

The Interplay Between Brain Lesions and Painter's Creative Transformations

A interação entre lesões cerebrais e transformações criativas do pintor

Painting is just another way of keeping a diary.

Pablo Picasso

Every good artist paints what he is.

Jackson Pollock

M. da Mota Gomes¹ [Orcid: <https://orcid.org/0000-0001-8889-2573>]

ABSTRACT

This narrative review addresses the complex relationship between neurological diseases and artistic expression, which can have a profound impact on a painter's works. This exploration highlights the dynamic and ever-evolving connection between neuroscience and art, offering insights into the extraordinary ways in which the human brain and artistic expression intersect and evolve. Following brain damage, there may be the emergence of sudden artistic talents, intriguing changes in the styles of established artists, the paradoxical facilitation of artistic abilities despite the cognitive decline consequent to these injuries, besides coping strategies that artists adopt in response to the challenges of health. Therefore, this article investigates different scenarios where brain injuries and disorders have had a profound impact on artists, leading to the emergence of new talents, changes in artistic styles, and unexpected improvements in their work, as well as adaptations in their artistic practices, as represented by some painters such as Tommy McHugh (1949 -2012), Francisco Goya (1746-1828), Otto Dix (1891-1969), Willem de Kooning (1904-1997), William Charles Utermohlen (1933-2007) and Charles Meryon (1821-1868). Consequently, works of art can be valuable but understudied tools for understanding brain dysfunction, although they must be interpreted with great care.

Keywords: Neurological Disorders, Artistic Expression, Brain Injuries, Creativity, Cognitive Decline, Chronic Degenerative Diseases, Neurosciences

RESUMO

Esta revisão narrativa aborda a complexa relação entre doenças neurológicas e expressão artística, que pode ter um impacto profundo na obra de um pintor. Esta exploração destaca a conexão dinâmica e em constante evolução entre a neurociência e a arte, oferecendo insights sobre as formas extraordinárias pelas quais o cérebro humano e a expressão artística se cruzam e evoluem. Após danos cerebrais, pode haver o surgimento de talentos artísticos repentinos, mudanças intrigantes nos estilos de artistas estabelecidos, a facilitação paradoxal de habilidades artísticas, apesar do declínio cognitivo consequente a essas lesões, além de estratégias de enfrentamento que os artistas adotam em resposta aos desafios de saúde. Portanto, este artigo investiga diferentes cenários onde lesões e distúrbios cerebrais tiveram um impacto profundo nos artistas, levando ao surgimento de novos talentos, mudanças nos estilos artísticos e melhorias inesperadas em seu trabalho, bem como adaptações em suas práticas artísticas, bem como representado por alguns pintores como Tommy McHugh (1949 -2012), Francisco Goya (1746-1828), Otto Dix (1891-1969), Willem de Kooning (1904-1997), William Charles Utermohlen (1933-2007) e Charles Meryon (1821-1868). Consequentemente, as obras de arte podem ser ferramentas valiosas, mas pouco estudadas, para a compreensão da disfunção cerebral, embora devam ser interpretadas com muito cuidado.

Palavras-chave: Transtornos Neurológicos, Expressão Artística, Lesões Cerebrais, Criatividade, Declínio Cognitivo, Doenças Crônicas Degenerativas, Neurociências

¹Federal University of Rio de Janeiro – Institute of Neurology (INDC-UFRJ), School of Medicine, Rio de Janeiro, RJ, Brazil

Corresponding author: Marleide da Mota Gomes, Instituto de Neurologia, Universidade Federal do Rio de Janeiro, Av. Venceslau Brás 95, Botafogo, Rio de Janeiro 22290-140

E-mail: mmotagomes@acd.ufrj.br

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INTRODUCTION

In this article, the third in a seven-part series about neuroaesthetics and visual art, there is the recognition that creating visual arts involves a complex interplay of motor skills, visual-spatial processing, emotional expression, cultural context, and creativity.

Picasso and Pollock's quotes presented at the beginning of this article emphasize how an artist's work is an expression of their inner self and experiences, consequently, understanding the relationship between artistic production and brain disease is crucial, as neurological conditions can have a significant impact on an artist's ability to create across multiple domains.

This article presents reports of neurological disorders that have affected works by famous or lesser-known artists, mainly in situations such as the emergence of artistic talent, the complete change in the artists' style, the liberation of artistic expression through "paradoxical facilitation" and the health coping strategy.

