## PLAY, SKILL, AND THE ORIGINS OF PERCEPTUAL ART[[1]](#footnote-1)

*Much of what we call ‘taste’ lies in this, the conformity between discriminations demanded by a painting and skills of discrimination possessed by the beholder. (Michael Baxandall* 1972, 34*)*

Art is very old—perhaps as old as certain hominin hand-axes, created more than 400,000 years ago, that are symmetrical beyond need and sometimes made from rare materials. Moreover, art is found just about everywhere.[[2]](#footnote-2) This broad spatiotemporal spread suggests that art manifests a human urge that is not specific to or dependent on any particular culture, past or present.[[3]](#footnote-3) This is something of a puzzle. Evolutionary theorists normally assume that it is disadvantageous to expend effort needlessly. In such large animals as ourselves, unneeded activity is particularly wasteful of energy. And it entails reduced vigilance. What biological need is served by making or attending to art? If there is none, why doesn’t natural selection work against it?

My aim in this paper is to show how perceptual art predictably emerges from certain well-known psychological tendencies.[[4]](#footnote-4) The first of these is *play*: perceptual and motor play*.*[[5]](#footnote-5)Play is fun activity. Its evolutionary benefit is developmental; it helps develop an individual’s skills. *Perceptual* play—a notion I introduce here—is fun use of the senses that evolution encourages because it develops perceptual skills. Similarly, motor play. Art is an artefact created for perceptual pleasure. At its simplest, the creation of such artefacts is an exercise of *motor* play. The simplest forms of art—too simple, actually, to merit the term—emerge from this interaction of perceptual and motor play. Play of this sort is why art is pleasurable, both to make and to consume.

Art is more than play, however. Thus, while perceptual and motor play go some way toward helping us understand the pleasure that art gives us, they are insufficient for understanding either why art is universally made or why it appeals. Art is the result of activity that is much more demanding than perceptual or motor play. To help more fully to understand this, I introduce a second psychological tendency: activity for skill development *beyond* that which play induces. Advanced skills can only be developed through arduous practice. I’ll argue that the development of advanced skills is also a natural goal, and that highly skilled activity gives pleasure in a different way. This second kind of pleasure is an essential component of the enjoyment of art by both artists and their discerning audiences.

The framework of skills development is meant to be deflationary with regard to evolutionary aesthetics. Given the apparent superfluity (or even burdensomeness) of art with regard to biological needs such as energy conservation, many theorists have proposed that it cannot be explained straightforwardly as an individual adaptation. So, they seek to ground its universality in fancy theoretical posits such as group selection, sexual selection, and evolutionary “spandrels.” From my perspective, this is unnecessary. It is relatively easy to understand how individuals benefit from activity that develops their skills, and so evolutionary theory can recede into the background.

Finally, before I get started, a disclaimer. I am not (of course) attempting here to give a complete functional account of aesthetic appreciation and artistic creation. My goal is to give an account of the value we realize by making and perceptually attending to certain artefacts—what psychological traits account for this tendency in humans, and what functional role do these traits play in our lives? There are other reasons why human beings make and appreciate art, some perceptual, some intellectual, some social. These are not touched on below.

## Part 1: The Explanatory Task.

### Art and Its Attractors

Ancient and traditional art is marked by certain *primary sensory attractors*, features such as:

* beat, metre, melody, and harmony in music,
* pattern (symmetry, continuation, occlusion, enclosure, repetition, the “line of beauty,” etc.), colour, and pictorial representation in visual art;
* graceful movement in dance (which is itself defined by rhythmic motion, another “primary attractor”).

(I am primarily concerned with sensory aesthetics here, and I will not discuss literary art, but narrative and word play are primary attractors there. These pleasures, and others involved in conceptual art, might also be comprehensible in terms of play.[[6]](#footnote-6))

The primary attractors are what make art appeal to the senses, and thus they are essential for the appreciation of art. Considerable effort has gone into explaining why we like them so much. Many think that at least some of them have universal appeal and propose that they are genetic and connected to evolution directly (Dutton 2009) or indirectly (Davies 2012).

But art is not simply the production of an artefact that can be appreciated in this way. Consider landscapes. Most of us would be moved by the sight of a craggy mountain peak, framed by a glacier below and spume of cloud and brilliantly blue sky above. A cell-phone photograph of the mountain might capture all of this; you might enjoy the vista vicariously by looking at the photograph. Nevertheless, the fact that it evokes an aesthetic response (by capturing the qualities of its subject) is not sufficient to give it artistic merit. Yet it exemplifies many of the scene’s primary attractors. A photograph’s artistic merit is actually independent of the beauty of the scene it portrays; a portrayal of squalor could be great art.

Now, the point just made does not tell against accounts that treat the aesthetic of natural objects as distinct from that of art. Semir Zeki (1999) and V. S. Ramachandran and William Hirstein (1999) do just this. Their idea is that art’s merit lies in distilling or exaggerating something important to visual processes. If this is right, artistic beauty could be assessed by the effectiveness of the distillation, and the mountain mentioned above could be assessed independently of the photograph. (These authors are predominantly concerned with visual art.) But even if the primary attractors of art are different from those of normal perception, these attractors are not sufficient to mark something off as art—for instance, you could have a crude or kitschy rendition of what these authors identify as an appealing characteristic of art.[[7]](#footnote-7) (As far as I can tell, a soft porn centrefold satisfies Ramachandran and Hirstein’s appeal to the peak shift effect.[[8]](#footnote-8)) Obviously, this misses something important. (Jennifer McMahon 2000 makes related observations.)

Art has another universal characteristic—it has *secondary attractors* that combine with the primary attractors in special ways. Form, technique, and fine execution are important in all traditional art forms, even where they are supererogatory with respect to the primary attractors. The secondary attractorshave to do with *how* the primary attractors are deployed. Art appreciation always includes an appreciation of this “how.” Consider, for example, the following statement:

Rembrandt wanted the surface of his paintings to sparkle, and he achieved his desired result by developing paints of a highly specialized formula. His paints contained secret ingredients known only to the artist, and have eluded discovery until now.[[9]](#footnote-9)

If you focus on primary attractors, this information is of no interest; what would then be important is that a Rembrandt is great to look at, not how the effect is achieved. Obviously, though, this is not true. The information contributes non-trivially to the appreciation of his work. Much the same is true for knowledge of technique; it is an essential part of expert appreciation and enjoyment.

The role of genre, form, and style is particularly interesting from this point of view. Patricia Meisol tells an illustrative tale in the New York *Times* (August 18th, 2013). In 1963, the 17-year old Jamie Wyeth painted a powerful painting of Helen Brooke Taussig, a pioneering paediatric cardiologist. Meisol writes:

In the painting, Dr. Taussig’s hair was slightly askew. Her dress was draped off her shoulder. Her steely blue eyes stared starkly ahead. She looked witchy. Her friends called it evil.

The painting is striking for its Caravaggist chiaroscuro, dramatic colours, focus on the face and neck, and the sexually interesting suggestion of a powerful 65-year old body not seen—the dress is not so much “draped off her shoulder” as placed in front of her. It disturbed Taussig’s colleagues and Taussig herself. The Johns Hopkins University Hospital would not hang it. In the *Times* story, the Wyeth portrait is shown next to one that is much more like what you might expect to see in a hospital lobby, an evidently skilled work by Patric Bauernschmidt. Executed in soft pastels, it portrays Dr Taussig with a grandmotherly smile, dressed in a lab coat and soft blue blouse with pearls. As art, the Bauernschmidt is rubbish, while the Wyeth, although somewhat immature and derivative, is way above the line.[[10]](#footnote-10) Why? After all, many found it less pleasing. The puzzle is particularly telling against those who root the appeal of art in human perceptual psychology. Why should the majority opinion be so obviously wrong?

For another indication of the independence of secondary attractors, think of what critics mean when they say that something is “restrained,” or “refined,” or “tasteful.” These epithets imply that the primary attractors are suppressed. As E. H. Gombrich (1979) says, rather archly:

In the history of Western Art the aesthetic ideal of restraint is inextricably interwoven with the classical tradition. The confidence with which we speak of ‘barbaric splendour’ betrays our deep-seated conviction that non-barbarians have other standards of excellence. A deliberate rejection of ornamental profusion has always been a sign of classical influence. (18)

Music or decorative art or architecture might embody classical proportions, and proportion is a potent primary attractor. But refinement demands that is not hammered home with gaudy emphasis. “Alberti’s desire to see the interior of churches white is reflected in the interior of the Badia in Fiesole, which relies for its effect entirely on proportion,” Gombrich writes. Why the restriction? Why not add the thrill of colour and three-dimensional relief?

