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Deep Naturalism: Patterns in Art and Mind

Liz Stillwaggon Swan

Mercyhurst University

This paper addresses the philosophical problem of how a physical conceptualization of mind can account for the "metaphysical" experience of being moved by a work of art. Drawing on theories in psychology about the role that patterns play in human cognition and various other insights from the mind sciences, it is argued here that it is possible to account for some features of our aesthetic experience with some types of visual art, such as Jackson Pollock's famous drip paintings, by appealing to our evolved pattern recognition capabilities. A speculative hypothesis is offered for why we are so adept at recognizing and creating natural patterns: we embody some of the very patterns that are ubiquitous in the natural world in which we evolved. The conclusion is reached that the interaction that occurs between our embodied patterns and the obscure patterns in Pollock's drip paintings is unavailable to our conscious mind though it affects us on a deeper level and thus takes on the subjective feel of being, in a sense, metaphysical.

Keywords: patterns, pattern recognition, aesthetic experience, Jackson Pollock

> *. . . considerith the simple forms or differences of things, which are few in number, and the degrees and co-ordinations whereof make all this variety.*
>
> Francis Bacon, 1605
> *The Advancement of Learning*

> *. . . aesthetic theories will only become intelligible and profound once based on the workings of the brain, and [. . .] no theory of aesthetics which does not have strong biological foundations is likely to be complete, let alone profound.*
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> Semir Zeki, 1999
> *Inner Vision*

Recent contributions to our understanding of aesthetic experience at the neurobiological level, which constitutes one focus in the field of neuroaesthetics,

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come from Zeki (Zeki, 1999, 2002; Zeki and Bartels, 2004; Zeki and Kawabata, 2004), Freedberg and Gallese (2007), and Taylor (Taylor, 2002, 2006; Taylor, Spehar, van Donkelaar, and Hagerhall, 2011; Taylor et al., 2005). Zeki (1999) has argued that vision is an active process, and that artists intentionally affect the visual process of observers. Freedberg and Gallese suggest that one element of aesthetic experience is the observer's empathic response, via neural mirroring, to the "trace" left behind by the artist's gestures in the creation of the work of art.[1] Taylor has done extensive research on the physiological responses observers have to the well-known drip paintings of Jackson Pollock, and has determined that obscure fractal patterns in the paintings mimic those found in nature which people find aesthetically pleasing. In this paper, I synthesize the findings from these researchers and others to suggest a new hypothesis about aesthetic experience, and human nature more generally: the reason we tend to find certain patterns aesthetically pleasing is because they resonate with the natural patterns embodied in us.

Before going deeper into my account of aesthetic experience, let me explicate the conceptualization of mind that is assumed in this paper. There is no such thing as "a mind" per se; rather, the term "mind" acts as a conceptual place-holder for a host of abilities that we and some other animals are able to do with our brains and bodies working in concert, such as: communicate, show affection, imagine, satisfy our needs, learn, feel and sense, remember, hold beliefs, and plan. All living organisms have a host of abilities uniquely attuned to their particular environments, which in some cases, such as the human case, are inclined to conceptualize as "having a mind." Mindedness is a biological phenomenon, thoroughly dependent upon a central nervous system in complex organisms such as humans and other primates, and a more diffuse kind of nervous system in less complex organisms. This simple observation implies that mindedness exists in degrees in the biological world, which entails that it certainly is not unique to humans, and that our particular kind of mindedness is just the most recent design in nature — its having existed in various forms long before hominins evolved. Given that the mind is a biological construct, it stands to reason that metaphysical, sympathetic, and empathetic responses are grounded in patterns that we recognize, consciously or subconsciously, and that we use repeatedly as reference points as we observe, analyze, and synthesize information at different cognitive levels.

The theme of the present paper is that an understanding of our mind's evolved pattern recognition capabilities can illuminate certain aspects of aesthetic

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[1]Eliciting empathetic responses can be a thoughtfully intentional process. Aristotle pointed out in his *Poetics* that in drama, "(t)he imitation is not just of a complete action, but also of events that evoke fear and pity." In other words, the observer of the play felt empathy for and association with the actors in the drama (see *Poetics*, book 6, *Plot: Species and Components*. Chapter I, *Astonishment*).

experience. Michael Wheeler (1996) poses the provocative problem of how a fully scientific and wholly physical account of mind and human understanding could ever explain the aesthetic and even metaphysical experience one has while staring at a Mark Rothko mural. Appreciating a work of art can be considered "a humbling or spiritual experience" (to use Wheeler's terminology), an experience that traditional cognitive science, "restricted as it is to the subject–object dichotomy, and the language of representation and computation," has no tools to articulate (p. 234). It is apparent that something quite different is called for, and that something, according to Wheeler, is a fully embodied account of cognition that emphasizes dynamic interaction of — and rejects any real divide between — self and world.

