

Radical acceleration and early entry to college: A review of the research

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"Few educational interventions have been as comprehensively studied as acceleration and few have acquired as compelling a body of empirical evidence for their success. Acceleration was one of the few educational procedures endorsed by Shore, Cornell, Robinson, and Ward (1991) in their comprehensive analysis of research in gifted education as being strongly validated by research. Yet, many educators are wary of possible ill effects of acceleration, citing fears for both the intellectual and affective well-being of students (Daurio, 1979; Southern, Jones, & Fiscus 1989). Particular concern is expressed when the acceleration under consideration is radical, that is, it employs a range of procedures leading to school graduation 3 or more years earlier than usual."

ABSTRACT

Radical acceleration is a successful, yet rarely utilized educational practice that assists educators in meeting the cognitive and affective needs of highly gifted students. Individual case studies and cohort studies of students who have radically accelerated are reviewed regarding combinations of procedures that result in successful acceleration, variables that appear to predict success and cognitive and affective outcomes. While research supports the use of radical acceleration for the positive cognitive and affective gains that result for highly gifted students, some concerns about the process have been identified. An outline is presented of procedures that have been shown to lessen the likelihood of unfavorable outcomes. These procedures include counseling support, study skills programs, and opportunities to foster social interaction with other students. The literature concerning radical acceleration strongly supports the wider adoption of this most successful intervention.

Few educational interventions have been as comprehensively studied as acceleration and few have acquired as compelling a body of empirical evidence for their success. Acceleration was one of the few educational procedures endorsed by Shore, Cornell, Robinson, and Ward (1991) in their comprehensive analysis of research in gifted education as being strongly validated by research. Yet, many educators are wary of possible ill effects of acceleration, citing fears for both the intellectual and affective well-being of students (Daurio, 1979; Southern, Jones, & Fiscus 1989). Particular concern is expressed when the acceleration under consideration is radical, that is, it employs a range of procedures leading to school graduation 3 or more years earlier than usual.

PUTTING THE RESEARCH TO USE

Radical acceleration addresses the needs of students who can move at an extremely fast pace through the prescribed school curriculum. Where IQ is cited, these students are, in general, exceptionally (IQ 160-179) or profoundly (IQ 180+) gifted. They tend to be significantly more mature in their affective development; many prefer the company of

older children and adults to that of their age peers. When schools retain such students with age peers, they typically underachieve and experience negative affective outcomes, including lowered self-esteem, anxiety and serious demotivation.

Interventions limited to enrichment and moderate degrees of acceleration tend to be unsuccessful either for reversing underachievement or for improving affective well-being. Schools should be aware of the wide range of accelerative procedures that can be combined to radically accelerate gifted students. Programs of cohort acceleration provide access to a supportive group of age and ability peers undertaking similar educational programs. Dual enrollment at school and college can assist students in developing skills necessary for successful college study. Precollege counseling can assist students in gaining a realistic understanding of what college will involve. Schools should evaluate gifted students' intellectual ability, academic readiness, and emotional maturity when considering any form of acceleration. However, many exceptionally gifted students experience social isolation in the inclusion classroom. This should not be misinterpreted as a lack of social skill or emotional immaturity; rather, it may indicate that the student would be better placed in an accelerated setting.

The term "radical acceleration" was first employed by Stanley in an address to alumni of Johns Hopkins University, later published in *Gifted Child Quarterly* (Stanley, 1978a), in which he described the remarkable progress and achievements of several young people who had entered JHU 3 or more years earlier than usual. However, it is often feared that radically accelerated students will lose interest in their area of talent and "burn out" or that they will suffer from significant gaps in their academic or social knowledge (Robinson, 1983).

A recent review of international research on the radical acceleration of highly gifted students analyzed more than 70 publications. Most were located through searches of the ERIC, Expanded Academic ASAP, Social Sciences Index, and PsycInfo databases. Others were generously sent to the authors by experts in the field of gifted education. They included research papers, descriptive articles, personal accounts, literature reviews, conference papers, book chapters, and a guidebook for investigating early college options.

Research papers outline individual case studies, multiple case studies, cohort studies, and biographical accounts. Some studies are longitudinal in nature, while others offer short-term, cross-sectional, and comparative studies. Data-collection procedures include questionnaires, surveys, interviews, tests of achievement, tests of ability, personality and self-esteem inventories, and measures of social adjustment. Other sources present the personal experiences of educators involved in programs for radical acceleration and include discussion about educational frameworks and theoretical rationales that support programs for radical acceleration.

Research concerning radical acceleration is limited, reflecting its underusage. Much of the research consists of case studies of small numbers of participants, introducing the possibility of selection bias (Olszewski-Kubilius, n.d.). Even so, such an approach is

particularly suited to studying infrequent events or small populations such as the small subgroup of gifted students who have radically accelerated (Cox, 1926; Gross, 1992, 2003; Hollingworth, 1942). In fact, studies of such students illustrate the impressive positive academic and affective gains and uncover areas in need of further investigation (see Charlton, Marolf, & Stanley, 1994; Kelly, 1985). However, several important large-scale studies have been conducted within the Study of Mathematically Precocious Youth (SMPY) in which significant longitudinal research addressing educational and affective outcomes has been progressing for more than three decades (for example, Lubinski, Webb, Morelock, & Benbow, 2001).

A smaller number of studies examine cohort acceleration, where structured groups of students undertake a joint acceleration program, usually early entry to university or college. Many such studies originate at sites where there is an established early entrance program, such as the University of Washington and California State University, Los Angeles (Gregory & Stevens-Long, 1986; Robinson & Noble, 1992).

A Brief International Overview

By far, the majority of publications addressing radical acceleration originate in the United States, suggesting a higher prevalence of radical acceleration there than in any other country. This situation may, however, equally reflect other factors, such as limited opportunities for effecting and publishing research concerned with gifted education in other locations. There are some reports outlining case studies of radical acceleration in Australia (Gross, 1986 et seq.; Vialle, Ashton, Carlon, & Rankin, 2001), and more recently, a number of publications have documented radical acceleration in China and Korea, with a smaller number outlining the process as it is practiced in Europe (Nowicka, 1995; Robinson, 1992; Roland, Joswig, & Balogh, 2000; Wu, 1991; Zhao, 1996). While studies exist from other parts of the world that describe and document acceleration programs--including Ireland, Italy, Japan, and Russia--these programs do not readily allow for radical acceleration (Comuman, 2000; Cooper, 1999; Gilheany, 2001; Khaladjan, 1993).

It has been suggested that nations make decisions about providing programs for acceleration based on prevailing sociopolitical and cultural values (Comunian, 2000; Gallagher, 1984), rather than on educational or psychological grounds. For instance, in Israel, enrichment strategies have traditionally been favored over educational acceleration (Donoghue, 1999), reflecting the belief that gifted children, while encouraged to fulfill their potential, should not be seen as being too different from their peers; that is, they should "conform to the group rather than reveal individuality" (Burg, 1992, p. 218). In Hong Kong, the concern has been for "equity rather than excellence," with limited educational resources being directed toward "groups with special needs... the sensory impaired, the mentally handicapped, and the learning disabled," rather than toward services for gifted students (Chan, 1998, p. 154).

