Foreword: Aesthetics and Neuroaesthetics

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Since ancient, if not primordial, times, humans wondered about art: why do we have art? How did we come to have art? What is the value of having art? Why do we experience pleasure in relation to art, and why does some art engender more pleasure than other art, and that only, apparently, for some people and not for all of us? Answering such questions is beyond the scope of a single book. Nor is it appropriate for a course manual to do more than set out the questions, provide informative contexts as well as equip readers and students with a basic set of skills to enable them to at least begin a journey of discovery. Hence, the present textbook aims to offer exactly that. We will begin a marvellous questing journey and walk the sometimes beaten, sometimes arduous, path, together, for a

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little while (at least for an academic semester). Hopefully, the journey will prove to be sufficiently interesting for you, the reader, to continue walking the path. Likely, you will never be alone on this sinuous journey. You will meet other scholar-travellers, from many different disciplines, who will walk with you for a longer or shorter period of time. Together, you will find magical oases of thought, Grail-like questions to ask and answer, stormy weather, and calm seas. It will be a wondrous journey.

But let us begin with the first steps. The very first step is to provisionally answer the question: 'What is neuroaesthetics?' An immediate, but not very useful, answer is that neuroaesthetics is the neuroscientific study of aesthetics. Let us postpone for a little while the more informative and useful answer, but only in order to better understand it. For, before we proceed to that answer, a historical overview of philosophical and empirical approaches to the study of aesthetics is in order.

Classical philosophical thought on aesthetics linked aesthetics with beauty. In that regard, it seems, all roads lead to Plato (c. 428–c. 348 BC). In his entry on Plato's aesthetics in the *Stanford Encyclopedia of Philosophy*, Nickolas Pappas points out at the outset that a major thread in Plato's philosophy of aesthetics posits a dilemma for modern readers: while Plato aligned beauty with the greatest good, he aligned art with the greatest danger. How can beauty be good, but art be dangerous? For Plato, beauty meant a perfection of form. However, he argued that perfect forms could only be found in an object's archetype and that all archetypes are located in a transcendental space of perfection. Hence, for each class of objects that exists in our mundane, natural world (say, amphoras) there exists a perfect single form (an archetypal amphora without physical existence) in the transcendental space of ideas, a space that sits beyond the physical world, that is, on a metaphysical plane. Therefore, while beauty belongs on a metaphysical plane of perfection beyond this world, art (or, more appropriately, *technê*, or craft) belongs in our natural, physical world. We may aspire to create the perfect form physically, but we will never be able to do so because the perfect form is without materiality. Hence, to the extent that art, imitating perfect forms, distances us from those forms, it is dangerous. However, if art objects can offer glimpses into perfect forms, then art serves a good purpose. Art can offer glimpses into perfect forms when it has beauty. The more beauty an object has, the more one is attracted to the object and compelled to extrapolate the possibilities of perfection. Attraction can mean love. If beautiful objects (and people!) set forth love, they set forth the beholder on a quest for uncovering the transcendental, otherworldly perfection of ideal forms. Beauty is more a measure of perfection than an intrinsic property of the object, and its correlate is the intensity of love. An object that manifests an ideal form, however imperfectly, may set out beauty according to how it sets forth the love required to propel one towards perfection. Beauty, it seems, is neither a property of ideal, immaterial forms, nor an intrinsic property of material objects that embody those forms imperfectly, but rather a quality of the experience of intuiting perfection. That is not an empirical approach to beauty, but rather one that invites introspection!

