



# Roots and Route of the Artification Hypothesis<sup>1</sup>

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## Abstract

Over four decades, my ideas about the arts in human evolution have themselves evolved, from an original notion of art as a human behaviour of “making special” to a full-fledged hypothesis of artification. A summary of the gradual developmental path (or route) of the hypothesis, based on ethological principles and concepts, is given, and an argument presented in which artification is described as an exaptation whose roots lie in adaptive features of ancestral mother–infant interaction that contributed to infant survival and maternal reproductive success. I show how the interaction displays features of a ritualised behavior whose operations (formalization, repetition, exaggeration, and elaboration) can be regarded as characteristic elements of human ritual ceremonies as well as of art (including song, dance, performance, literary language, altered surroundings, and other examples of making ordinary sounds, movement, language, environments, objects, and bodies *extraordinary*). Participation in these behaviours in ritual practices served adaptive ends in early *Homo* by coordinating brain and body states, and thereby emotionally bonding members of a group in common cause as well as reducing existential anxiety in individuals. A final section situates artification within contemporary philosophical and popular ideas of art, claiming that artifying is not a synonym for or definition of art but foundational to any evolutionary discussion of artistic/aesthetic behaviour.

**Keywords:** art; arts; ethology; evolution; adaptation; exaptation; ratification; ritualization; aesthetics.

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For more than forty years I have been developing a comprehensive hypothesis to account for the origin and evolution of the arts in ancestral humans. When I began my studies, I was simply curious about the possibility that “art” (whatever that is) was universally present in our species and had an origin in human evolution. Most writing about art at the time was the province of art critics and philosophers; evolutionary ideas about art were hard to find.

Between the 1960s and 1980s, most biologically-informed speculation about the origin and function of art was produced by two zoologists, Desmond Morris (1962, 1968) in England and Irenäus Eibl-Eibesfeldt (1975, 1989a, 1989b) in Germany, both of whom had studied with the founders of ethology, Niko Tinbergen (at Oxford) and Konrad Lorenz (in Bavaria). In their writings, “art” was presumed to refer to visual art and its animal roots were traced to play (Morris) or display and other forms of communication (Eibl-Eibesfeldt). Like these scholars, my earliest forays into the subject of art in human evolution were also heavily influenced by ethological concepts that were prominent at the time (Dissanayake, 1974, 1979, 1980, 1982).

In the United States, during the 1980s and thereafter, both animal and human ethology were gradually assimilated or swept aside by the American-born fields of evolutionary psychology and cognitive science. By 2008, in his influential textbook *Evolutionary Psychology: The New Science of the Mind*, David Buss described “the ethology movement” as being of primarily historical interest and essentially passé. Although Buss praised ethology for forcing psychologists to reconsider the role of biology in the study of human behaviour and for focusing attention on the importance of biological adaptation, he found that ethologists did not develop “rigorous criteria” for discovering adaptations. Moreover, their focus on observable behaviour resulted in descriptions that tended to be “labels” without explanatory force, particularly of the “underlying mechanisms” of the behaviour (Buss, 2010).

In late 1989, The Human Behaviour and Evolution Society held its first meeting and although a small art contingent grew throughout the 1990s, it was largely populated by scholars in humanities departments, especially literature. Only Kathryn Coe (1992, 2003), Nancy Aiken (1998, 2004) and I—all independent scholars outside the field of literature—had an ethological background.

After their emergence in the 1980s and eventual dominance by the end of the twentieth century, the fields of evolutionary psychology and cognitive science have developed a formidable body of theory about human evolution and behaviour, abetted by a continuing crescendo of neuro-imaging, computational and other investigative techniques for testing hypotheses about underlying mechanisms in human behaviour that were not available to ethologists. These advances can only be welcomed, although elsewhere I have questioned some of these fields’ assumptions and pronouncements about human art making and response (Dissanayake, 2009; Brown & Dissanayake, 2009).

Since the late 1980s, views about art from the perspective of evolutionary psychology have increased (for an overview of contributions to the field see Carroll 2011, pp. 3–54; for an overview of a variety of biological views of the arts through the 1990s see Cooke

& Turner, 1999, pp. 433–464). Philosophers Denis Dutton (2009) and Steven Davies (2012) published serious books for general readers about art as a species characteristic. It is no longer easy for newcomers to find their way through the many approaches, conjectures, speculations, or hypotheses (Davies, incidentally, provides an excellent bibliography). Scientists, like philosophers of art before them, are stymied by the difficulty of defining or circumscribing their subject. “Art” may refer to visual (or aural) beauty or beautiful things; to perceptual and cognitive biases for certain colours, shapes, subject matter, landscapes, or bodily and facial features; to use of these as communicative devices; to the cognitive ability to imagine or enhance; to creativity; to an expressive need; to emotional (“aesthetic”) responses; and to others—my list here is not comprehensive.

All these approaches seem to have some relevance to the subject of art in human behaviour and evolution, but is one more elementary than the others? Can we find a common denominator? It is not enough to treat our subject with a “cluster definition” (Dutton, 2009), if we wish to suggest an origin and adaptive function (or functions). We must know what we are talking about and looking for. “Art,” after all, is a modern concept and it is not surprising that ideas about what comprises art are influenced by our historical time and place.

