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Abstract

In this monograph, the authors advanced a set of interrelated arguments: The abilities of individuals do matter, particularly their abilities in specific talent domains; different talent domains have different developmental trajectories that vary as to when they start, peak, and end; and opportunities provided by society are crucial at every point in the talent development process. The authors argue that society must strive to promote these opportunities, but that individuals with talent also have some responsibility for their own growth and development. Furthermore, the research knowledge base indicates that psychosocial variables are determining influences in the successful development of talent. Finally, preparing young people for outstanding achievement or eminence ought to be the chief goal of gifted education.

Keywords

definition and/or conception of giftedness/talent, age/developmental stage, social and/or emotional development and adjustment

For nearly a century, scholars have sought to understand, measure, and explain giftedness. Succeeding theories and empirical investigations have often built on earlier work, complementing or sometimes clashing over conceptions of talent or contesting the mechanisms of talent development. Some have even suggested that giftedness itself is a misnomer, mistaken for the results of endless practice or social advantage. The current landscape of knowledge about giftedness and gifted education was surveyed and published in *Psychological Science and the Public Interest* (2011, Vol. 12, Issue 1; available for free download at <http://psi.sagepub.com/content/12/1/3.full?ijkey=bwNip9GMWeg2&keytype=ref&siteid=sppsi>) and is summarized here. Given space limitations, many of the topics covered in the monograph are not included in this overview (e.g., educating gifted students, major models of giftedness, methodological challenges, and a research agenda) or are substantially condensed, and we refer readers to the original monograph for a full explication of these issues as well as the full and comprehensive list of references associated with the article.

To frame our discussion, we propose a definition of giftedness that we intend to be comprehensive and useful across all domains of endeavor:

Giftedness is the manifestation of performance that is clearly at the upper end of the distribution in a specific talent domain even relative to other high-functioning individuals in that domain. Further, giftedness can be viewed as developmental in that in

the beginning stages, potential is the key variable; in later stages, achievement is the measure of giftedness; and in fully developed talents, eminence is the basis on which this label is granted. Both cognitive and psychosocial variables play an essential role in the manifestation of giftedness at every developmental stage, are malleable, and need to be deliberately cultivated.

The education research and policy communities in the United States and some Western European nations have been generally resistant to addressing academic giftedness in research, policy, and practice, based on the assumption that academically gifted children will be successful no matter what educational environment they are placed in. These arguments run counter to psychological science indicating the need for *all* students (including the most gifted) to be challenged in their schoolwork and that effort and appropriate educational programming, training and support are required to develop a student's talents and abilities.

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Consensus and Controversy: What Do We Know From Psychological Science?

Strong research evidence suggests we have considerable common ground, although several important controversies exist.

Contributors to Giftedness

Several variables in the literature are associated with outstanding achievement. The most important of these include general and domain-specific ability, creativity, motivation and mind-sets, task commitment, passion, interest, opportunity, and chance. Below, we highlight areas of agreement and contention in light of the current evidence.

Ability. The role of ability in giftedness is one of the most contested issues, although it is also one of the areas in which there is a considerable body of evidence. There are two questions that generate heated debates: (a) Is high ability necessary for outstanding accomplishments? (b) Is ability innate? There is no doubt in the research community that individual differences in ability exist in children (Neisser et al., 1996) and that ability, especially operationalized as IQ and other standardized measures, has predictive validity for many important outcomes, including school achievement (Kuncel & Hezlett, 2010). Disagreement lies in whether initial differences in ability are *causally* related to outstanding performance in the future and whether differences in ability are innate.

Is ability innate? The literature shows that abilities are derived from both genetic and environmental components, and are also modifiable. Arguing for a genetic basis to ability, researchers have put forward compelling accounts of nature–nurture interactions in the development of talent (see Dai & Coleman, 2005). Simonton (1999) argued that current understandings of talent as innate may be overly simplistic. He contended that talent is best understood in terms of emergent and epigenetic inheritance. The epigenetic perspective suggests that different traits will manifest at different times over the course of development.

How important are domain-specific abilities to outstanding performance? There are some domains in which this question has been addressed extensively and many domains in which it has not been addressed at all. Lubinski and colleagues (e.g., Wai, Lubinski, & Benbow, 2005) have found that specific mathematics and verbal abilities measured around age 13 in high-achieving students have predictive value for important educational and occupational outcomes, such as obtaining a doctorate, earning a good income, producing patents, and being awarded tenure at a top university. These studies have also shown that verbal versus quantitative tilt in abilities predicts differences in domains of accomplishment, with verbal tilt increasing the probability of accomplishments in the humanities and quantitative tilt increasing the probability of accomplishments in STEM

(science, technology, engineering, and mathematics) fields (Park, Lubinski, & Benbow, 2007).

The nature and importance of domain-specific talents may also differ by discipline. In another study of mathematical talent, Krutetskii (1976) identified mathematical cast of mind as a basic ability. The choreographer Eliot Feld, based on years of experience building dance troupes and educating novice dance stars, identifies potential dancers around the age of 8. His auditions seek indicators of flexibility, body proportion, and physical memory (Subotnik, 2002). In field hockey, researchers (e.g., Elferink-Gemser, Kannekens, Lyons, Tromp, & Visscher, 2010) found that elite and sub-elite players had better technical and tactical skills than non-elite players and that elite players also had better procedural skills than sub-elite players.

