Chapter 50

The Johns Hopkins Talent Search Model for Identifying and Developing Exceptional Mathematical and Verbal Abilities

Linda E. Brody

Abstract The Johns Hopkins Talent Search model, which was pioneered in the early 1970s by Professor Julian Stanley, has now spread to countries around the world. Also known as the MVT:D^4 model of talent development, the power and efficacy of this approach for identifying and serving students with above-grade-level mathematical and/or verbal reasoning abilities have been well validated. Researchers at Johns Hopkins, as well as at other universities who use this model, have contributed greatly to our knowledge and understanding of the needs of gifted students. They have also developed and evaluated numerous strategies for meeting the educational needs of students with advanced abilities. This chapter summarizes the history of the Talent Search, its principles and practices, and the research that has been done on Talent Search students.

Keywords Above-level tests · Acceleration · SAT · Center for Talent Development (CTD) · Center for Talented Youth (CTY) · Cogito.org

When Julian Stanley passed away in August 2005, the gifted education community mourned his loss. Colleagues he had worked with, graduate students he had mentored, educators he had influenced, and talented students whose lives he had changed described the tremendous impact that he had had on them personally and on the field. While he continues to be missed, Stanley's legacy lives on in the Johns Hopkins Talent Search model that he pioneered, a model that continues to expand worldwide, and in the many programs his ideas and work inspired.

L.E. Brody (✉)
Johns Hopkins University, Baltimore, MD, USA
e-mail: lbrody@jhu.edu

Stanley's concepts were simple: Use above-grade-level tests to assess ability in students who hit the ceiling on in-grade tests, adjust the level and pace of instruction to provide an optimal level of challenge, provide supplemental educational opportunities to augment school programs, and find ways for advanced students to interact with intellectual peers. In retrospect, Stanley referred to his efforts as "a quiet revolution" (Stanley, 2005, p. 5). But he had no idea how widely his ideas would be adopted when he first began working with precocious youths. He had no idea that there were so many other students like Joe who needed help.

The Study of Mathematically Precocious Youth

It was in 1968 that Julian Stanley was told about Joe, a 12-year-old who was enrolled in a summer computer science course at the Johns Hopkins University (Stanley, 1974). Stanley's work until then had focused primarily on experimental and quantitative psychology (he was co-author of the famous Campbell & Stanley 1966 volume *Experimental and Quasi-experimental Designs for Research*). However, he had had a long interest in testing and measurement and had been a high school teacher in his younger days, so his interest was piqued when he heard about the eighth grader who was doing college-level work in the summer course.

Stanley had also been intrigued by Leta Hollingworth's (1942) use of above-level tests to measure intelligence in gifted children. Inspired by her efforts, Stanley administered SAT reasoning and subject tests to Joe, measures designed to assess aptitude

L.V. Shavinina (ed.), *International Handbook on Giftedness*,
DOI 10.1007/978-1-4020-6162-2_50,

and achievement among college-bound high school seniors. When Joe, as an eighth grader, scored higher than the average Johns Hopkins University freshman on several of these tests, it was clear that a typical ninth grade curriculum would not meet his needs. Joe's local high school, however, was unwilling to provide him with advanced instructional opportunities, so Stanley arranged to have him enroll as a full-time undergraduate at Johns Hopkins University. Joe excelled in the stimulating college environment, obtained both bachelor's and master's degrees by age 17 years, and went on to earn a Ph.D. in Computer Science and to pursue a challenging career in this field (Stanley, 2005).

It was not long after Joe had enrolled at Hopkins before another parent heard about his progress and approached Stanley for help with her son. Under Stanley's guidance, this young man also took the above-level SAT, scored well, entered Hopkins at a young age, and excelled as a young college student. As a result of the successes of these two young men, Stanley began to think that the SAT-M could be an effective tool for identifying other young students with advanced mathematical reasoning abilities, other students who might also be languishing in middle schools with unchallenging age-in-grade curricula.

Stanley established the Study of Mathematically Precocious Youth (SMPY) at Johns Hopkins in 1971 to find and serve students who exhibit advanced mathematical reasoning abilities at a young age (Stanley, Keating, & Fox, 1974). Aware of the efforts of Lewis Terman (1925) who identified his subjects within a larger pool of nominated students, Stanley decided to invite students to participate in a Talent Search where they would take the above-level SAT. The SMPY staff expected the number of students who would excel on the difficult aptitude test to be small, but testing larger numbers of students would allow the researchers to find the students with the most advanced mathematical reasoning abilities within the group and for whom they would provide services.

The first Talent Search was held in March 1972 on the Johns Hopkins University campus with 450 seventh, eighth, and accelerated ninth graders participating. The results surprised the SMPY staff when 13% of the participants scored above 600 on SAT-M (Keating, 1974), excellent scores for high school seniors. This documented the need to establish systematic talent identification programs to find underserved students with advanced academic abilities. SMPY held subsequent Talent Searches on the Johns Hopkins campus in 1973, 1974, 1976, 1978, and 1979. Each time, greater numbers of students from broader and broader geographic areas participated.

While radical acceleration into college had been a successful intervention for SMPY's first prodigies, it was important to identify other ways to meet the academic needs of the students identified through the Talent Searches. Numerous programs and ways to accelerate in content areas were piloted. In particular, SMPY evaluated different ways to speed up the learning of math, biology, chemistry, and physics. Varying in length and intensity, the pilot programs included summer and year-round courses. Some were school based, while others were held at Johns Hopkins. The results clearly demonstrated that students with advanced mathematical reasoning abilities could master a great deal of content in a short period of time (Bartkovich & Mezynski, 1981; Benbow, Perkins & Stanley, 1983; Fox, 1974; George & Denham, 1976; Stanley, 1973, 1976). Stanley later referred to this period from 1971 to 1979 as one of "intense and extensive experimentation to determine how best to find excellent mathematical reasoners and help them educationally" (Stanley, 2005, p. 10).

In addition to offering classes, SMPY advised high-scoring students about accelerating their school-based programs and also encouraged them to participate in challenging supplemental opportunities outside of school. While a few students from each cohort still chose to enter college early, SMPY identified and created numerous alternatives for the majority of students who were not eager or ready to leave their high school environments before graduating. Students were encouraged to consider a "smorgasbord" of accelerative options, especially subject acceleration in their area(s) of strength, from which they could choose those most appropriate for their own educational needs and goals (Benbow, 1979; Benbow & Stanley, 1996; Lupkowski-Shoplik, Benbow, Assouline, & Brody, 2003; Southern, Jones, & Stanley, 1993). Ultimately, many schools were influenced to respond to the growing number of students who had earned high Talent Search test scores and found ways to accelerate their educational programs (Stanley, 2005). Participation in rigorous enrichment options such as math and science competitions was also encouraged (Muratori et al., 2006; Stanley, 1987).

SMPY's emphasis on acceleration was influenced somewhat by the work of Harvey Lehman (1953) who observed that the most outstanding accomplishments of mathematicians and scientists tended to be made during the early part of their careers. Stanley reasoned that accelerating students to enter these fields with more advanced content knowledge at younger ages might increase their overall output of creative achievements as adults. He hoped to add to the pool of highly productive mathematicians and scientists successfully solving society's greatest problems.

Another influence on SMPY and on the evolution of the Talent Search model was Harriet Zuckerman's (1977) finding that cumulative educational advantage had been important to the talent development of Nobel Prize winners. She showed how, for many of the individuals she studied, one important educational opportunity had led to the next one and that the cumulative effect of all of them was very powerful. Stanley wanted to provide such opportunities to students with the potential for exceptional achievement as adults. Follow-up studies of the early SMPYers now being conducted suggest that Stanley was quite successful in meeting this goal (e.g., Wai, Lubinski, & Benbow, 2005).

The MVT:D^4 Model

The Johns Hopkins Talent Search model (Brody et al., 2001) has also been referred to as the Talent Search model (Lupkowski-Shoplik et al., 2003) and the Center for Talented Youth model (Touron, 2005). Another descriptor is the MVT:D^{4}model (Brody & Stanley, 2005), which is useful for depicting the components of this approach to talent development.

MVT:D^{4}stems from the first book-length report of SMPY's work, which was entitled *Mathematical Talent: Discovery, Description, and Development* (Stanley, 1974). The three "D" words indicate the steps recommended by SMPY to find and serve talented youths. As a way to emphasize these steps, as well as the mathematical reasoning ability that the early Talent Searches assessed, the book's title and subsequent descriptions of the model were referred to as MT:D^3. A fourth D, for *Dissemination* of its principles, practices, and procedures, was later added to emphasize the role dissemination had always played in this work (Benbow, 1986; Benbow, Lubinski & Suchy, 1996; Stanley, 1980). Finally, with the Talent Search programs now serving verbally talented students as well as mathematically talented ones, adding a V for verbal talent seems appropriate. Thus, MVT:D^4 is an acronym that stands for building on Mathematical and/or Verbal Talent through Discovery, Description, Development, and Dissemination (Brody & Stanley, 2005).

Discovery

The first step is to find students with exceptional reasoning abilities so that their academic needs can be addressed. While parents, teachers, and in-grade tests may identify students who do well at grade level, they often fail to recognize students whose reasoning abilities are *advanced* compared to age peers. A student who excels at grade-level work but is not cognitively functioning above grade level has very different educational needs than one whose reasoning abilities are more like those of older students and thus is ready to master above-grade-level content.