The point of evaluations like these is that it is sometimes taken as a mark of artistic merit that the primary attractors are deployed in ways that might cause a tyro to miss them altogether. In a tastefully executed work, some primary attractors stand out—the point is not to suppress them altogether—but it demands a certain effort to discern how they are locally manifested, and to notice and appreciate the *absence* of colour and ornamentation.[[11]](#footnote-11) Evolutionary theorists give us no hint of how it could be worthwhile to show such “restraint.” Steven Pinker (1997) portrays art as violent and invasive: it is a “pleasure technology” that gives the brain “megadoses of agreeable stimuli” “without the messiness of electrodes or drugs” (524). The Chapel in the Badia Fiesolana must be one of the least gaudy churches in Italy—it eschews megadoses.[[12]](#footnote-12) Yet it is undeniably an artistic masterpiece. Pinker overplays the primary attractors.[[13]](#footnote-13)

Artworks are everywhere appreciated against the background of *form*, *genre*, and *style*—expected elements of artworks, which may be omitted or amended or creatively employed, but which contribute to appreciation even in the breach. (The delicate interplay of formal expectations is yet another secondary attractor.) Even children and JHU Hospital surgeons can appreciate music and painting for their primary attractors. But in all cultures, there are connoisseurs who take pleasure in relatively arcane formal aspects of artworks, and however loaded it might be in primary attractors, art is made in part to appeal to connoisseurs.[[14]](#footnote-14) In so-called high art, the secondary attractors predominate. For example, children and the untutored are rarely able to appreciate the more abstruse aspects of opera and stylized dance forms. (Have you ever sat through four hours of Kathakali?) The primary attractors are relatively *universal*: given a degree of patience, even a newcomer will get something out of Karnatak music or Chinese opera, but they will not understand the form or execution of these art forms. Yet form and execution, which are largely *local* and culture-bound, are highly prized and deeply appreciated in every culture. And most adult humans have at least some degree of appreciation for these secondary attractors in *some* art form.[[15]](#footnote-15)

Any account of the origins of art must explain the secondary attractors, since these are clearly part of the “art instinct.” But they are a riddle, especially for utility-based accounts (such as all evolutionary accounts are). What utilitarian value could they have? Shouldn’t one simply let the primary attractors do their work, whatever this work might be? Natural objects evoke an aesthetic response, but without the secondary attractors. A landscape is what it is: it doesn’t depend on perfect composition. Birdsong is similarly taken as it comes: imperfections in the semiquavers don’t spoil the effect (beyond a certain point). Why can’t the artist’s methods be similarly unobtrusive? Why does it add to our appreciation when we notice and attend to these methods?

Current theories of the art instinct are fractured. Some approaches shed light on the primary attractors—although less than one might hope for, since (as I shall argue in section II) most theorists misconstrue the explanatory task. But these approaches completely fail when it comes to the secondary attractors. Pinker (1997), for example, shrewdly identifies six mental faculties that music is “crafted to tickle.” He does not explain why art demands more than the production of these ticklers. Why are some songs considered vulgar though they have clever lyrics, a catchy tune, and great cadence? (Why don’t advertising jingles count as art? — Think of Barry Manilow’s “I am stuck on Band-Aid brand ’cause Band-Aid’s stuck on me.”[[16]](#footnote-16))

Other perspectives, for example the sexual selection thesis (Miller 2000, Dutton 2009), address the secondary attractors, but leave the primary ones untouched. The claim is that, for instance, the ability to play a perfectly even trill on the piano is a sign of excellent motor-control genes and hence attracts mates. Art is for sexual showing-off, and this is why execution is so important. Perhaps this is plausible, but why do these potential mates select music as an area of evaluation? Why isn’t even and rapid touch-typing just as attractive? Why does it not count as art?

One of the theoretical benefits of my approach is that it provides a unified framework within which to understand both the primary and the secondary attractors—both beauty and art.[[17]](#footnote-17)

### Aesthetic Pleasure

There are two reasons why it is difficult to explain the genesis of art in evolutionary or economic terms. The first is that it is difficult to explain the value of the primary attractors. The second is that even when one understands the primary attractors, it is difficult to explain the value of constraining their expression by the secondary attractors. These are different problems. I will begin by addressing the primary attractors. Many theorists misconstrue the explanatory task with regard to them.

Art is the creation of artefacts that can be aesthetically appreciated. Aesthetic appreciation is closely tied up with pleasure in attentive perceptual *contemplation* or *regard*.[[18]](#footnote-18) Thus, aesthetic appreciation of visual art (as well as of natural objects) is essentially bound up with pleasure taken in attentively looking; the appreciation of music (as well as of birdsong) has to do with pleasure in attentively listening, and so on. The first question to consider, then, is the psychological character of the aesthetic response. What is the nature of the pleasure we take in contemplating certain objects?

Pleasure is evaluative. It is often an evaluation that has an involuntary component, a feeling that one cannot, as rational agent, completely control. One can think of sensory pleasure as a bodily reaction to a state of affairs, a reaction that makes it appear desirable. Nico Frijda (2010) says of pleasure that it is the acceptance of an on-going state, marked by bodily expressions of the state that he terms “acceptance wiggles.” Whatever other function aesthetic pleasure may have, it signals acceptance of the activity of perceptual regard. It signals that this activity is worth continuing.

As a preliminary to tackling aesthetic pleasure, let me begin by making two distinctions with regard to positive evaluative states.

1. (a) An evaluative state might be *prospective*. Such an evaluation tells you to do something (or that doing it would be good). Hunger, thirst, and sexual desire are prospective evaluations. Respectively, they give you reason to eat, drink, and engage in sex. They are *causes* of such activity.[[19]](#footnote-19)

(b) An evaluative state might be *reactive*. Such an evaluation tells you that something you are doing is good, and that you should continue. Enjoyment of physical exercise is an evaluation of this sort. So is the pleasure we take in specific foods. These evaluative states tell us to keep going: keep exercising; keep eating this thing. They are a cause of continued activity, but they are not the cause of taking up the activity in the first place. We do things *for* the pleasure that they will give us, but pleasure is a goal, not a cause, of taking up some activity in the first place. (*Anticipated* pleasure can, of course, be prospective, but to explain this, we have first to explain why certain things give us pleasure in the first place.)[[20]](#footnote-20)

To reiterate: pleasure is a cause of continuing an activity in which we are already engaged; unlike prospective evaluations, it is not a cause (though it may be a goal) of taking them up in the first place.

1. (a) An evaluative state might be *object-forward* in the sense that it urges action *A* directed to object *O* because *A* realizes some good that *O* delivers distinct from *A* itself. When you are thirsty, *drinking* (*A*)gives you pleasure (unless, of course, a particular liquid is noxious). The pleasure evaluates the liquid (*O*) positively because it slakes your thirst. Consequently, the pleasure lasts only until thirst is slaked.

(b) An evaluative state might be *activity-forward*. Such a state also urges an action *A’* directed to an object *O’*. But here *O’* is evaluated as good only relative to *A’* itself. When you read (*A’*) a good book (*O’*), the pleasure you derive tells you that the book is good *to read* (and not, for example, that it is good to put on your shelf). However, the value of reading *O’* is not subordinated to some end-state that reading the book brings. The book is good for no other reason than that *reading* it is pleasurable. Consequently, there is no natural satiation point here. The pleasure of drinking cold water points forward to a state of rehydration. By contrast, when you read a great novel, you may ultimately want to stop because you get bored or because other desires intervene, but there is no natural satiation point reached when some hypothetical outcome is reached.

These types of evaluations can be summarized in a table:

TABLE 1: A CLASSIFICATION OF EVALUATIVE STATES

|  |  |  |
| --- | --- | --- |
|  | PROSPECTIVE | REACTIVE |
| OBJECT FORWARD | (i) Hunger, thirst, sexual desire. | (ii) Gustatory pleasure |
| ACTIVITY FORWARD | (iii) Langour: desire to relax in bed | (iv) Pleasure in relaxing; **aesthetic pleasure** |

Explanation Notes on Table 1

(i) Hunger and thirst are reasons to eat and drink. They are object-forward though in a relatively non-specific way. Hunger is for something (anything) that one can put in one’s mouth and swallow; thirst is slightly more specifically for liquid. Sexual desire is also object-forward, usually in a more specific way. It is not for just sexual activity, but for sexual activity with a specific partner or kind of partner.

(ii) One might wonder: given that we have hunger and thirst, why do we need gustatory pleasure? Hunger gets us to eat. What does pleasure in eating do? Two things. The first is that, as noted above, hunger does not tell us much about what we should eat and what we shouldn’t. Gustatory pleasure and displeasure helps us learn. Secondly, pleasure regulates how much we eat. (Unfortunately, it is not very good in this role.) Food should be pleasing only until we have satisfied our needs. Both these functions of gustatory pleasure show how it evaluates objects for purposes beyond eating itself.

(iii) The desire to relax (which I call “languor”) is evidently activity forward and prospective.

(iv) Aesthetic pleasure is activity forward and reactive. One looks at a painting, or listens to a piece of music; these objects are evaluated as good only insofar as looking at the one and listening to the other is good. Aesthetic pleasure tells us nothing about the end-state of the interaction. It motivates continued perceptual regard, but it is not informative with regard to any end achieved by undertaking this activity. As we’ll see in a moment, there is value in aesthetic appreciation beyond mere contemplation, but this value is not evident in aesthetic pleasure. It may have evolved because of what mere contemplation brings about, but from the point of view of the subject’s psychology, it is perceptual regard, not the consequent benefit, that motivates. Aesthetic pleasure is not, in other words, *prospective* with regard to the ultimate benefit of perceptual contemplation; rather, it is *reactive* with respect to contemplating the object of appreciation.

