential Prevalence* section below).

This controversial issue involves both similarities and differences between the fields because the reasoning about why one setting or another is good for children is different. For children with mental retardation, specialized classes are assumed to be detrimental because of low expectations and a lack of competent role models (although the opinion that these classes are the optimal educational setting also has supporters). For gifted students, the situation is just the opposite—regular classes are thought to provide too slow a pace, expectations that are too low, and a lack of challenge. Most (e.g., Gallagher & Gallagher, 1994; VanTassel-Baska, 1997), although not all (e.g., Renzulli, 1998), professionals in the field of giftedness favor self-contained classes for gifted students, with pull-out specialized options or cluster grouping of several gifted children together in a regular class seen as second-best compromises. One interesting objection to self-contained classes for gifted students is that their absence from the regular classroom denies nongifted classmates the opportunity for advanced role models and the direct tutoring that gifted students can provide (Kulik & Kulik, 1997).

Contributions to Education of All Children

Both fields have important lessons to contribute to education of all children, although the emphases differ. Issues of behavior management, reinforcement, task analysis and control, and individualization have been worked out in exquisite detail with mentally retarded learners and are now accepted as basic skills that teachers and parents need in dealing with all learners.

Many curriculum approaches found useful with gifted learners (see, e.g., Shore & Delcourt, 1996; VanTassel-Baska, 1997) are, however, at least as relevant, if not more so, for average students. Among these are *curriculum compacting* (using time efficiently by avoiding reteaching what children already know); emphasizing inquiry; enriching and extending curricula; integrating instruction across disciplines to focus on real-life problems (problem-based learning); encouraging children to monitor and manage their own learning; deepening the conceptual infrastructure of what is taught and helping children to make conceptual connections between understandings in disparate fields; encouraging creativity and intellectual risk-taking; tailoring teaching approaches to students' cognitive styles or strengths; teaching computer skills; and, above all, monitoring children's progress so that instruction matches their capability and challenges them to grow. Some practices such as acceleration, ability grouping, and high-level curricula are more specifically tailored for gifted students (Shore & Delcourt, 1996). It makes good sense to model classroom instruction on what works with high achievers as well as what works with low achievers and to use the best of both to create optimal matches for all students.

Values and Policy Issues

The values of a society often determine the degree and type of attention given to subgroups of young children. The value of *vertical equity* (the unequal treatment of unequals to make them more equal) has driven public policy in American education for some time. This value is expressed in Project Head Start, Title I, and major investments in children with disabilities, including those with mental retardation.

The reasons for public support for programs for gifted students are somewhat more complicated. For many years, competition with the Soviet Union created a rationale to support programs for the brightest of our youth so that we could compete scientifically with our perceived enemies. Major curricular reforms in mathematics and the sciences were often attributed to this concern. The end of the Cold War has left proponents of education for gifted students searching for other reasons. Our economic competition with other nations as well as the demands of the information age are currently used to justify investments in this special field of education (Gallagher & Gallagher, 1994).

Advocacy and Applied Research

Even without justifications like those just discussed, professionals in both fields all along have been explicitly applied- and action-focused in orientation, sincerely caring about how well individuals cope with their lives. Both fields deal with people who have real and compelling needs, people who need help. Much of the research in both fields has to do with seeking more effective means to maximize learning and performance. Indeed, with obvious exceptions, perhaps there is too much emphasis on such applied research, in view of our incomplete understanding of basic underlying phenomena. Sources of federal funding for research in mental retardation are multiple and cover both basic and applied approaches (with recent emphasis favoring applied). In contrast, the one source of federal dollars available specifically for research on giftedness under the Jacob Javits legislation is devoted exclusively to demonstration programs with underserved minorities.

