

“Aesthetic Primitives”: Fundamental Biological Elements of a Naturalistic Aesthetics

Ellen Dissanayake

In the last fifteen years or so, researchers in neuroscience, evolutionary psychology, and cognitive science have turned their attention to art and aesthetics. There are now recognized sub-fields called neuroaesthetics and evolutionary aesthetics¹, and books and articles by cognitive scientists have appeared concerning, for example, «the artful mind» (Turner [2006]) and «the aesthetic faculty» (Deacon [2006]).

Although I welcome the interest of scientists and social scientists in such an important and widespread area of human behavior – art making and appreciation – I find in general that their pronouncements are peculiarly unsatisfying to someone like myself who has been concerned with the arts (of all kinds) in all times and places, including the evolutionary past, and with exploring their universality and probable adaptive value.

Although neuroaesthetics, evolutionary aesthetics, and cognitive aesthetics are based in biology and human evolutionary history, many of their studies use works of recent European art – not the arts of premodern or ancestral groups – to illustrate what art is and how aesthetic experiencing works. In these studies, the two subjects («art» and «aesthetics»), as used, frequently have fuzzy boundaries and are often not defined. The terms may be used interchangeably, or «aesthetics» (used as a psychological term to refer to preferences or choices) is assumed to have relevance to «art», even though, as Brown and Dissanayake (2009) have phrased it: «Art is more than aesthetics and aesthetics is more than art».

¹ Neuroaesthetics identifies aesthetic functions and investigates their neurobiological causes (Skov, Vartanian [2009]: 3); evolutionary aesthetics describes preferences that shape behavioral choices and guide us to adaptive ends (Grammer, Volland [2003]).

That is to say, the complex and controversial referents of the modern label «art» (whether making or experiencing it) are broader and richer than the preferences described by evolutionary psychologists or the «aesthetic» features discovered by neuroscientists. And «aesthetics», as addressed by psychologists and scientists in general, is broader than any category of art phenomena, since it applies to choices and preferences about anything we perceive – things that may have nothing to do with art.

A serious omission in these new fields is that for the most part, the aesthetic experience and art behavior of pre-modern (and ancestral) humans is not part of the discourse, even though these people and societies comprise the vast majority of humans to have practiced art behaviors and to have responded (aesthetically or in other ways) to arts. Additionally, the cognitive and linguistic bias of these fields typically disregards the importance of emotion (affect) and emotional communication in art making and response. As a result, I have found that their writings insufficiently appreciate nonverbal or preverbal, nonsymbolic or presymbolic, intermodal, participative, affinitive, and intersubjective aspects of aesthetic experience and art behavior (Dissanayake [2009]; Franzini, this volume).

In this chapter, I do not deal in detail with these problems that pervade neuro-, evolutionary, and cognitive approaches to aesthetics. Taking another tack, I offer a preliminary but promising new approach to developing a naturalistic aesthetics.

1. What Is a Naturalistic Aesthetics?

Recent discoveries in genetics, human evolution, evolutionary psychology, paleoarchaeology, and neuroscience call for new approaches to traditional philosophical subjects such as metaphysics (being, the mind), epistemology (knowledge), ethics (morality), and aesthetics (beauty, value, judgment, taste) that historically have been addressed with what might be called «top down» (mentalistic, analytic, and linguistic) methods.

In this paper, I describe a «bottom up» approach – building upon the findings of the fields mentioned above as well as behavioral biology (ethology) and ethnographic knowledge about the arts in premodern and prehistoric societies. I believe that all these subject areas are important in understanding why humans first made and responded to the arts. With a naturalistic approach, it is possible to consider anew questions such as

what is art? where did it come from? what is aesthetic experience? what is good art? is art important? are there universals in art or aesthetic experience²?

I begin by suggesting seven overlapping premises (or axioms) that underlie a «bottom-up» approach to human art and aesthetics.

1. A naturalistic aesthetics begins with biology, the recognition that *needs for survival and reproduction* have shaped human bodies and minds – our physiology, psychology, and behavior – as they have for every living creature.

2. Anthropology and archaeology contribute to the recognition that all humans alive today and from ca. 200 thousand years ago are *members of the same genus, Homo*. Raised from infancy in any culture, any modern human would grow up to be a participating member, accepting the values and customs of that culture, including their making and experiencing arts³.

3. Adult psychology and experience grow from and build upon *inborn motives and preferences*. Although all humans are cultural creatures, being acculturated is a requirement of their biology: becoming cultural is biologically predisposed.

4. Traditional aesthetics has historically emphasized aesthetic *experience* more than making or physically participating in art – that is, «aesthetics» has often referred to a private, essentially passive «mental» experience. A naturalistic view will treat art as *an adaptive or evolved behavior*, a universal predisposition, such as mother-infant attachment, play, courtship, adult pair or group bonding, and language. Aesthetic behavior (as an overarching term) is concerned with appreciation as reception (perceptual, emotional, cognitive) but also includes art making and participation. On the other hand, the abstract category «art», referring vaguely to works or objects with qualities such as beauty or skill or creativity, is a «top-down» attribution that is not helpful to a naturalistic aesthetics that is concerned with an evolved behavioral predisposition.

5. Evolved behaviors (actions) arise, like other biological processes, from brain activity whose biological purpose is to motivate and reward appropriate responses – to

² Such a reformulation does not imply that traditional aesthetics is irrelevant or unimportant. Some individual subjects (e.g., criticism of individual works within a specific local or historical tradition) will not require the long viewpoint described here.