If Plato can be regarded as our almost archetypal idealist, around the same time, philosophers identified as Sophists can be regarded as developing philosophical thought that sits directly opposite to that of Plato (although a continuum between these extreme positions existed, as it always does). Much ink has been spilled on discussing Plato in the context of the *sophistēs*, directly proportional to the importance of the issues at stake, as one may surmise. As the root of the word *sophistēs* indicates, derived as it is from *sophia*, meaning 'wisdom', and *sophos*, meaning 'wise', sophist practice cultivated the embodiment of wisdom. 'Embodiment' here must be primarily understood in rather pragmatic terms, in the sense that it refers to the art of speaking and persuasion, and not to a content or corpus that constitutes wisdom. The sophists were purposeful when it came to wisdom, and were even accused of being materialistic by Plato, who disliked them for that reason. In Plato's dialogue, *Gorgias*, the Sophists' sophistry is compared to *kommōtikē*, 'cosmetics' or 'self-adornment', being negatively distinguished from truth and reality as promoting seeming and appearance (but alternative interpretations of Plato's use of the terms have been developed, for example, by Reames) (Reames, 2016). If beauty is a praxis of persuasion, seen by Plato as a cultivation of appearance, one may surmise that the Sophists were both utilitarian ('make things to appear beautiful, whether they are or not') and subjective ('beauty exists if one believes it exists'). And, in addition, they liked to be paid for making things look good and beautiful or teaching others the ways in which this might be achieved through mere use of speech (for a detailed presentation of Sophist practice and method see Wolfsdorf, 2015). Moreover, from the prominent Sophist, Protagoras (c. 490 BC–c. 420 BC), we have inherited the saying that 'Man is the measure of all things', a phrase where 'man' is usually capitalised when it shouldn't be. Protagoras may have not referred to an abstract 'Man', or humanity in the masculine, but rather to each man's individual experiences that inform the ways in which each individual measures, or weighs, what is one thing or other (Mansfeld, 1981). Beauty, then, in spite of the Sophists' pragmatism, is subjective—it is in the eye of the beholder. While pragmatic in its emphasis on factual experience, this approach to beauty, like Plato's, is not empirical. But the experience of beauty, alas (or fortunately?), keeps us closer to the mundane, as opposed to distancing us from it. It is not a measure of the intensity of longing for perfection (as with Plato), but a measure of individual experience, what modern psychologists might call a self-reported score on a self-created scale.

Plato and the Sophists have bequeathed to us frames of thought on which we, mere mortal moderns, like to build all too clear-cut dichotomies, such as the mundane vs. the sacred, realities vs. ideals, or disembodied vs. embodied. But closer inspection of modern philosophical thought, meaning those philosophies that emerged after the scientific revolution of the seventeenth century and the first industrial revolution that began in England in the 1750s, may help us set things right, so to speak.

The seventeenth century, the beginning of European modernity, marks an increasing alignment of art and science. As the century of classicism and later the Enlightenment, the importance of harmony, clarity, and brevity of the work of

art is now emphasised along with expression and taste (Ferry, 1990). A true manifesto of classicism, *Poetic Art* (1674) by Nicolas Boileau (1636–1711) marks the departure from ancient and medieval aesthetics, although it continues to keep at the centre previous frameworks that held together aesthetic object, beauty, and imitation. However, according to Boileau, an object is beautiful if it imitates nature on the basis of harmony and utility, and on the basis of general laws. The work of art needs an appropriate language, but above all it needs clarity and brevity, as we see masterfully exemplified in the work of the great French classics Pierre Corneille (1606–1684), Jean-Baptiste Poquelin (Molière) (1622–1673), Jean De La Fontaine (1621–1695), Jean Racine (1639–1699), where no word seems to be unnecessarily used. We see how beauty is sought in art in its original sense of production (from the Greek *to poein*): the artist is a perfect craftsman who creates an object that in turn imitates another object. It is not by chance that classical aesthetics has a huge passion for all things antique. The emphasis on measure, proportion, harmony, and balance is taken forward from Aristotle, Horace, Quintilian, or Vitruvius.

In this context, let us consider the work of Gottfried Wilhelm Leibniz (1646–1716), a man of his time yet often proposing ideas that seem to belong in our own time. If individuality, theory of small perception, and common sense, are some of the elements later used by Alexander Gottlieb Baumgarten (1714–1762), Immanuel Kant (1724–1804), and modern aesthetics more generally, Leibniz emphasises the idea of this world as not only the best but also the most beautiful of all possible worlds (Leibniz, 1985). The quantity of beauty and the ingredients of beauty can be measured with the right instruments, but only God can calculate the amount of beauty and the ingredients of beauty in every possible world. Therefore, based on the law of the optimum, God brought into existence that world, which is the most beautiful, i.e. our world (Leibniz, 1985). However, the important thing for our effort to define neuroaesthetics is the idea that beauty is quantifiable, an idea that brings us one step closer to aesthetics as a science.