Brain lesions and artists' styles and creative transformations

Many great artists have struggled with late-life impediments, from physical disabilities to cognitive decline, such as Monet's cataracts which were misery for him in his old age, but others have worse situations and surprises as will be presented⁷.

Artistic expression can serve as a window into neurological disorders and deviations from an artist's typical style or behavior that may suggest emerging brain dysfunction. Thus, for example, compulsive artistic behavior, often emerging early in the illness, highlights a significant aspect of the neurological disorder and the basis of this behavior may include disruption of the frontotemporal-limbic-subcortical circuitry.

Sensory and emotional experiences, such as increased sensitivity or joy, can accompany this artistic impulse. Thus, sequential changes in an artist's work, observed through a series of images, reveal changes in style, form, or color choices, potentially reflecting underlying neurological changes. However, Schott¹¹ advises caution against an exaggerated interpretation of these changes as definitive indicators of brain dysfunction, emphasizing that such changes are not always warning signs for the onset of the disease. He points out that several renowned artists have evolved their styles without underlying neurological problems.

As for abnormalities, they can occur in various neurological conditions such as dementia, stroke, Parkinson's disease, autism, psychiatric disorders, epilepsy, migraines, and trauma. In these cases, artworks reveal underlying brain dysfunctions through abnormal context, evolving changes in style or content, compulsive elements, or emotional accompaniments that may result from involved brain regions, suggesting impaired inhibition that leads to paradoxical functional facilitation, especially in the

hemisphere right hindquarters and individuals with an artistic inclination may be more prone to pathologically obsessive creativity¹¹.

The major review by Pelowski *et al.*⁹ highlights the historical connections established between art and neurological issues, particularly neurodegenerative diseases. It emphasizes how notable artists such as Albrecht Dürer, Willem de Kooning, Vincent van Gogh, Georges Braque, William Utermohlen, and others were linked to potential neurological problems, presenting changes in their artistic expression. This review discusses how discussions arose in the 19th and 20th centuries linking the artistic expressions of renowned figures to neurological conditions. For example, Van Gogh's unique artistic style was potentially linked to epilepsy and psychotic episodes, while other artists such as the German painter Lovis Corinth (1858-1925) after suffering a right-hemisphere stroke, experienced changes in his artistic style, shifting from highly detailed and realistic portraits to a more expressive, impressionistic technique, and there were also instances of neglecting or omitting the left side of his paintings. Furthermore, cases such as those of Willem de Kooning and William Utermohlen have shown changes in artistic expression linked to later diagnosed Alzheimer's disease (AD). The aforementioned review also analyzes the emergence of case studies from the late 1980s, published in various journals specialized in neurology and neurosciences, which generally highlighted changes in artistic production attributed to specific neurodegenerative diseases, such as AD, Parkinson's disease (PD), and stroke. Pelowski *et al.*⁹ observed several changes in formal artistic characteristics, such as color, line, and style of content, linking these changes to the appearance of the supposed disease. This review highlights that these case studies often lacked systematic assessments and relied predominantly on subjective assessments of artistic changes associated with neurodegenerative diseases. The authors identified different factors that indicate such disorders, including changes in the formal characteristics, quality, creativity, and emotions expressed in the artwork. However, there was some consensus among these reports, suggesting increased creativity for certain disorders such as frontotemporal dementia (FTD) and PD, while also indicating decreased creativity for AD and dementia with Lewy bodies.

Emergence of artistic talent

The emergence of artistic talent in certain neurodegenerative diseases, such as PD and FTD, has intrigued researchers. Despite declining motor skills, patients sometimes develop new artistic skills. In PD, higher doses of medication correlated with increased creativity⁸. One theory suggests that drug-induced increases in dopamine may trigger creativity, especially in individuals with low dopamine due to PD. Another theory proposes that as certain parts of the brain degenerate in these

disorders, other areas become more active, allowing latent talents to surface. This phenomenon in PD patients parallels observations in individuals with FTD, where patients also display a sudden inclination toward art production. FTD sometimes triggers an unexpected surge of artistic creativity in individuals who experience language loss due to damage to specific brain regions. Typically expressed through visual art, this creativity stems from retained visuospatial skills and heightened interests. In FTD, damage to left-sided areas of the brain can increase activity in right-sided brain regions associated with visual perception, allowing artistic expression despite other cognitive impairments. This change in brain activity, already approached, and known as paradoxical functional facilitation, is a structural change in neurodegenerative diseases such as FTD, leading to greater artistic creativity despite other neurological challenges⁶. These intriguing cases have led scientists to explore how neurodegenerative conditions can unlock or activate artistic capabilities despite the general degeneration of cognitive and motor functions.

