



Singapore Psychologist

ISSUE 16 | 2023 T3



CREATIVITY: CONTRIVED, CLEVER OR JUST CONTROVERSIAL?

A Publication of Singapore Psychological Society

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CREATIVITY: CONTRIVED, CLEVER OR JUST CONTROVERSIAL?

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EDITOR'S NOTE

Psychologists define creativity as an ability through which is displayed work that is original, imaginative, and expressive. To pursue creativity is to act deliberately or in a way that is contrived; but creativity cannot be contrived—it must come on its own. Neither does creativity imply that one is clever, for it's under conditions of uncertainty that creativity might most likely arise. A prevailing consensus in the psychological discipline is that questions about creativity inspire controversy. For instance, a long-standing debate endures as to whether there is a positive association between creativity and psychopathology. Of course, there's also the inevitable question concerning nature or nurture, with nature taking a back seat to nurture in the heritability challenge. It appears that although creativity is not passed down through families, it nonetheless is genetically transmitted in populations as an emergent trait. How's that for complicated? Well, let's raise the bar and introduce creative thinking, which can apparently be fostered through a range of techniques and through practice. The putative association between creativity and intelligence is yet another controversy, and creative thought has been linked to the concept of fluid intelligence (Silvia & Beaty, 2012). With so much to explore and so much to get creative about, we were keen to see what emerged from our Singapore Psychologist brains trust and we weren't disappointed.

In this issue, our writers consider the very nature of creativity and ways to recognise it based on character strengths, how it develops from neuropsychological underpinnings, and ways in which creativity can be unleashed. Suggestions range from communicative applications in data visualization and teaching, to healing applications for overcoming trauma, and to the matter of creativity in the age of AI. We're also encouraged to explore our inner creative side through mindfulness and sleep, and finally to redefine creativity that defines our unique selves. Read on to explore.

Dr Denise Dillon
Editor-in-Chief

Creativity Starts With a Unique Single Dot.

by Liliana Ferreira da Costa


The dot represents the beginning of anything we want. The question that brings us to this article addresses not only creativity, but also intelligence.

What exactly is intelligence? The way that researchers have defined the concept of intelligence has been modified many times throughout the ages. Intelligence is used in many contexts to refer to capacity for logic, understanding, self-awareness, learning, emotional knowledge, reasoning, planning, problem solving and, importantly, creativity. Intelligence has been most widely studied in humans, but has been documented in non-human animals, plants, and machines as in the case of artificial intelligence and neural network modeling. British psychologist, Charles Spearman, believed intelligence consisted of one general factor, called *g*, which could be measured and compared among individuals. Spearman focused on the commonalities among various intellectual abilities and emphasized what made each unique. Long before modern psychology developed, however, ancient philosophers, such as Aristotle, held a similar view (Cianciolo & Sternberg, 2004).

Whereas Sternberg describes the basic information processing components of the three subsections of intelligence as shared, different contexts and tasks require different kinds of intelligence that represent differences between the analytical, creative, and practical subcomponents of intelligence. Within the three subcomponents, analytical intelligence refers to the abilities to take apart problems and to see solutions, while creative intelligence refers to how well a task can be performed. Creative intelligence can be broken up into two sub-subcomponents: novelty and automation. People who excel in novelty are proficient at managing new situations and finding new ways of solving problems they are unfamiliar with whereas individuals who excel in automation are able to complete automated tasks and behaviors while performing other tasks at the same time.

Creativity versus Intelligence

Intelligence and creativity are often mistakenly linked together. People tend to believe that if someone is highly intelligent, they must also be creative. However, this may not be the case. Intelligence would not allow a person without any knowledge of mathematics to be able to solve a mathematics problem. However, the person may be able to solve the problem with creativity. Intelligence and creativity are different in that intelligence depends on previous knowledge or learned skills, while creativity does not rely on previous knowledge. The relationship between creative and intelligent thinking can be described as one in which skills overlap.



According to Baldwin and Ricker (2023), intelligence is a complex characteristic of cognition. Many theories have been developed to explain what intelligence is and how it works. Creativity is often assessed as a function of one's ability to engage in divergent thinking. Divergent thinking can be described as thinking "outside the box"; it allows an individual to arrive at unique, multiple solutions to a given problem. In contrast, convergent thinking describes the ability to provide a correct or well-established answer or solution to a problem (Cropley, 2006; Gilford, 1967). Creativity is defined as the ability to produce original work or thoughts. Originality and imagination are traits typically held by creative individuals. Intelligence is the ability to gain information, learn from experiences, adapt to one's environment, and use reasoning skills.



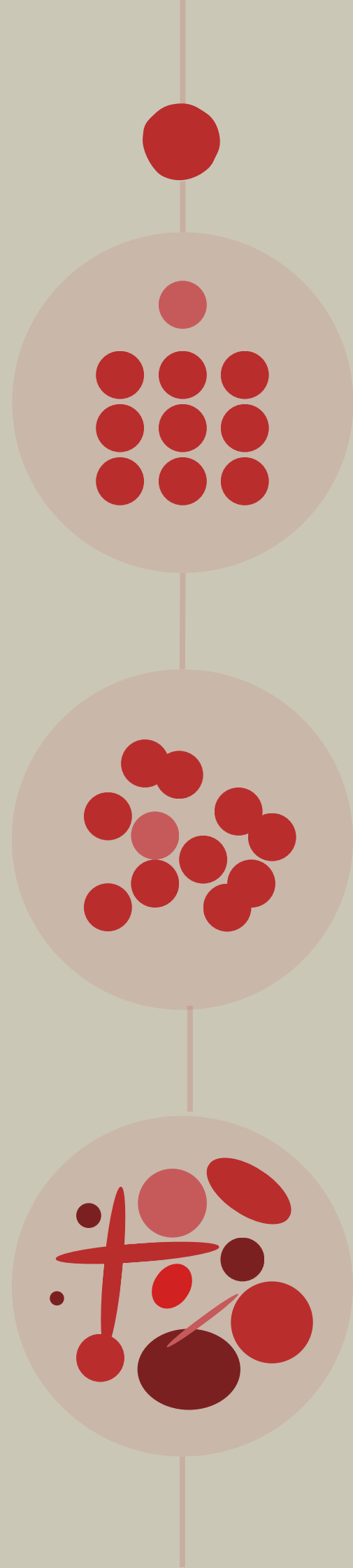
Ending with a Unique Single Dot.

Embracing Creativity in Times of Challenge

Intelligence can also have different meanings and values in different cultures. If you live on a small island, where most people get their food by fishing from boats, it would be important to know how to fish and how to repair a boat. If you were an exceptional angler, your peers would probably consider you intelligent. If you were also skilled at repairing boats, your intelligence might be known across the whole island. Think about your own family's culture. What values are important for Latino families? Italian families? In Irish families, hospitality and telling an entertaining story are marks of the culture. If you are a skilled storyteller, other members of Irish culture are likely to consider you intelligent and creative.

Some cultures place a high value on working together as a collective. In these cultures, the importance of the group supersedes the importance of individual achievement. When you visit such a culture, how well you relate to the values of that culture exemplifies your cultural intelligence, sometimes referred to as cultural competence. Thus, in these contexts, very creative people often have intense knowledge about something, work on it for years, look at novel solutions, seek out the advice and help of other experts, and take risks. Although creativity is often associated with the arts, it is actually a vital form of intelligence that drives people in many disciplines to discover something new. Creativity can be found in every area of life, from the way you decorate your residence to a new way of understanding how a cell works.

When asked to describe creative processes, most people would respond by describing various forms of artistic expression such as music or painting. Many scholars from ancient cultures such as Ancient Rome, Ancient China and Ancient India lacked the concept of creativity and viewed art as a form of discovery as opposed to a method of expression (Albert & Runco, 1999). Nowadays, discovery and creative expression both provide a safe and constructive outlet for emotions. When individuals channel their feelings into art, music, writing, or other creative forms, they can release pent-up emotions, reducing stress and anxiety, leading therefore to better psychological well-being.



A User's Guide to Creativity as a Character Strength

by Maria Hennessy

"Creativity is seeing what everyone else has seen and thinking what no one else has thought."—Albert Einstein

Have you ever sat in meetings at work and been impressed by new ideas that a colleague puts forward? Or admired a great film or an amazing meal? What you may have been noticing is creativity in action, and its use as a character strength is one of the key innovations in positive psychology over the past twenty years.

So what do we mean by character strengths? These were described by Peterson & Seligman (2004) in their seminal book *Character Strengths and Virtues*, that followed a three-year global research project that sought to find a common language and framework to describe what is best in human beings. Character strengths are considered the building blocks of wellbeing, and of a life well lived (Seligman, 2011). They are defined as individually fulfilling, pervasive and valued across cultures, and generating positive outcomes for oneself and others (Niemiec, 2017). All individuals possess the 24 character strengths and use them in idiosyncratic ways. It's often helpful to think of character strengths as a moving system, a constellation that is interactive and adaptive. Their use varies with different situations and contexts, and also varies across life stages. When we use our character strengths naturally and easily, they bring a sense of energy and fulfilment to our lives.



Creativity as one of the universal character strengths refers to seeing and doing things in original and adaptive ways, with a kind of uniqueness that is practical. If you've ever described someone as original or ingenious, then you've been spotting their use of creativity as a character strength. Artistic achievement is one of the most common examples, but creativity is not limited to this area. A parent trying to think of a new story to tell their children, a worker trying to think of a different way to fix a process issue, or a grandparent deciding which new plants to grow in their garden, are all using their creativity.

How an individual expresses their creativity varies widely according to the person, the situation they are in, and how much their society naturally values or supports creativity. Creativity when used in an optimal way supports its role as a building block for wellbeing. Character strength behaviours can be little, they don't need to be grand gestures. For example, if creativity is one of your signature strengths, you might find that you are able to use it most naturally when at home, where you have the freedom to explore different ideas and solutions to problems that might occur, or simply the enjoyment of rearranging flowers in a vase.



Understanding how creativity and the other character strengths are used leans on Aristotle's philosophical idea of the golden mean. This emphasises the virtue of balance in life's activities. When creativity is balanced, this means that it is being used with the right combination of other character strengths, in the right degree and in the right situation for each individual and their circumstance.

When used in this kind of strengths zone, one feels energised and creativity thrives. However, creativity can also be underused and when this occurs it is associated with a sense of conformity. You might be able to think of a time at work when you have had new ideas that might be a novel solution to a problem, but do not share them as you are concerned they do not "fit" with the culture of the workplace, or the management style of your boss. These behaviours can easily occur in our personal relationships, within our families, or during our schooling. In contrast, the overuse of creativity is associated with eccentricity.





