

Exceptionally Gifted Children: Long-Term Outcomes of Academic Acceleration and Nonacceleration

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A 20-year longitudinal study has traced the academic, social, and emotional development of 60 young Australians with IQs of 160 and above. Significant differences have been noted in the young people's educational status and direction, life satisfaction, social relationships, and self-esteem as a function of the degree of academic acceleration their schools permitted them in childhood and adolescence. The considerable majority of young people who have been radically accelerated, or who accelerated by 2 years, report high degrees of life satisfaction, have taken research degrees at leading universities, have professional careers, and report facilitative social and love relationships. Young people of equal abilities who accelerated by only 1 year or who have not been permitted acceleration have tended to enter less academically rigorous college courses, report lower levels of life satisfaction, and in many cases, experience significant difficulties with socialization. Several did not graduate from college or high school. Without exception, these young people possess multiple talents; however, for some, the extent and direction of talent development has been dictated by their schools' academic priorities or their teachers' willingness or unwillingness to assist in the development of particular talent areas.

Let me propose to you an experimental study.

Let us take a child of average intellectual ability, and when he is 5 years old, let us place him in a class of children with severe intellectual disabilities, children whose IQs are at least four standard deviations lower than his. The child will stay with this group for the duration of his schooling and he will undertake the curriculum designed for the class, at the level and pace of the class.

We will carefully observe and assess at regular intervals his educational progress, his feelings about school, his social relationships with classmates, and his self-esteem. We will also observe the child's parents and their interactions with the child's teacher, school, and

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school system. They will, of course, have had no say in the child's class or grade placement.

As one cannot generalize from a sample of one, the study will be replicated with 60 children in cities, towns, and rural and remote areas across the nation.

If this proposal appalls you, rest easy. Such a study will never be undertaken. No education system would countenance it. No ethics committee would approve it.

Instead, I will report some findings from a real-life study that is ongoing and that mirrors the hypothetical study described above. This study of 60 young Australians with IQs of 160 and above is in its 22nd year, and the majority of the subjects are in their mid- to late 20s. Like the children in the hypothetical study, the majority undertook their entire schooling in classes where the average IQ was 100, at least four standard deviations below theirs. These children, and their parents, were less than happy. The education systems were unresponsive and no ethics committee raised a whisper, as this treatment is common practice in Australia, as well as in the United States.

Terman "Versus" Hollingworth

As early as 1930, Terman and his colleagues (Burks, Jensen, & Terman, 1930) in the first few years of his landmark longitudinal study of 1,528 intellectually gifted children, warned that exceptionally gifted (IQ = 160–179) and profoundly gifted (IQ = 180+) students are children at risk. They pointed out that the intellectual functioning of a 6-year-old with an IQ of 180 is on a par with the average 11-year-old, and, by the time the child has *reached* 11, his cognitive development is not far from that of the average high school graduate. Add to this the accelerated socioaffective development generally found in such children, and "the inevitable result is that the child of 180 IQ has one of the most difficult problems of social adjustment that any human being is ever called upon to meet" (p. 264).

Terman (Burks et al., 1930) had not originally intended to make a special study of the very highly gifted; his interest was spurred by the difficulties with socialization that parents and teachers reported

for these young people in adolescence and which appeared much less severe in the gifted group as a whole. In the secondary study (above), which he consequently made of subjects with IQ of 170+, Terman noted that by 1930, when the mean age of the gifted group was 14, 60% of the boys and 73% of the girls were reported as being definitely solitary or “poor mixers.”

Contemporaneously, Leta Stetter Hollingworth (1926, 1931, 1942) was engaged in what is undoubtedly the most significant and influential study of *exceptional* intellectual potential yet undertaken. Hollingworth's interest in the extremely gifted was sparked by her association with “Child E,” a boy with an IQ of 187 whose academic and social progress she followed throughout her life. *Children Above IQ 180* (Hollingworth, 1942), published posthumously, analyzed the then current and previous conceptions of intellectual giftedness; described 19 children with IQs of 180 and above reported by previous researchers; and described in remarkable detail the intellectual, academic, and social development of 12 New York children with IQs of 180 and above whom Hollingworth herself had studied over the 23 years from 1916 until her death in 1939.

Hollingworth was intrigued by the differences she noted in the cognitive and affective development of moderately and exceptionally gifted children. She defined the IQ range of 125–155 as “socially optimal intelligence” (Hollingworth, 1926). She found that while children scoring in this range were socially self-confident young people who enjoyed the friendship of age peers, children with IQs of 160 and above experienced ongoing problems of social isolation. She believed that these difficulties arose from the cognitive and affective differences between the exceptionally gifted child and his or her age peers (Hollingworth, 1931).

It has been suggested that Terman's findings regarding extremely gifted children conflicted with those of Hollingworth (Grossberg & Cornell, 1988), but this is not so. Terman recognized the difference between socialization and social adjustment. Children with IQs between 170 and 180 tended towards “solitariness,” but Terman interpreted this as a personal preference rather than the outcome of peer rejection. However, while he reported generally positive social adjustment within his highly gifted group—possibly because all but

two had been accelerated—Terman (Burks et al., 1930) noted that his findings for the children who scored above an IQ of 180 were highly congruent with Hollingworth's.

