Philosophy of Music: Graphic Scores and the Brain

Hannah Samberg
Department of Philosophy
Lake Forest College
Lake Forest, Illinois 60045

The modularity of the brain represents a microcosmic desire to have uniformity and predictability in our lives. The brain is compartmentalized into modules with each one devoted to completing a specified task. The arrangement allows us to produce intricate responses and ultimately leads to higher thinking. The innate inclination to compartmentalize and create meaning from even the most ambiguous signals has been repeatedly challenged by art over time. From Pablo Picasso’s dream-like portrayals of reality, to modern avant-garde music’s attempt to redefine the inherent semantic function of musical scores, our brain constantly strives to explain visual and auditory inputs in a rational and practical way.

Traditional musical scores include well-defined symbols that directly translate into real sounds. The process of learning a Bach fugue for piano, for example, is structured and easy for our brain to process. The visual input of a note is perceived in the occipital lobe, then recognized using learned rules and memories stored in the medial temporal lobe, and finally a physical response is generated in the motor cortex region located at the back of the frontal lobe. There is no interpretation involved in this procedure. The score represents a map from which a song can form, and our brain contains a map of its own to project the map of the music. Humans are used to using their minds for this kind of thinking.

Contrasting with the straightforwardness of the classical use of our brains to read and play music, there is a new, modern style of music intended to change the role of a musical score from a set procedure to be followed to an outline musician and when translated into musical sounds they remain as an organic perception of the art. Since the score is not a procedural system as, but in actuality there is no system; we are purely comfortable. He indicates that the magic of the scores is illusionary concept heavily depends on the musician’s intuition. While memory and practice are key players in a musician’s classic set of skills, graphic scores throw out most traditional training a musician uses and forces them to use intuition. Henri Bergson, a French philosopher, said that intuition is more important than rationalism or science in order to understand reality. It is impossible to explain how intuition works because then it would be a different kind of knowledge, something more concrete rather than unconscious.

The desire to create meaning from inarticulate symbols by our brain is opposed by the directionless nature of graphic scores. The perception of the musical score can create any reality the musician wishes. Joanna MacGregor, a pianist who performs graphic scores expresses that, “...moving images could offer a more truthful and piquant expression of creative ideas than words or notation.” This supports the intuitive and organic perception of the art. Since the score is not a procedural map, which is what our brains would like to see due to our unique visual disposition, we are forced to use creativity. A projection is imposed onto the score based on what our brain perceives the system as, but in actuality there is no system; we are purely using intuition. An unconditioned response to graphic scores is characterized by creativity, intuition, and holistic perception and interpretation. The idea of using a holistic approach connects directly to Gestalt psychology, which focuses on the idea that we perceive images and stimuli as a whole before breaking something down into its parts. It represents a “big picture” way of thinking, which is necessary when looking at or interpreting graphic scores. The dichotomy between images and notation offers an explanation for why graphic scores are so appealing. There are two main processes that our brains use to perceive: top-down and bottom-up processing. Bottom-up processing is the compilation of individual components of visual stimuli (such as a traditional music score) to put together a whole composition. Top-down uses a Gestaltian approach, viewing a composition initially as a whole, and then trying to understand each component of it. Graphic scores employ a lot of top-down processing; the scores are initially seen as an ambiguous image until the musician begins to produce sound from them. Then, during the production of the sound a musician might look at details of the score to compose a united product. Another important aspect of Gestalt psychology that relates to neural mechanisms is the issue of figure/ground perception and the perception of contours. These characteristics are relevant in perceiving graphic scores since many scores have ambiguities in foreground and background distinctions. They present a visual illusion for the musician and when translated into musical sounds they remain as an illusionary reality since there are multiple interpretations possible.

*I would not accept...that the purpose of music was communication, because I noticed that when I conscientiously wrote something sad, people and critics were often apt to laugh. I determined to give up composition unless I could find a better reason for doing it than communication. I found this answer from Gira Sarabhai, an Indian singer: The purpose of music is to sober and quiet the mind, thus making it susceptible to divine influences. I also found in the writings of Ananda K. Coomaraswamy that the responsibility of the artist is to imitate nature in her manner of operation.