Creativity. Creativity, the ability to come up with novel and useful ideas or ways of doing things, has a long historical association with giftedness (Renzulli, 1978).

Creativity, ability, practice, and expertise. There are those who argue that creativity and general ability in a domain are related but distinct phenomena and that both are necessary for eminent levels of achievement (e.g., Renzulli, 1977). Some subscribe to the ability threshold/creativity hypothesis, which postulates that the likelihood of producing something creative increases with intelligence up to about an IQ of 120 (Dai, 2010). However, some research findings refute the ability threshold/creativity hypothesis. In a series of studies, Park et al. (2007) and Wai et al. (2005) showed that creative accomplishments in academic (degrees obtained), vocational (careers), and scientific (patents) arenas are predicted by differences in ability. These researchers argue that previous studies have not found a relationship between cognitive ability and creative accomplishments because measures of ability and outcome criteria typically do not have high enough ceilings to capture variation in the upper tail of the distribution and the time frame is not long enough to detect indices of more matured talent such as the acquisition of a patent.

Another debate in the field of gifted education is whether creativity is a generalized trait or a domain-specific capacity (see Plucker & Beghetto, 2004). The lack of agreement stems, in part, from the distinction between childhood creativity, which is often conceptualized as a person-centered trait, and adult creativity, which is generally thought of in terms of a process related to a particular product or domain in a specific time and place. There is general consensus on a distinction between *little c* and *Big C* creativity. Little *c* creativity refers to accomplishments that are unique to a classroom or office, or to the person. Big *C* creativity, on the other hand, refers to groundbreaking, field- and culture-altering products and knowledge, which occur in the broadest social context and involve eminent levels of creative productivity (Kaufman & Beghetto, 2009). Researchers (e.g., Simonton, 1992) also suggest that eminent producers across a variety of domains spend less time engaged in training and practice before beginning to make notable contributions.

Creativity versus expertise. Some scholars (e.g., Sternberg, 2005) distinguish between experts and creative producers. Experts are those who perform at high levels in their fields or occupations, without necessarily transforming current thinking or standards. Creative producers, on the other hand, generate new knowledge or art forms and significantly alter a field with their work. However, there is still debate about whether creative productivity is dependent on expertise in a field.

Plucker and Beghetto (2004) argued that being too deeply entrenched in the current knowledge and concepts of a field can result in being less open to outside perspectives or alternative ways of approaching problems. Alternatively, flexible thinking, or the ability to apply information from a different area to a new problem when needed, may be the key to creative productivity in general and to being creative in multiple domains. It is also possible that technical precision, skill automaticity, and large stores of knowledge are more important at certain stages of talent development than at others (Dai, 2010).

Creativity and eminence. Research indicates that creativity is clearly related to outstanding performance. In 1977, Simonton found that both creative productivity and creative longevity were direct predictors of eminence as a composer. Historical analyses and biographical studies show that each domain establishes traditions of taste, which can vary within a culture and historical period in response to creative contributions (Csikszentmihalyi, 1988), thereby affecting the attribution of eminence to any given individual.

Creativity in childhood versus adulthood. Cramond, Matthews-Morgan, Bandalos, and Zuo (2005) and Plucker (1999) shed some light on the continuity between childhood and adulthood creativity. These authors reported on a multidecade follow-up of students identified as creative with the Torrance Tests of Creative Thinking (Torrance, 1974). Torrance Test of Creative Thinking scores from childhood, which largely measure divergent thinking, predicted the quantity and quality of publicly recognized creative accomplishments in adulthood, accounting for 23% of the variance, and, according to Plucker (1999), divergent thinking contributed 3 times more than IQ. There is also some empirical support for continuity in creative processes across disparate domains, suggesting the contribution of general rather than domain-specific creative ability, at least in terms of some processes or skills (Root-Bernstein & Root-Bernstein, 2004).

Motivation. Several researchers argue that motivation—that is, drive or grit—is at the center of eminent levels of achievement (e.g., Duckworth, Kirby, Tsukayama, Berstein, & Ericsson, 2010) and credit motivation with determining an individual's ability to garner, respond to, and capitalize on talent development opportunities.

Intrinsic and extrinsic motivation. Intrinsic motivation refers to engaging in a task for the sake of learning, and extrinsic motivation refers to engaging in tasks for external factors such as rewards or instrumentality (i.e., practical utility).

Despite the generally held belief that gifted students tend to be intrinsically motivated, Covington and Dray (2002) showed that many high academic achievers are motivated both by valuing learning (intrinsic) and by proving their ability through accomplishment (extrinsic).

Achievement motivation. Dweck (2006) coined the term *mind-set* to describe assumptions held by children and youth about intelligence and achievement that affect the way that they respond to challenge, reward, feedback, and setbacks. Dweck has demonstrated the positive impacts of viewing intelligence as malleable and subject to modification. According to the theory of achievement motivation (Eccles, O'Neill, & Wigfield, 2005), children and adolescents consider how challenging the task might be for them. Concurrently, they gauge the task by virtue of how important doing well or poorly at it might be for them, how much they enjoy it, and what role it might play in their future goals. If the answer to both “can I?” and “do I want to?” is “yes,” then it is likely that the respondent will be motivated to engage in the task.

Task commitment. In 1977, Renzulli challenged the established conceptualization of giftedness as IQ by introducing a three-factor definition of giftedness: above average but not necessarily superior ability, task commitment, and creativity. Task commitment is best thought of as the constellation of psychosocial variables that translates ability and potential into outstanding performance.

