Part 2
The aesthetic universe
A composer's view on aesthetics and communication

Chapter 6. Knowledge and communication

6.1 Introduction

The ideas developed in Part 1 are theoretical and mathematical in nature, and the link between these ideas and the artistic output that results from them—and that will be discussed in Part 3—may not be very clear at first glance. There may appear to be a gap between the two. The goal of Part 2 of this dissertation is to bridge that gap; to explain the link between theory and output in my artistic practice and research. I will show that the concepts of tonality and dissonance—and the corresponding formulas that I have developed—describe what I will call my 'aesthetic universe'. The aesthetic universe of an artist represents how the artist thinks and who he or she is *as an artist*. It shapes the artist's artistic identity.

To make clear what the concept of aesthetic universe means and how it relates to the processes of my artistic practice and the present research, I have to start from the description of such basic concepts or ideas as 'knowledge', 'meaning' and 'definition', 'expression' and 'communication'. These ideas evolve from 'strictly objective' scientific ideas belonging to cognitive neuroscience, over 'at times more speculative' epistemological and semiotic ideas, to 'highly subjective' artistic claims, in such a way that the transition between the different fields may not always be very clear, but that is exactly the point I want to make: there is no clear distinction between the (objective) scientific or philosophical and the (subjective) artistic ideas within my aesthetic universe. There is for me, in other words, no gap between the realm of theory and technique on the one hand, and between that of artistic ideas and output on the other. It is impossible for me to distinguish between these realms in my creative and investigative practice as a composer. The whole first part of my dissertation, as well as the ideas developed in the present part, should therefore always be considered in the light of my *personal* artistic practice and research as manifestations of my *personal* aesthetic universe. The aim of the present part is to explain this claim.

The ideas developed in the present part will therefore be of a more speculative kind even if they are based on ideas developed in other fields of investigation, even if at times I may seem to "bend the truth for the sake of aesthetic effect"[350]. It is not my ambition to give a comprehensive account of the fields of investigation I borrow ideas from. I will only adopt ideas when they seem suitable for my own artistic research in order to sketch the broader context to which my ideas may belong, since it is my conviction that aesthetic ideas do not stand totally isolated from other fields of knowledge and inquiry. It is impossible—for me at least—to separate the ideas belonging to my aesthetic universe from those of other areas of knowledge. I claim that there is no limit to the elements of knowledge that may affect (or indeed *do* affect) an artist's aesthetic universe. Artists *as artists* are the product of the complete world, the time, and the culture(s) they live in.

[350] Stephen Davies, *Musical Meaning and Expression*, Cornell University Press, 1994, p. 9.

6.2 Knowledge and thinking; concept, meaning, and definition[351]

An individual's **knowledge**[352] is the individual's web of memory. It consists of synaptically interconnected neurons in the neocortex[353] of the individual's brain; all 'traces' that are left or imprinted in the brain by cerebral activity.

"Learning is the process of acquiring new information[354], the outcome of which is memory"[355]. It is the establishment and strengthening of synaptic interconnections among neurons; the acquisition of new knowledge (new traces in the brain) or the strengthening of existing knowledge (the strengthening of synaptic interconnections). **Thinking** (or a thought process) is the one-way[356] process of neuronal firing happening within the cerebral web of knowledge. Thoughts are the object of thinking. Whereas memory and knowledge are cerebral (organic) *dispositions* (physical arrangements or organisation of physical objects (neurons)), thinking is a *process* within the web of knowledge. The neuronal complexes of knowledge are the carriers of thought.

Let us define a **concept** as the quantum of thought.[357] It is the smallest one-way process that can count as a thought. The carrier of a concept or (as long as confusion can be avoided) a concept itself can be represented with an arrow running from left to right (to indicate the one-way direction of thinking), as shown in Example 6.1[358]. A concept is the 'left-to-right' *process* running through its carrier.

Example 6.1: (Carrier of) a concept.

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[351] Most of the neurophysical basis of this chapter is taken from Michael S. Gazzaniga, Richard B. Ivry & George R. Mangun, *Cognitive neuroscience, The Biology of the Mind*, W.W. Norton & Cie., 3rd edition, 2009; Jamie Ward*, The student's Guide to Cognitive Neuroscience*, Psychology Press, 2nd edition, 2010; and Philip Quinlan & Ben Dyson, *Cognitive Psychology*, Pearson Education Limited, 2008.

[352] The concept 'knowledge' will in this dissertation exclusively be used in the sense of "knowledge possessed by some knowing subject […] which should better be called organismic knowledge, since it consists of the disposition of organisms" (Karl R. Popper, *Objective Knowledge, An Evolutionary Approach*, Clarendon Press (Oxford), revised edition, 1979, p. 73). All information that is not cerebral (e.g. the content of books) is left out of this definition. Whenever reference is made to the latter kind of knowledge, it could be called 'material knowledge' (more precisely would be to call it 'other' material knowledge, since every knowledge—including subjective knowledge—is material). Popper contrasts subjective knowledge with objective knowledge: "the logical content of our theories, conjectures, guesses" (Karl R. Popper, *Objective Knowledge,* p. 73).

[353] "[M]ost researchers argue that the content of memory […] is stored in the neocortex" (Jamie Ward, *The Student's Guide to Cognitive Neuroscience*, p. 193).

[354] Information is here defined as any input that can be transformed into knowledge. This definition differs considerably from the definition used in information theory (see for instance Winfred Nöth, *Handbook of Semiotics*, Indiana University Press, 1990, p. 134-9, Umberto Eco, *The Open Work*, translated by Anna Cancogni, Harvard University Press, 1989, pp. 45-9, or Umberto Eco, *La structure Absente: Introduction à la Recherche Sémiotique*, translated by Uccio Esposito-Torrigiani, Mercure de France, 1972, pp. 44-46).

[355] Michael S. Gazzaniga, e.a., *Cognitive neuroscience*, p. 313.

[356] Neurons are semi-conductors through which the process of firing (transport of information) always happens in one and the same direction. " [The] axon […] conveys information *away* from the cell body. [The] dendrite […] conveys information *toward* the cell body" (Fred Delcomyn, *Foundations of Neurobiology*, W.H. Freeman and Company, 1998, p. 20).

[357] The Stanford Encyclopedia of Philosophy defines 'concepts' as "the constituents of thoughts" (see: http://plato.stanford.edu/entries/concepts/#Bib [last accessed: 03 January 2013]). This is only a theoretical model. In reality, the quantum of thought is most probably a variable combination of several firing neurons in different parts of the brain (not only the cortex), but this does not change the idea of concept as a quantum of thought. In this context see Douglas R. Hofstadter, *I am a strange loop*, Basic Books, 2007, p. 31: "Trying to localize a concept […] down to a single neuron makes no sense at all."