As an autonomous discipline, but also as a science, modern aesthetics might be said to begin with Baumgarten, who moves further and further away from Aristotle. According to the Stagirite, there is no science of individual things; knowledge (episteme) is the science of the universal; particular facts are studied by history (see Aristotle, *Poetics*, 1988). In *Aesthetics* (1750), along the lines of the Enlightenment and in line with mid-eighteenth-century advances in science, Baumgarten seeks a place for what Aristotle removed from the purview of aesthetics, namely, particular facts. As a science of individual things researched through the senses, aesthetics is the science of sensible things, but also the theory of liberal arts, the doctrine of inferior knowledge, the art of beautiful thinking, and also the art of the analogue of reason (Baumgarten, 1986). Imposing the autonomy of art and beauty, Baumgarten is modern through his emphasis on science, on reason, even if it is not reason in the Kantian sense. Although he continued to speak of imitation in art, Baumgarten goes a step further towards the aesthetics of expression, restoring the dignity of the imagination, showing that the artist imitates the maximum variety free from contradictions; hence, the role of perfection as an intrinsic value (Baumgarten, 1986).

Fast forward to Immanuel Kant. In the first part of his *Critique of the Power of Judgment* (1790), dedicated to the aesthetic perception and judgement of beauty, Kant distinguishes four moments or, should we say, dimensions, of the perception of beauty that are not necessarily successive: a feeling of disinterested pleasure (first moment), universally 'communicable' or shareable, but not conceptually determinable (second moment), as if it had a purpose but without calling for a definition of its purpose (the third moment), and compelling in others the same emotional response (the fourth moment). One might group these four moments of aesthetic judgement around feeling (first and third moments), and universality (second and fourth moments). However, in spite of its universality, one cannot measure the feeling of beauty because it does not have a determinate purpose. Since it does not have a determinate purpose, we cannot determine conceptually what is beautiful in an object. Beauty is experienced when imagination remains unconstrained by understanding, or, in other words, when the imagination is not mobilised by understanding, or, in yet other words, when the imagination and understanding are free to play. Nevertheless, this state of unconstrained imagination, or ungovernable imagination, or play, can be experienced by any human being, and is therefore universal. Because of that, one is entitled to ask others to agree with one's judgement that something is beautiful. One might say that Kant's envisioning of beauty is more like the Sophists' beauty than Plato's beauty, because it is communicable and persuasive, although the experience of beauty certainly does not serve utilitarian or pragmatic purposes. But one could equally say that Kant's envisioning of beauty is more like Plato's because beauty is an intensity, although, clearly, it is not a purposeful intensity (it does not bring us closer to understanding the perfection of metaphysical, or, say, a priori, forms).

According to Kant, Baumgarten's attempt to base aesthetics on rational principles is unsuccessful, given that the judgement of beauty is not really based on empirical rules (Kant, 2000b). Although in *Critique of Pure Reason* (CPR) and *Critique of Practical Reason* (CPrR) he makes an absolute distinction between sensibility, intellect, and reason, in *Critique of Faculty of Judgement* (CFJ) (1790), therefore only three years after the second edition of CPR (1787), Kant accepts that judgement can take the form of taste, or aesthetic judgement. If in CPR, *Transcendental Aesthetics* is the science of the a priori principles of sensibility (Kant, 2000b), in CFJ he unites the domains he had separated in the first two *Critiques*: feeling (pleasure or displeasure), located between knowledge and desire, is linked to judgement (of taste), having a priori principles and being applicable to art (Kant, 2000a).

Putting aesthetics on new foundations in relation to classicism and the previous attempts to scientifically establish aesthetics in modernity can be seen as an effort to understand the judgement of taste: the judgement of taste is subjective, that is, it belongs to a human individual, but it has the approval of all as if it were objective; the judgement of taste is synthetic, in the sense that it adds to the representation of

a thing the feeling of pleasure, and it is a priori, in the sense that it is not obtained from experience, being disinterested (Kant, 2000a) as pleasure can be experienced by everyone, equally. On these grounds, Kant can argue that the judgement of taste is necessary and universal. The departure from the aesthetics of imitation is also observed in the chapter dedicated to the ideal of aesthetic judgement: if in CRP, Kant refers to God (Kant, 2000b), in the aesthetic field the ideal is man with his main modes of expression, the word, taste, and sound (Kant, 2000a). Based on the type of expression, Kant distinguishes the arts of the word (eloquence, poetry), the plastic arts (plastic, painting, gardening), and the arts of free play (the art of colours, music) (Kant, 2000a).