Funding

Both fields are highly political and dependent on public funding. Advocacy is what makes things happen. Parents, in particular, compel the system to respond. After World War II, middle- and upper-middle-class parents of moderately retarded children opened schools to their children, and for some time, a considerably higher proportion of moderately retarded (or "trainable") children were being appropriately served than were mildly (or "educable") mentally retarded children who were more likely to come from economically impoverished families (Robinson & Robinson, 1976). This situation changed in the 1960s with the War on Poverty and the War on Mental Retardation, but whatever happened, is happening, or will happen in the future, the questions are highly political. For gifted children, there is unfortunately anything but a receptive climate today. The popular conception is that "they will make it on their own." But without parent and professional advocacy, many gifted children are not appropriately challenged, and far too many fall by the wayside (Rimm, 1997).

Despite similarities in values and social issues, a strong contrast between the fields is the availability of monetary resources. Children with all kinds of developmental disabilities are served within the schools, not always as well as they should be, but with mandated dollars for very expensive services. Despite the expectations of some, mainstreaming does not necessarily diminish the cost or improve the quality of special education. Indeed, when done correctly, inclusion can be as expensive as or even more expensive than special classes (Hocutt, 1996; D. L. Terman, Larner, Stevenson, & Behrman, 1996).

For gifted children, a little money is made to go a long way, but even these few dollars are unreliable and dependent on the largesse of state legislatures and local school boards (Passow & Rudnitski, 1993). Gifted children do not require smaller classes or many more resources than their average peers, just more appropriate ones. Some funds are needed for identification, teacher training, administrative oversight, transportation, and extra materials, however, and even such minimal funding is often lacking. A few years ago, the meager federal dollars in the Javits legislation for research in giftedness and for a federal office were almost wiped out by Congressional planners on the assumption that any budget under $10 million at the federal level could not be useful. In the 1990s, approximately $0.02 of every $100 of K–12 education funds were spent by states and local districts on gifted and talented education (P. O. Ross, 1993). Approximately $12.72 of every $100 of K–12 education funds were expended on special education for children with disabilities (Chambers, Parrish, Lieberman, & Wolman, 1998). The gifted community has learned to accomplish a great deal with very little; however, much more remains to be done.

Beyond high school, contrasts in funding continue. Although some colleges make special provisions for their brightest students and some states support concurrent enrollment in high school and college (Robinson, 1997), most postsecondary scholarships are based on financial need rather than merit, and no postcollege services of any kind are available to gifted adults. In contrast, adults with mental retardation can continue in public school programs until at least 21 years of age and are able to call on a variety of income-supplement, health, and social services as long as they are needed.

Differential Prevalence

The ethnopolitical issues facing the fields are two sides of the same coin. Because ethnicity, socioeconomic status, educational orientation, and success are highly confounded, there is an ethnic imbalance in retarded and gifted populations and, consequently, in special classes. There is overrepresentation in retarded populations of African American and Hispanic students relative to their proportions in the general population, whereas Asian American students are underrepresented (Gallagher & Gallagher, 1994). In the gifted population, the opposite pattern occurs (VanTassel-Baska, Patton, & Prillaman, 1989).

These results can be accounted for by skewed distributions of IQ scores, findings that again raise the issue of the role that the environment can play for better or worse in the developmental progress of children. Some issues reside in the process of identification (Frasier, Garcia, & Passow, 1995) and the language of the home. Others, however, occur unavoidably because the conditions for optimal child development are hard to maintain when a family is poor and when the parents' own education and experiences are incomplete and unsatisfying (Tannenbaum, 1998). The risks are increased that disadvantaged children will fall behind their classmates and that a smaller proportion will be found in high-achieving groups. A recent study (Robinson, Weinberg, Redden, Ramey, & Ramey, 1998) that followed post-Head Start children whose academic achievement was in the top 3% of their group clearly showed that high achievement and poverty were not mutually exclusive, but that families within the group who had relatively more resources and higher expectations tended to raise more competent children.

The issue of both putative and real discrimination by gender, race, and ethnic origin has preoccupied educators and our society for the past three decades, and concern for both children who are mentally retarded and those who are advanced has been central to these discussions. The thought that some minority students are treated as though they are inferior or are shunted off into poor school programs outrages their supporters (Hilliard, 1991; Sapon-Shevin, 1994), creating one of the driving forces behind the call for inclusive classrooms (Stainback & Stainback, 1996).