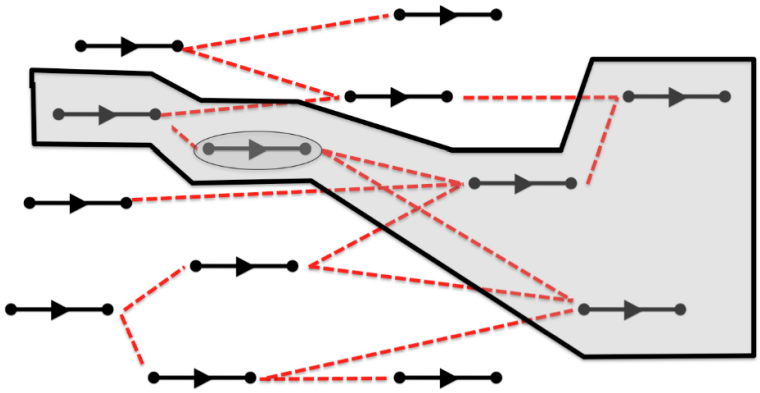
[358] A concept may be represented by a firing neuron (the arrow in the representation of a concept indicates the fact that a concept is a process).

Since an individual's web of memory or knowledge consists of synaptically interconnected neurons and since these neurons form the basis for concepts and concept carriers, the individual's web of **conceptual knowledge** can be defined as the set of 'interconnected' concept carriers or concepts. Concept carriers are said to be interconnected when it is possible to activate a single thought process through both of them. Such a (one-way) thought process involving two or more interconnected concepts is how I define the concept **proposition**.

Example 6.2: Proposition involving two concepts.

Example 6.2 represents the (carrier of the) simplest proposition between two directly[359] interconnected concepts.[360] If we call the concept to the left in Example 6.2 "A" and the concept to the right "B" the proposition connecting A and B can be read as "every (or an) A is a (or an instance of) B".

The complete web of all concept carriers and their interconnections in an individual's brain is the individual's **web of knowledge**. Example 6.3 shows a (very limited) web of knowledge containing only thirteen concept carriers, or (when activated) thirteen concepts.



Example 6.3: A web of knowledge. The meaning of the concept in the oval is contained in the grey box, pertaining to a web of knowledge.

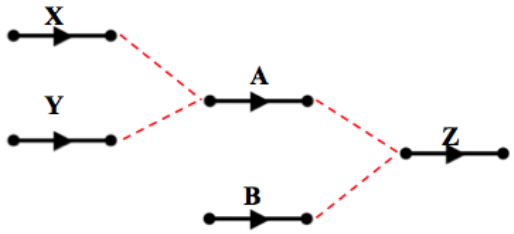
The concept enclosed in the oval in Example 6.3 can be part of propositions involving all the concepts contained in the grey box. This subset of the web of knowledge (the grey box) representing all the concepts that are interconnected with the given concept (in the oval) within a particular web of knowledge is defined as the **meaning** of the concept in the given web of knowledge (or for a given individual). Different concepts usually have different meaning.[361] A concept B belongs to the individual's meaning of a concept A when the concepts A and B are interconnected in the individual's brain. The meaning of a proposition P is the set of all concepts that are interconnected to the concepts belonging to the proposition, or, as Stephen Davies puts it: "The meaning of a proposition is a function of the meanings of its constituents"[362]. Note that meaning is attributed to concepts or propositions[363]

[359] Two concepts are said to be 'directly interconnected' when there exists a proposition containing only the two concepts; in other words: when there are no other concepts between the two concepts in the proposition.
[360] Hereafter, the distinction between concept and concept carrier will not always be made, but bear in mind that a concept is a process, not the material object in which the process happens. Similarly, a proposition is a process, not the material object (e.g. two interconnected neurons) in which the process happens.
[361] Two concepts that have exactly the same meaning are called synonymous concepts within a specific web of knowledge.
[362] Stephen Davies, *Musical Meaning and Expression*, Cornell University Press, 1994, p. 125.

only, not to processes or objects outside of thought, and that it is always related to a specific web of knowledge, that is: to a specific individual. This will be of major importance in the discussion of communication of meaning below.

I define the **definition** of a concept as that part of the meaning of the concept that is necessary and enough to distinguish the concept from all other concepts within a specific web of knowledge. In Example 6.4 below, showing a very simple web of knowledge, a definition of the concept A could be phrased as (we can also say: concept A could be defined as "all instances of Z that contain all X's". It should be clear that only concept A fits this definition, and not concepts B, X, Y or Z in the given web of knowledge.

The meaning of a concept is generally broader than (contains more concepts than) its definition[364]. Concept Y in Example 6.4 belongs to the meaning of concept A but not to the definition "all instances of Z that contain all X's". Note however that concept A could also have been defined as "all instances of Z that contain all Y's". In that case X would not belong to the definition of A, but would still be part of the meaning of concept A. The description "all instances of Z that are no B's" would not be enough to define A, because it also applies to X and Y, and is therefore not enough to distinguish A from X or Y.



Example 6.4: Web of knowledge in which concept A can be defined as "all instances of Z that contain all X's".

It should be clear from the stated definition that, since the meaning of a concept is always relative to a given web of knowledge, it usually differs from individual to individual. The consequences this has on interpersonal understanding in communication will be discussed in the section on relevant meaning and levels of communication below.

Although the concept of 'meaning' is a very common topic in the domains of epistemology, hermeneutics, semiotics and especially linguistics, there is no general consensus about its meaning or definition.[365] In the present post-structural era it is sometimes considered unnecessary or even impossible to define the technical concepts that are central to a discourse, such as the concept

[363] In what follows, I will only talk about the meaning of concepts. Keep in mind that, *mutatis mutandis*, the same applies to propositions.

[364] Although the usual connotations of the concepts may differ, the concepts of denotation and connotation correspond to my concepts of definition and meaning (there is a deliberate self-reference in this sentence).

[365] See for instance: Stephen Davies, *Musical Meaning and Expression*, Cornell University Press,1994; Michael Polanyi & Harry Prosch, *Meaning*, The University of Chicago Press, 1975; Jenefer Robinson (ed.), *Music and Meaning*, Cornell University Press, 1997; Stephen R. Schiffer, *Meaning*, Oxford University Press, 1972; Mark Johnson, *The Meaning of the Body, Aesthetics of Human Understanding*, University of Chicago Press, 2007; Aniruddh D. Patel, *Music, Language and the Brain*, Oxford university Press, 2008; Jean-Jacques Nattiez, *Music and discourse, Toward a Semiology of Music*, translated by Carolyn Abbate, Princeton University Press, 1990; C.K. Ogden & I.A. Richards, *The Meaning of Meaning*, Harcourt Brace Jovanovich Publishers, 1923; Winfried Nöth, *Handbook of Semiotics*, Indiana University Press, 1990; Umberto Eco, *The Open Work*, translated by Anna Cancogni, Harvard University Press, 1989, Leonard B. Meyer, *Emotion and Meaning in Music*, The University of Chicago Press, 1956; Susanne K. Langer, *Philosophy in a New Key: A Study in the Symbolism of Reason, Rite, and Art,* Harvard University Press, 1942; Roger Scruton, *Analytical Philosophy and the Meaning of Music*, in: The Journal of Aesthetics and Art Criticism, Vol. 46, Analytic Aesthetics, 1987, pp. 169-176. This list is, of course, far from complete. I only mention some of the book I have consulted from authors who's ideas are relevant within the context of my dissertation, because most of these sources refers to aesthetics in one way or another.