Research has shown us that creativity is one of the most common character strengths in children. It is most frequently related to the use of other character strengths such as curiosity, bravery, perspective, zest and open-mindedness. Creativity is increased by environments that are open, supportive, reinforcing and less structured. The use of creativity is also known to be limited by time pressures, close supervision and the critical examination of ideas and behaviours.

In a Singaporean context, it is interesting to reflect on the idea of the potential underuse and overuse of creativity as a character strength at a societal level. Is creativity being underused, given recent concerns that the Singaporean education system inhibits creativity through teaching methods (Koh, Tan & Ng, 2012)? Might this also be reflected in the finding that creativity is not a common trait amongst adult Singaporeans as identified by the Global Innovation Index in 2016?

Research also shows us that character strengths like creativity are developable capacities at any age for any individual. One of the most supported strategies for strengths growth is to use your chosen character strength in a new way every day for a week. For creativity these could be in little ways like thinking up a new story to tell your child, or trying something different in a favourite cooking dish. One of my favourite ways to let my creativity enjoy itself is to watch Studio Ghibli films by Hayao Miyazaki, such as *Spirited Away*, *Howl's Moving Castle* or *Totoro*. Now that's a good two hours spent basking in creativity to inspire new thoughts and ideas through the upward spirals of creativity emerging from positive emotions!

Research has also highlighted two strengths-based interventions for creativity. First, asking people to "be creative" before doing a task is known to improve performance. The second is to actively encourage the use of divergent thinking, which refers to searching for multiple different solutions to a problem rather than the "correct" one.

Our understanding of character strengths such as creativity has the potential to significantly enrich our own lives and contribute to the greater good of those around us. The evidence-based use of character strengths is supported by the VIA Survey which is an empirically based survey that individuals can take to identify their own individual mix of character strengths (Littman-Ovadia, Dubreuil, Myers & Freidlin, 2021). It is freely available along with additional training and resources for clients, professionals and researchers at the VIA Institute on Character's website at www.viacharacter.org. So let's "be creative" and go exploring!



Finding Creativity in Everyone and in Everyday

*By Marilyn Tan &
Lim Hui Tien*



Everyday Creativity Unlocked

Creativity has long been celebrated as the award-winning symphony piece, the abstract painting that hangs in your living room or the poetry recited at a live session. It is almost like a superior characteristic, with many laypersons exclaiming, "I can never be creative like that!", as if it is a natural gift, only for chosen ones.

The standard definition of creativity described by Stein in 1953 indeed talked about having elements of novelty and utility. This means that an idea or product is original and is appropriate to the issue at hand. Often, creativity is also expressed; sometimes in the form of a performance, or simply as a solution to a problem. By choosing to write this article, we are in fact embarking on a creative journey—an original article that is appropriate to the theme at hand and expressed in words to convey our ideas.

Is it true that creativity is only reserved for the chosen few? Recent studies on creativity have found it to be an everyday phenomenon. Whenever a novel situation that requires you to think on your feet occurs, you are not able to rely on past experiences to solve this novel problem. You have to think of a new solution (novelty), that can resolve the issue (appropriateness), and actually use it to solve the problem (expression). Whenever you choose to take an unconventional path in your daily routines or tasks, you are engaging in divergent thinking and choosing not to rely on known templates, in order to achieve the same (or better) outcome.



The Benefits of Everyday Creativity

Paradoxically, traditional notions of the "mad genius" (aka "the chosen ones") have convinced people of the negative relationship between creativity and mental wellbeing. Fortunately, recent studies have suggested otherwise and emphasized the importance of how creativity is being framed. When viewed as a strategy—a mindset, a way of life—creativity offers significant benefits (Zhao et al., 2022). Engaging in creative activities, even in the simplest forms like cooking a unique dish or doodling, provides your mind with a playground and positively impacts mental well-being.

Amidst our daily routines, we often underestimate the potential of creativity to enhance mental well-being. Embracing day-to-day creativity as a tool for managing emotions, improving problem-solving, and gaining different perspectives can transform our lives. It's not about artistic expression but cultivating a mindset, a trusted compass, to navigate through the ebbs and flows in life. Weaving creativity into our daily lives becomes a beacon of positivity and resilience, offering practical tools for mental health and well-being.

For example, when faced with a challenging situation, creativity enables us to reevaluate and reframe situations, leading to insightful and innovative solutions. Instead of soaking in negative emotions, creativity can be a powerful tool for emotional regulation by fostering improved mental health and resilience through turning adversities into opportunities.

In essence, as we navigate life's intricacies and harness our cognitive flexibility, we can find personal fulfillment, boost our self-esteem and gain a positive outlook. Additionally, creativity also has therapeutic potential, offering an outlet for emotional expression through mediums like journaling, doodling, writing, or photography. Let us each plant our seeds of creativity and watch them blossom and reverberate through society, creating a ripple effect that advances and evolves humanity.

The Everyday Creativity Toolkit

Here we suggest a few factors to consider when trying to increase the behaviour of creativity in the everyday:

While people with certain personality traits (openness, flexibility, playfulness) may be more creative in general, certain conditions matter in providing the context for creative juices to flow in the everyday.

Time

Interestingly, when people had more time on their hands due to the Covid-19 lockdown (Lopez-Persem et al., 2021), there were more reports of creative behaviours. Contrast this against the backdrop of a fast-paced, schedule-packed Singapore society; it inevitably means that we have to consciously make time for creativity. The creative juices need the canals of time in order to flow.

Time for Reflection and Sleep

Making time for creativity includes allowing time for contemplation, which facilitates creative thinking (Weick, 1993). Additionally, sleep has been known to facilitate memory consolidation and reorganization; not only do you start with a blank canvas in the morning, but the reorganization of information can spark new ideas.

Autonomy

When actors are given agency or freedom to create their role as they deem fit, the experience tends to be a positive one (Seife, 2022). Having a degree of autonomy in one's work (and daily life) allows individuals to explore and experiment, which in turn fosters creativity (Deci & Ryan, 1985). Positive emotions such as joy and curiosity can also enhance creative thinking (Fredrickson, 2001).

Psychological safety

Being creative essentially entails deviating away from the norm and that in itself necessitates risk-taking behaviour. A safe relational space where people can come together and not be afraid to be judged for being curious, for questioning the status quo, to be different, to take risks, and for accepting the greys will do magic on igniting that creative spark (Edmondson, 1999). Additionally, having exposure to diverse perspectives can lead to more creative solutions (Page, 2007). Consider including people from all walks of life when engaging in group activities.

Expansion and the Physical Space

Incorporating nature and the outdoors in our day-to-day helps to open up our visual fields and our minds, allowing our thoughts to flow freely. Being grounded in nature regulates our nervous system and allows ourselves to be more present for great ideas to flow.

Everyday creativity is not about that sudden bolt of inspiration; it is a skill that you can practice. The next time you pick up that paintbrush or find yourself in front of the mirror dancing, try allowing yourself more time and space to explore and experiment, with less judgement and more autonomy. You will find yourself on the path to a brighter, more creative, and mentally healthier you.



Understanding the Cornerstone of Creativity: The Brain

by Eleanor Poh Mei Hui

Have you ever wondered what happens in your brain during a brainstorming session? Or how you were suddenly hit with inspiration while performing a mundane task like driving?

Well, creativity encompasses the ability to recombine experiences in novel ways, and it often results from a combination of your genetics and life experience. Understanding the science behind creativity, and correcting our own misconceptions about it, may help us better comprehend our own creative process.

Debunking Creativity Myths

Myth 1: We are more creative if we are right-brained.

This popular myth suggests that if we are left-brained, we are analytical and logical, while if we are right-brained, we are more imaginative and inventive.

However, neuroscience tells us this left-brain and right-brain distinction is mistaken as most mental tasks, including the creative thinking process, tend to involve the interaction of both brain hemispheres (Liederman, 1998). Nielson et al.'s brain study (2013) involving over one thousand participants similarly did not find any evidence for the left and right brain distinction.

Hence, creative thinking is not localized to a single brain region. It results from how well our neurons from different brain regions can communicate with each other. Fortunately, creativity is not confined to individuals who are right-brained.

What brain areas, then, are behind the creative process?



For one, the frontal cortex is highly associated with creativity (Cavdarbasha & Kurczek, 2017) and is responsible for many cognitive functions and processes that aid creativity, such as planning, abstraction, working memory and cognitive flexibility. The white matter in our brain also helps connect different brain structures together to process information faster (Cavdarbasha & Kurczek). Having a better-connected brain helps bring together more ideas quickly.

Other areas include the hippocampus, which stores and retrieves memories from different brain areas. It can pull together different parts of our memories and mental representations in unique ways to create new ideas (Cavdarbasha & Kurczek, 2017; Duff et al., 2013).

Myth 2: You must be highly intelligent to be creative.

When we envision a creative individual, we might think of eccentric geniuses with an extremely high Intelligence Quotient (IQ), such as Albert Einstein.

Interestingly, intelligence comprises two broad constructs: fluid and crystallised intelligence. Fluid intelligence is the ability to explore and understand underlying principles and relationships between stimuli to solve novel problems (Cattell, 1963; Horn & Cattell, 1967).

It involves abstract reasoning without much prior learning, education, and experiences. In contrast, crystallised intelligence refers to knowledge, facts, and skills derived from past learning experiences, such as literacy and numeracy. As we grow older and accumulate more knowledge, the more we build up our crystallised intelligence.

Some research found fluid intelligence to be linked to creativity, potentially affecting idea originality (Benedek et al., 2012) and predicting response creativity to unusual uses tasks (Silvia, 2008).



Yet, being highly intelligent does not always mean that one will be highly creative. Psychologist Lewis Terman investigated whether intelligence could foster creative minds by following a group of gifted children as they grew up (Kersting, 2003). However, based on a longitudinal 25 years follow-up of their interests, activities, and vocations, not all of them were found to have creative success as adults due to varying factors of chance and circumstance. This suggests that while a moderate amount of IQ and fluid intelligence are required, a high IQ alone is not enough to become truly creative.



Myth 3: Drugs and alcohol can stimulate creativity.

Think of the famous painter Vincent Van Gogh and his use of absinthe, or pop sensation Michael Jackson and his litany of prescription drugs to help him perform. We might believe that use of these substances can help produce great art.