On the Leibniz-Baumgarten line, Kant places common sense as the organ of aesthetic feeling (Kant, 2000a), occupying a place between theoretical reason and practical reason. Without being a proper sense, like sight or hearing, the common sense is rather related to the imagination. Kant thus consents to a removal of the imagination from the area of negative connotations to which earlier aesthetics confined it. From here to the theory of genius is but a small step: if taste is needed to judge an aesthetic object, genius is needed to produce a beautiful object. As a propaedeutic of romanticism, the Kantian theory of genius is based on the idea that genius does not follow rules but provides a model from which rules can be drawn.

We notice now that the purposelessness of the experience of beauty is a recurring theme in the jostle of philosophies we have examined so far. Hence, what we might take forward from Kant in our neuroscientific exploration of aesthetic experience is the emphasis on the feeling of pleasure. Synthesising the philosophical positions presented so far, we might argue that **aesthetic experience is the experience of pleasure of various intensities, commensurate with our individual past experiences of the world, yet universally accessible to all.** But how individual are our individual experiences of the world? Before answering this question, let us take a break for a little imagination exercise.

A LITTLE IMAGINATION EXERCISE: Find one of your favourite photos (it can represent a person, landscape, whatever). First find your relaxed mood, then contemplate the photo for three minutes. At the end, fill in this box:

Intensity on a scale from 0 to 10, where 0 = no intensity of pleasure (this is impossible, actually, but the figure offers and anchor), 10 = My feeling of pleasure was so intense that I had to stop looking/ fell off my chair/ had tears in my eyes, etc.: ☐

Then answer the following questions:

1. **When in the past did I experience such intensity?**

2. **What were my personal circumstances at the time?**

Then ask a friend to follow the same steps, using THE SAME picture. Ask your friend to fill in the same box and questions (provided here again for convenience):

Friend:

Intensity on a scale from 0 to 10, where 0 = no intensity of pleasure, 10 = extreme intensity of pleasure: ☐

1. When in the past did I experience such intensity?

2. What were my personal circumstances at the time?

Compare the numbers, then the text. If our conclusion stated above this box is valid, the numbers should differ, but not by much. The text, of course, will be personal to each of you, but you could still compare the themes, and find them sufficiently different to validate our conclusion. And remember for future classes:

1. When you compared the numbers, you engaged in QUANTITATIVE RESEARCH. You performed a very simple comparison. Comparisons are a very big part of the core of statistical analyses!

2. When you compared the texts and sought common themes, you engaged in QUALITATIVE RESEARCH. You were interested in the depth, reached introspectively, that always lives beneath the numbers.

Romantic aesthetics acknowledged the central place played by emotion and feeling to the detriment of reason in all human experience: if classicism aimed to discipline feeling, and the Enlightenment aimed to replace it with reason, Romanticism places sentimentality in the foreground, dealing a (final) fatal blow to old forms of religion and law (Faure, 1987). However, Romanticism maintains the relationship with science in an eminently philosophical form, as it follows from the romanticism-idealism relationship (in particular, classical German idealism) of Johann Gottlieb Fichte (1762–1814), Friedrich Wilhelm Schelling (1775–1864), and Georg Wilhelm Friedrich Hegel (1770–1831). Schelling, especially, is the one who makes the lectures on the philosophy of art (1802–1803) a strictly scientific approach: aesthetics is (or should be) the science of art within the limits of philosophy. For him, scientific thinking is that way of thinking which, starting from an absolute presupposition, creates a totalizing impression of the world as a

whole: the philosophical system is the expression of absolute science. Thus, the scientific philosophy of art, i.e. aesthetics, presents in the plane of the ideal the real that is in art (Schelling, 1985). To build the necessary determinations (that he calls'potencies') of art, Schelling begins with the construction of the universe in the pose of art: the philosophy of art is the science of the universe in the form of art or in the potency of art. For example, lyric poetry is the transformation of the infinite into the finite**;** epic poetry is the representation of the finite in the infinite; dramatic poetry is the synthesis of the universal and the particular (Schelling, 1985).

Do you have among your friend's answers a piece of qualitative introspection that is so individual that it might be considered Romantic? Does it offer more depth than 'non-Romantic' text? Or simply more drama?

At this point we might wonder whether our provisional definition of aesthetic experience still stands. If the Romantics present an 'extreme case' of truly alienated and idiosyncratically enlightened individuals, like you were as a teenager, the definition still stands. But let us not break the champagne just yet! While we may feel justified in linking art and (disinterested) pleasure, philosophers aligned with constructionism feel justified in regarding art as a means of creating reality itself, pleasurable or not!