As a result, there are pressures to reduce the proportion of minorities receiving special services for developmental disabilities and to increase the proportion included in services for gifted children. In the fields of mental retardation and giftedness, the success and even the continued existence of programs are constantly vulnerable to civil rights issues of ethnicity and socioeconomic status. Schools are asked to solve the most basic problems of

society while endeavoring to provide appropriate day-to-day school experiences for children who are in need.

Social Values and Exceptional Children

The presence of youngsters at the extremes of intelligence forces us again to provide a rationale for expending extra resources and effort on their special education and their adaptation to the world around them. The "legitimacy" of public agendas is not always apparent, and it is especially not always politically valued to focus efforts on those who are not obviously hurting.

As we mentioned previously, for children with mental retardation, the concept of vertical equity, or the unequal treatment of unequals to make them more equal, clearly applies, as it does with children who have other disabilities and those with grossly limited opportunities and experience. We are a society that tries to reduce the obvious inequalities in the lives of such children. The egalitarian ethos of our democracy values aiding retarded individuals to function as much as possible like nonretarded people.

But then what is the rationale for spending more resources on gifted students, who are often seen as advantaged and able to fend for themselves? Their less obvious miseries in classrooms, which one said "are like six hours of a slow-motion movie," are often unrecognized or dismissed as selfish. Gifted children tend to hurt more privately, and as a society, we tend to underestimate the costs both to them and to ourselves of their reduced motivation and achievement. When we do devote attention to them, as we do primarily when another country makes a technological advance or when American students do poorly in international math and science comparisons, our interest historically has been fleeting.

Such inconsistency tends to reduce the contributions that bright students can make. Their potential achievements in political leadership, scientific and medical breakthroughs, and artistic accomplishments all represent benefits to society as a whole in exchange for an investment of resources for them at earlier ages. Major expenditures for medical schools and law schools, for example, are clearly based on the expectation of a return in broad social and personal benefits. And yet, optimizing the development of intellectually gifted children still raises for some the specter of creating an elite group of intelligentsia forever separated from the social mainstream (Zigler & Farber, 1985).

Our Joint Mission

Within the American Psychological Association, mental retardation has its own division with a total of about 750 dues-paying fellows, members, and associates. There is no parallel division for giftedness, and fewer than 70 American Psychological Association members self-identify as having an explicit interest in giftedness. We would presumably see a radical increase in the latter group if research funding were to become more abundant, as occurred in the 1960s when research funds became available for mental retardation. Whatever our numbers, however, those of us with interests in the two ends of the normal curve have much to tell other professionals who are unacquainted with the fields. Among our messages are the following:

1. Individual differences in level and pace of learning are important and create major problems for an educational system that has been designed for the average student. Because this is true, recommendations based on children's age always need to be tempered by the knowledge that one size does not fit all. Not all third graders wear Size 8 shirts because they happen to be 8 years old. Indeed, not all third graders have to be age 8! In a flexible system, all children's interests will be better served.

2. Educational strategies that well serve gifted children can provide excellent models to improve the school experience of all children. Because of our intense interest in improving instruction of children with mental retardation, exquisite strategies (e.g., the control of reinforcement) have been developed to assist them, and many of these strategies have generalized usefully to regular classrooms. It is at least as important for average as for gifted students, however, to use teaching time efficiently to address knowledge and skills not yet mastered, to encourage higher order thinking strategies and creativity, to emphasize problem finding and problem solving, to tailor teaching strategies to individual differences, to encourage children to manage their own learning effectively, and to deepen and broaden their conceptual understandings. These are strategies derived from the education of bright children.

3. We need to capitalize on the fact that American schools are, at least theoretically, much more receptive than ever before to adaptations to individual differences in abilities, so-called learning styles, even so-called intelligences. This is a commitment to individual differences and to diversity that is much greater than one finds in other countries (Robinson, 1999; Stevenson, 1998). By incorporating knowledge gained from diverse groups, American schools can become models for the rest of the world.