Yet, research has found that drugs and alcohol do not have any creativity-boosting effects and may even cause one to pass out and lower creativity. When taken to the extreme, such as an overdose, drugs can also be life-threatening.

People who consumed psilocybin, a psychedelic drug, felt their creativity was enhanced after taking the drug. However, they were doing worse creatively (Hall, 2023). Many of them also suffered health consequences. Frank O'Hara, an American writer, was unfortunately unable to survive his injuries from an accident due to excessive drinking that enlarged his liver.

So, what can stimulate creativity?

Drugs and alcohol do not an artist make.



For one, exercising may help us improve our mood by increasing feel-good neurotransmitters, such as serotonin. This increases activity in the anterior cingulate cortex to explore more remote possibilities and off-the-wall ideas. Even some meditation has been linked to improved creativity (Colzato et al., 2012), as it enables our minds to be open to any thoughts and sensations.

Our Brain When Inspiration Hits

Interconnected networks, such as our Mass Rapid Transport (MRT) systems, are commonplace in any society to function. You will be amazed to know that our brains similarly have networks that work synchronously to promote creativity and inspiration

Here are some examples:

- **Executive Control Network:** activated during deep concentration, such as during goal pursuit or complex problem-solving (Cavdarbasha & Kurczek, 2017).
- **Default Mode Network:** active during periods of daydreaming or mind-wandering, such as when reminiscing or thinking about the future (Cavdarbasha & Kurczek).
- **Salience Network:** helps us detect salient information in our internal stream of consciousness and in the external environment, filter out novel and useful ideas from the default mode network, and channel them to the executive control network that then constrains the focus on these ideas (Brenner, 2018).



Health Conditions and Creativity

Unfortunately, some illnesses may affect creative thinking. For instance, during a depressive episode, patients may be less creative as depression can cause a consistently low mood that reduces motivation and increases rigid thinking (Flaherty, 2011). Parkinson's disease also diminishes flexibility and visuo-spatial abilities, which affect creativity (Lhomme et al., 2014).

Conclusion

Neuropsychology has painted a clearer picture of how our brains can aid us to flourish creatively. If you have something specific to create, such as a novel, allow yourself to introspect, ask questions, and explore input from diverse sources. Most importantly, never doubt yourself—neuroscience says: if you have a human brain, you *can* be creative.





The Art and Science of Data Visualization: Unleashing Creativity for Effective Communication

by Shamini Ganasarajah

Data visualization has undergone a remarkable transformation in recent years, evolving from mere representations of facts and figures into a dynamic fusion of creativity and information. It has become an indispensable tool for conveying complex data and insights in a visually compelling manner, transcending the boundaries of conventional charts and graphs. Today, there's a growing trend in leveraging creativity to design data visualizations that not only inform but also engage, inspire, and tell a compelling story. In this article, we will explore the marriage of creativity and data visualization to unveil innovative approaches and their profound impact on data communication. We will also delve into the psychology behind this creative revolution and dissect how it shapes the way we perceive, interpret, and interact with data.

The Power of Data Visualization

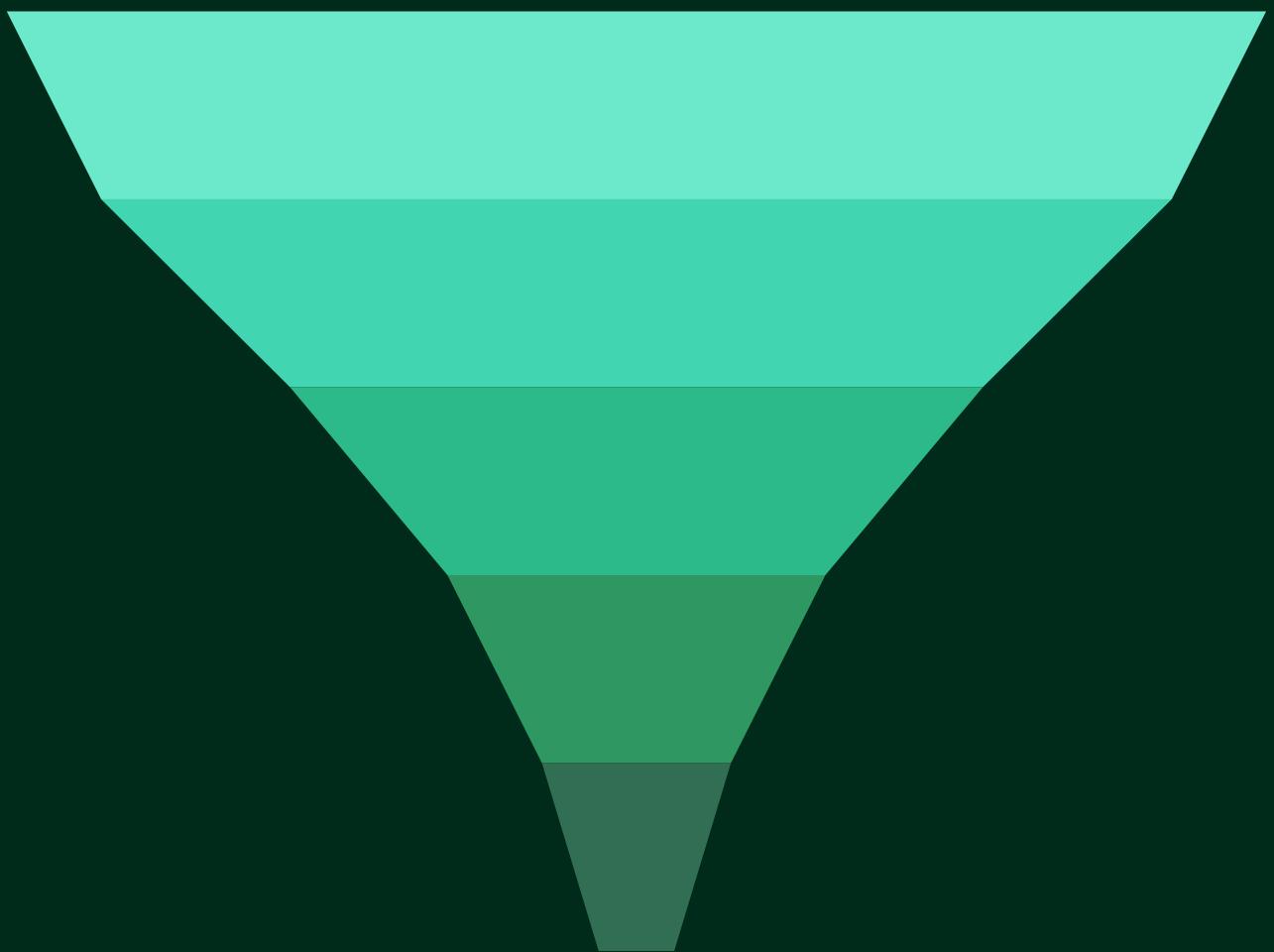
Data visualization is the art and science of transforming raw data into a visual format that is easily comprehensible. Our brains are inherently wired to process visual information more efficiently than text, making data visualization a powerful tool for conveying complex ideas. It simplifies data presentation and ensures that even individuals without a background in data analysis can understand and appreciate the insights it offers.

Traditionally, charts, graphs, and tables served as primary means of data representation. While these formats remain useful, they often fall short in terms of engaging and inspiring audiences. The introduction of creativity into data visualization has paved the way for a new era, where data is not merely presented but is artfully crafted to inform, inspire, and captivate.

Creativity in Data Visualization

The marriage of creativity and data visualization involves the infusion of design principles, aesthetics, and storytelling techniques into data presentation. Creative data visualization is an art that transforms raw data into an engaging narrative, enabling data to tell a story that resonates with the audience. Here are some innovative approaches that exemplify this union:

1. **Infographic Storytelling:** Infographics combine data visualization with storytelling, by presenting information in a visually stimulating and narrative-driven manner. They use compelling graphics, typography, and colors to convey data and insights effectively.
2. **Data Art:** Data artists take data visualization to the next level by creating visually stunning and intricate artworks from datasets. This approach not only communicates information but also elicits emotional responses and fosters a deeper connection with the data.
3. **Interactive Dashboards:** Interactive data dashboards empower users to explore data on their terms. With a combination of charts, filters, and dynamic elements, these dashboards provide an engaging and personalized experience.
4. **Data-driven Storytelling:** This approach combines data visualization with compelling narratives. It places data at the center of a story, allowing audiences to connect with the information on a personal level.



The Psychology of Creative Data Visualization

To understand the profound impact of creative data visualization, we must delve into the psychology that underlies this transformation. Several psychological principles come into play when we explore the fusion of creativity and data visualization:

- **Engagement and Attention:** Creative data visualizations captivate the audience's attention. The use of striking visuals, storytelling elements, and interactive features keeps viewers engaged and prevents them from losing interest in the data.
- **Cognitive Ease:** Creative data visualization simplifies complex information. Visual metaphors, analogies, and aesthetically pleasing design elements create cognitive ease, making it easier for individuals to process and understand the data.
- **Emotional Connection:** Creative data visualizations have the power to evoke emotions and empathy. When people connect with data on an emotional level, it becomes more than just numbers—it becomes a part of their personal experience.
- **Narrative Processing:** The storytelling aspect of creative data visualization taps into our natural inclination to process information in narrative form. Stories are more memorable, relatable, and persuasive compared to raw data.



The Impact of Creative Data Visualization

The integration of creativity into data visualization has a profound impact on effective communication. Here's how it transforms the way we perceive, interact with, and act upon data:

- **Increased Engagement:** Creative data visualizations are more captivating, leading to increased engagement with the information. This engagement is critical in capturing and retaining the audience's attention.
- **Enhanced Comprehension:** By using visual metaphors, analogies, and compelling design, creative data visualization simplifies complex information, making it easier for people to grasp the message.
- **Emotional Connection:** Creative data visualizations can evoke emotions and empathy, enabling the audience to connect with the data on a personal level. This connection can drive action and change.
- **Storytelling:** The art of storytelling embedded within data visualization helps to convey the context, significance, and impact of the data. It allows data to transcend mere numbers and become a part of a larger narrative.



Case Studies: Creative Data Visualization in Action

To better appreciate the impact of creative data visualization, let's explore some real-world examples:

1. COVID-19 Data Dashboard

Amid the COVID-19 pandemic, numerous data dashboards emerged to provide up-to-date information on infection rates, hospitalizations, and vaccination progress. The Johns Hopkins University's COVID-19 Dashboard is a prime example of creative data visualization. It features an interactive map that allows users to explore the global impact of the virus, offering a dynamic and informative experience that transcends standard charts and graphs.