Tommy McHugh (1949-2012), figure 1, an artist and poet from Liverpool, England, initially worked in construction and was involved in minor criminal activities. After a stroke at age 51 that resulted in a coma for a week, McHugh acquired savant syndrome, demonstrating remarkable artistic abilities that he had not possessed before. His strokes, initially debilitating, unexpectedly opened a new chapter in his life, giving rise to a magnificent adventure that lasted 11 years¹².



Figure 1. Thinking Dreaming by Tommy McHugh (1949-2012), adapted from <http://www.tommymchugh.co.uk/Picture%20Gallery/album/index.html#img=105%20-%20Thinking%20dreaming.JPG>.

Artists' Complete Change of Style

This section investigates cases in which established artists have undergone radical changes in their artistic styles, techniques, or subject matter due to neurological conditions. It involves comparative studies and case

analyses to understand the neurological and psychological factors that contribute to transformative changes in the bodies of work of renowned artists.

Francisco Goya (1746-1828), figure 2, a Spanish painter, suffered a serious illness, potentially lead poisoning, that caused a significant change in his artistic style. Before his illness, his works tended to be more traditional, however, after this illness, his paintings took on a darker, more mysterious, and unconventional tone, reflecting a profound change in his emotions. Goya's artistic evolution encompassed several styles, from Rococo to Romanticism, presenting a broad spectrum of artistic expression.

Otto Dix (1891 -1969), figure 3, a renowned German painter, experienced a diverse artistic journey marked by distinct phases. His early art, shaped by his World War I experiences, depicted grim war realities with detailed realism. Associated with the New Objectivity movement post-war, he continued portraying reality but with critical scrutiny, addressing societal issues. After a stroke later in life, his style shifted, embracing Expressionism's emotive, subjective approach. Departing from strict realism, his art became more emotionally charged and expressive. This likely evolution stemmed from personal experiences, evolving artistic trends, and potentially, neurological factors. Dix's stroke notably influenced his artistic expression, reflected in changes in his drawing style, including later self-portraits. He suffered a right hemisphere stroke in 1967, causing left-sided weakness, neglect, visual impairment, and difficulties with spatial tasks and arm movements. Initially unable to draw, he managed to make a simple tree sketch on the fourth day, demonstrating negligence by leaving the left side of the paper blank, in a week, a second tree sketch revealed considerable compensation for neglect. Dix's drawing style changed notably, obviously even in his later self-portraits².



Figure 2. Saturn Devouring His Son (from The Black Paintings), 1820-1823, by Francisco Goya (1746-1828), Romanticism (second half of 18th century–first half of 19th century), mixed technique and mural on the wall and canvas, Museo del Prado, from Wikipedia.



Figure 3. 'Otto Dix' (1891-1969) drawing style compared with his photo at the top left, with those in the bottom that share the absence of a resemblance to the painter adapted from Bázner and Hennerici, 2007.

Liberation by "Paradoxical Facilitation"

Some stories highlight the profound and varied ways neurological damage can influence an artist's style, often leading to unexpected and aesthetically appealing transformations in their work. There is a common assumption that brain damage might permanently alter an artist's creative abilities, although there are instances where the effects are unexpectedly positive as some artists, despite neuropsychological deficits, demonstrate an enhanced artistic output, showcasing the remarkable resilience and adaptability of the human brain. This "paradoxical facilitation" challenges the conventional understanding of art production. When specific brain regions are damaged, other areas may compensate in unexpected and fascinating ways. For instance, individuals experiencing changes in perception due to brain injury have shown remarkable adaptations in their artistic style. An artist who developed achromatopsia after a traumatic brain injury, previously known for colorful, abstract paintings, adapted to working with a limited palette. This limitation led to a newfound appreciation for a pure form, resulting in striking black-and-white artworks. Similarly, artists affected by spatial neglect due to right hemisphere damage might exclude details from one side of their images, resulting in a style characterized by hidden facets and essence rather than realism. Left hemisphere damage has influenced artists' styles as well. Brain damage sometimes leads artists towards simplicity and abstraction, for instance, an artist with a left occipital lesion simplified their work, becoming more abstract with limited colors. Similar trends have been observed in some artists with AD, like Willem de Kooning, whose later works were simplified yet coherent, embracing a more straightforward and colorful palette³.