I take as my starting point the intriguing philosophical problem that Wheeler touched upon: Is it possible for a physical account of mind to explain the metaphysical experience we have when we are moved by a work of art? I employ as a case study the drip paintings of Jackson Pollock to argue that our innate pattern recognition capabilities play a part in the visual processing involved in appreciating (at least) this one odd example of visual art.

It has been established that the underlying patterns of the famous drip paintings are similar to those found in nature, and furthermore that these patterns tend to have a soothing psychological effect on the viewer (Taylor, 2002, 2006; Taylor et al., 2005, 2011). I explain how these insights provide a glimpse into understanding why aesthetic experiences can feel metaphysical, as well as how it is possible to give a physicalist account of such experiences. I argue that we are adept at pattern recognition not only because we are embedded in a world where such capabilities are important to our survival, but also because we embody some of the same patterns found in the natural world in which we evolved, so that when we encounter complex or hidden patterns in artwork, they may affect us on a level much deeper than our conscious cognitive and linguistic selves; the experience might feel mysterious and ineffable, and we may even call it metaphysical.

The Rhythms of Nature

The claim that particular cognitive features may be evolutionary adaptations has been widely discussed in the evolutionary psychology literature. This paper extends the discussion to the realm of aesthetic experience, posing the question of whether aesthetic experience could be one such evolved cognitive feature, and if so, how and why. The central problem comes sharply into focus when one considers the progress made so far in the biological sciences in articulating how the human sensory systems work; for example, how the molecules particular to my favorite red wine produce, upon interaction with the sensors on my tongue, neural impulses that my brain interprets as pleasurable, and how sound waves entering my ear canal vibrate the intricate organs inside to produce neural impulses my brain interprets as words or music. What is not so clear, by striking contrast, is how my gazing at a painting or sculpture can inspire in me feelings of awe, wonder, and humility; or, alternatively, disgust, embarrassment or sadness. Is it possible to give a physical account of such experiences?

Taylor suspected a particular pattern in Pollock's masterpieces and used computer analysis on twenty of the famous drip paintings, first scanning each painting and then superimposing on each a grid that divided the painting into 1,000 squares. He found that the chaotic-looking paint splatter patterns of all twenty of the paintings were, in fact, fractal in nature. Fractal patterns are self-similar in nature and maintain the same properties regardless of magnification.[2]

Taylor and colleagues used two forms of control in their experimental analysis of the fractal-patterned Pollock drip paintings: (1) several non-Pollock drip paintings, and (2) a paint splatter painting that they allowed the natural elements to freely guide during a wind storm by rigging up cans of paint on one side and a large sheet to capture the wind on the other, and draping a canvas on the ground below. All of the control paintings were analyzed using the same method that was used on the Pollock paintings and none of these patterns was found to be fractal in nature.

Taylor incurred assistance from psychologists specializing in visual perception to investigate the psychological effects felt by people who were viewing fractals. The samples of fractals came from three sources: natural (e.g., trees, clouds, mountains, see Figure 1); mathematical (e.g., computer simulations, see Figure 2); and human (sections of Pollock's paintings, see Figure 3). Taylor reports that, regardless of the pattern's origin — whether natural or computer-simulated — test subjects consistently preferred images with a fractal dimension in the range of 1.3–1.5. The fractal scale for paintings ranges between 1 and 2, with neither pole itself being fractal in nature, and the highest intensity of fractal nature occurring right in the middle of the two poles (see Figure 4). This middle range, which was reported to be the favorable one by participants in the study, is the range in which fell most of the twenty Pollock drip paintings that were analyzed.