For more information: <https://coronavirus.jhu.edu/map.html>

2. Climate Change Awareness

Environmental organizations have leveraged creative data visualization to raise awareness about climate change. "The Climate Spiral" by Ed Hawkins, a climate scientist, is an artistic representation of rising global temperatures. This spiral graph, though unconventional, communicates the urgency of the climate crisis by visually connecting the data to a growing environmental concern.

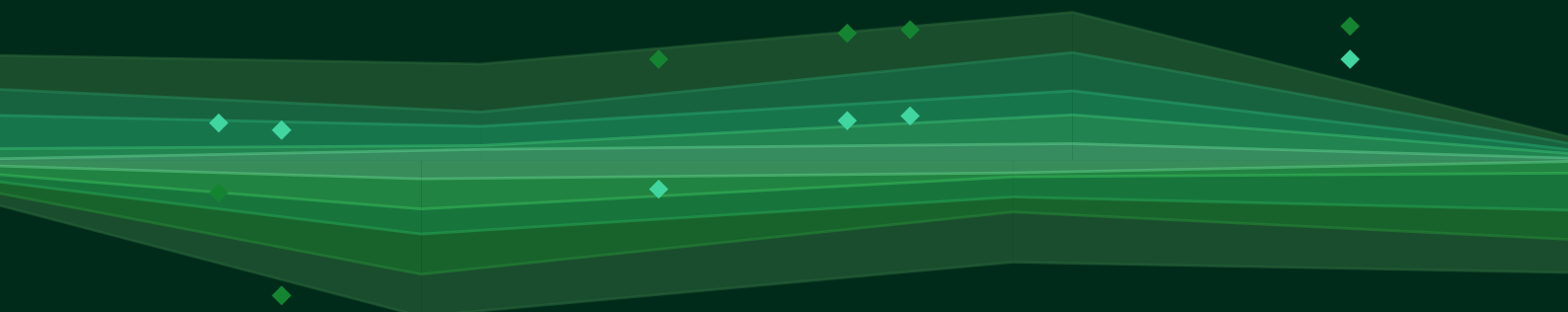
For more information: <https://www.climate-lab-book.ac.uk/spirals/>

3. The New York Times' COVID-19 Graphics

Throughout the pandemic, The New York Times used creative data visualization to engage and inform readers. Their "How the Virus Got Out" interactive feature combines data, storytelling, and visual elements to illustrate the early spread of the virus in the United States. By providing a visual narrative, it conveys the complex issue in an accessible and impactful way.

For more information:

<https://www.nytimes.com/interactive/2020/03/22/world/coronavirus-spread.html>



In today's world of information overload, the art and science of data visualization have become indispensable for effective communication. Beyond the conventional charts and graphs, creativity has emerged as a powerful tool to inform, engage, inspire, and tell compelling stories with data. From infographics and data art to interactive dashboards and data-driven storytelling, the possibilities are endless. By embracing this creative approach, we can harness the true potential of data visualization and unleash its power to transform the way we communicate complex information.

Creative data visualization enriches our understanding, evokes emotions, and empowers us to make informed decisions. It transcends mere data representation and enables us to see the world through a different lens. As we continue to explore the fusion of creativity and data visualization, we unlock new dimensions of understanding and connection with the data that surrounds us. Data is no longer an abstract concept—it becomes a story, a call to action, and a bridge between numbers and the human experience.

Teaching Creativity Creatively: Role of the Teaching Profession


by Christabel See



Creativity is a crucial skill that is essential for success in the 21st century. It is often defined as the ability to generate novel ideas, solutions, or even products. It involves thinking divergently, challenging the conventional norm, and embracing uncertainty. At the individual level, creativity is known to enhance one's critical thinking and problem-solving skills while fostering adaptability in a world characterized by rapid advancements. The cornerstone of creativity is an open mind to consider differing perspectives and come up with potential solutions. This in turn drives innovation which translates to the development of new products, ideas, or services that propel society forward and keeps it competitive over time.

In an increasingly complex and changing world, one can no longer afford to dwell in the realm of archaic practices. This leads many to ponder where else besides intrinsic motivation for creativity, does creativity truly begin. Often, the source leads back to one's experience with formal education. Educators play a pivotal role in nurturing fundamental acceptance of creativity that eventually carries into personal continual practice of this skill outside of the classroom, to the workplace, and into aspects of personal growth and development.

Whilst student motivation does play a part in the adoption of creativity, the teaching profession complements the cultivation of creative learning. In fact, teachings are the core of our education system. As the world evolves, so too must the pedagogy and the methods employed in the classroom. Innovative pedagogical approaches involve diversity in learning experiences, cultivating environments conducive for creativity and customization of learning materials to specific needs.

A photograph of a classroom corner. On the left, a wooden desk with a metal frame and a matching chair are positioned. The wall behind them is a mottled, textured brown. A bright, vertical beam of light illuminates a portion of the wall and the desk, creating a strong contrast with the darker areas.

If an educator is willing and able to embody such modern-day classroom teachings, the ripple effect across our socio-ecological system is immense. Creative teachings frequently translate to students who are more confident in tackling challenges, open-minded, adept in collaborating effectively and who may oftentimes have better academic outcomes too. Creative thinkers are also more employable, likely to be better equipped to handle leadership roles, complex global challenges, and maneuver tricky periods of organizational transitions too (Carnevale et al., 1990). As waves of 'creatives' enter the workplace driving changes and advancements, the global economy and society stands to benefit from these creativity-empowered individuals over time.

However, teaching creatively and cultivating creativity is not without its own set of challenges. Traditional education systems often prioritize standardized testing and uniformity which may dampen a student's innate creative tendencies and hinder abilities to grasp knowledge at an experiential level for accurate application. Creative instructions on the part of educators also require extra effort to learn and prepare, and additional financial resources may also be incurred to reinvent a curriculum that could simply be replicated albeit boring.

To encourage the integration of creativity in education, teacher training programs can provide graded exposure to diverse teaching methods and encourage experimentation to develop a mindset of being more adaptable and open to creative approaches. Professional development opportunities could also focus on providing manageable tools to boost confidence in implementing creative teaching methods in the classroom. Training workshops could explore project-based learning, inquiry-based teaching, use of AI-enhanced teaching methods, and collaborative learning to equip educators with practical skills, while also developing their abilities to measure and assess creativity among students too (Margaliot et al., 2020). These not only ensure the incorporation of creativity on the part of educators but also provide a sustainable and consistent cycle of efficacy evaluation.

It is important to note that even though educators are redefining their identity from "closed, standardized and benchmarked" styles to "open, imaginative and creative" selves focused on learning and reinventing, teachers and students alike need the right conditions for creativity to flourish. Here are six conditions:

1

Challenge

- Encouraging individuals to stretch their abilities by matching them to the appropriate level of challenge that is within their range of competency and distress tolerance

2

Freedom

- Affording adequate autonomy to explore routes to achieve the specified goals

3

Resources

- Providing sufficient time to achieve a change
- Providing the appropriate amount of financial resources to support new proposals
- Creating a physical and/or mental space for creativity to thrive

4

Work-group features

- Putting together a team with diverse background and experiences to share different perspectives
- Selecting a team that shares the same enthusiasm and commitment towards the specified goal
- Ensuring that the team is willing to support each other through challenging periods of innovation

5

Supervisory encouragement

- Offering encouragements that could come in the form of intrinsic motivations or extrinsic rewards
- Praising the individual or team for their creative processes instead of focusing on the outcomes
- Eliminating punishments, ridicules, harsh criticism and critical evaluations of new ideas

6

Organizational support

- Introducing healthy organizational practices such as leadership role modelling, inter-departmental sharing and collaboration opportunities

Considering the long-term profound impact of creative teaching on students and the society, teaching creativity is no longer a pedagogical choice in our current day's national education landscape; it has become a necessity that is highly valued in preparation for a future that demands an imaginative mind.



Creativity: A Healing Canvas for Youth Overcoming Trauma and ACEs

By Natasha Mitter

Trauma and Adverse Childhood Experiences (ACEs) cast long shadows that touch the lives of countless children, youth, and their families. ACEs ranging from neglect and abuse to witnessing violence or the loss of a loved one can leave profound scars. In a world where the scars of trauma and ACEs run deep, a surprising ally emerges: creativity. In this article, we delve into the extraordinary world of creativity as a healing force for children, youth and their families who have walked the difficult path of trauma and ACEs. Through the story of Kelly and an exploration of the systemic approach to trauma-informed care, we uncover how creativity, when combined with collaborative efforts, can be a guiding light on the journey to healing and resilience. We learn how, for many young survivors of trauma, creativity can be an anchor that offers hope, healing, and a pathway to resilience.



A Journey Through Trauma: The Story of Kelly

Meet Kelly, a 15-year-old girl whose journey through life was marred by adversity. She carried a backpack of ACEs—childhood neglect, sexual abuse, the witnessing of domestic violence, and a turbulent family history. The weight of these experiences threatened to drown her spirit. Kelly's emotional struggles were etched on her face, her voice silenced by her past.

The Turning Point: Creative Expression

Kelly found her turning point in an unexpected place: at The Salvation Army Children and Youth Group's residential facility, Gracehaven, dedicated to helping children and youth like her. Here at the Centre of Psychological and Counselling Services, she encountered art therapy, a creative outlet that allowed her to give voice to the emotions and memories she had buried deep within. Through paint brushes and canvases, she began to reveal her story.

Kelly's art told a story of resilience, healing, and hope. Her paintings, although at times controversial in their raw honesty, captured the essence of her journey—the darkness of her past and the dawning light of her future. Creativity allowed her to confront her demons, transform pain into beauty, and reframe her narrative.

The Therapeutic Power of Creativity: Contrived or Clever?

But is this therapeutic power of creativity simply contrived or clever? Not at all. It is backed by science. Art, music, dance, and writing therapies are well-established methods in trauma-informed care (Heiderscheit, 2022). They offer youth like Kelly a way to process their trauma, express emotions they cannot put into words, and rebuild a sense of self-worth.