Australia

A 20-year longitudinal study has documented the childhood, adolescence, and young adulthood of 60 exceptionally and profoundly gifted young Australians (Gross, 1993, 2003). This study found significant sociopolitical and educational opposition to acceleration within the Australian educational community, particularly in the 1980s when the majority of participants were in elementary school. For this reason, only a minority of the study participants were allowed to radically accelerate (Gross, 1993). The 17 young people who did so used various combinations of early entry to school, subject and grade skipping in elementary and high school, and early entry to university. In part because of the wariness with which acceleration was regarded in Australia until quite recently, the participants' programs were carefully monitored by both their schools and their families. In every case the radical accelerands, who are now in their 20s, report high levels of satisfaction with both the academic and socioaffective outcomes of their acceleration programs (Gross, 2003).

China

Radical acceleration has been a focus for programs for the education of gifted and talented students in China since 1978, when government policy concerning gifted and talented education was formalized. A highly successful early entry program at the University of Science and Technology of China (USTC) commenced in that year, has since been replicated at 12 other universities, and has led to high school programs of acceleration and enrichment that serve as preparation for early university enrollment (Liu & Barnhart, 1996). Students enter university 3 or more years earlier than usual, the youngest accelerand having entered at age 11. Students apply for entry on the basis of high achievement in school-based academic tournaments or through teacher, parent, or self-nomination; they then sit for a series of rigorous examinations set by the university.

The majority of early entry students achieve exceptional results during their time at USTC, and many are later accepted into graduate programs, with a growing number being accepted into overseas universities. One student began his assistant professorship at the age of 19, making him the youngest university faculty member in China. Such successes have encouraged strong public recognition of the USTC programs.

In 1991, the People to People Seminar in Gifted Education allowed teachers, administrators, psychologists, and researchers from across the world to interface with their counterparts in China to create a professional and cultural exchange of knowledge. The resulting publications raised international awareness of the remarkable expansion of gifted education in China over a surprisingly short period of time. Sisk (1992) drew some interesting evaluative comparisons between provisions for gifted students in China and provisions in the United States, pointing out the Chinese government's wide support for gifted education programs. Robinson (1992), in a separate visit, received equally positive impressions of the Chinese initiatives.

Zhao (1996) presented a thoughtful retrospective account of her own personal experiences as a Chinese student who was radically accelerated. In 1985, she enrolled in one of the USTC's early entry programs at age 13. She detailed her academic, social, and emotional life at university and concluded that, despite some minimal regrets concerning the limited range of subjects taught and the need for greater concern regarding the social and emotional needs of students, the program was beneficial and memorable.

Taiwan

The growth of gifted education in Taiwan since 1962 has been remarkable, expanding from special programs in only two elementary schools to programs in most elementary and high schools, as well as in many universities (Wu, 1991). Academic acceleration, including radical acceleration, for intellectually gifted students is widely supported and available. Enrichment opportunities are also commonly available in most government schools. Special schools cater to students talented in fine arts, music, dance, and athletics. The government encourages provisions for gifted education by supporting curriculum design, teacher training, resource acquisition, and research. Research arising from these programs has focused mainly on cognitive outcomes and shows impressive academic gains for students who have radically accelerated. Wu suggested, however, that future research on radical acceleration should be directed at issues concerned with socioaffective development.

Poland

In Poland, the social and educational reform conducted during the early 1990s in response to a move toward social democratization actually facilitated the development of provisions for educational acceleration, including early entry to school, grade skipping through elementary school and secondary school, and early admission to university (Nowicka, 1995). The Creative Schools Association and the School of Talents in Wroclaw offer individualized accelerated instruction, including Advanced Placement college courses. Such provisions have led to a significant number of students radically accelerating. One highly gifted young man who won first prize in the Mathematical Olympiad was permitted to complete high school in 2 years. He entered college at age 14, graduated at 19, and commenced independent research.

It is notable that, in places where radical acceleration is regularly practiced and evaluated, both the researchers investigating these programs and the accelerands themselves report strong positive outcomes and urge that greater numbers of highly gifted students be permitted this form of intervention.

Individual Case Studies

Case study research can provide a valuable perspective on the impact of radical acceleration not only on the gifted student, but also on his or her parents, siblings, and teachers. The triangulation of data, while enhancing reliability, also facilitates the

exploration of important factors influencing the success of radical acceleration, including the personal attributes of the student, relationships between student and family, and the influence of teachers, mentors, and counselors. Longitudinal case studies allow in-depth explorations of the interactions between a range of cognitive, affective, and environmental variables. Students' personal accounts of their experiences of radical acceleration may highlight new issues for consideration and, in some cases, inform changes to teachers' attitudes toward acceleration and to schools' educational programs.

The Importance of Family Support

A substantial proportion of the earliest research in gifted education comprised retrospective case studies of individuals whose remarkable intellectual, artistic, or leadership ability in childhood flowered into truly remarkable productivity and influence in adulthood. Many of these studies paid particular attention to the influence of parenting and family support. From his studies of the achievements of members of prominent British families, Galton (1869) concluded that the prime determinant of intellectual functioning was heredity. Contrary to the later claims of his detractors, however, he also readily acknowledged the impact of demographic and environmental variables in the development of youthful potential into adult productivity. In *Hereditary Genius: An Enquiry Into Its Laws and Consequences*, Galton discussed the socioaffective influences of both birth order and the traditional place in British society accorded to eldest sons. He noted that firstborn children were more likely to be treated as companions than subordinates by their parents, that they tended to be given family responsibilities--and indeed social responsibilities--at an earlier age, and that these factors could combine to facilitate talent development and increase the likelihood of their emergence as social leaders.

Many of the remarkable individuals whose careers were recorded by Galton (1869) were educated at home, which facilitated a much more sophisticated educational curriculum and much speedier progress than would have been possible in a conventional schoolroom setting. Indeed, many of these young people were radically accelerated and entered university at age 14 or younger. Cox's (1926) remarkable retrospective study of the childhood and youth of 300 of the most eminent individuals of history, which was planned as a parallel study to Terman's (1925) initial investigation of gifted schoolchildren in California and consequently focused on early indications of unusual precocity, likewise found that many of these highly productive adults, whether they were educated wholly or partly at home, entered university at remarkably early ages. Cox employed a procedure that she developed in association with Terman to estimate the intellectual status in childhood of the historical figures in her study. Of the 20 individuals for whom she estimated a childhood IQ of greater than 160 and for whom relevant educational details are known, fully 14 completed their high school education and entered university at age 15 or younger. Cox considered the influence of family and upbringing so important in the development of these remarkable young people that it comprises the first section of each of the 300 biographies included in her book.