³ I am aware that epigenetic and other factors (Jablonka, Lamb [2006]) within the last ten thousand years have contributed to genetic changes in physiology (e.g., ability in some to digest cow's milk). However, significant changes to brain circuitry, cognition, social temperament (Churchland [2011]: 21), and emotions that motivate and reward nurturance, sociability, need for others, play, and so forth. (Panksepp [1998]) cannot be easily altered in a social animal such as ourselves.

things that are good (positive) or bad (negative) for us. The «top down», «mental» analyses of traditional aesthetics are replaced by knowledge of «*bottom up*» *experience that is at once behavioral, cognitive, and emotional*. A «behavior» of caretaking of infants is an *evolved capacity* for performing various activities (suckling, holding, cuddling, rocking, reassuring, protecting, comforting) in response to specific emotional and cognitive experience (witnessing tears or hearing cries of distress, feeling tenderness and love). Similarly, a behavior of art can be conceptualized as an evolved capacity for performing various activities in response to specific emotional and cognitive experience (see «Why is art important?» below).

6. Because art behavior occurs in all known cultures, it is reasonable to assume that *this proclivity is universal* (that is, biologically predisposed) in all members of the species (which is implied in calling it «adaptive», as in Axiom 4)⁴.

7. Neuroscientists sometimes use the term «primitives» to describe basic elements of perceptual (psychosensory) experience in any sense modality. Insofar as aesthetic behavior, as described in this paper, includes art making and participation as well as aesthetic experience and appreciation, I propose additional *somatic* and *behavioral* primitives that are also fundamental to aesthetic behavior⁵.

2. Psychosensory "Primitives"

Neuroscientists have identified the primary visual cortex (Area VI) as the part of the brain that seeks out the most basic kinds of visual information – straight lines, edges, contours (curves, right angles), and dots, which provide evidence for actual solid bodies in the world (Hodgson [2006]). In the next major area (V2), these basic features are assembled into coherent shapes. Processing past this point produces more sophisticated aspects of visual perception, such as separating an image from its background, providing color, movement, and so forth (Hodgson [2006]: 56). Similar separate «primitives» in the auditory cortex become the building blocks of hearing natural and other sounds, speech, and music.

⁴ This is not the place to describe Darwinian theory or the processes of adaptation or selection. Interested readers are invited to read various summaries of evolutionary theory and adaptive explanations of art (e.g., Boyd *et al.* [2010]: 1-122; Dissanayake [2008]).

⁵ Somatic and behavioral primitives, as described in this article, are not neurologically as «basic» as psychosensory primitives. I use the term «primitives» to indicate that they are nevertheless fundamental evolved elements that predispose humans to «aesthetic behavior» – that is, to participate in art making and to respond to the arts of others.

One might think of *Gestalts* as a kind of psychosensory primitive in visual and aural modalities, as they are immediate and satisfying to perception and cognition – elements such as conciseness, proximity, similarity, continuity in time and space, conjoint spatial or temporal movement – as in the visual complexities of Balinese painting or the aural «carpet» of temporally-experienced rhythms or sounds in Balinese (or Central African) music (Apfelauer [2011]), and so forth.

Humans are also predisposed to respond to colors and their easily learned associations, which are sometimes near-universal – e.g., red with blood, white with milk or purity, black with death (e.g., Fernandez [1973]) or the dynamics of sound and their emotional associations (e.g., low or high pitch, faint, loud, looming, piercing, soothing, accelerating, slow, and so forth).

Our brains have evolved to perceive in this manner so that we can make sense of what we see, hear, and otherwise experience. Some strong percepts travel directly to the amygdala in the lower brain, causing an emotional response before the «executive» brain in the frontal lobes can analyze and identify the context and meaning. Their biological purpose is to make us respond appropriately – that is, positively or negatively – to things that are good or bad for us. They direct us to affordances (Gibson [1979]), those things in our physical and social environments that we need to seek out and pay attention to in order to survive⁶.

Scholars of neuroaesthetics describe how perceptual primitives underlie our appreciation of visual art (Hodgson [2000, 2006, 2013]; Solso [1994]; Ramachandran and Hirstein [1999]; Zeki [1999]; Volland and Grammer [2003]; Verpooten and Nelissen [2012]). Neuroscientist Derek Hodgson (2006), for example, proposes that primitives may appeal to us aesthetically because, as inherent features of the brain, they come to connote what has been safe, secure, and understood; they provide order in the midst of disorder; and they convey a sense of pattern and harmony in the midst of the chaos and confusion of nature. Certainly features such as straight lines, edges, contours, geometric shapes, and contrast attract attention, give cognitive satisfaction, and can be used or «parasitized» (Hodgson [2012]) by artists.

We should not forget, however, that perceptual or psychosensory primitives underlie our identification and appreciation of *any* complex visual stimulus and such studies do not make clear how, for instance, neurovisual resonance (Hodgson [2006]) to a modernist abstract painting is different from looking at a window, dart board, row of

⁶ Other creatures (e.g., frogs, birds, insects) have different wavelengths of light and sound to which they immediately respond with reference to their own biological affordances.

telephone poles, or a line drawing illustration from a catalogue of machine parts. Primitives are not art, but *ingredients* of art. To be «art», something more has to be done to them.

Scholars in evolutionary aesthetics (e.g., Miller [2000, 2001]; Thornhill [2003]) similarly claim aesthetic relevance to our evolved *preferences* for discrete traits or actions in the service of adaptive choices of mates or habitats. I do not find that these views contribute much to a *philosophical* understanding of *art*, noting that like perceptual primitives, signals in landscapes or mates (or anything else) that indicate adaptive value are aesthetic only in the rudimentary sense that our brains are predisposed to be attracted immediately to them. Again, they are ingredients of art, but require further «operations» that make them art.