Creativity as Controversy and Catalyst for Change

However, creativity's role in healing trauma is not without controversy. In some circles, it is seen as unconventional or frivolous (Morison, et al., 2021). Critics argue that more structured therapies such as Cognitive Behaviour Therapy (CBT) or Solution-Focused Brief Therapy (SFBT) should take precedence. But for young survivors like Kelly, creativity is not just about artistic expression; it is a lifeline, a bridge to hope. Critics argue that creativity might oversimplify the complexities of trauma and ACEs (Baker et al., 2018). They caution against viewing it as a panacea and instead emphasize the need for comprehensive trauma-informed therapy. However, proponents counter that creativity does not replace therapy but complements it, offering a holistic approach to healing that taps into the innate human need for expression and connection (Sykes, 2020).

Creativity: A Nurturing Force for Youth

Creativity is not just a clever therapy; it is a nurturing force that can mend the broken pieces of a young soul. For children and youth who have experienced trauma and ACEs, creativity provides a means to reclaim their lost childhoods, rewrite their stories, and discover their inner strength. It fosters resilience, self-discovery, and a sense of agency that are vital on their path to healing.

The Systemic Approach: Healing Beyond the Individual

Creativity, while powerful on its own, gains even greater potency when embedded in a systemic approach to trauma-informed care. It is a collaborative effort that involves families, schools, care environments, social workers, and clinical psychologists working in harmony to nurture the healing process. This is the approach taken by the Centre of Psychological and Counselling Services, creative collaboration:

1. Family Support:

Families are at the core of a child's healing journey. Clinical psychologists work closely with parents and guardians to educate them about trauma and ACEs, helping them understand their child's unique needs. They guide families in creating safe and nurturing home environments that reinforce the healing process.

2. School Involvement:

Schools play a crucial role in a child's development. Clinical psychologists collaborate with educators to create trauma-sensitive classrooms. This includes consulting with teachers and school counsellors to recognize trauma-related behaviours, offering support to affected students, and fostering a culture of understanding and acceptance.

3. Care Environment:

Residential facilities like Gracehaven, in which Kelly found solace, are critical in providing a safe haven. Clinical psychologists and counsellors work within these environments to integrate creative therapies into the daily routines of residents. They also train staff to recognise and respond to trauma triggers effectively.

4. Social Worker Partnership:

Social workers are essential allies in the systemic approach. They provide ongoing support for families, connect them with community resources, and help navigate complex systems. Clinical psychologists and counsellors collaborate closely with social workers to ensure a holistic approach to healing.

Conclusion: A Canvas of Possibilities

Kelly's story reminds us that within every young trauma survivor is a canvas of untapped possibilities. Creativity is not contrived; it is clever and, above all, it is an essential catalyst for change. Its true power shines when integrated into a systemic approach to trauma-informed care.

By weaving creativity into the fabric of families, schools, care environments, and social work, we empower our children and youth to paint their own futures filled with healing, hope, and resilience. Together, we can be the brushstrokes of change for the next generation.

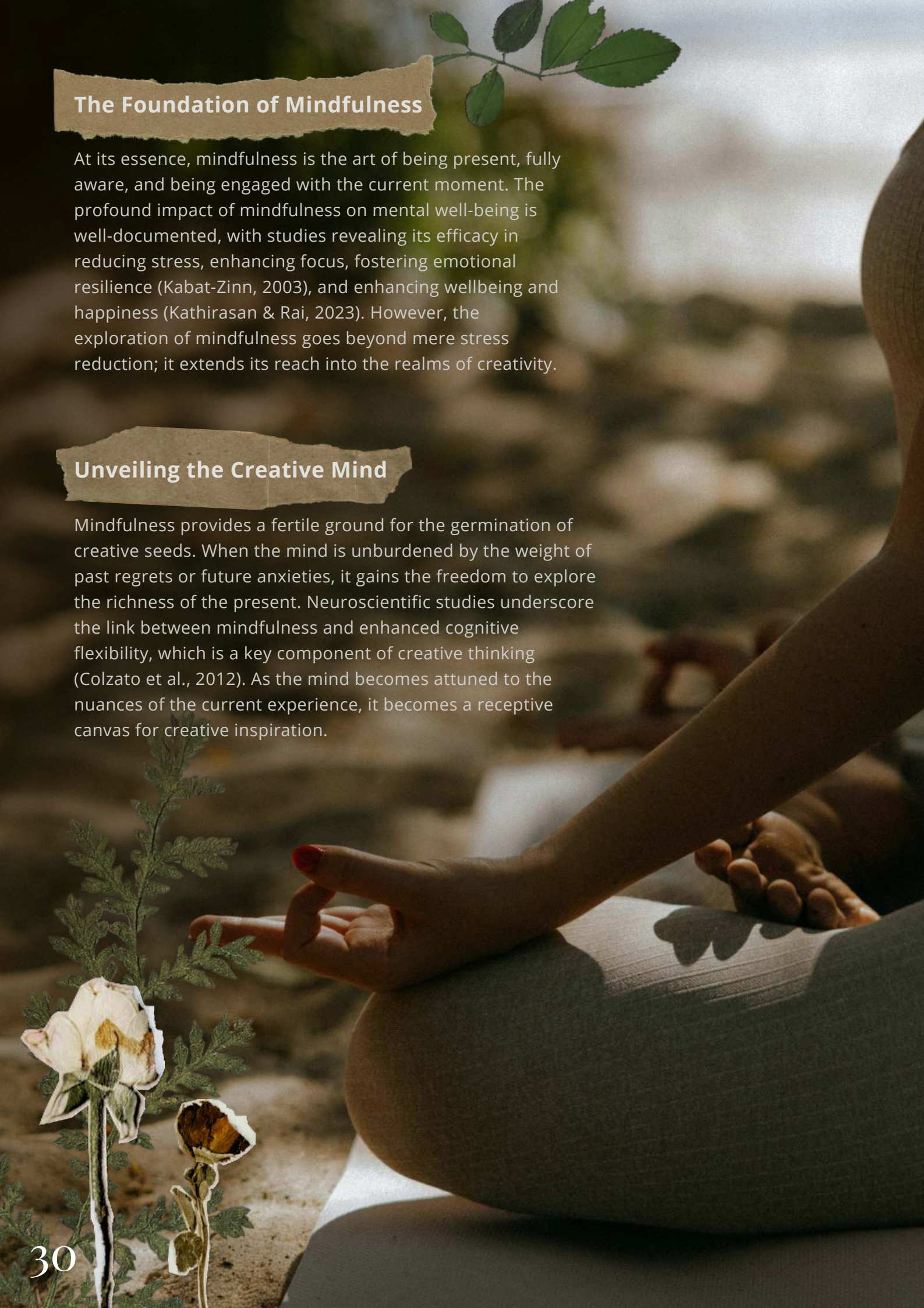


From Mindfulness to Masterpiece: A Journey of Creative Discovery

By Sunita Rai

In the frenetic rhythm of modern existence, where attention is a currency and distractions abound, the quest for creative expression can seem elusive. The nexus between mindfulness and creativity emerges as a beacon of hope in this intricate dance of the mind.

This article aims to unravel the profound connection between mindfulness and the creation of masterpieces, shedding light on the transformative journey that ensues when one cultivates a mindful state.

A person is shown from the side, sitting in a meditative pose on a light-colored surface. Their hands are resting on their knees in a mudra. The background is a soft-focus garden scene. Overlaid on the image are several paper cutouts: a green leafy branch at the top, a white rose and a smaller flower at the bottom left, and a small red flower in the middle right. The text is presented on torn paper-like backgrounds.

The Foundation of Mindfulness

At its essence, mindfulness is the art of being present, fully aware, and being engaged with the current moment. The profound impact of mindfulness on mental well-being is well-documented, with studies revealing its efficacy in reducing stress, enhancing focus, fostering emotional resilience (Kabat-Zinn, 2003), and enhancing wellbeing and happiness (Kathirasan & Rai, 2023). However, the exploration of mindfulness goes beyond mere stress reduction; it extends its reach into the realms of creativity.

Unveiling the Creative Mind

Mindfulness provides a fertile ground for the germination of creative seeds. When the mind is unburdened by the weight of past regrets or future anxieties, it gains the freedom to explore the richness of the present. Neuroscientific studies underscore the link between mindfulness and enhanced cognitive flexibility, which is a key component of creative thinking (Colzato et al., 2012). As the mind becomes attuned to the nuances of the current experience, it becomes a receptive canvas for creative inspiration.


The Dance of Intuition and Innovation

In the realm of creativity, intuition is a guiding force. Mindfulness amplifies this intuitive prowess by honing an individual's ability to perceive subtle cues and make connections that might elude a distracted mind. The marriage of intuition and innovation becomes a dance, with mindfulness as the choreographer that orchestrates the seamless flow of ideas.

Harmony in Neural Networks

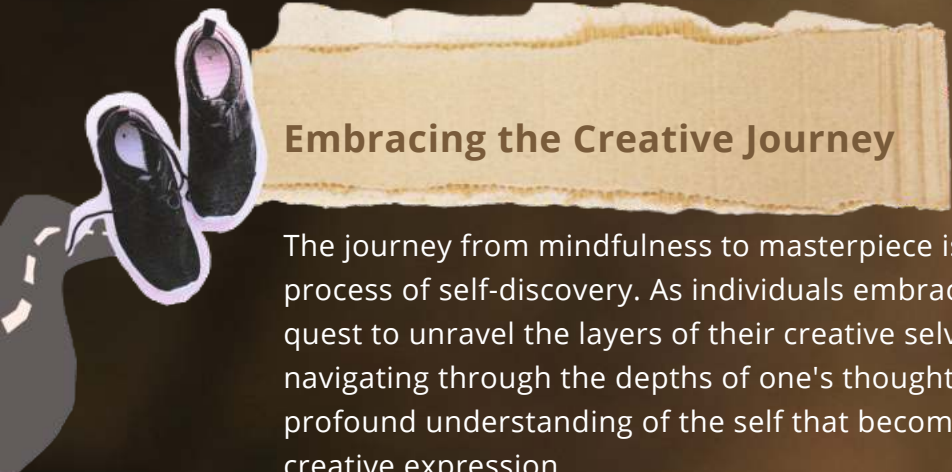
The *default mode network (DMN)* orchestrates mind-wandering and self-referential thoughts during wakeful rest. Engaging in mindfulness practices has demonstrated the power to reduce DMN overactivity. This reduction not only eases stress and enhances focus, but also holds the key to unlocking creativity. By calming the DMN, mindfulness redirects cognitive resources to an immediate experience of the present, thereby fostering an environment conducive to creative expression and contributing to positive mental health outcomes.