In her book on gifted children Professor Hollingworth presents case studies of a dozen children whose IQ's equal or surpass 180. The data amassed in these studies would appear to fully justify her generalization that the majority of children testing above IQ 180 'play little with other children unless special conditions such as those found in a special class for the gifted are provided. They have great difficulty in finding playmates in the ordinary course of events who are congenial both in size and in mental ability. Thus they are thrown back upon themselves to work out forms of solitary intellectual play.'

The children in our gifted group whose IQs are over 180 tend to fall into the social pattern described by Hollingworth. (pp. 173–174)

Terman (Burks et al., 1930) made the distinction between the *preference* for solitude, which he believed characterized the majority of his highly gifted group, and the loneliness imposed by peer rejection or by the absence of a congenial peer group. Like Hollingworth, he was aware that the likelihood of finding friends in the regular school setting was remote unless the child's high abilities were identified as early as possible and unless special opportunities to meet other gifted students were deliberately structured by the school or the education system.

In the 1920s and 1930s, school systems grade-advanced gifted students much more readily than they do now; by the time they graduated from high school, 10% of Terman's entire subject group had skipped two grades and a further 23% had skipped one (Terman & Oden, 1947). By contrast, the majority of the exceptionally and profoundly gifted children in the present study have been retained with age peers for the entirety of their schooling, and few of their schools have actively structured socialization opportunities for them.

The Present Study

Longitudinal comparative case studies allow us to examine differences both within subjects and between them on a range of variables throughout the period of the study. Within-subject and between-subject differences on each variable are recorded at regular time intervals. The researcher can examine changes over time; for example, fluctuations in academic achievement as the subjects progress through school and college, shifts in their attitudes towards their own abilities, and alterations in their career or life plans. Investigations may also include comparisons of the subjects' relationships with parents and siblings, the composition of their friendship groups, and the effect of various interventions on academic and socioaffective development. In the present study, this has included the effects of two "passive" interventions: the "Leave him alone; he's gifted, so he doesn't need help" response and the "Leave him alone; he's leveled out, so he wasn't gifted after all" response. I believe that in education, as in medicine, a decision to withhold treatment should be regarded as an intervention.

In contrast to studies conducted in geographically small but densely populated regions, the 60 young Australians in this study are spread over an area similar in size to the 48 contiguous states of the United States but with a population of only 21 million. Distances between settlements are vast and travel costs enormous. Face-to-face contact is not as frequent as I could wish and has been supplemented by mail, phone, and, in the more recent years, e-mail. Seven of the young people now live overseas; in five of these cases, the move was for purposes of postgraduate study on scholarships at prestigious research universities in Britain, Europe, or the United States.

Longitudinal studies are extremely time consuming, but frequent and regular contact with subjects is essential both to maintain the integrity of the study and also to minimize dropout rates, which, as Subotnik and Arnold (1994) discuss, are a consistent threat to longitudinal research. The researcher cannot ignore her subject families for several years and then expect them to welcome her "home" and kill the fatted calf! However, dropout rates are, understandably,

significantly less in small-scale than in large-scale studies; only one subject has dropped out of the present study.

As with most studies of populations that are characterized by their scarcity, this study has not employed random selection. Young people with IQs of 160 appear in the population at a ratio of fewer than 1 in 10,000. With few exceptions, I have restricted membership of the study to young people who were between ages 5 and 13 in the years 1988–1989, the period during which much of the childhood data was collected, and whose families were residents in Australia during the child's years of elementary schooling.

Given that Australia's population in the late 1980s was only 16 million, with only 1.7 million children in the 5–13 age range (Australian Bureau of Statistics, 1988), we should expect, statistically, that only some 170 children would meet the study's age and IQ criteria. It is remarkable that more than 30% of the target population has been identified. The study has no control group; a number of short-term comparative studies (e.g., DeHaan & Havighurst, 1961; Gallagher, 1958), and longer term comparative studies (e.g., Hollingworth, 1926, 1942; Janos, 1983) had already established that children with IQs of 160+ differ significantly from moderately gifted age peers on a range of cognitive and affective variables, and I wanted to follow the academic, social, and emotional development of as many young people with IQs of 160+ as I could find in the restricted population of my country.