In their attempt to explain the evolution of aesthetic appreciation, some authors invoke the value of its *object* as an environmental resource for bodily maintenance or reproduction: the argument is that we aesthetically respond to *X* because *X* promotes our well-being. Here, for example, is Stephen Davies (2012) summarizing the argument that aesthetic pleasure is rooted in the beneficial:

Behaviors that are in our genes’ best interests are often self-motivating because we experience them as intrinsically pleasurable. We act in ways that are conducive to our biological flourishing because we enjoy doing so, not because we calculate their biological consequences. For instance, we enjoy food, drink, sex, sleep, and exercise for their own sakes. (13)

There is an important and correct idea in this passage, namely that animals evolve in such a way as to find “intrinsic pleasure” in activities that contribute to their “biological flourishing.” The true evolutionary benefit of the activity gets hidden. Davies’ idea is that aesthetic appreciation does not present itself as related to biological flourishing, but that this is the starting point from which it evolved. I agree with this: as I said earlier, aesthetic pleasure is *not informative* about any end achieved by the activity it urges on us, namely contemplation. The pleasure presents itself as “intrinsic,” though it has an ulterior benefit.

The idea that instrumental value is converted to intrinsic pleasure is insightful, but Davies then veers onto a wrong trail. We want to explain why there is evolutionary value in *perceptually contemplating* or regarding something, for aesthetic appreciation is pleasure taken in this activity. Davies wants to base this on our positive attitudes towards things that are used for some other purpose, for example, to satisfy an appetite.[[21]](#footnote-21) In effect, he regards aesthetic pleasure as object-forward rather than activity-forward, and possibly as prospective, rather than reactive.

The fact is that we need food, water, and shelter wherever we find ourselves and whatever form our social life takes. This alone may establish a baseline landscape aesthetic that is applied to varying local conditions . . . People who were naturally drawn to [congenial] habitats, who found them appealing and pleasing, would have had an edge in reproductive success over those who were not. (Davies 2012, 101)

That a certain habitat provides food and shelter is not (in either evolutionary or rational terms) a reason to *look at it*.[[22]](#footnote-22) (Of course, the fact that a place is good to behold is a reason to live there, but this is irrelevant to explaining why we find a habitat aesthetically pleasing in the first place.)

Let me reiterate this since overlooking the point has been the source of much confusion. Whether object-forward or activity-forward, pleasure is specific to an activity and an object. Gustatory pleasure tells us that something is good to eat. But it is uninformative about other things you can do with the object. It doesn’t enjoin us, for example, to *look* at the thing that is giving us gustatory pleasure. Similarly, aesthetic pleasure tells us that *contemplating* a certain object is desirable. It is uninformative about any other value of the object. To explain the aesthetic value of an object in utilitarian or evolutionary terms, we must show how contemplating that object contributes to flourishing. It won’t work to cite how some other activity directed to that object contributes to flourishing.[[23]](#footnote-23) As D. E. Berlyne (1971, 119) says, the artist is concerned with “stimulus patterns that have pleasurable direct effects on his nervous system, whether or not they lead indirectly to other satisfactions.”

John Tooby and Leda Cosmides (2001) give their theory of aesthetic appreciation the right structure. They write:

A human being should find something beautiful because it exhibits cues which, in the environment in which humans evolved, signalled that it would have been advantageous to pay sustained sensory attention to it, in the absence of instrumental reasons for doing so. (17)

Tooby and Cosmides distinguish between satisfying bodily needs (which the animal does in what they call the “functional” mode) and *learning* how best to satisfy bodily needs (which it does in “organizational” mode). Their theory locates aesthetic value in instruction—contemplating an object is instrumental in learning, i.e., it helps an animal to change its own environmental dispositions in order to adapt to its surroundings.

Tooby and Cosmides say, misleadingly, that the value of attentive contemplation does not depend on “instrumental reasons.” This it not what distinguishes it from eating when one is hungry. For as Tooby and Cosmides acknowledge, there is a benefit to “pay(ing) sustained sensory attention” to a beautiful object—the benefit is instruction. The difference between the object-forward evaluations and the aesthetic response lies in what is manifest in each attitude and what is hidden. The object-forward attitudes present a certain activity as valuable because the object of this activity is beneficial with respect to a further goal. By contrast, the aesthetic response presents its object as valuable just for the activity it promotes, and not for some further result of this activity. The evolutionary value of this further result is not manifest in aesthetic pleasure.

The constraint that I have just placed on the explanation of aesthetic pleasure is related to Kant’s idea that the aesthetic response does not depend on the actual existence of its object, but only on its perceptual representation. Kant’s example is that of a palace. One may long to live in Buckingham Palace or one may abhor its extravagance. One’s aesthetic response to the Palace is independent of either reaction. Suppose Buckingham Palace did not exist. Then one could not live in it, nor would it be an extravagance. But its “mere representation” would still elicit a certain sensory pleasure. This sensory pleasure is the aesthetic response. It is not dependent on consuming or possessing the object. However, Kant’s account adds something non-trivial to mine. According to him, the object itself is unnecessary: contemplating the representation of the object (for instance, by imagination) is sufficient. Kant apparently takes an “internalist” view of sensory enjoyment, i.e., one on which aesthetic enjoyment does not depend on the external object, but merely on one’s sensory state. I am sympathetic to this, but it should be recognized that it is not implied by the idea that aesthetic appreciation is reactive and activity forward.[[24]](#footnote-24)

## Part 2: The Explanatory Framework

### Play, Practice, Pleasure

I now present the general framework of skills development in which I locate my account of aesthetic appreciation and the origins of art.

A skill is an ability that is developed by repeated trying. Most human abilities are skills, though the trying comes in two varieties. (Possibly, this distinction is, at the margins at least, one of degree.)

In some cases, normally expected activities lead to development according to a predictable timetable. Early learning of language, numerical calculation, and walking fall into this category. Infants hear speech and try it out; they count and add; they learn to walk (Smith and Pellegrini 2013). Given normal expectations for exposure and activity, the associated ability develops to a certain level at a more or less predictable rate. Some children will be better at expressing themselves than others; some will be better at mathematics; some will be faster and more graceful walkers. But each will reach a certain level without extraordinary effort, merely by what is naturally available to them, or by spontaneous activity. And this *spontaneously developed* (SD) level will be sufficient to function in human society.

Now, these and other abilities can be developed beyond the SD level (which might be zero for many abilities). In the case of speech, individuals learn to project to large audiences, speak very clearly or very fast, and develop unusually large vocabularies or a facility for compelling rhetoric. In mathematics and physical activity, the analogues are obvious. They also learn to play the piano and sing opera and paint, to play basketball and compete in the triathlon, to compose poetry, to play chess, and to read x-rays for evidence of cancer.

Traditionally, the development of skills beyond SD levels was thought to be a continuation of the same pattern of learning, resulting, as Anders Ericsson (2006, 688) writes, in “an orderly progression from novice to intermediate and to expert.” But now it is increasingly being recognized that there is a transition at a certain stage from a developmental process more or less prefigured in our genes to a different kind of learning. Mere exposure is not enough at this point—for example, people who have attentively drunk a lot of wine are not necessarily very good at tasting (Valentin et al 2000); physics professors are not always very good at applying basic concepts to difficult problems (Reif and Allen 1992).

The second, non-spontaneous, phase in the development of skills requires more than mere exposure. Deliberate practice, positive goal-oriented reinforcement, and teaching are required. Individuals have to know the connection between techniques they employ and results that they achieve. Let us sum this up by saying that deliberate practice is *guided.*

Experts in training undertake arduous practice regimens with extraordinary discipline and dedication; they seek out coaching and instruction; they use specialized techniques; they rest between practice sessions; they persist with these regimens for up to a dozen years or more. Some even develop new techniques of exercising their skills, and teach others to use them (Ericsson, Krampe, and Tesch-Römer 1993, Ericsson 2006). All human skills can be increased in these ways to extraordinary *effortfully acquired* (EA) levels. At these levels, the skills are qualitatively different from those that are spontaneously developed. Motor skill learning, in particular, brings about brain changes often interpreted as the encoding of motor routine programs.[[25]](#footnote-25) But progress beyond a given level of skill requires that the automatic routines acquired at earlier stages be broken so as not to interfere with the more difficult tasks that can be accomplished at higher skill levels (Ericsson 2006, 696).

Both SD and EA levels of skill require trial and practice. But trying for an SD level of skill is undertaken spontaneously. To motivate this spontaneous activity, evolution has implanted in humans an urge to undertake and to prolong such activity on their own inclination. Thus, to echo Davies, we enjoy such activity for its own sake. It gives us pleasure.

Deliberate practice for an EA skill level is, by contrast, quite difficult. It needs substantial amounts of effort over a long period of time. Moreover, it is a structured activity that demands tutoring. Animals can acquire EA skill levels through training. (Think of sniffer dogs, Lipizzaner horses, and hunting falcons.) Some may even undertake deliberate practice. But humans regularly engage in skill-developing practice and learning routines because they want to develop the skills. They realize that skills that they have developed spontaneously can be developed to higher levels and are naturally motivated to undertake the mostly non-pleasurable practice routines that achieve this.

*Play* is activity that is (a) self-motivating because of the pleasure it gives, and (b) results in the development of SD levels of skill. Consider language. Infants babble and repeat words. This is a form of play for them. Playing in this way is essential for language learning. Similarly, consider chasing or batting a ball. Children get great pleasure out of these activities. By repeating them again and again, they develop essential motor skills.

