



# Wired to Create: Unraveling the Mysteries of the Creative Mind

By Scott Barry Kaufman, Carolyn Gregoire

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**Discover the ten things highly creative people do differently.**

Is it possible to make sense of something as elusive as creativity? Based on psychologist Scott Barry Kaufman's groundbreaking research and Carolyn Gregoire's popular article in the Huffington Post, *Wired to Create* offers a glimpse inside the "messy minds" of highly creative people. Revealing the latest findings in neuroscience and psychology, along with engaging examples of artists and innovators throughout history, the book shines a light on the practices and habits of mind that promote creative thinking. Kaufman and Gregoire untangle a series of paradoxes— like mindfulness and daydreaming, seriousness and play, openness and sensitivity, and solitude and collaboration – to show that it is by embracing our own contradictions that we are able to tap into our deepest creativity. Each chapter explores one of the ten attributes and habits of highly creative people:

Imaginative Play \* Passion \* Daydreaming \* Solitude \* Intuition \* Openness to Experience \* Mindfulness \* Sensitivity \* Turning Adversity into Advantage \* Thinking Differently

With insights from the work and lives of Pablo Picasso, Frida Kahlo, Marcel Proust, David Foster Wallace, Thomas Edison, Josephine Baker, John Lennon, Michael Jackson, musician Thom Yorke, chess champion Josh Waitzkin, video-game designer Shigeru Miyamoto, and many other creative luminaries, *Wired to Create* helps us better understand creativity – and shows us how to enrich this essential aspect of our lives.

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### Editorial Review

#### Review

"*Wired to Create* is an empowering manifesto for creative people. Endlessly relatable and chock-full of wisdom, Kaufman and Gregoire's study of the creative personality will have you saying over and over again, "This is Me!"

—**Susan Cain, Quiet Revolution co-founder and New York Times bestselling author of *Quiet***

"Together, [Kaufman and Gregoire] have created a satisfying overview of creativity research that is likely to provide nuggets of wisdom to even the most seasoned creative spirit. Readers looking for tips on how to increase creativity will find plenty here."

—**The New York Times**

"With cutting-edge science and timeless wisdom, Carolyn Gregoire and Scott Barry Kaufman shine a light on the habits, practices and techniques that can help us tap into our deepest creativity."

—**Arianna Huffington, New York Times-bestselling author of *Thrive***

"Scott Barry Kaufman has just written the go-to book on creativity and genius. With Carolyn Gregoire, he puts together the newest scientific findings from the brain, from mental life and from the messy world of emotion to whiz us to the cutting edge of the highest human accomplishments."

—**Martin Seligman, Director, Positive Psychology Center, University of Pennsylvania**

"A lively, intimate glimpse into the creative mind from one of the most creative psychologists I know. Don't miss it."

—**Angela Duckworth, bestselling author of *Grit***

"There are numerous books telling readers what they can do to become more creative. For the most part, the suggestions are made up: They have no basis in scientific fact. This book is unusual and perhaps unique not only in explaining what creativity is, but also in showing scientifically how people can unlock and develop their creative talents. If you are interested in unleashing your own creativity, you will want to read this book!"

—**Robert J. Sternberg, author of *Successful Intelligence***

"*Wired to Create* is an exquisite tour through the science of that most prized but often frustratingly ineffable quality: creativity. By weaving research through portraits of the lives of great creators, Kaufman and Gregoire bring creativity into our grasp, and provide a rubric for how each of us can have more of it in our lives."

—**David Epstein, New York Times bestselling author of *The Sports Gene***

"Through science and storytelling, Kaufman and Gregoire reveal the inner workings of the creative mind. It all adds up to a fascinating and instructive read."

—**Robert Greene, New York Times bestselling author of *Mastery***

"One of my favorite thinkers and one of my favorite writers came together to write a book about one of my favorite topics: creativity. There is so much here, start now."

—**Ryan Holiday, author of *The Obstacle Is The Way***

"*Wired to Create* is the state of the science on the personalities behind innovative ideas. It cleans up the messy minds of creative people."

—**Adam Grant, Wharton professor and *New York Times* bestselling author of *Give and Take***

"*Wired to Create* looks to be the place to go for a highly synthetic, readable account of personal creativity and the psychological behaviors known to support it. Understanding our 'messy minds,' as Kaufman and Gregoire help us do, may very well be the first step to enhancing creative potential—in ourselves and in our children."

—**Michele Root-Bernstein, author of *Inventing Imaginary Worlds* and co-author of *Sparks of Genius***

"At last there is a book on creativity that is both accessible, engaging, and highly readable that does not sacrifice scientific rigor in the name of communication. Filled with stories and anecdotes, this is a must-read."

—**James C. Kaufman, author of *Creativity 101***

"This book will create a shift in the approach to creativity; how it is fostered in childhood and continued throughout our lives. It is a fascinating read and an important scientific contribution on how creative people use the whole brain, and find ways to deal with the joy and struggles of living creatively."

—**Bo Stjerne Thomsen, Ph.D., Director, Research & Learning, the LEGO Foundation**

"The mysteries of creativity have been unearthed by two eminent thinkers. Readers will be rewarded with cutting-edge science, great stories, and new insights into the multiple roads that lead to one of the most valuable human endeavors."

—**Dr. Todd B. Kashdan, Professor of Psychology at George Mason University and author of *The Upside of Your Dark Side***

"*Wired to Create* is both broadly entertaining and deeply informative. Few books on creativity integrate the two so well!

