
Helping Students Become Extraordinary

This text has described ways to help students soar to success. For most readers, student success is characterized by high academic achievement, effective learning skills, and motivation to succeed. These are certainly challenging and important outcomes. But can students soar even higher?

Some people do extraordinary things—soar to amazing heights. Consider Mozart's musical compositions, Picasso's paintings, Freud's theory of the unconscious mind, Darwin's work on natural selection, Gandhi's social change movements, Crick and Watson's scientific discovery of DNA's double helix model, the Wright brothers' invention of the airplane, Martha Graham's dance movements, Virginia Woolf's introspective writings, Bobby Fischer's chess games, and Tiger Woods's golf shots.

How are such extraordinary contributions possible? Were these extraordinary creators born with talent, or was the talent largely made? And if talent is largely made, how do we make it? What roles can educators—teachers, coaches, and parents—play in making students extraordinary or at least more extraordinary?

IS TALENT BORN OR MADE?

At first glance, it looks like talent is born. Consider prodigies like Mozart, Picasso, and Fischer. Mozart (see Gardner, 1997) learned to play the piano at age 3. At 4, he taught himself to play the violin. At 5, he began

to compose. Within two years, he composed regularly, toured Europe, and performed in leading concert halls. Picasso the child painted like an adult. American author Gertrude Stein said that young Picasso "wrote paintings as other children wrote their A, B, Cs" (Gardner, 1993, p. 140). When Bobby Fischer was 14, he became the youngest U.S. chess champion; he also soon became the youngest player in the world to attain the game's highest title—chess grandmaster.

Look more closely, though, and talent appears made even among these prodigies. Both Mozart and Picasso (Gardner, 1993) were born into their talent areas and jump-started by fathers well equipped to provide initial instruction in the talent domain. Mozart's father was a musician and composer; Picasso's father was an artist. Moreover, the duo's talents did not blossom for some time. Both worked at their crafts for many years before creating significant works. And they were hardly alone on the long road to talent development. Hayes (1985) studied outstanding composers and artists to determine the time interval between initial training and first significant contribution. Almost none of the extraordinary creators he studied developed significant works in less than 10 years—including the prodigious Mozart and Picasso. Mozart's first important composition was written when he was 16. Picasso was 25 when he painted his first significant work.

Bobby Fischer (see Brady, 1989) was not born into a chess family. Fischer worked hard at chess. He sat for hours at the board and thoughtfully played both sides of the game. He solved chess puzzles on his pocket set on the bus rides to and from school. Fischer voraciously read chess books and magazines, even those written in Russian—a language he taught himself because the best games and analyses appeared in Russian publications. Fischer even tucked chess literature inside his school books and studied chess under the guise of school learning. At lunch time, he ventured off campus to study chess with a local master. After school, he often frequented chess clubs in Brooklyn or Manhattan, where he learned at the feet of some of America's strongest grandmasters. He dropped out of school at 16 and pursued chess full time. Even with all this passion, practice, and mentorship, Fischer was not an overnight success. He did not win the world title until he was 29. Fischer's long climb to chess prominence was not unusual. Researchers studying chess grandmasters found that most only attain the grandmaster title after about 32,000 hours of intensive study (Charness, Krampe, & Mayr, 1996). Do the math: That's 11 years of study, 8 hours a day, 7 days a week. As was the case with musical composition and art, chess skills seem largely made, not born.

Most psychologists, though, adopt the stance that talent is part born and part made. Perhaps it's useful to think about talent like a rubber band. At birth, we all receive differing amounts of genetic potential, different sized rubber bands. Over the course of our lives, however, the bands can be stretched many times their size by environmental factors, such as

instruction and practice, or the bands can hardly be stretched at all. The rubber band view is hopeful; talent is not fixed but modifiable, and environmental factors are the hands stretching the band.

Most psychologists also believe that our genetic potential, our rubber band, is best understood and measured in terms of general intelligence or IQ (see Gardner, 1997). Those with high IQ scores are destined to accomplish great things; those with low IQ scores are destined to struggle. It's not that simple. First, the correlation between intelligence and extraordinary talent is weak. High intelligence alone does not permit one to flourish in a domain (Gibson & Light, 1967). Highly gifted children with meteoric IQ scores generally carve out successful careers, but few ever make extraordinary contributions (Terman & Oden, 1947; see Wargo, 2006). As you'll soon learn, other factors such as passion and practice are more important than native intelligence. Second, IQ tests are limited in scope. They only measure verbal aptitude and logical reasoning—the kinds of skills valued in school. Although children with high IQs are well equipped to master school subjects steeped in language or logical reasoning, they are not necessarily equipped to master other areas such as music, art, or chess.