Admittedly, the subjects of the Galton (1869) and Cox (1926) studies were selected on the basis of their remarkable lifetime achievements; equally gifted individuals who did not achieve remarkable adult productivity were not reported. It is notable, however, that the young people who progressed speedily through school certainly do not seem to have suffered from the experience, either academically or emotionally. This being so, it is perhaps ironic that much of the societal wariness of early radical acceleration and, in particular, early entry to university should have been fueled by the tragic and sensationally publicized case of William James Sidis, a young man whose ambitious and domineering father courted ongoing media documentation of his son's astonishing abilities and his accelerated educational program, which was designed and conducted by the father himself. The media frenzy surrounding Sidis' youthful successes and subsequent public academic failure at Harvard devastated the young man. He dropped out and lived as a virtual recluse, changing jobs frequently and dying alone at a relatively young age.

The critical importance of family support is highlighted in a frequently referenced comparison study of Sidis and a second prodigy, Norbert Wiener, for whom radical acceleration led to very different outcomes (Montour, 1977). Both men had dominant fathers who pressured their sons to achieve. However, while Sidis was completely home-schooled, Wiener attended public school for a period of time and learned to form relationships with other children and adults. While Sidis' father emphasized his son's difference from his age peers, Wiener's father made a point of stressing his son's normality. In contrast to Sidis, Wiener's father protected his brilliant son from excessive media attention.

The two boys entered Harvard in their early teens and were university colleagues. However, while Wiener was popular with students and teachers, Sidis appeared socially immature and lacked social adaptability. Wiener achieved excellent grades and settled easily into academic life, whereas Sidis had difficulty adjusting to its academic and social demands. While Wiener married a supportive woman who, he said, helped him to attain independence from his family, Sidis seemed unable to sustain an adult relationship; Montour postulated that this may have been due to emotional immaturity arising from the lack of emotional support in childhood. She suggested that Wiener was able to make the transition from father-dominated infant to self-identifying adult, whereas Sidis was not able to shed the mantle of his father.

The importance of parental support is reinforced by the positive outcomes arising from the radical acceleration of Colin Camerer, an exceptionally gifted young man whose progress was monitored through the Study of Mathematically Precocious Youth (SMPY) at Johns Hopkins University (Holmes, Rin, Tremblay, & Zeidin, 1984). Colin attributed the success of his program, which included enrolling in college at age 14 with 34 credits and sophomore standing, to ongoing support and encouragement from his parents and other adults, including Dr. Julian Stanley, who served as friends and mentors. It is also significant that Colin himself possessed a strong motivational drive for achievement and a keen interest in radically accelerating his education. By the time he was in second grade, he was completing fourth- and fifth-grade work with high levels of success and

keen enjoyment. He then skipped seventh grade, completed studies in precalculus in 120 hours of Saturday morning "speeded-math" classes, and finally skipped the last year of junior high and the first year of senior high. He completed his Ph.D. in behavioral decision theory at age 21 and accepted a position as an assistant professor of business policy at the Kellogg Graduate School of Management at Northwestern University.

Camerer holds strong positive views of his radical acceleration. He commented that, if he had been held to lockstep progression through school with age peers, he would paradoxically have developed an unrealistically modest perception of his abilities and would probably have entered a low-level management position (Holmes et al., 1984). He insists, however, that it is important for students to be emotionally stable before any form of acceleration is considered.

Australian prodigy Terry Tao, who gained his B.S. at age 15, M.S. at 17, and Ph.D. at age 21, was appointed to a full professorship in a major U.S. university at age 24 and is regarded as one of the leading mathematical minds of his generation. Like Camerer, Terry strongly benefited from the ongoing support of parents and the mentorship of educators with knowledge and experience in gifted education (Gross, 1986). Terry's educational program in the early years was designed by his parents. Guided by his mother, who was herself a first-class honors graduate in mathematics and physics, he completed almost all the elementary school math curriculum before his 5th birthday. One of Terry's early mentors, a professor of math education at a local university, described Grace Tao's role as one of guiding Terry's math development, rather than teaching him: "She said that while she sometimes attempts to guide Terry's mathematical learning, she doesn't help him much because he 'doesn't like to be told what to do in mathematics,'" (Clements, 1984, p. 221). Indeed, most of Terry's knowledge was acquired through his voracious reading of mathematics and mathematics textbooks.

Socioaffective Factors in the Success of Radical Acceleration

Many case studies of young people who radically accelerated their education indicate that they demonstrate from an early age a passion for learning and a remarkable capacity to persist with tasks. Tony Lai, a Canadian student who entered graduate school shortly before his 15th birthday, became interested at age 3 in drawing two-dimensional views of traffic lights, laundry symbols, and cars and would spend anywhere between a few weeks and 3 months on the same topic, perfecting the representation before moving on (Sharkey, 1987).

This desire to reach the highest standards of which one is capable can become apparent in exceptionally gifted children at remarkably early ages. Terry Tao's passion for learning has been noted by many of his friends and mentors. He taught himself to read at age 2, and a few months later, his parents found him using a typewriter in his father's office; he was completely absorbed in what he was doing and had copied a whole page from a children's book laboriously with one finger (Gross, 1986). Years later, Billy Tao, Terry's father, described his son's capacity for absorbing himself in a

math problem to the exclusion of virtually everything else. The incident described below occurred when Terry, then a professor and on vacation from his university, was visiting his parents in Sydney. It is a remarkable illustration of the qualities of intense motivation, self-direction, and dedication to a task that characterizes many successful radical accelerands such as Terry and Tony Lai.

I spent a week with him in September 2000, soon after the Olympics and had firsthand experience watching him tackling a difficult math problem. It was nothing like sailing through math competitions, solving problems preset by a committee... It fully occupied every corner of his mind. He did not seem to taste what he ate and when he was traveling with us we literally had to pull him along. One day in a railway station, when waiting for the train to arrive, he was standing with his back against a wall, looking at his hands, shaping them like a sphere, rotating them against each other, totally immersed and cut off from his surroundings. An elderly man had been watching him for a long time, perhaps a good 10 minutes or so, and finally could not stand back any longer. So he walked toward Terry and asked him, "Are you all right?" Terry stared back at him, surprised, and replied, "I'm okay." He then went back to look at his hands and kept moving them in spherical directions. Meanwhile the train arrived and we dragged him on. We noted that his eyes were still glued to his hands. (Tao, 2003)

The solution to the problem was published in two journals and won Terry the Bocher Prize for Mathematics, which is awarded only once every 5 years. He was 25 years old.

Cases such as these and the 14 radically accelerated students reported by Chariton et al. (1994) challenge the still common societal belief that acceleration generally leads to social and emotional distress and underline the importance of tracking affective development in students who choose to radically accelerate. All students in the Chariton et al. study experienced an increased zest for learning after radical acceleration, which effectively led to a reduction in boredom and positive emotional gains. They reported healthy social relations and no social disadvantages. Typically, these students finished college in less than 4 years and went on to graduate school. Many then pursued doctoral study in preparation for academic research careers. Some studied abroad, accepted fellowships, or pursued other educational opportunities.

