**Conceptual Art: A Blind Spot for Neuroaesthetics?**

Increasing interest in how the brain and body function during aesthetic experience has not only spread to different areas of neuroscience and cognitive research but to embodied philosophy, art history, musicology and architectural theory. ‘Neuroaesthetics’ is a collective term I will use here to designate different kinds of approaches which involve the study of art from the point of view of perceptual physiology or cognitive science. Neuroaesthetics tends either to emphasize the processes of neuronal groups in the visual cortex when artworks are perceived [1] or suggests that visual experience depends on a tacit knowledge of how to interact physically with art objects, a proficiency that has a neurological basis in the sensorimotor areas of the brain. [2]

For Semir Zeki, art has a biological substrate, a dense network of neuronal cells, feature detectors processing line, color and motion. Zeki’s theories on art are based on experiments from quite localized perceptual sites in the brain that are also engaged in abstracting processes, which nevertheless are far from explaining complex concepts such as ideals and beauty, as Zeki himself admits: “I have been vague about the precise neurological way through which ideals are constructed by the brain.” [3] Surveying Western art, Margaret Livingstone also analyses perceptual feature detectors as well as facial recognition and studies of luminance. Others emphasize homeostatic neural mechanisms of arousal and emotional regard involved in responses to art rooted in our evolutionary development. There is a sizable amount of literature which engages critically with these approaches. [4]

Alva Nöe proposes that consciousness is not something in our heads but it is something that we do. Seeing becomes a way of acting in the world, moving around and among objects, spaces and artworks is a process of active perception which helps to create concepts. With embodied concepts, neural pathways connecting sensorimotor areas process such actions as back, forward, up, down or through which also form the basis of concepts, suggesting a mimetic relation between conceptual schema and motor orientation. Concepts are ‘acted out’ using our sensorimotor knowledge. There have been a number of objections to how this approach privileges sensorimotor areas of the brain and the role of mirror neurons. [5] It tends to minimize the role of recall, reason and the imagination (not associated with the sensorimotor system) which are important for kinds of conceptual thought which support parody or irony, for example. We can employ prepositions (up, down, through), figuratively, or we may even parody them—uses based more on broader activity in the brain. [6]

It is not my intention here to dwell on objections to these approaches, but merely to point out that neuroaesthetics as a whole predominantly looks to the formal and perceptible qualities found in traditional and modernist examples of art from Michelangelo to Mondrian, whereas conceptual art, which tends to downplay such qualities, is consistently omitted in these studies. [7] Instead, I want to foreground what neuroaesthetics might consider addressing at some later date, namely, the kind of conceptual thought involved in conceptual art which has formed the paradigm upon
which contemporary art practice continues to evolve. It is hoped that a consideration of such art will encourage neuroaesthetics to take into account larger scale neural events such as concepts and their relation to the study of localized microstructures favored by neuroscientific approaches. Putting neuroaesthetics into this wider cognitive context, which conceptual art clearly demands, stands a much better chance helping us to understand our varied and nuanced experiences of art.

Conceptual art is a loosely historical term referring to the works of artists, musicians, filmmakers and writers in the sixties and seventies, often directly or indirectly referencing Duchamp’s work. Themes identified with conceptual art may be found before and after this period running through Dada, Pop and Neo-Dada and Postmodernism, and in many different cultures. At the risk of simplifying, it brings together non-art objects (‘readymades’) that appear to have no author, purpose, or artistic process by which to distinguish them. Its themes challenge traditional notions of beauty and formal design, artistic dexterity, aesthetic composition and technique, in short, the qualities that neuroaesthetics examines in detail in order to understand the brain and its interactions with art. One might object that these examples are ‘anti-art’ yet they continue to be celebrated as art in the history books and galleries, and are considered as such by artists and philosophers.[8]