By taking a test with enough "ceiling" to allow them to exhibit the true extent of their abilities, students can gain a better understanding of their cognitive abilities and educational needs. Since it can be difficult to predict which students will perform well on the above-level test, systematic assessments are needed that invite large numbers of students to participate. This is the premise behind regular, annual Talent Searches. Based on the level of academic precocity they exhibit on the above-level Talent Search tests, students can be provided with academic services that are appropriately challenging. See Olszewski-Kubilius (2005) and VanTassel-Baska (1996) for programmatic recommendations as they relate to Talent Search score performance.

Description

Description of students' cognitive and affective characteristics is the second step in the MVT:D^4 model. The Talent Search assessment serves to identify students who have the ability to master advanced content in mathematical and/or verbal areas, but it is also important to assess their content knowledge in a subject before determining a course of study. It is useful, as well, to consider other attributes such as personality characteristics, motivation, and learning styles. In the early Talent Searches, SMPY brought high-scoring students back to the Hopkins campus to evaluate their affective characteristics and content knowledge (Stanley, 1974). Whether assessment of these characteristics is done formally or informally, it is an important component in planning an educational program that will optimize talent development.

In this model, description also refers to research that sheds light on the characteristics and needs of gifted students and to program evaluation that identifies effective intervention strategies. The research efforts of SMPY, CTY, and other Talent Search centers have informed programmatic decisions and contributed greatly to our understanding of the needs of gifted students (see summary of research later in this chapter).

Development

It was always SMPY's goal not just to identify talent but also to develop it. With few programs available when SMPY was established, much work was needed to develop the strategies that might serve gifted students who exhibit a variety of academic and social needs. Ultimately, a wide variety of options, especially accelerative strategies, curricular flexibility, and participation in supplemental opportunities, were shown to be effective, and they continue to be recommended for students with advanced academic abilities. Effective articulation with schools is essential so that students receive credit for out-of-school experiences, and consolidation at the next stage so that students continue to build on what they had learned is also crucial (Stanley & Brody, 2001).

In addition to advocating for appropriate academic support in- and out-of-school, the Talent Search centers have developed a variety of programs to serve students they identify. Through commuter and residential summer programs, distance education courses, seminars, and conferences, direct support for talent development is provided by these centers.

Dissemination

While the fourth D in the MVT:D^4 model, dissemination, was not listed on the first SMPY book (Stanley, 1974), this book and the many publications that followed in rapid succession are evidence of the importance that Stanley gave to disseminating information about the principles, practices, and research results of SMPY's efforts in order to influence others to adopt these practices. The Talent Search centers continue to recognize the importance of disseminating its work through the publication of books and professional articles, presentations at conferences, and consultations with schools (see Touron, 2005). As a result of these efforts, the Johns Hopkins Talent Search model has become widely known, highly respected, and adapted by others around the world.

The Center for Talented Youth (CTY)

By 1979, Stanley was growing less interested in the administrative responsibilities associated with the rapidly expanding Talent Search programs and was eager to focus, once again, on counseling the brightest students and on his research and writing. Consequently, the Center for Talented Youth (CTY), initially called the Office of Talent Identification and Development (OTID), was established at Johns Hopkins to administer the Talent Search and to find new opportunities to serve the students identified through this process. Still, no one could have foreseen the extent of the growth that lay ahead for this evolving model for identifying and developing academic talent.

With students coming from an increasingly large geographic area for Talent Search testing and to participate in academic programs on the Johns Hopkins campus, the CTY staff recognized that there was a clear need to find a way to serve students who could not commute to Baltimore. Arrangements were made for students to take the SAT at local high schools and to have their scores sent to CTY program administrators. A residential academic summer program was also established, which allowed students, regardless of where they lived, to participate in summer courses while boarding on campus. The residential setting also allowed students to have greater interaction with intellectual peers, a need Stanley had identified early in his work.

CTY's first residential program was held on just one college campus in the summer of 1980. The growth since then has been phenomenal so that today approximately 10,000 students attend CTY summer programs on campuses throughout the United States and abroad. The annual CTY Talent Search, meanwhile, has grown to include over 70,000 students in grades 2–8 who take above-level assessments.

Students are eligible to participate in CTY's Talent Search if they have scored at or above the 95th percentile on an in-grade standardized test. These students, who have all scored well on the in-grade assessment, then take an above-level aptitude test through CTY. Students in grades 2–6 take the SCAT (School and College Abilities Test) and students in grades 7 or 8 take either the SAT or the ACT. It has been found that, in the Talent Search testing, students who have excelled and "hit the ceiling" on an in-grade test may score at any level on the more difficult above-level tests. A new full distribution of scores results from the above-level Talent Search assessment. This is the purpose of Talent Search: to identify those students who exhibit exceptional mathematical or verbal reasoning abilities and are ready for advanced, accelerated coursework. Recognition ceremonies call attention to the achievements of these students, encouraging parents and schools to respond with challenging educational opportunities (Barnett, Albert, & Brody, 2005).

Students who score well on the Talent Search assessment are invited to participate in programs offered by CTY. Summer residential programs provide students with the opportunity to take a rigorous math, science, or humanities course and to live on a college campus with other bright and motivated students. Participants attest to the value of their experience, both academically and socially, and some even consider it to be life changing. They value the challenging coursework and also the opportunity to meet and interact with students who share their interests and abilities (Barnett et al., 2005). Distance education courses supplement the summer courses with opportunities for year-round learning (Wallace, 2005). Students can take advantage of CTY course offerings to accelerate their educational programs or to access courses not offered in their schools.

Talent Search students are also invited to participate in a variety of family academic programs. These include one-day topical conferences, as well as weekend or weeklong educational excursions. Groups of students and their families have gone with CTY to such places as Scotland, Tanzania, and the Galapagos Islands (Barnett et al., 2005; Ybarra 2005). CTY also houses a research department that continues to study gifted students and to evaluate programs, a Diagnostic and Counseling Center, the Julian C. Study of Exceptional Talent, and a number of special projects funded by grants.

CTY works hard to develop outreach programs and to solicit funding so that students from underserved backgrounds can take full advantage of all of its programs and services. As a result of these efforts, large numbers of students are receiving scholarships to attend CTY programs, and CTY's campuses are representative of a much more diverse population than in the past (Brody, 2007a; Ybarra, 2005).

Expansion of the Model Nationally

Soon after CTY was established, sister programs that utilize the Johns Hopkins model were established at other universities in the United States. The first of these was the Talent Identification Program (TIP), which was founded at Duke University in 1980 (Putallaz, Baldwin, & Selph, 2005). Today, TIP continues to conduct annual Talent Searches and to offer a variety of academic opportunities to the students it serves. In 1982, the Center for Talent Development (CTD) at Northwestern University (Olszewski-Kubilius, 2005) and the Rocky Mountain Talent Search (RMTS) at the University of Denver (Rigby, 2005) were established. Like CTY and TIP, CTD and RMTS also serve students in large regions of the United States who participate in their annual Talent Searches and avail themselves of programs and services.

In addition to maintaining their commitment to the model of utilizing above-level testing and offering summer residential programs, these talent centers have also developed their own unique program opportunities for their students. For example, Duke offers numerous international programs, and Northwestern provides enrichment classes for preschoolers. Researchers associated with these programs have also contributed to the research base to further our understanding of the characteristics and needs of students with advanced academic abilities (e.g., Olszewski-Kubilius, 1998; Putallaz et al., 2005).

Other programs in the United States that utilize some or all aspects of the Johns Hopkins model include the Academic Talent Search at California State University Sacramento; the Belin-Blank Center at the University of Iowa; C-MITES at Carnegie-Mellon University; the Halbert and Nancy Robinson Center for Young Scholars at the University of Washington; OPP-TAG at Iowa State University; SMPY at Vanderbilt University; and the Wisconsin Center for Academically Talented Youth (WCATY). The combined reach of all of these programs, along with the larger Talent Search programs, contributes greatly to the opportunities and services available for academically talented students in the United States.

Expansion of the Model Internationally

The influence of the Johns Hopkins model has also been felt worldwide, as educators around the world have proven to be eager to implement aspects of it. After learning about the Johns Hopkins program components, many of them have sought help in adapting this approach to serve gifted students in their countries (Ybarra, 2005).

An early test of the transferability of this model to another culture took place in the 1980s when Julian Stanley evaluated the feasibility of using it in China. After having the SAT-M translated into Chinese (for language only, with no consideration for cultural differences), the test was administered to students who attended some of the more selective Chinese middle schools. The result was that a large number of examinees scored extremely well, suggesting the test could be quite an effective tool to identify precocious mathematical ability in China, just as it had been in the United States (Stanley, Feng, & Zhu, 1989). Stanley hoped that several "SMPY in China" offices might emerge from the effort, but, instead, many of the top scorers kept in touch with Stanley and sought his help in applying to attend college in the United States. These students excelled in American undergraduate and graduate programs, helping to confirm the predictive validity of the SAT test taken while in middle school for this population.

The first full replication of the Johns Hopkins model in another country occurred in Ireland. Working in collaboration with CTY at Johns Hopkins, the Irish Centre for Talented Youth (CTYI) was established at Dublin City University in 1992 as an independent program. This center uses the PSAT, an adaptation of the SAT, as a tool to identify advanced mathematical and verbal reasoning abilities. Since the Irish students speak English, no translation of this test was necessary, but the fact that cultural differences did not impact on test scores was still a bit surprising when this program was first established. Once again, the strength of the above-level aptitude test to identify above-level reasoning abilities was confirmed. CTYI conducts annual Talent Searches based on the Hopkins model. It also sponsors a residential summer program, as well as numerous year-round educational offerings, and conducts ongoing research and evaluation of its efforts (Gilheany, 2001, 2005).