4. We need to admit that neither of our fields can solve the problems of economic and ethnic disadvantages that beset our society. In these two fields, we focus on understanding how to enhance the adjustment and performance of people who are in the process of developing, and if there is ethnic imbalance in these groups, it is a predictable result of imbalance of advantages that impinge on children from the moment of conception onward. We must address needs when we find them, provided that we continue to look broadly at all groups for those who show differences of these kinds and that, especially in the field of giftedness, the doors are kept wide open for children whose homes are ethnically different, economically disadvantaged, or both.

5. Finally, there are research agendas to which these two fields can contribute, agendas such as neurodevelopmental science, brain function, and the genetics of enhanced or diminished talents. Of course, there are many ways that something can go awry in development and perhaps fewer ways that development can be significantly enhanced, but research that looks at both issues can often be more illuminating than looking at one issue alone. Both fields are particularly in need of longitudinal studies that can illuminate complex interactions of experience and ma-

turity. One particularly promising area of research focuses on personality and motivation. Although there is not a great deal we can do to alter genetic draws or biological predispositions, we can devise interventions to overcome maladaptive approaches to learning and performance that hinder many retarded and gifted students. Such work can ultimately move both fields closer to their shared goal of enabling all individuals to fully use the intelligence and related skills that they possess.

REFERENCES

Achter, J. A., Lubinski, D., & Benbow, C. P. (1996). Multipotentiality among the intellectually gifted: "It never was there and already it's vanishing." *Journal of Counseling Psychology, 43,* 65–76.

American Association on Mental Retardation. (1992). *Mental retardation: Definition, classification, and systems of supports* (9th ed.). Washington, DC: Author.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

Andreason, N. C. (1987). Creativity and mental illness: Prevalence rates in writers and their first-degree relatives. *American Journal of Psychiatry, 144,* 1288–1292.

Archambault, F. X., Jr., Westberg, K. L., Brown, S. W., Hallmark, B. W., Emmons, C. L., & Zhang, W. (1993). *Regular classroom practices with gifted students: Results of a national survey of classroom teachers.* Storrs, CT: National Research Center on the Gifted and Talented.

Bennett-Gates, D., & Zigler, E. (1998). Resolving the developmental-difference debate: An evaluation of the triarchic and systems theory models. In J. Burack, R. Hodapp, & E. Zigler (Eds.), *Handbook of mental retardation and development* (pp. 115–131). New York: Cambridge University Press.

Bloom, B. S. (Ed.). (1985). *Developing talent in young people.* New York: Ballantine Books.

Borkowski, J. G., & Peck, V. (1986). Causes and consequences of metamemory in gifted children. In R. J. Sternberg & J. E. Davidson (Eds.), *Conceptions of giftedness* (pp. 182–200). New York: Cambridge University Press.

Brown, A. L. (1972). Context and recency cues in the recognition memory of retarded children and adolescents. *American Journal of Mental Deficiency, 77,* 54–58.

Brown, A. L. (1973). Judgments of recency for long sequences of pictures: The absence of a developmental trend. *Journal of Experimental Child Psychology, 15,* 473–480.

Campbell, F., & Ramey, C. (1994). Effects of early intervention on intellectual and academic achievement: A follow-up study of children from low-income families. *Child Development, 65,* 684–698.

Chambers, J. G., Parrish, T. B., Lieberman, J. C., & Wolman, J. M. (1998). *What are we spending on special education in the U.S.?* (CSEF Briefs No. 8). Palo Alto, CA: American Institutes for Research, Center for Special Education Finance.

Chorney, M. J., Chorney, K., Seese, N., Owen, M. J., Daniels, J., McGuffin, P., Thompson, L. A., Detterman, D. K., Benbow, C., Lubinski, D., Eley, T., & Plomin, R. (1998). A quantitative trait locus associated with cognitive ability in children. *Psychological Science, 9,* 1159–1166.