Costly signaling (e.g., Miller [2000, 2001]; Voland [2003]) is a concept from evolutionary psychology and evolutionary aesthetics, derived from the theory of sexual selection (Darwin [1871]). It has to do with *high degrees of beauty, skill, or virtuosity*, displayed by males, which immediately attract the attention of females for mating. The *Ur*-example is of the peacock where only a very fit male can bear the physiological cost of maintaining and erecting a splendid, heavy tail or the physical handicap of dragging such an impediment around, not to mention the hazard of evading predators. By analogy, art behavior in humans is sometimes called «costly» because it requires time, energy, and material resources and does not obviously appear to contribute to primary survival. However, the concept of costly signaling can be applied to many contexts, not only art. Evolutionary aesthetics does not suggest how an art context is different from a sports or debating context nor does it account for the observation that art behavior, like language (another adaptation) is adaptive for everyone, not just a few superior males who use it competitively.

3. Other "Bottom-Up" Primitives

To my knowledge, neither neuroaesthetics nor evolutionary aesthetics has addressed other kinds of fundamental feeling states and early-developing activities that contribute – even more than psychosensory primitives—to adult experience of the arts. Some somatic states inherent in bodily life and some infant and child behaviors that arise developmentally could also be considered as primitives. Like psychosensory primitives, they are not only noteworthy elements in aesthetic behavior and experience, but also occur in non-aesthetic perception and behavior. Unfortunately, in a short article there is only space to mention, but not fully describe, these.

4. Somatic Primitives

In *The Corporeal Turn* (2009), American interdisciplinary philosopher Maxine Sheets-Johnstone has collected her writings over forty years that integrate phenomenology with ontogeny and phylogeny. Her development of provocative ideas such as animation, thinking in movement, kinetic qualia, and corporeal consciousness, among others, describe primitives of the body and bodily life that are fundamental to formulating a naturalistic aesthetics. Her discussion of the term «embodied» as «a lexical band-aid covering a three-hundred-fifty-year-old wound generated and kept suppurating by a schizoid metaphysics» (p. 215) is just one of many provocative calls for a new «bottom up» way of thinking about unified body-mind experience and activity, especially prominent in the arts.

Developmental psychologist Daniel Stern (1999, 2010) has described what he calls «vitality affects» in infants – feeling states that result from movement, dynamics, and temporal progression of experiences that can be captured by words such as «surging», «fading away», «fleeting», «exploding», «effortful», «accelerating», «decelerating», «climaxing», «bursting», and «drawn out» (1999: 68), terms that can be applied to several sensory modalities. In a similar vein, psychologist Howard Gardner (1972, 1973) in his early work, described somatic experiential states of infants, calling them modes and vectors (see also discussion in Dissanayake [1988]: 145-148), and I have more recently called comparable bodily states rhythms and modes (Dissanayake [2000]: 6-7). At least some experiencers of art will probably recognize unverbalizable states or associations like these as relevant in their responses to works of art⁷.

5. Behavioral Primitives

In addition to psychosensory and somatic primitives I suggest that there are evolved *behavioral* primitives that predispose us to participate in and respond *proto-aesthetically* to formal attributes in visual, vocal, gestural, and literary artifacts. These in themselves are not art or aesthetic responses but predispositions that are used in art behavior.

One is the ability to *entrain* – to keep time to an external pulse (Phillips-Silver and Keller [2012]; Phillips-Silver *et al.* [2010]), which can be observed in some young children

⁷ Philosopher Susanne Langer famously said that music is the tonal analogue of emotive life (Langer [1953]: 27), echoing a remark attributed to Princeton philosopher of art, Carroll Pratt («music sounds the way emotions feel»). For a critique of Stern's concept of vitality affects, see Kjøppe, Harder, Væver (2008).

as early as two and a half years when encouraged by actions such as practicing drumming with a social partner (Kirschner and Tomasello [2008]). The capacity to entrain, absent in other mammals, enables humans to move synchronically with other people as in dance and song, and to detect manipulations of a beat, setting up expectations that may be used or experienced aesthetically.

Another behavioral primitive is the predisposition in young children to *draw and make marks*. Universally, this proclivity follows a sequential course of making circular motions, dots, and scribbles with the whole arm, then more controlled scribbles from which emerge forms that resemble visual primitives and their combinations⁸. These include deliberate circular forms, meanders, straight lines (horizontal, vertical, diagonal), sets of parallel lines and crossed lines, arcs, radials, spirals, and geometric shapes in an infinite variety of arrangements and constructions that seem to indicate «a kind of universal, innate visual grammar» (Engle in jacket comment for Fein [1993], see also Fein [1993]). Eventually, with adult encouragement, children use these basic elements to draw figurative objects – people, animals, and objects in the environment such as houses or vehicles. It is interesting to observe that children's earliest marks are much the same as the earliest known human marks on small pieces of ochre or broken fragments of ostrich egg shell containers made seventy to a hundred thousand years ago (Dissanayake [2014]).

Moving one's body regularly to an external pulse and using one's hand and fingers to make marks with an implement on a surface are activities that are pleasurable and satisfying. They often look like play, which, as a category, might also be called a behavioral primitive that easily merges into art and aesthetic behavior, whether it be motor, social, linguistic, or imaginative. In all its variety, in every child, play behavior appears without being taught.

Another behavioral primitive that has not received the recognition and study that it deserves requires description: what I have called «making special» and, more recently, «artification» – the two terms can be used interchangeably. A brief outline of this behavioral proclivity follows.