Skin conductance and EEG readings were taken on participants in several different experiments in order to ascertain the effect of fractal viewing (Taylor et al., 2011). These physiological measurements were found to be consistent with the claim that viewing fractals with midrange values evoked feelings of peace and relaxation. Apparently, Pollock was creating fractals in his paintings

[2]The French mathematician Benoit Mandelbrot coined the term "fractal" in 1975 and is largely credited with being the first to articulate in detail fractals' strange nature which can be seen both in natural systems such as tree branching and snowflakes, and in computer generated patterns that resemble these natural systems, as well as the colorful and more abstract patterns popular in tie-dyed T-shirts.

Figure 1: Rock formations in Ouray, Colorado. Permission granted by the photographer, Eric Swan.

Figure 2: Computer-simulated plant grown using a Lindenmayer system. Permission granted by the creator, Bruce Damer.

Figure 3: Jackson Pollock's "Number 3, 1949: Tiger." Permission granted by Art Resource, New York. © 2013 The Pollock–Krasner Foundation/Artists Rights Society (ARS), New York.

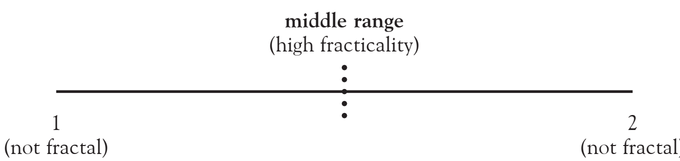

Figure 4: The scale of fracticality in two-dimensional objects such as paintings ranges between 1 and 2. Neither pole (1 or 2) is itself fractal in nature; the highest intensity of fracticality occurs in between the two extremes — around 1.5 on the scale — the range in which Pollock's drip paintings commonly measure.

decades before their discovery in mathematics. Pollock was quoted as saying that when he was engaged in the activity of painting, his concern was with "the rhythms of nature" (Taylor, 2006, p. 112). Pollock created patterns in his paintings that elicited positive changes in one's psychological state; intentional or unintentional, the fractal patterns that emerge elicit a metaphysical response in the viewer's consciousness.

Human Pattern Recognition

Fractal patterns are recognizable both in nature and in human artifacts — and on a spectrum of conscious and subconscious levels. We can create fractal patterns intentionally, as in computer simulations, or apparently unintentionally, as did Pollock. These observations suggest a hypothesis: the mind is structured in such a way to both recognize and create patterns — and perhaps even particular types of patterns, such as fractals. The fractal patterns uncovered in Pollock's drip paintings fall in the particular range of those found in the natural world in tree branching, mountain ridges, snowflakes, seashore waves, and wave-like patterns on sand dunes.

Fractals may be inherent only to certain types of paintings, whether intended or not, or even to just the twenty Pollock drip paintings analyzed. Of course, there are many other types of patterns and related principles that come into play in evaluating visual art, for example, symmetry, depth, shape, alignment, color, and angle. Analyzing a work of visual art using rubrics of this sort does not immediately seem to get to the heart of the question concerning our metaphysical experience of art. One might even argue that to evaluate a work of art in such an *analytical* way is to miss the point, for example by failing to appreciate its emotive quality. However, the example of Pollock's paintings provides insight into the larger philosophical question of why certain types of modern visual art would move us emotionally or affect us psychologically, and why we sometimes think of or describe these experiences as being metaphysical or ineffable.

Although Pollock was presumably aware of his interest in "the rhythms of nature," he was perhaps not aware that he was consistently creating patterns in his drip paintings that were *in nature*, and neither were viewers aware that they were responding to these patterns. Therefore, it is plausible to suggest that in appreciating one of Pollock's drip creations we are in effect responding to the rhythms of nature embodied in us through the long process of evolution, which does seem like an experience that would be inherently beyond articulation — something we are not accustomed to as linguistic creatures, and thus something that would engender in us feelings of awe, humility, and wonder.

The case of Pollock's paintings poses an interesting question for Steven Pinker's (1997) theory of the function of art. Pinker's view of art is that it is our way of "cheating" evolution by getting pleasure out of something that does not enhance biological fitness. That we like fattening foods, sexy movies, and paintings of hearth and home can all, according to Pinker, be explained by the fact that our brain's pleasure centers react to these things because they represent things that our ancestors would surely have found biologically advantageous: food, sex, and shelter.