The importance of warm and supportive peer relationships is emphasized by Gross's (2003) longitudinal study of young people with an IQ of 160 or higher. As stated earlier, only 17 of the 60 subjects were permitted radical acceleration despite documented evidence of their extraordinary abilities. Conservative accelerative procedures, such as a single grade-skip, were insufficient to meet the children's intellectual and social needs (Gross, 1992). The considerable majority of the subject group spent their entire elementary education in "inclusion" classes with age peers, where they had little contact with other gifted students and no contact with other young people who even approached their levels of cognitive ability. While every one of the radical accelerands reported that their social and emotional well-being significantly improved, warm friendships were formed with their older classmates, and marked academic gains were achieved, the majority of the children retained with age peers experienced significant and lasting

difficulties in forming or maintaining friendships, and a substantial proportion of them (the young people are now in their 20s) still find it very difficult to establish close social relationships (Gross, 2003).

Gross's radical accelerands were found to have higher levels of social and general self-esteem than subjects of equal intellectual ability who had been retained with age peers or skipped only one grade, many of whom experienced depressed or seriously depressed social self-esteem (Gross, 1992, 1993). By contrast, the academic self-esteem of radical accelerands was less advanced, averaging .7 of a standard deviation above the mean for their age peers. Marsh and Craven (1997) suggested that the Big Fish-Little Pond Effect (BFLPE; a hypothesized decrease in academic self-esteem when gifted children are ability-grouped or accelerated) was operating for these radical accelerands; however, this is highly unlikely because the BFLPE is predicated on a predicted change in class ranking through the acceleration or grouping, whereas, by contrast, the radical accelerands in Gross's study still outperformed all or the majority of their classmates who were at least 3 years older (Gross, 2003). Gross (2003) proposed that radical acceleration allows exceptionally gifted children to realize the full extent of their abilities and, therefore, what they can expect of themselves. The more modest self-esteem of the radical accelerands therefore reflected their realization, often for the first time, of the gap between their remarkable achievements and their even more remarkable potential. It reflects an acceptance of how far they have to go if they are to become all that they can be.

Interestingly, the majority of these Australian radical accelerands, while remarkably gifted intellectually, also possessed a wide range of social interests, which made them somewhat more acceptable to their age peers (Gross, 2003). Several are highly talented in sports, and, even although they tend to excel in individual rather than team sports, this increased their "street credibility" with their schoolmates. Almost all are musically gifted and tend to enjoy a range of popular musical genres. All are humorous and quick-witted, and all deeply enjoy socializing with friends. None is the stereotypical "nerd." Indeed, they may have been "forgiven" for being intellectually gifted because they displayed a range of interests that their classmates and teachers could relate to, and these factors may have decreased their teachers' fears that acceleration would result in social or emotional damage. Notably, equally gifted young people in Gross's study whose interests are more esoteric were deliberately retained with age peers on the grounds of their teachers' belief that sustained socialization with students of their own age would reduce their "strangeness."

Advantages of Dual Enrollment

Enormous variability is evident in the paths students take toward radical acceleration. Brody and Stanley's (1991) summary of the factors leading to successful educational acceleration, including radical acceleration, illustrates a smorgasbord of accelerative alternatives, including home-schooling, grade skipping, subject acceleration, multiple grade skipping, and, in a few cases, skipping high school completely. When he was 6, Terry Tao was attending grades 3, 4, 6, and 7 for different subjects, and by the following

year, having far outpaced the seventh-grade students in mathematics, he was permitted to attend the local high school to work in math at the 11th-grade level with students 7 years older (Gross, 1986). By the time he was 12, Terry was enjoying dual enrollment at high school and university. His university studies included fourth-year algebra, second-year physics, and second-year computer science. Terry believes that this early exposure to university-level studies, particularly in math and science, while at high school assisted him in adapting more easily and confidently to fulltime college enrollment.

Brody and Stanley (1991) linked successful early entrance to the number of Advanced Placement credits a student has accumulated, the amount of advanced coursework taken prior to acceleration, opportunities to develop skills necessary for university study, and the degree of subject or grade acceleration a student has experienced prior to early entry. Olszewski-Kubilius (n.d.) likewise suggested that students considering early entry should study college or university subjects part-time to gain experience with the demanding nature of tertiary study before committing to fulltime enrollment. These three authors emphasize the need for students to examine their strengths, weaknesses, experiences, interests, and physical and emotional maturity before making a decision to radically accelerate. They discuss issues related to living on campus while still very young and suggest that there are many advantages to being in a cohort of early entrants. Some early entrance programs offer counseling for students, and this, too, appears to be beneficial. While research shows that students who enter college early achieve well whether they live on site or commute to the campus, the authors suggest that, in general, it might be best for younger students to consider living at home and commuting.

Using the Time Saved

Students who radically accelerate into college or university graduate 3 or more years earlier than students who enter at the traditional age. Brody and Stanley (1991) suggested that students need to consider how they might use the time saved. Options include pursuing higher study or career development or exploring scholarships for study overseas. They presented the example of one student who graduated from Johns Hopkins University at age 18 with a degree in the humanities. He went on to study law at a top law school, spent a year studying international law in Sweden as a Fulbright Scholar, and finally served for a year as a law clerk to a federal circuit court judge. At the end of this time, he was still young enough to win a Marshall Scholarship to Oxford University to study whatever he wished for 3 years.

Two of Gross's 17 radical accelerands have "reinvested" one or more of the years saved through their acceleration. In neither case has this been motivated by a desire to reverse the acceleration; rather, it represents an alternative use of the time saved. Christopher Otway "repeated" both 11th and 12th grade with different subjects, graduating with 10 major subjects rather than 5--still at the age of 16. Hadley Bond, who entered university at age 15 and earned two bachelor's degrees and a master's degree by age 20, is one of Australia's leading amateur squash players. Currently, at age 22,

he has decided to put his career as an actuary partly "on hold" for the next 3 years to pursue the sport semiprofessionally.

Olszewski-Kubilius (1995), in her review of the academic and social outcomes for students who choose early entry to university, suggested that the reinvestment of time saved through acceleration may not be uncommon. She concluded that the majority of early entrants achieve worthy academic outcomes, go on to complete rigorous graduate study, and tend to use the time gained from early college entry to take advantage of further academic opportunities.

Individualized Programs for Early Entrance to College

In recent years, a growing number of universities and colleges in the United States have introduced special programs for the enrollment of young students, with a significant number accepting students who are 3 or more years younger than average freshmen. College and university early entrance programs vary considerably. Some are residential, while others require students to commute. Some are single-sex, others coeducational. Admission criteria also vary, but on the whole students who enter college or university early are a highly selective group with high intellectual ability, supportive families, social maturity, confidence, and the will to succeed (Brody & Stanley, 1991).

Although academic acceleration is still underutilized when one considers the numbers of gifted youth who could benefit from this range of interventions, its increased utilization has undoubtedly been influenced by the Study of Mathematically Precocious Youth (SMPY), initiated in 1971 by Julian Stanley at Johns Hopkins University. Stanley subscribed to the benefits of radical acceleration for highly gifted youth after observing students in their early teens, and occasionally even younger, enroll in university study and achieve extraordinary results. He researched the progress of early university graduates from Johns Hopkins University since its foundation and established that the majority of these young graduates achieved superior university results and went on to pursue distinguished careers in diverse fields (Stanley & Benbow, 1983). Since its inception, SMPY has influenced the formation of programs for educational acceleration throughout the United States and; more recently, in Europe and Asia, although the latter programs are less likely to embrace radical acceleration (Gilheany, 2001; Touron, 2001; Wu, 1991).