—**Dean Keith Simonton, Editor, *The Wiley Handbook of Genius***

"Scott Barry Kaufman is the leading researcher who I'm watching for the next paradigm on how the creative mind works. This very well-crafted book, written with Carolyn Gregoire, lays the foundation."

—**Peter Sims, Co-Founder & President, Silicon Guild, Inc. and author of *Little Bets: How Breakthrough Ideas Emerge from Small Discoveries***

"This book brings a very fresh perspective to a field that has, inexplicably, been struggling to 'create' new ideas for several decades. With scientifically based research on imagination, daydreaming, intuition, and mindfulness, it opens up new avenues of thinking about this critical human capacity. It is a must read for both scientists and anyone else interested in the 'inner world' of creativity."

—**Rex E. Jung, Ph.D., editor of the forthcoming *Cambridge Handbook of the Neuroscience of Creativity***

"More than ever we need creativity in our lives and to answer the pressing challenges of our times. Scott Barry Kaufman and Carolyn Gregoire paint a brilliant portrait of the many faces of creativity: a fusion of seemingly contradictory mental states that can be limpid and messy, wise and crazy, exhilarating and painful, spontaneous and yet arising from sustained training. Fascinating all the way."

—**Matthieu Ricard, humanitarian and Buddhist monk, author of *Altruism***

"Groundbreaking creativity scholar Scott Barry Kaufman and talented science journalist Carolyn Gregoire shed light on one of the most mysterious phenomena of the human psyche: creativity. *Wired to Create* is a page-turner that masterfully blends cutting-edge research with historic and contemporary real-world examples of artists and geniuses, inspiring the readers to get in touch with her own inventive spirit."

—**Emma Seppälä, Ph.D., author of *The Happiness Track: How to Apply the Science of Happiness to Accelerate Your Success* and Science Director, Stanford Center for Compassion and Altruism Research and Education**

"This guide is well-documented, never pedantic, and always educational and inspiring."

—**Publishers Weekly**

#### About the Author

**Scott Barry Kaufman, Ph.D.**, is scientific director of the Imagination Institute and investigates the measurement and development of imagination, creativity and well-being in the Positive Psychology Center at the University of Pennsylvania. He has written or edited six previous books, including *Ungifted: Intelligence Redefined*. He is also co-founder of *The Creativity Post*, host of *The Psychology Podcast*, and he writes the blog Beautiful Minds for *Scientific American*. Kaufman lives in Philadelphia.

**Carolyn Gregoire** is a senior writer at the *Huffington Post*, where she reports on psychology, mental health, and neuroscience. She has spoken at TEDx and the Harvard Public Health Forum, and has appeared on MSNBC, the *Today* show, the History Channel and HuffPost Live. Gregoire lives in New York City.

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#### Preface

When the artist is alive in any person, whatever his kind of work may be, he becomes an inventive, searching, daring, self-expressive creature. He becomes interesting to other people. He disturbs, upsets, enlightens, and opens ways for better understanding. Where those who are not artists are trying to close the book, he opens it and shows there are still more pages possible.

—ROBERT HENRI, AMERICAN PAINTER

The creative genius may be at once naive and knowledgeable, being at home equally to primitive symbolism and to rigorous logic. He is both more primitive and more cultured, more destructive and more constructive, occasionally crazier and yet adamantly saner, than the average person.

—FRANK X. BARRON, PSYCHOLOGIST AND CREATIVITY RESEARCHER

Several years ago, Scott gave a popular science rapper an extensive battery of personality tests. At the time, this Canadian entertainer, known as Baba Brinkman,<sup>1</sup> was starring in an Off-Broadway show called *The Rap Guide to Evolution*, a hip-hop tribute to Charles Darwin and the theory of natural selection. In the show, an animated Brinkman jumps energetically onstage, drops rhymes such as "The weak and the strong, who got it goin' on? We lived in the dark for so long," and "Getting pregnant before marriage; it's such a tragedy. Apparently it's also a reproductive strategy." He was one of the most bold and magnetic performers Scott

had ever witnessed on the stage.

Brinkman's test results were perplexing, revealing a personality riddled with contradictions. On the one hand, Scott noticed that Brinkman scored high in "blirtatiousness"—a personality trait characterized by the tendency to say whatever is on one's mind. But at the same time, Brinkman didn't seem extraverted offstage.

He then found that while Brinkman scored high in assertiveness—one hallmark of extraverted personalities—he was only slightly above average in enthusiasm, another big marker of extraversion.<sup>2</sup> How could this charismatic performer, who seemed so full of energy, be only slightly above average in expressiveness behind the curtain? Scott dug deeper into the data to try to make sense of Brinkman's puzzling personality.

"I get that remark all the time with people who hang out with me after the show," Brinkman told Scott. "They say, 'You're so quiet, what happened to the guy onstage?' I get in front of a crowd, I get charged up, and it's like 'I'm gonna get everybody into this.' There has become this huge split, where I'm quite a temperate personality most of the time until I get on a stage and have a job to do, and then it's like *bam*."

As Scott delved deeper into Brinkman's psyche, further paradoxes emerged. For one, he noticed that Brinkman was low in narcissism—a trait that can be rampant among performers (and often rappers in particular). However, Brinkman *did* possess some of the individual qualities that together make up narcissism. Brinkman scored high in exhibitionism and superiority—two aspects of narcissism that had likely proved helpful to his career as an entertainer—while scoring low in the exploitativeness and entitlement aspects of narcissism. Brinkman also scored high in several positive characteristics that were undoubtedly beneficial to his career in music: emotional intelligence, social awareness, and the ability to manage stress. Scott noticed too that Brinkman was simultaneously oriented toward short-term romantic affairs while demonstrating a strong ability to sustain relationships.