Task commitment came to the fore again in the research of Ericsson and his colleagues (e.g., Ericsson, Nandagopal, & Roring, 2005) with their focus on deliberate practice. Ericsson et al. (1993) showed how the amount of deliberate practice differentiated among three tiers of talented violin players. There are two important points to make about this research. First, Ericsson et al. contended that deliberate practice is not enjoyable but is engaged in because it is instrumental. This hypothesis suggests that those who engage in the amount of practice that results in elite performance are higher in another aspect of task commitment than their peers, that is, self-regulation. However, it is also probable that the mastery that comes from extended deliberate practice also has intrinsic value for elite performers (Csikszentmihalyi, 1990).

Second, it is worth noting that deliberate practice *aimed at technical proficiency* is more relevant to some aspects of a domain than others. It will therefore be important to learn how domain-specific ability (e.g., musicality) interacts with deliberate practice to result in creative performance beyond mastery of high-level technique (cf. Ruthsatz, Detterman, Griscom, & Cirullo, 2008).

Emotional Trauma. Many eminent individuals experienced family tragedies early in life or lived in dysfunctional, chaotic, and challenging family situations (Albert, 1994), suggesting that these environments facilitate creative productivity by engendering characteristics that help individuals meet the demands of creative careers or jobs that involve tackling ill-defined, unstructured, and complex problems. These characteristics include early psychological independence,

self-sufficiency, an ability to cope with high levels of stress, resiliency, emotional strength, a tolerance for ambiguity, intellectual risk taking, and a preference for challenge (Olszewski-Kubilius, 2008). Difficult childhoods, childhood trauma, or experiences of marginalization may also create compelling psychological needs that are ameliorated or compensated for through creative productivity in adulthood (Ochse, 1990). It is also clear that some eminent individuals did not grow up in dysfunctional environments and that many individuals from such environments never become eminent.

Parents. Goertzel and Goertzel (1962) studied the biographies of eminent 20th-century politicians, reformers, musicians, and artists to isolate the special role of parents in their children's long-term achievements. An emergent consistent theme was the strong values held by these parents for intellectual or creative excellence and recognition. This drive was channeled into their children's talent development, often at the expense of the parents' own personal fulfillment. Syntheses of retrospective studies on eminent individuals' early lives by Ochse (1990) and others highlighted the ample encouragement and intellectual stimulation offered to talented offspring. However, this encouragement and stimulation were not necessarily accompanied by emotional support. Nonetheless, and to the extent that outstanding achievement was the goal, the parents seemed to have contributed to their children's attainment of eminence.

Interest. The role of interests in outstanding performance is an emerging theme in the literature on outstanding performance (Tai, Liu, Maltese, & Fan, 2006). In 2010, Ceci and Williams concluded that "one of the most robust findings has been that women at all levels of math aptitude do not *prefer* [italics added] math-intensive careers in anywhere near the numbers that men do" (p. 190). Even in gifted programs, if a student has been identified based on general ability without a clear sense of what the child's talent domain and interests are, it is probable that the child will not develop as much as he or she would if interests are taken into account (Tai et al., 2006).

Passion. The notion of passion is interesting in gifted and talented education because it is often mentioned but seldom studied. Piirto (1998) refers to the "thorn" or call that drives the creatively productive person to pursue explorations in a domain. Ochse (1990) claimed that single-minded drive can lead to great intellectual or creative gains—or emotional disorders—and that many great artists, leaders, and scholars avoided pain, loneliness, and self-awareness by engaging deeply in their work. Nevertheless, we often fail to recognize that passion is directed toward a specific domain.

Opportunity. Outstanding performance is also dependent, in large part, on the opportunity to develop the talent that one has. Opportunity provides a context for talent to be nurtured, sometimes even before it is recognized. This means that talents are more often developed in households with adequate financial and other resources (Collins & Buller, 2003). For talent to be fully developed, however, there must also be the

opportunity for it to be *appropriately* cultivated. This argues for greater access by talented individuals to high-quality talent development programs. Of course, the person to whom the opportunity is offered must choose to accept it and commit to it (Noble, Subotnik, & Arnold, 1996).

Chance. Not all opportunities are calculated. Serendipity also plays a role (Coleman, 1995). In 2004, *60 Minutes* ran a piece on low-income adolescents of color from Harlem, four of whom were representing the United States at the Olympics in fencing that year. As chance would have it, a former Black fencing champion had retired to Harlem and had begun giving lessons 15 years earlier. His work provided the opportunity for many youngsters who may never have held a sword in their hands to discover that they had a talent for fencing. Along with their newly discovered talent, these youngsters also exhibited the interest, passion, and commitment to pursue the gift; and of course, they had a teacher to help them hone the gift appropriately (Haensly, Reynolds, & Nash, 1986).

Cultural Factors. Researchers who study talent development recognize that all achievements exist and are valued within a sociocultural context (Csikszentmihalyi, 1988). Cultures that value certain fields and domains and make them more available to children via access to instruction and programs (e.g., chess, violin) will produce more prodigies and champions in those fields. Based on perceived national needs, societies may promote and value giftedness in particular areas at particular times, for example, the interest in STEM talent that has been reignited in the United States. Broad ideologies also provide a framework for the purposes and goals of talent development—to honor the family in collectivist cultures, assist the state in communist societies, and maximize wealth in capitalist societies (Mandelman, Tan, Aljughaiman, & Grigorenko, 2010). Historical events focus attention on certain problems—for example, the current need for more environment-friendly, renewable energy sources to reduce U.S. dependence on foreign oil—that result in fiscal resources and other forms of support being channeled into specific kinds of creative work that capitalize on specific talents.