I concur with much of Pinker's theory for what it says about our attraction to art in general, but what about the Pollock case in particular? Being attracted to Pollock's drip paintings is presumably *not* biologically adaptive (why would it be?), but being attracted to the paintings' underlying patterns, I would argue, most certainly is. Pinker believes that our appreciation of more abstract types of modern art, wherein the content is not warm scenes of home and hearth but jagged lines, angles, and repeated patterns, comes from our ancestral desire to make out clearly whatever is in our field of vision. He explains it as our preferring pizzazz to drab; we are conditioned to seek clues of depth, for instance, to help us make out clearly what is off in the distance ahead of us (a tall shadowy object), and we feel relieved when we are finally able to identify unambiguously what it is we see (a copse of pine trees). Perhaps then the essence of our experience of looking at a Pollock is the relief that comes from subconsciously having identified order in the apparent chaos.[3]

Andrea Lavazza's insights on the subject of abstract art coincide with those of Pinker's. He explains, "It can be argued that an abstract work of art suggests a vague and blurred set of references, none of them clearly identifiable. But their assembly is to trigger an emotional resonance in the fringe. [. . .] In other words, non-representational and abstract art could have an implicit cognitive aspect, necessary to cross the threshold of aesthetic experience" (2009, p. 179, footnote 25). This explanation suffices for understanding our experience with Pollock's creations because it could be argued that although we are gazing at the chaotic-looking display of colors on the canvas, our patternistic mind is actively detecting the underlying order — the discovery of which evokes a barely conscious sigh of relief.

Although Pinker's theory goes far in explaining why we are attracted to certain themes in art, even in the case of abstract patterns in modern art, it does not answer why we are adept pattern recognizers in the first place, why we are drawn to patterns in our environment. Could our pattern recognition capabilities be piggy-backing on top of the "real" evolved feature of human nature? Such a case would be difficult if not impossible to make simply because of the ubiquity of our pattern recognition capabilities. Jackendoff (1994) argues that pattern recognition plays a central role in our abilities in language, vision, and music. And I argue herein that pattern recognition plays some part in aesthetic experience as well.

Jackendoff has argued that the proper way to understand language, visual perception, and even musical acuity, is as complex interactions between innate structures of the mind and environmental stimuli. Jackendoff (1994) defends two of Chomsky's (1956) well-known arguments for (1) mental grammar, which consists of the innate part (our natural endowment for language and the general

[3]And in fact the title of Taylor's *Scientific American* article on Pollock is "Order in Pollock's Chaos."

properties of the mind) and the learned part, and (2) innate knowledge, the notion that the way children learn to talk implies that the human brain contains a genetically entailed specialization for language. Although Jackendoff does not, even in his discussion on vision, comment on our experience with visual art, his fundamental intuitions about the extent to which our capabilities of language, music, and vision depend on innate pattern recognition structures can be extended to our experience of visual art with a little interpretive license.

The notion of mental grammar can be understood as a heuristic used by the mind to enable us to interpret in a meaningful way sentences we have never heard before. It is unlikely that our brain has a "file" of all possible sentences in case we should encounter them in our lifetime, if for no reason other than our brain is of finite size and storage capacity, and the list of all possible sentences is essentially infinite. It is much more plausible that our knowledge consists of the *meanings of words* (the learned part) and the *patterns into which words can be placed* (the innate part).[4]

An important caveat of the concept of mental grammar is that it is subconscious and thus unavailable to us through introspection. It is likely that part of the intrigue and appreciation of a Pollock comes from our responding to the underlying order in his paint splatter creations. The belief that there was no method to Pollock's madness is strengthened by our seeing the artist in action in photographs that depict him as using the full power of his body to wildly and furiously throw paint onto giant canvases which lay on the ground. The following quotation from Isaiah Berlin was not written about Pollock, but could very well have been:

> . . . if everything in nature is living, and if we ourselves are simply its most self-conscious representatives, the function of the artist is to delve within himself, and above all to delve within the dark and the unconscious forces which move within him, and to bring these to consciousness by the most agonising and violent internal struggle. (Berlin, 2000, p. 89)

It is likely that the chaotic overlay of a drip painting, though inherently interesting to some, is not what really draws us in. Rather, our attraction to these peculiar works of art is due to the underlying order that affects our psychological state. If true, this speculation provides the beginning of an explanation for the difficult-to-articulate but intensely felt experience we have when we are moved

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[4]Heuristics represent an important component of this discussion. Through the mechanisms of heuristics, the respondent relies on recognized elements to process new information. These elements, or tags, can be simple as in "noisy" or "red," but can be more highly developed, such as "muddy riverbed" or other evocative phrases or images. Thus when a respondent hears the phrase "snow storm" or hears high winds, the color white might come to mind. Likewise, in the subconscious mind, the recognition of fractal patterns in a Pollock painting evoke an emotional response that identifies elements that are meaningful to the observer.

by a work of visual art. That is, some forms of visual art may affect us in ways that are not available to introspection and thus cannot be made conscious through articulation.