Subject Identification

The formal commencement of the study was advertised during 1986–1987 in the *Bulletin* of the Australian Psychological Society, in the newsletters of the national and state gifted children's associations, through letters to Colleges of Education in Australian universities, through letters to psychologists in private practice, and through informal contact with colleagues across the country who had a special interest in gifted education. In 1987, I was honored with the Hollingworth Award for Research and the media publicity that ensued from this led to a considerable influx of referrals, especially from psychologists who had assessed children who scored in

the criterion range on the Stanford-Binet: L-M (SB: L-M; the version of this test then current), from parents of high-scoring children, and from teachers who believed they had extremely gifted children in their classes. By 1989, at which time the first phase of the study was reported in my doctoral dissertation, the study comprised 40 children with SB: L-M IQ scores of 160 or above. The youngest child was 4 years old on entrance to the study; the oldest was 13. (This girl, with an IQ of 180, was referred to the study by the psychiatrist who was treating her for severe depression; she had been retained with age peers in the “inclusion” classroom for 8 years without even the temporary relief of a pullout program.) An additional 20 students entered between 1990 and 2002. Children entering after 1992, the year in which Australian norms for the Stanford-Binet Revision IV became available, took the SB: L-M as a supplementary test after having ceilinged out on the Revision IV or WISC-III. From the start of the study, mental age scores were computed for children who reached the highest standard scores for their age listed on the normative tables of the SB: L-M.

It is important to recognize that even though a pleasing 30% of the theoretical population of the subjects was identified, these children represent a minority within a minority—exceptionally and profoundly gifted children whose abilities have been recognized. Equally gifted children who have been successful in concealing their abilities, who deviate significantly in their behavior and origin from Australian teachers’ expectations of gifted children, or whose abilities have been masked by learning disabilities, may be underrepresented. Research has repeatedly shown that, as in the U.S., Australian teachers generally believe that gifted children originate from successful professional families within the dominant culture. The underrepresentation of children from working class and socially deprived families among my subjects is a matter for concern.

Data Collection

Full details of the data collection appear in Gross (1993); what follows here is a short précis of the principal elements. To track their academic progress through the school years, subjects undertook

regular assessment in several school subjects, including math and reading, on standardized tests of aptitude and achievement; above-level testing was required as subjects ceilinged out on virtually all age-appropriate tests. Results were compared with teachers' assessment of the students' academic progress as recorded in the written school reports that Australian schools send home twice each year. This enabled a comparison of teachers' perceptions of the children's achievement levels against their actual achievements. As Australian teachers in the 1980s were strongly opposed to standardized testing, most had no idea of the true abilities of the study children. Serious discrepancies were noted between ability and educational response; several children who by age 10 had scored above the mean on the Scholastic Aptitude Test-Mathematics (SAT-M) were doing fourth- or fifth-grade math with their age peers while the level of the children's required reading in class and their leisure reading at home varied by as much as 7 years.

Records of physical characteristics and health were taken through childhood. A series of parent questionnaires elicited data on early childhood development; family history; and the child's reading, computer use, TV viewing, hobbies, interests, play preferences, and involvement in music and sport; these were triangulated with child questionnaires and with regular parent and child interviews. Subjects' self-esteem was assessed through the Coopersmith Self-Esteem Inventory (Coopersmith, 1981) and moral reasoning through the Defining Issues Test (Rest, 1986).

Naturally, as the young subjects have moved through adolescence into adulthood, the majority of my communication has come to be directly with them, but after 20 years their parents still share with me their perceptions of what is happening in their children's lives. This has developed informally as another form of triangulation.

Early Development of Reading

The first edition of *Exceptionally Gifted Children* (Gross, 1993) described the children's physiological, academic, and socioaffective development and their school history in childhood and adolescence. The second edition (Gross, 2004) carried their stories forward into

adulthood. This paper focuses principally on the outcomes of academic acceleration or nonacceleration; however, brief mention should be made of the early and accelerated development of reading because teachers' response to this was strongly predictive of how they would respond, in general, to the child's academic precocity.

Exceptionally gifted children appear to be characterized by the early onset of reading. This study has adopted a rather cautious definition of reading: the capacity to decode and comprehend more than five words from a printed source *without* the use of pictures as visual cues. Under this definition, more than 40 of the 60 children were reading before their fourth birthday and all but one were reading before school entry, which was generally between the ages of 4½ and 5½. While in a small number of cases the children's first teacher accommodated this, the majority were required to work with their classmates through reading readiness exercises, even though some already had reading accuracy and comprehension ages of 7 or 8. When the parents attempted to explain to the school that the child was an early reader, they were generally disbelieved. Some were met with overt hostility. When the mother of 5-year-old Richard McLeod asked his teacher if he could be permitted to skip the "reading readiness" program because he had been reading since age 2, the teacher angrily accused her of teaching the boy to read. "You leave him to me," she added. "It's my duty to pluck the tall poppies."

Outcomes of Acceleration and Nonacceleration

I believe that all the young people in this study would have benefited greatly, both academically and socially, from grade advancement, while the considerable majority would have benefited from radical acceleration. Sadly, only 17 were radically accelerated, and indeed, the majority (33 of the 60) were retained with age peers for the duration of their schooling.

Radical acceleration is defined as any combination of accelerative procedures that results in a student graduating high school 3 or more years earlier than is customary (Stanley, 1978). When thoughtfully planned and carefully monitored, as is generally the case, it is a highly successful intervention for highly gifted students who are

also socially and emotionally mature (Gross & van Vliet, 2005). Interesting and disturbing differences appear when the study cohort is examined in terms of the degree of acceleration they were permitted.