In his seminal book, *Languages of Art* (1968), and in subsequent work developing from it, Nelson Goodman proposed that the interface between us and the material world is a space of symbols. One might imagine this interface as a transparent screen, on which we paint what we see behind the screen. What we paint, our representations of the 'real world' behind the screen, is not a copy of that world. Rather, depending on the technique we adopt, the skill we possess, and the degree of creative imagination we employ, our painting will look more or less abstract. That is because we abstracted from the real world some of its features and reassembled them on the transparent screen. The image on the screen might be said to be composed of symbols. We can say that because it is generally accepted that symbols are abstract and by that virtue, well, symbolise features of the 'real world' (or, as a scientist might say, clusters of matter of various kinds arranged or disposed in a fairly systematic manner).

Now, imagine that the transparent screen on which we painted a piece of the 'real world' (that piece which sits behind it) is actually the surface of a sphere and that we are inside that sphere at its centre. Imagine then that we paint the entire surface of this sphere made of a transparent screen. At the end of the process, we will no longer see the 'real world' behind the screen, but a world that we painted, a world composed of symbols. Now imagine that we have always lived, since birth, inside such a sphere, that the sphere is actually a magic bubble that moves with us when we move, and that we have always been at its centre, even when we moved. Imagine that by a magic feat, our brain continuously painted what our eyes

saw behind the screen so that the scenes on the sphere surface always changed, as fast as we moved, with no less than the speed of thought. This could mean, as Nelson Goodman argued, that we have always only knew the reality that we ourselves constructed using symbols. In other words, while our eyes touched the ‘real world’ (and now it becomes clearer why I used inverted commas), that is, our eyes perceived the ‘real world’, the actual real world which we have always inhabited is the one our brain has been dynamically painting around us since the moment of our birth.

Supposing that this might indeed be the case, imagine that our sphere intersects with another person’s sphere so that our brain paints on the interior surface of our sphere what our eyes see on the interior surface of the other sphere. Suppose then that there exist as many spheres as people on earth, and think about how they might intersect on a bus or train. Remember that we don’t see anywhere inside a person’s sphere their thoughts or emotions! What we see are symbols that their brain defined using those thoughts and emotions! Surely some of the paintings inside other spheres might be similar to those within our sphere at certain times, but not always because the brain paints over the inner surface of our sphere very fast, and it will paint another image when we leave the bus over the one it had painted while we were inside the bus. But while we were inside the bus, we would have contemplated the same seascape running past the window, and within different spheres, it would have been painted various shades of green or blue or in between. Now try something harder: imagine that when you say a word, an image is summoned, and that only images painted by our brain inside our little spherical universe can be summoned. Imagine that all spheres (so to speak) decided to use a certain word to summon a certain colour, irrespective of what the eyes see and the brain paints. Let’s say that some used the word ‘green’, and others ‘blue’, and some hesitated about which to use. Words, then, are themselves symbols. It looks like it gets very complicated inside the spheres. While people are complex, the spheres on the bus would generally agree among themselves about the general shape of the landscape, and about a generally similar colour of the sea, which all spheres somewhat arbitrarily decided to call ‘green’ or ‘blue’, but not, as in Goodman’s example, ‘grue’, which would have been equally justified for symbolising a shade between green and blue.

Finally, imagine that the bus is in fact the whole planet Earth and that the passengers are its human population. The world we live in, according to Nelson Goodman, is one we constructed using symbols, and we did that because we wanted to know this world, but couldn’t really touch it in a way that would confirm for us that only this or that world is absolutely true. Indeed, even when we touch a stone, we cannot know the stone’s (material, not mystical) truth. We know that something of a certain shape is there and that it has certain texture and temperature. But all these words were decided by consensus among the spheres (sorry, I really like using ‘sphere’ to denote ‘person’). They symbolise a truth that is there only when the spheres congregate, and when they do not, we don’t know what happens to the stone. Nelson Goodman thus helps us to understand that the language of

science may be as remote from the phenomena it aims to define objectively as any other subjective language (e.g. the many languages of art).