Talent searches such as SMPY provide the opportunity for gifted students to take above-level tests that allow them to demonstrate mastery of learning that would commonly be expected of older students, facilitating the identification of gifted young people who may not have been recognized otherwise. Learning experiences can then be tailored to match the abilities of the individual. Brody (2001) recorded the success of talent searches in assisting many thousands of gifted students gain access to appropriate educational opportunities, including summer programs, weekend programs, correspondence courses, online courses, Advanced Placement courses, and university early entry programs. She pointed out that all of these opportunities can assist students

who choose to radically accelerate.

SMPY has also acted as an important focus for research into gifted education, conducting many longitudinal studies that investigate academic and psychosocial effects of acceleration. Swiatek (1993) reviewed results from a wide range of studies and established that, contrary to community perceptions, students who choose to accelerate their education, including those who radically accelerate, achieve exceptional academic outcomes, do not "burn out," and do not suffer from gaps in their knowledge or skills. Most students report high levels of satisfaction with the acceleration process. Swiatek pointed out that, indeed, studies designed to identify factors hindering the accelerative process have encountered difficulties because neither accelerated students nor researchers evaluating this process have identified such factors. She concluded that radical acceleration assists gifted students to establish a foundation for advanced learning, maintain interest and involvement in academic activities, and earn extra time for career development.

A retrospective study (Stanley, 1985) analyzed academic outcomes for younger-than-average students who entered Johns Hopkins University several years earlier. Of these students, four were 3 or more years younger than typical freshmen. These radically accelerated students had better academic records than their nonaccelerated classmates, were accorded more honors and awards at high school and university, graduated faster, and were accepted into prestigious programs for further study, including M.D. and Ph.D. programs. Students who were known to SMPY before they commenced accelerated university study tended to fare better than those who had no prior contact with SMPY. Stanley suggested that this was consequent to precollege counseling made available through SMPY, which allowed these students to gain a realistic understanding of what to expect from university study and to develop skills to facilitate the transition from school to university.

Do accelerated students regret their acceleration in later years? SMPY has published findings of four key longitudinal studies, undertaken over the course of between 10 and 20 years, investigating long-term outcomes of various types of acceleration. A 10-year study surveyed 320 young people who were identified as being in the top 1 in 10,000 of their age peers in terms of mathematical or verbal reasoning regarding their satisfaction with the type and amount of acceleration they had received (Lubinski et al., 2001). More than 50% of these young people, who were in their 20s at the time of the study, had taken college courses when still at high school. Fully 70% expressed satisfaction with the degree of acceleration they had undertaken, and of those who, in retrospect, said they would alter things if they had their time again, the majority stated that they would accelerate even more!

A longitudinal study (Pollins, 1983) conducted over 5 years compared two groups of 21 boys identified through SMPY talent searches and matched for age (13) and ability (their math and verbal scores on the Scholastic Aptitude Tests) when the study commenced. Experimental-group students were assisted by SMPY to radically accelerate their high school education, mainly through combinations of grade skipping

and subject acceleration, so that, at the conclusion of the study at age 18, the majority were seniors in college. Although over the 5 years of the study many members of the control group did engage in more modest forms of acceleration, none were radically accelerated.

At the start of the study, both groups were assessed on the California Psychological Inventory (CPI) to measure general social functioning and the Strong-Campbell Interest Inventory (SCII) as a measure of vocational interests, academic interests, and introversion-extroversion and were compared with a group of randomly selected age peers (Pollins, 1983). The two study groups hardly differed at all on their CPI profiles, but both groups scored much more positively than the random group, presenting as mature, academically advanced, and inter-personally effective. On the SCII, both study groups were also remarkably similar, preferring investigative pursuits over artistic pursuits and appearing rather more introverted than the random group.

Unfortunately, the two groups were not assessed on the CPI or SCII at the close of the study. However, a standardized questionnaire was administered to all participants assessing their views on a range of issues related to their educational and social experiences over the 5 years, the use they had made of the educational opportunities available to them, their educational aspirations, the degree to which SMPY had assisted them, and the effect of acceleration (if they had accelerated to any degree) on their social and emotional development. The radical accelerands had much higher educational aspirations than the control group, planning on average to earn a doctoral degree, and they had much more positive feelings than the control group regarding how well they had used their educational opportunities. The radical accelerands believed their association with SMPY had positively influenced their social and emotional development, while the control group perceived no difference. Both groups felt that acceleration (to the degree that the control group had experienced it) had slight positive influences on their social/emotional development. No negative social or emotional effects were identified, and there was some evidence for positive gains.

Outcomes of Individualized Radical Acceleration

Highly gifted students pursuing individualized programs of radical acceleration achieve high, sometimes extraordinary, levels of academic success at college and university and tend to enter high-status careers that provide ongoing intellectual challenge and stimulation and in which they continue to excel.

Radical accelerands socialize well with their older classmates. The reduction of boredom and demotivation that was an almost inevitable result of being held to the pace and level of curricula designed for age peers of average ability leads to a reawakening of their early delight in learning. There is no indication of social or emotional maladjustment arising from well-planned acceleration programs.

Cohort Studies

In the early years of the Study of Mathematically Precocious Youth, a number of students chose to enter Johns Hopkins at ages as young as 13, bypassing high school not because they specifically wished such radical acceleration, but because there were, in those years, very few suitable alternatives (Stanley, Keating, & Fox, 1974). In later years, SMPY's work led to the establishment of a range of programmatic structures designed to serve students who did not wish to radically accelerate, but who most certainly required access to high-pitched, fast-paced work (Benbow & Stanley, 1983).

Despite the outstanding success of the majority of radical accelerands, schools and universities have remained wary of possible social and emotional ill effects of college entry at ages younger than are customary. One response to this has been the development by a growing number of colleges of programs of cohort acceleration in which groups of gifted students who generally have not completed high school spend their initial college years as a mutually supportive community of early entrants, often with special residential accommodation and with enhanced access to career and personal counseling.

A considerable number of studies have been conducted at the University of Washington, which inaugurated its early entrance program (EEP) in 1977. These have investigated both cognitive and affective outcomes, identifying important variables that mediate these outcomes. The employment of appropriate control groups enables the comparison of findings for radically accelerated students with those for students of similar ability, both same age and older, at the same stage of their college career. This substantial body of research provides an overview of the development of the EEP and its continuance over time, including important program changes that have occurred. Such documentation can be extremely helpful in informing the development of similar programs at other sites.

A three-part evaluation of the EEP investigating the academic performance (Janos & Robinson, 1985), social and psychological adjustment (Robinson & Janos, 1986), and moral judgment (Janos, Robinson, & Lunneborg, 1989) of the accelerated students was initiated in 1982 by the University of Washington's Child Development Research Group. The first two studies compared the academic performance and psychosocial development of 13 female and 11 male "EEPers" with 24 regular students matched for scores on the Washington Pre-College Test (WPCT), but averaging 4 years older (as they had entered university at the conventional age), and also with 24 National Merit Scholars. Interestingly, the three groups were also assessed on the Concept Mastery Test (CMT), which was developed by Terman (1956) for his longitudinal study of gifted adults. This instrument, which has been used in several studies of gifted individuals (e.g., Stanley et al., 1974), assesses an individual's capacity to reason verbally at unusually high levels. Despite the similarity of their scores on the WPCT, substantial differences appeared on the CMT between the EEPers and the regular students.