Spontaneously developed language and motor skills are adequate for most purposes, but they are far below those of the most accomplished performers. An accomplished poet or playwright has a command of language that comes from repetition, practice, and instruction. She comes to this level of expertise with great difficulty. The same goes for an elite athlete.

SD levels of skill are achieved by pleasurable activity, EA levels by painful and difficult activity. But there is a kind of pleasure that comes with EA levels of skill as well. Somebody who is practising to reach a higher level of skill than she has thus far achieved experiences displeasure when she performs. Let’s say she’s a pianist practising Chopin’s *Etudes*. She is dissatisfied when she plays them at the skill level she has currently achieved; this is why she wants to improve her skill. But when she tries to play them in a way that sounds better—faster, more evenly, with more power—she finds that her fluency is poor. She has to break established automaticities in order to achieve a higher level of performance. Her teacher may introduce her to new techniques to help, or she may try them out on her accord, or even (if she is truly outstanding) invent them. But when she uses these new techniques, not only does she have to think step-by-step about what she is doing, which is stressful, but also she constantly fails. These are painful experiences. But when she finally is able to play at the skill level she is aiming for, she plays fluently and what she plays sounds good to her. [[26]](#footnote-26)

Generally speaking, then, there is pleasure in activity that is both *fluent* and *a match with one’s aspirations* with regard to skill; in other words, there is pleasure when there is no gap between aspirational skill level and achieved skill level. At a level that one has successfully attained, motor routines are efficiently executed. Moreover, these routines are not being creatively disrupted to get to a yet higher level. These are sources of pleasure. (In addition, of course, there is the satisfaction of having attained a goal. But I want to set this aside in order to focus in the pleasure taken in the actual activity of playing, or more generally of performing.)[[27]](#footnote-27)

The idea that aspirational skill level is self-dictated is documented by Ericsson, Krampe, and Tesch-Römer (1993). They document the pleasure that truly expert musicians take in practice. They also mention the frustration experienced by artists who for external reasons (often economic) cannot practise sufficiently, and consequently fail to achieve the quality of production to which they aspire:

Once these artists could no longer commit sufficient time and energy to maintain and improve their performance they stopped painting completely because they could not accept performing at the lower level. This finding shows that the activity of painting as such is not inherently motivating but rather the act of producing art that satisfies the artists’ subjective criteria for quality. (*ibid*., 372)

Each artist aspires to a different level of skill: some, as we know, find satisfaction at a relatively low level of performance. But it is in the nature of the human situation that *some* will be satisfied only at a level that exceeds the best in the world.

Why is activity that results in SD skill levels pleasurable? And why do humans undertake practice routines in order to develop skills beyond that level? One relevant factor with regard to both questions is surely that humans have phylogenetically exceptional organs that they exercise for characteristically human activities. We have uniquely dextrous hands that we use with extraordinarily fine motor control. We are bipedal; we have erect posture. We have vocal tracts that are uniquely adapted to the precise and variable articulation of a wide array of phonemes and tones (Belin 2006). Each of these faculties requires both specialized anatomical organs and also a nervous system that is able to control them. However, while the organs and the nervous system are present at birth, the ability to control them is not. What is present at birth is, instead, the joy of play. And this allows us to develop the uses for which our evolutionarily novel organs were selected.

As far as practice to achieve expert skill levels is concerned, the crucial factor is that most individuals realize quite early that their organs are capable of activity at far higher than SD levels. Evolution gave us a descended larynx, a straight vocal tract (which brings an increased risk of choking), a flexible tongue, and fine breath control; these facilities make speech possible (Belin 2006). But this apparatus can also be called on for extraordinary voice production that far exceeds the mere capacity to speak clearly or hold a tune. Similarly, our hands, which enable tool use, are also capable of exquisitely controlled activity that exceeds by far the rudimentary tool uses to which it is adapted in the first instance. In both cases, the organs that enable basic human activities are too good for just these activities. Realizing this potential, most individuals are motivated to exercise themselves to improve above SD levels in *some* area of performance. SD development is asymptotic, but individuals can always glimpse the possibility of higher achievement. They cannot develop EA skill levels in very many areas because the resource demands would be too great, but most do so in at least some areas.

To summarize then: There is natural pleasure in the kind of playful activity that is necessary for the development of SD skill levels. There is also a natural motivation to improve some skills beyond SD levels, but the activity required for this is arduous and unpleasant. However, there is pleasure in performing at the EA level of skill to which one aspires. It is worth noting that art production is a natural arena for the operation of EA skill levels. It always involves the use of uniquely human anatomy: music exploits the control of breathing, voice, fingers, and hands; dance is bipedal; visual art requires hand and arm control. Art is a good example of the play-practice-pleasure sequence outlined above.

## Part 3: The Theory

### Perceptual Play and Practice

Our perceptual receptors receive a “booming, buzzing confusion” of stimulation. Most relevant to art and beauty, vision gives us two slightly differing two-dimensional images; audition gives us two sound images each a summation of sonic emissions from many different sources. These images change from moment to moment, as the perceiver’s position as well as external circumstances change. Yet, perception delivers to our consciousness a remarkably clear and coherent presentation of discrete objects arrayed in three-dimensional space. This happens even in bad conditions—in near-darkness (in which stimuli are faint), in fog (where the outlines of objects are indistinct), in the noise of a loud party or concert (in which voices are fragmented and broken up), in the chaos of a carousel or fast-moving car (where nothing seems to stay still). In a huge range of conditions, many inimical to receiving information, perceivers have an extraordinary ability to construct a stable and coherent image of the world.

A number of psychologists (Ramachandran and Hirstein 1999, Zeki 1999, Livingstone 2002[[28]](#footnote-28)) have remarked on how visual art trades on the techniques that we use to extract perceptual information from confusing visual images. But they do not say why we get pleasure from contemplating these arrays. My theory invokes *play* and *practice*.The ability to perceive and to extract information from these chaotic arrays depends on trying. And at a certain level of skill development, evolution has made perceptual trying pleasurable because it results in necessary perceptual skills. At a higher level of skill development, performance at an aspired to level is pleasurable because it is fluent, and because the aspired to level has been achieved, there is none of the pushing upward to higher skill levels that is accompanied by a lack of fluency.

Here are some illustrative examples of how practice leads to perceptual skill.

(a) The extraction of some content from sensory stimulation is spontaneously developed early in life. But this is almost always dependent on exposure to sensory stimuli. For example, a famous series of studies in the nineteen-sixties (Reisen 1961, Held and Hein 1963, Hirsch and Spinelli 1970, Blakemore and Cooper 1970) showed perceptual deficits as well as visual cortex abnormalities in kittens that were deprived of sensory stimulation. Arguing to a similar conclusion, human infants become better at discriminating phonemes in their native language (Werker and Tees 1984) and faces of their native ethnicity, but worse for foreign-language phonemes and foreign-ethnicities—unless exposed to the unfamiliar items between the ages of 6 and 9 months (Pascalis et al 2005). Face recognition takes a long time to develop: only at adolescence are humans fully competent (Mondloch, Le Grand, and Maurer 2010). These abilities develop by self-motivated practice. Infants are fascinated by their sensory abilities: they gaze and listen intently; they mouth virtually everything they can get close enough to.

(b) Among adults, there are marked differences in the perceptual abilities of experts and novices. Experts effortfully acquire novel perceptual behaviours and techniques through practice, and this enables extraordinary levels of skill. Here are a few examples.

* Tom Busey and Fransciso Parada (2010) did a study of fingerprint experts, and found that they made smaller saccades when examining prints, and ignored spatial frequency information that tends to be irrelevant. (See Livingstone 2001 for spatial frequency selection in visual art.) They achieved these capacities by examining fingerprints again and again. (A similar shortening of saccades occurs in sensorimotor coordination: Wolpert, Diedrichsen, and Flanagan 2011.)
* In a more complicated situation, Jarodzka et. al. (2010) discovered that expert ichthyologists had different gaze patterns when looking at rapidly moving fish. They would attend to features more relevant to the classification of these fish and their swimming movements and ignore irrelevant features. This performance can be improved by training, for instance by leading subject gaze with spotlights that land where experts direct their gaze without external guidance (Jarodzka et. al 2013). Along the same lines, the gaze patterns of experienced soccer players is quite different during play than that of novices (Williams and Davids 1998, Salveburgh et. al. 2002).
* Finally, it has been suggested that perceptual learning can improve the visual performance of patients suffering from amblyopia (or “lazy eye”), a disorder in which information from an otherwise normal eye fails to be properly transmitted to the brain, often because of changes in visual brain areas (Levi and Li 2009). Repeated training on spatial location and frequency tasks is reported to improve the performance of these impaired individuals.

There is a difference between the results mentioned under (a) and (b) above: those under (a) are spontaneously developed; those under (b) are effortfully acquired. This difference closely parallels a distinction between “blind” and “myopic” flailing made by Robert Goldstone, David Landy, and Lionel Brunel (2011). Flailing is random perceptual activity that Goldstone et al conceptualize by analogy with infant movement—random bodily motion that develops motor skill by selective reinforcement. With respect to blind flailing, they observe that “simple random variation with reinforcement that may be internally generated is all that is needed to systematically improve perceptual systems.” However, in “myopic flailing,” “we may be interested in tweaking our perceptual system so that the tasks we need to perform are performed better.” In so doing, “people purposefully “hack” their perceptual systems in order to facilitate performance.” This encapsulates the distinction between the two kinds of trying that I want to develop.

