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Old masters and young geniuses: The two life cycles of human creativity



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## **OLD MASTERS AND YOUNG GENIUSES: THE TWO LIFE CYCLES OF HUMAN CREATIVITY**

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There are two fundamentally different approaches to innovation, and each is associated with a distinct pattern of discovery over the life cycle. *Experimental* innovators work by trial and error, and arrive at their major contributions gradually, late in life. *Conceptual* innovators make sudden breakthroughs, usually at an early age. Both types of innovators have made important contributions to art and science.

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On October 22, 1906, Paul Cézanne died in Aix-en-Provence, at the age of 67. Severely ill with diabetes, he had collapsed after being caught in a thunderstorm while painting in the hills above his studio, was carried home after being exposed to the rain for several hours, and died seven days later. In time, Cézanne would come to be widely regarded as the most influential painter who had worked in the nineteenth century. It is also generally recognized that Cézanne made his most important contribution late in his life; it is the paintings from the last decade of his life that are most often illustrated in textbooks of art history (Galenson 2006a), because it was this work that influenced virtually every important painter of the next generation.

In the spring of 1907 –less than a year after Cézanne’s death– 26-year-old Pablo Picasso began to invite a few friends to his Paris studio to see his new work in progress, a large painting that would later be given the title *Les Demoiselles d’Avignon*. This would become the single most important painting in the history of modern art: so for example it is illustrated in more than 90 percent of all art history textbooks

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published in the past three decades, more than any other painting executed in the past two centuries (Galenson 2006b). The privileged position of the painting is a consequence of its role as the forerunner of Cubism, which Picasso and his friend Georges Braque would create during the next few years, and which the art historian John Golding (1959) described as “perhaps the most important and certainly the most complete and radical artistic revolution since the Renaissance.” Picasso would make thousands of paintings during the next 66 years, until his death in 1973 at the age of 92, and he would become the most famous artist of the twentieth century. Yet he would never produce another painting as important as the *Demoiselles*.

This dramatic contrast, between the ailing Cézanne producing his greatest work only at the end of decades of painstaking study, and the young Picasso producing his at just 26, is not an anomaly or an accident: Cézanne and Picasso are in fact prime examples of two very different types of innovator, who have very different life cycles of creativity.

Cézanne is an archetypal example of an *experimental* innovator. Experimental artists are motivated by aesthetic criteria: their goal is to present visual perceptions. They are uncertain how to do this, so they work by trial and error, cautiously and incrementally. Their uncertainty about their goals means that these artists rarely feel they have succeeded, and their careers are often dominated by the pursuit of a single objective. They repeat themselves, painting the same subject many times, gradually changing its appearance. Experimental painters want to make discoveries as they work, so they rarely make preparatory drawings or other plans for a painting. They are in fact usually more concerned with learning than with making finished paintings. Experimental artists build their skills gradually over the course of their careers, and produce their best work late in their lives.

In contrast, Picasso was a classic example of a *conceptual* innovator. Conceptual artists want to communicate ideas or emotions. They have precise goals for their paintings, and they consequently make preparatory drawings or other plans for them. They often consider the actual execution of the painting as unimportant, since all they are doing is carrying out their plans: indeed, not only such recent conceptual artists as Andy Warhol and Damien Hirst have had their paintings made by assistants, following their plans, but so too such great conceptual Old Masters as Raphael and Rubens would often make drawings that their assistants would then turn into paintings. Conceptual innovations appear suddenly, as a new idea immediately produces a novel result. Unlike experimental artists, who generally feel they cannot achieve their goals, conceptual artists often consider they have accomplished exactly what they wanted to do, and can therefore go on to work on a very different problem.

Conceptual innovations occur suddenly, and can be made at any age, but the most radical –and therefore the most important– are usually made early in an artist’s career, before he has become constrained by fixed habits of thought, and while he is still free to violate basic conventions of his art.