Educators in England looked to CTY for assistance when the National Academy for Gifted and Talented Youth (NAGTY) was founded. As a result, residential summer programs based on the Johns Hopkins model were incorporated into NAGTY's efforts to serve gifted students. No longer in operation, evaluations of NAGTY were nonetheless extremely positive (Frost, 2005).

In Bermuda, an ongoing relationship exists between CTY Bermuda and CTY at Johns Hopkins. With the support and counsel of CTY at Hopkins, CTY Bermuda offers above-level testing and provides opportunities for accelerated and enriched coursework to gifted students in Bermuda who are not adequately challenged by their regular school programs.

In spite of Stanley's success in China, the need to find or translate an appropriate assessment tool has posed a challenge for applying the Hopkins model in non-English speaking countries that was not a problem in Ireland, England, and Bermuda. Javier Touron, a Professor at the University of Navarra in Pamplona, Spain, took on this challenge and successfully translated the School and College Abilities Test (SCAT) into Spanish. The SCAT has three levels of difficulty (elementary, intermediate, and advanced), and thus can be used as an above-grade-level test with a broad spectrum of age groups. Touron's research led to the development of local norms for the translated version. Subsequently, he established CTY Espana in consultation with CTY at Johns Hopkins. This program offers Talent Search assessment using the Spanish SCAT and provides services to students including a residential summer program and distance education courses (Touron, 2001; Touron, Touron, & Silvero, 2005).

The successful translation of the SCAT into Spanish inspired the possibility that it might also work in Thailand when educators in that country expressed a desire to collaborate with Johns Hopkins and establish CTY Thailand. This translated test is now successfully identifying students to attend challenging academic programs there. CTY Thailand has established residential programs based on the Johns Hopkins model, as well as numerous other initiatives, to serve a diverse constituency of gifted students in Thailand.

Clearly, these many applications are evidence that the Hopkins approach to talent identification and development has proven incredibly robust in being able to be transferred across national borders and cultures. To facilitate the work with partners around the world, CTY International was formed, an organization in which its members agree to adhere to the core principles of the Johns Hopkins model (Ybarra, 2005).

International students are also well represented in all of the programs offered by CTY at Johns Hopkins. Students from at least 80 countries have enrolled in CTY summer programs in the United States and in distance education courses. CTY also operates summer program sites in Mexico and China.

Working with other prominent organizations that serve gifted students, CTY has taken the lead in developing Cogito.org, a free website for top math and science students around the world. Cogito.org seeks to link these students to each other, to scientific content and programs, and to practicing scientists and mathematicians. All of these efforts will help ensure that the kinds of opportunities provided by CTY and its partner organizations will be increasingly available to students wherever they live.

Julian C. Stanley Study of Exceptional Talent (SET)

After establishing CTY to run the Talent Search programs, Stanley launched a national search in 1980 under SMPY's direction for "students who score 700–800 on SAT-M before age 13." Returning to his strong interest in fostering the talent development of students with the potential to be great mathematicians and scientists, the purpose of this initiative was to find, counsel, and study students who "reason *extremely* well mathematically." In 1991, the work on behalf of the "700 Group" moved to CTY as the Study of Exceptional Talent (SET) under the direction of Linda Brody, and broadened its scope to include high-verbal scorers. In Stanley's later years, he joined SET as a Senior Scholar, continuing to counsel families, conduct research, and write. Months before his death, SET was named in Stanley's honor as the Julian C. Stanley Study of Exceptional Talent as a permanent legacy to the principles and practices he inspired.

SET serves students who score 700–800 on either the Mathematical or the Verbal (now Critical Reading) part of the SAT before age 13. Students who test after their 13th birthday are also eligible if they earn an additional 10 points above the minimum for each additional month of age. Almost 4,000 students have qualified for and joined SET since its inception. They now range in age from 11- to 12-year-old recent qualifiers to students in their late 30s who qualified in 1980 when the group was first established. Identification for SET is ongoing and new students qualify every year. Research on SET student's shows that the majority are achieving at exceptionally high levels (Brody, 2005; Brody & Blackburn, 1996; Lubinski, Webb, Morelock, & Benbow, 2001; Muratori et al., 2006).

SET's efforts on behalf of these students are a direct outgrowth of the individualized approach Stanley used with the early Talent Search prodigies. Counselors work with students and their parents, both individually and in small group settings, to help them identify the educational opportunities that will meet their needs. SET's publications (Precollege Newsletter and *Imagine* magazine) and Internet resources (Cogito.org and SET listserv) also serve to inform SET students about the many challenging supplemental opportunities they might consider. With many articles in *Imagine* and on Cogito written by or about past or present students, these resources also expose the readers to role models and mentors.

In general, SET students are encouraged to use accelerative strategies combined with supplemental opportunities to develop a challenging program that meets their unique educational needs. They are also encouraged to find ways to interact with intellectual peers to enhance their social development (Brody, 2005, 2007b). It is clear that, even among this group of students who all possess exceptional reasoning abilities, there are important differences in their individual cognitive profiles and in their interests, goals, values, and motivation. Opportunities also vary in their respective homes and communities (Brody, 2005; Brody & Blackburn, 1996). These differences support the importance of offering an individualized counseling program that addresses each student's unique needs.

The question may arise as to why SET's services are offered to only a segment of the Talent Search population. The rationale is twofold: (1) These students are so advanced in their reasoning abilities that their needs are less likely to be met with school programs than Talent Search students who score at lower levels, and (2) it is important for the future of society to cultivate the abilities of those who are likely to be able to solve the problems we will face in the future. However, SET's individualized approach to serving gifted students and its emphasis on out-of-school supplemental opportunities can be a model for any parent or educator seeking to challenge students with exceptional academic abilities. Dissemination of information about SET's activities is intended to encourage others to utilize this approach (Brody, 2007b), and both *Imagine* magazine and the Cogito.org website are intended to serve students beyond the SET population.

Research on the Talent Search Model

One of the strengths of the Johns Hopkins Talent Search model is its strong empirical base. From the beginning, SMPY's efforts were research based. Students in the first Talent Searches were assessed, studied, and described in an effort to learn more about the characteristics and needs of academically precocious students, and programs were evaluated systematically (e.g., see Keating, 1976; Stanley, 1974). A longitudinal study was launched that continues today at Vanderbilt University (e.g., see Lubinski, Benbow, Shea, Efekhari-Sanjani, & Halforson, 2001), and CTY and other university-based Talent Search programs have also recognized the importance of validating their programs through careful evaluative studies and research on the characteristics and needs of the students these programs serve.

The cumulative body of research results is highly supportive of the importance of identifying and developing the talents of students with advanced academic abilities and of the principles and practices behind the Johns Hopkins Talent Search model (Brody & Mills, 2005). Following is a summary of some of the findings.

Predictive Validity of Talent Search Scores

Above-level testing is the critical component that sets the Talent Search model apart from most other intervention programs for gifted students. By differentiating among students who all excel at in-grade work to find those who are truly functioning above their age peers, appropriately challenging educational experiences can be provided to all of the students. In particular, accelerative coursework can be provided to those high-scoring students who are most likely to excel in an advanced curriculum.

In 1977, Julian Stanley published *The Predictive Value of the SAT for Brilliant 7th and 8th graders* where he documented the range of scores obtained on the SAT during the first four Talent Searches at Johns Hopkins (Stanley, 1977–78). In all of the years since then, with the expansion of Talent Search to other regions of the United States and to other countries, the pattern has held up. Students who achieve nearly perfect scores on an in-grade test spread out on the above-level Talent Search assessment into a new distribution of scores (Barnett et al., 2005). The process discriminates well within the group tested so that students with exceptionally advanced reasoning abilities can be identified and their educational programs adjusted to include more advanced content.

Stanley (1977–78) also documented how performance on the SAT at a young age predicted students' performance in fast-paced classes and as young college entrants. Since then, a whole body of literature has been produced that supports the use of Talent Search scores to predict a student's ability to learn more advanced content at a faster pace than lower scorers or average classmates (e.g., Bartkovich & Mezynski, 1981; Gustin & Corazza, 1994; Olszewski-Kubilius, Kulieke, Willis, & Krasney, 1989). Studies that specifically focus on top Talent Search scorers are also supportive of the finding that they achieve at high levels in accelerated programs (Brody & Blackburn, 1996; Kolitch & Brody, 1992).

Other research has linked high performance in the Talent Searches to a pattern of taking more advanced courses in high school, to more honors and awards in high school, and to higher educational aspirations (Barnett & Durden, 1993; Brody, 1998; Burton, 1988; Lupkowski-Shoplik et al., 2003; Mills & Ablard 1993; Olszewski-Kubilius, 1998; Wilder & Casserly, 1988). Talent Search scores have also been found to be predictive of achievement years after Talent Search, with top Talent Search scorers outperforming low talent search scorers on numerous important variables (Benbow, 1992; Lubinski, Webb et al., 2001; Wai et al., 2005).

The predictive validity of the Talent Search assessment, therefore, has been heavily researched and well established. An above-level aptitude test is useful for identifying students who are ready to master advanced content and who are likely to continue to achieve at high levels if their academic needs are met. Researchers also report that students who participate in Talent Search find taking the test to be a positive experience regardless of their scores (Jarosewich & Stocking, 2003).