Brinkman's personality was a case study in one of the most well-known findings in the history of creativity research: *Creative people have messy minds*.

Creative people also tend to have messy processes.

•••

Picasso went through a rather chaotic process in creating his most famous painting, *Guernica*.

After being asked to create a mural for the Spanish Pavilion at the 1937 World's Fair, the painter found himself spinning his wheels for three months while he searched for creative inspiration. Then, inspiration struck alongside tragedy. In the wake of the Nazis' bombing of a small Basque town at the behest of the Spanish Nationalist forces, Picasso set out to illustrate the atrocities of Spain's bloody civil war.

Just fifteen days after the bombing, Picasso went to work on a series of forty-five numbered sketches. He painstakingly drew numerous versions of each of the figures that would appear in the painting—the bull, the horse, the warrior, the woman crying, the mother with her dead child—before touching a single drop of oil to the eleven- by twenty-five-foot canvas on which he would paint the mural.

For each figure, Picasso sketched a diverse set of variations. These sketches often did not exhibit a clear upward progression. In several cases, the figure he selected to appear in the finished painting ended up being one of the earliest he had sketched. The figure of the mother with her dead child featured in the final work, which depicted the mother holding the child in her arms and weeping, was very similar to the first two versions he sketched. But then, he went on to create two images that were wildly different—instead of the



mother holding the child in her arms (as she appears in the painting) the discarded sketches show the mother carrying her child up a ladder. Picasso continued his experimentation with new figures even after moving on to the canvas, which often required him to paint over what was already there. He also explored a number of creative possibilities, such as a bull with a human head, that he ultimately didn't pursue.

Although Picasso was a seasoned painter who had been creating masterpieces for decades by the time he took on the project, his process in painting *Guernica* appeared to be more chaotic than controlled, more spontaneous than linear. The surplus of ideas and sketches that Picasso produced did not show a clear progression toward the final painting. The process was characterized by a number of false starts, and as some art historians have noted, many of the sketches he drew appear to be superfluous to the final product.<sup>3</sup>

Exploration and seemingly blind experimentation were key to Picasso's creative process. Rather than creating a painting to reflect his own preexisting worldview, he seemed to actively build and reshape that worldview through the creative process. While he may have had a rough intuition, it's likely that Picasso did not quite know where he was going, creatively, until he arrived there.<sup>4</sup>

Picasso said of his own creative process, "A painting is not thought out and settled in advance. While it is being done, it changes as one's thoughts change. And when it's finished, it goes on changing, according to the state of mind of whoever is looking at it."

The progression of Picasso's *Guernica* sketches offers a fascinating glimpse into his imagination, but it raises as many questions as it offers answers. To what extent did the painter have even the slightest idea what he was doing? And if he didn't know what he was doing, then how are we to make sense of his creative process—or of the creative process more generally?

Attempting to analyze Picasso's personality offers little in terms of answers. The painter was a protean shapeshifter as both artist and man; he has been described as a difficult personality,<sup>5</sup> who was intensely passionate and deeply cynical; "a towering creative genius one moment . . . a sadistic manipulator the next."<sup>6</sup> Picasso himself hinted at these paradoxes in his life and work when he said, "I am always doing that which I cannot do," and described the act of creation as one of destruction.<sup>7</sup>

So how are we to make sense of the complex creative process and personality? It starts with embracing a very messy set of contradictions.

## Introduction: Messy Minds

Do I contradict myself? Very well, then I contradict myself, I am large, I contain multitudes.

—WALT WHITMAN

The debate over the creation of *Guernica* reflects a much larger schism in our understanding of the creative mind.

The history of scientific thinking about creativity has been defined by polarization, starting with a popular 1926 theory of the creative process that set the stage for decades' worth of debate among psychologists.

In his book *The Art of Thought*, British social psychologist Graham Wallas outlined the popular "four-stage model" of creativity. After observing and studying accounts of eminent inventors and creators, Wallas proposed that the creative process involves the following stages: *preparation*, during which the creator acquires as much information as possible about a problem; *incubation*, during which the creator lets the

knowledge stew as the unconscious mind takes over and engages in what Einstein referred to as “combinatory play”;<sup>1</sup> *illumination*, during which an insight arises in consciousness—the natural culmination of a “successful train of association”; and a *verification stage*, during which the creator fleshes out the insights, and communicates their value to others.<sup>2</sup>

If only the creative process was so tidy. While psychologists continue to vigorously debate its workings, most agree that the traditional four-stage model is far too simplistic.<sup>3</sup> In his presidential address to the American Psychological Association in 1950, J. P. Guilford made a bold call for psychologists to take a closer look at creativity. He rejected the four-stage model, calling it “very superficial from a psychological point of view,”<sup>4</sup> because it tells us so little about the mental processes occurring during the act of creation.

As psychologists continued to put artists under the microscope to examine the creative process in action, they continued to find it to be far from a clear-cut, step-by-step process.<sup>5</sup> Further research showed creative people to engage in rapid switching of thought processes and to exhibit nearly simultaneous coexistence between a number of these processes, from generating new ideas to expanding and working out the ideas, to critical reflection, to taking a distance from one’s work and considering the perspective of the audience.