In all cases, the development of the ability depends on exposure to patterns and regularities and learning to separate pattern from patter—or, as they say in scientific circles, signal from noise.[[29]](#footnote-29)

Now, two-dimensional visual pattern is a sign of significant three-dimensional features. (Hoffman 1998 is an excellent review.) Bayesian psychologists of perception study the many rules of pattern extraction and perceptual inference based on probabilistic rules of inference—rules of inferring what is the most likely real world configuration given the dynamic two-dimensional patterns available to us.[[30]](#footnote-30) For example, as Ramachandran and Hirstein remark, a series like this:

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is more naturally seen as a series of () objects than as a series of )( objects. The reason is that the boundaries of the former enclose a finite area, as most object boundaries do, while the latter are unbounded (and hence they do not suggest an object at all). In addition, the objects above would normally be seen as of the same size and at the same distance, since it would be a huge coincidence if different sized objects at different distances projected so regular a two-dimensional line-up.

The Gestalt rules of grouping are organizational principles that do work of this sort. Similarly, colour and luminance are separate indicators of depth and contour (Livingstone 2002). And auditory pattern such as synchronized voices, rhythms, harmonies are good indicators of how producers of sound are configured in the external world (Bregman 1990)—a rhythmic series, for example, indicates a coordinated source (such as a single dripping spigot or a single bird calling). It is natural, therefore, that we should be perceptually attentive to pattern. Practice with such patterns is spontaneous and pleasurable.

Additionally, there is a problem that perceptual systems must face *before* they can begin to extract representations of a solid world beyond from these visual and auditory patterns. It is to clean up the noisy images that are impressed on our sensory receptors. A straight line in the two-dimensional array is taken to indicate a straight line in three-dimensional space, Hoffman (1998) says—it would be too much of a coincidence if it were two lines at different distances that just happened to be aligned. However, given that there are dust motes, beams of light, and shadows that mess up the receptoral array, detecting a continuing straight line in the retinal array is not a trivial task. Getting a clean image is the first problem; inferring the state of the world outside is a second stage. So we have not only to be attentive to pattern, but also to be skilled at seeking it out. This sort of skill comes from repeatedly contemplating arrays with the goal of finding pattern.[[31]](#footnote-31)

The fingerprint experts mentioned earlier illustrate the point. A clean fingerprint is a good indicator of the identity of the person who left it. But actual prints lifted from crime scenes and from citizens have many irrelevant marks: lesions and raised scar tissue on the skin, uneven pressure of finger on receiving surface, abrasions and dirt on this surface, and so on. These interfere with the true image of the whorls of finger pads. The experts learn to filter these out by tuning out obscuring information in irrelevant spatial frequencies: what is important is the information that matches the spatial separation of each whorl from the next. Information that presents itself in other frequencies is irrelevant and needs to be ignored. They learn to do this by looking at a lot of fingerprints.

The repeated and extended contemplation of patterns is the basis of perceptual learning. Some such contemplation is self- or instructor-motivated with learning as a goal. A lot of perceptual expertise would fall into this category. But there is a core set of patterns for which evolution provides humans with an innate motivation to seek them out and then to contemplate them over time. This activity is motivated by an impulse to search out relevant patterns, and by pleasure when these are found. The patterns that evoke such behaviour include curves that indicate object boundaries, gently curving lines that suggest extended boundaries between two different environmental materials (e.g., land and water, or water and sky), and various indications of causal connection, such as repetition, symmetry, and acoustic harmony.[[32]](#footnote-32) (Some expertise-learning may also be pleasurable for reasons mentioned in the previous section. Consequently, they too can be sources of play-like pleasure, once an aspirational level of skill has been achieved.)

In my exposition, I have concentrated on early vision and audition and the importance of pattern detection for object recognition and scene analysis. Of course, pattern detection of various kinds plays a role in all perception. Consider for example how visual artists portray motion in painting and sculpture. This activates a fairly high-level visual task, namely the detection of frozen postural attitudes that indicate dynamic activity. (But see Livingstone 2002 on Mondrian’s *Broadway Boogie Woogie*.) Obviously this ability is both environmentally useful and non-trivial: to be able to tell upon a mere glimpse that a person is angry or amused, running or standing still. Zeki (1999) writes of Cubism’s attempts to present a view-invariant visual representation of three-dimensional objects, evidently a synthetic cognitive process that utilizes views from numerous perspectives:

The elimination of point of view became a prominent feature of many of Picasso’s portraits, so that the subject could seemingly be facing one direction or another. In later representative paintings such as *The Violin Player*, Picasso introduced so many different points of view that the painting ceased to be recognizable to the human brain . . . (85)[[33]](#footnote-33)

From my point of view, the point is more to contemplate many different views as views of the same subject from different perspectives. Picasso is playing, successfully or unsuccessfully, as it may be, on our delight in this perceptual exercise.

A remark is in order here about pictorial representation. Given human fascination with patterns relevant to scene analysis, vision will chance upon retinal patterns that normally indicate three-dimensional objects, but which are actually two-dimensional. These will attract attention, because upon further examination (particularly dynamic exploration, as in note 30 above) a tension will be revealed between real and simulated indications of external objects. This tension is a natural source of perceptual play that leads to the ability to recognize pictures for what they are, while at the same time being able to recognize what they portray. (Humans are pretty good at this, but not many other species can do it.)

I do *not* want to claim that pattern detection for skill is the only kind of perceptual activity that we find intrinsically pleasurable. There may well be other reasons for pleasure: for example, we may enjoy musical harmony because it causes the basilar membrane of the ear to vibrate in a non-conflicting way. There may be other examples of this, consequences of perceptual tuning effects, hormonal gratification, and other bodily processes. All pleasurable perceptual activities are potential primary attractors, and not all of these are pleasure-for-learning. A productive artist learns to exploit them skilfully nonetheless. Note, however, that no perceptual skill is fostered by these other sources of pleasure, and no ramping upwards of perceptual skills by practice. Nonetheless, creative skill may focus on these other sources of pleasure.

Here are some conclusions we may take from the above discussion.

1. Practice in pattern recognition develops perceptual skills.
2. Some (but not all) practice regimes are genetically implanted by evolution.
3. Practice that is genetically implanted by evolution is pleasurable.
4. Genetically implanted perceptual play is an individual adaptation: it is instrumental in acquiring core abilities essential for an individual’s perceptual detection of relatively universal features of a complex and changing environment.
   1. The kinds of patterns that are the target of genetic perceptual play often concern object or sound source scene analysis.
   2. These kinds of patterns have cross-cultural appeal as targets of perceptual play.
5. Sensory aesthetic appreciation is the pleasure of contemplating such patterns.
6. Sensory beauty is the property of being pleasurable to contemplate in this way.
7. Sensory beauty is the *primary attractor* of perceptual art.
8. There are practice regimes deliberately undertaken by individuals to develop skills beyond spontaneously developed levels.
   1. These practice regimes are guided; minimally, there is reinforcement for success and correction for error. Usually, it must be transparent how attempted techniques are effective in achieving goals.
   2. Deliberate practice brings about pleasure in performance at aspirational levels. This pleasure results from fluency of execution at the aspired to level of performance.
9. Artistic merit lies in skills at higher levels.

### Artefacts for Perceptual Play

Motor play and motor-skill acquisition are better-known phenomena than perceptual play, and so I will not spend a great deal of time explaining them beyond what has already been done in Section III above. The young of many species acquire and improve their motor performance by playing. Humans play all of their lives. There is a functional aspect to this: humans play with their children, which is why play extends into adulthood. But it may also be the result of a neoteny (i.e., a modification of developmental timing). That is, it might be that love of play is (non-functionally) extended beyond the point at which it is functional. However this may be, it is evident to all humans that their spontaneously developed motor skills can be improved. High levels of physical skill are developed through intense practice regimes, which are often motivated, at least in part, by the pleasure of play and facilitated by specific instruction.

Humans make things such as houses and clothes; they also do things such as walk and sing. The basic assumption of my approach to art is that since the primary attractors give us pleasure, there is a natural tendency to incorporate them into artefacts and performances. Further, human manual skill is needed to make things and as we have noted, skills of voice, bodily motion, and dexterity that are among the abilities that humans uniquely possess. And incorporating primary attractors into artefacts is manually skilled activity, which, by the principles already stated, some humans will be motivated to improve upon and develop. To put this in a nutshell, decoration adds value; those who possess the skill to make decoration realize this value.

So we can imagine a virtuous spiral in the co-development of perceptual and bodily skill: perceivers demand artefacts that challenge perception more; makers up the ante by developing their own skills and pitching their artefacts at a continually higher level. The process that I am describing plays out locally and in a culture-bound way; local manifestations are not genetically dictated. In other words, skill-escalation will take path dependent course, and therefore it will be different in different cultures. Yet the process is driven by dispositions and tendencies that all humans possess. These dispositions are basic enough to make art apt to occur in all cultures independently of one another.