This essay is divided into four main areas of conceptual art which provide opportunities for research for cognitive science and neuroaesthetics. First, it has been argued that such conceptual art stimulates us because it is witty and puzzling as in a word game, and it has been ventured that such art’s aesthetic content can be compared to the elegance of a mathematical proof; [9] second, some of us find it refreshing that conceptual art questions the traditional importance placed on the visible qualities of art: our perceptions of shape and form are less important here than the parody of them, and so a recurrent theme in conceptual art is the interplay between ‘the visible and invisible’ aspects of art; a third point is that conceptual artworks reference other works: here, the viewer enjoys constructing conceptual relations between artworks (which I call ‘intertextuality’) using short and long term memory which have a bearing on how we perceive the work at hand. Fourth, often related to this intertextuality is a tendency in conceptual art to stimulate the reordering of ‘conceptual complexity’, often into larger conceptual wholes or superordinate categories, which, in turn, help us to see art in unaccustomed ways.

**Puzzles**

Joseph Kosuth’s *Art as Idea as Idea*, 1967, (Fig. 1) peaks our interest by inviting a perceptual examination of the shapes of the letters as ‘art’, yet also invites us to override this response encouraging us to reflect on the nature of vision and art. There are many works of art which use puns and word games to present the viewer with visual paradoxes. One of the earliest examples is Magritte’s *Treachery of Images* (‘Ceci n’est pas une pipe’) 1928-9, which, according to Zeki, ‘goes against everything the brain has seen, learnt and stored in its memory’ (1999: 46-58).

Yet this ‘going against’ is pleasurable and conceptually interesting. In Kosuth’s image, we alternate reading a text with seeing an image. We also read the words ‘human skill’
and ‘execution’ in the text presented, concepts which have been extended by Kosuth to include ‘quoting’ and recontextualizing words, an act of quoting that he wants us to consider is also indicative of art. The artwork adopts a mutually reinforcing strategy: it suggests a reading between the lines and its visual equivalent, an understanding beyond optical sensation.

Viewing art by Seurat or Mondrian, which take a thematic approach to perceptual experience, is more easily traced to the action of neuronal feature detectors in early stages of perception in the visual cortex. With conceptual art, these processes are less important than mechanisms of memory, rational induction, planning, semantic and linguistic processing and mental imagery. In addition to brain areas associated with these functions, pleasure might be derived from solving puzzles found in conceptual art which would involve stimulating emotions as well as linguistic processing. Thus, without going into too much detail, conceptual thought is produced from a cooperation of many brain areas together. [10] This cooperation can produce multiple interpretations which the viewer may integrate into larger conceptual wholes not easily traced to one particular area of the brain, let alone particular groups of neuronal firings. Conceptual art seems to require this ‘molar’ conceptual integration and in a dynamic sense. Zeki characterizes such multiple interpretations as ‘ambiguity’ based a three tier system:

[...] due to activity in a single area in which the micro-conscious correlate of activity may be in more than one state. Obviously, there is no ‘‘top-down’’ influence here. At a higher level, the ambiguity may involve more than one area, as in the Rubin vase. This may or may not involve higher areas in the frontal lobe. At a higher level still, the ambiguous state may involve several distinct areas that are able to bring their influence [...] Here, memory, experience, learning and much else besides can influence what is perceived at any given moment. This almost certainly involves a ‘‘top-down’’ influence, from diverse sources, not just the frontal lobes. Thus, opening up the capacity for a given brain area to be influenced by another area is merely one step in opening up the capacity to be influenced by multiple other areas. [11]

It is this third area involving a ‘higher level’ processing where “top-down” influence on perceptual organization is strongest that is most often functional in our experience of concepts and semantic processing in conceptual art and which has been largely ignored by neuroaesthetics. It is this kind of art that reveals a new set of problems, issues and opportunities for understanding the relationship between art and neuroscience.

The Visible and the Invisible

A good introduction to how this important interplay of themes requires a cooperation of several brain areas is to look at Duchamp’s much written about Bride Stripped Bare by Her Bachelors, Even (known as the ‘Large Glass’), 1915-1924. This elegant and enigmatic work is made of twisted metal wire and flattened metal plates cut into suggestive shapes mimicking machine forms pressed between two sheets of glass which are held up by a metal frame. It is thus free standing, so one can walk around the work, see through it and look upon it. According to the artist’s notes, it is divided into a female area above suggesting an anagogic, heavenly presence, versus the gravitational pull of machine parts, chocolate grinder, filters and scissors below. It has variously been interpreted as a metaphor for sex, yet the piston mechanism, which is supposed to
connect the sections above with that below, fails to make contact, and instead, suggests unfulfilled desire.