Despite Buss’s dismissal, I continued to find ethology to be the most helpful starting place to examine the biological origin and function of art. The bewildering cornucopia of ideas about what art is (and what art does) demanded that one conceptualise art as a behaviour (or behavioural predisposition)—rather than an object (“work” of art), quality (beauty, skill), preference (for a feature that promoted adaptive success in the past), cognitive capacity, or label assigned by a cultural group. Ethologically speaking, art is something that people *do* (like play, display, court, mate, mourn, establish territory and hierarchy, form families, practice aggression and ethnocentrism, and so forth). Because there is no general verb (e.g., “to art”) for what people do when they engage in art, I looked for another term. At first, it was “making special” that seemed to me, in an initially naïve way, to characterise all instances of art. That term was criticised by scientists as fuzzy and simplistic—although many artists found it convincing. I then tried “elaboration,” and “making the ordinary extraordinary.” Gradually I adopted the verb “artify” (noun: “artification”) and have “operationalised” what it comprises. A more precise description will be deferred until section 5, as its components require development in sections 1 through 4.

In my most recent writing, I emphasise that increasingly I find artification to be more than a description, synonym, or feature of art behaviour. Rather, I consider it to be foundational to any other named characteristic of art, such as those just described. That is, people use such things as beauty, perceptual biases, imagination, creativity, skill, personal expression, and emotion when they artify. Artification has its own motivation and function(s). It is not a by-product of other adaptations except insofar as, like many adaptations, it originated (was co-opted) from elements in an earlier evolved adaptive behaviour—mother–infant bonding (see sections 1 and 4).

During hominin evolution, under selective pressures of individual anxiety about environmental uncertainty and the need for mechanisms of group bonding, artification arose from proto-artistic/aesthetic predispositions that emerged ancestrally in both mothers and infants and subsequently developed its own adaptive (exaptive) trajectory (see section 4). The prefix “proto-” indicates that in these intimate reciprocal interactions (unlike in artifying) the operations are not deliberately intended to provoke an aesthetic response.

### 1. Mother–Infant Bonding

In hominins, the close bond that can be observed between all primate mothers and infants became especially intense during the evolution of the upright-walking, large-brained genus *Homo*. Bipedality altered the female pelvis, reshaping and narrowing the birth canal, so that parturition became difficult, especially with large-headed infants. Anatomical adaptive solutions to this problem included a compressible neonate skull, a temporarily-separable maternal pubic symphysis, a postponement of three-quarters of infant brain growth until after birth (Portmann, 1941), and a considerable reduction of the gestation period. Compared to other primates, human babies are born in a strikingly helpless state so that they require constant care for months and years.

Along with the adaptations just described, I propose that our ancestors developed a significant behavioural adaptation as well: the universally-observable reciprocal interaction between mother and baby that is sometimes called “motherese,” referring to the peculiar sing-song vocalisations that mothers (and others) universally address to infants (Fernald & Kuhl, 1987; Fernald, 1992). The interaction, however, also includes concurrent peculiar facial expressions and head and body movements. It is so unlike social communicative exchanges between adults as to demand evolutionary attention.

To begin with, the prelinguistic infant of course does not understand the semantic meaning of the words it hears. It responds to the multivalent package of vocal, visual, and gestural stimuli with its own vocalisations, facial expressions, and head and body movements. The mother leads the interaction but responds in a split-second, unconscious manner to the infant’s signals. Indeed, babies actively let adults know by their own positive reactions—their coos, wriggles, and smiles—which vocal, visual, and gestural signals they prefer. In other words, they are predisposed from birth to elicit and reward only certain signals from their caretakers.

Interestingly, these signals to infants are all derived from visual, vocal, and gestural indications of interest, openness, familiarity, submission, appeasement, devotion, and affection that adults universally and casually exchange with each other. These ordinary universal adult communicative signals have been well-described and documented in people all over the world by Eibl-Eibesfeldt (1975, 1989a) and have been used by psychologists to predict the mood and intent of patients during interviews (Grant, 1968, 1972). The difference is that when used with infants, adults simplify or stereotype, repeat, exaggerate, and elaborate the signals, making them more distinct and noteworthy, more likely to attract the infant’s attention, sustain its interest, and create and manipulate its emotional response.

Although mother and baby are simply enjoying each other's company, suffused with pleasure and love, these signals are, unknown to a mother, flooding her brain with the prosocial hormones that foster maternal behaviour in all mammals (Panksepp, 1998). Making such signals, then, reinforces her brain's neural circuits for affiliation and devotion, ensuring that she will be motivated to care for her demanding, helpless baby. Responding positively to these signals of affection, the baby unwittingly calls forth more and more maternal love and attentiveness.

## **2. Ritualisation and Ritual**

One of the most interesting and original ethological observations is that of ritualisation of behaviour in animals, particularly birds (Tinbergen, 1952, 1959; Eibl-Eibesfeldt, 1971, 1989a). The earliest evolutionary description was by Julian Huxley (1914), who coined the term to refer to the process by which natural selection gradually alters certain behaviours into increasingly effective signals.

In ritualisation, components of a behaviour that occurs as part of normal, everyday, instrumental activity such as preening, nest-building, preparing to fly, or caring for young are, as it were, "chosen" or taken out of context, "ritualised," and used to signal an entirely different motivation—usually an attitude or intention that may then influence (affect or manipulate) the behaviour of another animal. For example, the head movements used by gulls to pluck grass for building a nest may be co-opted and ritualised to signal aggression (thus driving another gull away), or behaviours derived from feeding young (e.g., touching bills, offering a token with the bill, coughing as if regurgitating) may become ritualised and used for courtship (attracting a mate).

In the process of ritualisation, specific changes occur in the original behaviour pattern so that the resulting signal becomes prominent, distinctive, and unambiguous, and consequently is not confused with its precursor (Eibl-Eibesfeldt, 1971, 1989a; Smith, 1977). Compared to their original instrumental or "ordinary" precursor behaviour, ritualised movements become "extraordinary" and thus attract attention. They typically become (a) simplified or stereotyped (formalised), and (b) repeated rhythmically, often (c) with a "typical intensity" (Morris, 1957)—that is, with a set regularity of pace. The signals are frequently (d) exaggerated in time and space and (e) further emphasised by the development of special colours or anatomical features. The peacock's display is a canonical example of a ritualised behaviour that originated in such simple precursors as pecking the ground for food and lifting, spreading, and fanning the tail feathers for thermoregulation (see Eibl-Eibesfeldt, 1971, pp. 44–47).