Coleman, M. (1992). A comparison of how gifted/LD and average/LD boys cope with school frustration. *Journal for the Education of the Gifted, 15,* 239–265.

Csikszentmihalyi, M., Rathunde, K., & Whalen, S. (1993). *Talented teenagers: The roots of success and failure.* Cambridge, England: Cambridge University Press.

Deary, I. J., Egan, V., Gibson, G. J., Austin, E. J., Brand, C. R., & Kellaghan, T. (1996). Intelligence and the differentiation hypothesis. *Intelligence, 23,* 105–132.

Dingman, H. F., & Tarjan, G. (1960). Mental retardation and the normal distribution curve. *American Journal of Mental Deficiency, 64,* 991–994.

Dweck, C. S. (2000). *Self theories: Their role in motivation, personality, and child development.* Philadelphia: Psychology Press.

Edgerton, R. B. (1967). *The cloak of competence: Stigma in the lives of the mentally retarded.* Berkeley: University of California Press.

Ericsson, K. A. (1996). The acquisition of expert performance: An introduction to some of the issues. In K. A. Ericsson (Ed.), *The road to excellence: The acquisition of expert performance in the arts and sciences, sports and games* (pp. 1–50). Mahwah, NJ: Erlbaum.

Feldhusen, J. F. (1998). A conception of talent and talent development. In R. C. Friedman & K. B. Rogers (Eds.), *Talent in context: Historical and social perspectives on giftedness* (pp. 193–209). Washington, DC: American Psychological Association.

Flynn, J. R. (1998). IQ gains over time: Toward finding the causes. In U. Neisworth (Ed.), *The rising curve: Long-term gains in IQ and related measures* (pp. 25–66). Washington, DC: American Psychological Association.

Forness, S. R., Keogh, B. K., MacMillan, D. L., Kavale, K. A., & Gresham, F. M. (1998). What's so special about IQ? Limited explanatory power of cognitive abilities in the real world of special education. *Remedial and Special Education, 19,* 315–322.

Frasier, M., Garcia, J., & Passow, A. (1995). *A review of assessment issues in gifted education and their implications for identifying gifted minority students.* Storrs, CT: National Research Center on the Gifted and Talented.

Gagné, F. (1998). A proposal for subcategories within gifted or talented populations. *Gifted Child Quarterly, 42,* 87–95.

Gagné, F. (1999). My convictions about the nature of abilities, gifts, and talents. *Journal for the Education of the Gifted, 22,* 109–136.

Gallagher, J. J. (1991). The gifted: A term with surplus meaning. *Journal for the Education of the Gifted, 14,* 353–365.

Gallagher, J., & Courtright, R. (1986). The educational definition of giftedness and its policy implications. In R. J. Sternberg & J. E. Davidson (Eds.), *Conceptions of giftedness* (pp. 93–111). New York: Cambridge University Press.

Gallagher, J., & Gallagher, S. (1994). *Teaching the gifted child* (4th ed.). Boston: Allyn & Bacon.

Gallagher, J. J., & Lucito, L. J. (1961). Intellectual pattern of gifted compared with average and retarded. *Exceptional Children,* 479–482.

Gottfredson, L. (1997). Why *g* matters: The complexity of everyday life. *Intelligence, 24,* 79–132.

Gross, M. U. M. (1993). *Exceptionally gifted children.* London: Routledge.

Guralnick, M. (Ed.). (1996). *The effectiveness of early intervention.* Baltimore: Brookes.

Hilliard, A. (1991). The ideology of intelligence and IQ magic in education. In A. Hilliard (Ed.), *Testing African American students: Special re-issue of the Negro Educational Review* (pp. 136–145). Morristown, NJ: Aaron Press.

Hocutt, A. M. (1996). Effectiveness of special education: Is placement the critical factor? *Future of Children, 6*(11), 40–53.

Jackson, N. E. (1992). Precocious reading of English: Origins, structure, and predictive significance. In P. S. Klein & A. J. Tannenbaum (Eds.), *To be young and gifted* (pp. 171–203). Norwood, NJ: Ablex.