Barriers to Developing Giftedness

For more than a quarter century, gifted education has been criticized for the underrepresentation of children of color and those from low socioeconomic backgrounds (Worrell, 2009), with blame being cast on identification procedures and societal racism. However, this critique fails to connect underrepresentation in gifted and talented programs to the larger issue of the achievement gap. African Americans, Latinos, and Native Americans are severely underrepresented among the top 1%, 5%, and 10% on almost every achievement measure, including grades, GPA, class rank, and standardized test scores—and at every level of education from kindergarten through professional school (Miller, 2004). Using data from the National Assessment of Educational Progress and state

achievement tests, Plucker, Burroughs, and Song (2010) documented the underrepresentation of lower income students, English Language Learners, and historically underrepresented minorities at the highest levels of achievement—what the authors refer to as pervasive *excellence gaps*. Indeed, any analysis of the academic performance of students by ethnic and racial group provides a cogent explanation for the discrepancy between the proportions of groups of students in gifted programs and the general school population (Aud, Fox, & KewalRamani, 2010).

The reasons and causes for the achievement gap include a host of factors that could be labeled educational malnourishment (Coleman, 2005). Among them are lack of access to supplemental educational programs and other educational tools including technology, higher rates of poverty, poor-quality schools with underprepared teachers, lower teacher expectations, cultural and language differences, negative peer influences, geographic mobility, academic declines over the summer months, and lack of tacit knowledge about higher education (Jussim & Harber, 2005).

Several psychosocial factors have also been posited. Cultural ecological theory (Ogbu, 2003) suggests that African American students may actively resist doing well, because achieving academically is perceived as giving up one's Black identity and acting White. Alternately, Steele (1997) and colleagues suggest that stereotype threat particularly undermines the performance of African Americans who care the most about doing well. These formulations suggest that high-ability or high-achieving students from low-income or ethnically and racially marginalized backgrounds may experience psychosocial stress reconciling their social identities with their academic identities, (Worrell, 2010). However, debate continues around how well these effects generalize to different school settings with different school populations (Fuller-Rowell & Doan, 2010) or beyond the laboratory to the real world (e.g., Cullen, Waters, & Sackett, 2006).

Expected Outcomes of Gifted Education

If one accepts the view of giftedness as a hereditary characteristic, it follows that the field simply needs to learn how to reliably identify it. A contrasting perspective associates giftedness with accomplishment (Subotnik, 2003). In other words, what determines whether individuals are gifted or not is not *who they are* but *what they do*. From this point of view, it really does not matter how high an individual's IQ is if he or she never makes a substantive and substantial contribution to some field of endeavor. Given that most contributions are made by adults and there is a growing literature on the importance of talent development, one can argue that giftedness in children is probably best described as potential. This suggests that to maintain the label of gifted in adolescence and adulthood requires turning potential into outstanding accomplishments (Coleman, 1995). This debate can be

formulated into at least two views of what gifted education should lead to: self-actualization versus eminence.

Roeper (1996) argued that gifted education has focused on developing the cognitive abilities of children; from her point of view, gifted education should be concerned with "the growth of the individual as well as his/her responsible membership in the world community" (p. 18). Success, from this perspective, is based on gifted children maximizing the development of this emotionally different psyche. Although this view of giftedness is still prevalent in many quarters, there is little empirical support for viewing gifted people as qualitatively different.

Alternatively, Subotnik and Rickoff (2010) contended that the goal of gifted education should be to provide the wherewithal to produce eminent adults. These authors suggest that (a) to be labeled gifted as adults, gifted children need to be eminent producers and (b) society has a right to expect outcomes from its investment in developing children's gifts. The premise here is that gifted education should have a specific goal. The talent development goal does not mean that self-actualization is not important; rather, the suggestion is that self-actualization should not be the *primary* goal of gifted *education* programs. Moreover, longitudinal studies (cf. Subotnik & Arnold, 1994) make it clear that outstanding accomplishment in the domain of their talent is an important part of the self-actualization of gifted adults.

Psychosocial Coaching in Gifted Education

As noted previously, the process of achieving eminence requires psychosocial strength. Taking a developmental perspective, Jarvin and Subotnik (2010) suggested the type and relative importance of various psychosocial skills required for transformation of abilities into competencies, competencies into expertise, and expertise into eminence differs and contended that one of the functions of a good teacher is to offer appropriate psychological strength training in addition to information specific to the talent domain. Academically talented students, who also live and work in competitive and occasionally stressful environments (Preuss & Dubow, 2004), *rarely have access to psychological coaching*. Furthermore, school and college teachers receive no systematic training in this dimension of differentiated instruction.

In the performance arenas of athletics and the arts, training institutions are closely tied to the gatekeepers and agents associated with attaining success in a field. Explicit attention is focused on creating a healthy motivational climate through mental skills training in goal setting, along with behavioral, cognitive, and emotional control. The U.S. Olympic Committee sponsored a study (Gould, Dieffenbach, & Moffett, 2001) to investigate the development of psychological strength in U.S. Olympic champions. According to Gould et al., to become a champion, individuals need to master both physical and mental skills.