Acceleration as a Strategy for Serving Gifted Students

When SMPY was established, there was much fear of acceleration. "Early ripe, early rot" was a common misperception, suggesting that advanced students would burn out if they were overly challenged. There was also a great deal of concern about the social and emotional adjustment of accelerated students, particularly those accelerated in grade placement. A review of the literature by Daurio (1979) that was commissioned by Stanley, however, concluded that resistance to acceleration was based largely on preconceived ideas rather than any evidence that it is harmful. Still, it was important for SMPY researchers to explore this issue further, since the purpose of the Talent Search is to identify those students who are ready for more advanced, accelerated coursework and to recommend appropriate accelerative measures. The result has been a large body of research in support of acceleration that has helped to dispel the myth that acceleration is harmful (see Colangelo, Assouline, & Gross, 2004).

Since the early prodigies accelerated by entering college at radically young ages, early college entrance has been an important area of investigation. Stanley tracked six students who had entered college at particularly young ages and demonstrated how highly successful they were, helping to refute the "early ripe, early rot" myth (Stanley, 1985). Numerous studies were also conducted on early entrants to Johns Hopkins University, as well as on Talent Search students who entered other universities at young ages. The overall conclusion of these studies of *groups* of early entrants was that they fared extremely well academically without the acceleration contributing to any social or emotional problems (Brody, Lupkowski & Stanley, 1988; Brody & Stanley 1991; Olszewski-Kubilius, 1995; Stanley & McGill 1986; Pollins, 1983).

Inevitably, however, there were individuals within these groups of young college entrants who fared less well, so studies were designed to shed light on the predictive factors that come into play. For example, Brody, Assouline, and Stanley, (1990) investigated levels of success among early entrants to Johns Hopkins and found that experience with Advanced Placement courses prior to enrolling in college was the best predictor of success in college. Similarly, Brody et al. (1988), in a study of early entrants who attended a variety of colleges, identified exposure to advanced content, whether through AP or part-time college courses, as helpful in preparing them for the rigor of college-level work.

As a result of these findings and others, the following recommendations have been suggested for any student who is contemplating enrolling in college at an unusually young age: (1) Take advanced college-level courses before enrolling in college full-time, (2) find opportunities to interact with older students before leaving high school, (3) take full advantage of any challenging opportunities your high school does offer before leaving, and (4) choose a college where you are most likely to be successful based on your developed abilities, interests, and readiness to live away from home (Brody & Stanley, 1991; Brody, Muratori & Stanley, 2004; Muratori, 2007).

Research studies were also conducted on the value and effectiveness of accelerating students in one or more subjects, and the findings have been extremely positive. In particular, SMPY's experimental fast-paced mathematics classes clearly showed that students with advanced mathematical reasoning abilities can master a great deal of mathematics content in a shorter period of time and at a faster pace than is typically taught in school (Benbow & Stanley, 1983; Fox, 1974; George & Denham, 1976; Stanley, 1976). Follow-up studies of students who accelerated in math showed that they were well prepared for subsequent academic work in mathematics (Kolitch & Brody, 1992; Swiatek & Benbow, 1991a).

The efficacy of acceleration in science was also investigated, with researchers proving that high-ability students can effectively master a full year's worth of science in a 3-week summer course. In these studies, not only was the pace altered but the students typically took the course several years earlier than they traditionally would have been exposed to the content (Lynch, 1992; Stanley & Stanley, 1986). Studies have also shown that students who participate in a variety of fast-paced summer courses go on to excel in subsequent coursework and to take more advanced courses, thus refuting a common belief that accelerated classes must produce gaps in knowledge (Barnett & Durden, 1993; Kolitch & Brody, 1992; Lynch, 1990; Mills, Ablard, & Lynch, 1992; Schiel & Stocking, 2001).

Since Talent Search counselors advocate that students consider a variety of ways, in- and out-of-school, to accelerate their educational progress, researchers have also sought to evaluate the broader question of the effectiveness of utilizing accelerative strategies in a variety of settings. As a result of this work, there is much evidence that Talent Search students who moved ahead in subject and/or grade placement have benefited from acceleration without exhibiting concomitant social and emotional difficulties (Brody & Benbow, 1987; Kolitch & Brody, 1992; Lubinski, Webb et al. 2001; Richardson & Benbow, 1990; Swiatek & Benbow, 1991b). It is noteworthy that a follow-up study of top-scoring Talent Search students showed that 95% reported having accelerated their educational program in some way, a huge proportion of the group (Lubinski, Webb et al., 2001). The exceptional achievements of these students are a testimonial to the value of acceleration for meeting their educational needs.

Characteristics of Gifted Students

In order to make more appropriate decisions about how best to meet the needs of the gifted students they serve, Talent Search researchers have investigated their cognitive and affective characteristics. With well over 250,000 students participating annually in Talent Searches around the world, these students represent a broad spectrum of students with exceptional academic abilities who have been extensively studied.

Cognitive abilities. Although many school-based programs treat gifted students as a homogeneous group, the results of many years of Talent Search assessment and research attest to the fact that high-achieving students can differ dramatically from each other in important ways. For example, students who might nonetheless be considered gifted may score high on the mathematical SAT but low on critical reading in the Talent Search, or they may score high on critical reading but low on mathematical reasoning. Others may score high on both parts or low on both parts. Students with such differing levels of mathematical and/or verbal reasoning abilities have quite different cognitive profiles and thus very different educational needs. Benbow and Minor (1990) explored this phenomenon further and found verbally precocious students, as a group, to also score higher on general knowledge tests than mathematically talented students. The mathematically talented students, on the other hand, scored higher on speeded and non-verbal measures.

One of these non-verbal areas is spatial ability, and its role in predicting high achievement in mathematics and science has also been an area of investigation by Talent Search researchers. In the early SMPY Talent Searches, students who obtained high scores on the SAT were administered a battery of other assessments, including a test of spatial aptitude (Stanley, 1976). Under the direction of CTY, research on spatial ability in talented students led to the development of the Spatial Test Battery (STB), which is offered as an optional assessment in CTY's Talent Search. Stumpf (1993) found that spatial aptitude is not a uni-dimensional trait, but rather there are different spatial skills that should be assessed, and the STB reflects this by including a number of subtests. Validation studies have found the STB to be effective, as a complement to measures of mathematical and verbal reasoning ability, in predicting the achievement of Talent Search students in accelerated math and science classes (Stumpf, 1993).

Follow-up studies of Talent Search students have also demonstrated the value of assessing spatial ability to predict achievement over time. For example, Shea, Lubinski, & Benbow (2001) found that the assessment of spatial ability at age 13 added incremental value to SAT-M and SAT-V assessments for predicting educational and vocational achievement 20 years later. This finding supports the value of assessing a variety of cognitive traits at a young age, but most especially mathematical, verbal, and spatial aptitude, to guide educational decision making.

Gender differences. Gender differences in ability and/or achievement in mathematics and science have been a focus of inquiry by Talent Search researchers since differences favoring males in performance on the mathematical portion of the SAT were observed in the first Talent Searches. Publicity about this phenomenon and speculation about its causes stirred much controversy and debate, particularly when a large gender difference among the top-scoring Talent Search boys and girls was reported (Benbow & Stanley, 1980).

Gender differences in mathematics favoring males were also found on tests with younger populations of gifted students (Mills, Ablard, & Stumpf, 1993; Robinson, Abbott, Berninger, & Busse, 1996). Additional studies of performance on a variety of widely used aptitude and achievement tests, including the Advanced Placement tests, SAT subject tests, and graduate admissions tests, found that gender differences extended to numerous subject areas in addition to mathematics (Stanley, Benbow, Brody, Dauber, & Lupkowski, 1992; Stumpf & Stanley 1996, 1997). In some studies, gender differences in achievement in particular disciplines have been linked to interests, personality traits, and parental influences, as well as ability (Lubinski & Benbow, 2000; Mills, 1992, 1997; Olszewski-Kubilius & Yasumoto, 1995).

The good news is that gender differences on the highest levels of performance on the mathematical part of the SAT have diminished. While earlier studies reported a ratio of 13 males scoring 700 or above for every female (Benbow & Stanley, 1980), the ratio of males to females scoring at this level in the annual Johns Hopkins Talent Search is now about 4:1 or 5:1. Also, research has shown that recognition of mathematical and scientific talent and intervention programs aimed at females have contributed to increasing participation and achievement by females in these fields (e.g., Brody & Fox, 1980; Fox, Brody, & Tobin, 1980; Fox, Tobin, & Brody, 1979; Olszewski-Kubilius & Grant, 1996; Stocking & Goldstein, 1992).

Social and emotional adjustment. Studies of Talent Search students confirm that, as a group, these students are socially well adjusted, report having friends, and have positive self-concepts (e.g., Ablard, 1997, 2004; Brody & Benbow, 1986; Parker, 1994). In fact, studies have found Talent Search students to be more psychosocially mature than age peers (Luthar, Zigler, & Goldstein, 1992; Weiss, Haier, & Keating, 1974), a finding that supports the appropriateness of utilizing accelerative strategies to meet their educational needs.

There are indications, however, that within the Talent Search population, extremely gifted students may experience more difficulties than moderately gifted students and also that verbally gifted students may have more social and/or emotional problems than those who are mathematically talented (Ablard, 1997; Brody & Benbow, 1986; Dauber & Benbow, 1990). More high-verbal students than high-math students perceive themselves as being unpopular and report having difficulty fitting in with peers (Brody & Benbow, 1986; Dauber & Benbow, 1990). For students who do have difficulty finding or interacting with peers who share their interests, the positive social benefits of the interaction that occurs at Talent Search residential summer programs have been demonstrated (e.g., Olszewski-Kubilius, 1989).

