

## Creativity patterns and the brain

### Abstraction, extraction, and figuration in the art of Gerard Caris

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What is commonly called abstract art today is a twentieth century « invention » of Western culture. Although it started with a few timid precursors, among them Elena Guro, most attribute the birth of the abstract movement to Wassily Kandinsky and his emergence into the genre in 1910. Legend holds that Kandinsky, saw one of his watercolors hung upside-down, and this new, strange visual perception became his trigger for exploring new ways of painting outside more traditional forms.

However, one immediately sees the inaccuracy of the term « abstract » because the word « abstraction » refers to the extraction of the main elements of a defined pattern (for instance, cubists typically abstract the different perspectives of objects from multiple points of view), while nonfigurative art is more likely to directly represent mental and visual automatisms from the artist's mind, visual memory, and brain function. In this regard, nonfigurative art refers to inner, spontaneous, cerebral processes, while « abstract-figurative » art implies the voluntary activation of neural mechanisms, allowing for the representation of a predefined item.

There is no data on the quality of satisfaction that artists experience while producing nonfigurative art, as opposed to abstract-figurative art. Artists who have produced both types have usually moved from figurative to nonfigurative work, although there are major exceptions, such as Nicolas de Stael or Hans Erni, who returned to figurative art after a nonfigurative period. Kandinsky is particularly remarkable because his work

evolved over 30 years from explicit visual representations to more geometric patterns. However, his ultra-geometric figures are often interpreted as partial explicit representations, such as birds on an electric cable in his purely nonfigurative works from 1929 to 1930, as if the total absence of explicit representation tended to annihilate itself by generating new figurations. In Gerard Caris' work, the repetition of geometric pentagons gives an extreme example of this opportunity for the onlooker to reconstruct his or her own image structures on the basis of an apparently nonfigurative elementary pattern, emphasizing the creativity of the spectator, and not only of the artist. The work of other artists, such as George Vantongerloo, Piet Mondrian, or Viktor Vasarely, also triggers similar cerebral phenomena leading to the creation of mental images based on geometric patterns, which are the primary pillars of their art. However, although their work is typically two-dimensional, the art of Caris is nearly systematically based on three-dimensional visual stimulation, especially in the images of the platonic solid dodecahedron. Moreover, the pentagon pattern repetition is more systematic than the geometric figures of other artists, imbuing the final work with a particularly strong and fascinating power.

The absence of figurative intentions in Caris' work associated with the multiplication of geometric patterns based on the elementary pentagon is reminiscent of the decorative patterns found in mosques, as the Islamic faith does not allow the direct representation of God and the Prophet. When I was twenty, I travelled across Iran, Afghanistan, and Pakistan, with a special interest in mosques of different cultures and traditions, marking the way to India. I always had a feeling of serenity and « spirituality » in these mosques – in fact, even more so than in more familiar Christian buildings, which are usually overloaded with images of saints and anthropomorphic representations of God. To me, the geometric patterns on mosques' walls seem to more effectively trigger visitors' eyes by representing the invisible world lying beyond the material nature of our surroundings. In some way, the personal quest towards God seemed more expedient due to the lack of « physical » barriers associated with forced, imposed, and established

representations of the divine. One does not need to be especially religious to experience this feeling, and it is also possible that the state of mind of artists such as Caris follows, consciously or unconsciously, the same orientation during the creative process itself. In fact, Caris asked himself « Why does geometry keep me practically nailed to my drawing table turning out drawing after drawing involving sub-drawings in which pentagons, darts and kites turn up in most varied ways, keeping me in a spell of excitement and happy loss of time, and away from other frivolous matter of facts of regular day life ? » I do not think it would an exaggeration to describe this as a spiritual experience, as Caris seems to be noting that something fundamental is happening. However, this perception would be immediately modified - or even abolished - by moving to elaborate figurative perception and representation. As Immanuel Kant demonstrated in his theory of schematism, geometric figures are not images, but conceptual patterns, and by bypassing the representation of any particular object from the material world, these figures lead the mind directly into the « universal ».

The brain likes to work on its own perceptions, and indeed, perceiving is very different from passively receiving information. It could even be considered a creative process in itself, as Matisse intuitively suggested one century ago on the issue of looking at paintings. For this reason, unfinished art can become particularly fascinating, as it requires the perceptual process to be especially active and productive. The same is true for certain works in which fascination is not associated with beauty, but with strangeness (as in some surrealist works by Max Ernst and Hans Bellmer), in which the spectator's brain is stimulated to construct an understandable and balanced perception based on an initially bizarre, uncertain feeling. This « openness » of sensation leads to the brain's prompt for perceptual completion, where discovery generates creativity. It is clear that a similar process is at work in Caris' works, because the infinite possibilities of geometrical pattern combinations open a similarly infinite number of personal reconstructions, or « creations », for onlookers. By their construction, geometrical patterns avoid the trap of imposed representations, making the

reconstructive perception process much more fluid and spontaneous.