Here is a parable to illustrate the process. Suppose that a primitive maker of cloth decorates her product with a repetitive design. She does this because (a) she finds it pleasant to look at, and also (b) it is pleasant to make as a skill-developing play-exercise that develop her motor skills and hand-eye coordination. Though time-consuming, this activity is adaptive and valuable. As it turns out, everybody else in the community shares in the perceptual pleasure she enables, which gives her an economic incentive to produce more cloth with patterns of the same sort. Maybe others copy her as well and insinuate themselves into her domain. Independently of this, there will be other cloth-makers who spontaneously decorate their product as well. At this point, repeated perceptual attention to the pattern will induce a greater sensitivity to the pattern by perceptual learning. Thus, people in the community (including the maker herself) become sensitized to imperfections in the repetitions—perhaps the spatial interval is not perfectly even, or perhaps the repeated element is not exactly the same throughout. This gives the maker and other makers the incentive to improve their production skills. They can do this by practising their manual skills.

Now suppose that the process repeats itself, greater skill of making resulting in greater perceptual skills, and these heightened perceptual skills resulting in greater demands on the maker, and consequently greater skills of making. This results in higher and higher levels of perfection in the repeated design. There will come a point beyond which both the perceptual and the manual skills involved can be improved only through effortful practice. At this point, the audience becomes fragmented. There will be some who appreciate the design, but who are unable to discern perfection beyond a certain point because they do not put arduous effort into the perceptual learning required. There will be others who by dint of practice and study are able to differentiate outstanding designs from ones that are merely very good. The maker will try to satisfy these very discerning consumers, though less discerning consumers will still appreciate the product up to a point. This is the stage at which art is established. The very fine execution appreciated only after considerable development of skill is a secondary attractor. It is a locally appreciated feature thrown up by the historical particularity of the process that occurred *here*. It is a refinement that can be economically valuable despite the extra effort involved in the production of something that is functionally supererogatory.

Before I go on, note that the process that I imagine is very different from others that have been proposed. Pinker (1997) sees arts as “Sunday afternoon projects of dubious adaptive value,” but which deliver “megadoses of pleasure.” He thinks that the magnitude of the pleasure delivered causes us to waste valuable time and resources to art production and appreciation. According to Pinker, art is a by-product of the faculties that provide the pleasure: it is an evolved spandrel. Dutton (2009) similarly thinks that the production of art is an adaptive disadvantage—it is a waste of time and energy—and seeks to explain it in terms of sexual selection and the “handicap principle.” Individuals who waste time working on art demonstrate that they have resources to spare, and hence that they are excellent mating prospects.

In my account, art is not evolved, but rather arises in a post-evolutionary context from evolved adaptive dispositions—play and skill development through deliberate practice. This is significant. The existence of aesthetic universals and the universality of art itself have been used to argue that art must be an evolved disposition. How else can art have arisen spontaneously in widely divergent cultures? My account is based on the psychology of human skills-development, and the co-development of perceptual skill and skills of making. The idea is that there are universals of cultural development.

Putting this disagreement with Pinker and Dutton aside, the deeper disagreement is that I find the emergence of art quite comprehensible in economic terms. We do not need to seek desperate measures to explain why people “waste time” on non-functional beauty—contemplating beauty is valuable for the perceptual skills that depend on doing so; creating patterns is valuable for the motor skills it develops. Given that these coordinate activities give us pleasure, it is quite natural that we should create art. Moreover, though perhaps unrelated to the basic bodily needs to which natural selection supposedly attends, art conforms to the laws of supply and demand, given cultural evolution of taste. On the other hand, it is not defined by the huge rush of pleasure it delivers to faculties that everybody possesses. Rather, it is defined by the high levels of discrimination necessary to extract fullenjoyment from it (which is not to deny that it *can* deliver Pinkerian mega-doses). (Incidentally, this is a reason to deny that animals have art. Some animals produce highly decorated objects. But as far as we know, animals do not appreciate these objects in a way that encourages specialized skills of discrimination beyond those that would spontaneously develop.)

The account that I have offered privileges decorative art. This is not surprising, since I have focussed on sensory processes to the exclusion of conceptual beauty. Nevertheless, some of the same issues recur in the broader realm. My basic idea is that the things humans make are preferable when they are beautiful, and that perceptual and manual skill learning leads from this starting point to the emergence of art. The emergence of “pure” art, if I may call it that, may seem a bit more puzzling. It may seem that making beautiful cloth is not a waste of time, because cloth is something useful, but making a beautiful painting is, because paintings serve no functional purpose. It should be obvious by now, however, that the same principles apply. It is not a big step from supposing that people prefer functional things when they are beautiful to the idea that they might consider non-functional things to be valuable for their beauty. The economic argument remains the same: they are willing to pay for beauty (whatever the form of payment might be in pre-monetary societies).

### Two Concluding Remarks on Form

I hesitate to say anything about so recondite a subject as form, and in any case even a minimally adequate understanding of form demands an excursus into conceptual development and cultural evolution. As I have emphasized, my concern here is narrower. Nevertheless, I shall essay two very tentative remarks to conclude my discussion.

In the previous section, I portrayed art as an upward spiral of perceptual and productive skills, beginning with naturally pleasurable activities of perceiving and making, but advancing to skill levels that demand practice and learning. Clearly form emerges at this later stage. Our cloth maker gets into highly skilled decoration aimed at connoisseurs who have developed perceptual skills. Her skilful activity encourages the invention and improvement of certain techniques and devices. The decorator becomes progressively better at producing a particular kind of pattern or using a particular kind of technique; the consumer becomes progressively better at discriminating between good and poor executions of these devices. The cloth maker has developed a *style*; a community of cloth makers would converge on an *art form* that codifies style. This style would at least partially be dictated by the skills of sophisticated consumers. The creativity of the producer is expressed in innovative uses and brilliant allusions to the style. Of course, this is compatible with the parallel emergence of kitsch and tchotchkes: artefacts that please the unsophisticated by emphasizing primary attractors.

Looked at in this way, form is a natural outcome of the spiralling process of coordinated skills development. We would expect that art would be graded by the standards of an art form. This grading would have an objective basis, at least in traditional art, where deliberate displays of non-skill have not as yet acquired conceptually mediated value. As John A. Fisher (2012) writes about “high” art:

The ethnomusicologist Bruno Nettl points out that distinctions between broad categories of music and consequent value hierarchies are common in societies as diverse as the Blackfoot, Asian societies and traditional Iranian societies (Nettl 2005: 364). The high/low distinction is not a local bias. (475)

Fisher is speaking here of art forms rather than art works, but the prediction for both is the same: higher skills of production lead to higher skills of perceptual discrimination, and both lead to higher deemed value.

Form can have another role as well. Once an art form is established it serves as a set of rules within which interactive play can be initiated. The artist can “hide” primary attractors within a form to challenge the consumer—for instance by using form as an indicator of hidden pleasures in visual art, or by hiding a melody behind a transcription. Thus conceived, the rules of form are like rules of a game. In a game, a certain goal (such as checkmate in Chess, or putting a ball in a hole in Golf) is constrained and made more difficult by the rules (Suits 1978, 1988). For reasons that (in my view) connect to the motivations of skills development, achieving the goal in the constrained way is more enjoyable than achieving it in a more straightforward way. Thus conceived, form permits the artist to play with her audience, setting the audience a task that has to be figured out within the framework of rules. This is another characteristic of what is known as high art.

But exploring these issues is more than I am able to undertake here.

## REFERENCES

Baxandall, Michael (1972) *Painting and Experience in Fifteenth-Century Italy* (Oxford: Clarendon Press)*.*

Belin, Pascal (2006) “Voice Processing in Humans and Non-Human Primates”, *Philosophical Transactions of the Royal Society B* 361, 2091-2107.

Berlyne, D. E. (1970) “Novelty, complexity, and hedonic value”, *Perception & Psychophysics* 8, 279-286.

Berlyne, D. E. (1971) *Aesthetics and Psychobiology* (New York: Appleton-Century-Crofts).

Blakemore, Colin and Cooper, Grahame F. (1970) “Development of the Brain Depends on the Visual Environment”, *Nature* 228, 477-478.

Bullot, Nicolas J and Reber, Rolf (2013) “The Artful Mind Meets Art History: Toward a Psycho-Historical Framework for the Science of Art Appreciation”, *Behavioral and Brain Sciences* 36, 123-137.

Busey, Thomas A., and Parada, Francisco J. (2010) “The Nature of Expertise in Fingerprint Examiners”, *Psychonomic Bulletin and Review* 17, 155-160.

Davies, Stephen (2012) *The Artful Species* (Oxford: OUP).

Dissanayake, Ellen (1974) “A Hypothesis about the Evolution of Art from Play”, *Leonardo* 7, 211-18.

Dissanayake, Ellen (1988) *What is Art For?* (Seattle, University of Washington Press).

Dutton, Denis (2009) *The Art Instinct* (Oxford: OUP).

Ericsson, K. Anders, Krampe, Ralf Th., and Tesch-Römer, Clemens (1993) “The Role of Deliberate Practice in the Acquisition of Expert Performance”, *Psychological Review* 100, 363-406.

Ericsson, K. Anders (2006) “The Influence of Deliberate Practice on the Development of Superior Expert Performance”, in K. A. Ericsson (ed.) *The Cambridge Handbook of Expertise and Expert Performance* Cambridge: Cambridge University Press, 683-703.