With regard to other problems gifted students can face, perfectionism and multi-potentiality are two that are sometimes cited. However, research on the prevalence of perfectionism among Talent Search participants found that there is no tendency for them to be more perfectionistic than a national sample comparison group (Parker & Mills, 1996). Similarly, multipotentiality was not been found to be an issue for these students. In fact, one study found Talent Search students to be quite goal oriented by age 13 (Achter, Lubinski, & Benbow, 1996).

Personalities, interests, values, and learning styles. The roles personality, interests, values, and learning styles play in talent development and student achievement have been studied extensively by Talent Search researchers, and the results have important implications. For example, Independence and Flexibility (as measured by the California Psychological Inventory) were identified as traits that characterize a group of high-achieving mathematically gifted males in an early Talent Search (Weiss et al. 1974). These are excellent traits for students, who may need to pursue educational programs that differ from the norm, to possess.

Fox and Denham (1974) investigated interests and values in another study of early Talent Search participants. They found a high proportion of the students to be interested in investigative careers, though more so for the males. Among the females, investigative preferences were more common among the high scorers than among less talented girls. Similarly, they also reported a high Theoretical orientation for the group, based on the Allport–Vernon–Lindzey Study of Values. Again, this was more so for the males, but the small group of females assessed in this study scored higher on Theoretical than the general population. Subsequent studies continue to report a high Theoretical orientation among Talent Search students, with females also valuing Aesthetic and Social values, and males more likely to also value Political or Economic interests (Blackburn & Brody, 1996; Olszewski-Kubilius & Kulieke, 1989).

Distinctive patterns have also emerged from studies of Talent Search students using the *Myers-Briggs Type Indicator*. When compared to normative groups of adolescents, Talent Search students tend to be more open to new experiences and learning. They also express a preference for utilizing a Thinking mode of evaluating information, and they are more likely to be Introverts. By preferring Thinking over Feeling, Talent Search females look more like young men than females in general do (Mills, 1993).

Within the Talent Search group, studies found that students who score high on measures of both verbal and mathematical aptitudes have the strongest preferences for Introversion and Intuition, while high math but low verbal scorers prefer Thinking and Sensing. Investigative interests were also found to predominate among the students with high-math abilities (Mills, 1993). Similar patterns in regard to personality and learning style, as well as gender differences, were found in a group of gifted Irish adolescents (Mills & Parker, 1998). There are indications that these personality traits may influence the early career interests of Talent Search students. For example, Blackburn (1997) found that students' interests in pursuing careers in mathematics and the physical sciences were positively related to Introversion, interest in careers in law and sports were related to Extroversion, and careers in arts and humanities were related to Intuitiveness and Feeling.

Longitudinal follow-up studies of Talent Search students have affirmed the relevance of personality traits, interests, and values to predicting career choice and achievement among high-ability students over time (Achter, Lubinski, Benbow, & Eftekhari-Sanjani, 1999; Lubinski & Benbow, 2000; Lubinski, Webb et al., 2001). Differences in these traits may also explain some gender differences in career choice, especially with regard to mathematical and scientific fields (Achter et al., 1999; Mills, 1997; Schmidt, Lubinski, & Benbow, 1998). Thus, while identification of exceptional aptitude in an area such as mathematics in a Talent Search is predictive of a student's ability to achieve at a high level, personality traits and interests clearly influence the choices he or she makes, and assessment of these other factors enhances the predictability of the Talent Search score with regard to ultimate achievement in related career fields.

Twice-exceptional students. Researchers at Johns Hopkins began investigating high-ability students with concomitant learning disabilities in the early 1980s when there was still considerable skepticism that advanced cognitive abilities and serious academic difficulties resulting from learning disabilities could co-exist in the same individual. This work clearly demonstrated that highly gifted students could also have learning disabilities and led to recommendations for serving them (Fox, Brody, & Tobin, 1983).

Today, twice-exceptional students who meet eligibility requirements fully participate in Talent Search programs, sometimes with minor accommodations. This population continues to be of interest to researchers who have focused on gaining a better understanding of the unique needs of twice-exceptional students. In general, the importance of recognizing and addressing the students' need for challenge in their areas of strength has been emphasized rather than focusing primarily on remediation of the weakness (Brody & Mills 1997, 2004).

Gifted students from low-income or under-represented populations. The Talent Searches have also made special efforts to identify and include students from traditionally under-represented and low-income families in their programs and services (Olszewski-Kubilius, 2005; Ybarra, 2005). Studies of the performance of low-income students who qualify for and attend CTY programs have shown them to be highly successful in the classes they select. These students have also been found to have academic aspirations and self-concepts similar to other program participants. As a group, they place a high importance on getting good grades and attending a good college, and they value learning (Center for Talented Youth, 2003).

When students from disadvantaged backgrounds have been found to have deficits or gaps in skills or knowledge, targeted accelerated instruction has been shown to successfully address these deficits. Students made significant gains in mathematics achievement and aptitude in programs that specifically identified content that had not been mastered and allowed students to progress rapidly through it in a challenging program (Barnett, Gustin, & DuSel, 1996; Lynch & Mills, 1993; Mills, Stork, & Krug, 1992).

While summer programs and other interventions can clearly make a difference in the lives of disadvantaged learners, the importance of ongoing support for their academic needs has also been shown to be important (Brody, 2007a; VanTassel-Baska, 1989a). Recognition of this has led the Talent Searches to establish several year-round counseling initiatives to serve low-income gifted students. These include the Jack Kent Cooke Young Scholars Program, which is supported by the Jack Kent Cooke Foundation, and the Next Generation Venture Fund, which has numerous philanthropic sponsors. Preliminary evidence suggests that both have been highly successful in nurturing talent. For the Jack Kent Cooke program, in particular, the first cohorts of Jack Kent Cooke Young Scholar are now in college. Many of these students garnered prestigious awards and recognition before leaving high school, and they are attending prestigious colleges and universities (Brody, 2007a).

Family backgrounds. Numerous studies show that the majority of Talent Search participants come from fairly advantaged homes, with well-educated parents (e.g., Ablard, Mills, & Hoffhines, 1996; Blackburn & Brody, 1994; VanTassel-Baska, 1989b). In one study, for example, all but about 10% of Talent Search parents had some college experience, and more than half the fathers had graduate degrees (Center for Talented Youth, 2002). In a study of students who qualified for the Study of Exceptional Talent, the highest scorers among Talent Search participants, 75% of fathers and 49% of mothers reported having graduate degrees (Blackburn & Brody, 1994). Talent Search students are also more likely than is typical to come from families with both parents in the home (Blackburn & Brody, 1994; VanTassel-Baska, 1989b), though this is less true for Talent Search students from low-income families where divorce is more prevalent (VanTassel-Baska, 1989a).

Research has shown that most Talent Search students have positive feelings about their families and feel supported in their goals (Ablard, 2004). They report that their parents value and support educational opportunities, but they do not feel pressured to achieve at exceptionally high levels (Ablard & Parker, 1997; Center for Talented Youth, 2002). Nonetheless, parents have been shown to influence students' educational decisions through their expectations (Olszewski-Kubilius & Yasumoto, 1995).

Performance of Talent Search Students over Time

Numerous studies attest to the high achievements of Talent Search students over time, thus validating the predictability and usefulness of the talent identification process. The results also suggest that the educational choices that were made following the Talent Search identification, including decisions to accelerate, were appropriate for talent development.

For example, subjects who had participated in Talent Search while in middle school were surveyed at age 33. As a group, they achieved high levels of career success, as well as satisfaction in their careers. Gender differences were observed in that males were more represented in the inorganic sciences and engineering, while females were more represented in fields related to the medical, biological, or social sciences or the arts or humanities, but the level of satisfaction was high in both gender groups (Benbow, Lubinski, Shea, & Eftekhari-Sanjani, 2000; Webb, Lubinski, & Benbow, 2002).

While Talent Search participants overall have been found to achieve at high levels over time, within group differences have also been found, thus attesting even more precisely to the predictability of Talent Search scores. Wai et al. (2005), for example, compared students who had scored in the top quartile as Talent Search participants with those who had scored in the bottom quartile in an evaluation that took place 20 years later. They found the higher Talent Search test scores to be predictive of higher levels of achievement later in life.

The level of achievement has been found to be particularly high among the students in the very top range of Talent Search scorers, those who represent at least the top 1 in 10,000 in mathematical or verbal reasoning ability. SET serves these students and has observed high achievement in college acceptances, graduate school admissions, and career attainment (Brody & Blackburn, 1996; Muratori et al., 2006). In a study of 320 individuals in this group, Lubinski, Webb et al. (2001) found the subjects to have pursued doctoral degrees at rates 50 times higher than the general population, with a number having created noteworthy literary, scientific, or technical products by their early 20s. Most reported that they had accelerated their educational progress in some way.

Conclusion

The Johns Hopkins Talent Search (or MVT:D^4) model has effectively transcended the boundaries of time, place, and culture to become one of the most widely utilized and highly respected vehicles for identifying and serving students with advanced academic abilities. Now being adapted by educators in countries around the world, the Talent Searches have provided services to well over a million students, and this approach to talent identification and development is arguably the most extensively researched and validated one in existence.

The model builds on the psychology of individual differences, i.e., recognition that individuals can differ a great deal in their cognitive and affective traits and that these differences can influence behavior and achievement (see Lubinski, 2000). Assessment of these traits is critical in order to identify a student's unique needs, and systematic Talent Searches, using above-grade-level tests, have proven to be effective vehicles for identifying students with advanced reasoning abilities.