Human ritual ceremony, with its associated and necessary arts, has obvious parallels with the biological display of ritualised signals in other animals (Dissanayake, 1979, 1988, 1992). Watanabe and Smuts (1999) have listed characteristics of biologically-evolved cooperative (as contrasted with agonistic) ritualisations in nonhuman animals that suggest an evolutionary substrate for human culturally-created rituals. That is, ceremonial rituals, like

ritualised behaviours, draw upon gestures or behaviours from other social contexts and recombine them into distinctive displays or signals. These recombined displays now relate not to instrumental activities (e.g., ordinary motor behaviour, ordinary discourse, making and using everyday functional objects), but to specialised social communication. Human ceremonial displays become “ritualised” to the extent that they circumscribe a repertoire of possible behaviours and establish a formalised framework of interaction that participants recognise as such and choose to conform to. Finally, the displays literally embody in communal participation the mutual coordination they presuppose (Watanabe & Smuts, 1999).

It is important to recognise that a large proportion of the distinctive recombined components of human ritual ceremonies resemble (or in fact are) what we today call the arts—dance and mime, poetic language, visual display, and music (song, drumming, instrument playing). Indeed, one can view ceremonial and other arts as ordinary behaviour (i.e., ordinary bodily and facial movements, ordinary speech, utilisation of ordinary objects and surroundings, ordinary prosodic vocalisations) made extraordinary through essentially the same operations or procedures as in the ritualisations described by ethologists for other animals: formalisation (stereotypy), repetition, exaggeration, and elaborations of various kinds.

Interestingly, mother–infant interaction itself can be considered as a biologically ritualised behaviour, where visual, vocal, and gestural expressions drawn from adult affiliative contexts (look at, smile, open eyes and mouth, mutual gaze, eyebrow flash, head bob backwards, head nod, head and body lean forward and back, soft undulant elaborated sounds, touches, pats) are simplified, stereotyped, repeated or sustained, exaggerated and elaborated—all serving to behaviourally coordinate and emotionally unite the mother–infant pair. As described in section 1, infants are born ready to respond to and coordinate their own behaviour with these very signals and, from about eight weeks of age, to respond to their dynamic variation and manipulation.

### **3. From Mother–Infant Interaction to Artification**

The artification hypothesis proposes that ancestral mother–infant interaction, with its universal and characteristic operations or features that can be observed today, holds the germs of the beginnings of the arts. Although “proto”-artistic/aesthetic operations arose in ancestral mother–infant interaction, these are not yet “art” or “artification,” either in Pleistocene or present-day mothers and infants. I suggest at least four transitional evolutionary steps that could have led from biologically-adaptive mother–infant interaction to cultural predisposition—that is, from proto-artistic/aesthetic capacity to intentional artification that itself gives adaptive advantage to individuals and groups.

These universal human behaviours—play, mark-making, self-adornment, and ritual/ceremony—can be considered as “steps” on the evolutionary path to artification, both phylogenetically and ontogenetically. There is space here to discuss them only briefly. All use one or more of the operations of ritualisation, described in section 2, that are first experienced in mother–infant interaction and that recur in adult artification.

### **3.1. On the Path to Artification: Play in Children**

Because play occurs in many juvenile animals, we can reasonably assume that young hominins, like other primates, played. Here I must emphasise that I do not mean to imply that prehistoric art makers were “childlike,” but simply to suggest that the ontogeny of the cognitive abilities and manual dexterity that are exercised in play may provide insights into their phylogenetic origin and trajectory in our genus and species.

Although we cannot know when fantasy play (pretense) began in our remote ancestors (evidence for its occurrence in great apes is controversial [Pellegrini & Bjorklund, 2004]), it is universal in human children, where it often occurs in a social context. Interestingly, play often requires the player to take a stance that is different from reality (Lillard, 1993): something (say, a stick) is substituted for something else (a doll or a horse to ride). Human children, like other social animals, use “frame markers” such as a “play face” or exaggerated voice or movement to signal to others that “this is [only] play—not ordinary behaviour” (Leslie, 1987; Pellegrini & Bjorklund, 2004, p. 31). Frame markers in play create “another dimension” to ordinary reality, as do other characteristic elements of play: stereotypy and formalisation, repetition, and elaboration.

### **3.2. On the Path to Artification: Mark-Making in Children**

From their first months, babies are preoccupied with using their hands. First, they reach out, then grab and manipulate anything within reach, and eventually are able to use a precision grip. As tool-makers and users, it is not surprising that members of our species evolved to find satisfaction and even pleasure in using their flexible and dexterous hands. Making marks is part of the hand–mind repertoire. Children eagerly learn to draw with “orderly growing complexity” (Fein, 1993, p. xiii). Their first scribbles gradually resolve into more controlled movements, then into deliberate meanders and spirals, which eventually become more and more “geometric” or stereotyped. The elements of representational form emerge from only four modalities, the circle and perpendicular, parallel, and oblique lines. If given drawing material, most children discover these manual gestures spontaneously between ages three and four, and use them as the fundamental elements of their first drawings of humans and animals (Fein, 1993).

Children’s early drawings emerge from an “inner imperative” (Fein, 1993, p. xiii; see also Alland, 1983 and Kellogg, 1970) to mark and then follow their marks where they lead—often to the formalisations, repetitions, exaggerations, and elaborations of artification. For the child, the making itself (and its frequently unforeseen results) is the “meaning.”