Lavazza (2009, p. 159) explains that, "our appreciation of a work of art is guided by vague and blurred perception of a much more powerful content, of which we are not fully aware." He draws heavily on the dissertation of Bruce Mangan (1991) in which Mangan stresses that two features in particular of aesthetic experience had already been identified in ancient Greece: a sense of unity and its ineffable quality. The ineffable quality of Pollock's drip paintings has already been addressed. And the concept of unity that Mangan identifies, I believe, is related to the viewer's vague sense of the underlying order within a Pollock painting.

The second of Jackendoff's arguments, invoking the existence of an innate human specialization for language, seems especially compelling since humans are the only ones who use language.[5] According to Jackendoff's theory, our language abilities are transferred genetically like any biological trait except they are specific to our species because their instantiation depends on a particular brain structure. This assertion may partly account for the failure of artificial intelligence (AI) efforts to produce a computer program that can convincingly carry on a casual conversation. While computers are very good at pattern recognition (and were in fact developed for just that purpose, as code-breaking machines in World War II), they are nevertheless poor at learning or imitating human language, which depends on pattern recognition. A plausible explanation for this paradox is that since we do not yet have an explicit account of how humans exploit patterns that are innate in our cognitive architecture, it is not yet possible for us to simulate the process effectively in computers. And in the meantime, no matter how much vocabulary we stuff into a program, an AI system does not have the advantage of innate patterns to tell it *what makes sense* linguistically and it is not easy to see how such a feature, which evolved in humans over much time, could be built into such a system.

Recursive Patterns

Computer scientist (and father of the artificial life research program) Christopher Langton (1989) has noted that the different types of Lindenmayer systems used in artificial life programming very closely resemble the formal grammars delineated in Chomsky's theory of language. Lindenmayer systems are programs consisting of a small set of simple replacement rules that are applied recursively to generate complex structures (the computer simulated tree

[5]Jackendoff, I think rightly for this discussion, demarcates animal communication from human language.

in Figure 2 is one such example). The formal similarity noted between Lindenmayer systems and natural language suggests that our innate linguistic patterns might also be recursive in nature, wherein formal rules general enough to generate and interpret a language without recourse to specific cases are applied again and again.

There is insufficient human memory to account for every possible case; what progress was made in AI with the use of general heuristics instead of specific case algorithms gives credence to this observation. If cognition does depend heavily on innate pattern recognition capabilities that are recursive in nature, then it is not surprising that we would be especially attuned to identifying, even subconsciously, recursive patterns in the world, such as the fractal patterns in Pollock's drip paintings.

Certainly one can find countless examples where the ability to recognize patterns had particular advantages that facilitated, if not ensured, our survival — think for instance of early celestial navigation where a good working knowledge of the changing configurations of the stars was crucial. Our being embedded in a world full of patterns, the recognition of which has been crucial to our survival as a species, explains why we are so adept at recognizing patterns in nature and, much more recently, creating them with computers. Figure 5 compares three different kinds of systems (evolved, mathematical, and human-created) in terms of the innateness of their patterns. But there is a deeper explanation for our inherent pattern recognition capabilities that is not so obvious and yet is sug-

Patterns	Are they fractal or recursive?	Are they innate?
In the mind	Patterns are applied recursively to generate unlimited sentences	Yes
Lindenmayer systems	Recursive rules produce fractal structures	Yes, in the program
Pollock drip paintings	Recursive painting technique created fractal patterns	Yes (I argue)

Figure 5: Comparison chart of patterns inherent in human artifacts and innate in human cognitive architecture.

gested by our evolutionary history, which is this: because we evolved in and emerged out of the natural world which exploits the recursive use of sets of patterns to achieve unlimited complexity, we should expect to find at least some of the natural world's patterns embodied in us.