This phenomenon may be easier to understand when determining how artistic creativity is generated within the brain. Contrary to widespread belief, artistic creativity does not arise from a primarily sophisticated, ultra-organized, constructive process, but from the exact opposite. Indeed, the first step is a process of mental disorganization involving recorded, repetitive, and reflexive patterns, causing the omission of a large part of the acquired automatisms during the incubation-production phases of creation. Thus, a « novel » pattern may arise from the play of free, wandering associations. Here, Kandinsky's example is the most revealing. Indeed, although the legend mentioned earlier intentionally focused on the birth of nonfigurative art on a precise instant (when the painter discovered his watercolor hang upside-down), a careful, chronological look at Kandinsky's work shows how, over time, figurative representations inexorably became deconstructed, simplified, and modified into nonfigurative items.

Frontal lobe disinhibition may be critical for creativity, as suggested by the development of artistic activity in individuals with no history of artistic interest or ability, and who began painting at an advanced age, parallel to patients who have developed a frontal type of dementia. In these patients, artistic creativity is a manifestation of brain disease, through the leverage of physiological mechanisms of neuronal inhibition. In a way, this brings back the old question « Is it necessary to be crazy to be creative ? » While simplistic, this question is indeed critical. At least, it is necessary to be « different ». Indeed, artistic creativity is not a « normal » (e.g., frequent) human characteristic, although some degree of general creativity can be found in every person. It is useful to note here that more than half of the American expressionists of the New York School suffered from severe psychiatric disturbances, depression, substance abuse, or had a history of suicide attempts. Joan

Miró, who showed manifestations of bipolar disorder, stated that suffering from depression was usually an efficient trigger to his artistic creativity.

The role of this frontal disinhibition, which seems to follow a jacksonian mechanism of unmasking, is clear in poetry, jazz improvisation, automatic writing, and in the « going back to childhood » feeling often quoted by great artists. However, little is known regarding the exact brain mechanisms that lie behind artistic creativity. Fascinating cases are provided by some famous artists who developed brain lesions that did not lead to the interruption of their work, but a change in their style. Willem de Kooning's dementia and Carl-Frederik Reuterswärd's stroke are extraordinary examples of a dramatic modification of style without loss of artistic quality, in parallel to devastating cognitive and behavioral changes that dramatically alter daily living.

Caris' work is a good example of how the active, though unconscious, brain deconstruction of common and learned figurative patterns may lead to the emergence of new forms and patterns, which then recombine into new and « unknown » structures, although they are based on elementary geometric items. Here, within his own life chronology, Caris' repetition of the same geometric form is reminiscent of traditional and « primitive » societies, where art was allowed only through the replication of significant figures or patterns, in order to avoid any novelty within a determined frame, and without aiming for aesthetic value. This lies in opposition to certain Western contemporary art currents that condemn replication as a form of plagiarism, and whose painters have become obsessed with creating « novelty » at all costs. However, novelty cannot be commanded, and its occurrence requires the sequential brain processes mentioned above. One cannot change the way the brain is wired.

« New » information, plans, and actions challenge established experiences and ways of thinking, so the brain tends to reject them when it realizes that they do not match previous memories. Novelty tends to destabilize ongoing functioning

because it introduces itself as an alien item, which explains why revolutionary thinking and art production is typically rejected as distressing. When a stimulus falls outside of an established pattern, it triggers unfamiliarity and unease, with a sense of « chaos » that then causes automatic correction. Unfamiliar and novel patterns lead to neuronal « agitation », with the subsequent release of dopamine to signal distress. However, in rare instances, the opposite may occur, so that previous patterns are erased or deeply modified, allowing new patterns to develop into a transformed canvas of thought and creation.

In the brain, creativity is processed through three main steps. The first one is the perception process itself, where perception may involve internal (feelings, imagination, etc.), and external stimuli. The second step involves the ability to extract certain features of the perception in order to abstract them into a specific pattern. This then allows the third step, corresponding to the executive process and skills, to execute the work. Associated mental functions are critical along these steps, including will, decision-making, awareness, mood, and memory. While these steps may involve focal cerebral functions (e.g., executive processes involve mainly anterior brain regions, while perception involves mainly posterior brain regions), it is critical to remember that the brain typically functions as a *whole*, and that reductionist localizationism cannot explain human activity and behavior as the expression of mental and emotional processes.

With this in mind, Gerard Caris' art is a unique example of the way the brain may transform inner and outer perceptions into specific pieces through a process that encompasses both pattern deconstruction and rebuilding.

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