It is interesting to note that the earliest known human-made marks, everywhere in the world, are also non-iconic, that is, they are geometric—not representations of things in the world. As early as 250kya (thousand years ago), ancestral hominins hammered cupules (cup-shaped indentations) on horizontal and vertical surfaces, often in rows or ranks, in the tens, hundreds, and even thousands at one site (Bednarik, 2008). Here one again finds the use of formalisation, repetition, exaggeration, and elaboration to make ordinary rock surfaces extraordinary.

### **3.3. Intentional Artification: Self-Adornment in Premodern (and Presumably Ancestral) Adults**

Perhaps the earliest artifications were to the human body: hair and skin made extraordinary with paint, feathers, leaves, dyed and woven fibres, or bone and shell objects inserted through the nasal septum, lips, or earlobes. Permanent and extreme procedures such as tattooing or cicatrisation are unmistakable indications of a non-natural state. Evidence of tooth-filing and skull elongation exists from at least 75kya (Coe, 1992, 2003). Although usually called “body modification,” these are all examples of making the ordinary body extraordinary. Perforated beads fashioned from materials such as marine shell, ostrich eggshell, and ivory occur from as early as 200kya (Bednarik, 2011). Beads artify those who wear them, marking them as important or special in some way. Although body ornamentation does not leave archaeological traces, one can note that contemporary examples in both premodern and post-industrial societies rely on the operations of artification.

### **3.4. Intentional Artification: Ceremonial Practices in Premodern (and Presumably Ancestral) Societies**

Art requires deliberation and intention: it is not an accident. The previous sub-sections describe three transitional or related behaviours that, like artification, differentiate between an ordinary or mundane order, realm, mood, or state of being and one that is unusual, extraordinary, or supernatural. The behaviour of play, described by the earliest ethologists (e.g., Meyer-Holzapfel, 1956), is common to all social animals, but is based in recognising and creating an “as if” or “other” world, or a “meta-reality.” The predispositions to make marks and adorn the self, easily observed in the play of children as well as more seriously in adults, also create the extraordinary.

These three behaviours may have preceded or accompanied the invention of ritual ceremony in which we can identify arts as we recognise them today. Although “ritual” is considered an important human universal, it is not always appreciated that rituals themselves are collections of arts. That is, if the artifications of face and body (masks and costumes), voice (song), movement (dance), story (poetic language and performance), and environments (decorated paraphernalia, shaped and embellished surroundings, and built structures) were removed, there would be no ritual, just everyday people using their voices and bodies in ordinary ways.

To say it a different way, it is by means of artifications, using formalisation, repetition, exaggeration, and elaboration in visual, vocal, and gestural media, that early members of our species created the extraordinary world of a ceremony, as we still see in recent and contemporary premodern societies as well as our own. I suggest that artifications arose along with religion, indeed *were* religious practice.



Early humans, like other animals, lived in an unpredictable and sometimes dangerous environment. At some point in human evolution, however, our ancestors, unlike other animals, acquired the ability to remember the past, when good or bad things occurred and then to try to predict and influence such occurrences in the future. Under selective pressures of individual anxiety about uncertainties in their lives and the need for mechanisms of group bonding, ancestral humans adopted already extant proto-artistic/aesthetic predispositions and used them in ritual practices. Positing a connection between individual anxiety and the performance of ritual ceremonies seems warranted when we remember that rituals everywhere occur at transitional times of uncertainty about success in important biological matters such as obtaining or ensuring food, safety, prosperity, and health, conceiving and bearing a healthy child, and traversing important life changes such as puberty, marriage, and death (van Gennep, 1960/1908; Turner, 1969). Ceremonies are performed in order to influence important outcomes—to have an effect (Malinowski, 1954).

Although a discussion of the subject of religion can take us far afield, for my purposes here I consider religion to refer to a group's beliefs and practices that explain their world and help its members to get what they want and need. As Jean Clottes and others have noted, religions entail belief in supernatural entities and ritual practices that afford contact with those entities (Clottes, 2006, p. 9). For those who perform ceremonies, supernatural (extraordinary) entities are embodied, accessed, and influenced through the culturally-created artifications that inhere in these practices. I suggest that we consider these to be behavioural/emotional mechanisms of religious belief.

#### **4. Artifying as Adaptive/Exaptive: Proximate and Ultimate Functions**

Artification has its own motivation and function(s) and is not a “by-product” of other adaptations, except insofar as it originated and developed over evolutionary (phylogenetic) time from the proto-artistic/aesthetic operations of an earlier evolved adaptive behaviour—mother–infant bonding, as described in Sections 2 and 3. The predisposition in humans to artify is more accurately viewed as an *exaptation*, the biological term for a pre-existing trait—here, a behavioural predisposition to make the ordinary extraordinary that had emerged in ancestral mother–infant interaction (and additionally as it also is present in play, mark-making, self-adornment, and ceremonial practices)—that arose originally to solve an adaptive problem, the survival of highly immature infants.

Under new conditions, the proto-aesthetic operations on expressive voice, face, and body movements used by ancestral mothers were, in evolutionary parlance, co-opted (exapted) to address two new adaptive problems in human societies—relieving stressful existential anxiety (Malinowski, 1954) and fostering coordination and cooperation among individual group members, each having his or her own self-interest. Hunter-gatherers, whose social systems have no chiefs or central authority, need ways to encourage communal action (Wade, 2006, p. 164). As “design features” that were already used to coordinate emotional states and unify the mother–infant pair, proto-artistic/aesthetic operations were inherent

means that in group ritual practices could attract the attention of participants, sustain their interest, arouse and shape their emotions, and physically coordinate, as well as psychologically and emotionally unify them.