6. *Making Special ("Artification")*

From at least two hundred and fifty thousand years ago, the archaeological record indicates that species of *Homo* showed a capacity to deliberately make ordinary things

⁸ The forms that emerge in children's earliest scribbling are also remarkably similar to drawings of phosphenes of adults (Kellogg, Knoll, Kugler [1965]).

in the world extra-ordinary or «special». Natural surroundings (cave walls, rock outcroppings, boulders, small pieces of stone), common artifacts (e.g., tools), and probably ordinary bodies (skin, hair) were made special with engraved or painted marks. It is likely that special vocalizations (called by us, song) and movements (dance) also occurred at least this early, although they leave no material trace.

Before deliberately making something special, it is necessary to recognize specialness. An example of this ability in early hominins is evident at least as early as 285,000 years ago in the attraction to red ochre pigment (McBrearty [2001]: 92). Although recognizing specialness is not necessarily aesthetic or artful – any animal can recognize that something departs from habitual or familiar experience – early *Homo* (from at least 250 thousand years ago) seems to have noticed unusual minerals, stones, and fossils, picked them up, and transported them to their dwellings (Dissanayake [1988]: 96-97; Oakley [1973])⁹. Also at this early date, there are at least two known instances in which a stone tool was fashioned with an already embedded fossil in a central position, as well as a number of sites with hammered cup-shaped depressions on stone surfaces. By at least 100,000 years ago, humans were regularly using ochre pigment (Henshilwood *et al.* [2011]) and by 77,000 years ago pierced marine shell beads (Vanhaeren *et al.* [2006]), to make their bodies, possessions, and surroundings special.

7. *The Evolutionary Origin of Making Special (Artification)*

My hypothesis of the evolutionary origin of artification is difficult to summarize briefly and it requires some knowledge of several subjects that are often unfamiliar to philosophers of art – human evolutionary history, the process of ritualization in certain bird species, human ethology, cognitive archaeology, the neuroscience of affiliation, developmental psychology of infants, and the phenomenon of exaptation as a variant of adaptation. By synthesizing knowledge from these fields, I have developed a hypothesis that the «aesthetic» behaviors or predispositions of artification were exaptations from earlier adaptive behaviors that contributed to survival and reproductive success in the evolution of *Homo sapiens* and possibly earlier hominins.

⁹ The behavior seems to resemble that of contemporary pack rats or jackdaws, who are innately attracted to shiny things that they pick up and carry to their nests. However, we don't know what objects attracted these animals before aluminum foil and other manmade material became available.

I trace the phylogenetic origin of making special in humans to consequences of two early adaptations in human evolution. The first is bipedality (e.g., Potts [1996]). Numerous anatomical adaptations were required over several million years of evolution to convert a quadrupedal knuckle-walker into an upright strider¹⁰.

A second significant trait, brain enlargement, began about two and a half million years ago with the emergence of the genus *Homo*. By the time of *Homo habilis*, between two million and one-and-a-half million years ago, the brain had doubled in size from that of earlier four-legged forms. Another spurt of brain growth and doubling of size occurred around a half million to two hundred thousand years ago (Mithen [1996]: 11)¹¹.

Among the anatomical changes required by bipedality was a reshaped pelvis that became shortened from top to bottom and broadened from fore to rear in order to center the trunk over the hip joints and thereby reduce fatigue during upright bipedal locomotion (Klein and Edgar [2002]: 52-53). This reconfiguration secondarily resulted in a serious obstetric problem – giving birth to an increasingly large-brained baby through an increasingly narrowed birth canal¹². Further anatomical adaptations addressed this difficulty¹³, and the period of gestation became reduced, thereby ensuring a smaller infant head.

To conform to the general primate pattern, human babies should be born at around 18 months (Tomasello [2003]). After only nine months gestation, they are extremely helpless at birth and for several years thereafter (Falk [2009]), requiring intensive maternal care. I have proposed that another important *behavioral* adaptation helped to ensure this essential care: interactive behaviors between infant and mother that created an emotional bond. The behaviors include special vocalizations, facial expressions, and

¹⁰ For example, the spine was reshaped and the opening of the spinal cord relocated, the lower limbs and feet altered, joint surfaces reconfigured, body musculature reshaped, and the rib cage (and even the tiny bones of the inner ear) were reconstructed.

¹¹ Bailey and Geary (2009) provide strong empirical evidence that human cranial capacity increased systematically with population density that led to competition between groups. Neural/behavioral mechanisms to increase cooperation *within* these competing groups would have been advantageous. (See «Why is Art Important?» in Conclusion, below).

¹² *H. ergaster* had a narrower pelvis than its predecessor, *H. habilis*, in which rapid brain expansion was occurring between two to three million years ago (Wade [2006]: 18-22). «Turkana Lad», a specimen of *H. erectus* of 1.6 million years ago, also has a narrow pelvis (Falk [2009]: 51).

¹³ Anatomical changes included a female pubic symphysis that separates slightly during childbirth; a neonate skull that is compressible at birth; and alteration of the timing of the infant's brain growth: in the first four years, it becomes three times larger than at birth (Portmann [1941]).

head and body movements directed by mothers to infants, who are born ready to respond to these signals and even to elicit them.

These bonding behaviors are all derived from universal adult signals of friendliness and accord, as described by psychotherapists and ethologists (Grant [1968, 1972]; Eibl-Eibesfeldt [1989]): Look At and Open Eyes express interest; Raised Eyebrows and Backward and Upward Head Lift indicate familiarity; Head Nods show agreeableness; Open Mouth or Smile show receptivity, pleasure, liking, and appeasement; Mutual Gaze displays intimacy, Soft Melodious Voice, non-threat or submission, and Touch, Stroke, Pat, Hug, and Kiss are physical gestures of sympathy and devotion. When used by mothers with infants, however, all these ordinary visual, vocal, and gestural signals of affinity are made distinctive or special. They are simplified or formalized (sustained and stereotyped), exaggerated (e.g., enlarged) and repeated, often with dynamic variation and elaboration (made louder, softer, faster, slower, larger, smaller). Also unlike their precursors, they are used only with infants (and, after wild animals were domesticated, some child-substitutes, pets). As infants mature, they become bored with the soothing pace of their early months and desire to engage in games such as Peek-A-Boo or This Little Piggy, in which the mother uses these signals to manipulate the infant's expectation within a shared temporal continuum.