Mindful Practices as Catalysts

Several mindful practices serve as catalysts for the unleashing of creative potential. Mindful meditation, with its focus on breath and awareness, not only nurtures a calm mind but also allows for the emergence of novel ideas (Lebuda et al., 2016). Moreover, mindful movement practices offer a holistic approach that integrates the mind and body, which will foster a conducive environment for creative expression.



Embracing the Creative Journey

The journey from mindfulness to masterpiece is not a linear path but a dynamic process of self-discovery. As individuals embrace mindfulness, they embark on a quest to unravel the layers of their creative selves. This journey involves navigating through the depths of one's thoughts and emotions, fostering a profound understanding of the self that becomes the bedrock for authentic creative expression.

Here are **five practical suggestions** to help initiate your journey into *using mindfulness as a catalyst for **unlocking your creativity***:

1

Morning Mindful Moments

Commence your day with a short mindfulness ritual. Before diving into the demands of the day, take a few moments to engage in mindful breathing. Focus on each inhalation and exhalation, grounding yourself in the present moment. This mindful start can set a positive tone for the day, priming your mind for creative endeavours.

2

Mindful Walking for Inspiration

Transform your daily walk into a mindfulness practice. As you stroll, pay attention to each step, the sensation of your feet connecting with the ground, and the rhythmic movement of your body. Let go of mental clutter and allow your mind to wander freely. Often, creative insights emerge when the mind is in a relaxed and open state.

3

Mindful Digital Detox

Set aside dedicated time for a mindful digital detox. In our technology-driven world, constant digital stimuli can clutter the mind and stifle creativity. Designate a specific period each day—perhaps an hour or more—where you disconnect from screens. During this time, engage in activities that promote mindfulness, such as reading a physical book, practising mindful breathing, or simply enjoying the present moment without the intrusion of notifications. This intentional break from digital distractions can create a serene mental space, allowing your creative thoughts to blossom organically.

4

Mindful Journaling

Combine mindfulness with the act of journaling. Set aside time each day to reflect on your thoughts and emotions with a mindful approach. Instead of rushing through the process, immerse yourself in the act of writing. This not only enhances self-awareness but also serves as a reservoir for creative inspiration.

5

Mindful Observation Exercises

Engage in mindfulness by observing the world around you with fresh eyes. Choose an object, whether it's a natural element like a flower or a mundane item in your surroundings. Spend a few minutes attentively observing its details, colours, and textures. This practice sharpens your ability to notice the intricacies of your environment, fostering a heightened sense of creativity.

In a world where the cacophony of distractions threatens to drown the whispers of creativity, mindfulness emerges as the silent yet potent force that guides individuals towards their artistic zenith. The interplay between mindfulness and creative prowess is a symphony that transforms the ordinary into the extraordinary, making the journey from mindfulness to masterpiece an odyssey of self-discovery and creative fulfilment.

Dream for Inspiration: How Sleep Improves Creativity

by Eleanor Poh Mei Hui



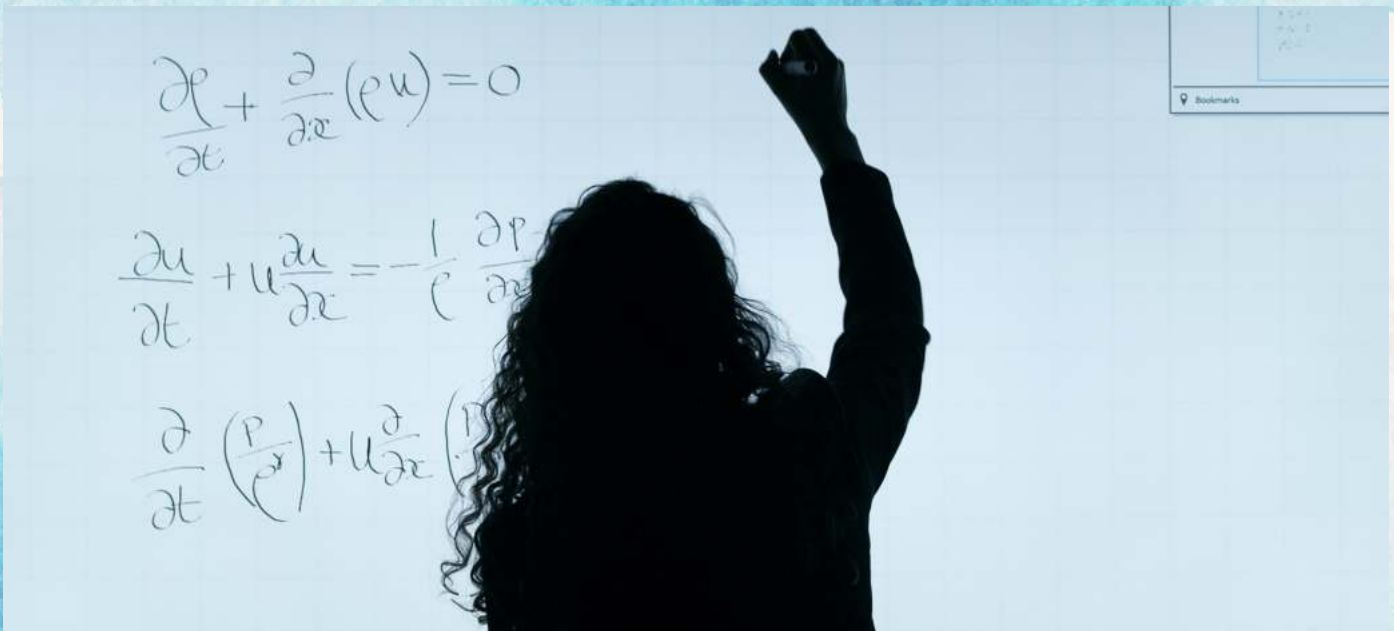
With our hectic daily schedules, long hours of sleep may be a luxury that most of us cannot afford as we strive to optimise our time fully. Yet, when we face a creative block or an enigma, we may be advised to "sleep on it"—to think more about it overnight and delay decision-making until the next day. But does sleep really help with creativity?

Well, it seems that several people have woken up with creative and innovative solutions after a good night's sleep (or dream).

For instance, Dmitri Mendeleev, a Russian chemist, was inspired by a dream to organise the chemical elements in what we now call the "periodic table" (Nierenberg, 1986). In 1867, he noticed that the lack of classification to group the different elements had impeded his students' understanding of chemistry. Back then, elements were usually sorted either by their shared properties (e.g., gas, metals) or by their atomic weight.

One night, he dreamt of a table wherein the two ways of classification could be combined into one system. He awoke and drew the table where even properties of "missing" chemical elements could be predicted using his periodic table.

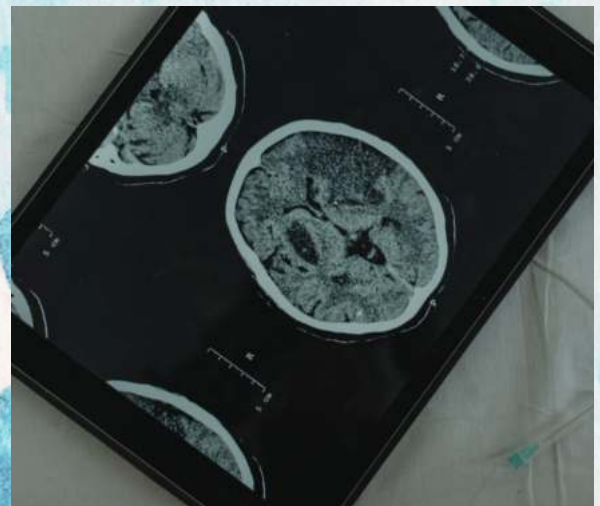




Besides Mendeleev, dreams also helped physicist Niels Bohr to discover the atomic structure which created a scientific breakthrough (MacIsaac, 2015). He dreamt of electrons spinning around the nucleus of the atom, like planets orbiting around the sun in the solar system.

From these examples, it seems that sleep, and thereby dreams, can be an abundant source of creative inspiration. But how?

Sleep is no longer a mystery that eludes us. With advanced neuroscience tools such as functional magnetic resonance imaging (fMRI), electroencephalography (EEG) and positron emission tomography (PET) scans, we now know that the sleep cycle mainly has two stages: The Rapid Eye Movement (REM) and Non-Rapid Eye Movement (NREM) stages that alternate throughout the night. Dreams can occur in both REM and NREM stages (Foulkes, 1962).



Around 75% of our time sleeping is spent in NREM (Malik et al., 2018), which typically begins as light sleep until it progresses to deep sleep when our body muscles fully relax, our body temperature drops and our breathing slows down. This differs from REM stages as there are slow eye movements during NREM sleep.

REM starts around 90 minutes after the first NREM stage. During REM, our eyes move rapidly behind our closed eyes in various directions that may correlate to the dream content. That is also when our body's voluntary muscles are paralysed temporarily, possibly preventing sleepers from acting out dreams and injuring themselves. At this stage, our bodies usually operate similarly to when we are awake. The brain is also most active during REM with brainwave patterns akin to wakefulness.

However, most REM sleep occurs in the last few hours of sleep, during which more vivid dreaming happens and new neural connections form. These processes aid brain connectivity by facilitating information flow between various brain regions and promoting formation of associative networks (Cai et al., 2009). These also allow integration of new information with past experience which enhances the synthesis of innovative ideas.

Longer sleep time may enhance creativity

Interestingly, an experiment that investigated sleep and creative thinking (Cai et al., 2009) had participants solve a word puzzle called the "Remote-association test (RAT)". Each was provided three words and had to deduce a fourth that connected with the other three. For instance, if the words "place", "courtesy", and "sense" were given, the answer "common" would be correct.



Often, participants would be challenged to use creative thought during the RAT as the first and most obvious solution would likely be wrong. After their first attempt, participants would then rest for 40 minutes before repeating the RAT. During that period, some would rest or have a light sleep while others had a deeper REM sleep. The result?

Those who had more REM sleep showed a 40% improvement in getting the right answers during their second attempt, while the other participants fared worse than their previous tries. It suggests that a sufficient shuteye could have enhanced their cognitive abilities and convergent thinking to discover more remote associations and creative patterns among strings of words or concepts.



Hormones and neurotransmitters during sleep

There is more to the neurobiology of sleep than you think.

The neurotransmitter dopamine usually surges in levels when we are dreaming during REM stage and being creative (Chermahini & Hommel, 2010; Perogamvros et al., 2013). As dopamine is linked to our brain's reward system, it may reinforce the flow of ideas and put us in a positive emotional state to experiment with them. This enhances our capacity for creative problem-solving.