Two Examples of Radically Accelerated Students.

Christopher Otway. Chris is a young man of truly phenomenal ability. Testing on the SB: L-M one month short of his 11th birthday revealed a mental age of 22. Five months later, he scored 710 on the SAT-M. His remarkable talent in math and language was evident from his earliest years; by age 4, he was capable of fourth-grade math.

Fortunately, the principal of Chris's primary school had visited Johns Hopkins University on a Churchill Fellowship. He had met several young people from the Study of Mathematically Precocious Youth (SMPY) who had been radically accelerated and had familiarized himself with some of the research on acceleration. Accordingly, he was responsive to Chris' academic and social needs. While in Grade 1, Chris was accelerated to work with fifth-grade students for math and sixth-grade students for English. The following year he did math with seventh-grade students. This proved so successful that at the end of his second-grade year Chris made a full grade skip to fourth grade but took math with the eighth grade. By age 12, he was theoretically enrolled in 9th grade but took five subjects (physics, chemistry, English, math, and economics) with 11th-grade students 5 years older than he. He was extremely happy, loved school, and was popular with his classmates despite the difference in age.

The following year, Chris then took the rather unusual course of "repeating" 11th grade with an *additional* five subjects—English, legal studies, Australian history, accounting, and biology. This was by no means an attempt to reverse the acceleration process; it was Chris's decision because he felt he would be too young to enter university at age 13, and this alternate plan would give him a breadth of studies that would be otherwise unavailable. Chris repeated this process in 12th grade, doing twice the number of subjects spread over 2 years, and thus graduating with 10 university entrance subjects instead of 5. In both his 12th-grade years, he was one of the

top-scoring students in his state. He entered university at 16 years 2 months, graduating with Bachelor of Science (First-Class Honours) in computer science and mathematics at age 20.

Chris won a scholarship to a major British university and graduated with a Ph.D. in pure math at age 24. Since then, based in London, he works for a worldwide consultancy assisting other companies with financial strategies.

Sally Huang. Sally was born in Australia to Malaysian parents. She scored 165 on the SB: L-M at 6 years 11 months. Unfortunately, the psychologist stopped the test before Sally had reached her ceiling, and I believe her true IQ is significantly higher than this.

From her earliest years, Sally displayed phenomenal gifts in math and English. Her elementary and high schools, in a large country town, arranged a series of carefully planned and monitored grade skips coupled with subject acceleration. Sally entered second grade at age 6, fourth grade the following year, seventh grade at 9, and compacted the 6 years of high school into 4, graduating at age 13.

Sally's path through school was assisted by her math teacher and the elementary school principal, who had a strong interest in gifted education and has since earned a postgraduate degree in this field. She entered university, on scholarship, at 13½ years old, as one of the top scoring 12th-grade students in her state.

Sally's studies focused on the physical and mathematical sciences, but she also studied Chinese, Japanese, and music. She was allowed to skip first-year university math and enrolled in the science faculty's second-year pure and applied math classes. Her enrollment in university required her to move to the city, and stay, during the week, in the home of friends of her parents. This gave her access both to the social life of the university and to her family. She gained a Bachelor of Science (First-Class Honours) at 16 years 8 months, and, like Chris Otway, won a full postgraduate scholarship to a major British university.

Sally gained her Ph.D. in theoretical physics at age 21 with five publications in major journals. She participated fully in the academic and social life of the university and had many warm and supportive friendships. She speaks fluent Chinese and Japanese, is an accomplished pianist, and holds a first-dan black belt in Tae Kwon Do.

The following year, at a major European university, she completed a postdoctoral MBA aimed specifically at postgraduates with a science and engineering background and in 2004 accepted a management appointment with the firm in which she did her internship.

Sally is certain that acceleration has brought her nothing but benefits:

If I had *not* been accelerated, I feel sure that I would have become quite frustrated, as indeed I often did at various stages and still do when I attend things like mixed-ability language classes. . . . But the frustration in that case would have been prolonged and severe, having a detrimental effect not only on my love for learning but also on me as a person. Given the existing educational framework, acceleration was the best option for my particular situation, and I certainly don't feel that I've suffered any ill effects as a result; indeed, all the effects have been beneficial. But this is only because of the support and watchful eyes that were kept trained on my progress academically and as a person all throughout.

Young People Who Have Been Radically Accelerated. Surprisingly, given the wariness with which Australian teachers regard acceleration, 17 of the 60 young people were radically accelerated. None has regrets. Indeed, several say they would probably have preferred to accelerate still further or to have started earlier. Lubinski, Webb, Morelock, and Benbow (2001) report similar findings from a study of profoundly gifted SMPY accelerands.