Harvard psychologist Howard Gardner (1993) believes there is not a unitary general intelligence but multiple intelligences—eight in all. In addition to linguistic and logical intelligences—the kinds measured on standard IQ tests—Gardner posits at least six other brands: musical, spatial, body kinesthetic, natural, interpersonal, and intrapersonal. According to Gardner, all people possess the eight intelligences in varying degrees, often with one or two of the intelligences being particularly strong. Mozart was high in musical intelligence, Picasso in spatial intelligence, and Fischer in spatial and logical intelligence. Introspective writer Virginia Woolf was high in linguistic and intrapersonal intelligence, Martha Graham and Tiger Woods in bodily kinesthetic intelligence, Gandhi in interpersonal intelligence, and Darwin in natural intelligence. Extending the rubber band theory, people have not one rubber band but eight, all in varying sizes.

According to Gardner (1998), the sizes of those eight bands or intelligences are a product of heredity and environment. As was true for general intelligence, heredity sets the band's initial size, and environment does the stretching. Gardner (1998) believes we are best served if we pursue activities and careers where we have a biological advantage or leverage. Mozart was well equipped for music and Picasso for art. Had each worked as hard in the other's domain, each might have been well accomplished, but it's unlikely that Mozart could have been Picasso or Picasso been Mozart. Although all eight rubber bands are stretchable, heredity puts us at an advantage in just some areas and even at a deficit in others.

So is talent born or made? Before answering, let's first confirm what talent is and is not. Talent is not potential but productivity, not promise but fulfillment, and not answers on an intelligence test but real-world

achievement. Many have the potential to excel; few realize that potential. We know Mozart had musical talent not because of a test score but because he composed *The Marriage of Figaro* and the *Jupiter* symphony. As to whether talent is born or made, talent is largely made. Although heredity provides leverage in certain areas, talent rises only when certain environmental factors prevail. We next turn our attention to the environmental factors most associated with talent development.

ENVIRONMENTAL FACTORS IN TALENT DEVELOPMENT

Psychologist Benjamin Bloom (1985) studied the 120 most talented American adults in six domains: piano (music), sculpture (art), swimming, tennis, mathematics, and neurology. His purpose was to understand how childhood factors shaped talent development. Bloom interviewed the talented Americans along with their parents and teachers. Howard Gardner (1993) investigated eight extraordinary creators from the early 1900s, such as Mozart and Picasso, by examining their biographies. He searched for environmental commonalities in the creators' youth that explained their talent roots. My colleagues and I (Kiewra, O'Connor, McCrudden, & Liu, 2006) investigated young chess masters—children under age 16 who had attained a master rating. At the time of our study, just 1% of all chess players were masters, and there were just eight young masters in the United States—all of whom were boys. We interviewed the parents of six young masters to uncover the environmental factors that spurred these chess kids to become so good so fast. I mention these three studies because all investigated early environmental factors related to talent development, and all revealed five common factors: early experience, practice, singleness of purpose, mentorship, and family commitment. Each factor is discussed in turn.

Early Environment

In some cases, those who become talented adults are born into the talent area. Mozart and Picasso (Gardner, 1993) are cases in point. Their fathers were accomplished musicians and artists, respectively. Some of the talented people Bloom (1985) studied were also born into households where the eventual talent domain was operative. Parents in these homes were proficient and passionate artists, musicians, or athletes, for example. The parent of a tennis player remarked, "We always kidded that our daughter woke up in a car bed, next to the tennis courts, hearing the ping-pong of tennis balls—that was one of the first sounds she recollects probably. . . . We belonged to a tennis club and played tennis all weekend" (p. 447). Among the young chess masters, three of the six were reared in homes where parents or family members already played and valued chess.

Even when children were not born into the talent area, most enjoyed an early introduction, a head start, and were soon immersed in the talent area. Among the young chess masters, for example, chess play began between the ages of three and nine and the average starting age was six. Three of the six young masters, by the way, were introduced to chess outside the home, either in school or clubs. Whether the child was born into the talent area or brought the talent area home, the child-centered family became immersed in the talent area. The parents supported the child's early interest and development by exploring the area, providing informal lessons, and accessing equipment and resources. As the child's interest intensified, so did the family's interest and involvement. They spent increasingly more time playing, practicing, and traveling to events to watch or participate. Families became so impassioned with the child's talent area that they soon saw themselves as tennis, music, or swimming families as the following parent remarks, reported by Bloom (1985, p. 462), reveal.

- "Most of our vacations were frankly tennis-oriented."
- "The whole family revolved around the music."
- "Swimming was our way of life. All our vacations and extra money went to swimming weekends—that was our recreation."

The early environment was also one that instilled values likely to sprout talent. The parents in Bloom's (1985) study modeled and advocated hard work and perfection. The parents were tireless workers. Even in the home, they filled their leisure time with constructive hobbies such as reading, carpentry, sports, music, or photography and spurned idle activities such as watching television. While pursuing these activities, they also modeled the values and mechanics of studying a domain, establishing priorities, and organizing time. The parents pursued perfection in their work and held their children to the same standards. If something's worth doing, they'd say, it's worth doing right. Whether parents monitored the child's homework, household chores, or practice in the talent domain, the expectation was always a job best done.