These processes, of course, differ from one type of artist to another. When creating fiction, writers tend to exhibit a complex process of their own. Research conducted on a group of novelists painted a picture of the fiction-writing process as a “voyage of discovery” that begins with a *seed incident*—an event or observation that inspires fascination and exploration and becomes the fertile ground on which creative growth occurs. Seed incidents tend to break the mind out of ordinary understanding and create new meanings for the writer, as evidenced by the writers’ descriptions of these events as “touching,” “intriguing,” “puzzling,” “mysterious,” “haunting,” and “overwhelming.” Commenting on a family incident that became the seed for a story, one writer said that the event seemed “full of meanings I couldn’t even begin to grasp.”<sup>6</sup>

The seed incident is followed by a period of navigation between different creative worlds. At this stage, the writers oscillated between the “writingrealm”—a place of retreat from the world where the writer can plan and reflect on what has been written—and the “fictionworld” of their own making: an imaginative place in which the author engages with fiction characters and events as they unfold. For instance, after one writer began her story with the line “I am a poodle,” she imaginatively transformed herself into a dog, “allowing the sounds and sights and smells of a dog’s world to come to her.” She then switches mental gears, returning to the writingrealm to reflectively evaluate and improve upon what she had written. This fictionworld, which consists of imagination and fantasy, is a distinctly different realm of experience from the writingrealm, where reflective thinking and rational deliberation occur. This constant toggling between imaginative and rational ways of thinking suggests a more complex, less linear account of fiction writing than the four-stage model can accommodate.

Further analyses of creative writers continued to reject a step-by-step account of the creative process, suggesting that writing is likely to be considerably less controlled. Focusing on the contemporary novelist’s search for meaning and struggle to express a specific experience,<sup>7</sup> another study emphasized that the writing process often moves forward even without the novelist’s full understanding of where the work is going. As the writer slowly gains a sense of the direction in which he is moving, he can begin to move forward deliberately and with greater clarity. The process reflects what *Calvin and Hobbes* creator Bill Watterson said of creativity and life, “The truth is, most of us discover where we are headed when we arrive.”<sup>8</sup>

Psychologist Dean Keith Simonton, who has extensively studied the career trajectories of creative geniuses across the arts, sciences, humanities, and leadership, came to a strikingly similar conclusion. Based on a detailed case study of Thomas Edison’s creative career, Simonton suggested that even at the level of genius, creativity is a “messy business.”<sup>9</sup>

Even at the level of genius, creativity is a “messy business.”

Given the complex and ever-changing nature of the creative process, it should come as little surprise that creative people tend to have messy minds. Highly creative work blends together different elements and influences in the most novel, or unusual, way, and these wide-ranging states, traits, and behaviors frequently conflict with each other within the mind of the creative person, resulting in a great deal of internal and external tension throughout the creative process.<sup>10</sup>

One of the most fascinating things about creative work is that it brings together and harmonizes these conflicting elements, which exist to some extent in everyone. Creative people are hubs of diverse interests, influences, behaviors, qualities, and ideas—and through their work, they find a way to bring these many disparate elements together. This is one of the reasons why creativity feels so ineffable—it is so many different things at the same time! After interviewing creative people across various fields for over thirty years, the eminent psychologist of creativity Mihaly Csikszentmihalyi observed: “If I had to express in one word what makes their personalities different from others, it’s *complexity*. They show tendencies of thought and action that in most people are segregated. They contain contradictory extremes; instead of being an ‘individual,’ each of them is a ‘multitude.’”<sup>11</sup>

Case in point: The brilliant journalist David Carr—a creature of many contradictions and a protean shapeshifter if there ever was one—said that he often reflected upon the many “selves” that he had possessed over his lifetime, from drug addict to media celebrity. “I spent time looking into my past to decide which of my selves I made up—the thug or the nice family man—and the answer turned out to be neither,” he reflected. “Whitman was right. We contain multitudes.”

Another prototype of the messy creative mind is the iconic Jazz Age entertainer Josephine Baker. The famous American in Paris—who will forever be remembered for dancing in a banana skirt in *La Revue Nègre*—was not only a singer, dancer, and actress but also a French spy during World War II, a civil rights activist, a mother of twelve adopted children from around the world (her “rainbow tribe”), a rumored lover of men and women numbering in the thousands, and an eccentric character described as both deeply loving and volatile by those who knew her well. Baker’s “adopted” son Jean-Claude Baker wrote in his biography of the star, “I loved her, I hated her, I wanted desperately to understand her.”

Efforts to peel back Baker’s many masks seem to have only brought further questions to light. Feminist studies scholar Alicja Sowinska shines a light on Baker’s complexities:

If she embodied a savage on stage, she would behave like a lady on the street; if men were dying for her as seductress, she would put on a man’s suit and bend gender boundaries; if she was called a “black Venus,” she would treat her head with a blonde wig. When the perception of her became too refined, she walked her pet leopard down the Champs-Élysées.<sup>12</sup>

David Foster Wallace proved to be similarly perplexing to those who attempted to understand him. Commentators have described the virtuoso author of *Infinite Jest* as both deeply fragile and intensely strong willed, at different times politically conservative and fiercely liberal, a writer of prose that is as precise as it is unwieldy, a master of writing about both highbrow and lowbrow topics. Wallace’s biographer, D. T. Max, said that he found himself surprised by the “intensity of violence” in the writer’s personality. However, he said, “On the other end of the spectrum, he was also this open, emotional guy, who was able to cry, who intensely loved his dogs. He was all those things.”<sup>13</sup>