Some of the children had an unfortunate start to school before their abilities were recognized; others were fortunate enough to enroll in schools where a teacher or school administrator recognized their remarkable abilities and almost immediately argued for a strongly individualized program. In every case, these young people have experienced positive short-term and long-term academic and socioaffective outcomes. The pressure to underachieve for peer acceptance lessened significantly or disappeared after the first acceleration. Despite being some years younger than their classmates, the majority topped their state in specific academic subjects, won prestigious academic prizes, or represented their country or state in Math, Physics,

or Chemistry Olympiads. The majority entered college between ages 11 and 15. Several won scholarships to attend prestigious universities in Australia or overseas. All have graduated with extremely high grades and, in most cases, university prizes for exemplary achievement. All 17 are characterized by a passionate love of learning and almost all have gone on to obtain their Ph.D.s.

In every case, the radical accelerands have been able to form warm, lasting, and deep friendships. They attribute this to the fact that their schools placed them, quite early, with older students to whom they tended to gravitate in any case. Those who experienced social isolation earlier say it disappeared after the first grade skip. Two are married with children. The majority are in permanent or serious love relationships. They tend to choose partners who, like themselves, are highly gifted.

Two-year accelerands. The five young people who accelerated by 2 years report as much, or almost as much, personal satisfaction with their education as do the radical accelerands although, like the radical accelerands, the majority say they would have liked to have been accelerated further. Only two have taken Ph.D.s, but the remaining three have taken Bachelor Honours (research) degrees. Like the radical accelerands, they have entered professional careers, many of which utilize their remarkable abilities in math and the sciences.

In general, they have enjoyed satisfactory personal and love relationships. However, those who were retained with age peers until fourth grade or later tend to find socializing difficult. Exceptionally and profoundly gifted students should have their first acceleration in the early years of school before they experience the social rejection that seems to be a significant risk for such students retained in mixed-ability classes. The skills of friendship building are first learned in the early years of school, and children who are rejected by their peers may miss out on these early and important lessons in forming relationships.

Subjects accelerated by one year. The five young people who were permitted a single grade advancement are not deeply satisfied with their education. Their school experience has not been happy, and they would have dearly loved to have been accelerated further. After

the euphoria of having new, challenging work, school became just as boring as it had been before the acceleration.

These children's schools had been reluctant to accelerate them and were afraid that, while the grade skip had been successful, further acceleration might lead to social or emotional damage in later years. In two cases, the school told the children's parents that they were concerned for the self-esteem of other students because the accelerated student was performing so much better than they were!

This group has tended to take undergraduate degrees and stop there. Because they have not had the experience of pitching themselves successfully and over a period of time at work that is truly challenging and demanding, they have no idea of the full extent of their capacities. Perhaps because of this, they have tended to enroll in undemanding academic courses and have consequently found university intellectually unchallenging. It is with this group that a serious dissatisfaction with friendships and love relationships starts to appear. Two have had severe problems with social relationships.

Subjects Not Permitted Acceleration. The remaining 33 young people were retained, for the duration of their schooling, in a lockstep curriculum with age peers in what is euphemistically termed the "inclusion" classroom. The last thing they felt, as children or adolescents, was "included." With few exceptions, they have very jaded views of their education. Two dropped out of high school and a number have dropped out of university. Several more have had ongoing difficulties at university, not because of lack of ability but because they have found it difficult to commit to undergraduate study that is less than stimulating. These young people had consoled themselves through the wilderness years of undemanding and repetitive school curriculum with the promise that university would be different—exciting, intellectually rigorous, vibrant—and when it was not, as the first year of university often is not, it seemed to be the last straw.

Some have begun to seriously doubt that they are, indeed, highly gifted. The impostor syndrome is readily validated with gifted students if they are given only work that does not require them to strive for success. It is difficult to maintain the belief that one can meet and

overcome challenges if one never has the opportunity to test oneself.

Several of the nonaccelerands have serious and ongoing problems with social relationships. These young people find it very difficult to sustain friendships because having been, to a large extent, socially isolated at school, they have had much less practice in their formative years in developing and maintaining social relationships. Six have had counseling. Of these, two have been treated for severe depression. If educators were made responsible to ethics committees, as are researchers, such developmentally inappropriate educational misplacement would never be permitted.

Factors Influencing Schools' Decisions to Radically Accelerate Students

In the 20-year update of this study (Gross, 2004), I commented that possibly the greatest gift we can give to a gifted child is a teacher who recognizes the gift, who is not threatened by it, but rather rejoices in it and works with joy to foster it. The majority of children who were radically accelerated benefited from the guidance, support, and friendship of such a teacher. Perhaps unsurprisingly, in many cases these teachers had a preexisting interest in gifted children or, in a few cases, academic qualifications in gifted education. This echoes the findings of Southern, Jones, and Fiscus (1989) who noted that educators with professional or personal experience of acceleration had more facilitative attitudes towards acceleration than those who had not.