The last three decades of Cézanne’s life were dominated by a single vague goal, that he described as the desire to make Impressionism as solid and lasting as the art of the Old Masters: he wanted to preserve the bright, natural colors of Monet and Pissarro, but he also wanted to do this without sacrificing the spatial depth the Impressionists had given up. In pursuit of his visual goal, Cézanne insisted on going out into the fields to paint, in spite of the physical hardships this caused him in old age. But he believed that “in order to make progress, there is only nature,” and that the knowledge of how to express his feeling for nature “is only to be acquired through very long experience.” He made dozens of paintings of his beloved Mont Sainte-Victoire during his final decades, often working on a single canvas for months in his effort to see nature better, and to improve his technical means of expressing that vision. His quest for the vague goal he called “realization” took on an almost spiritual character: so for example in 1903, three years before his death, Cézanne wrote to his friend and dealer, Ambroise Vollard, “I am working doggedly, for I see the promised land before me. Shall I be like the great Hebrew leader or shall I be able to enter? ... I have made some progress. Why so late and with such difficulty. Is art really a priesthood that demands the pure in heart who must belong to it entirely?” (Rewald 1995).

Picasso’s art was not based on vision, but on thought: he declared “I paint objects as I think them, not as I see them” (Golding 1959). His greatest innovation broke sharply with centuries of the western artistic tradition that a work of art must be restricted to the actual appearance of the object it represents: Cubism did not record the artist’s perception of an object, but rather his knowledge of it. Our vision does not allow us to see a person from more than one angle at any one time, but a Cubist painting can combine views of a person from many vantage points simultaneously. Picasso planned his paintings carefully in advance. During the winter of 1906-07 he filled one sketchbook after another with preparatory drawings for the *Demoiselles d’Avignon*, which he specifically intended as a masterpiece; the art historian William Rubin (1994) calculated that there are in all more than 400 preparatory studies for the painting, “a quantity of preparatory work without parallel, for a single picture, in the entire history of art.” Unlike Cézanne, who labored for decades to perfect his style, Picasso changed styles frequently. For him, style was not the artist’s trademark, but simply a convenient means of expression. Thus he explained that “Whenever I had something to say, I have said it in the manner in which I have felt it ought to

be said” (Barr 1946). A biographer contrasted Picasso’s practice with that of his great predecessor: “There was not one Picasso, but ten, twenty, always different, always changing, and in this he was the opposite of a Cézanne, whose work followed that logical, reasonable course to fruition” (Cabanne 1977).

I have now done quantitative analyses for a total of more than 125 modern painters, comparing their attitudes and artistic practices to measurements of when they did their greatest work, based on surveys of the illustrations in art history textbooks, and in nearly all cases their life cycles of creativity fit these patterns. Thus Table 1 presents the ages of some of the greatest artists of the modern era in the single year from which their paintings are most often reproduced in textbooks: the ages at which the conceptual artists produced their greatest work range from Marcel Duchamp and Jasper Johns at 25 to Henri Matisse at 36, while the comparable ages for the experimental artists range from Jackson Pollock at 38 to Cézanne at 67.

I began today by speaking about painters because I began this research project, more than 10 years ago, by studying painters. And let me confess that at the time, I didn’t set out to understand creativity, but prices: my initial question was why the late paintings of some artists sell at auction for higher prices than their early paintings, while for some artists we see exactly the opposite relationship between price and the artist’s age (Galenson 2000). Everything I’ve discussed up to now is what I learned in trying to understand modern artists’ age-price profiles. The more I studied these artists, however, the more I began to realize that these different life cycles of creativity were not unique to painters. So I extended this work to other arts. Let me show you briefly how this analysis works for novelists.

**Table 1. Ages of selected modern painters in year of most textbook illustrations**

Conceptual	Age	Experimental	Age
Henri Matisse	36	Paul Cézanne	67
Vincent van Gogh	35	Claude Monet	54
Andy Warhol	34	Mark Rothko	54
Frida Kahlo	32	Willem de Kooning	48
Edouard Manet	31	Wassily Kandinsky	47
George Braque	29	Paul Klee	43
Georges Seurat	27	Camille Pissarro	43
Pablo Picasso	26	Edgar Degas	42
Marcel Duchamp	25	Piet Mondrian	40
Jasper Johns	25	Jackson Pollock	38

Sources: Galenson 2006b, 2006c, 2009.

Mark Twain wrote one of the most famous novels in American history, about a boy named Huckleberry Finn. It took Twain a total of eight years to write this book, but he wasn't working on it the whole time, because on three separate occasions he had to put it aside. The problem was that Twain couldn't plan his plots, and periodically he got stuck, and couldn't see how to continue the story. Then he had to stop writing until he figured it out (Emerson 2000). Twain also had trouble writing endings for his books. Huck Finn was no exception. In many editions, this book carries the title *The Adventures of Huckleberry Finn*. That's not the real title, however. The actual title Twain gave the book was *Adventures of Huckleberry Finn*, because he didn't consider it complete: he thought there were more adventures to come, and in the book's last paragraph Huck mentions that he's going out West, to avoid having to go to school. On several occasions Twain tried to continue the story, but he never published these attempts, because he couldn't finish them. It may not surprise you at this point to learn that Twain was an experimental novelist: *Adventures of Huckleberry Finn* is a great book because of its realistic characters, not because it has an elegant plot. Twain's mastery of language improved as he grew older, and he published *Huckleberry Finn* when he was 50. Twain also gained in judgment and wisdom as he grew older, and another reason for the great importance of this book is Huck's moral rejection of slavery, a subject Twain had carefully avoided in his earlier books.