Substantial differences also appeared in the academic performance of the EEPers and the regular students. The EEPers' average grade-point average (GPA) far exceeded that of the regular students (3.42 out of 4 compared to 2.98, a difference beyond the .001 significance level) and matched the average GPA of the National Merit Scholars (3.44). On a questionnaire designed to assess students' perceptions of their university experiences, EEPers were significantly more satisfied with the academic environment provided by the university--including the intellectual level of offerings, pace of instruction, and academic content--than were regular students. Again, they appeared more similar to National Merit Scholars.

In the parallel study, aspects of the socioaffective functioning of the three groups were assessed through several instruments: The Minnesota Multiphasic Personality Inventory (MMPI) was used to assess serious psychopathology, the California Personality Inventory (CPI) to assess adjustment at higher levels of functioning, the Tennessee Self-Concept Scale (TSC) to assess self-perceptions, and the Inventory of Peer and Parent Attachments (IPPA) to assess the affective quality of students' parent and peer relationships (Robinson & Janos, 1986). No significant differences appeared on the MMPI. The regular students and National Merit Scholars scored significantly higher than the EEPers on the "dominance" subscale of the CPI, suggesting that they may have been more likely to exercise social leadership than the younger students. Interestingly, the EEPers scored higher on the "achievement through independence" and lower on the "conformity" CPI subscales, suggesting that they may have viewed themselves as less bound by conventional thinking than the other groups. As the authors suggest, this may account in part for their having chosen a more unusual route through college, and their attitudes may have also been influenced by "the negative views of those who regard deviations of any kind, whether in personality or academic trajectory (including academic acceleration) as *prima facie* evidence of disturbed adjustment" (Robinson & Janos, p. 58).

A subsequent 3-year study of radical accelerands followed 23 male and 23 female students who enrolled in the EEP at age 12 or younger on the basis of outstanding scores on the Washington Pre-College Test and scores well above the 85th percentile of college-bound 12th graders on the Math and Verbal portions of the Scholastic Aptitude Tests (Janos et al., 1989). Following the format of the previous studies, accelerands were compared on aspects of intellectual functioning, social and personal adjustment, and maturity to 44 comparatively bright agemates who qualified for enrollment in the EEP, but who chose instead to attend high school, to 43 typical undergraduate students who were on average 4.5 years older than the EEP students, and to 59 National Merit Scholars with similar academic ability to the EEP students, but who were also approximately 4.5 years older. Again, EEP students made excellent academic progress, attaining similar GPAs to the National Merit Scholars (3.33 out of 4, compared to 3.31) and higher GPAs than the typical undergraduates (3.01). Additionally, the EEPers completed more honors courses than regular students. The authors found no association between early entry to university and psychological or

social impairment. Indeed, in self-concept, perceptions of parent and peer relationships, self-acceptance, and sense of responsibility, the EEPers were virtually indistinguishable from equally able age peers who had elected to follow the normal route through high school. The participants' levels of moral judgment were assessed on the Defining Issues Test (Rest, 1979), which evaluates the degree to which individuals use moral principles to evaluate behavior. No significant differences appeared among the four groups, suggesting that the EEPers were developmentally well placed in their college course.

Noble and Smyth (1995) surveyed 30 young women who had participated in the EEP to investigate whether gender played a role in their decision to radically accelerate and if they thought gender influenced their experiences of radical acceleration. Participants were asked whether their attitudes toward themselves and the attitudes of others toward them were affected by their participation in the EEP. They were questioned on their perceptions of sexism in educational and work environments; the values and dreams that guided their educational, professional, and relationship decisions; and whether they thought early entrance had helped or hindered them in achieving personal goals.

Although gender was not reported to influence the decision to radically accelerate, it appeared that the young women derived unique benefits from the process. Specifically, the authors suggested that it enabled them to experience a rare combination of acceptance and encouragement from peers and adults at a critical time in their development, which appeared to help inoculate them against future, less-supportive work environments. While intelligence was found to influence successful outcomes, the authors also identified a sense of responsibility for one's own learning, determination, commitment, and motivation as important factors contributing to successful radical acceleration.

Noble, Arndt, Nicholson, Sletten, and Zamora (1999) used focus group discussions to investigate the perceptions of 16 males and 15 female EEPers aged 14 to 19 regarding the social and emotional effects of early entry to university. All believed that early entry allowed them to develop appropriate levels of maturity and independence and reported enjoying the social environment that university offered despite their young age. Students identified the importance of acceptance of individual differences, encouragement of excellence and personal responsibility, and solidarity and sense of belonging as important strengths of the EEP.

Robinson and Noble (1992) summarized findings from studies conducted in the first 15 years of the program and concluded that the EEP has permitted many highly gifted students access to learning experiences matched appropriately to their abilities and has resulted mostly in positive academic and affective outcomes. They pointed out that most studies link these positive outcomes to provisions for developing university-level study skills, as well as provisions that support social and emotional development (counseling services, social event planning, and frameworks to encourage peer support). An important feature of the EEP, initiated in 1980, is a Transition School that compresses 4 years of high school into 1 year.

A study surveying 33 students of average age 14 who were enrolled in their first year of an early entry residential program in a small liberal arts college for women attempted to document personality growth over their first year of college (Cornell, Callahan, & Loyd, 1991a) by comparing these students to 18 nonaccelerated students of comparable age and intellectual ability who were enrolled in traditional high school programs. Changes in personality adjustment were measured on the California Psychological Inventory. Early entry students were found to change in a number of ways that indicated healthy personality growth and increased maturity. They became more independent, resourceful, self-assured, self-disciplined, and self-sufficient over the course of the year. They developed a more positive self-image and became more optimistic about the future. Their scores reflected a decisive and action-oriented view of life. They also became more empathetic and more interested in the lives of others. Nonaccelerated students experienced significantly fewer personality changes as the year progressed, and those changes that did occur did not necessarily reflect healthy personality growth. In fact, the nonaccelerands became less confident, less assertive, less independent, and less self-sufficient.

However, a disturbing feature of this study is that some of the accelerands experienced depression and other adjustment problems during the course of the year, and some dropped out of the program. A second study (Cornell, Callahan, & Loyd, 1991b) investigating a range of personality and family variables in 44 first-, second-, and third-year students in the same program, some of whom were radical accelerands, found that more than half of them were reported by staff as suffering periods of depression during the year of the study, and five were reported as engaging in suicide-related behavior. Thirteen of the 44 left the program for reasons judged as stress-related. These results, however, are difficult to interpret, as there were no comparison groups in the study, thus making it impossible to judge whether findings for early entry students were significantly worse than for other groups of university students. The low-threshold IQ of the entrants to this program--as low as IQ 115--is also of concern. Stanley (1991), in a critique of the study, commented that, to be radically accelerated, a student should probably have an IQ of at least 140, and the authors acknowledge that some of the students may have experienced emotional stress due to a mismatch between their intellectual or academic ability and the demands of the program. In later years, the selection procedures for this early entry program were altered on the basis of the research findings. In particular, students were required to meet more stringent admission requirements regarding intellectual and academic ability. Subsequent studies of the program have reported a significant drop in the attrition rate (Olszewski-Kubilius, n.d.).