Although mother and baby are simply enjoying each other's company, awash in loving feelings, the mother's emphatic signals of friendly interest are, unknown to her, reinforcing her brain's neural circuits for affiliation and devotion and augmenting the release in her brain of prosocial hormones that foster maternal behavior in all mammals (Panksepp [1998]). Making these signals thereby ensures that she will want to care for a demanding, helpless creature for months and years¹⁴. Compared to mothers who did not make emphatic affiliative signals that reinforced such devotion, an interactive mother was more likely to have reproductive success. By eliciting such signals from its mother and encouraging her to keep making them, an interactive baby, compared with less responsive infants, inadvertently helped to ensure maternal care and therefore its own continuing survival.

I consider this dyadic interaction to be a behavioral adaptation in hominins that evolved to address the problem of ensuring continued care of highly altricial infants¹⁵. With minor variations, mother infant interaction as just described can be observed

¹⁴ See Scherer, Zentner (2001) for a description of biofeedback.

¹⁵ The trend toward difficult births and greater infant altriciality was well underway about 1,8 to 1,6my in *H. ergaster* (Falk [2004]: 499; Mithen [2005]) and *H. erectus* (Flinn, Ward [2005]: 31).

worldwide (Dissanayake [1999]: 376-379; Falk [2009]). When such an interaction is absent or unreliable, infants' physical, social, emotional, and cognitive development is compromised – as recently and unfortunately was evinced in emotionally neglected children who had been raised from early weeks or months in some Eastern European orphanages before the break-up of the Soviet Union.

What does this behavioral adaptation from a million years ago have to do with formulating a naturalistic aesthetics today? To answer this, I now introduce another biological, specifically adaptive process in other animals, the ritualization of behavior, which, like mother-infant interaction, uses communicative signals that have been made special.

8. Proto-Aesthetic Devices of Ritualized Behaviors

In the biological process called ritualization, a movement from a practical, ordinary context (say, self-grooming or flapping the wings before flight) becomes altered so that attention is drawn to it, and it then communicates a new social message. No longer does a drake's preening indicate simply cleaning his feathers, but when ritualized, this action means «Notice me: I want to mate with you». Wing-flapping, when ritualized, no longer indicates preparation for flight but means «This is my territory and I will defend it». Ritualized behaviors are typically used in agonistic or cooperative and affiliative contexts.

In its ritualized form, the precursor behavior (such as self-grooming or wing-flapping) has been subjected to various alterations that make it look as well as mean something different from its ordinary functional meaning. These manipulations, or «operations», include (1) simplification or stereotypy, (2) repetition (usually with a «typical intensity» (Morris [1957]), a set regularity and pace), (3) exaggeration in time (longer or shorter, faster or slower), space (larger or smaller, higher or lower), or volume (loud, soft,) (4) elaboration (striking evolved accoutrements of color or form), and (5) manipulation of expectation. These features (which usually overlap) make the signal conspicuous («special») thereby attracting attention, sustaining interest, and arousing, shaping, and molding emotion (Eibl-Eibesfeldt [1989]: 439-440).

Mothers' unusual vocal, facial and kinetic movements to infants can be seen as derived from ordinary adult affiliative signals and are, in essence if not fact, ritualized (Dissanayake [2006]: 38)¹⁶. Adults spontaneously and universally perform these altered,

¹⁶ I have suggested that mother-infant interaction is a ritualized behavior in humans (Dissanayake [2000], [2006]: 38). Ericson ([1976]: 694) calls «the greeting between mother and baby» the

special or more-than-ordinary signals to babies, who demonstrate (with smiles, wriggles, and coos) that they decidedly prefer them to ordinary adult communication.

I suggest that these same alterations of ritualized behaviors (here called «operations») are used by artists to make things special and as such can be thought of, abstractly, as «*aesthetic primitives*», with neural substrates and correlates. In animals and babies, they are not yet «art», rather as the psychosensory, somatic, and behavioral primitives described earlier or the preferences revealed by evolutionary aesthetics are not art. However, they may well become *ingredients* of art – that is, elements that an artifier uses intentionally to make something special. As said earlier, in order to become art, something has to be done to an object, movement, environment, occasion, or theme¹⁷: that is to say, they are artified with the operations just described.

What I have called somatic (body state) and behavioral primitives (capacities to entrain, to make marks, to play, and to artify) have been largely overlooked by biological and evolutionary studies of the arts. Being nonverbal – often unverbalizable – and suffused with emotion, they are difficult to study and even to describe. However, I suggest that they are intrinsic to and should be recognized as essential to any formulation of a naturalistic aesthetics. There may well be other components that I have missed.

9. Answers to Perennial Questions about "Art"

Readers may have noted that mine is a *formal* theory of the nature of art experience and making, as contrasted with an emphasis on *content* (symbolic or thematic subject matter) or *individual and personal expression*. This emphasis on formal aspects derives, I think, from considering art as a behavior of *doing something to ordinary reality* to make it more than ordinary – thereby attracting attention, sustaining interest, and evoking and shaping emotion, *having an effect*. Artification is participative, not only reactive.

In the introduction I listed questions whose answers follow from the axioms of a naturalistic aesthetics and from various somatic and behavioral primitives that easily motivate and influence art making and participation.