The considerable majority of radical accelerands have extraordinary abilities in mathematics that were evident from the earliest years of school. At 5 years 5 months, Roshni tested at the 99th percentile for 7-year-olds on a standardized test of math achievement; her school responded by accelerating her to second grade. By fourth grade, at age 7½, she was taking math with the sixth-grade students. She entered university at age 15. Hadley taught himself to add, subtract, multiply, and divide before school entry, and at 7 years 9 months tested at the 78th percentile for 12-year-olds. He scored 730 on the SAT-M at 11 years 8 months, and at age 9 entered seventh

grade, where he promptly topped his year of 125 students in math. He achieved three university degrees by age 20 and has a successful career as an actuary. Adrian, who by age 4 could multiply two-digit numbers by two-digit numbers in his head, scored 760 on the SAT-M before his ninth birthday, by which time he had graduated from elementary school and was enjoying dual enrolment in secondary school and university.

By contrast, equally gifted children whose most visible talents lie in English are much less likely to be significantly accelerated. Jade, who was talking in sentences before her first birthday and who at 5 years 2 months of age obtained a mental age of 9 on the SB: L-M, was allowed early entrance to school but was offered no further acceleration or even enrichment. Her school experience, academically and socially, has been deeply unhappy. The psychologist who tested Rufus on the SB: L-M at age 5½ (his IQ was 168, at the test ceiling for his age) assessed his reading at a 10-year-old level. His only educational provision in elementary school was a short-lived pullout program, and he has never been accelerated.

Hollingworth (1931) pointed out that “society attends to that which is socially annoying. The school attends to those who give it trouble” (p. 3). Schools too often assume that exceptional ability in language can be fostered purely through an open-ended curriculum. Additionally, when elementary school children who are ardent readers finish their work early, teachers tend to allow them to “read quietly” rather than provide appropriate enrichment. The mathematically gifted child, however, gives the school more “trouble.” The teacher is unlikely to suggest that these students construct math problems to keep themselves occupied (she would then have to mark them!); consequently, the school is more likely to establish structures within which their progress can be guided and monitored. Additionally, school-based math tends to be more linearly structured than English, and, from the teacher’s point of view, math performance may be easier to judge, there being fewer “shades of grey” in students’ responses. Teachers may feel it is easier to accelerate students through math because the pathways are more clearly defined.

Despite their visible exceptionality in math, the radical accelerands are what their teachers would probably call “well-rounded.”

They have a wide range of interests that are socially acceptable within the Australian culture. Roshni is a talented actress and has performed professionally. Hadley, Chris, Roshni, and Sally excel at sports. Roshni, at age 5 but in the second grade, swam as well as the majority of her classmates. Sally gained her first-dan black belt in Tae Kwon Do at age 12. At age 14, Hadley captained the under-16 soccer team, and in 12th grade (age 15,) he played on the school's elite cricket team, which toured England, playing against a range of English schools. Chris captained and played in several sports teams at school and university. The majority of the radical accelerands are musically talented. All are humorous and quick-witted, and all deeply enjoy socializing with friends. They have been forgiven for being intellectually gifted because they displayed a range of interests that their classmates and teachers could readily relate to and feel comfortable with. Schools were much more reluctant to accelerate equally gifted students whose interests were more esoteric, like Ian who, by age 5, had developed a consuming passion for cartography and Fred who, by 11, was reading psychology textbooks. Both spent their first 5 years of school with age peers in the mixed-ability classroom

Interestingly, teachers also appear to be much less threatened by exceptionally gifted students who have accelerated by more than one year. Their academic achievements can now be viewed against the performance of children 2 or more years older, and paradoxically, appear less out of the ordinary. Additionally, the students now require less curricular differentiation and are therefore easier to teach. Teachers find their presence in the class less of an irritant.

Acceleration and Self-Esteem

The Coopersmith Self-Esteem Inventory, which the subjects completed in childhood and adolescence, measures self-esteem along four factors: home/family, academic, social, and general. The young people in this study enjoy close and loving family relationships, and the majority scored at, or close to, the ceiling on this subscale. General self-esteem, likewise, was almost universally positive. However, substantial differences appeared in academic and social

self-esteem between subjects who had been accelerated by 2 or more years and those who were accelerated by only 1 year or retained with age peers.

The social self-esteem of subjects who had been substantially accelerated was at least one standard deviation above the mean for their age. These young people were happily learning and socializing with students at least 2 years older with whom they had more similarities than differences. They were liked and accepted; indeed some, like Hadley, had developed as social leaders. Social self-esteem was particularly high for subjects who had earlier been deeply unhappy with age peers and had subsequently been accelerated. “Kindergarten and Year 1 were a slow death,” says Anna. “I came alive when I skipped to Year 3, and the second skip to Year 5 was like getting to heaven. I had friends for the first time—kids who shared my quirky sense of humor, people who laughed *with* me, not *at* me.”

By contrast, the social self-esteem of one-year accelerands and nonaccelerands was low, and in many cases, disturbingly low. Ian, the cartographer, who ceilinged on every subtest of the WISC-III and later was assessed on the SB: L-M with a mental age exactly twice his chronological age, was deeply unhappy with age peers and scored 1.97 standard deviations below the mean. Anastasia, who had been advanced by one grade but who was still socially rejected, scored 2.59 standard deviations below.