This delicate, and sometimes extreme, dance of contradictions may be precisely what gives rise to the intense inner drive to create. In the 1960s, the research of Frank X. Barron examined this fundamental motivation.<sup>14</sup> In a history-making study, Barron invited a group of high-profile creators to live on the University of

California, Berkeley campus for a few days. The group—which included Truman Capote, William Carlos Williams, and Frank O'Connor, along with leading architects, scientists, entrepreneurs, and mathematicians—arrived, suitcases in hand, to bunk at a former fraternity house for several days.<sup>15</sup> They spent time talking to one another, being observed, and completing various evaluations of their lives, work, and personalities, including tests of mental illness and creative thinking, which required them to answer some very personal questions.<sup>16</sup>

What did Barron find that these highly creative people did differently? One thing that became quite clear is that while IQ and academic aptitude were relevant (to a moderate degree), they did not explain the particular spark of the creative mind.<sup>17</sup>

This led Barron to claim that creativity might be distinct from IQ—a fairly revolutionary idea at the time, as it ran counter to the longtime assumption that intelligence, as measured by IQ tests, was the special sauce of creative genius. IQ testing was seen as the best route to understanding creativity by many academics in the first half of the twentieth century, but even their own data sets suggested that additional personality traits were important,<sup>18</sup> and Barron's findings added more cause for skepticism.

The Berkeley study also showed that the ingredients of creativity were too complex and multifaceted to be reduced to a single factor. The findings demonstrated that creativity is not merely expertise or knowledge but is instead informed by a whole suite of intellectual, emotional, motivational, and ethical characteristics.<sup>19</sup> The common strands that seemed to transcend all creative fields was an openness to one's inner life, a preference for complexity and ambiguity, an unusually high tolerance for disorder and disarray, the ability to extract order from chaos, independence, unconventionality, and a willingness to take risks.

This new way of thinking about creative genius gave rise to some fascinating—and perplexing—contradictions. In a study of writers, Barron and Donald MacKinnon found that the average creative writer was in the top 15 percent of the general population on all measures of psychopathology covered by the test.<sup>20</sup> But here's the kicker: They also found that *creative writers scored extremely high on all the measures of psychological health!*

The writers scored high on some measures of mental illness, but they also tended to score very high on “ego-strength,” a trait that's characterized by “physiological stability and good health, a strong sense of reality, feelings of personal adequacy and vitality, permissive morality, lack of ethnic prejudice, emotional outgoingness and spontaneity, and intelligence.”<sup>21</sup> Barron's creators were just as strong in adaptability and resourcefulness as they seemed to be pathological by other measures. They appeared to be little more than a loosely assembled bundle of paradoxes and perplexities. In order to determine how these writers could be simultaneously mentally healthier and more mentally ill than the average person, Barron began to question the value of the tests themselves and the labels we put on individual personalities.

As Barron began to make sense of what he observed, he came to identify a key consistency among creative people. Namely, these people seemed to become *more intimate with themselves*—they dared to look deep inside, even at the dark and confusing parts of themselves.<sup>22</sup> Being open to and curious about the full spectrum of life—both the good and the bad, the dark and the light—may be what leads writers to score high on some characteristics that our society tends to associate with mental illness, while it can also lead them to become more grounded and self-aware. In truly facing themselves and the world, creative-minded people seemed to find an unusual synthesis between healthy and “pathological” behaviors.

Armed with mounting evidence of these deep paradoxes, scientists now generally agree that creativity is not a single characteristic but a *system* of characteristics, and many theories now emphasize the multifaceted nature of creativity.<sup>23</sup> The characteristics highlighted by these theories include general intellectual

functioning, knowledge, and skills relevant to the activity; creative skills and thinking styles; psychological resources such as confidence, perseverance, and a willingness to take risks; inner motivation and a love of one's work; a complex suite of positive and negative emotions; and environmental factors such as access to gatekeepers in the field and key resources.

To be creative, you don't need to score off the charts on every single one of these characteristics. Creativity is not so much a sum as it is a *multiplication* of factors.<sup>24</sup> What does that mean? Well, it may be possible to compensate for lower values on one dimension (like IQ) by capitalizing on another set of strengths (like motivation and perseverance). Indeed, these factors often interact and feed off each other over time, which can amplify levels of creative output.<sup>25</sup>

Creative people not only cultivate a wide array of attributes but are also able to adapt—even *flourish*—by making the best of the wide range of traits and skills that they already possess. This ability to adapt to changing circumstances with fluidity and flexibility is reflected in three main “super-factors” of personality that are highly correlated with creativity: plasticity, divergence, and convergence.<sup>26</sup> *Plasticity* is characterized by the tendency to explore and engage with novel ideas, objects, and scenarios.<sup>27</sup> Characteristics like openness to experience, high energy, and inspiration are all related to each other, forming the core of this drive for exploration. *Divergence* reflects a nonconformist mind-set and independent thinking and is related to impulsivity and lower levels of agreeableness and conscientiousness. Finally, *convergence* refers to the ability to conform, put in the hard effort necessary to exercise practicality, and make ideas tenable. Convergence consists of high conscientiousness, precision, persistence, critical sense, and sensitivity to the audience. Individually and together, these diverse qualities encourage the development and expression of creativity.