A richer involvement with the *Large Glass* is achieved by using at least two ways of seeing: the processing of perceptible qualities using feature detectors or sensorimotor mechanisms, in addition to areas of the brain responsible for semantic processing and rational induction. The *Large Glass* is more than a neurological stimulation of sensorimotor movements, despite its exacting (yet ironic) system of illusionism based on geometries in perspective, it also involves a distancing from the optical ‘point of view’ when we begin to create concepts using a series of poetic associations linked to notions of transparency and light ‘shining through’ the sensible properties of the work.

The transparency of the glass engages different ways of seeing. We can think about the flatness of the work and the formal features of the machine parts, or the glass invites us to see beyond them, thereby suspending our awareness of the perceptible elements of the work, as we would the shapes of letters on a page while trying to understand their meaning. While the machine parts tell us a story of a reproductive cycle that misfires, seen from the point of view of the transparent glass, one is reminded of St. Thomas Aquinas’s description of the Immaculate Conception as a ray of light which passes through a glass leaving the glass (and the Virgin’s body) intact. The light shines through the glass as we gaze through it; we ‘read through’ objects (and our sense perceptions of them).

While it is possible to interpret Duchamp’s machinism in a visceral sense as a representation of sensorimotor movements in the sex act, it can be viewed within a tradition depicting technology as a model for processes of thought. Hobbes and Leibnitz used mechanics in this way. Freud used thermodynamics as a way to articulate psychological processes and cognitive science sometimes uses the computer as a model for the brain. [12] Seen from this tradition, Duchamp’s system of machine parts in the *Large Glass* may only literally reference sex. It can also be seen as a body, the top part is the mind, the chocolate grinder below, the sexual organs. The work invites a continual shift of different systems: the careful perspective in which the bachelors have been placed below, and the parody of the window; the suggestion of psychological sex drives; the mechanics of industrial machine forms; and the absence of freedom suggested by automata; the automatism of biological reproduction; the theological implications of the light and the glass and predeterminism, and perhaps above all, a life affirming and endlessly complex relations of concepts. Each conceptual system is an interpretative framework that can be engaged at any moment while we are visually inspecting the work with perceptual processes that need not be employed thematically.

Duchamp’s *Large Glass* remains one of the most widely discussed works of art. It has a visual allure encouraging both conceptual complexity and self-reflection. However, it is placed into an even more fascinating conceptual context in the form of *La Boîte-en-valise* (‘box in a suitcase’), (Fig. 2) a suitcase in which there is a box of hand tinted prints and miniature artefacts which catalogue Duchamp’s oeuvre. The artist worked on over 300 editions of this valise from 1935-41. In many of them, the *Fountain* was reproduced in
miniature form, as if to re-admit it into another ‘gallery’ context in the valise, often called a portable museum. Each artwork similarly gains new significance by being recontextualized and juxtaposed next to other works. The valise is a visual mnemonic system, as well as a form of conceptual exploration. Each artwork, the Large Glass prominent among them, is a token of a distinct concept which can be seen in any order from right to left, or vice versa, or from top to bottom. We can combine the objects in Duchamp’s box, put them in different sequences, and use them as touchstones for concepts in relation to others. The box also invites us to imagine using it with our bodies as well as our minds; as a suitcase it invites us to pack and unpack objects as we might when planning a trip or organizing a stay. It uses localized perceptual processes, sensorimotor involvement, and the processes of memory and conceptual planning ahead. This experience thus engages dynamically with many brain areas requiring multiple levels of explanation.