A Proposed Talent Development Megamodel

We propose a megamodel of talent development, integrating the most compelling components of already established models, intended to apply to all domains of endeavor. A comprehensive model of talent development should take into account whether a domain can be expressed meaningfully in childhood, adolescence, and adulthood. A comprehensive model should also take into account the acuties or propensities that can serve as signs of potential talent. These can, for example, include deep interest (Tai et al., 2006), musicality (Subotnik & Jarvin, 2005), or mathematical cast of mind (Krutetskii, 1976). Some of these propensities or interests are developed exclusively outside of school, and some can be accelerated and enriched in school, but none of these are developed exclusively in school to a level sufficient for elite talent development (Olszewski-Kubilius, 2010). Budding talents are usually recognized, developed, and supported by parents, teachers, mentors, and apprenticeships. These same individuals may or may not offer guidance for the talented individual in the psychological strengths and social skills needed to move from one stage of development to the next.

We developed the model with the following principles in mind: abilities matter, domains of talent have varying developmental trajectories, opportunities need to be provided to young people and taken by them, psychosocial variables are determining factors in the successful development of talent, and preparation for eminence is the aspired outcome of gifted education. In introducing the model, we first distinguish between the development of performers and producers. Then we use these two categories to illustrate within-domain differences in trajectories. Finally, we offer a figure and description of our model.

Performers and Producers

Exemplars of the performer category include singers, instrumentalists, dancers, actors, and athletes. The producer category includes composers, choreographers, writers, and scholars/scientists/academics. As indicated in Figure 1, the two groups are similar in some ways and different in others. Empirical research and expert opinion indicate that both outstanding performers and producers have high levels of knowledge in the content of their domain and in the content of domains related to the projects they are working on. Both have also developed expertise in the skill sets required to perform or produce in their domain. This expertise is developed by way of mentored guidance, through a challenging regimen of practice or intensive study, and with a commitment to excellence.

Psychosocial skills are important for success in all domains. In the performance domains, and perhaps most explicitly in sport, coaching in mental skills is an integral

part of training and talent development (Martindale, Collins, & Abraham, 2007). These skills include handling setbacks, adjusting anxiety levels for optimal performance, and imagining success, among others. Academic domains have been the least likely to explicitly convey the importance of this type of psychological strength training.

There are also differences between how elite performers and producers are evaluated as they develop. Substantial investments have been made in developing practice benchmarks for outstanding performers related to incremental skill development. Although there are individual differences in *how* skills are developed in performers, there is consensus on what the appropriate skills are. Producers' learning tasks are not so clearly defined and are more dependent on the individual mentor, area of specialization, and his or her student. Widely accepted benchmarks do not yet exist in the academic domains. Concurrently, standards for excellence are more explicit in performance domains and the paths to achieving excellence are clearer (Hamilton & Robson, 2006).

Physical skill plays a central role in the development of performers. Reliance on the physical also sets some limits on the length of performers' careers—when they begin, peak, and end. These physical limitations result in fewer opportunities for late bloomers to enter a performance field, so the talent development trajectory increasingly winnows out participants over time. By contrast, there is often room in a field for producers who are late bloomers, especially in domains that are of substantial importance to society. Elite performers are also appreciated by the general public, whereas elite producers, especially in specialized academic domains (e.g., mathematics, theoretical physics), tend to be most appreciated by individuals who are also members of that field.

Judgments made by gatekeepers in performance domains and artistic and athletic production domains tend to be made on the demonstration of specific talents in ways that closely mirror actual performances (e.g., musical auditions or portfolios of work). In many production domains, however, we rely first on indicators of potential because production is often years away and involves accumulated knowledge and a more varied set of skills and competencies. For example, admission to special programs for academically talented children is very rarely based *exclusively* on demonstrated achievement. It relies heavily on standardized testing to provide on what aspires to be objective measures of potential.

Developmental Trajectories in Three Domains

Figure 2 highlights differences in performance trajectories among and within domains in terms of beginnings, peaks, and endings across the life span. Although there are often exceptions to general principles, the purpose of this figure is to depict how the process of talent development varies by type of field. Whether a trajectory begins in early childhood versus adolescence, for example, depends on when the skills

	Performers	Producers
Similarities	Must master the content within the domain	
	Need guided and deliberate practice and/or study	
	Must have commitment and motivation	
	Domain values are inculcated by mentors	
	Psychosocial variables limit or enhance success	
Differences	What you need to practice is more clearly defined—results of practice seen more easily	Tasks are more diffuse, long term, and multi-component
	Judgments of experts are trusted throughout the process	Judgments for selection in academic disciplines, at least at the pre-collegiate level, are not trusted, and objective tests serve as a stand-in
		Judgments of experts are trusted in fields such as composition, playwriting, and visual arts
	Physical abilities are important—you do not have them forever, which constrains the arc of talent development	Physical abilities do not serve as central constraints to the arc of talent development
	Greater winnowing and fewer opportunities over time	Room for a greater number of producers, particularly in domains designated to target societal need
	More current focus on psychosocial-skills training	Little current focus on psychosocial-skills training
	The outcome of excellence and creativity is clearer—better sense of knowing the path and where you are going	Outcome of excellence is clear only in some areas—e.g., academic publications, grants, awards
	Domain is appreciated more widely by the public	Domain is mainly appreciated by insiders

Figure 1. Similarities and differences between performers and producers

and abilities in the talent area emerge and coalesce. This is affected by physical maturation in fields such as music and sport, and it also depends on when talent can be recognized by systematic identification procedures or knowledgeable adults.