'meaning' in books or articles on meaning. Marcel Danesi even goes so far as to claim: "like the axioms of arithmetic or geometry the notion of meaning is best left undefined. It is something of which everyone has an intuitive understanding, but which virtually no one can really explain."[366] This represents, in my opinion, a considerable shortcoming that is the cause of much misconception, miscommunication, and mystification. Other authors give descriptions of the concept that are so obscure or vague it makes clear definition and understanding impossible.[367] Although concepts may be defined in different ways and may have divergent meanings for different individuals, it is important that there is similarity of relevant meaning in the process of inter-subjective communication to make understanding possible. I am aware of the fact that my definition is highly stipulative, but I don't think it is in contradiction with most non-externalist definitions[368] and it has the advantage of being an explicit definition.

It is beyond the scope of this dissertation to give a comprehensive account of the definitions of 'meaning' encountered in literature. As an example, I only want to mention Jean-Jacques Nattiez, one of the few authors who make an attempt at more or less explicitly defining the concept of meaning. Nattiez defines 'meaning' as follows: "An object of any kind takes meaning for an individual apprehending that object, as soon as that individual places the object in relation to areas of his lived experience—that is, in relation to other objects that belong to his or her experience of the world. […] [M]eaning exists when an object is situated in relation to a horizon."[369] Although this definition largely corresponds with mine (it belongs to internalism[370], considers meaning subject-dependent and sees it as the result of a relationship with other concepts), it leaves some questions unanswered. It is not completely clear whether for Nattiez "meaning" *is* the relation he describes, or whether it is *generated by* that relation. In the latter case, it still remains unclear what it is that is generated. Also, if the object "takes meaning", the object is actively involved in the process of meaning making (or taking). This too is not very clear. Still, of all the definitions (or descriptions) I have so far encountered, this is one of the definitions that correspond best with mine.[371] Only, I ascribe meaning only to concepts. Nattiez ascribes them to objects and specifies: ""Object" refers to words (that is the "props" of meaning) as well as to concepts per se, concrete or abstract things, individual behaviors, and social facts."[372] For me, the meaning of a word, a concrete thing, an individual behavior, a social fact, or any object or process that is not a concept would be the meaning of the concepts that correspond to them in the individual's brain. Their meaning is 'mediated' by the concept. No object or process can have meaning as long as there is no concept related to it in a web of knowledge. This web of knowledge is how I understand Nattiez's horizon in relation to which (the concept related to) an object is situated.

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[366] Marcel Danesi, *Messages, Signs, and Meanings: A Basic Textbook in Semiotics and Communication Theory*, Canadian Scholar's Press Inc., 3rd edition, 2004, pp. 11-12. Axioms may be left unproven (by definition), but, contrary to what Danesi claims, that doesn't mean the concepts they contain are not defined.

[367] The conservative thinker Roger Scruton, for instance examines musical meaning—which he defines as "the meaning that is given to us in the experience of music" (p. 169)— very vaguely as an instance of "the more general phenomenon of "aesthetic meaning"" (p. 170), and he defines "aesthetic meaning" as "meaning understood in and through an aesthetic experience" (p. 170). He further claims "meaning is the object of understanding. The meaning of a piece of music is what you understand when you understand it. […] And musical understanding is a form of hearing. The content of music is a heard content, and it is heard *in* the tones" (p. 169) (Roger Scruton, *Analytical Philosophy and the Meaning of Music*, in: The Journal of Aesthetics and Art Criticism, Vol. 46, Analytic Aesthetics, 1987, pp. 169-176).

[368] Externalism (in the philosophy of the mind) is "the idea that the meanings of words, and by extension the contents of our minds, are not inside our heads, but are matters of causal relations between what is in our heads and the external world." (John R. Searle, *Mind, a Brief Introduction*, Oxford University Press, 2004, p. 8).

[369] Jean-Jacques Nattiez, *Music and Discourse, Toward a Semiology of Music,* translated by Carolyn Abbate, Princeton University Press, 1990, p. 9.

[370] Internalism states that meanings belongs to the contents of our minds, and not to the external world.

[371] Together with Suzanne Langer's definition of meaning as a function of a term (Susanne K. Langer, *Philosophy in a New Key: A Study in the Symbolism of Reason, Rite, and Art,* Harvard University Press, 1942, p. 55).

[372] Jean-Jacques Nattiez, *Music and Discourse,* p. 9.

6.3 Empirical, pure and imaginative knowledge

Empirical knowledge is all knowledge that has its source in sensory cerebral input (sense data). The empiricists claimed that all our knowledge is the result of sensory experience; that "all the materials of reason and knowledge [come from sensory] experience. In that all our knowledge is founded."[373] It is not my aim to discuss whether this claim is true, or whether there are ideas (concepts) that are not empirical or even innate, but it is certainly the case that at least some of the knowledge of most human beings has its basis in empirical experience, provided by the activity of our senses. Empirical concepts are the concepts that result from this activity of our senses. An individual's empirical knowledge consists of the web of all the individual's interconnected empirical concepts.

As was discussed above, only concepts or propositions have meaning. Empirical sources (objects or processes that can be perceived through the senses) have no intrinsic meaning. The meaning of an empirical object or process has to be understood as the meaning of the empirical concept that corresponds to the empirical object or process in the individual's brain. It is determined by the relationship of that concept with other concepts belonging to the individual's knowledge. This meaning is only *indirectly* the meaning of the object or process. The meaning for an individual of something X that is not a concept, is the meaning of a individual's concept for X. X never has meaning without an individual that has a concept for X. The meaning of a particular tree for a particular individual is the meaning of the concept 'tree' for that individual. It seems completely unclear to me what the meaning of an empirical object could be, if it is a quality that belongs to the object, as Roger Scruton[374] and other externalists claim.

I call knowledge that does not originate from empirical experience 'non-empirical knowledge' (the empiricists would argue that such knowledge is impossible). Non-empirical knowledge can be divided in pure knowledge and imaginative knowledge. **Pure knowledge** consists of interconnected pure concepts. A pure concept is defined as a non-empirical concept that (at least in theory) doesn't precede any empirical concept in a specific web of knowledge (such as the concept of infinity and other mathematical concepts and abstract concepts). A non-empirical concept that does precede an empirical concept in an individual's web of knowledge belongs to the individual's **imaginative knowledge**; which is to be understood as the individual's knowledge of imagination, of fiction or fantasy (such as unicorns or fairies)[375], not his or her knowledge consisting of 'images' of any kind or his or her imaginary knowledge (knowledge that is wrongly claimed to correspond with empirical sources).