Reinforcing the themes of visibility and invisibility in the valise is an image of L.H.O.O.Q Shaved. The ‘original’ L.H.O.O.Q was a print of the Leonardo’s Mona Lisa on which Duchamp had painted a moustache and goatee. In L.H.O.O.Q Shaved the moustache and goatee have been omitted. The work plays with notions of absence and presence and the continually deferred ‘original’ in the context of a box of simulacra. The work encourages us to question our perceptual response which note the ordinarily obvious: it is a print of the Mona Lisa, but we cannot help but imagine it as Duchamp had defaced it years before, we ‘see’ the absence of the moustache. Much has been written on the enigmatic beauty of the Mona Lisa’s smile and more recently from a neurobiological point of view. [13] Yet with L.H.O.O.Q Shaved this perceptual or pleasurable response, although still available to us, is questioned, as we turn our attention to Duchamp’s act of defamiliarizing a well-known face and a questioning of habitual ways of experiencing beauty.

**Intertextuality**

Duchamp’s well-known intention to “leave retinal art behind” is clearly demonstrated in the valise as a constant principle, it is a microcosm of the intertextuality principle. Histories of contemporary or conceptual art often begin with Duchamp’s Fountain, 1917 (a miniature version contained in the valise), a urinal turned on its side in order to challenge the ‘retinal’ appreciation of formal categories, and also included is 50 cc Air de Paris, 1919 (an empty glass ampoule which, as a joke, contains ‘Parisian air’, taken with him when he migrated to America).

There are many artists who have referenced Duchamp’s examples too numerous to mention here. But in the spirit of Duchamp’s non-retinal principle is Rauschenberg’s De Kooning Erased, 1953 a drawing by the revered abstract expressionist and scandalously erased by Rauschenberg and framed. In Piero Manzoni’s Artist’s Breath, 1960 the artist personalized Duchamp’s gesture of the Air de Paris by breathing into a red balloon on a plinth. Robert Barry’s Inert Gas, Helium, 1969, is a canister of gas released in a desert, as elusive and transparent as Duchamp’s Air de Paris. And in contemporary art, there is Martin Creed’s Light Going On and Off, 2000, a room in the Tate Modern, London where
a light went on and off every 5 seconds, an exertion for which the artist won the Turner Prize in 2001. We do not normally think of a blinking light as art, and this invitation to do so may be infuriating, simply uninspiring, or witty, making the gallery or ‘art’ disappear and reappear. The work ‘blinks’ between appearance and disappearance, art and reality. But the blinking also references the viewer’s gaze and the fact that she can also make reality or art ‘disappear’. This is a play on the binary between visibility and invisibility, the former showing us emptiness in a gallery, the latter repeating emptiness in a different light and ‘reproducing it’. Art is ‘dematerialized’ but the concept remains and can be staged in any gallery anywhere in the world or in any number of galleries at the same time.

Our experiences of all these examples of conceptual art are not explained by neurobiological experiments to do with perceptible properties of the artworks, yet such experience generates a whole field of intellectual analysis, artistic innovation and controversy over value and meaning in the arts.

Many conceptual works of art reference other artworks in a semantic network not readily reduced to neurological explanation. This system of associations helps us to create new concepts by recombining stored ones in novel relationships using both our rational and imaginative capabilities.

**Conceptual Complexity**

It might be tempting to presume that concepts are merely stored in the brain which we then recognize in the artwork through perceptual cues, and that all the organizational work of comparing and contrasting conceptual works in meaningful sequences is all generated from higher order processes cut off from the world. But some concepts, whose tokens may be found in the external world, not only help to reconfigure or re-sequence our stored concepts but also affect our eye movements and attention.[14] While phenomenology and enactivism challenge the traditional mind/body duality by asserting that embodied interaction with the world is a part of an ongoing process of cognition, not simply the after effect of it, some theorists go further in suggesting that our cognitive work can be ‘extended’ into the environment which gives the world itself an important part to play in cognition.