Differences were also noted in the academic self-esteem of substantially accelerated subjects and the one-year and nonaccelerands. While the academic self-esteem of almost all subjects during the elementary and early secondary school years was above the mean for their age peers, it was the nonaccelerands who scored more than one standard deviation above the mean. By contrast, subjects accelerated by 2 or more years have positive but moderate self-esteem—specifically, between the mean for their age and .7 of a standard deviation above.

In a critique of this study, Marsh and Craven (1998) claimed that while the academic self-esteem scores of nonaccelerands were “realistically high,” the more modest scores of the accelerands were a function of the big-fish-in-the-little-pond effect (BFLPE)—a predicted dip in academic self-esteem arising from the change in class

ranking that may occur when a gifted child is accelerated to be with older students or is placed in an ability-grouped setting.

Earlier in this paper, exceptionally gifted students retained in the regular classroom were compared to children of average intellectual ability who have been placed with age peers with IQs of 40 or below. The average child would excel academically without effort in such a setting and her academic self-esteem might well be high; however, it would derive from a completely invalid comparison. Equally, the academic self-esteem of students with IQs of 160+ can hardly be called “realistic” when it derives from a comparison of their performance against age peers whose cognitive ability is four or more standard deviations below theirs.

The BFLPE theory rests on the assumption that gifted students’ class ranking will change with their new placement, yet this did not happen for the majority of subjects in this study. Children and adolescents who were accelerated compared their achievements against older students, and they *still* outperformed their classmates! Gena Leung completed her university entrance math qualifications at age 13, topping her school despite being at least 4 years younger than the other candidates. Chris Otway ceilinged on the university entrance math test at age 14. Sally entered university at 13 as one of the top high school graduates in her state. Hadley topped his year of 125 seventh-grade students in math despite being the youngest by a margin of 3 years. Roshni, a fourth-grade student at age 7, was in the top ability group in every subject. Sean was dux (highest scoring student) of his elementary school at age 9. Because, according to Marsh and Craven (1998), the BFLPE depends on a change in academic ranking, it was patently *not* operating with these young people.

I believe the positive, but not inflated, academic self-esteem of students who were substantially accelerated may originate from something quite different. In a study conducted during the 1990s, I noted that academically gifted students were significantly more likely than age peers of average ability to possess a task-involved, rather than ego-involved, motivational orientation (Gross, 1997). The modest academic self-esteem of substantially accelerated students may not, therefore, have been associated with the ego-involved process of wanting to outperform their older classmates (become a

very *visibly* big fish in a little pond), but with the task-involved goal of wanting to master the more challenging work they were now presented with.

William James (as cited in Campbell, 1984) proposed that self-esteem derives from a comparison of one's performance against one's expectations of how one *should* perform. Substantial acceleration allows exceptionally gifted children to realize, often for the first time, the full extent of their abilities and therefore what they can *realistically* expect of themselves. Their moderate levels of self-esteem reflect a realization of how far they still have to go if they are to become all that they can be.

In this study, academic self-esteem in childhood has not been shown to be predictive of academic success in adolescence or adulthood. However, both the formation of good social relationships at university and later success in professional occupations that involve close and productive teamwork have been more reliably predicted by healthy social self-esteem in childhood.

Lessons Learned From the Study

Issues of Multipotentiality

Multipotentiality is best defined as the possession of a range of abilities of such an order that the individual is capable of succeeding *at extremely high levels* in several fields (Colangelo, 2003). It should not refer simply to the possession of multiple interests. A significant advantage of longitudinal studies is that the researcher can trace, through an individual's childhood, adolescence and young adulthood, the development or underdevelopment of relative talent areas and the reasons for these discrepancies.

Multipotentiality was clearly apparent in many of the subjects of this study in the early years of school. As discussed earlier, most of the children ceilinged out on age-appropriate tests of academic ability and achievement in most elementary school subjects. It was only when above-level testing was applied that relative "peaks and higher peaks" became apparent (Gross, 1993, 2004). Follow-up studies of young

people in the various SMPY cohorts have found the same phenomenon (see, e.g., Achter, Lubinski, & Benbow, 1996). It is important that we do not misinterpret *multipotentiality* as *equipotentiality*.

Ironically, in many cases, the academic fields in which the young people came to specialize were not dictated by the student's area of greatest talent or even by his or her own "passion area." Rather, specialization was generally dictated by what the school's *teaching staff* viewed as the most important of the student's multiple talents. In cases where students showed outstanding ability in both math and the humanities, they were almost invariably encouraged to accelerate in math and were thus "steered" into math specialization; reasons for this are discussed above. Sometimes the practices through which teachers manipulated this were less than admirable. When, at age 11 years 4 months, Chris Otway scored 710 on the SAT-M and 580 on the SAT-V he was astonished by his verbal score and asked me to have the test rescored. "I couldn't have done as well as that," he told me. "The teachers reckon I'm just average in English."