6.4 Emotions and emotional knowledge

An **emotion** may be defined as "an affective (positive or negative) mental response to a stimulus that also may be expressed physically (e.g., by change in heart rate, facial expression, and speech)"[376], or more precisely as "a valenced[377] experience that is felt with some intensity as happening to the self, generated in part by a cognitive appraisal of the situation, and accompanied by both learned and reflexive physical response."[378] "[E]motions are neither overt behaviors nor specific thoughts; they are experiences. […] [E]motions are passions, not actions. […] Actions are initiated by the actor, whereas passions happen to the actor. […] Emotions depend not just on situations but on what you *think* about

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[373] John Locke, *An Essay Concerning Human Understanding,* Volume 1, Dover Publications, 1959, pp. 121-2.
[374] See Roger Scruton, *Analytical Philosophy and the Meaning of Music*, pp. 169-70.
[375] Imaginative concepts or knowledge turn into empirical knowledge once a link between the concept and a sense datum has been established in a justifiable or reliable way (e.g. when a fairy has been reliably observed or when its existence has been demonstrated in some other justifiable (i.e. scientific) manner, the concept "fairy" becomes an empirical concept).
[376] Michael S. Gazzaniga, e.a., *Cognitive neuroscience*, Glossary p. G-4.
[377] "Events, objects, and situations may possess positive or negative valence; that is, they may possess intrinsic attractiveness or aversiveness. The adjective *intrinsic* serves to distinguish these features from derived attractiveness or aversiveness: Loss derives its aversiveness from the positive valence of the object lost." (Nico H. Frijda, *The Emotions,* Cambridge University Press, 1986, p. 207).
[378] Douglas A. Bernstein, Edward J. Roy, Thomas K. Srull, Christopher D. Wickens, *Psychology*, Houghton Mifflin Company, 2nd edition, 1991, p. 472.

those situations, such as how you interpret their potential for threat or pleasure. […] Emotions are, therefore, experiences that are both triggered by the thinking self and experienced by the self as happening to the self."[379] Emotions may be conscious or unconscious (or preconscious); "The conscious aspects of an emotion are the subjective feelings of that emotion. The preconscious aspects of emotion may concern, for example, detection of a potential threat."[380]

Emotions are defined here as internal cerebral processes, not as responses to those processes, and need therefore to be distinguished from emotional response and emotional learning. Emotions may be triggered by external sensory input (empirical information) into the brain but they may also arise as a response to internal cognitive processes (thoughts).[381] Thinking of a traumatizing experience from the past may trigger strong emotions, for instance, even if there is no sensory cause triggering the recollection of the traumatizing experience. Emotions themselves are no sensory input. They constitute a process that happens entirely inside the brain, triggered either by sensory input or by other bodily or cerebral activity. Emotional responses, on the other hand, may affect the rest of the body, including the neocortex, where a process of emotional imprint (emotional learning) results in **emotional knowledge** (the traces left in the brain by emotions).

Although emotions, emotional response, and the process of acquisition of emotional knowledge can be distinguished as different kinds of processes, on a neuronal level "[e]motion and cognitions may involve overlapping response systems."[382] The amygdala plays a central role in these systems. Its role "should be construed in terms of its influence upon a wider circuit of emotional processing."[383] It "is believed to be important […] particularly for the emotional content of memories"[384]. "There are connections from the amygdala to the autonomic system"[385]. The frontal cortex also plays a role in the processing of emotions; it is involved in showing or suppressing emotional response.[386] "[0]ther regions, including the ventromedial frontal lobes, [are] activated only when making explicit judgments about [an] emotion."[387]

Whatever the link is between the function or role of different parts of the brain in emotions and emotional processing, for the purpose of the present dissertation it is enough to assume that it is possible to distinguish between the different processes: emotion, emotional learning (resulting in emotional knowledge), and emotional response (resulting in a non-cerebral process such as smiling, sweating or rising heartbeat) as shown in Example 6.5.

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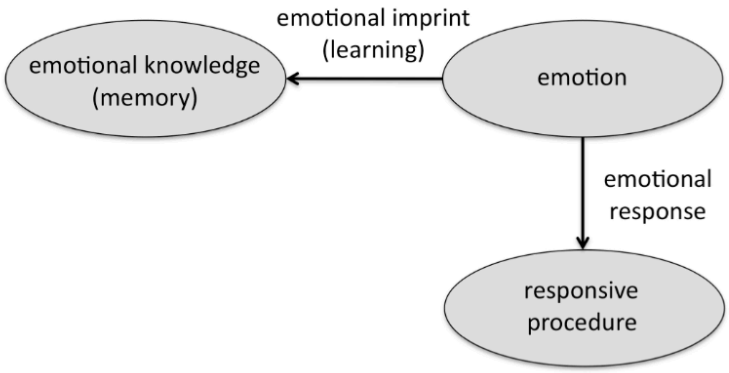
[379] Douglas A. Bernstein, e.a., *Psychology*, p. 471.
[380] Jamie Ward, *The student's Guide to Cognitive Neuroscience*, p. 337.
[381] Empiricists would have to reject the latter part of this claim or they would have to regard thoughts as sensory input to our emotions.
[382] Richard D. Lane & Lynn Nadel eds., *Cognitive Neuroscience of Emotion*, Oxford University Press, 2000, p. 4
[383] Jamie Ward, *The student's Guide to Cognitive Neuroscience*, p. 343.
[384] Jamie Ward, *The student's Guide to Cognitive Neuroscience*, p. 341, referring to Richardson, M.P., Strange, B.A., & Dolan, R.J., *Encoding of Emotional Memories Depends on Amygdala and Hippocampus and their Interactions,* Nature Neuroscience, 7, 2004, pp. 278-85.
[385] Jamie Ward, *The student's Guide to Cognitive Neuroscience*, p. 343.
[386] See: Jamie Ward, *The student's Guide to Cognitive Neuroscience*, p. 340.
[387] Jamie Ward, *The student's Guide to Cognitive Neuroscience*, p. 342.



Example 6.5: Emotions and emotional processing in the brain.

The concept of 'emotional response' corresponds to Collingwood's concept of "physical expression". According to Collingwood, a physical expression "consists in the doing of involuntary and perhaps even wholly unconscious bodily acts, related in a particular way to the emotions they are said to express"[388]. Collingwood distinguishes between emotion and sensation, two different kinds of experiences that go by the name "feeling". He describes "the specialized activities of […] 'feeling' colours, sounds, scents and the like collectively as the senses, and the common activity which is specialized into them as sensation. Secondly, we speak of feeling pleasure or pain, anger, fear, and so forth. Here also we have a general activity of feeling specialized into various kinds, each with its proper specification of what we feel. It is not, clearly, of quite the same kind as sensation; to distinguish it, let us call it emotion"[389].

6.5 Procedural knowledge

In addition to the conceptual knowledge discussed above, the human brain also contains procedural knowledge. **Procedural knowledge** is knowledge that provides motor skills (such as speaking a language, running, riding a bike, composing, or playing a musical instrument) or cognitive skills (such as reading)[390]. Conceptual knowledge belongs to explicit or declarative knowledge[391]; procedural knowledge belongs to implicit, tacit or non-declarative knowledge (knowledge that cannot be consciously accessed).[392] The former is normally restricted to knowledge that is "expressed in declarative sentences or indicative propositions"[393]. I extend the concept of 'conceptual knowledge' to all knowledge that is not procedural (no matter whether it is semantic, autobiographical or episodic)[394]. This knowledge can be pure as well as empirical (even synaesthetic[395]) knowledge; verbal as well as non-verbal knowledge; explicit as well as tacit, intuitive and emotional knowledge.