Jackson, N. E., & Butterfield, E. C. (1986). A conception of giftedness designed to promote research. In R. J. Sternberg & J. E. Davidson (Eds.), *Conceptions of giftedness* (pp. 151–181). New York: Cambridge University Press.

Jackson, N. E., & Klein, E. J. (1997). Gifted performance in young children. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (2nd ed., pp. 460–474). Boston: Allyn & Bacon.

Jamison, K. R. (1993). *Touched by fire.* New York: Basic Books.

Jensen, A. R. (1982). The chronometry of intelligence. In R. J. Sternberg (Ed.), *Advances in the psychology of human intelligence* (Vol. 1, pp. 255–310). Hillsdale, NJ: Erlbaum.

Kanevsky, L. (1992). The learning game. In P. S. Klein & A. J. Tannenbaum (Eds.), *To be young and gifted* (pp. 204–241). Norwood, NJ: Ablex.

Kounin, J. (1941). Experimental studies of rigidity: II. The explanatory power of the concept of rigidity as applied to feeblemindedness. *Character and Personality, 9,* 273–282.

Kulik, J., & Kulik, C. (1997). Ability grouping. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (2nd ed., pp. 230–242). Boston: Allyn & Bacon.

Lazar, I., & Darlington, R. (Eds.). (1982). Lasting effects of early educa-

tion: A report from the Consortium for Longitudinal Studies. *Monographs of the Society for Research in Child Development, 47*(2–3, Serial No. 195).

Legree, P. J., Pifer, M. E., & Grafton, F. C. (1996). Correlations among cognitive abilities are lower for high ability groups. *Intelligence, 23,* 54–57.

Lewin, K. (1936). *A dynamic theory of personality.* New York: McGraw-Hill.

Lipsey, M., & Wilson, D. (1993). The efficacy of psychological, educational, and behavioral treatment. *American Psychologist, 46,* 1181–1209.

Ludwig, A. M. (1995). *The price of greatness: Resolving the creativity and madness controversy.* New York: Guilford Press.

MacMillan, D. L., & Forness, S. R. (1998). Role of IQ in special education placement decisions: Primary and determinative or peripheral and inconsequential? *Remedial and Special Education, 19,* 239–253.

Marsh, H. W. (1987). The big-fish-little-pond effect on academic self-concept. *Journal of Educational Psychology, 79,* 280–295.

Masling, J. W., & Mulick, J. A. (Eds.). (1996). *Manual of diagnosis and professional practice in mental retardation.* Washington, DC: American Psychological Association.

McClelland, S. E. (1982). *A verbal/performance analysis of the Stanford Binet Intelligence Scale and the development of high-IQ preschoolers.* Unpublished doctoral dissertation, University of Washington.

McNemar, Q. (1942). *The revision of the Stanford–Binet Scale.* Boston: Houghton-Mifflin.

Moon, S. M., Jurich, J. A., & Feldhusen, J. F. (1998). Families of gifted children: Cradles of development. In R. C. Friedman & K. B. Rogers (Eds.), *Talent in context: Historical and social perspectives on giftedness* (pp. 81–99). Washington, DC: American Psychological Association.

Morelock, M. (1996). On the nature of giftedness and talent: Imposing order on chaos. *Roeper Review, 19,* 4–12.

Morelock, M., & Feldman, D. H. (1997). High-IQ children, extreme precocity, and savant syndrome. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (2nd ed., pp. 439–459). Boston: Allyn & Bacon.

Neisser, U. (Ed.). (1998). *The rising curve: Long-term gains in IQ and related measures.* Washington, DC: American Psychological Association.

Passow, A. H., & Rudnitski, R. A. (1993). *State policies regarding education of the gifted as reflected in legislation and regulation.* Storrs, CT: National Research Center on the Gifted and Talented.

Plomin, R. (1997). Identifying genes for cognitive abilities and disabilities. In J. Sternberg & E. L. Grigorenko (Eds.), *Intelligence: Heredity and environment* (pp. 89–104). New York: Cambridge University Press.