These characteristics come into play during the two broad stages of the creative process: *generation*—in which ideas are produced and originality is sought out—and *selection*, which involves working out ideas and making them valuable to society. While characteristics associated with plasticity and divergence are most relevant when generating ideas, convergence is most important during the stage when ideas are being ironed out and made tenable. Considering that creativity involves both novelty and usefulness, this makes a lot of sense. While exploration and independent thinking can foster the generation of novel ideas, the more practical quality of convergence can help make them useful.

Divergence and convergence are just two of many seeming polarities associated with creativity. This is precisely the point. Creative people, *being human*, have at least some level of these varying characteristics within themselves, and they can choose to flexibly switch back and forth depending on what's most helpful in the moment. Creative people seem to be particularly good at operating within a broad spectrum of personality traits and behaviors. They are both introverted and extraverted, depending on the situation and environment, and learn to harness both mindfulness and mind wandering in their creative process. As Csikszentmihalyi put it, “What dictates their behavior is not a rigid inner structure, but the demands of the interaction between them and the domain in which they are working.”<sup>28</sup>

### The Many Networks of Creativity

Today, we're seeing evidence of this complexity at the neural level. It turns out that creativity does not involve only a single brain region or even a single side of the brain, as the “right brain” myth of creativity would have us believe. The creative process draws on the *whole* brain.

The creative process draws on the whole brain.

This complex process consists of many interacting cognitive systems (both conscious and unconscious) and emotions, with different brain regions recruited to handle each task and to work together as a team to get the

One of the most important networks at play here is the “default network” of the brain—or as we’ll call it, the “imagination network.”<sup>30</sup> Considered an exciting discovery by many cognitive neuroscientists, the identification of the default mode network has been described as a fortunate accident.<sup>31</sup> For years, cognitive neuroscientists treated the subjective realm of inner experience as mere “noise,” useful only as a comparison to the more “productive” mental activity involved in sensory perception and engagement with the outside world. But when a few rogue cognitive neuroscientists began wondering what the brain actually *does* when it’s not engaged in an externally directed task, the importance of this network became abundantly clear.<sup>32</sup>

Even that may be a huge understatement. Some scientists believe that the discovery of this brain network represents nothing less than a *paradigm shift* in cognitive neuroscience, from a focus on external, goal-directed task performance to the more nebulous yet omnipresent phenomenon of *inner experience*. As cognitive neuroscientist Kalina Christoff puts it, “Such a paradigm shift may help us accept our drifting mind as a normal, even necessary, part of our mental existence—and may even enable us to try to take advantage of it in some creative, enjoyable way.”<sup>33</sup>

What does the imagination network do? Well, let’s start with what it does *not* do. For starters, this brain network is not highly active when we take on leadership roles that focus on getting tasks completed (as opposed to leadership roles that focus on developing relationships), when we reason about physical objects (“I wonder what would happen if the wheels of this skateboard could rotate 360 degrees”), or when we imagine what another person knows about something (as opposed to their mental and emotional state).<sup>34</sup> See the similarities? All of these activities have to do, in some way, with our engagement with the immediate, concrete world outside our minds, which makes up much of our lives.

Nevertheless, external focus is only one part of the creativity puzzle. Another critical aspect of creative cognition comes from the imagination network, which is involved in as much as *half of our mental lives*. The processes associated with this brain network make us each unique and help breathe meaning into our lives. In fact, the functions of the imagination network form the very core of human experience. Its three main components—personal meaning making, mental simulation, and perspective taking—often work together when we’re engaged in what researchers call “self-generated cognition.”<sup>35</sup> Engaging many regions on the medial (inside) surface of the brain in the frontal, parietal, and temporal lobes, the imagination network enables us to construct personal meaning from our experiences, remember the past, think about the future, imagine other perspectives and scenarios, comprehend stories, and reflect on mental and emotional states—both our own and those of others.<sup>36</sup>

In recent years, the imaginative and social processes associated with this brain network have also been found to be critical for the healthy development of compassion and empathy as well as the abilities to understand ourselves, create meaning from our experiences, and construct a linear sense of self.<sup>37</sup> It should come as no surprise that the activity of the imagination brain network can also help inform not only our most deeply personal but our most creative ideas.<sup>38</sup>

Creative thought doesn’t emerge solely from the imagination network.<sup>39</sup> A different brain network—the “executive attention” network, which helps us direct our attention—is also crucial here. Executive control processes support creative thinking by helping us deliberately plan future actions, remember to use various creative tactics, keep track of which strategies we’ve already tried, and reject the most obvious ideas.<sup>40</sup> They also help us *focus* our imagination, blocking out external distractions and allowing us to tune in to our inner experience. The imagination network and the executive attention network cooperate with each other whenever we have to evaluate personal information, from future planning to keeping track of social information, to evaluating a creative idea, to planning and carrying out a project.<sup>41</sup>

When we generate new ideas, these networks—along with the salience network, which is responsible for motivation—engage in an intricate dance. Researchers have observed this cognitive tango in action through the brain scans of people engaged in their personal creative process—from study volunteers thinking up creative uses for everyday objects like a brick, to published poets generating new verses, to jazz musicians and rappers deep in improvisation.<sup>42</sup> Initially, their brain states resemble a state of *flow*, or complete absorption in the task. The imagination and salience networks are highly active, while the more focused executive attention network is relatively quiet. As they further hone and refine their work or engage in collaboration with others, however, the executive attention network becomes increasingly more active.