For example, boy sopranos can begin to perform in the early elementary grades, but adult singing voices do not

develop until after puberty. Similarly, precocity in mathematics can be recognized as early as the preschool years, whereas outstanding contributions in psychology do not typically occur until several years after completing an advanced degree. In the athletic domain, specialized training for outstanding performance in some sports begins in childhood (e.g., gymnastics). In other sports (e.g., American

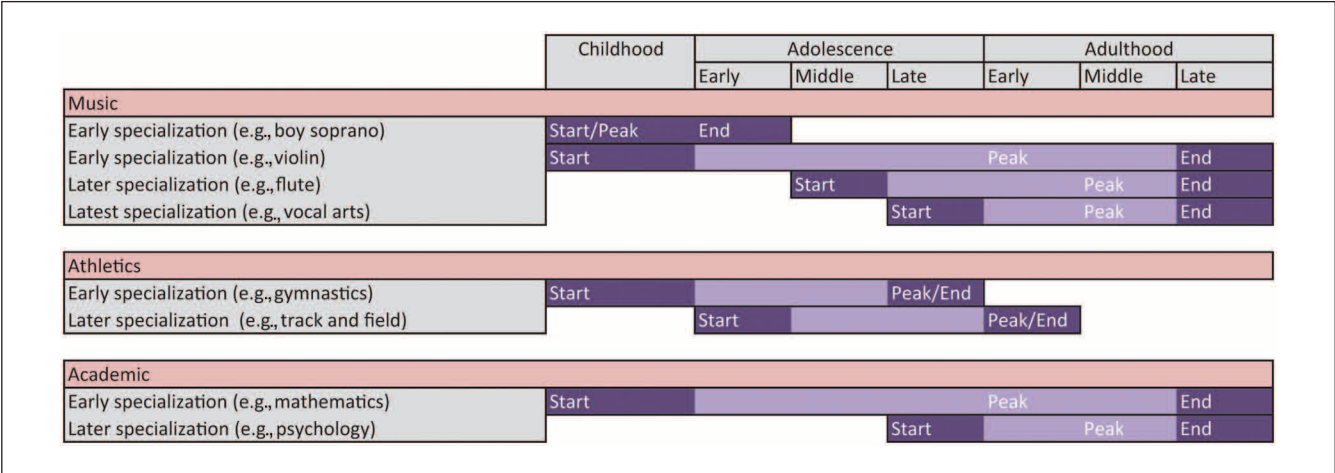


Figure 2. Early and later trajectories in music, athletics, and academics, within and across domains

football), adult size and speed are important contributors, and training is more generalized until adolescence.

End points of developmental trajectories also vary widely. Some trajectories are short (e.g., puberty truncates development for boy sopranos), whereas in most academic fields and some musical fields, developmental arcs are virtually life-long. Fields where outstanding performance peaks in late adolescence or early adulthood, such as gymnastics, diving, and figure skating, are typically those involving particular physical skills or body type. These fields also typically have short peak-to-end intervals. For many other fields, especially academic ones, individuals can remain involved and active well into late adulthood, with almost no limits on productivity. Intervals between starts and peaks also vary greatly, with some fields requiring long periods of preparation (e.g., most academic fields). Peaks are also affected by the amount of training and education needed to reach high levels of expertise. Some domains, such as psychology, religion, or diplomacy, require the accumulation of maturity and experience to generate important contributions.

From Ability to Eminence

In the first six rows of Figure 3, we combine several of the threads previously discussed with regard to giftedness. First, domains have developmental trajectories with different start, peak, and end times for outstanding performance. Second, giftedness is evaluated in relationship to others. At the earliest stages, it is determined and largely defined by potential, whereas at the middle stages, it is determined by demonstrated achievement. At full maturity, eminent levels of achievement define giftedness. Third, the talent development process involves several transitions whereby abilities

are developed into competencies, competencies into expertise, and expertise into eminence.

The type of creativity an individual manifests is one of the features that distinguishes ability from competence, competence from expertise, and expertise from eminence. Transitioning to eminent levels of achievement requires a substantial shift: Creative products are judged not just in relation to others at similar levels in the field but also by how they move the field forward. Although we recognize that the generation of creative performances or ideas requires person, process, and product, it is also the case that the relative emphasis on these factors shifts over time. For example, it is important that young children develop a creative approach and attitude (person), that older children acquire skills (process), and that the acquisition of these mind-sets and process skills are then coupled with deep multidisciplinary content knowledge and applied to the creation of intellectual, aesthetic, or practical products or performances (product).

As with creativity, there may be different levels and kinds of motivation associated with eminent levels of achievement. What we call *little m* motivation refers to the motivation involved in smaller achievement-related tasks and decisions, such as which course to take, what to major in, whether to attend a summer program, and whether to try to get an A in a course. *Big M* motivation, a term we have coined, like *Big C* creativity, refers to compelling drives, rooted in early experiences and underlying, overarching goals, such as the desire for fame, fortune, power, or notoriety or the desire to change the world that is associated with achieving eminence.