Plomin, R., & McClearn, G. (Eds.). (1993). *Nature, nurture, and psychology.* Washington, DC: American Psychological Association.

President's Committee on Mental Retardation. (1970). *The six-hour retarded child.* Washington, DC: U.S. Government Printing Office.

Ramey, C. T., Campbell, F. A., Burchinal, M., Skinner, M. L., Gardner, D. M., & Ramey, S. L. (2000). Persistent effects of early childhood education on high-risk children and their mothers. *Applied Developmental Science, 4,* 2–14.

Ramos-Ford, V., & Gardner, H. (1997). Giftedness from a multiple intelligences perspective. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (2nd ed., pp. 54–66). Boston: Allyn & Bacon.

Reis, S. M., & McCoach, D. B. (2000). The underachievement of gifted students: What do we know and where do we go? *Gifted Child Quarterly, 44,* 152–170.

Renzulli, J. S. (1998, October). A rising tide lifts all ships: Developing the gifts and talents of all students. *Phi Delta Kappan, 80,* 105–111.

Rimm, S. (1997). Underachievement syndrome: A national epidemic. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (2nd ed., pp. 416–434). Boston: Allyn & Bacon.

Robinson, N. M. (1997). The role of universities and colleges in educating gifted undergraduates. *Peabody Journal of Education, 72,* 217–236.

Robinson, N. M. (1999). Necessity is the mother of invention, or the roots of our "system" of providing for gifted secondary students. *Journal of Secondary Gifted Education, 10,* 120–128.

Robinson, N. M., & Robinson, H. B. (1976). *The mentally retarded child* (2nd ed.). New York: McGraw-Hill.

Robinson, N. M., Weinberg, R. A., Redden, D., Ramey, S. L., & Ramey, C. T. (1998). Factors associated with high academic competence among former Head Start children. *Gifted Child Quarterly, 42,* 148–156.

Ross, L. E., & Ross, S. M. (1973). Classical conditioning and intellectual defect. In D. K. Routh (Ed.), *The experimental psychology of mental retardation.* Chicago: Aldine.

Ross, P. O. (1993). *National excellence: A case for developing America's talent.* Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement.

Sackett, G. P., Novak, M. F. S. X., & Kroeker, R. (1999). Early experience effects on adaptive behavior: Theory revisited. *Mental Retardation and Developmental Disabilities Research Reviews, 5,* 30–40.

Sapon-Shevin, M. (1994). *Playing favorites: Gifted education and the disruption of community.* Ithaca: University of New York Press.

Schooler, C. (1998). Environmental complexity and the Flynn effect. In U. Neisser (Ed.), *The rising curve: Long-term gains in IQ and related measures* (pp. 67–79). Washington, DC: American Psychological Association.

Schwarz, R. H., & Cook, J. J. (1971). Mental age as a predictor of academic achievement. *Education and Training of the Mentally Retarded, 6,* 12–15.

Schweinhart, L., & Weikart, D. (1997). The High Scope preschool curriculum comparison study through age 23. *Early Childhood Research Quarterly, 12,* 117–143.

Shore, B. M., & Delcourt, M. (1996). Effective curricular and program practices in gifted education and the interface with general education. *Journal of the Education of the Gifted, 20,* 138–154.

Silverman, L. K. (1995). Highly gifted children. In J. Genschaft, M. Birely, & C. Hollinger (Eds.), *Serving gifted and talented students* (pp. 217–240). Austin, TX: Pro-Ed.

Spitz, H. H., & Nadler, B. T. (1974). Logical problem solving by educable retarded adolescents and normal children. *Developmental Psychology, 10,* 404–412.

Stainback, S., & Stainback, W. (1996). *Inclusion: A guide for educators.* Baltimore: Brookes.

Sternberg, R. J., & Davidson, J. E. (Eds.). (1986). *Conceptions of giftedness.* New York: Cambridge University Press.