Cortisol, a stress hormone that may potentially result in fragmented memory, also increases during the REM stage (Payne & Nadel, 2004; Vgontzas et al., 1997). This may promote the fragmentation and reconstruction of different concepts into narrative themes, even if they are bizarre (Payne & Nadel, 2004).

What can you do to unleash the dreamer within?

If you are stuck with a creative block or problem that has been eluding you during the day, priming your brain before bedtime by thinking about it may help further your chances of uncovering some creative answers through sleep (Barrett, 1993; Kluger, 2017).

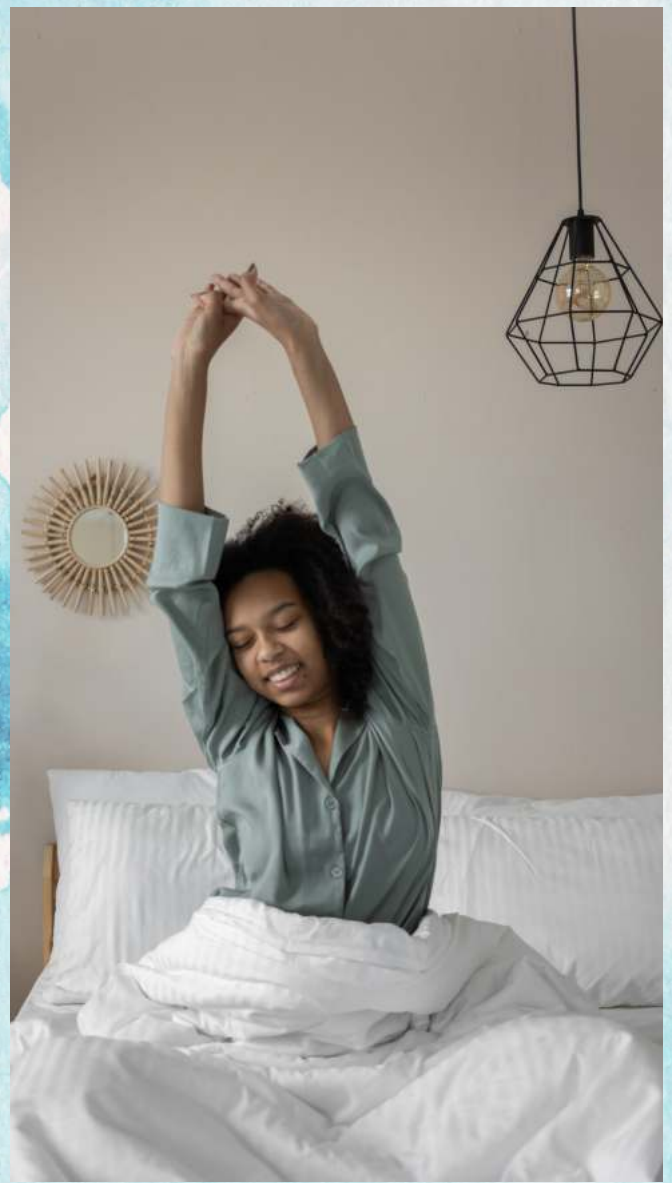
Good sleep hygiene is also key to increasing likelihood of deep sleep and enhancing creativity. This includes:

- Having a regular sleep schedule
- Creating a conducive sleep environment (e.g., making the bedroom area as dark as possible)
- Avoiding alcohol
- Reducing disruptions (e.g., putting aside electronic devices for at least 30 minutes before bedtime to limit exposure to blue light that may hinder sleep)

Besides, keeping a dream diary or journal to record and preserve dream content may help you to remember dreams better. Otherwise, they would be rapidly forgotten upon awakening. After all, greater dream recall is found to be positively correlated with measures of creativity (Sierra-Siegert et al., 2019).

Conclusion

Sleep may not be the cure-all for what afflicts our creativity. But next time you choose revenge bedtime procrastination or stay up late, think about how you may be self-sabotaging your own creative potential!



Creativity in the Age of Artificial Intelligence

by Janet Lim

Creativity has emerged as the most sought-after skill of the 21st century. The World Economic Forum (WEF) ranks it as the top skill on the rise from 2023 to 2027, a sentiment echoed by major organizations such as the Organisation for Economic Co-operation and Development (OECD), McKinsey, and Pearson. Creativity drives innovation, productivity, adaptability, and growth in all work areas. Yet, understanding and nurturing creativity remains a challenge. This article explores how we can foster and cultivate creativity in this digital era, harnessing AI to enhance our creative potential rather than fearing its dominance.

What is Creativity?

Creativity, collectively interpreted as the "ability to generate new and original ideas or products that are useful or valuable" (Stanford Encyclopedia of Philosophy, 2023), is often aimed at problem solving, utility creation and perspective generation. It also elevates aesthetic appeal and enjoyable experiences. While at times used interchangeably, creativity and innovation are distinctly different. Creativity represents the "front end" generation of unique and useful ideas, while innovation refers to the implementation of these creative concepts. Without creativity, innovation does not happen. Given its importance, can creativity be trained, produced on demand, and enhanced in humans?

Many Shades of Creativity

To answer this question, let us examine creativity through the lens of the human brain and its thinking modes; and how we can understand its usefulness and value.

Human Brain and Creativity

Recent neuroimaging advances have shed light on how creativity manifests in our brain. Studies revealed that the default mode network (DMN), also known as the brain's "Imagination Network", is key to creativity (Kaufman, 2013). It activates when our mind wanders and we daydream about the future, and deactivates during complex cognitive tasks (Jenkins, 2019), as monitored and coordinated by the salience network (SN). The activated DMN allows us to access deep memories and awareness, forming distant and unique associations of ideas that are not common to us (Anderson et al., 2022).



In Lewis Carroll's poem "Are You Old, Father William" from *Alice's Adventures in Wonderland*, the young man associating his father's old age with white hair is an example of a "nearby and common" association. Whereas, the young man's father standing on his head because he believes it would not hurt his brain as he has none, is an example of an "uncommon and unique" association (Quinton E.G.C, 2016).

That said, meaningful creative cognition involves all brain systems working together. At the early stage, it is helpful to dim down the executive attention network (EAN) to reduce inner critics, and increase DMN and SN, allowing freer associations (hence getting into a "flow state"). However, the EAN needs to be activated later to sensemake and evaluate the value of the creativity (Kaufman, 2013). Furthermore, alpha and theta brainwaves can facilitate access to our subconscious creativity (Boynton, 2001). Alpha brainwaves assist in information absorption, thought connection and anxiety reduction. Increased alpha brain waves in the right temporal area can enhance creativity by breaking usual thought patterns, leading to novel ideas (Di Bernadi Luft, et al., 2019).

Alpha waves occur during wakeful relaxed states, such as daydreaming, meditation, mindfulness, or aerobic exercise and are strongest when we close our eyes. Theta brainwaves also boost creativity and enhance intuition. They play a role in storing memories and emotions, are prevalent between wakefulness and sleep, and occur when internally focused, meditating and praying. Both alpha and theta waves are most active when we are rested, relaxed and emotionally positive.

To tap into our subconscious mind so as to spark "eureka moments", we can consider the following practices (Weir, n.d.):

- Meditation, mindfulness practices, yoga, deep breathing or aerobic exercises
- Taking breaks and engaging in unfocused, relaxing activities like strolling in nature, showering, listening to music or appreciating art.
- Literally sleeping on the problems, allowing the brain to synthesize, connect and generate ideas. Avoid checking the mobile phone right after waking up as it forces our body to skip theta and alpha states, when our creative mind is most attuned.
- To capture any sudden burst of ideas, do keep a notebook handy!

Thinking Models

The better known models for generating new and innovative ideas include Divergent, Lateral, Aesthetic, Systems and Imaginative thinking models (Wooll, 2021). In a recent HBR Magazine issue (Jan-Feb 2023), Kellerman and Seligman proposed another typology around Integration, Splitting, Figure Ground Reversal, and Distal Thinking. Amongst them, Distal and Imaginative Thinking tap into visualisation and imagination, and are considered higher forms of creativity that spark profound breakthroughs. For instance, Nikola Tesla imagined a radio and neon lamp before building them; Chaum invented digital cash way before the internet was common. These models undoubtedly serve as excellent training tools to improve our creative thinking, and are used in corporate training and product development.

Measuring Values and Usefulness

Creativity is an evolving concept. To ascertain what is "useful" and "valuable, let us turn to the Four C-Model (Kaufman & Beghetto, 2009) for inspiration:

- mini-c creativity: Self-recognised
- little-c creativity: Recognised by other people
- Pro-c creativity: Domain expert
- Big-C creativity : Impact of society and culture

This model helps us comprehend the subtleties, contemplating different developmental paths and resources for different levels of value creation. Kaufman and Beghetto also emphasised the importance of achieving mastery before arriving at true creativity.

Big-C level creativity, while being the most impactful, is often not fully understood or realized within the creator's lifetime. It is also the rarest. It is worth noting that a recent UCLA study revealed that highly creative Big-C individuals might be better at connecting distant brain regions compared to their equally intelligent peers (Anderson, et al., 2022).

The Human Connectome Project (Smith et al., 2015) found that a wholesome lifestyle with continuous learning and regular exercise can boost brain connectivity, stimulate neural growth, and enhance overall cognitive performance. To achieve Big-C creativity, it appears that we might need to uplift humanity's overall brain connectivity by defining what constitutes the best life for us.

AI Creativity vs Human Creativity

Human imagination, often seen as the seed of creativity in much research, is being emulated by advanced AI algorithms. Beyond the conventional creative thinking patterns, AI algorithms are beginning to visualize non-existent ideas and objects, and self-evaluating and selecting the desirable outputs. Once trained, AI creativity can become invoked on-demand ideation, customized for different purposes. Human creativity, on the other hand, is unpredictable, inconsistent and hard to scale. This raises some questions: What is our role in this new landscape? Is this the end of human creativity?

While the rise of AI can be daunting, creativity is about solving problems and adding value to human existence. No doubt AI may connect, extrapolate and permute ideas faster and better than humans; it is ultimately for us to determine the value we desire to create.

We would need to assume a leadership role, guiding AI towards ethical and beneficial creativity, one that fosters societal progression and improves human wellbeing. Reskilling humans for creativity may eventually gear us towards developing our prefrontal cortex to enhance our executive functions, and boosting our whole brain connectivity. This might better enable us to think critically, discern right from wrong and enable us to imagine a desirable future.