«ontogenetically earliest ritualization in man [*sic*]». I have not found any other reference to this behavior as being ritualized.

¹⁷ In stories, innately appealing and biologically important themes that have to do with danger, adventure, triumph over adversity, achieving and maintaining high status, or finding a mate are made special.

What is art? A behavior of art can be conceptualized fundamentally as an evolved capacity (called «artification») for making ordinary reality *extraordinary* or «special», unlike the everyday¹⁸. Perceptual, thematic, bodily, and behavioral primitives are artified by means of «aesthetic operations» (formalization, repetition, exaggeration, elaboration, and manipulation of expectation) in response to biologically-important circumstances in which the artifier has an emotional investment (i.e., cares). I invite skeptical readers to challenge this characterization by naming artworks or art behaviors that do not fit this description.

Where did art come from? (What was its evolutionary origin?) Artification makes use of proto-aesthetic elements or operations that originated in adaptive ancestral mother-infant interactions along with psychosensory, somatic, and behavioral primitives, as described, and the evolved preferences identified in evolutionary aesthetics. In themselves these are not art, but *ingredients of art*.

What is aesthetic experience? Aesthetic experience is a response to what is done to the ordinary subject, object, or their components by means of (proto-aesthetic) operations, not simply a response to the primitives themselves.

What is good art? This is a question for other scholars that I see as depending in large part on cultural contexts. Universal standards for components of various arts such as «good» proportion, beauty of form and color, affecting harmonic progression or melodic contour, and the like are relevant to aesthetic value but beyond the scope of my evolutionary scheme of naturalistic aesthetics as it currently exists.

Why is art important? What does art «do» for people? I trace the origin of intentional artification to early humans' participation in ritual ceremonies. Despite homogeneity and routine, subsistence lives are subject to anxiety about daily sustenance and safety. Uncertainty leads to physiological and neuroendocrine responses that may negatively affect brain development, genetic expression, and other factors necessary to survival and reproduction. But when supportive social ties are in place, these stress responses decrease (Taylor [2002]: 13). The most supportive social tie of all is that between mother and infant (Keverne *et al.* [1999]), and it seems reasonable to suggest that participation in ceremonial arts, which makes use of the mechanisms evolved to enable mother-infant mutuality, would contribute to the coordination, conjunction, and

¹⁸ «Making special» and its five operations are echoed by cognitive scientist Per Aage Brandt (2006) in his use of such words as «specia», «extraordinary», «elaborated», and «excess structure».

emotional reassurance of their adult participants, providing a sense of social support and of coping that ameliorates the deleterious effects of the stress response.

Ceremonial ritual behavior in all human groups is performed primarily at times of transition and uncertainty that concern obtaining or maintaining goods, achieving successful outcomes to ventures, and avoiding threats to well-being. Interestingly, this evolved and adaptive motivation to preserve goods and withstand dangers has resulted in ritual (that is, artfied) behavior in human groups everywhere.

When used in a group's ceremonies, the components of artification (formalization, repetition, exaggeration, elaboration, and manipulation of expectation in visual, vocal, and gestural modalities) possess inherent beneficial neurological effects that relieve anxiety (reduce cortisol), instill confidence and trust (release of oxytocin), and promote group coordination and oneheartedness (release of oxytocin and dopamine). In prehistoric times, neural-behavioral mechanisms to enhance cooperation would have been highly adaptive (see footnote 11).

Today, artification may provide the same results to individuals when making/participating; hence, the benefits of arts therapies, such as the treatment of trauma through neurobiologically-informed *relational* non-verbal communication (Chapman [2014]). Although much contemporary art is often deliberately «conceptual», anarchic, and private, its makers, like their Pleistocene predecessors, continue to artify important things and to make ordinary reality extraordinary.

Are there universals in art or aesthetic experience? Scholars in evolutionary aesthetics, cognitive aesthetics, and neuroaesthetics have described widely-favored natural stimuli (e.g., kinds of textures, body configurations, colors, shapes, and so forth) that are «preferred» – chosen by humans as beautiful or attractive. Aesthetic primitives, introduced and briefly described for the first time here in somatic and behavioral modalities, add further «aesthetic» fundamentals, inherent in early *sapiens*, that influenced their earliest art making and aesthetic responses, as they continue to do today. The existence and persistence of universal aesthetic primitives, along with predisposed aesthetic preferences, contribute to establishing an evolved, adaptive, «bottom-up» or «naturalistic» aesthetics and demonstrate that as we became *Homo sapiens*, we were at the same time *Homo aestheticus*.

Bibliography

Apfelauer, G., 2011: *Singen und Sprechen. Musikwissenschaftlich-linguistische Unterschiede der beiden menschlichen Lautäußerungsformen*, Herbert Utz, München.