Fisher, John A. (2012) “High Art Versus Low Art”, in B. Gaut and D. M. Lopes (eds.) *Routledge Companion to Aesthetics*,3rd edition (London, Routledge), 473-484.

Frijda, Nico (2010) “On the Nature and Function of Pleasure”, in M. L. Kringlebach and K. C. Berridge (eds.) *Pleasures of the Brain* (New York, OUP), 99-112.

Gibson, Eleanor J. (1963) “Perceptual Learning”, *Annual Review of Psychology* 14, 29-56.

Goldstone, Robert L. (1998) "Perceptual Learning", *Annual Review of Psychology* 49, 585-612.

Goldstone R. L., Landy, D. H., and Brunel, L. C. (2011) “Improving Perception To Make Distant Connections Closer”, *Frontiers in Psychology* 2: article 385. doi: 10.3389/fpsyg.2011.00385.

Goldstone, Robert L. and Byrge, Lisa (forthcoming) “Perceptual Learning”, in M. Matthen (ed.) *Oxford Handbook of the Philosophy of Perception* (Oxford: OUP).

Gombrich, E. H. (1979) *The Sense of Order: A Study in the Psychology of Decorative Art* (London, Phaidon).

Hagemann, Norbert, Shorer, Jörg, Cañal-Bruland, Rouwen, Lotz, Simone, and Strauss, Bernd (2010) “Visual Perception in Fencing: Do the Eye Movements of Fencers Represent Their Information Pickup?” *Attention, Perception, & Psychophysics*, 72(8), 2204-2214.

Held, Richard, and Alan Hein (1963) "Movement-produced stimulation in the development of visually guided behavior", *Journal of Comparative and Physiological Psychology* 56, 872.

Hirsch, Helmut V., and D. N. Spinelli (1970) "Visual experience modifies distribution of horizontally and vertically oriented receptive fields in cats", *Science* 168, 869-871.

Hoffman, Douglas (1998) *Visual Intelligence: How We Create What We See* (New York, W. W. Norton).

Hyman, John (2010) “Art and Neuroscience”, in R. Frigg and M. C. Hunter (eds.) *Beyond Mimesis and Convention*, *Boston Studies in the Philosophy of Science* 262 Dordrecht: Reidel: 246-261. DOI 10.1007/978-90-481-3851-7\_11,

Jarodzka, Halszka, Schelter, Katharina, Gerjets, Peter, and van Gog, Tamara (2010) “In the Eyes of the Beholder: How Experts and Novices Interpret Dynamic Stimuli”, *Learning and Instruction* 20, 146-154.

Jarodzka, H., van Gog, T., Dorr, M., Scheiter, K., & Gerjets, P. (2013) “Learning to see: Guiding Students’ Attention via a Model's Eye Movements Fosters Learning”, *Learning and Instruction*, 25, 62-70.

Klein, Richard G. with Edgar, Blake (2002) *The Dawn of Human Culture* (New York: John Wiley).

Levi, Dennis M. and Li, Roger W. (2009) “Perceptual Learning as a Potential Treatment for Amblyopia: A Mini-Review”, *Vision Research* 49, 2535-2549.

Livingstone, Margaret S. (2002) *Vision and Art: The Biology of Seeing*. (New York: Harry N. Abrams).

Livingstone, Margaret S. (2001) “Is It Warm? Is It Real? Or Just Low Spatial Frequency?” *Science* 290, 1299.

Luft, Andreas R and Buitrago, Manuel M (2005) “Stages of Motor Skill Learning”, *Molecular Neurobiology* 32, 205-216.

Matthen, Mohan (2012) “Art and Evolution”, in B. Gaut and D. M. Lopes (eds.) *Routledge Companion to Aesthetics*,3rd edition (London, Routledge), 278-288.

McMahon, Jennifer Anne (2000) “Perceptual Principles as the Basis for Genuine Judgments of Beauty,” *Journal of Consciousness Studies* 7 (8-9): 29-35.

Miller, Geoffrey (2000) *The Mating Mind* (New York: Random House, Anchor Books).

Mondloch, Catherine J., Le Grand, Richard, and Maurer, Daphne (2010) “Development of Expertise in Face Recognition”, in I. Gauthier, M. J. Tarr, and D. Bub *Perceptual Expertise: Bridging Brain and Behavior* (New York: OUP), 67-107.

Moore, G. E. (1903) *Principia Ethica* Cambridge: Cambridge University Press.

Nettl, Bruno (2005) *The Study of Ethnomusicology: Thirty-one Issues and Concepts* (Urbana: University of Illinois Press).

Parsons, Glenn and Carlson, Allen (2008) *Functional Beauty* (New York: OUP).

Pascalis, O., Scott, L. S., Kelly, D. J., Shannon, R. W., Nicholson, E., Coleman, M., & Nelson, C. A. (2005) “Plasticity of Face Processing in Infancy”, *Proceedings Of The National Academy Of Sciences Of The United States Of America*, 102, 5297-5300.

Pinker, Steven (1997) *How the Mind Works* (New York: W. W. Norton).

Raffman, Diana (2003) “Is Twelve-Tone Music Artistically Defective?” *Midwest Studies in Philosophy* 27, 69–87.

Ramachandran, V. S. and Hirstein, William (1999) “The Science of Art: A Neurological Theory of Aesthetic Experience”, *Journal of Consciousness Studies* 6, 15-51.

Reif, F. and Allen, S (1992) “Cognition for Interpreting Scientific Concepts: A Study of Acceleration”, *Cognition and Learning* 9, 1-44.

Riesen, A. H. (1961) “Studying Perceptual Development Using the Technique of Sensory Deprivation”, *The Journal of Nervous and Mental Disease*, 132, 21-25.

Salmon, David P. and Butters, Nelson (1995) “Neurobiology of Skill and Habit Learning”, *Current Opinion in Neurobiology* 5, 184-190.

Savelsbergh, G.J.P., Williams, A.M., Van der Kamp, J., and Ward, P. (2002). “Visual Search, Anticipation and Expertise in Soccer Goalkeepers”, *Journal of Sports Sciences*, 20, 279- 287

Shiner, Larry (2001) *The Invention of Art: A Cultural History* (Chicago: University of Chicago Press).

Smith, Kyle S., Mahler, Stephen V., Peciña, Susana, and Berridge, Kent C. (2010) “Hedonic Hotspots: Generating Sensory Pleasure in the Brain”, in M. L. Kringlebach and K. C. Berridge (eds.) *Pleasures of the Brain* New York, Oxford University Press, 27-59.

Smith, Peter K. and Pellegrini, Anthony (2013) “Learning Through Play”, *Encyclopedia of Early Childhood Development* Published online at <http://tinyurl.com/ktprcbs>.

Suits, Bernard (1978) *The Grasshopper: Games, Life, and Utopia* (Toronto: University of Toronto Press).

Suits, Bernard (1988) “Tricky Triad: Games, Play, and Sport”, *Journal of the Philosophy of Sport* 15, 1-9.

Tooby, John and Cosmides, Leda (2001) “Does Beauty Build Adapted Minds? Toward an Evolutionary Theory of Aesthetics, Fiction and the Arts”, *SubStance* 30, 6-27.

Valentin, D., Pichon, M., de Boishebert, V., and Abdi, H. (2000) “What’s in a Wine Name? When and Why Do Wine Experts Perform Better Than Novices”, *Abstracts of the Psychonomic Society* 5, 36.

Werker, Janet and Tees, Richard (1984) “Cross-Language Speech Perception: Evidence for Perceptual Reorganization During the First Year of Life”, *Infant Behaviour and Development* 7, 49-63.

Williams, A. M. and Davids, K. (1998). “Visual Search Strategy, Selective Attention, and Expertise in Soccer.” *Research Quarterly for Exercise and Sport*, 69, 111-128.

Wolpert, Daniel M., Diedrichsen Jörn, and Flanagan, J. Randall (2011) “Principles of Sensorimotor Learning”, *Nature Reviews Neuroscience* 12, 739-751.

Wulf, Gabriele and Shea, Charles H. (2002) “Principles Derived from the Study of Simple Skills Do Not Generalize to Complex Skill Learning”, *Psychonomic Review and Bulletin* 9, 185-211.

Wyvell, Cindy L. and Berridge, Kent C. (2000) “Intra-Accumbens Amphetamine Increases the Conditioned Incentive Salience of Sucrose Reward: Enhancement of Reward "Wanting" without Enhanced "Liking" or Response Reinforcement”, *Journal of Neuroscience* 20, 8122-8130.

Zeki, Semir (1999) “Art and the Brain”, *Journal of Consciousness Studies* 6, 76-96.