Creative people are particularly good at exercising flexibility in activating and deactivating these brain networks that in most people tend to be at odds with each other. In doing so, they're able to juggle seemingly contradictory modes of thought—cognitive and emotional, deliberate, and spontaneous.<sup>43</sup> Even on a *neurological* level, creativity is messy.

### Living More Creatively

In this book, we'll discuss creativity as a habit, as a way of life, and as a style of engaging with the world.<sup>44</sup> Following in the footsteps of psychologists J. P. Guilford, Frank Barron, E. Paul Torrance, Robert J. Sternberg, and Abraham Maslow, we'll argue that we are all, in some way, *wired to create* and that everyday life presents myriad opportunities to exercise and express that creativity. This can take the form of approaching a problem in a new way, seeking out beauty, developing and sticking to our own opinions (even if they're unpopular), challenging social norms, taking risks, or expressing ourselves through personal style.

We are all, in some way, wired to create.

We can display creativity in many different ways, from the deeply personal experience of uncovering a new idea or experience to expressing ourselves through words, photos, fashion, and other everyday creations, to the work of renowned artists that transcends the ages.<sup>45</sup> All these types of creativity are rooted in the same fundamental thought processes, creative problem-solving skills, and ways of being. In this book, we'll explore the ten habits of mind that foster them.<sup>46</sup>

Creative self-expression, in its many forms, can be a particularly powerful means of coping with life's inevitable challenges. There's a great myth that creativity requires mental illness or suffering, but as we'll see throughout this book, while there are interesting connections between creativity and suffering, they do not suggest that suffering is a necessary or sufficient condition for creativity. Of course, trauma is a part of the human condition—every life has its “ten thousand joys and ten thousand sorrows,” as Buddhists have long noted. While creativity—expressions of originality and meaningfulness in daily life—does not require suffering, creative work can be highly therapeutic for those who are experiencing hardship. People who engage in a creative lifestyle—perhaps by drifting off in daydreams, taking photographs just for fun, talking passionately about personal goals, writing thoughtful cards or letters to friends and family, keeping a journal, or starting their own business—tend to be more open minded, imaginative, intellectually curious, energetic, outgoing, persistent, and intrinsically motivated by their activity. They also report a greater sense of well-being and personal growth compared to those who are less engaged in these everyday creative behaviors.<sup>47</sup>

People who set aside a special time and place in their lives for creative thinking and work—for instance, waking up with the sunrise each morning to write in the quiet of the early hours or meditating before a painting session—also tend to score higher on measures of creative potential.<sup>48</sup> In contrast, those who are more *motivated to develop a final product* (agreeing with statements like, “I work most creatively when I have deadlines,” “If I don't have something to show for myself, then I feel I've failed”) tend to score *lower* in creative potential and intrinsic motivation and *higher* in stress and extrinsic (reward-oriented) motivation.

Those who derive enjoyment from the act of creating and feel in control of their creative process tend to show greater creativity than those who are focused exclusively on the outcome of their work.

As with happiness, it seems that the more you strive for creativity, the less likely you are to achieve it. Creativity can't be bottled and sold, or tapped into at will—it works in seemingly mysterious and paradoxical ways, and rarely at our own convenience. But learning to embrace and enjoy the creative process itself—with all its peaks and valleys—can yield immense personal and publicly recognized rewards. This has important implications for the sorts of attributes and processes we value and reward in society. If we want to develop creativity and imagination on a large scale, it's important to begin to foster these skills during childhood and to continue to do so throughout our lives. Repeated engagement of the many networks of creativity are essential for their optimal development.<sup>49</sup>

To build these skills, we must encourage risk taking and originality, and give people the autonomy to decide how they learn and create. We must offer them the time they need for personal reflection, daydreaming, and inner exploration. We must make tasks more meaningful and relevant to their personal goals and help people find and develop their unique purpose and identity. To foster creativity, it is important to build people's confidence and competence to learn new information and deal with adversity; make tasks conducive to flow by engaging them in the appropriate level of challenges; and help them develop supportive, positive social relationships.<sup>50</sup>

Unfortunately, our society increasingly allows children's creativity and imagination to fall by the wayside in favor of the passive consumption of social media and television as well as superficial learning evaluated by standardized tests—which only serve to increase extrinsic motivation, often at the expense of intrinsic passion. And it's to our own detriment. Learning to solve the increasingly complex world problems of the twenty-first century—and to identify the problems themselves—will require creative qualities like originality, curiosity, risk taking, and a tolerance for the ambiguity inherent in the idea that there is not always a single correct solution.<sup>51</sup> Of course, knowledge, skills, and intelligence in the traditional IQ sense are important, but they're not enough for true innovation. Being creative requires the cultivation of a balance of skills—including the ability to learn and memorize—as well as the ability to *free oneself* from that knowledge and from habitual ways of thinking in order to imagine possibilities that have never been dreamed of before.

### The Evolution of the Science of Creativity

Since the 1950s, there has been a dramatic rise in research on creativity. Between the late 1960s and early 1990s, more than nine thousand scientific papers were published on the subject.<sup>52</sup> Between 1999 and 2009, another ten thousand papers were written about creativity from a variety of psychological perspectives, including biological, developmental, social, cognitive, and organizational domains, as well as in other fields including economics, education, and the arts.<sup>53</sup> Today, creativity research is in full bloom, with its own scholarly journals and a division of the American Psychological Association.<sup>54</sup> There are now twenty-one thousand books on or related to creativity on Amazon and an endless array of blogs devoted to sharing tips for living more creatively.