Another famous American novelist, Ernest Hemingway, did not have trouble planning his plots. His novel that is most intensively studied by scholars, *A Farewell to Arms*, has two very different themes—love and war. Hemingway connects them, however, so that over the course of the book, the narrator's relationship to World War I goes through six discrete stages, and these run precisely parallel to the six stages of his relationship with Catherine Barkley (Young 1966). By the end, Frederic Henry's relationship to the war has died, for he has become a deserter, and his mistress has also died: both themes are resolved, and both lead to the same conclusion, that life is a struggle in which the individual inevitably loses. Hemingway's elegant plotting, and the clarity of the resolution of his novel, are characteristics of a conceptual novelist: in light of this, it is not surprising that *A Farewell to Arms* was written when Hemingway was just 30 years old.

I have studied a number of important novelists, and as with the painters there is a clear division between those whose work privileges ideas, with stylized characters who are subordinated to these larger themes, as opposed to those who create realistic characters, whose actions often do not lead to any neat resolution. And the novelists' life cycles tend to vary according to this division. So for example the conceptual

novelists Herman Melville, James Joyce, D.H. Lawrence, and F. Scott Fitzgerald all produced their most important novels—those that receive the most attention from scholars—before the age of 40, whereas the experimentalists Charles Dickens, Thomas Hardy, Joseph Conrad, and Virginia Woolf wrote their greatest books after the age of 40 (Galenson 2006b).

We can also see this same division between two types of movie directors. Orson Welles is known above all for having directed and coauthored the movie *Citizen Kane*. There is remarkably widespread agreement that this is the most important movie ever made. So for example the British Film Institute conducts an international poll of movie critics once every decade, and the Institute has ranked *Citizen Kane* first in each of its past five polls. *Citizen Kane* was the first movie Welles ever made, at the age of just 26. The movie was influential because of its radical technical innovations, in sound and photography. Welles elegantly used these novel technical devices to reinforce the symbolic message of the film's story. Thus the fragmented visual images, with unusual camera angles and unexpected transitions, reinforce the message of the film's presentation of the wide variety of differing judgments of the movie's central figure presented by different characters (Borges 1945). Just as the camera sees Charles Foster Kane from many different viewpoints, so do the people who knew him throughout his life: as the movie goes on, we realize that there is no single true image of the man, just as there is no single true view of his personality.

Two decades after *Citizen Kane*, Jean-Luc Godard again revolutionized world cinema with his own first film, *Breathless*, which he directed when he was 30. *Breathless* immediately changed the way young directors filmed and edited their movies, and its plot was even more disjointed and confusing than that of *Citizen Kane*. When he was asked whether his movies have any structure—even a beginning, middle, and end—Godard famously replied, “Yes, but not necessarily in that order” (Sterritt 1999).

Welles and Godard were radical conceptual innovators. Their movies were in large part intellectual exercises: they were about ideas, they were complicated, often confusing, and their goal was to make their audiences think. Their innovations conspicuously broke earlier rules of filmmaking, and their ability to do this was greatest early, before they had developed fixed habits of thought (when asked how he'd had the courage to make such a revolutionary movie when he was so young, Welles replied: “Ignorance, ignorance, sheer ignorance—you know there's no confidence to equal it. It's only when you know something about a profession, I think, that you're timid or careful.”) In contrast, experimental directors make movies that tell stories.

They want to entertain their audiences, by showing them realistic characters engaged in realistic activities. Unlike conceptual directors, who want their audiences to be aware that they are looking at artificial creations, experimental directors want their audiences to believe they are watching real life: indeed, experimental directors often want their audiences to become so involved with their characters and their stories that they forget they are watching a movie. Great experimental directors improve with age, as their increasing mastery of the techniques of filmmaking allows them to use those techniques more and more effectively to tell stories.