Conclusion

Creativity in the age of AI is a story of Industrial 4.0 and beyond. Amidst current technological advancements, we will grapple with human-machine interfaces and, more importantly, define their roles and boundaries. By leveraging AI to augment our idea-generating capability, we could boost mini-c to Pro-c level creativity, and focus on clarifying human values to accelerate Big-C level creativity within our lifetime. Such a shift might also liberate ourselves for higher pursuits like spiritual growth, reconnecting with nature, enhancing relationships, and thereby enabling better physical health and mental well-being.

How would you see human creativity playing out in the new hyper-digitalized era?

Redefining Creativity: Embracing and Cultivating Your Unique Creative Voice

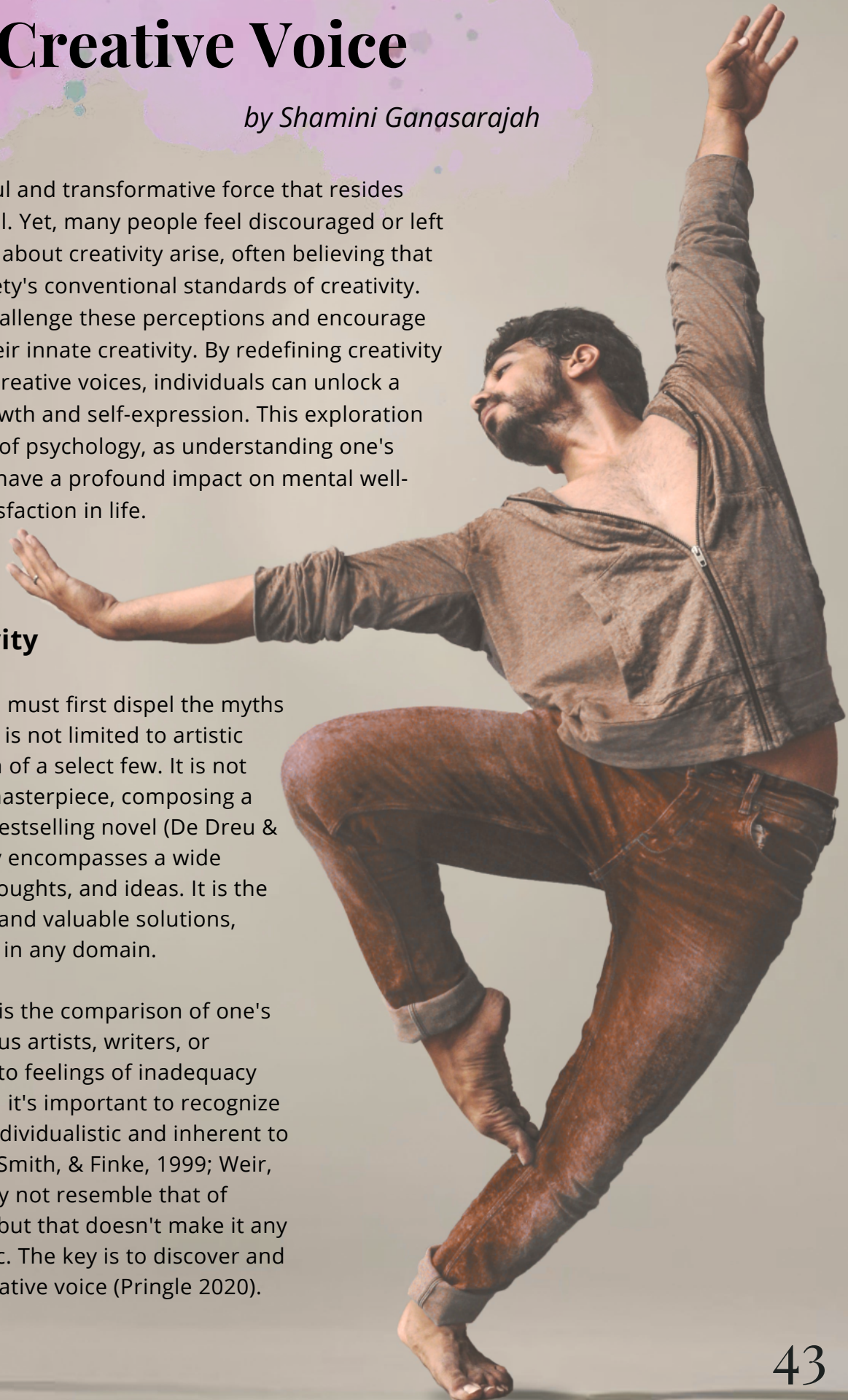
by Shamini Ganasarajah

Creativity is a powerful and transformative force that resides within every individual. Yet, many people feel discouraged or left out when discussions about creativity arise, often believing that they fall short of society's conventional standards of creativity. This article aims to challenge these perceptions and encourage readers to explore their innate creativity. By redefining creativity and embracing their creative voices, individuals can unlock a world of personal growth and self-expression. This exploration delves into the realm of psychology, as understanding one's creative capacity can have a profound impact on mental well-being and overall satisfaction in life.

Redefining Creativity

To redefine creativity, we must first dispel the myths surrounding it. Creativity is not limited to artistic endeavors or the domain of a select few. It is not solely about painting a masterpiece, composing a symphony, or writing a bestselling novel (De Dreu & Nijstrad, 2017). Creativity encompasses a wide spectrum of activities, thoughts, and ideas. It is the ability to generate novel and valuable solutions, concepts, or expressions in any domain.

The mistake often made is the comparison of one's creativity to that of famous artists, writers, or musicians. This can lead to feelings of inadequacy and self-doubt. However, it's important to recognize that creativity is highly individualistic and inherent to human cognition (Ward, Smith, & Finke, 1999; Weir, 2022). Your creativity may not resemble that of Picasso or Shakespeare, but that doesn't make it any less valuable or authentic. The key is to discover and cultivate your unique creative voice (Pringle 2020).



Embracing Your Uniqueness

Every person possesses a set of experiences, perspectives, and talents that is entirely their own. Embracing this uniqueness is the first step towards redefining creativity. Instead of striving to fit into preconceived notions of creativity, celebrate what makes you different. Embrace your quirks, your past experiences, and your personal interests. These are the building blocks of your creative identity.

Start by taking a moment to reflect on your life journey. What experiences have shaped you? What are your passions and interests? What are the themes that resonate with you on a deep level? These reflections can help you identify the elements that make your creative voice distinct.

Recognizing Your Creative Potential

Recognizing your creative potential requires a shift in mindset (Jonah, 2023). Instead of focusing on external validation or comparison, turn your attention inward. Understand that creativity is not about being the best; it's about expressing your true self. Here are some strategies to help you recognize your creative potential:

- **Mindfulness:** Practice mindfulness to connect with your inner thoughts and feelings. Mindfulness meditation can help you access the depths of your mind where creative ideas often reside.
- **Journaling:** Keep a journal to document your thoughts, ideas, and inspirations. Reviewing your journal can help you identify recurring themes and interests.
- **Self-assessment:** Take personality assessments and quizzes that can shed light on your unique traits and preferences. These insights can guide your creative endeavors.
- **Seek feedback:** Reach out to friends, family, or mentors for feedback on your creative pursuits. They may provide valuable insights that you've overlooked.



Cultivating Your Creative Voice

Once you've recognized your creative potential, the next step is to cultivate your creative voice. This involves nurturing your creativity and giving it room to grow and evolve (Novotney, 2009). Here are some ways to cultivate your creative voice:

- Practice regularly: Creativity is like a muscle; it becomes stronger with practice. Dedicate time to your creative pursuits regularly, even if it's just a few minutes a day.
- Experiment and explore: Don't be afraid to step out of your comfort zone and try new things. Experimentation can lead to unexpected breakthroughs.
- Embrace failure: Understand that failure is a natural part of the creative process. Instead of seeing it as a setback, view it as a stepping stone towards improvement.
- Collaborate with others: Collaborating with like-minded individuals or seeking input from others can provide fresh perspectives and ideas.
- Keep learning: Continuously expand your knowledge and skills in your chosen creative field. The more you learn, the more tools you have at your disposal.

Psychology of Creativity

The psychology of creativity plays a significant role in redefining and embracing one's creative voice. Understanding the mental processes that underlie creativity can demystify the concept and empower individuals to tap into their creative potential (Zubair & Kamal, 2015; Byrne, MacDonald & Carlton, 2003; Hessels, 2023).

- **Flow state:** Creativity often flourishes in a state of "flow", where individuals are fully immersed in an activity, lose track of time, and experience a sense of effortless focus. Recognize the conditions that facilitate your flow state and create an environment that encourages it.
- **Overcoming creative blocks:** Creative blocks are common but surmountable. Recognize when you're facing a creative block and employ strategies such as taking breaks, changing your environment, or seeking inspiration from diverse sources to overcome it.
- **Self-compassion:** Be kind to yourself throughout your creative journey. Self-criticism and perfectionism can stifle creativity. Embrace self-compassion and acknowledge that creativity is a process with its ups and downs.
- **Resilience:** Creative individuals often face rejection and setbacks. Developing resilience can help you bounce back from disappointments and continue pursuing your creative passions.

Benefits of Embracing Your Creative Voice

Embracing and cultivating your unique creative voice has numerous psychological and emotional benefits:

- **Enhanced self-expression:** Creative activities provide a powerful outlet for self-expression, allowing you to convey thoughts, emotions, and ideas that may be challenging to express through words alone.
- **Stress reduction:** Engaging in creative pursuits can lower stress levels and promote relaxation. It serves as a therapeutic outlet for processing emotions.
- **Increased self-confidence:** As you embrace your creativity and witness the growth of your creative skills, your self-confidence naturally improves.
- **Improved problem-solving:** Creativity sharpens your problem-solving skills, making you more adaptable and resourceful in various life situations.
- **Greater life satisfaction:** Living in alignment with your creative voice can lead to a profound sense of fulfillment and satisfaction in life.

Creativity is not a limited resource reserved for a select few. It resides within every individual, waiting to be discovered and nurtured. By redefining creativity, embracing your uniqueness, and recognizing your creative potential, you can unlock a world of self-expression and personal growth. Cultivating your creative voice is a lifelong journey that brings immense psychological and emotional benefits. So, embark on this creative adventure with an open heart and a willingness to explore the depths of your imagination. Your unique creative voice is waiting to be heard, and it has the power to transform your life.





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