Patterns in Body and Brain

Gregory Bateson used the phrase "the pattern which connects" (1979, p. 8) to capture a broad, philosophical, and biological concept of a grand pattern connecting all living things, and he defined the term *aesthetic* as one's being responsive to this theoretical meta-pattern. Though Bateson focused on, for example, how crabs are related to lobsters in that their symmetries and relations among corresponding parts are encompassed in a crustacean meta-pattern, as well as how crustaceans are related to humans in an even broader biological meta-pattern, etc., many of Bateson's intuitions about how we identify and respond to patterns in nature hold true in the present context.

Taylor's research has shown that humans subconsciously respond to obscure meta-patterns in Pollock's paintings that are ubiquitous in nature as well as in the structure and function of human mindedness. However, this subconscious response to patterns is very different from Bateson's exercises of examining and comparing crabs and lobsters: in the case of humans observing Pollock's hidden patterns, the identification is below the level of conscious awareness and, thus, a resonance is sensed between observer and observed, but such resonance is inherently difficult if not impossible to articulate.

Alan Turing (1952) introduced what is now called the reaction-diffusion model, employed in artificial life simulations to generate simple but lifelike forms and patterns. The basic idea in Turing's original formulation of the idealized mechanism was that chemicals in the organism act as catalysts for the unfolding of the phenotype, wherein different spatial patterns (tubes, curves, indentations, spirals, etc.) are effected by different chemicals reacting with one another. On this account then, the end result, the adult organism, can be thought of as the expression of the sum total of patterns encoded in the genotype.

Mandelbrot is known to have speculated that Purkinje cells of the cerebellum are fractal in nature. There is a notable visual similarity between the branching structure of neurons and that of computer images generated with recursive pattern algorithms (for an example of this see the Lindenmayer system in Figure 2). The neuroscientist Andras Pellionisz (1989) built a computer model of two million brain cells to test his hypothesis that the Purkinje brain cells were not just fractal in appearance, but were actually so in function. He noted that there simply was not enough information in the human genome to specify the massive number of neurons in the cerebellum, and he speculated that some sort of "compression algorithm" must be exploited by nature in building the brain.

Pellionisz hypothesized that different brain cell types resulted from repetitive execution of certain genetic code sequences. Generally considered to be the main contribution of Pellionisz's thesis is the empirical evidence it provides for his theory that the study and application of fractal sets will elucidate certain aspects of morphogenesis.

More recently, work in neurobiology has exploded in the area of neural patterning or neural grouping, and overall grand-scale neural dynamics. Swan and Goldberg (2010b) developed an account of what they call "brain-objects" which are identifiable and repeatable patterns of neural activity occurring in conjunction with particular environmental stimuli (e.g., neural pattern A corresponds to a green traffic light and neural pattern B corresponds to a red traffic light). Their account of brain-objects is based on current research in neuroscience on the rat somatosensory system conducted by Nicolelis (2008; Nicolelis and Ribeiro, 2006) who identifies "neural assemblies" or "neural ensembles" and uses these terms in essentially the same way Swan and Goldberg use brain-object.

What is significant about recent research in neural dynamics in the context of this paper is that although the recorded brain activity of an organism engaged in a task appears to be wildly chaotic and random, it is not; neural activity consistently arranges itself into identifiable and repeatable patterns which are the neurobiological substrate of mental representation. For example, my understanding of the concept "red traffic light" is literally grounded in my brain by a particular pattern of neural activity that is instantiated every time I encounter or think about a red traffic light.

Similar notions abound in the mind sciences literature. Edelman (1987, p. 6) gives an extensive elaboration of a population model of neuronal activity that he calls the theory of neuronal group selection. Edelman explains that ensembles of neurons, or "neuronal groups," were dynamically selected from large networks of neurons. Successful selection of a neuronal group from tens of thousands of neurons in a network is dependent upon altering the synaptic efficacies among neurons in the network "so that there is an increased probability of their response to similar or identical signals," such as additional red or green traffic lights. These selected neuronal groups are composed of hundreds or thousands of strongly interconnected neurons that act as functional units and are correlated with signals from the environment. In essence, though there are billions of neurons in the brain, and a constant, seemingly random and chaotic flurry of neural activity when the organism is awake and active (and is never totally absent, even in sleep), this neural activity arranges itself into consistent and repeatable patterns that represent features of the environment that enable the organism to make sense of its world and survive. There is order in the disorder.