Outcomes of Cohort Studies

In general, programs of cohort acceleration appear to have excellent results. Young accelerands experience high levels of academic success, and fears of social and emotional maladjustment appear unfounded. Unlike many individualized programs of radical acceleration, they offer accelerands structured access to young people who are both agemates and ability peers.

With each other, the early entrants appear to find a communality permitting genuine mutual ' exchange. About half of them had experienced such friendships before, but in so many cases, the unique opportunity of enrolling in college along with other 13- or 14-year-olds as academically inclined as they were, opened up, for the first time, the world of intimate friendship. (Janos et al., 1989, p. 515)

It is extremely important, however, that young people seeking enrollment in a cohort program of radical acceleration are screened as carefully for intellectual and academic readiness, social readiness, and emotional maturity, as would be the case if they intended to pursue individualized programs of radical acceleration.

Underachievement in Early College Entrants

Although, as can be seen from the studies above, the research literature in general supports early entrance to college and university for highly gifted students, some studies have identified issues related to underachievement. These studies have been beneficial for influencing changes to particular entry entrance programs that have led to improved outcomes for students.

A University of Washington study investigated underachievement in a group of early entry students consisting of 25 females and 31 males, all younger than 15 (Janos, Sanfilippo, & Robinson, 1986). Students were said to "underachieve" if their GPA was below 3.0 on a 4-point scale, indicating a significant discrepancy between their ability as assessed by pre-entry testing and course achievement. Underachieving students took fewer credits in undergraduate and honors courses, withdrew from almost twice as many courses, and took incompletes twice as often. Underachieving males showed less psychological maturity, being caught up in adolescent concerns of fantasy, computer games, and struggling for personal autonomy, and they suffered more internal conflict than male achievers. By contrast, underachieving females evidenced greater psychological maturity than their achieving counterparts. The authors suggested that, paradoxically, this may have contributed to their absorption in extracurricular commitments, including varsity sports, with the resultant neglect of academic pursuits. They concluded that selection procedures for early entry programs should emphasize readiness for intense and sustained study. As a result of this study, changes to selection procedures were implemented at the study site in an effort to decrease problems associated with underachievement.

Gregory and Stevens-Long (1986) presented case studies of five students who enrolled in the early entry program at California State University, Los Angeles (CSULA) in its first years. Their aim was to illustrate some common problems that early entry students appeared to face and to suggest strategies to avoid or remedy these problems for later students. The authors identified lack of study skills as a major problem for students and suggested that all early entrance programs offer students the chance to develop skills that are required for university study, including note-taking and time-management skills. They also noted coping problems associated with low grades and suggested that students be counseled about how to address these problems before they occur;

specifically, they should be encouraged to see low grades as a signal to reassess study techniques, rather than as a sign of failure. Counseling might include discussions regarding the detail and accuracy required on examinations, the level of detail and comprehension one must achieve when taking lecture notes, and the propriety of approaching a college professor in order to clarify expectations or grading procedures.

This study identified parental support as a major factor influencing successful early college entrance. Providing parents with full and clear information about the process of early entrance is crucial for encouraging parents' full support. Parents may also benefit from advice regarding the need to allow students to gain increased autonomy. As in the case of the University of Washington, the CSULA program was adapted in light of the findings from this and other studies, with a resultant drop in psychological and academic problems.

Facilitating Successful Radical Acceleration

Acceleration is an educational placement; it is not, by itself, an educational program. The provision of a developmentally appropriate curriculum is essential to its success, and the ongoing evaluation of that curriculum's suitability to the changing needs of the individual student is critical. Stanley (1978b) addressed the need for flexible curriculum planning and for open access to a variety of learning options for students considering radical acceleration. It is evident that no single path will be appropriate for all young students who decide to radically accelerate their education and that flexibility in curriculum planning is the only way to honor individual differences between students and to ensure the most productive acceleration experiences for each student.

Radical acceleration is a process that unfolds over a period of years as a consequence of one or more procedures being adopted by educators to meet the needs of highly gifted students. Such procedures may include early school entry, subject acceleration, grade skipping, dual enrollment, curriculum compacting, curriculum telescoping, Advanced Placement courses, part-time college courses, summer programs, and correspondence courses (Olszewski-Kubilius, n.d.; Robinson & Harsin, 2002). Studies of individual radical acceleration illustrate the variety of combinations of these procedures students have undertaken in their progress toward and through radical acceleration (Gross 1986, 1992; Holmes et al., 1984; Sharkey, 1987).

Stanley (1978) suggested that academic and emotional harm may result for highly gifted students who are refused radical academic acceleration. Gross (1993) found this to be true for exceptionally gifted students who were placed in mixed-ability classes. Many of these students underachieved in an effort to gain peer and teacher approval, and many became frustrated and despondent. The social isolation experienced by several of these young people in childhood and adolescence has translated in adult life into significant difficulties in forming and maintaining friendship or love relationships (Gross, 2003).

The progress of radical accelerands can be greatly assisted where young people and their families have access to at least one educator who is knowledgeable about the

needs of gifted children (Brody & Stanley, 1991). Case studies reveal the important role this educator plays as long-term critical planner, monitor, and mentor by identifying appropriate interventions for the student, providing information concerning access to these interventions, and supporting the student and his or her family and teachers.

The student's personal characteristics influence the outcomes of radical acceleration significantly (Gregory & Stevens-Long, 1986; Sharkey 1987). Positive outcomes ensue when students are motivated to achieve, show persistence, and are closely involved in the educational decision making regarding their acceleration programs (Gross, 1986; Holmes et al., 1984). Ongoing family support and encouragement is essential for the student who chooses to radically accelerate (Montour 1977; Gross 1986). It is important for students to feel that their parents are their partners in the process. Encouragement and support from significant others, including friends and teachers, has significant positive effects (Sayler, 1994).

In addition to ensuring flexible curriculum planning based on individual needs, program modifications supporting successful radical acceleration should include provisions to address gifted students' affective needs (Robinson & Harsin, 2002). It is important to pay particular attention to the need for interaction with peers sharing similar intellectual ability (Gross, 1992; Noble et al., 1999). Counseling before and during the process of radical acceleration has been identified by many educators as crucial in supporting successful academic and affective outcomes (Noble & Smyth, 1995; Robinson & Noble, 1992; Stanley, 1985).

Southern and Jones (1992) provided some evidence to suggest that talented athletes may wish to avoid acceleration because they may be physically disadvantaged when competing with older students. Sayler (1994) cautioned that student athletes considering early entrance to university or college should reflect on the possibility of not being able to play their sport due to their youthful age. One student who radically accelerated into university raised this as an issue of concern; however, its importance paled in light of the overwhelmingly positive academic and social benefits he enjoyed after his acceleration (Charlton et al., 1994). Given the importance of sport in American (and Australian) society, it is important that students considering acceleration give due weight to these issues.