*Movie Maker* magazine recently named Alfred Hitchcock the most influential director of the twentieth century. For much of his career, Hitchcock was not regarded as a great artist, but merely as a commercially successful director, because he made popular films. His stated goal was to entertain mass audiences, and he believed that the way to do this was by telling stories as simply as possible (Hitchcock 1995). Critics now widely agree that Hitchcock's skills grew steadily throughout his long career, and the latest poll taken by the British Film Institute designated *Vertigo*, which he made at the age of 59, as his greatest film.

Joshua Kotin and I (2007, 2008) have done studies of the careers of the most important movie directors of the past century, and we have found that the conceptual directors consistently peak creatively at younger ages than the experimental directors. So for example, according to the most recent British Film Institute poll, the conceptual directors Sergei Eisenstein, Buster Keaton, Ingmar Bergman, Francis Ford Coppola, and Steven Spielberg all made their best movies before they reached the age of 40, whereas the experimental directors John Ford, Howard Hawks, Billy Wilder, Robert Altman, and Clint Eastwood all made their greatest films after the age of 50.

I don't want to go on much longer, but I do want to make one more point about the generality of this analysis of the life cycles of creativity. Specifically, I believe it applies to virtually all intellectual activities. It may be possible to find a few disciplines in which all significant innovations are made by conceptual innovators, but I think these are very rare. Let me take one case, far from the arts. In today's world of global markets, instant communication, and precocious internet billionaires, we might be tempted to think that important innovations in entrepreneurship are restricted exclusively to young conceptual prodigies. This is not the case, however. One remarkable counterexample involves Muhammad Yunus, who received a PhD in economics in the United States, then returned to his native Bangladesh to teach economic theory at provincial Chittagong University. In 1974, Bangladesh suffered a severe famine, and people were literally dying in the streets. Frustrated by the failure of economic theory to help solve the extreme problems of the rural poor, in

desperation Yunus went out into the villages, to learn about the poor by talking to them. In his book *Banker to the Poor* (2003), he tells us that “the poor taught me an entirely new economics.” Yunus began lending small amounts of money to the village poor, in transactions that existing banks refused to make because the borrowers had no collateral. Yunus himself confesses that when he first began making these loans, he had no idea if he was right: “I was walking blind and learning as I went.” Yunus formally founded the Grameen Bank in 1983, when he was 43 years old. He has managed it on the classic experimental principle that experience is the best guide: all the bank’s employees are encouraged to suggest changes in even the most basic rules if they perceive better procedures for dealing with problems they encounter in the course of their daily work. Today the Grameen Bank is the largest bank in Bangladesh, and its contribution to helping the rural poor was formally recognized when Muhammad Yunus and the Grameen Bank were jointly awarded the Nobel Peace Prize in 2006.

In conclusion, let me ask: what do we learn from this research?

One thing we learn is that it is people, not activities, that determine the nature of creativity. Prior to my research, the major studies on the relationship between age and creativity were by psychologists, who believed quite unanimously that it was the discipline that determined the time path of creativity: for example, poets peak early, novelists peak late (Simonton 1988). My work shows that this is wrong: psychologists studied poets and novelists as aggregates, so they didn’t notice that some great poets have peaked late in their lives, just as some great novelists have peaked early. And as a result, the psychologists failed to see the important differences in both processes and products within each of these activities, that the poets and novelists who peak early share a conceptual orientation, while those poets and novelists who peak late make an entirely different kind of art, that I call experimental.

We also learn that creativity does not necessarily favor the young. Prominent psychologists have argued that wisdom and creativity are opposing concepts. According to them, young people are brash and creative, old people are balanced and wise: creativity and wisdom do not go together, because they require different kinds of thinking (Sternberg 2003). My work shows that this is wrong. It is true that bold and brash leaps into the unknown are the source of conceptual innovations, and this is the primary domain of the young, but I have found that there is another, very different form of creativity, in which important new discoveries are the cumulative product of gradual and extended experimentation. What Cézanne, Virginia Woolf, and Muhammad Yunus have understood is that improving their work by trial and error might be painstaking and slow, but that over long periods

the cumulative effect of this process can be very great. This recognition is enormously important. We often tend to assume that radical innovations, in art or other intellectual activities, are necessarily the result of dramatic leaps. This isn't true. Radical innovations can equally be the sum of many small steps. Both conceptual and experimental innovators have made enormous contributions to art and science. Their contributions are very different, and it is important for our economy, and our society, to have both types.

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