Finally, the talent development process is driven by expert teachers, mentors, and coaches. At each stage, the strategies and goals of instruction change (Bloom, 1985). In the

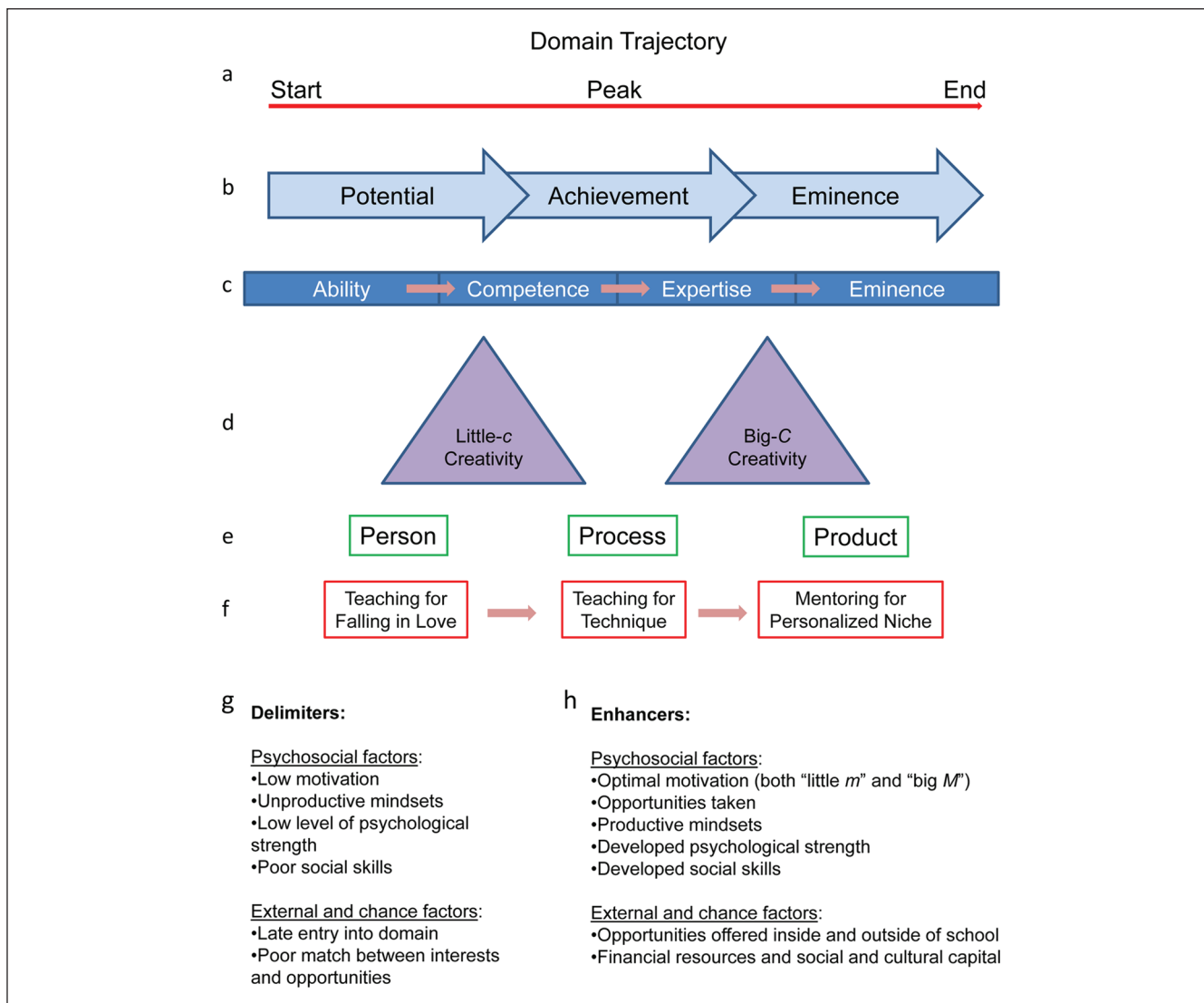


Figure 3. From ability to eminence in a domain

Note. Domains have developmental trajectories with different start, peak, and end times (a). Giftedness in a domain is evaluated in relationship to others (b)—initially in terms of potential, later by demonstrated achievement, and finally, in adulthood, by eminence. The talent development process involves several transitions whereby abilities are developed into competencies, competencies into expertise, and expertise into eminence (c). These transitions are distinguished by levels of creativity (d), beginning initially with "little c" creativity (independent thinking, entertaining different perspectives, creation of projects and products that are novel when compared with those of peers) and ultimately leading to the "big C" creativity required for eminence. These transitions involve shifting emphasis from "person" (creative approach and attitude), to "process" (acquiring process skills and mind-sets), to "product" (creation of intellectual, aesthetic, or practical products or performances). Each stage of the talent development process is also characterized by different strategies and goals of instruction (f)—initially, to engage young people in a topic or domain ("falling in love"), then helping the individual develop the needed skills, knowledge, and values ("teaching for technique"), and finally helping talented individuals develop their unique niche, style, and method or area of application ("mentoring for personalized niche"). Movement from ability to eminence can be delimited (g) by factors such as low motivation, mind-sets that prevent coping with setbacks or thwart resiliency, less than optimal learning opportunities, or chance events. Progress can be enhanced, maintained, or accelerated (h) by the availability of educational opportunities, including out-of-school enrichment and mentoring, psychological and social support from significant individuals, and social capital.

earliest stage, it is the job of the teacher to engage the explicit or undeveloped interests of young people in a topic or domain and to engender and capitalize on motivation. At the next stage of development, it is critical that teachers help the individual develop the needed skills, knowledge, and values associated with the acquisition of expertise in that domain.