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[388] Robin George Collingwood, *The Principles of Art*, Oxford University Press, 1938, p. 229.
[389] Robin George Collingwood, *The Principles of Art*, p. 160.
[390] See: Michael S. Gazzaniga, e.a., *Cognitive neuroscience*, Glossary p. G-9.
[391] Declarative knowledge (or declarative memory) is "knowledge to which we have conscious access, including personal and world knowledge (events and facts). The term *declarative* signals the idea that declarations can be made about this knowledge, and that for most part, we are aware that we possess the information." (Michael S. Gazzaniga, e.a., *Cognitive neuroscience,* Glossary p. G-4).
[392] See Michael S. Gazzaniga, e.a., *Cognitive neuroscience*, p. 322, and Jamie Ward*, The student's Guide to Cognitive Neuroscience*, p. 185.
[393] http://en.wikipedia.org/wiki/Descriptive_knowledge [last accessed: 08 February 2012].
[394] "**Semantic memory** is conceptually based knowledge about the world, including knowledge of people, places, the meaning of objects and words. It is culturally shared knowledge. By contrast, **episodic memory** refers to memory of specific events in one's own life. The memories are specific in time and place." (Jamie Ward*, The student's Guide to Cognitive Neuroscience*, p. 186).
[395] Synaesthetic knowledge is the knowledge that results from synaesthetic experiences. On synaesthetic experience in artistic perception, see a.o.: Kathleen Coessens, *Experiencing Art, a Synesthetic Unfolding*, in Proceedings of the Third International Congress on Synaesthesia, Science & Art, Granada, Spain. Ediciones Fundación Internacional Artecitta, Actas del III

6.6 Intuitions and intuitive knowledge

Intuition or intuitive knowledge may be defined as "a non-inferential knowledge[396] or grasp, as of a proposition, concept or entity, that is not based on perception, memory or introspection; also, the capacity in virtue of which such cognition is possible"[397]. "Intuitions are the pre-theoretical judgments that a person makes about something. They are usually contrasted with the judgments a person makes after having considered the issue extensively. Often these reflective judgments are the result of accepting some theory. A theory is a systematic explanation or description of a large class of phenomena. The theory must consist of some general propositions that apply to all or almost all of the phenomena."[398] "In one sense, an intuition is a faculty of knowing particular objects without being able to form a judgment simply on the basis of that knowledge."[399]

In the framework of the previously developed ideas, I define **intuition** as the ability or the capacity to skip or by-pass referential or connective steps in the acquisition of conceptual or procedural knowledge. **Intuitive knowledge**, then, is the knowledge that results from the procedures of intuition. When an individual possesses two elements of knowledge that are not yet interconnected—or at least not consciously—in his or her complete set of knowledge, and when the interconnection of both elements demands several cognitive connective steps or extra sensory data, intuition may lead to the interconnection of both elements without the intermediate conceptual connections or sensory data. This procedure of course does not guarantee 'reliable' knowledge (which can only be obtained after the necessary intermediate interconnections—the necessary cognitive deductions and inferences—have been made)[400].

The conceptual elements of knowledge connected in intuitive procedures may have an emotional, empirical, pure, or imaginative origin. Intuitive knowledge is often triggered by or may result from emotional or sensory processes. Intuitive procedures may also involve the establishment of connections between conceptual and procedural knowledge.

6.7 Expression and communication

Explicit or declarative conceptual knowledge is knowledge (or are thoughts) that can be **expressed**. This means it can be externalized, transformed[401] on the basis of a procedure of **encoding** into a material process (e.g. sound) or object (e.g. a score) external to the individual's body. The tools of this procedure of encoding belong to the individual's procedural knowledge (e.g. language skills). Without expressive procedural knowledge of some kind, an individual would not be able to express his or her conceptual knowledge or thoughts. In that case, at most bodily responses would be possible.

Congreso Internacional de Sinestesia, Ciencia y Arte, eds José de Cordoba, Edwards Hummard , Dina Ricca and Sean A. Day, 2009.

[396] Non-inferential knowledge is knowledge that is not inferred from other (conceptual) knowledge.

[397] Robert Audi (ed.), *The Cambridge Dictionary of Philosophy*, Cambridge university Press, 1995, p. 382. It is remarkable that none of the manuals on cognitive science listed above even mentions the concept of intuition.

[398] A.P. Martinich, *Philosophical Writing, An Introduction*, Blackwell Publishing, 3rd edition, 1996, p. 17.

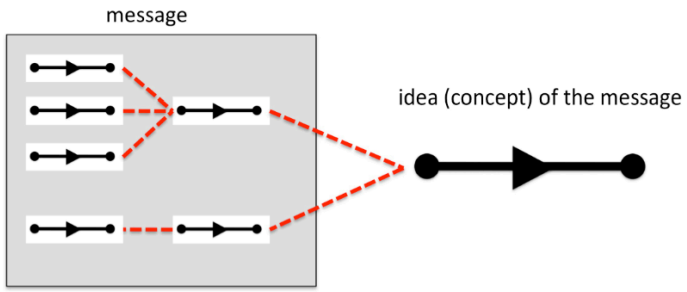
[399] A.P. Martinich, *Philosophical Writing,* footnote p. 17.

[400] According to authors who define knowledge as justified true belief intuitive knowledge would not be called "knowledge", since it may not be true, and according to them, "[w]hat is not true is not known" (Robert Audi, *Epistemology, A Contemporary Introduction to the Theory of Knowledge*, Routledge, 1998, p. 214).

[401] The term 'transformation' is here used in the sense used by Noam Chomsky for his concept of "transformational-generative-grammar", stressing the difference between deep structure and surface structure, between what will below be called message and encoded message (see: Noam Chomsky, *Language and the Mind*, Cambridge University Press, 3rd ed., 2006, p. 93).

Usually, expression of knowledge doesn't happen in isolation but as part of a process of **communication**; one or several of the inter-subjective processes of knowledge transfer from one individual to one or several other individuals. The knowledge that is expressed in a process of communication is what I call a **message.** The term "message" ordinarily "refers to a text or to the meaning of a text"[402], a text being "a system of signs (in the form of words, images, sounds and/or gestures) […] which can be "read" for meaning"[403]. I want to restrict the meaning of 'message' to the set of concepts or propositions (i.e. elements of knowledge) that is communicated (expressed in the process of communication) and which differs therefore from the material text. It is also important to distinguish between a message and its meaning. The meaning of a message consists of all the concepts that are interconnected with the concepts belonging to the message in an individual's brain, and is therefore generally broader than the set of concepts contained in the message.

Within an individual's web of knowledge, a message can be 'represented' by the **idea of the message**. This is the individual's concept containing all the concepts or propositions of the message as shown in Example 6.6. To say that an individual expresses meaning of the concept of a message is the same as to say that the individual expresses the meaning of the message. Indeed, the individual's meaning of a message and his or her meaning of the idea of that message are identical.

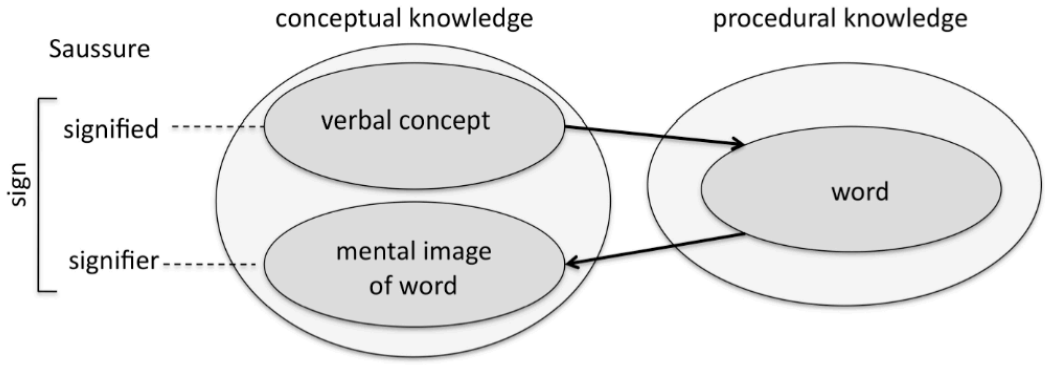


Example 6.6: Idea (or concept) of a message in relation to the message it represents.