Does this help us rewrite our provisional definition of aesthetic pleasure? Our last version was this: **aesthetic experience is the experience of pleasure of various intensities, commensurate with our individual past experiences of the world.** On the face of it, Goodman's philosophy does not challenge such a definition. However, it adds the critical element of what might be called 'a time line of consensus', and thus forces us to rethink the part that concerns 'our individual past experiences of the world.' When we reflect on these experiences, do we use a language that, as Kant would have it, allows us to persuade others to agree that something is beautiful? If we were to quantify or measure how much individuals agree that something is beautiful, would we obtain a measure of how beautiful something (e.g. an object) is? Would that agreement take place because of some universal factors that channel our judgement of what is beautiful? **What do YOU think?** (Do take ten minutes to ponder!).

►Having spent time reflecting on the questions set forth in the above paragraph, let's see then if you agree with this redefinition of aesthetic experience: **aesthetic experience is the experience of pleasure of various intensities, pleasure caused by universal biological mechanisms specific to human animals, but triggered by non-biological cultural factors, and commensurate with those of our past experiences of the world that can be reported in a language historically validated by consensus.**

Read the definition again and find those words that suggest dimensions we could measure. Add those words and phrases to the list below:

Intensities of pleasure (how would you measure THAT?)
Degree of consensus
Universality (can we measure that?)
……………………………. (for you to fill in)
……………………………. (for you to fill in)

Note the appearance of a new factor in the definition above: the cultural factor. Think about whether cultural factors relate to the phrase 'a language historically validated by consensus'. Think about the language of consensus in which we report our memories, those memories that ground or anchor cultural factors that trigger pleasure. Have you been offered a rose by your beloved? Do you think about your beloved when you see any rose of that particular colour? Have you come across a poem, painting, or song that represents red roses and love and you have experienced pleasure because of the memory of the rose offered to you by someone

dear? If the poem, song, or painting is a cultural factor that triggers pleasure, can it do so outside Europe and North America? Can you measure whether the stimulus (sorry!) will have the same effect in other cultures?

'Enough questions!' you perchance now exclaim. Indeed, it would be difficult to answer all of these questions in a textbook, never mind a mere introductory chapter. Suffice it to say that some answers exist, and will be pointed out in various sections of this manual. Let us conclude for now that we can measure scientifically some dimensions of the experience of beauty, and briefly introduce the work of the German physicist and philosopher, Gustav Theodor Fechner (1801–1887) (for a more detailed discussion of his work and its implications, see Skov et al., 2009).

Fechner is credited as the founder of empirical aesthetics, for which 'neuroaesthetics', as some might say, is another term. Fechner's monumental work provided an integrative vision for the study of aesthetic experience by proposing two converging approaches: 'aesthetics from above' and 'aesthetics from below' (Fechner, 1860, 1876, 1878). 'Aesthetics from above' (*Aesthetik von Oben*) refers to the study of the general concepts and ideas about the experience of aesthetic pleasure, much like the kind of philosophical work selectively presented so far in this Introduction. 'Aesthetics from below' (*Aesthetik von Unten*) refers to the study of the simplest empirical facts, leading progressively to the discovery of regularities in, or patterns of, aesthetic response, that can be formulated as general rules and principles, thereby meeting and joining with those general concepts developed by the philosophers. The general principles discovered through scientific enquiry substantiate, so to speak, the philosophical concepts and ideas. Fechner's own description of these **complementary** approaches is worth quoting in full (in translation from his 'Das Associationsprincip in der Aesthetik' from 1866) (Fechner, 1866):

> From the pure heights of these general ideas [of the philosophers], one then descends to the level of simple empirical singularities, of specific beauty bound by time and space, evaluating every individual phenomenon with respect to the general. The Aesthetics from Below sets out from singular experiences of what pleases and displeases. From there, it builds up all concepts and laws that have their place in aesthetics, attempting to develop them with regard to the laws of what is and what ought to be—and to these laws pleasure must always be subordinated. By generalizing more and more, we will arrive at a system of the most general concepts and laws. Whereas the Aesthetics from Above focuses on concepts and ideas, with all explanations being merely based on subordinations to categories of concepts or ideas; the Aesthetics from Below focuses on empirical laws, and all explanations are mainly based on subordinations to such. (Ortlieb et al., 2020, brackets added)

In his empirical explorations of aesthetic pleasure, Fechner developed the theory that aesthetic experience depends on a direct factor (pleasure is determined by the material features of an object, that are objective, measurable dimensions of that object) and an associative factor (different people respond differently to those objective dimensions, because they are biased by their subjective, personal, past experiences). An important legacy of Fechner's work is his effort to integrate the objective with the subjective, or, we might say, the sciences with the humanities.