In ritual ceremonies, artifications used the adaptive operations that arose from ancestral mother–infant interaction, which itself relied on earlier propensities or capacities—i.e., to recognise or posit an “other” world, and to be sensitive to alterations in commonplace visual-vocal-gestural communicative signals. (It is interesting to note, parenthetically, that the proto-artistic/aesthetic operations of Early Pleistocene mother–infant interaction may also have contributed to other features that became adaptive during human evolution (e.g., an increase in multi-modal association cortex [Panksepp, 1998, p. 310, n35]; the development of vocal anatomy for language [Falk, 2009]; and provision of psychological and emotional predispositions for bonding between males and females [Eibl-Eibesfeldt, 1989a], thereby helping to ensure that fathers remain close to mothers and their infants, willing to protect and provide for them).

To put it another way, arts behaviour (artification) in ceremonies developed as a way of demonstrating individual and group care and concern about biologically important outcomes, fulfilling two proximate (immediate or motivating) functions. First, in uncertain circumstances artification provided “something to do” that by its extravagance seemed likely to attract and persuade spirits and other supernatural powers to affect individual and/or group interests. At the same time, deliberate artifications, with the inherent appeal and reinforcing effect of their culturally-created (no longer “proto-”) artistic/aesthetic operations, enticed people to engage in and become convinced of the truth of the ceremony.

Religious practice appeals not only to the intellect in the form of beliefs or precepts but to senses and emotions. Deep emotions (awe, wonder, fear, desire) and emotional bonding are produced less by esoteric knowledge than by engaging with others in stimulating shared activities. Rituals work because their artifications provide the excitement and drama that make their messages memorable and meaningful (Dissanayake, 1992; Schiefenhövel, 2009).

I propose two ultimate adaptive functions of artification (as it appears in arts-suffused rituals). First, by providing shaped and elaborated actions as something to do when beset by uncertain circumstances, artifying could alleviate the deleterious effects of the stress response in participating individuals. The release of stress hormones like cortisol negatively affects growth, tissue repair, energy release, immune system activity, mental activity, digestive function, metabolism, and even reproductive physiology and behaviour (Sapolsky, 1992). In this sense, ceremonial/arts behaviour—compared to doing nothing—is adaptive (Kaptchuk, Kerr, & Zanger, 2009). Repetitive or regularised movement is notably effective in regulating disturbing emotions like fear or anxiety and thereby contributing to the well-being of participants.

Humans seek out others for comfort when they are fearful (Taylor, 1992). For example, anthropologists Margaret Mead (1976/1930) and Bronislaw Malinowski (1922) each describe members of small-scale societies huddling together during terrifying storms, chanting charms to abate the wind. Additionally, the lament, a widespread musical/poetic form performed by or for bereaved persons, apparently helps individuals cope with their loss (Dissanayake, unpublished).

A second ultimate adaptive function of participation in the artifications of ceremonies is that of instilling collective emotions such as trust and belongingness and to coordinate (physically, neurologically, and emotionally) members of the group so that they cooperate in confidence and unity (Aiken & Coe, 2004). Not only are brain chemicals like cortisol suppressed by participating with others in formalised and rhythmically repeated activities, oxytocin and other endorphinic substances are secreted, creating pleasurable feelings of unity with others, strengthening their commitment to each other.

Affinitive behaviours and emotions, such as those created and reinforced in mother–infant interaction and in arts-suffused ceremonial participation, activate the orbitofrontal cortex and other reward centers of the brain (Carter et al., 1999, and others cited in Brown & Dissanayake, 2009, p. 53). Although neuroscientists have known for many years that oxytocin and opioids are released at parturition and during maternal behaviour in all mammals, they have only recently discovered that moving to and even listening to music releases these same chemicals as do dancing and other movement activities in which people participate with one or more others (Freeman, 2000). In addition to instilling trust and attachment, oxytocin relieves individual anxiety (Üvnas-Moberg, 1999).

In summary, I use a helpful capsule formulation of the relationship of an adaptation and an exaptation (Seghers, 2015, p. 338). While an adaptation (here, the ritualised proto-aesthetic operations of mother–infant interaction) emerges through a history of selection in order to solve an adaptive problem (the survival of highly immature infants), an *exaptation* (predisposition to engage in and respond to aesthetic operations) corresponds to an already present adaptation (the proto-aesthetic operations that foster mother–infant bonding) and gains a new adaptive function (reducing individual anxiety and joining group members in common cause) without subsequent selection.

### **5. The Roots of Artification and “Art as We Understand It”**

In two publications, the philosopher of art Stephen Davies has presented a serious and comprehensive analyses of my evolutionary ideas, particularly the notion of “making special.” In the first (Davies, 2005, p. 291, 296), he finds my concept of art as making special to be “so thinly characterised that it does not pertain to art as we understand it” and in *The Artful Species* (Davies, 2012, p. 131) says that like other broad theories focused on art’s origin, my hypothesis “reduce[s] art to the lowest common denominator.” Although at the time of his analyses of my work he was not yet acquainted with my most recent formulation of what I now call the artification hypothesis, his charges apply equally well to that idea.

I accept these charges. Artification is different from the notion of “art” as it is and has been used in various ways by philosophers of art, including Davies. It may seem “thinly characterised” because it approaches and understands the nature of art in a way that is not automatically or uniformly understood by scholars of contemporary aesthetics—i.e., ethologically, as a behavioural predisposition, and thus traces the arts to what may be considered their lowest common denominator. The concept of artification does not “pertain to” art as Davies understands it, but rather employs a broader, more universal framework that is based on the observation and description of the behaviour of animals, including the human animal.

Because human infants are born as essentially “natural” (“animal”) rather than “cultural” (“human”), they provide a made-to-order subject for ethological investigation. Locating the roots of human artifying in the earliest social interactions of infants with their caretakers reveals that the art impulse is far more deeply dyed and consequential to the evolution and psychology of humans than heretofore suspected by philosophers and scientists alike.