A small number of students in an early entry cohort experienced frustration with having to make career decisions at a young age and expressed a desire for early career counseling (Janos et al., 1989); nonetheless, they affirmed that this concern was not significant enough to warrant returning to high school. Hendricks (1997) reported an individual student who expressed concern about academic specialization at a young age; however, this student raised the concern as an example of an issue for others to consider before they decide to radically accelerate, rather than something that affected his own personal experience.

In their study of students' perceptions of early college entry, Noble and Drummond (1992) found that some students had regrets about radical acceleration. Three of the 24

students surveyed said they missed school music and arts programs, as well as some extracurricular activities. Four missed social interaction with school friends, while another four missed the debating team, band, and orchestra. Other regrets included missing formal dances, sports, math competitions, chess club, and language classes. Students also reported missing the ethnically diverse mix of students in the school population. Six students felt that, had they attended high school, they would have been able to apply for more scholarships and would have had opportunities to attend more prestigious universities. It is important that students considering radical acceleration be encouraged and assisted in weighing the disadvantages of such lost opportunities against the advantages of early entrance.

Swiatek (1993) found that students who had radically accelerated were somewhat less involved in extracurricular activities than other students. Colin Camerer, however, suggested that such a finding probably reflects a healthy interest in academic pursuits, rather than an unhealthy lack of social interaction (Holmes et al., 1984). Swiatek also noted that students in her study had no concerns about their psychosocial adjustment and reported no difficulties in forming friendships. Many other studies have found that radically accelerated students forge healthy relationships with older students, as well as maintain friendships with students of a similar age (Gross, 2003; Noble & Smyth, 1995).

Sayler (1994), reviewing literature concerning early entrance to college from as early as 1929, concluded that, despite fears of social and emotional problems, most students electing to enter college early experience academic achievement, make friends, participate in extracurricular events and organizations, and enjoy normal social activities. He suggested that success is closely associated with highly developed study skills and stressed that it is of key importance that students are confident about their decision to enter college early. Sayler synthesized the information gleaned from this literature review into a series of guidelines for parents, students, and school staff, listing 12 points for prospective early entrants to consider:

1. Contact the admission office, explain circumstances, and request information about policies regarding early entrance.
2. Exhaust the challenging opportunities available in the school system, including Advanced Placement courses, honors courses, advanced-level coursework, and part-time college courses.
3. Attend university summer programs before leaving school as a way of developing skills in preparation for early college entrance.
4. Be sure you have a sincere desire to accelerate and a realistic understanding of the consequences.
5. Seriously consider attending cohort acceleration programs where a group of young students attend college together, as there are many advantages to having a student support network.
6. Match career goals to the courses offered at particular colleges or universities.
7. Do not select a college or university based on "big name" appeal, but rather concentrate on the offerings of programs and departments.
8. Decide whether to live on campus or commute.

9. Determine whether your aptitude and achievement measures are at least as high as the average for the freshman class.
10. Assess the extent of your organizational skills.
11. Visit the college or university campus and meet the admissions personnel, current early entrance students (if there are any), and academic staff. If possible, tour the residence facilities.
12. Avoid excessive publicity about the decision to enter college early, as a public profile might bring unreasonable expectations from others and create uncomfortable situations.

Conclusion

Research provides strong support for the use of thoughtfully planned and monitored radical acceleration as a process allowing educators to respond to the academic and affective needs of a significant subgroup of the gifted population. In general, the academic performance of students who radically accelerate is highly impressive. These students earn higher GPAs, and they are more likely to complete college on time or early, earn general and departmental honors, make the dean's list, enter graduate school, engage in research, and embark on prestigious careers (Olszewski-Kubilius, 1995, n.d.; Stanley, 1978c; Swiatek & Benbow, 1991; Terman & Oden, 1959). Research also documents positive outcomes for social and emotional development, with radically accelerated students adjusting well to their new learning context, making friends easily, being accepted by older students, and enjoying increased levels of self-esteem and self-confidence (Gross, 2003; Janos et al., 1988; Pollins, 1983). Programs of cohort acceleration developed over the last 25 years have provided highly gifted students with a cadre of age peers of somewhat similar ability and supportive organizational structures, including career and academic counseling.

Radical acceleration is a practical, cost-free--indeed cost-saving--intervention that can be easily implemented within existing educational settings and can be readily adapted to the needs of individual students. It is unfortunate that such a successful intervention is not more widely utilized.

Christopher Otway, the profoundly gifted young Australian who radically accelerated through primary and middle school and used some of the time saved to "repeat" both 11th and 12th grade, graduating from high school at the age of 16 with twice the usual number of subjects, was the first student ever to be accelerated by his school. Chris's younger brother, Jonathan, also a member of Gross's study, chose not to radically accelerate, but still graduated high school 2 years early. Looking back on his school career, Jonathan feels that Chris, having been accelerated earlier, helped the school to acknowledge that this was a viable path for highly gifted students.

"The school was used to having Chris doing all that acceleration," Jonathan comments. "I was just the next one along. And now the school's got a whole class of accelerated students, so I think everyone's got used to the concept. And well, all I did was a few classes one or two years ahead. Compared to Chris's acceleration, nothing that out of

the ordinary. That's an interesting point, now that I think about it--once you start doing it, no one's that surprised anymore. By Grade 11/12, it didn't faze anyone at the school--it was just what the Otway boys did. Chris and I caused a stir when we started, but we just became fixtures by the time we left." (Gross, 2003, p. 225)

Jonathan wants to see acceleration used more often in Australian schools:

"Kids adapt," he says frankly. "If grade-skipping becomes commonplace, kids just accept it. And because intellectual prowess isn't valued nearly as much as sporting prowess in Australia, intellectual elitism will never be a problem in this country--the other kids won't be jealous of an accelerated kid's intellectual prowess, because they (and the rest of society) don't particularly value it. The only people who will care are the parents and teachers who complain about it." (Gross, p. 226)

Ironically, as Southern et al. (1989) found in their study of educators' attitudes toward acceleration, teachers who have themselves been accelerated, who have a family member who has been accelerated, who have taught an accelerated student, or who have even taught in a school where a student has been accelerated are significantly more positive toward the procedure than teachers who have had no contact with accelerands, either personally or professionally. Fear of the unknown may be what holds schools back. Having seen firsthand and at close range the benefits of acceleration for Chris and Jonathan, their school has, over the last few years, accelerated several students, including two other radical accelerands and now offers a successful program of cohort acceleration. This adoption of accelerative practices that have proved successful when combined, if possible, with a moderation of the anti-intellectualism that is such a feature of both Australian and American society, may be a solution to the problem. The more we employ acceleration, including radical acceleration, with gifted students who would benefit academically and socially, the more we will recognize its benefits to both students and society and the more readily we will continue its use.

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End Note

1. The term *accelerant* is often used to describe a gifted student who has been accelerated. However, correctly used, accelerant denotes an agent that instigates acceleration. The authors believe that *accelerand* is a more appropriate term to denote students who have been accelerated.