Once students are identified through the Talent Searches, their unique characteristics and individual needs determine appropriate strategies for serving them. The need to challenge students whose reasoning abilities are above-grade level is clear, however, and accelerative strategies have proven to be effective for meeting the needs of many of these advanced learners. In addition, supplemental options such as summer programs, competitions, and other extracurricular activities can serve to provide rigorous learning opportunities, as well as opportunities to interact with intellectual peers. The Talent Searches offer programs directly to the students they serve, and they also advocate an approach to educating gifted students that has implications for serving them both in- and out-of-school. For schools, recognition of individual differences in abilities and willingness to use curricular flexibility are crucial for meeting students' needs.

The principles and practices that Julian Stanley experimented with at Johns Hopkins when SMPY was established no longer seem experimental and have been well validated. With the early Talent Search participants embarked into their careers, some at illustrious levels, and follow-up studies attesting to the success of the intervention strategies they utilized, confidence in the Talent Search approach to serving gifted learners is assured. This confidence is reflected in worldwide interest among educators who want to adapt this approach in order to meet the educational needs of gifted students in their countries. With so much growth and expansion of the use of the Johns Hopkins Talent Search model likely to occur in the future, one can only wonder about the impact it will have on the next generation of highly precocious youth, the next generation of the world's potential problem solvers.

References

Ablard, K. E. (1997). Self-perceptions and needs as a function of type of academic ability and gender. *Roeper Review, 20*, 110–115.

Ablard, K. E. (2004). *The developmental study of talented youth (DSTY): Six-year trends*. Technical Report No. 31. Baltimore: Johns Hopkins Center for Talented Youth.

Ablard, K. E., Mills, C. J., & Hoffhines, V. L. (1996). *The developmental study of talented youth (DSTY): The participants*. Technical Report No. 13. Baltimore: Johns Hopkins Center for Talented Youth.

Ablard, K. E., & Parker, W. D. (1997). Parents' achievement goals and perfectionism in their academically talented children. *Journal of Youth and Adolescence, 26*, 651–667.

Achter, J. A., Lubinski, D., & Benbow, C. P. (1996). Multipotentiality among the intellectually gifted: "It was never there and already it's vanishing." *Journal of Counseling Psychology, 43*(1), 65–76.

Achter, J. A., Lubinski, D., Benbow, C. P., & Eftekhari-Sanjani (1999). Assessing the vocational preferences among gifted adolescents adds incremental validity to abilities: A discriminant analysis of educational outcomes over a 10-year interval. *Journal of Educational Psychology, 91*(4), 777–786.

Barnett, L. B., Albert, M. E., & Brody, L. E. (2005). The Center for Talented Youth talent search and academic programs. *High Ability Studies, 16*(1), 27–40.

Barnett, L. B., & Durden, W. G. (1993). Education patterns of academically talented youth. *Gifted Child Quarterly, 37*(4), 161–168.

Barnett, L. B., Gustin, W. C., & DuSel, J. C. (1996). Community challenge: Enhancing the academic achievement of children and youth. *Roeper Review, 19*(2), 111–114.

Bartkovich, K. G., & Mezynski, K. (1981). Fast-paced precalculus mathematics for talented junior-high students: Two recent SMPY programs. *Gifted Child Quarterly, 25*(2), 73–80.

Benbow, C. P. (1979). The components of SMPY's smorgasbord of accelerative options. *Intellectually Talented Youth Bulletin, 5*(10), 21–23.

Benbow, C. P. (1986). SMPY's model for teaching mathematically precocious students. In J. S. Renzulli (Ed.), *Systems and models for developing programs for the gifted and talented* (pp. 2–25). Mansfield, CT: Creative Learning Press.

Benbow, C. P. (1992). Academic achievement in mathematics and science between ages 13 and 23: Are there differences among students in the top one percent of mathematical ability? *Journal of Educational Psychology, 84*, 430–441.

Benbow, C. P., Lubinski, D., Shea, D. L., & Eftekhari-Sanjani, H. (2000). Sex differences in mathematical reasoning: Their status 20 years later. *Psychological Science, 11*, 474–480.

Benbow, C. P., Lubinski, D., & Suchy B. (1996). The impact of SMPY's educational programs from the perspective of the participant. In C. P. Benbow & D. Lubinski (Eds.), *Intellectual talent: Psychometric and social issues* (pp. 266–300). Baltimore: Johns Hopkins University Press.

Benbow, C. P., & Minor, L. L. (1990). Cognitive profiles of verbally and mathematically precocious students: Implications for identification of the gifted. *Gifted Child Quarterly, 34*(1), 21–26.

Benbow, C. P., Perkins, S., & Stanley, J. C. (1983). Mathematics taught at a fast pace: A longitudinal evaluation of SMPY's first class. In C. P. Benbow & J. C. Stanley (Eds.), *Academic precocity: Aspects of its development* (pp. 113–138). Baltimore: Johns Hopkins University Press.

Benbow, C. P., & Stanley, J. C. (1980). Sex differences in mathematical ability: Fact or artifact? *Science, 210*, 1262–1264.

Benbow, C. P., & Stanley, J. C. (Eds.) (1983). *Academic precocity: Aspects of its development*. Baltimore: Johns Hopkins University Press.

Benbow, C. P., & Stanley, J. C. (1996). Inequity in equity: How equity can lead to inequity for high-potential students. *Psychology, Public Policy, & the Law, 2*(2), 249–292.

Blackburn, C. C. (1997) *The developmental study of talented youth: Early career interests*. Technical report No. 20. Baltimore; Johns Hopkins Center for Talented Youth.

Blackburn, C. C., & Brody, L. E. (1994). Family background characteristics of students who reason extremely well mathematically and/or verbally. In N. Colangelo, S. G. Assouline, & D. L. Ambroson (Eds.), *Talent development* (Vol. II., pp. 439–444). Dayton, OH: Ohio Psychology Press.

Blackburn, C. C., & Brody, L. E. (1996). *The Study of Exceptional Talent: A longitudinal study*. Technical Report No. 24. Baltimore: Johns Hopkins Center for Talented Youth.

Brody, L. E. (1998). The talent searches: A catalyst for change in higher education. *Journal of Secondary Gifted Education, 9*(3), 124–133.

Brody, L. E. (2005). The Study of Exceptional Talent. *High Ability Studies, 16*(1), 87–96.

Brody, L. E. (2007a). Center for Talented Youth (CTY). In J. VanTassel-Baska & T. Stambaugh (Eds.), *Overloooked gems: A national perspective on low-income promising learners* (pp. 77–81). Washington DC: National Association for Gifted Children.

Brody, L. E. (2007b). Counseling highly gifted students to utilize supplemental educational opportunities: Using the SET program as a model. In J. L. VanTassel-Baska (Ed.), *Serving gifted learners beyond the traditional classroom* (pp. 123–143). Waco, TX: Prufrock Press.

Brody, L. E., Assouline, S. G., & Stanley, J. C. (1990). Five years of early entrants: Predicting successful achievement in college. *Gifted Child Quarterly, 34*(4), 138–142.

Brody, L. E., & Benbow, C. P. (1986). Social and emotional adjustment of adolescents extremely talented in verbal or mathematical reasoning. *Journal of Youth and Adolescence, 15*(1), 1–18.

Brody, L. E., & Benbow, C. P. (1987). Accelerative strategies: How effective are they for the gifted? *Gifted Child Quarterly, 31*, 105–110.

Brody, L. E., & Blackburn, C. (1996). Nurturing exceptional talent: SET as a legacy of SMPY. In C. P. Benbow & D. Lubinski (Eds.), *Intellectual talent: Psychometric and social issues* (pp. 246–265). Baltimore: Johns Hopkins University Press.

Brody, L. E., & Fox, L. H. (1980). An accelerative intervention program for mathematically gifted girls. In L. Brody, L. H. Fox, & D. Tobin (Eds.), *Women and the mathematical mystique* (pp. 164–178). Baltimore: Johns Hopkins University Press.

Brody, L. E., Lupkowski, A. E., & Stanley, J. C. (1988). Early entrance to college: A study of the academic and social adjustment during the freshman year. *College and University, 63*(4), 347–359.

Brody, L. E., & Mills, C. J. (1997). Gifted children with learning disabilities: A review of the issues. *Journal of Learning Disabilities, 30*, 282–296.

Brody, L. E., & Mills, C. J. (2004). Linking assessment and diagnosis to intervention for gifted students with learning disabilities. In T. M. Newman & R. J. Sternberg (Eds.), *Students with both gifts and learning disabilities: Identification, assessment, & outcomes* (pp. 73–94). New York: Kluwer Academic.

Brody, L. E., & Mills, C. J. (2005). Talent search research: What have we learned? *High Ability Studies, 16*(1), 97–111.

Brody, L. E., Muratori, M. C., & Stanley, J. C. (2004). Early entrance to college: Academic, social, and emotional considerations. In N. Colangelo, S. G. Assouline, & M. U. M Gross (Eds.), *A nation deceived: How schools hold back America's brightest kids* (Vol. II, pp. 97–107). Iowa City: University of Iowa.

Brody, L. E., & Stanley, J. C. (1991). Young college students: Assessing factors that contribute to success. In W. T. Southern & E. D. Jones (Eds.), *The academic acceleration of gifted children* (pp. 103–131). New York: Teachers College Press.

Brody, L. E., & Stanley, J. C. (2005). Youths who reason exceptionally well mathematically and/or verbally: Using the

MVT:D^{4}model to develop their talents. In R. J. Sternberg & J. E. Davidson (Eds.), *Conceptions of giftedness* (2nd ed., pp. 20–37). New York: Cambridge University Press.