1. I am grateful to Kevin Connolly, Rob Goldstone, Bence Nanay, William Seeley, Barry Smith, and two anonymous referees for helpful comments. [↑](#footnote-ref-1)
2. Some (e.g., Shiner 2001) claim that art is a recent European invention, on the grounds that in older times, functional artefacts counted as art, but (according to him) no longer. (See Dutton 2009, chapter 4, for an incisive rebuttal of views in this family.) I won’t directly address this kind of point, which is about the meaning of a word. My claims can be reformulated by saying that art in Shiner’s less inclusive sense comes from the same psychological urges as art in the (allegedly) older, more inclusive sense. [↑](#footnote-ref-2)
3. Dutton (2009), Davies (2012), and Matthen (2013) are recent philosophical treatments. See Gombrich (1979), Dissanayake (1988), Tooby and Cosmides (2001), and Klein with Edgar (2002) for samples of perspectives from other disciplines. [↑](#footnote-ref-3)
4. I will deal only with the perceptual aspects of art appreciation here and leave aside the pleasures that art gives us through the exercise of our intellects. [↑](#footnote-ref-4)
5. Ellen Dissanayake (1978) advanced the idea that art is a form of play. Her paper was an inspiration, but the way I develop the idea of play is new. [↑](#footnote-ref-5)
6. This could serve as the foundation for extending the ideas of this paper beyond the realm of the senses and bodily skills. [↑](#footnote-ref-6)
7. They may not be necessary either. I will assume for present purposes that in every culture art originates with things made to exemplify primary attractors, though it may historically develop in such a way that this becomes less essential. [↑](#footnote-ref-7)
8. John Hyman (2010) makes a similar point, but adds that Ramachandran and Hirstein don’t “distinguish between a sculpture that represents a woman with big breasts and a woman with big breasts” (250). The latter point presupposes, not implausibly, that the appeal of “a woman with big breasts” rests on the peak shift effect. [↑](#footnote-ref-8)
9. An Amazon.com summary of a video called “Rembrandt’s Masterly Brushstrokes”: http://tinyurl.com/oglx8ul. [↑](#footnote-ref-9)
10. The story and the two paintings can be found at tinyurl.com/kjmn7jq. It’s possible that some experts in, say, 18th century France would have hated the Wyeth. However that might be, I venture that nobody at any time would have accorded the Bauernschmidt the status of (good) art. [↑](#footnote-ref-10)
11. Gombrich is sardonic again: “To my knowledge no contemporary member of the culture criticized an Indian temple, a Moorish Palace, a Gothic Cathedral or a Spanish Baroque Church as ‘over-ornate.’” This shows the art-form specificity of “restraint” as a secondary attractor. G. E. Moore (1903) takes a different line, claiming that classicism sees value in the *whole* from which valuable parts would only detract (214-216). Moore’s approach neglects the secondary attractors, which (even in a classical work) might well have to do with parts (such as a novel way of executing a particularly difficult feature or effect). [↑](#footnote-ref-11)
12. http://tinyurl.com/kmekcgg [↑](#footnote-ref-12)
13. Along Pinkerian lines, Ramachandran and Hirstein (1999) highlight the role of visual exaggeration, appealing to the so-called “peak shift” phenomenon, and display the exaggerated curviness of nudes in Indian Chola sculpture as an example ([tinyurl.com/nytyr7x](http://tinyurl.com/nytyr7x).) While important for pattern detection, which I make the foundation of the primary attractors below, it is unclear how Ramachandran and Hirstein can account for the extraordinary delicacy in the portrayal of movement and emotion in Chola sculptures such as the one just exampled (though of course they are well aware of these virtues). [↑](#footnote-ref-13)
14. I am not, of course, taking the evaluation of connoisseurs to be constitutive of art. [↑](#footnote-ref-14)
15. Davies (2012) argues that art *production* is also universal. I very much doubt this. His evidence is that most humans undertake activities like doodling, making up stories for their children, and humming tunes. In my view, this kind of activity falls well short. Often, it is an instinctive bodily response to art—I hum a tune from the opera because that’s a natural consequence of enjoying it, not because I want to *perform* it. [↑](#footnote-ref-15)
16. http://tinyurl.com/kvd3bse. [↑](#footnote-ref-16)
17. Many secondary attractors are art-form and culture specific, while the primary attractors have broader, some even universal, appeal. This might indicate that a dual source theory is needed to understand art. Nicolas Bullot and Rolf Reber (2013) offer a dual aspect theory; they argue that while human psychology explains certain universal aspects of art, “art history” is needed too because artist and culture specific factors are also relevant. I agree, but attempt to offer a unified account. [↑](#footnote-ref-17)
18. I use the term ‘contemplation’ because it is neutral with respect to the modalities. Thus looking, gazing, listening etc. count for me as perceptual contemplation. The spiritual echoes of the term should be disregarded. I will occasionally use the more awkward term ‘regard’ for the sake of variation. [↑](#footnote-ref-18)
19. Berlyne 1971 assimilates prospective evaluations to states of arousal. Unfortunately, he equates pleasantness with arousal potential. This seems to me to confuse remembered pleasure, which can be prospective, with being pleasant, which is reactive. [↑](#footnote-ref-19)
20. The distinction between prospective and reactive evaluation is similar to Kent Berridge’s distinction between wanting (prospective) and liking (reactive). Wanting is dopamine-fuelled, while liking is caused by opioids. See Wyvell and Berridge 2000. [↑](#footnote-ref-20)
21. Davies is not alone in this. See, for example, Dutton (2009) on landscape. Darwin apparently originated this line of thought; he thought that animals *aesthetically* respond to potential mates. “When we behold a male bird elaborately displaying his graceful plumes or splendid colours before the female . . . it is impossible to doubt that she admires the beauty of her male partner. As women everywhere deck themselves with these plumes, the beauty of such ornaments cannot be disputed,” he says in chapter 3 of *The Descent of Man*. (In chapter 14, however, he acknowledges that this is not “direct evidence,” and cites the habits of bowerbirds as better indications.) [↑](#footnote-ref-21)
22. A referee notes: “Davies writes about being drawn to it or beckoned by it, not about looking at it.” I acknowledge this; it is precisely my complaint that aesthetic appreciation can’t be founded on something “beckoning” the subject as a good place to live. As I argued earlier, aesthetic pleasure “motivates continued perceptual regard, but it is not informative with regard to any end achieved by undertaking this activity.” [↑](#footnote-ref-22)
23. Davies notes that we often find functional objects to be beautiful; one might add that one sometimes appreciates how beautifully adapted they are to their functions. This does not negate the fact that aesthetic pleasure is pleasure in perceptually regarding an object. If I understand them correctly Glenn Parsons and Allen Carlson (2008) offer a theory of “functional beauty” that respects this constraint. [↑](#footnote-ref-23)
24. Kent Berridge’s treatment of pleasure, or liking—see Smith et al 2010—converges with an internalist approach, since it posits certain hedonic centres of the brain that are closely associated with sensory signals from an object. These centres can be activated independently of veridical perception. [↑](#footnote-ref-24)
25. Salmon and Butters 1995, Wulf and Shea 2002, Luft and Buitrago 2005, Wolpert, Diedrichsen, and Flanagan 2011 review relevant principles of motor skill development. [↑](#footnote-ref-25)
26. Wulf and Shea (2002, 186) note that the functional complexity of a task decreases with expertise, resulting in faster reaction and movement times, smaller response errors, reduced attention demands, increased movement efficiency, and changes in the number of degrees of freedom utilized to produce movement. [↑](#footnote-ref-26)
27. Suits (1988) distinguishes between merely doing something for its own sake (which he entitles play) and doing it with some other goal in mind. He sees professional athletes as engaged in the latter; they “play” for gain. My taxonomy is bit more complicated: an elite athlete may well take pleasure in performing, but usually getting to her high level requires unpleasant deliberate practice. What Suits misses, I think, is that this unpleasant practice is often, or even always, motivated (at least partially) by the improvement it brings, which is a natural human aim, not one that is motivated externally by fame or money. [↑](#footnote-ref-27)
28. This approach has its roots in the work of Donald E. Berlyne. (See his 1971.) [↑](#footnote-ref-28)
29. For extended discussion of perceptual learning, see Gibson (1963), Goldstone (1998) and Goldstone and Byrge (forthcoming). [↑](#footnote-ref-29)
30. Dynamic patterns are temporally extended, changing, but connected patterns created by environmental change and by exploratory activity on the part of the perceiver. For example, a sphere presents a constant profile with observer movement, while an ovoid does not. This is one of the features that humans use to distinguish the two. Though extremely important in the context of the aesthetic response, I will not complicate the present account by considering dynamic profiles in detail. [↑](#footnote-ref-30)
31. Semir Zeki (1999) suggests that art is a “search for the constant, lasting, essential, and enduring features of objects,” and compares its activity to that of vision, which searches for constancies in visual information, and discards confusing variables. My idea is along the same track, but while Zeki focuses on visual constancies, my target is the activities that enable us to develop the skills to detect these constancies. My explanation accounts for the pleasure we take in contemplating these patterns; Zeki’s does not. [↑](#footnote-ref-31)
32. A referee insightfully remarks on “the ways in which artists achieve effects by deviating from what would generate those same effects in the actual world,” mentioning “shading, hatching, chiaroscuro, speed lines, and the rest.” I do not have, ready to hand, an empirical take on the effectiveness of these techniques. It is possible that they replicate actual visual effects more faithfully than is apparent at first glance. (Livingstone 2002 is full of examples of this kind of thing.). My guess, though, is a bit different: that we delight in them precisely because they are both like and unlike visual effects we find in the actual world, and that we delight in discerning the fake from the real. Compare what I say below about pictorial representation. [↑](#footnote-ref-32)
33. Diana Raffman (2003) makes a similar point about twelve-tone music: that the listener cannot recover the seriality of the composition. She makes this a point of criticism, however, which Zeki does not with regard to Picasso. [↑](#footnote-ref-33)