The growth of the field of positive psychology—spearheaded by Martin Seligman and Mihaly Csikszentmihalyi in the late 1990s, and carried on by the numerous positive psychologists featured in this book—has also contributed substantially to our understanding of creativity and has shed light on the many ways that creativity contributes to psychological health and well-being. Indeed, the scientifically rigorous field of positive psychology, which focuses on “nurturing what is best within ourselves,”<sup>55</sup> grew out of the humanistic psychology of the mid-twentieth century, a field that emphasized the whole person and the many paths to personal growth.<sup>56</sup>



In preparing this book, we scoured current and past scientific research over the past hundred years (including new research conducted by Scott and his colleagues) and extracted common themes from within the minds and lives of eminent creators throughout the course of human history. Together, science and art offer a glimpse into the many things that highly creative people do differently. While this list is by no means exhaustive, people who live the creative lifestyle do a good number of these things, and there are very few people with originality and meaningfulness who do *none* of them.

In March 2014, Carolyn’s *Huffington Post* article “18 Things Highly Creative People Do Differently” went viral, amassing five million views and more than half a million Facebook likes in a matter of days.<sup>57</sup> The article, which featured Scott’s research, explored some of the characteristic traits and habits of creative people and was widely shared and discussed within creative communities. That article became the basis for this book, which explores in greater depth the same questions of the creative mind and personality.

As you’ll notice, this book presents many paradoxes—mindfulness and mind wandering, openness and sensitivity, solitude and collaboration, play and seriousness, and intuition and reason. These seeming contradictions capture some of the polarities that come together in the creative person and that are reconciled through the creative process as the creator makes meaning out of her inner and outer experiences. Creative people learn to harness these widely varying skills, behaviors, and ways of thinking as the situation demands and to bring them together in new and unusual ways to come up with novel ideas and products.

The aim of this book is to shed light on the fascinating perplexities of the creative mind and to encourage readers to embrace their own paradoxes and complexities, and in doing so, open themselves up to a deeper level of self-understanding and self-expression. As we’ll suggest, it is precisely *this* ability to hold the self in all of its dimensional beauty that is the very core of creative achievement and creative fulfillment.

And so it is here, with the deepest respect for the intimate and complex connections between creativity, personal identity, and meaning, we begin our exploration of the things highly creative people do differently.

## Ten Things Highly Creative People Do Differently

### Imaginative Play

You see a child play . . . and it is so close to seeing an artist paint, for in play a child says things without uttering a word. You can see how he solves his problems. You can also see what’s wrong. Young children, especially, have enormous creativity, and whatever’s in them rises to the surface in free play.

—ERIK ERIKSON

As a young boy growing up in rural Japan in the late 1950s and early 1960s, Shigeru Miyamoto created fantastical worlds in his imagination. He made his own toys using pieces of wood and string. Miyamoto also created puppets and acted out performances with them, drew cartoons, and explored the mountains and river valley surrounding the village where he lived, in the mountains northwest of Kyoto.

As the boy got older, he spent more and more time in nature. One carefree summer when he was around eight years old, Miyamoto stumbled upon a hidden cave. He passed many happy hours in the dark cavern that summer, letting his imagination roam free.<sup>1</sup> Later in his life, these outdoor excursions would provide the inspiration for some of his most influential work—namely, the creation of the iconic *Super Mario Bros.* video game.

The man who spent his childhood inside an imaginary world of his own making would grow up to share that imagination with the world. Miyamoto—often called the Walt Disney of video games—created and designed not only *Super Mario Bros.* but also the blockbuster's *Donkey Kong*, *The Legend of Zelda*, and the Wii console in addition to overseeing the creation of more than four hundred Nintendo games.

After the collapse of Atari in the 1980s, *Super Mario Bros.*—the classic game that follows a mustached, overalls-clad Italian plumber who must venture on a journey through the Mushroom Kingdom, along with his right-hand man, Luigi, to rescue Princess Toadstool—revived the modern video gaming industry. Through *Mario* and other classic games, Miyamoto inspired the admiration of gamers and aspiring video game creators around the world. His video games are now widely held to be some of the greatest (and most profitable) ever created.

What's Miyamoto's secret to dreaming up some of the world's most beloved games? Nintendo's luminary, as he's grown older, has managed to never lose a sense of play. According to *The Sims* creator Will Wright, "He approaches the games playfully, which seems kind of obvious, but most people don't."<sup>2</sup>

For Miyamoto, childhood play paved the way for prolific adult creativity. As journalist Nick Paumgarten wrote in a 2010 *New Yorker* profile, Miyamoto always sought to re-create the sense of wonderment he experienced as a child in his games.<sup>3</sup> This spirit of childlike curiosity and exploration is palpable in each of his highly imaginative creations. "When you play his games, you feel like you're a kid and you're out in the backyard playing in the dirt," Wright observed.

Miyamoto's philosophy is that anything can be turned into fun and games. While he continues to draw creative inspiration from his childhood, he also channels his personal interests and fascinations into his work—the creation of the Wii Fit, for instance, was the result of a personal attempt to "gamify" his weight loss efforts. Turning the mundane into play and fun, Miyamoto found, could help people get more enjoyment out of their activities, whether it be exercise, working up to the next level of *Zelda*, or learning a new lesson in school.

"Anything that is impractical can be play," Miyamoto told *The New Yorker*. "It's doing something other than what is necessary to continue living as an animal."

From Childhood Play to Adult Creativity

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