The individual that expresses a message is called the **addresser**[404] (or the sender of the message)[405]. The procedure of encoding through which the message is transformed into an external material object or process is the **code** of communication. The material process or object that results from this transformation is what will (in the present dissertation) be called the **sign vehicle** of the message. The concept "sign vehicle" is commonly distinguished from the concept "sign". Daniel Chandler defines a sign as "a meaningful unit which is interpreted as 'standing for' something other than itself. Signs are found in the physical form of words, images, sounds, acts or objects (this physical form is sometimes known as the sign vehicle)"[406]. The concept 'sign' is the source of much controversy in semiotic discourse however. According to many semioticians (e.g. Ferdinand de Saussure), a sign is not a

[402] Daniel Chandler, *Semiotics, The Basics*, Routledge, 2nd edition, 2007, p. 253. Much of the present section quotes this book, which contains 'only' the basics of semiotics and is therefore less comprehensive than e.g. Winfred Nöth's more academic *Handbook of Semiotics* (Indiana University Press, 1990). However, for the purpose of the present dissertation (which is not a semiotic study but the academic result of artistic reflection), the information in Chandler's more recent book and his clear phrasing seemed the more appropriate source.
[403] Daniel Chandler, *Semiotics*, p. 263.
[404] This concept corresponds to Roman Jakobson's concept of "addresser". See: Roman jakobson, *Closing Statement: Linguistics and Poetics*, in: Thomas A. Sebeok (ed.), *Style in Language*, MIT Press, 1960, p. 353 (Roman Jakobson, *Essais de Linguistique générale*, *1. Les Fondations du Langage,* (Translated by Nicolas Ruwet), Les Editions de Minuit, 1963, p. 214, uses the French translation "destinateur").
[405] The addresser is called *the "producer"* of the sign vehicle by Jean Molino, the actor in what Jean-Jacques Nattiez calls the *"poietic process"* of communication, as opposed to the *"esthesic process"* for which Molino's receiver is the actor (see: Jacques Nattiez, *Music and Discourse: Toward a Semiology of Music*, translated by Carolyn Abbate, Princeton University Press, 1990, p. 16-7).
[406] Daniel Chandler, *Semiotics*, p. 260.

material object, but "the whole that results from the association of the signifier with the signified"[407], whereas "for some commentators [the concept "sign"] means the same as the *signifier* (which for Saussure himself did *not* refer to *material* form). The Peircean equivalent is the *representamen*: the form which the sign takes, but even for Peirce this was not necessarily a material form"[408]. "The *signifier* is now commonly interpreted as the *material (or physical) form* of the sign[409]—it is something which can be seen, heard, touched, smelled or tasted—as with Roman Jakobson's *signans*, which he described as the external and perceptible part of the sign."[410] For de Saussure, however, a signifier[411] *(signifiant)* is a mental pattern (not a physical object or process) that is linked to a concept, which he called the signified *(signifié)*. According to him "[a] linguistic sign is not a link between a thing and a name, but between a concept and a sound pattern. The sound pattern is not actually a sound; for a sound is something physical. A sound pattern is the hearer's psychological impression of a sound, as given to him by the evidence of his senses"[412]. Interpreted this way, Saussure's signified and signifier both belong to conceptual knowledge and words belong to (or result from) procedural knowledge, as is shown in Example 6.7. Since there is apparently no consensus about the meaning of the concept of 'sign', since there is no need for me to use it in the present dissertation, and in order not to add to the general semantic confusion, I will avoid the concept as much as possible altogether. In the present context, I will make no distinction between signifier (in the material sense), signans (in Jakoson's sense), text or sign vehicle and only use the latter term.



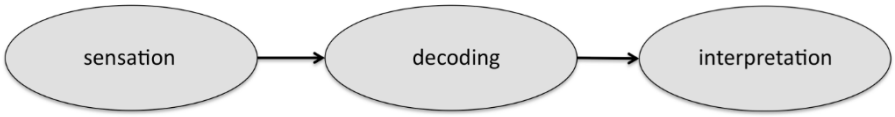
Example 6.7: Mental images of words
and an interpretation of Saussure's concept of "sign" within this model.

Knowledge *of* a procedure is conceptual knowledge about the procedural knowledge that is necessary for the procedure in question. It is conceptual knowledge that has a 'procedural origin' (the same way as emotional knowledge is knowledge with an emotional origin). Saussure's mental image of a word (his signifier) is therefore the conceptual knowledge of the procedure required for the expression of

[407] Roman Jakobson, *Language and Parole: Code and Message*, (1984), in: Linda R. Waugh & Monique Monville-Burston (eds.), *On Language*, Harvard University Press, 1990, p. 67, quoted from Daniel Chandler, *Semiotics,* p. 15.
[408] Daniel Chandler, *Semiotics*, p. 260.
[409] See for instance: Marcel Danesi, *Messages, Signs, and Meanings: A Basic Textbook in Semiotics and Communication Theory*, Canadian Scholar's Press Inc., 3rd edition, 2004.
[410] Daniel Chandler, *Semiotics,* p. 15, referring to Roman Jakobson, *Language and Parole*, p. 98.
[411] Louis Hjelmslev used the term "expression" for Saussure's "Signifier". (see: Winfred Nöth, *Handbook of Semiotics*, Indiana University Press, 1990, p. 66, referring to Louis Hjelmslev, *La stratification du Langage*, 1954, in: *Essais Linguistiques*, Nordisk Sprog- og Kulturforlag, 1959, pp. 37-68). In the present dissertation, I restrict the meaning of the concept 'expression' to the process of transformation of conceptual knowledge into a non-cerebral object or process. Hjelmslev's concept of "concept" (Saussure's "signified"), on the other hand, corresponds to the concept of 'concept' as I understand it.
[412] Ferdinand de Saussure, *Course in General Linguistics*, Duckworth, trans. Roy Harris, 1919/1983, p. 66. Translation of: "Le signe linguistique unit non une chose et un nom, mais un concept et une image acoustique. Cette dernière n'est pas le son matériel, chose purement physique, mais l'empreinte psychique de ce son, la représentation que nous en donne le témoignage de nos sens". Ferdinand de Saussure, *Cours de Linguistique Générale*, Editions Payot, 1972, p. 98.

the concept with the word (or word complex) in question. "A mental image […] is a conceptual version of some physical or emotional sensation. […][It can] be elicited by fictitious or imaginary referents."[413] A mental image of a word, a sound, or of any other element of procedural knowledge, consists of the concept(s) or conceptual knowledge of elements of linguistic, musical, or other procedural knowledge. Auditory imagination of not-yet-existent sound or music by a composer, for instance, is an imaginary mental sound image.