During the late 1980s and early 1990s, Australian educators were strongly influenced by Gardner's multiple intelligence theory (MI), which encouraged the perception of human abilities as discrete or quasi-discrete (Gardner, 1983). Before this time, teachers observing a student with outstanding potential in one cognitively mediated subject, such as math, would have been philosophically open to the idea that this might indicate superior ability in other academic subjects. Now, however, many adherents to MI theory assumed that the field in which a child's talent was most readily observed was that child's "intelligence"—and ceased to look further. The strong egalitarian sociopolitical focus of the times (see Gross, 1993) did not help; heaven forbid that a bright child should possess more than her "fair share" of talent.

In many cases, subjects followed their alternate passions outside school. Chris, aged 12, while taking five subjects with 11th-grade students, was devouring Dickens, the Brontës, Thomas Hardy, and a range of the more "serious" science fiction authors. When he enrolled in university shortly after his 16th birthday, he joined the science fiction club and was promptly elected to the committee. Sally Huang, who entered university at age 13, and Jonathan Otway, Chris's

younger brother who accelerated by 2 years, were able to pursue their passion for music outside their academic program. While justifiably proud of his academic successes (he completed his Ph.D. in artificial intelligence and now holds a research position at a British university), Jonathon, a talented pianist, recounts as one of the peak experiences of his life playing Gershwin's *Rhapsody in Blue* to an audience of 200; one of Sally's peak experiences was giving a recital on the great organ in the chapel of the famous English university college where she obtained her Ph.D.

I most certainly am *not* suggesting that we should not accelerate students in their areas of special talent; however, we should not require young people with multiple talents to make decisions regarding specialization before they have explored possible pathways through which several of their talents might be optimized. It was Chris Otway's awareness of this that led him to take the last 2 years of high school over 4 years rather than 2, broadening his range of subjects from 5 to 10.

When I was a young teacher, the slang word for a highly gifted kid was "a whiz" (e.g., "She's a math whiz." or "He's a science whiz.") Far from supporting the multiple intelligences theory of discrete abilities, the subjects of this study are "g whizzes."

The Necessity for Early Identification and Placement

Hollingworth (1942) reported that, in her longitudinal study of profoundly gifted young people, the most successful interventions occurred when the children were identified earlier, rather than later, in their elementary schooling and were either accelerated or placed in a class with other gifted children. She claimed that it was between the ages of 4 and 9 that the social difficulties experienced by children with IQs of 160+ were most acute.

The present study mirrors Hollingworth's (1942) findings. The seeds of what happened in later childhood, adolescence, and adulthood have been sown in the first 3 years of school. Many of the young people in this study who experienced social rejection in these early years deliberately underachieved for peer acceptance through much of their school career. Some deliberately moderated their perfor-

mance in the hope that it would make them more acceptable to their class teachers. Ian Baker, who a month before his sixth birthday was assessed with the reading and comprehension skills of a 12-year-old, developed what he called his “camouflage vocabulary” in an attempt to blend in. It mimicked, with disturbing fidelity, the vocabulary and syntax of his 5-year-old classmates.

Several of the nonaccelerands cannot recall a time in their lives when camouflage has not been an automatic survival mechanism, accepted as a painful but necessary part of living. By contrast, young people in this study who were accelerated by 2 or more years believe that they were now more appropriately placed in terms of their academic, social, and emotional needs.

In both Australia and the United States, schools tend to delay acceleration and ability grouping until the middle years of elementary school. This policy is fundamentally flawed. It is in the early years of school that we should be identifying exceptionally and profoundly gifted children and developing programs of acceleration and grouping to provide a more effective response to their accelerated intellectual and emotional development.

The earlier exceptionally and profoundly gifted children are placed in a setting that is deliberately structured to allow them access to children at similar stages of cognitive and affective development, the greater will be their capacity to form sound friendships in their later childhood, adolescent, and adult years.

For Roshni, who entered university at 15 and won major prizes in her first and third years, academic success still takes second place to social acceptance:

I cannot even begin to imagine how desperate I would have felt to be left with my age peers. The best way to describe how I anticipate I would have felt is to say that if I hadn't accelerated I would have suffocated. . . . My entire life and happiness revolve around my satisfaction in personal relationships. That is why, as a child, the hostility of the other children had such a devastating impact on me.

Alice Marlow, even after a grade advancement, found much of her primary and secondary schooling unrewarding. It was “not done”

to speak of, or take visible pleasure in, academic success. She spent much of her time conforming to the culture of the school, “talking down,” and concealing her grades so that the other students would not feel bad. A second acceleration gave her access to more challenging work and a small group of academically gifted classmates. The following year, in law school at university, she felt she had finally come home.

There is such a sense of belonging. I didn’t have that in primary or high school, but here it’s such a joyful interaction. It’s not just being interested in the same things, it’s being *passionate* about the same things. Everything I hoped to find is here—intellectual and emotional growth—an ongoing sense of discovery—it’s world-expanding.

As educators, our goal should be to expand, rather than constrict, the academic and social worlds of gifted students, including the most highly gifted. Radical acceleration can provide a structured pathway to a developmentally appropriate placement.

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