William de Kooning (1904-1997), figure 4, a Dutch-American abstract expressionist painter, developed AD in his later years. His artistic style went through several transformations, alternating between representation and abstraction, after the "Woman" series, de Kooning moved

more in the direction of abstraction. In 4 decades, de Kooning's art had traveled from concreteness to abstraction^{1,4}. Kooning was diagnosed with dementia when he was almost 80 years old, but signs of the disease had already been noticed years before. However, in the following years, he painted more than 300 abstract paintings, glorified by art critics, with temporary interruption, but when he started again, his work had changed, as he became exuberant, carefree, and full of life, and paintings carried out in weeks rather than months. As his illness progressed, his art became progressively more abstract and difficult to understand, although he continued to attract critical attention. His career is indeed fascinating, especially the period in which he continued to produce art despite battling dementia. In his later years, his style underwent a noticeable transformation, becoming more abstract and challenging to interpret. Despite these changes, his work remained critically acclaimed, and his ability to express himself through art persisted even as his illness progressed. It's remarkable how he continued to create, evolving his style and captivating attention despite the challenges he faced due to dementia⁴. Despite his cognitive decline, his art underwent a transformation characterized by bold, expressive brushstrokes, reflecting a paradoxical facilitation of artistic talent.

Another painter also diagnosed with AD was William Charles Utermohlen (1933-2007), figure 5, an American figurative artist. In contrast to de Kooning's exuberant works, he followed the classical understanding that brain damage can permanently alter an artist's creative abilities. Utermohlen is known for a series of self-portraits that express his cognitive decline that followed his diagnosis of probable AD in 1995, at the age of 61, after a long and successful career as a painter. As the artist struggled to maintain contact with the world around him, his works became flatter and more abstract, with a greater loss of detail and spatial sense. Many of the stylistic changes are probably the result of the rapid decline of their visuospatial and motor skills over a few years.⁴



Figure 4. Woman 1, 1950 and Untitled XXVIII, 1983, by William de Kooning (1904-1970), adapted from <https://www.theguardian.com/science/2016/dec/29/paintings-reveal-early-signs-of-cognitive-decline-claims-study>.

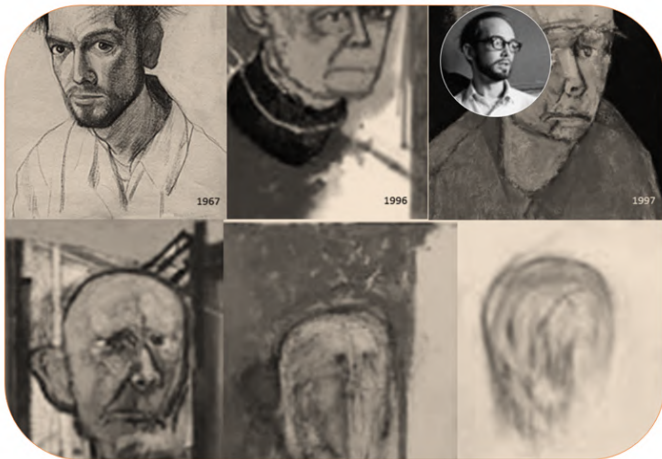


Figure 5. The impact of Alzheimer's disease on self-portraits by William Charles Utermohlen (1933-2007), adapted from <https://digitalcommons.iwu.edu/utermohlen/113>

Coping Strategies Against Health Problems

This section discusses the multitude of factors that influence changes in painters' styles, encompassing personal evolution, life experiences, experimentation, market trends, and feedback from peers and critics. It also explores how artists use art as a mechanism for coping with the challenges posed by neuropsychological conditions.

Charles Meryon (1821-1868), figure 6, was a French artist, an illegitimate son of a Parisian opera dancer, and an English doctor, recognized for his etchings. After studying art, he realized that his congenital color blindness prevented him from being successful with oil paints, turned to etching, and also faced mental illness, apparently depression, and later developed hallucinations and persecutory delusions^{5,10}. His art was deeply intertwined with his personal experiences and emotional responses, serving as a coping mechanism to address perception issues and lasting mental health challenges.