Developmental psychologists Daniel Stern (1971) and Beatrice Beebe (1982) were the first to film and minutely analyse interactions of mothers and infants at eight weeks. Lacking the evolutionary lens of ethology, however, they did not recognise that they were witnessing a universal “ritualised” behaviour, although the implications of there being such a fundamental evolved biological construct at the beginning of life would have underscored and reinforced their important demonstration of exquisitely attuned dyadic communication. Although psychotherapist John Bowlby (1969–1980) based his pioneering studies of attachment and loss on ethological principles, he focused on infants in the second half of their first year (and thereafter), without fully describing the critical importance of face-to-face vocal and gestural interaction in the earliest weeks and months. Studies of infant communicative behaviour by evolutionary psychologists and cognitive scientists have been motivated primarily by interest in the origin and evolution of language more than the equally valuable and aesthetically-relevant nonverbal and emotional aspects of communication that an ethological approach to the arts reveals. The work of Anne Fernald (1992) is an exception.

Artification, as I describe or “understand” it, is an evolved behavioural predisposition in members of the genus *Homo* to intentionally make the ordinary extraordinary (i.e., to “make special”), by means of artistic/aesthetic operations (e.g., formalisation, repetition, exaggeration, and elaboration), particularly in circumstances about which one cares (considers important). Let us examine (or “unpack”) this formulation.

### **5.1. Ordinary/Extraordinary; Special**

The predisposition to artify requires an earlier capacity, shared by some other animals, to recognise that some aspects of experience and some actions are unusual, special, noteworthy—that they are different from the everyday. Humans everywhere recognise what can be described as an ordinary or mundane order, realm, mood, or state of being and another that is unusual, extraordinary, or supernatural. These are imprecise terms and may be considered scientifically or philosophically inadequate. Yet the distinction seems apt to

account for evidence that as early as a million years ago ancestral hominins were carrying with them to their dwelling sites stones with unusual patterns or markings (Dissanayake, 1988) or carving cupules in small or vast quantities on stone surfaces (Bednarik, 2011). Makers of art as modern philosophers understand it are not so different when they make ordinary cave, desert, or wilderness environments and objects extraordinary in Chauvet, Lascaux, Egypt, Greece, Rome, and elsewhere, as illustrated in art history textbooks. Artists of all kinds today use artistic/aesthetic operations to artify things that they care about: that is, they transfigure the commonplace (Danto, 1981).

Some anthropologists would disagree that this distinction is universal when they describe the worldviews of premodern peoples as often making no separation between natural and spiritual realms and considering themselves and nonhuman entities and forces to be all equally real inhabitants of their cosmic order (see for example Tonkinson [1978] on the Mardudjara in Australia). However, the actions of such peoples in rituals demonstrate that they take time and effort to make their bodies, surroundings, movements, and utterances different from their ordinary state. That is, they artify or make them special.

## **5.2. Deliberate Use of “Artistic/Aesthetic Operations” Such as Formalisation, Repetition, Exaggeration, Elaboration, and Manipulation of Expectation**

Philosophers of art may find insignificant a predisposition to use artistic/aesthetic operations because, after all, birds and other animals also use and appreciate them as worth paying attention and responding to—that is, as being different from the ordinary. Even human infants are primed to respond to these operations when presented to them by adults in infant-directed vocalisations, facial expressions, and head and body movements. To an art theorist who is also ethologically informed, however, the discovery of such sensitivity at the beginning of life suggests that emotional response to aesthetic manipulations has been critical to human survival. It is not surprising that these operations should become powerful sources of emotion.

At the end of section 2, I briefly mentioned perhaps the most important aesthetic operation of all—manipulation of expectation—although it does not appear in the earliest mother–infant interactions. It can, however, be observed in mothers’ behaviour to infants of about four months and older, who become bored with soothing predictability and instead desire suspense and surprise, as in games of Peek-a-boo or This Little Piggy. Manipulation of expectation rests, I suggest, on Desmond Morris’s ethological notion of “typical intensity,” described when he noted that the iteration of a ritualised movement or sound has a typical rhythmic regularity and intensity in time (Morris, 1957). If humans (including four-month-old infants) were not aware of typical intensity, they would not be susceptible to its manipulation. Manipulation of expectation is one of the primary devices used to produce aesthetic response in narrative and musical unfolding and has been well described by philosophers of the arts, although without awareness of the evolutionary reasons that form the background to its power and persistence.

### **5.3. Uncertain Circumstances about Which One Cares and Considers Important**

The concept of art as understood today by philosophers and members of the art world is inseparable from historically unprecedented complex social and economic changes that developed as preindustrial societies became what is now called modernised. Culture-wide ideas of individuality, originality, liberty, competition, the marketplace, and the use of science and reason rather than religion to address human problems have gradually replaced the intellectual and cultural conservatism that characterised all previous societies, which were permeated by a religious worldview.

Although an ethological view of art is also an outgrowth of these changes, it attempts to account for the artistic/aesthetic behaviour of people of all times and places. Artification, not art as we understand it, is a universal behavioural predisposition that characterises all humans. As such it cannot be confined to specialist highly-skilled artists or original masterpieces. Nor can it be “disinterested” and lack biological function. Throughout human history and prehistory, artifications have been essential parts of traditional life, particularly in religious practices. Experience of the arts in small-scale societies is often multisensory, not separated, and the arts’ adaptive effects require active participation in order to produce the neurochemistry that is posited to reduce stress and produce feelings of trust and belonging.