If so far we have attempted to answer the question 'What is aesthetic experience?' through accounts that might be said to fit Fechner's aesthetics from above approach, let us move on to a brief account of aesthetic experience that might fit the aesthetics from below approach. This will allow us to formulate, by way of conclusion, a tentative answer to the question, 'What is neuroaesthetics?'. Brief this account may be for now, but questions relating to the aesthetics from below approach will be further discussed and refined in subsequent chapters.

► **Stop and think**: Is our provisional definition of aesthetic experience consistent with Theodor Fechner's work? Are Fechner's ideas about a **direct factor** and an **associative factor** taken in in our definition: A**esthetic experience is the experience of pleasure of various intensities, pleasure caused by universal biological mechanisms specific to human animals, but triggered by non-biological cultural factors, and commensurate with those of our past experiences of the world that can be reported in a language historically validated by consensus.**
Reach out for a green marker and a blue marker and use the green marker to underline the words in the above definition that suggest the direct factor. Then use the blue marker to underline which words suggest the associative factor.

Let's consider the words you have highlighted in green and blue (or did you also use 'grue'?) above. You were asked to group them according to whether they reflect Fechner's concepts of direct and associative factors, but let's attempt a regrouping of these words within the categories of science (green) and philosophy (blue). While you may ponder on why philosophy is blue, and science is green, you will likely also find that some words and phrases, such as 'various intensities' are rather 'grue'! They can be placed in the science category because intensities are measurable, but, as we have seen with Plato, they could also be placed in the philosophy category because the experience of the intensity of pleasure signals the nearness, in our intuition, of transcendental, perfect forms. They can be thus placed because science research methods have their origins in philosophy and logic.

For example, look at the phrase, 'pleasure of various intensities'. Think about how this pleasure is quantifiable by measuring Heart Rate Variability (HRV), and then think about how the same phrase evokes the presence of (forever veiled) transcendental forms (or, if you are a Romantic, the phrase may evoke the idea that intensity of pleasure is the key that opens the gate between our pitiful mundane realm of measurable HRV, and the pure realm of perfection). Do you sense a tension between the two kinds of thinking, or, on the contrary, a seamlessness?

> I know you are curious about which is the correct answer, but I must say that I look up to you, who are now a student, to give us the right answer in a few years (or decades).

We will come back to the definition of neuroaesthetics in the final summative section of this textbook. In what follows, we will take you through six units, each comprising an Overview (for you to read at home before class), a Lesson or interactive lecture, and a practical Lab where you will do simple experiments based on the lesson topics. Unit 5, which introduces the fMRI technique is an exception in that it does not contain a lab, but yet another lecture instead of a lab. This is because access to an fMRI device is still rare for beginners in neuroaesthetics. We aim to offer you merely an introduction to the discipline, in a first effort to create a textbook for this new field of study, that can surely be further improved in new or future editions. We have taken a somewhat daring approach by including topics such as dance arts and human-AI interaction, as well as a Unit on Problem-Based Learning, whereas most 'traditional' neuroaesthetics research focuses on the visual arts. We have thus hoped to signal a growing interest in areas that have benefitted from less attention by comparison to the visual arts within the discipline of neuroaesthetics. While there are many studies on dance arts within the field, they are fewer than the number of studies on visual arts, and there are very few, if any, on human-AI interactions. As regards the latter, we are still tentatively exploring possible links between neuroaesthetics and AI research, yet our inclusion of a second Lecture dedicated to human-AI interfaces signals our strong conviction that AI will play an increasingly important role in the field, even if many will regard it as not quite amenable to the kind of research being currently regarded as falling within the remit of neuroaesthetics. For example, when we react to symmetry in an image, does it matter if our neural response is triggered by an image created by a human, or by an image created by an AI? If not, where is the border between art, as defined by centuries of humanities research and critiques, and reality? If AIs will become capable of eliciting emotional responses from us, as Pamela Breda's 'Blurred Lives' suggests, how can we understand their awareness of beauty? If we fall in love with an AI avatar, can it love us back because it sees beauty in us? In any case, we are confident that by the end of the module, you will have at least tasted some of the pleasures of investigating aesthetic pleasure.

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