- Bailey, D.H., Geary, D.C., 2009: *Hominid brain evolution: testing climatic, ecological, and social competition models*, "Human Nature", 20, pp. 67-79.
- Boyd, B., Carroll, J., Gottschall, J. (eds.), 2010: *Evolution, literature, and film: a reader*, Columbia University Press, New York.
- Brandt, P.A., 2006: *Form and meaning in art*, in M. Turner (ed.), *The artful mind: cognitive science and the riddle of human creativity*, Oxford University Press, Oxford, pp. 171-188.
- Brown, S., Dissanayake, E., 2009: *The arts are more than aesthetics and aesthetics is more than art: neuroaesthetics as narrow aesthetics*, in M. Skov, O. Vartanian (eds.), *Neuroaesthetics*, Baywood, Amityville (NY), pp. 43-57.
- Chapman, L., 2014: *Neurobiologically informed trauma therapy with children and adolescents: understanding mechanisms of change*, Norton, New York.
- Churchland, P.S., 2011: *Braintrust: what neuroscience tells us about morality*, Princeton University Press, Princeton (NJ).
- Darwin, C., 1871: *The descent of man and selection in relation to sex*, Appleton, New York.
- Deacon, T., 2006: *The aesthetic faculty*, in M. Turner (ed.), *The artful mind: cognitive science and the riddle of human creativity*, Oxford University Press, Oxford, pp. 21-53.
- Dissanayake, E., 1988: *What is art for?*, University of Washington Press, Seattle.
- Dissanayake, E., 1999: *Antecedents of musical meaning in the mother-infant dyad*, in B. Cooke, F. Turner (eds.), *Biopoetics: evolutionary explanations in the arts*, Paragon House, New York, pp. 367-397.
- Dissanayake, E., 2000: *Art and intimacy: how the arts began*, University of Washington Press, Seattle.
- Dissanayake, E., 2008: *The arts after Darwin: does art have an origin and adaptive function*, in K. Zijlmans, W. van Damme (eds.), *World art studies: exploring concepts and approaches*, Valiz, Amsterdam, pp. 241-263.
- Dissanayake, E., 2009: *The artification hypothesis and its relevance to cognitive science, evolutionary aesthetics, and neuroaesthetics*, "Cognitive Semiotics", 5, pp. 136-158.
- Dissanayake, E., 2014: *A bona fide ethological view of art: the artification hypothesis*, in W. Schiefenhövel, C. Sütterlin, G. Apfelauer (eds.), *Art as behaviour: An ethological approach to visual and verbal art, music and architecture*, Hanse Studies, BIS-Verlag, Oldenburg, pp. 43-62.
- Eibl-Eibesfeldt, I., 1989: *Human ethology*, transl. by P. Wiessner-Larsen and A. Heunemann, Aldine de Gruyter, Hawthorne (NY).
- Ericson, E.H., 1976: *Play and actuality*, in J.S. Bruner, A. Jolly, K. Silva (eds.), *Play: its role in development and evolution*, Penguin Books, Harmondsworth, pp. 688-703.

- Falk, D., 2004: *Prelinguistic evolution in hominin mothers and babies: whence motherese?*, "Behavioral and Brain Sciences", 27, 4, pp. 461-503.
- Falk, D., 2009: *Finding our tongues: mothers, Infants, and the origin of language*, Basic Books, New York.
- Fein, S., 1993: *First drawings: genesis of visual thinking*, Exelrod Press, Pleasant Hill, CA.
- Fernandez, J.W., 1973: *The exposition and imposition of order: artistic expression in Fang culture*, in W.L. d'Azevedo (ed.), *The traditional artist in African societies*, Indiana University Press, Bloomington.
- Flinn, M.V., Ward, C.V., 2005: *Evolution of the social child*, in B. Ellis, D. Bjorklund (eds.), *Origins of the social mind: evolutionary psychology and child development*, Guilford, London, pp. 19-44.
- Gardner, H., 1972: *The quest for mind*, Coverture, London.
- Gardner, H., 1973: *The arts and human development*, John Wiley and Sons, New York.
- Gibson, J.J., 1979: *The ecological approach to visual perception*, Houghton-Mifflin, Boston.
- Grammer, K., Voland, E., 2003: *Introduction: from Darwin's thoughts on the sense of beauty to evolutionary aesthetics*, in E. Voland, K. Grammer (eds.), *Evolutionary aesthetics*, Springer, Berlin, pp. 1-5.
- Grant, E.C., 1968: *An ethological description of nonverbal behavior during interviews*, "British Journal of Medical Psychology", 41, pp. 177-183.
- Grant, E.C., 1972: *Nonverbal behavior in the mentally ill*, in R.A. Hinde (ed.), *Nonverbal communication*, Cambridge University Press, Cambridge, pp. 349-358.
- Henshilwood, C., D'Errico, F., Van Niekerk, K., Coquinot, Y., Jacobs, Z., Lauritzen, S-E., Menu, M., Garcia-Moreno, R., 2011: *A 100,000-year-old-ochre-processing-workshop at Blombos Cave, South Africa*, "Science", 334, pp. 219-222.
- Hodgson, D., 2000: *Art, perception, and information processing: an evolutionary perspective*, "Rock Art Research", 17, 1, pp. 3-34.
- Hodgson, D., 2006: *Understanding the origins of paleoart: the neurovisual resonance theory and brain functioning*, "PaleoAnthropology", pp. 54-67:
<http://www.paleoanthro.org/journalcontent/PA20060054.pdf>
- Hodgson, D., 2012: *The parasitic nature of «art»: response to Varella et al. and associated commentaries*, "Rock Art Research", 29, 2, pp. 219-221.
- Hodgson, D., 2013: *Ambiguity, perception, and the first representations*, in K. Sachs-Hombach, J.R.J. Schirra (eds.), *Origins of Pictures*, Herbert von Halem, Köln, pp. 401-423.