These are not the characteristics of art as it is understood by most people today, when religious art has been supplanted by more secular, discrete varieties and when most people experience art more than they make or participate in it. Nevertheless, artification remains a significant and useful idea, precisely because as a concept it is broader than art “as we understand it.” It deliberately avoids connotations of beauty, skill, depiction, originality, creativity and self-expression that are inherent in the modern Western notion of art, yet it recognises that because people tend to artify things that they consider important—that they care about—they will often use these characteristics. At the same time, artification may include behaviours that the modern concept might reject, such as the artifications of face, body, movement and voice that fans display at sporting events or public protest marches (i.e., occasions that they consider important).

Artification as a concept may seem initially unwieldy or unappealing, especially to philosophers of art, but I consider it foundational to the evolutionary understanding of both the making and the response to the arts. Scholars can of course continue to seek to understand individual traditions of one or another art, or can study the arts according to individual psychology, culture, society, or worldview. Yet, when all is said and done, the adaptive predisposition to artify underlies these other views. The “art” of philosophical aesthetics, as an ethologist understands it, is more accurately described as being a sub-set of a broader universal entity, artification.

## References

- Aiken, N. E. (1998). *The biological origins of art*. Westport, CT: Praeger.
- Aiken, N., & Coe, K. (2004). Promoting cooperation among humans: The arts as ties that bind. *Bulletin of Psychology and the Arts*, 5(1), 5–20.
- Alland, A. (1983). *Playing with form*. New York, NY: Columbia University Press.
- Bednarik, R. (2008). Cupules. *Rock Art Research*, 25, 61–100.
- Bednarik, R. (2011). *The human condition*. Berlin, Germany: Springer.
- Beebe, B. (1982). Micro-timing in mother–infant communication. In M. R. Key (Ed.), *Non-verbal communication today* (pp. 169–195). The Hague, The Netherlands: Mouton.
- Bowlby, J. (1969–1980). *Attachment and loss*, 3 Vols. New York, NY: Basic Books.
- Brown, S., & Dissanayake, E. (2009). The arts are more than aesthetics: Neuroaesthetics as narrow aesthetics. In M. Skov & O. Vartanian (Eds.), *Neuroaesthetics* (pp. 43–57). Amityville, NY: Baywood.
- Buss, D. M. (2010). Evolutionary psychology: The new science of the mind. In B. Boyd, J. Carroll, & J. Gottschall (Eds.), *Evolution, literature, film: A reader* (pp. 21–37). New York, NY: Columbia University Press.
- Carroll, J. (2011). *Reading human nature: Literary darwinism in theory and practice*. Albany: State University of New York Press.
- Carter, S., Lederhendler, I., & Kirkpatrick, B. (Eds.). (1999). *The integrative neurobiology of affiliation*. Cambridge, MA: MIT Press.
- Clottes, J. (2006). Spirituality and religion in Paleolithic times. In F. Shults (Ed.), *The evolution of rationality: Interdisciplinary essays in honor of J. Wentzel van Huyssteen* (pp. 133–146). Grand Rapids, MI: William B. Eerdmans.
- Coe, K. (1992). Art: The replicable unit—an inquiry into the possible origin of art as a social behavior. *Journal of Social and Evolutionary Systems*, 15(2), 217–234.
- Coe, K. (2003). *The ancestress hypothesis: Visual art as adaptation*. New Brunswick, NJ: Rutgers University Press.
- Cooke, B., & Turner, F. (Eds.). (1999). *Biopoetics: Evolutionary explorations in the arts*. Lexington, KY: ICUS.
- Danto, A. (1981). *The transfiguration of the commonplace*. Cambridge, MA: Harvard University Press.
- Davies, S. J. (2005). Ellen Dissanayake’s evolutionary aesthetic. *Biology and Philosophy*, 20, 291–304.
- Davies, S. (2012). *The artful species*. Oxford, UK: Oxford University Press.
- Dissanayake, E. (1974). An hypothesis of the evolution of art from play. *Leonardo*, 7(3), 211–218.
- Dissanayake, E. (1979). An ethological view of ritual and art in human evolutionary history. *Leonardo*, 12(1), 27–31.

- Dissanayake, E. (1980). Art as a human behavior: Toward an ethological view of art. *Journal of Aesthetics and Art Criticism*, 38(4): 397–406.
- Dissanayake, E., (1982). Aesthetic experience and human evolution. *Journal of Aesthetics and Art Criticism*, 41(2), 145–155.
- Dissanayake, E. (1988). *What is art for?* Seattle, WA: University of Washington Press.
- Dissanayake, E. (1992). *Homo aestheticus: Where art comes from and why*. New York, NY: Free Press.
- Dissanayake, E. (2009). The artification hypothesis and its relevance to cognitive science, evolutionary aesthetics, and neuroaesthetics. *Cognitive Semiotics*, 5, 136–158. Special issue on aesthetic cognition.
- Dutton, D. (2009). *The art instinct: Beauty, pleasure, and human evolution*. New York, NY: Bloomsbury.
- Eibl-Eibesfeldt, I. (1971). *Love and hate: The natural history of behaviour patterns*. (G. Strachan, Trans.). New York, NY: Holt, Rinehart and Winston. (Original work published 1970)
- Eibl-Eibesfeldt, I. (1975). *Ethology: The biology of behaviour* (2<sup>nd</sup> ed.). (E. Klinghammer, Trans.). New York, NY: Holt, Rinehart and Winston.
- Eibl-Eibesfeldt, I. (1989a). Human ethology. (P. Wiessner-Larsen & A. Heunemann, Trans.). New York, NY: Aldine de Gruyter.
- Eibl-Eibesfeldt, I. (1989b). The biological foundation of aesthetics. In I. Rentschler, B. Herzberger, & D. Epstein (Eds.), *Beauty and the brain: Biological aspects of aesthetics* (pp. 29–68). Basel, Switzerland: Birkhäuser Verlag.
- Falk, D. (2009). *Finding our tongues: Mothers, infants and the origin of language*. New York, NY: Basic Books.
- Fein, S. (1993). *First drawings: Genesis of visual thinking*. Pleasant Hill, CA: Exelrod.
- Fernald, A. (1992). Human maternal vocalisations to infants as biologically relevant signals: An evolutionary perspective. In J. H. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 391–428). New York, NY: Oxford University Press.
- Fernald, A., & P. K. Kuhl. (1987). Acoustic determinants of infant preference for motherese speech. *Infant Behaviour and Development*, 10, 279–293.
- Freeman, W. (2000). A neurobiological role of music in social bonding. In N. Wallin, B. Merker, & S. Brown (Eds.), *The origins of music* (pp. 411–424). Cambridge, MA: MIT Press.
- Grant, E. C. (1968). An ethological description of nonverbal behaviour during interviews. *British Journal of Medical Psychology*, 41, 177–183.
- Grant, E. C. (1972). Nonverbal communication in the mentally ill. In R. Hinde (Ed.), *Non-verbal communication* (pp. 349–358). Cambridge, UK: Cambridge University Press.
- Huxley, J. (1914). The courtship habits of the great crested grebe (*Podiceps cristatus*) together with a discussion of the evolution of courtship in birds. *Journal of the Linnean Society of London: Zoology*, 53, 253–292.