Cage does not believe that musical scores should intend to communicate something, but they should rather serve as a means to generate ideas, or as an interface of collaborating ideas, or allowing intuition to take charge. This can be seen as a zen-like thought, “experiencing reality [in a way] that relies entirely upon intuition”. Sylvia Smith, curator of the exhibition of music notations, believes that, “to standardize notation is to standardize patterns of thought and the parameters of creativity. Our present abundance of notations is as it should be. It makes our differences more clear.” Smith’s perspective suggests that the purpose of the unique notations is to propel individuality. Earle Brown, an American composer and creative notationist, believes that the nature of ambiguous scores makes people uncomfortable. He indicates that the magic of the scores is illuminated when the “artists [realize] that the material is free and that any definition or condition that is imposed upon it is only an imaginary and momentarily effective illusion.” This illusionary concept heavily depends on the musician’s intuition. While memory and practice are key players in a musician’s classic set of skills, graphic scores throw out most traditional training a musician uses and forces them to use intuition. Henri Bergson, a French philosopher, said that intuition is more important than rationalism or science in order to understand reality. It is impossible to explain how intuition works because then it would be a different kind of knowledge, something more concrete rather than unconscious.

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An example of non-definitive figure/ground placement is exemplified in Figure 1. The score itself is over 100 pages and each contains complex graphic notation, most of which contain visual illusions. Another aspect of Gestalt psychology that involves perception of graphic scores is contouring. Many scores do not have prominent contours and are extremely minimalistic. The lack of edges makes it challenging to perceive and harder for the mind to judge. Figure 2 illustrates unfinished edges causing spatial ambiguity that confuses the brain at first glance. Important information is collected about visual stimuli based on its edges, so without them an image becomes illusion-like.

The approach to interpreting these scores varies widely. How intuitively read them can depend on the process of free association. For example, in Figure 1, each circle can be interpreted as a cluster of sounds, or a cluster of instruments, and the relative sizes of the circles can be interpreted as referring to volume or density of sound. The relationship between positive and negative space on the right hand side of the illustration can be read as indicating a relationship between sound and silence. The various ground lines anchoring each cluster of circles can be understood as tones that form a musical ground. This is just one way of making what is indeterminant, determinant. The performer is free to construct a set of rules or methodology for interpreting the symbols. For example, you might have a rule that when you interpret a symbol one way on one page, you would interpret it the same way when you saw it again. This lends the musical interpretation a degree of consistency. However, it does not override intuition because you still rely on intuition to determine even what rules you want to employ on a general level to the graphic. Apart from this, the particular sounds that a musician will produce may or may not be given by a different set of rules, which themselves will be the result of intuition. The nature of this freely associated stream of consciousness is an analog to the neurocognitive condition called synesthesia. Synesthesia is a “bleeding of the senses” or a tie between different cognitive and sensory pathways. For example, a common form of synesthesia is music-color synesthesia, which is characterized by seeing colors when hearing a sound. There are at least sixty-one different manifestations of the disorder, each with its own unique triggering stimulus and synesthetic neurological response. This parallels the distinctiveness of a graphic score interpretation not only in its uniqueness, but also in the way our brain translates the static images and colors into vibrant and communicative sounds. Graphic scores offer a platform to understand the complex systems involved in synesthesia. The parallel between synesthesia and graphic scores is apparent in the similar schematic mechanisms within our brain and also in the fact that it is difficult to arrive at a single definition for either concept. Graphic scores are explicitly defined, yet their implicit purpose is undetermined, just as it is difficult for researchers to create a definition of synesthesia that encompasses the wide range of cross-modular experiences that can occur.

Another connection between perceiving graphic scores and neuroscience is found in the work of composer George Crumb. Makrokosmos is a series of graphic scores, each representing an icon prevalent in society containing smaller graphic structures within.
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These graphic scores can be viewed as an analog to the neural mechanisms we use to perceive them: a hierarchy of systems used to create a whole which is different from the sum of its parts.

Graphic scores offer a unique lens through which we can speculate about how our brains perceive reality. They provide a landscape to explore the patterns of perception and illusion as well as illustrate different examples of philosophical beliefs. For example, Henri Bergson, as mentioned earlier, believed that intuition is key in discovering how we perceive reality. Although there is no defined process that clarifies what our conceptions will consist of, there is an organic and unpredictable force that guides it. He explains that perception is not merely perception because it is joined with memory, intuition, and creativity to compose our conceptions. According to Bergson’s ideas, one can argue that looking at graphic scores forces on us the realization that our understanding of the world does not arise through perception alone; rather, our intersection with reality is defined by the intermingling of memory, intuition, perception, and creativity. This combination of mediums creates a platform to understand Bergson’s concept of duration.