Brody, L. E., Stanley, J. C., Barnett, L. B., Juhasz, S. E., Gilheany, S., & Touron, J. (2001). Expanding the Johns Hopkins talent search internationally. *Gifted and Talented International, 16*(2), 94–107.

Burton, N. W. (1988). *Survey II: Test taking history for 1980–81 young SAT-takers*. New York: College Board.

Campbell, D. T., & Stanley, J. C. (1966). *Experimental and quasi-experimental designs for research*. Chicago: Rand McNally.

Center for Talented Youth (2002). *Parents' values and children's perceived pressure*. Topical Research Series 4. Baltimore: Johns Hopkins Center for Talented Youth.

Center for Talented Youth (2003). *CTY-Goldman Sachs young scholars program annual report.* Baltimore: Johns Hopkins Center for Talented Youth.

Colangelo, N., Assouline, S. G., & Gross, M. U. M. (2004). *A nation deceived: How schools hold back America's brightest students*. Iowa City, Iowa: University of Iowa.

Dauber, S. L., & Benbow, C. P. (1990). Aspects of personality and peer relations of extremely talented adolescents. *Gifted Child Quarterly, 34*(1), 10–15.

Daurio, S. P. (1979). Educational enrichment versus acceleration: A review of the literature. In W. C. George, S. J. Cohn, & J. C. Stanley (Eds.), *Educating the gifted: Acceleration and enrichment* (pp. 13–63). Baltimore: Johns Hopkins University Press.

Fox, L. H. (1974). A mathematics program for fostering precocious achievement. In J. C. Stanley, D. P. Keating, & L. H. Fox (Eds.), *Mathematical talent: Discovery, description, and development* (pp. 101–125). Baltimore: Johns Hopkins University Press.

Fox, L. H., Brody, L., & Tobin, D. (Eds.). (1980). *Women and the mathematical mystique*. Baltimore: Johns Hopkins University Press.

Fox, L. H., Brody, L., & Tobin, D. (Eds.). (1983). *Learning-disabled/gifted children: Identification and programming*. Austin, TX: Pro-ed.

Fox, L. H., & Denham, S. A. (1974). Values and career interests of mathematically and scientifically precocious youth. In J. C. Stanley, D. P. Keating, & L. H. Fox (Eds.), *Mathematical talent: Discovery, description, and development* (pp. 140–175). Baltimore: Johns Hopkins University Press.

Fox, L. H., Tobin, D., & Brody, L. (1979). The impact of early intervention programs upon course-taking and attitudes in high school. In S. F. Chipman, L. R. Brush, & D. M. Wilson (Eds.), *Women and mathematics: Balancing the equation* (pp. 249–274). Hillsdale, NJ: Lawrence Erlbaum

Frost, P. (2005). The CTY summer school model: Evolvement, adaptation, and extrapolation at the National Academy for Gifted and Talented Youth (England). *High Ability Studies, 16*(1), 137–153.

George, W. C., & Denham, S. A. (1976). Curriculum experimentation for the mathematically talented. In D. P. Keating (Ed.), *Intellectual talent: Research and development* (pp. 103–131). Baltimore: Johns Hopkins University Press.

Gilheany, S. (2001). The Irish Centre for Talented Youth: An adaptation of the Johns Hopkins talent search model. *Gifted and Talented International, 16*(2), 102–104.

Gilheany, S. (2005). The Irish Centre for Talented Youth. *High Ability Studies, 16* (1), 113–120.

Gustin, W. C., & Corazza, L. (1994). Mathematical and verbal reasoning as predictors of science achievement. *Roeper Review, 6*, 160–162.

Hollingworth, L. S. (1942). *Children above IQ 180 Stanford Binet*. Yonkers, NY: World Book Co.

Jarosewich, T., & Stocking, V. B. (2003). Talent search: Student and parent perceptions of out-of-level-testing. *Journal of Secondary Gifted Education, 14*, 137–150.

Keating, D. P. (1974). The Study of Mathematically Precocious Youth. In J. C. Stanley, D. P. Keating, & L. H. Fox (Eds.), *Mathematical talent: Discovery, description, and development* (pp. 23–46). Baltimore: Johns Hopkins University Press.

Keating, D. P. (1976). *Intellectual talent: Research and development*. Baltimore: Johns Hopkins University Press.

Kolitch, E. R., & Brody, L. E. (1992). Mathematics acceleration of highly talented students: An evaluation. *Gifted Child Quarterly, 36*, 78–86.

Lehman, H. C. (1953). *Age and achievement*. Princeton, NJ: Princeton University Press.

Lubinski, D. (2000). Scientific and social significance of assessing individual differences: "Sinking shafts at a few critical points." *Annual Review of Psychology, 51*, 405–444.

Lubinski, D., & Benbow, C. P. (2000). States of excellence. *American Psychologist, 55*(1), 137–150.

Lubinski, D., Benbow, C. P., Shea, D. L., Eftekhari-Sanjani, H., & Halforson, M. B. J. (2001). Men and women at promise for scientific excellence: Similarity not dissimilarity. *Psychological Science, 12*(4), 309–317.

Lubinski, D., Webb, R. M., Morelock, M. J., & Benbow, C. P. (2001). Top 1 in 10,000: A 10-year follow-up of the profoundly gifted. *Journal of Applied Psychology, 86*, 718–729.

Lupkowski-Shoplik, S., Benbow, C. P., Assouline, S. G., & Brody, L. E. (2003). Talent searches: Meeting the needs of academically talented youth. In N. Colangelo & G. A. Davis (Eds.), *Handbook of gifted education* (pp. 204–218). Boston: Allyn & Bacon.

Luthar, S. S., Zigler, E., & Goldstein, D. (1992). Psychosocial adjustment among intellectually gifted adolescents: The role of cognitive-developmental and experiential factors. *Journal of Child Psychology and Psychiatry, 33*(2) 361–373.

Lynch, S. J. (1990). Credit and placement issues for the academically talented following summer studies in science and mathematics. *Gifted Child Quarterly, 34*, 270–30.

Lynch, S. J. (1992). Fast-paced high school science for the academically talented: A six-year perspective. *Gifted Child Quarterly, 36*(3), 147–154.

Lynch, S. J., & Mills, C. J. (1993). Identifying and preparing disadvantaged minority youth for high level academic achievement. *Contemporary Educational Psychology, 18*, 66–76.

Mills, C. J. (1992). *Gender, personality, and academic ability*. Paper presented at the 15th annual conference of the Eastern Educational Research Association, Hilton Head, SC.

Mills, C. J. (1993). Personality, learning style, and cognitive style profiles of mathematically talented students. *European Journal for High Ability, 4*, 70–85.

Mills, C. J. (1997). *Gender differences in math/science achievement: The role of personality variables*. Paper presented at the 20th annual Conference of the Eastern Educational Research Association, Hilton Head, SC.

Mills, C. J., & Ablard, K. E. (1993). Credit and placement for academically talented students following special summer courses in math and science. *Journal for the Education of the Gifted, 17*, 4–25.

Mills, C. J., Ablard, K. E., & Lynch, S. J. (1992). Academically talented students' preparation for advanced-level coursework after an individually-paced precalculus class. *Journal for the Education of the Gifted, 16*, 3–17.

Mills, C. J., Ablard, K. E., & Stumpf, H. (1993). Gender differences in academically talented young students across age and subskills. *Journal of Educational Psychology, 85*, 340–346.

Mills, C. J., & Parker, W. D. (1998). Cognitive-psychological profiles of gifted adolescents from Ireland and the U.S.: Cross-societal comparisons. *International Journal of Intercultural Relations, 22*(6), 1–16.

Mills, C. J., Stork, E. J., & Krug, D. (1992). Recognition and development of academic talent in educationally disadvantaged students. *Exceptionality, 3*, 165–180.

Muratori, M. C. (2007). *Early entrance to college: A guide to success*. Waco, TX: Prufrock Press.

Muratori, M., Stanley, J. C., Gross, M. U. M., Ng, L., Tao, T., & Ng, J. (2006). Insights from SMPY's former child prodigies: Drs. Terrence (Terry) Tao and Lenhard (Lenny) Ng reflect on their talent development. *Gifted Child Quarterly, 50*(4), 307–324.

Olszewski-Kubilius, P. (1989). Development of academic talent: The role of summer programs. In J. L. VanTassel-Baska & P. Olszewski-Kubilius (Eds.), *Patterns of influence on gifted learners* (pp. 214–230). New York: Teachers College Press.

Olszewski-Kubilius, P. (1995). A summary of research regarding early entrance to college. *Roeper Review, 18*, 121–126.

Olszewski-Kubilius, P. (1998). Research evidence regarding the validity and effects of talent search educational programs. *Journal of Secondary Gifted Education, 9*(3), 134–138.

Olszewski-Kubilius, P. (2005). The Center for Talent Development at Northwestern University: An example of replication and reformation. *High Ability Studies, 16*(1), 55–69.

Olszewski-Kubilius, P., & Grant, B. (1996). Academically talented females and mathematics: The role of special programs and support from others in acceleration, achievement, and aspirations. In K. Arnold, K. Noble, & R. F. Subotnik (Eds.), *Remarkable women: Perspectives on female talent development* (pp. 281–294). Cresskill, NJ: Hampton Press.

Olszewski-Kubilius, P., & Kulieke, M. J. (1989). Personality development of gifted adolescents. In J. VanTassel-Baska & P. Olszewski-Kubilius (Eds.), *Patterns of influence on talent development: The home, the self and the school* (pp. 125–145). New York: Teachers College Press.