- Kapтчuk, T. J., Kerr, C. E., & A. Zanger. (2009). Placebo controls, exorcisms, and the devil. *Lancet*, 374(9697), 1234–1235.
- Kellogg, R. (1970). *Analyzing children's art*. Palo Alto, CA: Mayfield.
- Leslie, A. M. (1987). Pretense and representation: Origins of “theory of mind.” *Psychological Review*, 94, 412–426.
- Lillard, A. S. (1993). Pretend play skills and the child's theory of mind. *Child Development*, 64(2), 348–371.
- Malinowski, B. (1922). *Argonauts of the Western Pacific*. London, UK: Routledge and Kegan Paul.
- Malinowski, B. (1954). *Magic, science, and religion*. Garden City, NY: Doubleday Anchor Books. (Original work published 1925)
- Mead, M. (1976). Growing up in New Guinea. New York, Y: Morrow. (Original work published 1930).
- Meyer-Holzappel, M. (1956). Spiel des Säugetieres. *Handbuch der Zoologie*, 8(2), 1–36.
- Morris, D. (1957). Typical intensity and its relation to the problem of ritualisation. *Behaviour*, 11, 1–2.
- Morris, D. (1962). *The biology of art*. New York, NY: Knopf.
- Morris, D. (1968). *The naked ape*. New York, NY: McGraw-Hill.
- Panksepp, J. (1998). *Affective neuroscience: The foundations of human and animal emotions*. Oxford, UK: Oxford University Press.
- Pellegrini, A. D., & Bjorklund, D. F. (2004). The ontogeny and phylogeny of children's object and fantasy play. *Human Nature*, 15(1), 23–43.
- Portmann, A. (1941). Die Tragzeiten der Primaten und die Dauer der Schwangerschaft beim Menschen: ein Problem der vergleichenden Biologie. *Revue Suisse de Zoologie*, 48, 511–518.
- Sapolsky, R. M. (1992). Neuroendocrinology of the stress response. J. R. Becker, S. M. Breedlove, & D. Crews (Eds.), *Behavioural endocrinology* (pp. 287–324). Cambridge, MA: MIT Press.
- Schiefenhövel, W. (2009). Explaining the inexplicable: Traditional and syncretistic religiosity in Melanesia. In E. Voland & W. Schiefenhövel (Eds.), *The biological evolution of religious mind and behaviour* (pp. 143–164). Berlin: Springer.
- Seghers, E. (2015). *Methodology in the evolutionary study of art: Perspectives in philosophical anthropology, cognitive archaeology, and evolutionary theory* (Doctoral dissertation). University of Ghent, Belgium.
- Smith, W. J. (1977). *The behavior of communicating: An evolutionary approach*. Cambridge, MA: Harvard University Press.
- Stern, D. (1971). A microanalysis of mother–infant interaction. *Journal of the American Academy of Child Psychiatry*, 10, 501–517.
- Taylor, S. (1992). *The tending instinct: How nurturing is essential to who we are and how we live*. New York, NY: Henry Holt.

- Tinbergen, N. (1952). Derived activities: Their causation, biological significance, origin, and emancipation during evolution. *Quarterly Review of Biology*, 27, 1–32.
- Tinbergen, N. (1959). Comparative studies of the behaviour of gulls (Laridae): A progress report. *Behaviour*, 15, 1–70.
- Tonkinson, R. (1978). *The Mardudjara aborigines: Living the dream in Australia's desert*. New York, NY: Holt, Rinhart and Winston.
- Turner, V. (1969). *The ritual process: Structure and anti-structure*. London, UK: Routledge and Kegan Paul.
- Üvnas-Moberg, K. (1999). Physiological and endocrine effects of social contact. In C. S. Carter, I. I. Lederhandler, & B. Kirkpatrick (Eds.), *The integrative biology of affiliation* (pp. 245–261). Cambridge, MA: MIT Press.
- van Gennep, A. (1960). *The rites of passage*. London, UK: Routledge and Kegan Paul. (Original work published 1908).
- Wade, N. (2006). *Before the dawn: Recovering the lost history of our ancestors*. New York, NY: Penguin Press.
- Watanabe, J. M., & B. B. Smuts. (1999). Explaining religion without explaining it away: Trust, truth, and evolution of cooperation in Roy A. Rappaport's "The obvious aspects of ritual." *American Anthropologist*, 101, 98–112.