Bergson attempts to redefine our understanding of perception by creating a new concept called duration. It is derived from the claim that planning ahead for the future is impossible since time itself unravels unforeseen possibilities. This hypothesis indicates that time is a continuous yet heterogeneous medium. These two concepts, continuity and heterogeneity, seem to contradict each other; how can a continuous thing, which usually specifies causality with one thing leading to another, be equated with heterogeneous discrete events? The answer is found in Bergson’s idea of duration. He implies that he does not mean time in the mathematical sense, but time as a form of space. He explains that the very essence of duration is the subjective, un-extended, continuous yet heterogeneous “essence of life”. He says, “Pure duration is the form which our conscious states assume when our ego lets itself live, when it refrain from separating its present state from its former states.” Duration is a concept of time that has “…succession without mutual externality…” or in other words, a state of consciousness that is perpetually evolving, or “becoming”, and never something that is “made”.

Duration can be observed in memory, perception, and intuition. Bergson specifies that memory is the primary medium in which duration is exhibited, since in memory the past survives in the present. Duration in memory is described as the necessity to gather and rely on our present memory of the past and force it into the present. In this way, memories from the past intersect with the present in a continuous and recursive manner. Memory is essentially “…the intersection of mind and matter”. Bergson juxtaposes memory with perception. He says that perception is linked to the reality of an object and the brain mechanism we use to see it. We are actually, “placed outside ourselves…pure perception is constituted by dawning action, its actuality lies in its activity”. Intuition is defined by Bergson as, “…an instinct that is capable of reflecting upon an object…[and] enlarging it indefinitely”. This idea is recursive, since your intuition of reality relies on your last experience, which in turn relies on the experience before it. He specifies that intuition does not divide the world into separate parts, but instead it is a more wholesome process. An example of the complicated concept of duration can be seen in a simple test case: I look at an old lamp. My perception of the lamp is just the mechanism of vision but the experience of viewing the object is a more compound type of experience. Perception is intertwined with my memories and intuition, or in other words, my history with the object. I may be thinking about when I bought it, or when I moved its location on my desk a week prior, or when the bulb went out and I did not have a replacement bulb. All of these thoughts are intuitive and rely on memory to arise. I cannot look at the lamp without memories intuitively thrusting themselves into the moment of intersection with the real. For example, someone might say, “I can’t look at something without feeling fear,” or, “I can’t look at something without feeling disgust.” This means that our perceptions are always mingling with our memories and emotional experiences. These can be referred to as heuristics and biases. This experience is intuitive; you don’t think about thinking about the lamp when you see it—you just think about the lamp.

This perpetual evolution of being in reality leads to the idea of reality being indeterminate. Bergson states that, “…determinism is an impossibility and free will has pure mobility.” There is no determined future, and free will relies on the mobile, morphing, and recursive concepts of intuition and memory. Bergson purposefully defines the concept of duration vaguely due to his belief that direct definitions cannot accurately capture the richness and depth of an idea in its entirety. One must rely on intuition and imagination, the very processes used to describe duration, in order to fully grasp the idea in itself. Graphic scores illustrate Bergson’s concept of duration in the sense that determinism is not present since there are multiple ways to interpret it. They represent pure mobility and free will because a musician uses intuition to read it, and they require the accessing of memories to give the ambiguous symbols depth and context.