- Jablonka, E., Lamb, M.J., 2005: *Evolution in four dimensions: genetic, epigenetic, behavioral, and symbolic variation in the history of life*, The MIT Press, Cambridge (MA).
- Kellogg, R., Knoll, M., Kugler, J., 1965: *Form-similarity between phosphenes of adults and pre-school children's scribbles*, "Nature", 208, 5015, pp. 1129-1130.
- Keverne, E.B., Nevison, C.M., Martel, F.L., 1999: *Early learning and the social bond*, in C.S. Carter, I.I. Lederhendler, B. Kirkpatrick (eds.), *The neurobiology of affiliation*, The MIT Press, Cambridge (MA), pp. 264-73.
- Kirschner, S., Tomasello, M., 2009: *Joint drumming: social context facilitates synchronization in preschool children*, "Journal of Experimental Child Psychology", 102, pp. 299-314.
- Klein, R.B., Edgar, B., 2002: *The dawn of human culture*, Nevaumont and John Wiley and Sons, New York.
- Køppe, S., Harder, S., Væver, M., 2008: *Vitality affects*, "International Forum of Psychoanalysis", 17, pp. 169-179.
- Langer, S., 1953: *Feeling and form*, Scribner, New York.
- McBrearty, S., 2001: *The Middle Pleistocene of East Africa*, in L. Barham, K. Robson-Brown (eds.), *Human roots: Africa and Asia in the Middle Pleistocene*, Western Academic and Specialist Press, Bristol, pp. 81-92.
- Miller, G., 2000: *The mating mind: how sexual choice shaped the evolution of human nature*, Doubleday, New York.
- Miller, G., 2001: *Aesthetic fitness: how sexual selection shaped artistic virtuosity as a fitness indicator and aesthetic preferences as mate choice criteria*, "Bulletin of Psychology and the Arts", 2, 1, pp. 20-25.
- Mithen, S., 1996: *The prehistory of the mind: the cognitive origins of art*, Thames and Hudson, London.
- Mithen, S., 2005: *The singing Neanderthals: the origins of music, language, mind and body*, Weidenfeld and Nicolson, London.
- Morris, D., 1957: «*Typical intensity*» and its relation to the problem of ritualization, "Behaviour", 11, pp. 1-2.
- Oakley, K., 1973: *Fossil shell observed by Acheulian man*, "Antiquity", 47, pp. 59-60.
- Panksepp, J., 1998: *Affective neuroscience: the foundation of animal and human emotions*, Oxford University Press, Oxford.
- Phillips-Silver, J., Keller, P.E., 2011, *Searching for roots of entrainment and joint action in early musical interactions*, "Frontiers in Human Neuroscience" 6, Article 6, February, pp. 1-11.

- Phillips-Silver, J., Aktipis, C.A., Bryant, G.A., 2010: *The ecology of entrainment: foundations of coordinated rhythmic movement*, "Music Perception", 28, pp. 3-14.
- Portmann, A., 1941. *Die Tragzeiten der Primaten und die Dauer der Schwangerschaft beim Menschen: ein Problem der vergleichenden Biologie*, "Revue Suisse de Zoologie", 48, pp. 511-518.
- Potts, R., 1996: *Humanity's descent: the consequences of ecological instability*, William Morrow, New York.
- Ramachandran, V.S., Hirstein, W., 1999: *The science of art: a neurological theory of aesthetic experience*, "Journal of Consciousness Studies", 6, 6, pp. 15-51.
- Scherer, K.R., Zentner, M.R., 2001: *Emotional effects of music: production rules*, in P.N. Juslin, J.A. Sloboda (eds.), *Music and emotion: theory and research*, Oxford University Press, Oxford, pp. 361-392.
- Sheets-Johnstone, M., 2009: *The corporeal turn: an interdisciplinary reader*, Imprint Academic, Exeter, U.K.-Charlottesville, Virginia.
- Skov, M., Vartanian, O., 2009: *Introduction*, in M. Skov, O. Vartanian (eds.), *Neuroaesthetics*, Baywood, Amityville, NY, pp. 1-7.
- Solso, R.L., 1994: *Cognition and the visual arts*, MIT Press, Cambridge, MA.
- Stern, D., 1999: *Vitality contours: the temporal contour of feelings as a basic unit for constructing the infant's social experience*, in P. Rochat (ed.), *Early social cognition: understanding others in the first months of life*, Erlbaum, London, pp. 67-80.
- Stern, D., 2010: *Forms of vitality: exploring dynamic experience in psychology and the arts*, Oxford University Press, New York.
- Taylor, S., 1992: *The tending instinct: how nurturing is essential to who we are and how we live*, Henry Holt, New York.
- Thornhill, R., 2003: *Darwinian aesthetics informs traditional aesthetics*, in E. Voland & K. Grammer (eds.), *Evolutionary aesthetics*, Springer, Berlin, pp. 9-35.
- Tomasello, M.C., 2003: *Recursion as the key to the human mind*, in K. Sterelny, J. Fitness (eds.) *From mating to mentality: evaluating evolutionary psychology*, Psychology Press, New York, pp. 155-172.
- Turner, M., 2006: *The artful mind: cognitive science and the riddle of human creativity*, Oxford University Press, Oxford.
- Vanhaeren, M., d'Errico, F., Stringer, C., James, S.L., Todd, J.A., Mienis, H.K., 2006: *Middle Paleolithic shell beads in Israel and Algeria*, "Science", 312, pp. 1785-1788.
- Verpooten, J., Nelissen, M., 2012: *Sensory exploitation: underestimated in the evolution of art as once in sexual selection theory?*, in K.S. Plaisance, T.A.C. Reydon (eds.), *Philosophy of Behavioral Biology*, "Boston Studies in the Philosophy of Science", 282, pp. 189-216.

Ellen Dissanayake, "Aesthetic Primitives"

Voland, E., 2003: *Aesthetic preferences in the world of artifacts – adaptations for the evaluation of «honest signals»?* in E. Voland, K. Grammer (eds.), *Evolutionary aesthetics*, Springer, Berlin, pp. 239-260

Voland, E., Grammer, K. (eds.), 2003: *Evolutionary aesthetics*, Springer, Berlin.

Wade, N., 2006: *Before the dawn: recovering the lost history of our ancestors*, Penguin Press, New York.

Zeki, S., 1999: *Inner vision: an exploration of art and the brain*, Oxford University Press, Oxford and New York.