Olszewski-Kubilius, P., Kulieke, M. J., Willis, G. B., & Krasney, N. (1989). An analysis of the validity of SAT entrance scores for accelerated classes. *Journal for the Education of the Gifted, 13*(1), 37–54.

Olszewski-Kubilius, P., & Yasumoto, J. (1995). *Journal for the Education of the Gifted, 18*(3), 298–318.

Parker, W. D. (1994). Psychological adjustment in mathematically gifted students. *Gifted Child Quarterly, 40*, 154–157.

Parker, W. D., & Mills, C. J. (1996). The incidence of perfectionism in gifted students. *Gifted Child Quarterly, 40*(4), 194–199.

Pollins, L. D. (1983). The effects of acceleration on the social and emotional development of gifted students. In C. P. Benbow & J. C. Stanley (Eds.), *Academic precocity: Aspects of its development* (pp. 160–178). Baltimore: Johns Hopkins University Press.

Putallaz, M., Baldwin, J., & Selph, H. (2005). The Duke University Talent Identification Program. *High Ability Studies, 16*(1), 41–54.

Richardson, T. M., & Benbow, C. P. (1990). Long-term effects of acceleration on the social-emotional adjustment of mathematically precocious youths. *Journal of Educational Psychology, 82*(3), 464–470.

Rigby, K. (2005). Rocky Mountain Talent Search at the University of Denver. *High Ability Studies, 16*(1), 71–75.

Robinson, N. M., Abbott, R. D., Berninger, V. W., & Busse, J. (1996). The structure of abilities in math-precocious young children: Gender similarities and differences. *Journal of Educational Psychology, 88*(2), 341–352.

Schiel, J. L., & Stocking, V. B. (2001). Benefits of TIP summer residential program participation, as reflected by subsequent academic performance in high school. In N. Colangelo & S. G. Assouline (Eds.), *Talent development IV: Proceedings from the 1998 Henry B. and Jocelyn Wallace National Research Symposium on Talent Development* (pp. 435–438). Scottsdale, AZ: Great Potential Press.

Schmidt, D. B., Lubinski, D., & Benbow, C. P. (1998). Validity of assessing educational-vocational preference dimensions among intellectually talented 13-year-olds. *Journal of Counseling Psychology, 45*(4), 436–453.

Shea, D. L., Lubinski, D., & Benbow, C. P. (2001). Importance of assessing spatial ability in intellectually talented young adolescents: A 20-year longitudinal study. *Journal of Educational Psychology, 93*(3), 604614.

Stanley, J. C. (1973). Accelerating the educational progress of intellectually gifted youths. *Educational Psychologist, 10*(3), 133–146.

Stanley, J. C. (1974). Intellectual precocity. In J. C. Stanley, D. P. Keating, & L. H. Fox (Eds.), *Mathematical talent: Discovery, description and development* (pp. 1–22). Baltimore: Johns Hopkins University Press.

Stanley, J. C. (1976). Special fast-mathematics classes taught by college professors to fourth through twelfth graders. In D. P. Keating (Ed.), *Intellectual talent: Research and development* (pp. 132–159). Baltimore: Johns Hopkins University Press.

Stanley, J. C. (1977–78). The predictive value of the SAT for brilliant seventh and eighth graders. *College Board Review*, No. 106, 31–37.

Stanley, J. C. (1980). Manipulate important educational variables. *Educational Psychologist, 15*(3), 164–171.

Stanley, J. C. (1985). How did six highly accelerated gifted students fare in graduate school? *Gifted Child Quarterly, 29*(4), 180. Reprinted S. M. Reis (Series Ed.) and L. E. Brody (Vol. Ed.), *Essential Readings in Gifted Education: Vol. 3 Grouping and acceleration practices in gifted education* (pp. 1–2). Thousand Oaks, CA: Corwin Press.

Stanley, J. C. (1987). Making the IMO team: The power of early identification and encouragement. *G/C/T, 10*(2), 22–23.

Stanley, J. C. (2005). A quiet revolution: Finding boys and girls who reason extremely well mathematically and/or verbally and helping them get the supplemental educational opportunities they need. *High Ability Studies, 16*(1), 5–14.

Stanley, J. C., Benbow, C. P., Brody, l. E., Dauber, S., & Lupkowski, A. E. (1992). Gender differences on eighty-six nationally standardized aptitude and achievement tests. In N. Colangelo, S. G. Assouline, & D. L. Ambroson (Eds.), *Talent development: Proceedings from the 1991 Henry B. and Jocelyn Wallace National Research Symposium on Talent Development* (pp. 42–65). Uniondale, NY: Trillium Press, 1992.

Stanley, J. C., & Brody, L. E. (2001). History and philosophy of the talent search model. *Gifted and Talented International, 16*(2), 94–96.

Stanley, J. C., Feng, C. D., & Zhu, X. (1989). Chinese youths who reason extremely well mathematically: Threat or bonanza? *Network News and Views, 8*, 33–39.

Stanley, J. C., Keating, D., & Fox, L. H. (Eds.) (1974). *Mathematical talent: Discovery, description, and development*. Baltimore: Johns Hopkins University Press.

Stanley, J. C., & McGill, A. M. (1986). More about "Young entrants to college: How did they fare?" *Gifted Child Quarterly, 30*, 70–73.

Stanley, J. C., & Stanley, B. S. K. (1986). High-school biology, chemistry, or physics learned well in three weeks. *Journal of Research in Science Teaching, 23*(3) 237–250.

Stocking, V. B., & Goldstein, V. B. (1992). Course selection and performance of very high ability students: is there a gender gap? *Roeper Review, 15*(1), 48–51.

Stumpf, H. (1993). Components of spatial ability and their relationship to success in accelerated mathematics and science courses. In E. A. Hany & K. A. Heller (Eds.), *Competence and responsibility: The third European conference of the European Council for High Ability* (pp. 286–297). Seattle: Hogrefe & Huber.

Stumpf, H., & Stanley, J. C. (1996). Gender-related differences on the College Board's Advanced Placement and achievement tests, 1982–1992. *Journal of Educational Psychology, 88*, 353–364.

Stumpf, H., & Stanley, J. C. (1997). The gender gap in Advanced Placement computer science: Participation and performance, 1984–1996. *College Board Review, 181*, 22–27.

Southern, W. T., Jones, E. D., & Stanley, J. C. (1993). Acceleration and enrichment: The content and development of programs. In E. A. Heller, F. K. Monks, & A. H. Passow (Eds.), *International handbook of research and development of giftedness and talent* (pp. 387–409). New York: Pergamon.

Swiatek, M. A., & Benbow, C. P. (1991a). A ten-year follow-up of participants in a fast-paced mathematics course. *Journal for Research in Mathematics Education, 22*(2), 138–150.

Swiatek, M. A., & Benbow, C. P. (1991b). A ten-year longitudinal follow-up of ability-matched accelerated and unaccelerated gifted students. *Journal of Educational Psychology, 83*, 528–538.

Terman, L. M. (Ed.) (1925). Mental and physical traits of a thousand gifted children. *Genetic studies of genius* Vol. I. Stanford, CA: Stanford University Press.

Touron, J. (2001). School and College Ability Test (SCAT) validation in Spain: Overview of the process and some results. *Gifted and Talented International, 16*(2), 104–107.

Touron, J. (Ed.) (2005). *The Center for Talented Youth model*. Special issue of *High Ability Studies, 16*(1).

Touron, J., Touron, M., & Silvero, M. (2005). The Center for Talented Youth Spain: An initiative to serve highly able students. *High Ability Studies, 16*(1), 121–135.

VanTassel-Baska, J. (1989a). The role of the family in the success of disadvantaged gifted learners. In J. L. VanTassel-Baska & P. Olszewski-Kubilius (Eds.), *Patterns of influence on gifted learners* (pp. 60–80). New York: Teachers College Press.

VanTassel-Baska, J. (1989b). Profiles of precocity: A three-year study of talented adolescents. In J. L. VanTassel-Baska & P. Olszewski-Kubilius (Eds.), *Patterns of influence on gifted learners* (pp. 29–39). New York: Teachers College Press.

VanTassel-Baska, J. (1996). Contributions of the talent search concept to gifted education. In C. P. Benbow & D. Lubinski (Eds.), *Intellectual talent: Psychometric and social issues* (pp. 236–245). Baltimore: Johns Hopkins University Press.

Wai, J., Lubinski, D., & Benbow, C. P. (2005). Creativity and occupational accomplishments among intellectually precocious youths: An age 13 to age 33 longitudinal study. *Journal of Educational Psychology, 97*(3), 484–492.

Wallace, P. (2005). Distance education for gifted students: Leveraging technology to expand academic options. *High Ability Studies, 16*(1), 77–86.

Webb, R. M., Lubinski, D., & Benbow, C. P. (2002). Mathematically facile adolescents with math-science aspirations: New perspectives on their educational and vocational development. *Journal of Educational Psychology, 94*(4), 785–794.

Weiss, D. S., Haier, R. J., & Keating, D. P. (1974). Personality characteristics of mathematically precocious youth. In J. C. Stanley, D. P. Keating, & L. H. Fox (Eds.), *Mathematical talent: Discovery, description, and development* (pp. 126–139). Baltimore: Johns Hopkins University Press.

Wilder, G., & Casserly, P. L. (1988). *Survey I: young SAT-takers and their parents*. New York: College Board.

Ybarra, L. (2005). Beyond national borders: the Johns Hopkins University Center for Talented Youth reaching out to gifted children throughout the world. *High Ability Studies, 16*(1), 15–26.

Zuckerman, H. (1977). *Scientific elite: Nobel laureates in the United States*. New York: Free Press.