The third-stage teacher helps the talented individual develop a niche in the field, a personal style, method or approach, or unique area of application.

Of course, movement from ability to eminence can be enhanced or impeded by factors described in the literature, such as low motivation, mind-sets that prevent coping with

setbacks or thwart resiliency, less than optimal learning opportunities, or chance events. On the other hand, progress can be maintained or accelerated by the availability of educational opportunities including out-of-school enrichment and mentoring, psychological and social support from significant individuals, and social capital.

Conclusions

In this article, we have provided a definition of giftedness that is intended to apply across domains, synthesized the literature on the variables related to giftedness, and shared research and theory aimed at crafting a new framework to guide future research and practice in the field of gifted education. Our proposed framework builds on and extends existing conceptions of talent development. In this final section, we recap the main points.

Abilities Matter

General intellectual ability and specific abilities predict and are fundamental prerequisites to high achievement and eminence in their respective fields. The amount of ability, the balance of general and specific abilities, and the exact nature of specific abilities vary by talent domain and, as of yet, are not completely understood. Because ability is important, work to identify the general and specific abilities that have been shown to matter in particular domains and fields should be a priority. Teachers should be trained to look for indications of these abilities, and multiple, domain-relevant ways of determining and assessing them should be developed by researchers. Assessment should start with young children and be continuous, systematic, and ongoing throughout early and middle childhood and adolescence, even into adulthood.

Although general ability and potential may be the hallmarks of academic giftedness in children, domain-specific ability and domain-specific achievement should be emphasized and increasingly expected as children grow older. Schools should enable children to advance in academic domains where they show interest and developed talent. Therefore, teachers with high levels of content knowledge and technical expertise are needed even at the earliest levels of education or training to meet the needs of young, very advanced children. Older students should be allowed to specialize early if they demonstrate high levels of interest, commitment, and achievement for a domain with an early trajectory. Subjects typically not studied until high school or college should be introduced earlier to enable individuals with interest and talent in those areas to be identified and to begin the process of talent development within those domains. Similar opportunities for appropriate developmental supports should be provided to children and adolescents whose talents are in nonacademic areas.

Domains of Talent Have Unique Developmental Trajectories Across the Life Span

Because of physical and intellectual demands and cultural traditions, domains have different entry points, peaks, and endings. Understanding trajectories in different fields is critical so that windows of opportunity for talent development are not missed. Depending on the domain (e.g., music, tennis, art), much of the talent development process may take place outside of school through coaches, teachers, mentors, and community programs. Elucidating the nature of these domain-specific developmental trajectories requires research to understand the variables that are most important at each stage of development. At this point, however, we know that most trajectories will require different kinds of teachers and coaches as talented young people acquire knowledge and technical expertise and move on to creative productivity in the talent area. Benchmarks of excellence for the abilities, knowledge, and psychosocial skills needed for different levels and stages of development must be developed and understood by teachers for all talent domains so that progression across different stages can be optimally promoted (see, e.g., Kay, 1999).

Effort and Opportunity Are Important at Every Stage of the Talent Development Process

Opportunity rests on the availability of both in-school and outside-of-school programs tailored to the talent area. Continuous effort is critical as research has shown that it takes 10,000 hours of continual study or practice to reach levels of expertise in most domains. Many more programs are needed than currently exist, especially in low-income and rural communities. From our perspective, talent development activities, primarily in the form of enrichment, should be provided to all children as early as possible. Students who demonstrate sufficient effort and task commitment should be supported to move forward toward increasingly challenging and rewarding talent development opportunities, regardless of their age. Students who stall at particular points along the path should be encouraged and assisted to reinvest at a later time when they have renewed interest and motivation.

Psychosocial Variables Are Important Contributors to Outstanding Performance at Every Stage of Development

Qualities such as the willingness to take strategic risks, the ability to cope with challenges and to handle criticism, competitiveness, motivation, and task commitment will differentiate those

students who move to increasingly higher levels of talent development from those who do not. The psychological sciences have tended to focus on addressing issues that impede performance. This research continues to be very important, particularly in helping talented individuals transfer compelling negative drives for achievement into positive ones. Even so, more psychological research is needed to elucidate those factors that go beyond neutralizing the effects of impediments to support the development of optimal levels of performance across the life span. Moreover, it is also our view that psychosocial awareness and skills should be taught in all domains by parents, teachers, coaches, and mentors explicitly and deliberately, and not left to chance. We suggest that this *psychological strength training* is as important as content and skill instruction and practice in a talent area.

Preparing for Eminence Should Be the Goal of Gifted Education

Increasing the number of individuals who make pathbreaking, field-altering discoveries and creative contributions by their products, innovations, and performance is the aim of our proposed framework for gifted education. The world needs more of these individuals, and gifted education can be organized to provide the supports for optimal performance and productivity. We value and recognize the importance of high levels of expertise and well-rounded individuals, and we are not implying that we limit services only to those who are on the path to eminence. However, keeping our focus on eminence sustains a continued focus on excellence. We reject the idea that aspiring to eminence need be deleterious to the personal well-being or mental health of individuals, particularly if its promotion is guided by knowledge about the appropriate kinds and levels of support needed from teachers, family, communities, and national and state policy. We assert, in fact, that aspiring to fulfillment of one's talents and abilities in the form of transcendent creative contributions will lead to high levels of personal satisfaction and self-actualization as well as unimaginable benefits to society.

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