Bergson stresses the idea of experience being necessary to describe anything. He says that intelligence is used to gather knowledge of things and to make observations. This kind of knowledge is relative, though, because it is not directly connected to a qualitative experience—only a quantitative description. This kind of knowledge is defined by Bergson as “analysis…that is, the dividing of things according to perspectives taken.” It follows that, “comprehensive analytic knowledge then consists in reconstruction or re-composition of a thing by means of synthesizing the perspectives. This synthesis, while helping to satisfy needs, never gives us the thing itself; it only gives us a general concept of things.” You can take pictures from every vantage point within a city and attempt to experience the unified city through the pictures, but you cannot capture the real depth and feeling of a city without walking through it yourself. Even capturing the city using video, which incorporates the dimension of time into the Bergsonian analysis, does not count as firsthand experience because it leaves out the ability to see peripherally or behind you as you wish, while walking through a city. It leaves out the smells, sounds, and personal associations within a city, in other words, the experience of duration. Only through a pure durational experience, involving memory and intuition, can you...
say you have grasped the full city. Bergson states that duration in an experience is, “a unity and a multiplicity, but being mobile, it cannot be grasped through immobile concepts.” Graphic scores can illustrate this concept in a similar way as the city analogy. One can attempt to predict what the auditory product of a score will be from looking at the score itself, but this is merely guessing at the interpretation of a static image. One cannot truly know how a musician, or oneself, will intuitively express duration within the music without carrying out the performance itself. Bergson explains that this pure duration is characteristic of action rather than imagining action.

The dichotomy between analysis and experience can be illustrated by the difference between Western and Eastern methods of creating and interpreting art. Western art calls for a more descriptive representation of ideas, based on techniques of perspectivism and using a concrete visual grammar, or, the law of seeing. This kind of art leads to a more judgmental perception of a work. Eastern techniques focus on a more synesthetic overlapping of colors, shapes, and edges to create an expressive and sometimes illusive work, utilizing abstract visual grammar, which is defined as, “…idealized shapes that can’t physically be created.” There is a presence of duration in this kind of viewing. The accessing of memories creates a more personal or emotional intuitive understanding of this kind of art. It can be argued that intuition is always an emotional experience. These two tiers parallel the analytic process of looking at a graphic score versus the emotional, durational, experience of playing one, respectively.

Our intuition of the world is deeply intertwined with memory. Bergson’s theory of duration explains that memory is integrated in our intuitive perception of reality. The reason humans have durational intuitive reactions to stimuli is due to the innate accessing of memories to give things meaning in the context of one’s own life. Any stimuli, no matter how concrete, must always have a context in order for our brains to determine its identity. Bergson derived a schematic image to represent the interaction between memory and the perception of the present. His diagram is seen in Figure 4: Bergson’s Cone of Memory.

![Figure 4. Bergson’s Cone of Memory](image)

The plane represents, as Bergson defines it, “the plane of my actual representation of the universe.” The cone as a whole, SAB, is intended to represent memories. The base of the cone, AB, symbolizes the oldest, unconscious, memories, for example, those that arise in dreams. As the cone narrows towards point S, memories become more recent. Point S itself represents the exact moment of one’s body within space during a moment of perception. This layout indicates durational perception’s direct dependence on memory. Graphic scores require the use of memories to give the symbols depth and context. Analogous to a random squiggle’s meaninglessness without a coordinate plane to indicate its identity as a function, a graphic score’s random lines and shapes are indeterminate without a musician’s intuition and memory working to produce meaningful sound from them by providing the context, that is, the memories, within which the score can be interpreted. For example, the first line in Figure 8 looks like a feather, and based on how one knows a feather moves in the wind—lightly and daintily—a musician would play that line using minimal sounds and notes to represent the gracefulness and simplicity of the feather’s movement.

This is a thought process that is not predictable because as you begin interpreting a score, the mind is flooded with associations, though they are not the result of a determinant process. As we are thinking that something looks like something else, our mind is working in a way that is unconsciously directed by memories. Figure 6 can be looked at in different ways, channeling the undetermined nature of duration. You can look at it holistically (a more Eastern approach) or you can hone in on the details (a more Western approach). Holistically it can almost represent a gust of fire, while looking at the detailed lines elicits a memory of a multi-lane traffic jam. If these interpretations were played, they would sound different in many ways. The holistic approach would most likely be transient and loud, having an aggressive or ominous feel, while the detailed approach would last longer, because a traffic jam represents a period of immobilization. In her essay Bergson, Deleuze, and the Becoming of Unbecoming Elizabeth Grosz explains the concept of duration as, “…[the] double generation of the past and the present, the virtual and the actual…movement of difference. A graphic score is un-extended and the production of the sound itself is continuous, undetermined, and relies on intuitive memory, which is very similar to how Bergson describes our grasp of reality.

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Appendix