Work on the extended mind theory by Andy Clark suggests a complex interaction between stored and created cognition across brain-body-world:

I have files (both paper and online) which contain all kinds of hints and fragments, stored up over a long period of time […]. As I move these things about […] the intellectual shape of the chapter grows and solidifies. It is a shape that does not spring fully developed from inner cogitations. Instead, it is the product of a sustained and iterated sequence of interactions between my brain and a variety of external props […] a good deal of actual thinking involves loops and circuits that run outside the head and through the local environment. [15]

Clark’s thesis is not intended for concepts, but it is interesting that the simpler forms of cognition he asserts are offloaded into the environment can help to form the basis of
conceptual thought. With Duchamp’s valise, some of the cognitive work of concepts is to be found in the art object as a series of cues or guidelines for conceptual relations. Edwin Hutchins [16] argues that a material object can anchor conceptual relationships, yet it does this not in an imitative or fixed symbolic sense but in presenting opportunities for mental manipulation: we can shift around the sequence of perceptual cues to create new meanings, concepts and categories. It is a well known linguistic principle that changing the syntax of units of meaning creates new meaning and in a dynamic process of changing conceptual sequences, new concepts arise. [17] So, while we continually look for the root cause of concepts grounded in perceptions we often fail to recognize concepts are themselves responsible for generating more concepts, either through contrast, integration or resequencing. Again, recent cognitive research seems to indicate that this is how concepts are formed, through the creative reordering of relations.[18]

The valise is a repository of tokens referencing Duchamp’s longstanding devotion to the concept of a non-retinal art. And this is an organizing concept which helps to guide, in a top-down fashion, our perceptual inspection of the valise. If we imagine that the box is a traveling exhibition of non-retinal art, an ‘archive of invisibles’, we would see reproduced in the box, along with L.H.O.O.Q Shaved and the glass ampoule referring to the 50cc air de Paris, an image of the famous bottle rack ready made, upon which we can imagine wine bottles hung out to dry. There is also the Traveler’s Folding Item, 1916, a reduced version of an Underwood typewriter cover suggesting a typewriter underneath, a tool which can be used to write a letter or poem. Although the typewriter as a symbol of creativity has been ‘put away’, the conceptual work continues beyond the manual or mechanical execution of ideas. Also included is the fluttering love-heart print, a famous diagram used in perceptual experiments which Duchamp has used to alert us to the theme of the retinal and non-retinal in art. The image of his famous Nude Descending a Staircase is a conceptual depiction of motion in a fixed medium: do we see the figure or the motion? In such cases, we are no longer seeing perceptually. As a whole, the valise helps to activate an intensity of conceptual production through a continuous parody of visual codes. We are able to see each individual object not in the customary perceptual way using feature detectors or sensorimotor capabilities but as part of a jigsaw puzzle which uses other brain areas, the memory, rational induction, linguistic processing and the imagination in order to produce a conceptual way of seeing, but one which is structured as a network of relations characteristic of many kinds of art.

Arthur C. Danto suggests that much of art is, in fact, conceptual, as it invites an ‘enthymematic’ phenomenon whereby the viewer is responsible for supplying the ‘missing’ conceptual link which the work itself suggests. [19] And Duchamp claimed, “What art is in reality is this missing link, not the links which exist. It’s not what you see that is art, art is the gap.” [20] The concept or superordinate category that we bring to the work of art in the case of Duchamp’s valise is: ‘non-retinal art’ which primes our attention and guides our perceptual searching. [21] And in the other direction, the objects in the box help us to ‘pack’ new examples into our superordinate category of non-retinal art. Rather than holding all of the connectivities of concepts in the mind, the valise helps us to think and to mark concepts in a larger conceptual space, which is what we do with maps, diagrams, flow charts and notebooks indicating a network of elements. The box
allows us to access, reaccess and augment our complex conceptual thinking and to reflect on this.

The box requires that we use many different brain areas, the feature detectors of visual cortex, the spatial areas of the sensorimotor areas studied by neuroaesthetics and cognitive science, plus memory, language and rational induction employed by other areas studied by these disciplines along with psychology and philosophy. To privilege only one of these aspects would be to massively reduce the multidimensional meaning and experience the valise affords.