Practice

An enriched early environment might jump-start a child on the road to Carnegie Hall, but only practice, practice, and more practice can deliver him. Among the young chess masters, most practiced 10 to 20 hours a week. Not only did the young masters practice a lot each week, they did so over a long time period. On average, it took the young masters eight years and 8,000 practice hours to attain a master rating.

Bloom (1985), too, found that heavy practice loads distinguished the top American performers from others—including those with comparable genetic stuff. In many of the families Bloom studied, siblings enjoyed the

same early experiences and enriched opportunities to excel. But in only a very few cases did a sibling even come close to the level of accomplishment as the talented sibling Bloom studied. This was true even though many parents reported that it was another child in the family who early on seemed to possess more talent and natural ability. The one who "made it" was the one who practiced the most.

Logging a lot of playing time is not the same as practice, however. According to Anders Ericsson (1996), an expert in expert performance, the number of chess games played or the time spent playing the piano are weak predictors of skill level compared with the amount of effortful practice. Ericsson defines effortful practice as practice for the purpose of improvement. It is focused, arduous, and intense; it requires full concentration and most likely occurs alone. It is not social or necessarily enjoyable. A classic study (Ericsson, Krampe, & Tesch-Romer, 1993) investigating effortful practice examined the practice routines of expert level musicians over a 15-year period. The musicians spanned four groups ranging in expertise from "professional" to "best experts" to "good experts" to "least accomplished experts," in descending order. Results showed that the four groups spent the same amount of time on music activities (experience) but varied in effortful practice. The professionals, for example, practiced alone for about 25 hours per week, three times more than the least accomplished experts. Weekly practice differences, of course, really add up over time. At age 20, the two best groups had spent over 10,000 hours on effortful practice compared with the lower groups, which had spent 8,000 (good experts) and 5,000 (least accomplished experts) hours.

Effortful practice becomes a matter of routine for the highly talented. These comments came from the talented pianists Bloom (1985, p. 485) studied:

- "I would get up and practice just like you would get up and wash your face in the morning. It was a very natural thing to do, and you just accepted it as something very normal."
- "When you're studying four or five years, habit has taken over quite strongly."
- "Christmas was the only day off."

There are plenty of stories about the effortful practice routines of childhood experts in training. Mozart, for example, practiced for three hours per day beginning at age three. By age six, he had logged more than 3,500 practice hours (see Wargo, 2006). No wonder he was so much more talented than anyone in his peer group. Eric lo Shih-kai was 13 when he became the youngest golfer to ever play in a PGA European Tour event. His daily practice routine looked like this: Jog to a park at 7:00 a.m. and practice approach shots until school; after school, spend five or six hours

practicing golf drills—sometimes hitting 300 golf balls in a session (see Marshall, 2003). Julliard School of Music teacher Dorothy DeLay has made a living working with violin prodigies such as Itzhak Perlman. DeLay insists that her students practice a minimum of 5 hours a day, but most actually practice 10 to 12 hours daily (see Renaud, 2000).

Singleness of Purpose

Long and daily practice sessions and immersion in the talent area (e.g., lessons, competitions, and performances) leave the talented individual with little time for outside activities. Among the young chess masters (Kiewra et al., 2006), only two of the six had secondary interests—both in music. The others spent the bulk of their free time on chess. One parent remarked, “The extraordinary amount of time we put toward this one activity takes him out of a lot of fun and games. The kid gives up an enormous amount to dedicate himself to the sport the way he does” (p. 102). For some of the young chess masters, social relationships are limited by their chess focus. One parent commented, “Chess is a little bit reclusive if you’re using a computer and not interacting with other people” (p. 102). The young masters also spent little time watching television. While the national average for children is four hours of television viewing per day, two chess kids watched no television, and the four others watched less than an hour per day. When parents were asked why their chess kids spent so much time practicing and why they sacrificed other pursuits to do so, parents’ answers were unanimous. All credited the child’s chess passion. One parent remarked:

He is passionate about it . . . just thrilled by it. . . . It gives him a lot of joy and satisfaction . . . and he’s not really happy when he’s not (playing). . . . If someone were to take chess away from him, he just wouldn’t be a complete person. . . . We once took chess away and he was miserable; it was like yanking the soul out. (p. 103)

Sticking with the chess theme, I once had the pleasure of meeting American grandmaster Patrick Wolff at a tournament in South Dakota. While he paced the room between moves, I seized the opportunity to question him. “My name is Ken Kiewra,” I blurted. “I’m an educational psychologist interested in talent development, so I wanted to ask how you got to where you are today.” “I flew from Boston to Sioux City and took a puddle jumper from there to Sioux Falls,” he answered, eyeing me quizzically. After I apologized and rephrased, he told me that it was practice and passion that made him strong. From the time he was in elementary school, he awoke every day to study chess for several hours before going to school. Chess was his passion. Fellow grandmaster Maurice Ashley (Killigrew, 1999) also dedicates himself to chess because he enjoys studying chess.