When a sign vehicle reaches an **addressee**[414], the individual at the receiving end of the communication process perceives the sign vehicle. This process of perception or impression (as the opposite of expression)[415] is "[t]he process through which people take raw **sensations**[416] from the environment and interpret them, using knowledge, experience, and understanding of the world, so that the sensations become meaningful experiences"[417]. It can involve reading, listening, hearing, smelling, tasting, or any other type of sensory perception. Impression first turns the sense data of the sign vehicle into cerebral signals that are then decoded with the appropriate code belonging to the addressee's procedural knowledge. The process of **decoding** transforms the sensory input into a decoded message in the addressee's web of conceptual knowledge (and into signals that are processed in other parts of the brain, e.g. in the form of emotions) where, in the optimal case, it results in the creation of meaning for the decoded message. This latter process is the process of **interpretation**. The processes involved in perception or impression are shown in Example 6.8. Sensation happens on the level of the sense organs, decoding in the individual's procedural knowledge, interpretation in the web of conceptual knowledge.



Example 6.8: Processes involved in perception or impression.

The process of decoding can only happen after the addressee has recognized the perceived sign vehicle as being a sign vehicle, that is: as an encoded message. This requires the presence of a similar *kind* of code in addresser and addressee (e.g. linguistic capacity, which is innate in human beings[418] and which can be developed through language acquisition into the necessary procedural knowledge of verbal language). Only after this recognition of a sign vehicle can the addressee decode the sign vehicle, that is, create meaning for the traces that are left in his or her brain by the perception of the sign vehicle. The addressee is said to understand the addresser's message if he or she is able to create meaning for the received message that is at least similar to the meaning the message has for the addresser. This requires the presence (by prior convention[419]) of a highly similar code in addresser and addressee (for instance, knowledge of the same natural language, e.g. English).

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[413] Marcel Danesi, *Messages, Signs, and Meanings: A Basic Textbook in Semiotics and Communication Theory*, Canadian Scholar's Press Inc., 3rd edition, 2004, p. 67.

[414] This concept corresponds to Roman Jakobson's concept of "addressee". See: Roman jakobson, *Closing Statement: Linguistics and Poetics*, p. 353 (Roman Jakobson, *Essais de Linguistique générale*, *1. Les Fondations du Langage*, p. 214, uses the French translation "destinataire").

[415] "Impression" is the term Susanne Langer uses to refer to the process the addressee is involved in (see: Susanne K. Langer, *Feeling and Form*, Charles Scribner's Sons, 1953, pp. 13-4.

[416] Sensation is the process of taking in "raw" sense data that precedes perception (see for instance: Douglas A. Bernstein, Edward J. Roy, Thomas K. Srull, Christopher D. Wickens, *Psychology*, Houghton Mifflin Company, 2nd edition, 1991, p. 125).

[417] Douglas A. Bernstein, e.a., *Psychology*, glossary p. A-26.

[418] The innateness of human linguistic capacity is discussed in a.o. Noam Chomsky, *Language and the Mind*, Cambridge University Press, 3rd ed., 2006, Steven Pinker, *The Language Instinct, The New Science of Language and Mind*, Penguin Books, 1994 or Simon Kirby, Mike Dowman, & Thomas L. Griffiths, *Innateness and culture in the evolution of language*, Proceedings of the National Academy of Science of the United States of America, Vol. 104, N°12, March 2007, pp. 5241–45.

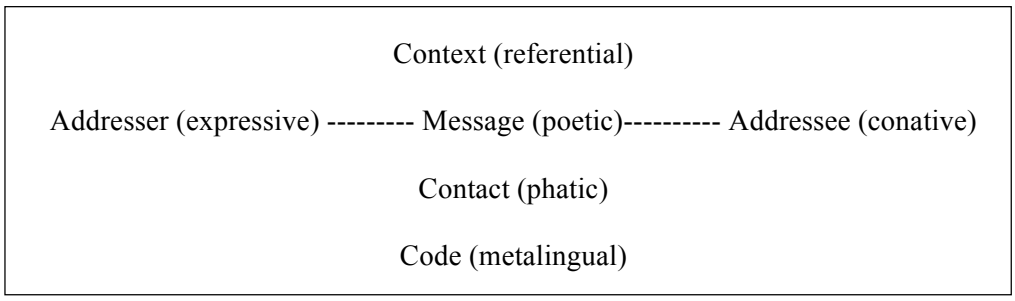
[419] George Miller defines a "code" as: "[e]very system of symbols that, *by prior convention*, is used to represent and transmit information from a source to a point of destination" (George A. Miller, *Language and Communication*, MacGrow Hill, 1951;

To make the difference between similar codes and similar *kinds* of codes clear, consider the case where someone addresses you in a language you don't understand at all. Even though you don't understand what the person is trying to say, you presume that the person is expressing a message verbally, in other words, you understand that what is said is a sign vehicle, because you possess a same kind of code (i.e. language capacity) even though you are unable to decode the message because you don't possess the same code (you don't understand the same language). The process of communication can only be effective, successful or 'operative' if the addressee is able to decode the sign vehicle. Roman Jakobson describes the process of operative communication as follows:

> The addresser sends a message to the addressee. To be operative the message requires a context referred to ('referent' in another, somewhat ambivalent, nomenclature), seizable by the addressee, and either verbal or capable of being verbalized[420], a *code fully, or at least partially, common to the addresser and addressee* (or in other words, to the encoder and decoder of the message); and finally, a contact, a physical channel and psychological connection between the addresser and the addressee, enabling both of them to stay in communication.[421]

It should be clear from what is said that sign vehicles have no intrinsic meaning, since they are objects or processes different from knowledge or thought. Meaning is, as was discussed, only attributed to conceptual knowledge or thought (concepts and propositions). If we want to talk about the meaning of a sign vehicle, the encoded message, we need to distinguish between its meaning for the addresser and for the addressee. *For the addresser* it is to be understood as the meaning of the message that is encoded by the addresser. The meaning of the sign vehicle *for the addressee* is to be understood as the meaning of the decoded message, belonging to the addressee's web of knowledge. The meaning of the decoded message may be (and in many cases is) different from the meaning of the (original) message.

Different authors have constructed different models of communication according to the elements that are important in their theories. Some traditional models are represented below (Example 6.9: Jakobson; Example 6.10: Shannon and Weaver; Example 6.11: Eco).



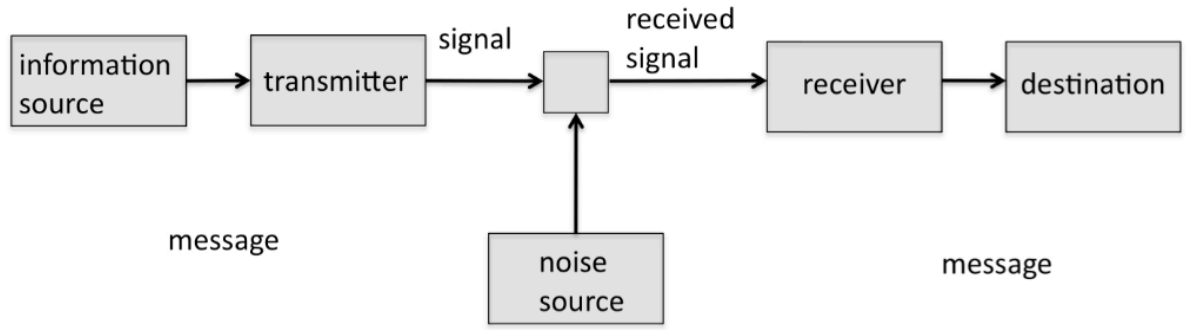
Example 6.9: Jakobson's model of communication.[422]

quoted in Umberto Eco, *La structure Absente: Introduction à la Recherche Sémiotique*, translated by Uccio Esposito-Torrigiani, Mercure de France, 1972, p. 118 [my translation from Eco 1972,13, my italics]).