Stevenson, H. W. (1998). Cultural interpretations of giftedness: The case of East Asia. In R. C. Friedman & K. B. Rogers (Eds.), *Talent in context: Historical and social perspectives on giftedness* (pp. 61–77). Washington, DC: American Psychological Association.

Styfco, S. J. (1999). Children with special educational needs: A case study of advocacy vs. policy vs. research. In E. Zigler & N. W. Hall (Eds.), *Child development and social policy: Theory and applications* (pp. 251–281). Boston: McGraw-Hill.

Swiatek, M. A., & Dorr, R. M. (1998). Revision of the Social Coping Questionnaire: Replication and extension of previous findings. *Journal of Secondary Gifted Education, 10,* 252–259.

Tannenbaum, A. J. (1998). Programs for the gifted: To be or not to be? *Journal for the Education of the Gifted, 22,* 3–36.

Terman, D. L., Larner, M. B., Stevenson, C. S., & Behrman, R. E. (1996). Special education for students with disabilities: Analysis and recommendations. *Future of Children, 6*(1), 40–53.

Terman, L. M., & Oden, M. H. (1947). *Genetic studies of genius: Vol. 4. The gifted child grows up.* Stanford, CA: Stanford University Press.

Thompson, J. M., & Finley, C. J. (1962). A further comparison of the intellectual patterns of gifted and mentally retarded children. *Exceptional Children, 29,* 379–381.

VanTassel-Baska, J. (1997). What matters in curriculum for gifted learners: Reflections on theory, research, and practice. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (2nd ed., pp. 126–135). Boston: Allyn & Bacon.

VanTassel-Baska, J., Patton, J., & Prillaman, D. (1989). Disadvantaged gifted learners: At risk for educational attention. *Focus on Exceptional Children, 22*(3), 1–15.

Westberg, K. L., Archambault, F. X., Jr., Dobyns, S. M., & Salvin, T. J. (1993). *An observational study of instructional and curricular practices used with gifted and talented students in regular classrooms.* Storrs, CT: National Research Center on the Gifted and Talented.

Yates, C. M., Berninger, V. W., & Abbott, R. D. (1995). Writing disabil-

ities in intellectually gifted children. *Journal for the Education of the Gifted, 18,* 131–155.

Zeaman, D., & House, B. J. (1966). The relation of IQ and learning. In R. M. Gagné (Ed.), *Learning and individual differences.* Columbus, OH: Merrill.

Zigler, E. (1967, January 20). Familial mental retardation: A continuing dilemma. *Science, 155,* 292–298.

Zigler, E. (1969). Developmental versus difference theories of mental retardation and the problem of motivation. *American Journal of Mental Deficiency, 73,* 536–556.

Zigler, E. (1973). Why retarded children do not perform up to the level of their ability. In R. M. Allen, A. D. Cortazzo, & R. P. Toister (Eds.), *Theories of cognitive development: Implications for the mentally retarded* (pp. 13–35). Coral Gables, FL: University of Miami Press.

Zigler, E. (1982). MA, IQ, and the developmental-difference controversy. In E. Zigler & D. Balla (Eds.), *Mental retardation: The developmental-difference controversy* (pp. 207–211). Hillsdale, NJ: Erlbaum.

Zigler, E. (1988). The IQ pendulum [Review of the book by H. H. Spitz, *The raising of intelligence: A selected history of attempts to raise retarded intelligence*]. *Readings: A Journal of Reviews and Commentary in Mental Health, 3*(2), 4–9.

Zigler, E., & Butterfield, E. C. (1968). Motivational aspects of changes in IQ test performance of culturally deprived nursery school children. *Child Development, 39,* 1–14.

Zigler, E., & Farber, E. A. (1985). Commonalities between the intellectual extremes: Giftedness and mental retardation. In F. D. Horowitz & M. O'Brien (Eds.), *The gifted and talented: Developmental perspectives* (pp. 387–408). Washington, DC: American Psychological Association.

Zigler, E., & Trickett, P. K. (1978). IQ, social competence, and evaluation of early childhood intervention programs. *American Psychologist, 33,* 789–798.