A closely related concept is Waddington's (1957) *chreods* — useful and well-worn neural pathways found in actional, mental, and symbolic operations. These neural tracks, for Waddington, were associated with goal-oriented behavioral tendencies that are played out in concrete circumstances. The neural pathways are established by the organism's repeatedly receiving a certain stimulus. If the stimulus remains about the same in location and intensity, if it is repeated often enough, and if it requires a survival-enhancing response by the organism, then a chreod will be established in the neurobiological substrate. Chreods, in the context of this paper, constitute yet another example from the history of psychology of conceptualizing how the brain has the ability to produce ordered thought, language, and behavior from a substrate of seemingly chaotic and random neural activity.

The foregoing examples from philosophy of mind, psychology, neuroscience, and computer science are invoked for what light they shed on the hypothesis that the brain itself employs patterns (both in structure and in function) to make sense of the world, and that, given this particular disposition, it stands to reason that the human brain would be drawn to instances of visual art that give it the opportunity to make order out of disorder, an opportunity that is made especially salient by a Pollock drip painting. Given the broad responses already attributable to recognition of fractal patterns in other sensory spectra such as memory, taste, and language, it is plausible to hypothesize by extension that different visual cues exploited in other types of abstract art trigger other fundamental cognitive mechanisms, thus producing a prelinguistic, felt quality constituting some form of aesthetic experience.

Conclusion

In this paper I have argued that a naturalistic explanation of some types of aesthetic experience is possible, and offered a speculative hypothesis as to why such experiences might affect us in ways that seem ineffable. As suggested by Wheeler (1996) in his observation that traditional cognitive science lacks the tools to account for aesthetic experience, the effect that a work of art has on us is a dynamic interaction between self and world. Lavazza (2009, p. 174) explains it simply: “The aesthetic experience is a consequence of our basic cognitive mechanisms.” We witness on a physical level, in Pollock's drip paintings, the invisible patterns at work in his, and more generally speaking, in human, consciousness.

What and how we experience a thing has a lot to do with what we *bring to* the experience. Our innate, embodied patterns and their recursive application not only in our organic development but also in our everyday thought, language and behavior enable us to process the unlimited variety of experiences we encounter, including our apperception of art that moves us in a seemingly infinite variety of ways. As Lavazza puts it, “An artifact ‘works,’ is ‘successful’ if its component parts integrate in line with the way our perceptive cognitive processes work” (2009, p. 171). This is an insight that Kant would have endorsed, I believe, since it is reminiscent of a transcendental connection between the structure of our mind and the structure of the world, the interaction of which creates an experiential resonance that can in certain instances, such as in aesthetic appreciation, feel familiar or right as when something clicks into place, but is just out of the reach of direct conscious awareness.

The idea that the human mind is ontologically continuous with the rest of the natural world is not new, yet perhaps more deeply explicated in the context of the themes explored herein.[6] If mindedness is an enriched facet of life, a thesis that is held by the concept of strong continuity, then it makes sense that our ability to identify and recreate natural patterns follows from our being a physical phenotypical instantiation of the patterns encoded in human DNA, the very codes that direct the development of our brains. In essence, we are good at recognizing patterns because we are composed of patterns from the ground up, so to speak. And thus our being moved beyond words by a work of art such as a Pollock drip painting is less an instance of our reacting to the world *out there* and more one of our responding to patterns embodied *in us*.

I conclude with an explanation of the paper's title, "Deep Naturalism." There is a long history in the philosophy of mind of attempts to "naturalize" the mind, which usually takes the form of describing various aspects of human mindedness in terms that other philosophers have deemed "naturalistic." As a result, many projects aimed at a naturalistic account of mind wind up being just as abstract and removed from the natural world as accounts that are not intended to be naturalistic. I believe naturalism in the philosophy of mind needs to aim much deeper — to an understanding of how human structure and function evolved from the structure and function of the natural world.

What I have attempted to do in this paper is explain one aspect of human mindedness — aesthetic experience — in a way that is consistent with the natural history of mind. We evolved in a world that is replete with patterns, and thus we should expect to find some of these patterns embodied within us. And furthermore, becoming aware of the fact that we embody patterns from the natural world goes some distance in explaining why our encounters with such patterns — whether in nature or in works of art — strikes a resonance between us and what we observe. And this very fundamental resonance, in the many different forms it can manifest in human experience, begins to explain that felt but seldom articulated dimension of aesthetic experience.

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[6]See for example, Godfrey–Smith (1994), Wheeler (1997), Stillwaggon (2005), and Swan and Goldberg (2010a).

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