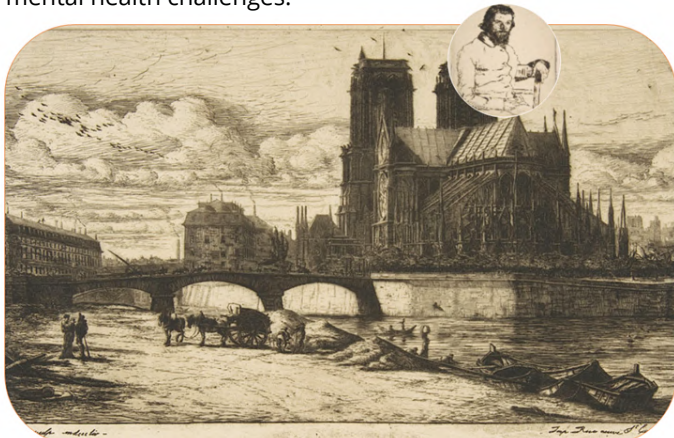


Figure 6. Abside de Notre Dame, 1854, the fourth state of nine, 1854, Charles Méryon (1821-1868), Etching with engraving and drypoint on laid paper, Metropolitan Museum of Art, from Wikipedia.

CONCLUSION

The intricate interplay between neurological disorders and artistic expression uncovers the exceptional adaptability and transformative power of the human mind. The cases presented reveal how brain injuries and

neurological conditions shaped these artists' creations, transcending the forms and boundaries of conventional art. This exploration emphasizes the captivating and ever-evolving field of neuroscience and art, offering insights into the remarkable connection between the human brain and artistic creativity.

REFERENCES

1. Barnes B. ABSTRACT EXPRESSIONIST WILLEM DE KOONING DIES. *Washington Post*, 1997, March 20. Available at: <https://www.washingtonpost.com/archive/politics/1997/03/20/abstract-expressionist-willem-de-kooning-dies/1a9c20e4-f4e7-48a1-a0a5-9069885f2976/>
2. Bäßner H, Hennerici MG. Painting after right-hemisphere stroke - case studies of professional artists. *Front Neurol Neurosci*. 2007;22:1-13.
3. Chatterjee A. The neuropsychology of visual art: conferring capacity. *Int Rev Neurobiol*. 2006;74:39-49.
4. Cipriani G, Cipriani L, Danti S, Picchi L, Di Fiorino M. Links Between Painting and Neurology: The Example of Dementia. *Am J Alzheimers Dis Other Demen*. 2019;34(4):217-222.
5. Dodgson C. The Etchings of Charles Meryon." 2021. Editor: C. Geoffrey Holme Gutenberg.org. 2021. Available at: <https://www.gutenberg.org/cache/epub/66036/pg66036-images.html>.
6. Erkinen MG, Zúñiga RG, Pardo CC, Miller BL, Miller ZA. Artistic Renaissance in Frontotemporal Dementia. *JAMA*. 2018;319(13):1304-1306.
7. Glover M. Did work by artists like De Kooning, Renoir, Matisse and Monet decline in old age? (2017, October 10). *The Independent*. Available at: <https://www.independent.co.uk/arts-entertainment/art/features/willem-de-kooning-renoir-matisse-monet-skarstedtgallery-picasso-titian-a7992676.html>
8. Lhommée E, Batir A, Quesada JL, Ardouin C, Fraix V, Seigneuret E, Chabardès S, Benabid AL, Pollak P, Krack P. Dopamine and the biology of creativity: lessons from Parkinson's disease. *Front Neurol*. 2014;5:55.
9. Pelowski M, Spee BTM, Arato J, Dörflinger F, Ishizu T, Richard A. Can we really 'read' art to see the changing brain? A review and empirical assessment of clinical case reports and published artworks for systematic evidence of quality and style changes linked to damage or neurodegenerative disease. *Phys Life Rev*. 2022;43:32-95.
10. Ravin JG, Anderson N, Lanthony P. An artist with a color vision defect: Charles Meryon. *Surv Ophthalmol*. 1995;39(5):403-408.
11. Schott GD. Pictures as a neurological tool: lessons from enhanced and emergent artistry in brain disease. *Brain*. 2012;135(Pt 6):1947-1963.
12. Thomson H. Mindscapes: Stroke turned ex-con into rhyming painter, 2013. Available at: <https://www.newscientist.com/article/dn23523-mindscapes-stroke-turned-ex-con-into-rhyming-painter/>.
13. Utermohlen, William; Green, Jonathan; Montpetit, Mignon A.; Diaz, Joanne; Kooker, Wendy; Kerr, Noel; Kerr, Jean M.; Criley, Mark; Cook, Kent; and Hudson, William, "Pursuing the Ephemeral, Painting the Enduring: Alzheimer's and the Artwork of William Utermohlen". *Pursuing the Ephemeral, Painting the Enduring: Alzheimer's and the Artwork of William Utermohlen*, 2015. Available at: <https://digitalcommons.iwu.edu/utermohlen/1>