The valise might seem to be exceptional among art objects for its complexity, but one need only consider that many artists collect a number of their own artworks into one exhibition to achieve this conceptual multiplicity. Artists commonly think in groups of works rather than simply in isolated cases. Art historians are trained also to think in terms of networks of relationships between artworks which represent an intertextual system of references. Thus, the valise is a model of how we think about art but science has neglected this important aspect of art. One could even go so far as to say that thinking this multiplicity, even in the encounter with a single work of art, contextualizing it by placing it into an imaginary network of other artworks and conceptual relations is an essential part of the aesthetic and affective pleasures artworks provide.

The Large Glass enriches and is enriched by the company it keeps in the suitcase. The extraordinary thing about Duchamp’s valise is the instrumental role it plays in merging visual experience with conceptual exploration. Duchamp’s valise allows us to reflect on concepts and their relations to each other as we ‘pack’ and ‘unpack’ each local work of art within the larger context of art itself. The discoveries of neuroaesthetics need to be balanced by cognitive, psychological and other approaches; it too, can be enriched by the company it keeps. Providing such a context for the perceptual data of neuroaesthetics helps us to come closer to understanding the massive neural, cognitive and conceptual cooperation which art entails.

3. Zeki, [1] 74. Zeki concedes that concepts that are used as standards by which to judge art are “difficult to study at the level of brain cells; we just do not have the technology at present […] we therefore have to limit ourselves to generalities and to hints.”(53) and “where the concept itself resides is problematic.” (54).
4. ‘Art and the Brain’, *Journal of Consciousness Studies*, 6: 6–7, 1999. Art and the Brain’, *Journal of Consciousness Studies*, 6: 6–7, 1999; ‘Art and the Brain II’ *Journal of Consciousness Studies*, 7, No. 8–9, 2000, and ‘Art and the Brain III’ *Journal of Consciousness Studies*, 11, No. 3–4, 2004, where E. Harth in ‘Art and Reductionism’ writes, “almost any macroscopic physical event that involves the intervention by a human brain cannot be fully understood by just following the chain of cause and effect beginning with elementary neural events”, 114. Citing Livingstone, Irving Massey, *The Neural Imagination* (Austin: University of Texas, 2009), 137 observes the tendency to analyze episodes of vision as perfect laboratory models ignoring the differences in subjective experiences or attention spans. Raymond Tallis, Professor Emeritus of Geriatric Medicine at the University of Manchester questions that ‘love’ can be traced to ‘bits of brains’ as Zeki proposes, when even “sophisticated neural imaging [...] cannot distinguish between physical pain and the pain of social rejection: they seem to “light up” the same areas.” The fallacy of fMRI scans is that, “the
areas that light up are regarded as “the centre” for that experience, emotion, or propensity.” Times Literary Supplement, April 9, 2008.


6. Single or group cell experiments need to be put into a broader, dynamic context because “no cortical area operates in isolation but is connected to many other areas by anatomical long-range connections (“association fibers”). The upshot is that the behavior of a particular [brain] area cannot be predicted and explained from local microstructure alone.” F. Egan and R. Matthews, ‘Doing cognitive neuroscience: a third way’ Synthese, 2006, 153: 385.

7. Zeki suggests Duchamp’s work was not “universally appealing” Inner Vision (London: OUP, 1999), 146, a caveat which reveals a bias for traditional art, popularly defined.


10. For embodied concepts see Barsalou, ‘Abstraction in perceptual symbol systems’. Philosophical Transactions of the Royal Society of London: Biological Sciences, 2003, 358, 1177-1187. Conceptual knowledge is also stored in visual areas; in somatosensory or premotor areas and temporal lobe involvement for semantic processing. Thanks to the anonymous reviewers for these points.


17. In cognitive research the conceptual meaning of words “is generated on the fly through an inferential process […] intended meaning is obtained as the result of an intersection between two different inferential routes, one starting from the context and coming across the stored concept at some point, the other starting from words and moving forward along the conceptual structure associated with them” Mazzone and Lalumera, ‘Concepts: Stored or created?’ Minds and Machines, 2010, 20: 1, 19.


21. It is the prefrontal cortex which is said to provide abstract rules for organizing perceptual categories.