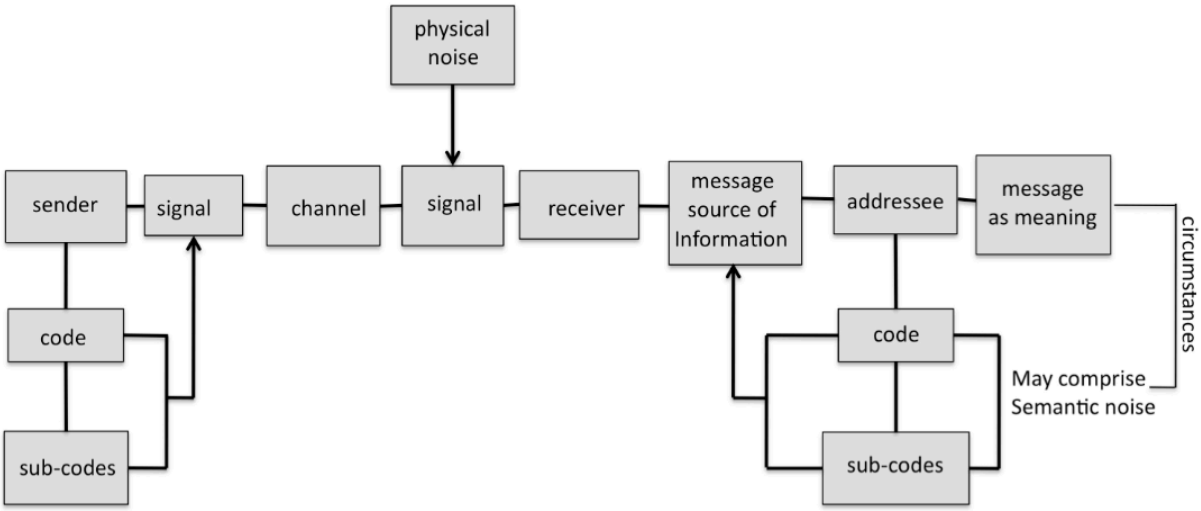
[420] Jakobson seems to restrict his model of communication to the transfer of verbal knowledge. I extend this idea to all explicit knowledge in the next section (on verbal and non-verbal knowledge). The communication of non-verbal knowledge will be shown to be central to musical communication.

[421] Roman jakobson, *Closing Statement: Linguistics and Poetics*, in: Thomas A. Sebeok (ed.), *Style in Language*, MIT Press, 1960, p. 353 [my italics].

[422] Roman Jakobson, *Essais de Linguistique générale*, *1. Les Fondations du Langage,* (Translated by Nicolas Ruwet), Les Editions de Minuit, 1963, p. 214. Jakobson's linguistic functions are added between brackets.



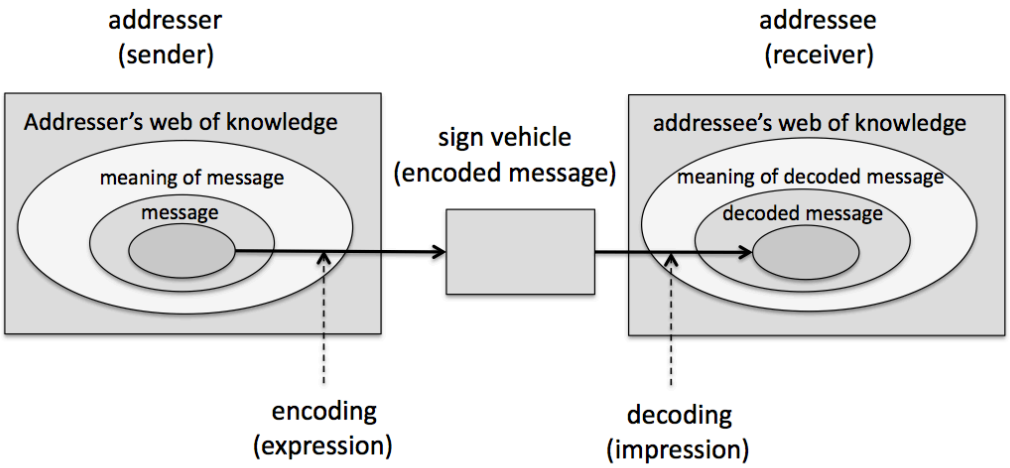
Example 6.10: Shannon and Weaver's model of communication (1949).[423]



Example 6.11: Umberto Eco's model of human communication.[424]

Shannon and Weaver's model and Eco's model include physical "noise" (see Example 6.10 and 6.11). Noise is any disturbance that may influence the signal or sign vehicle. Physical noise is external to both actors, and is distinguished from semantic noise, which consists of differences in the codes, not in the difference of conceptual knowledge (meaning of concepts). Although noise may at times be an important factor in the difference between the meaning of the addresser's message and that of the addressee's decoded message, it will not be taken into account here, since it is not essential in the context of the present dissertation. Based on the ideas developed above, a model of communication can be constructed as shown in Example 6.12.

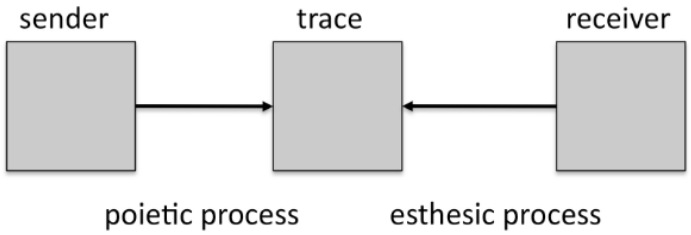
[423] Source: Philip Quinlan & Ben Dyson, *Cognitive Psychology*, Pearson Education Limited, Harlow, 2008, p. 37.
[424] Source: Umberto Eco, *La structure Absente: Introduction à la Recherche Sémiotique*, translated by Uccio Esposito-Torrigiani, Mercure de France, 1972, p. 118.



Example 6.12: Model of communication.

The sign vehicle in this model *is* the encoded message. It does not *contain* the encoded message. The box representing the sign vehicle is therefore 'empty'. This idea corresponds to Umberto Eco's claim that "the message is presented as an *empty form*, to which one can attribute many possible meanings"[425]. The term "message" in the quote has to be understood as 'encoded message' in the present context.

The process of expression in Example 6.12 corresponds to Jean Molino's "poietic process"; the process of impression is different from his "esthesic process",[426] in that in Molino's model, the esthesic process goes from receiver to trace (sign vehicle), as is shown in example 6.13. For him the esthesic process is "essentially a reconstruction of the trace"[427].



Example 6.13: Molino's model of communication.

I want to distinguish between the process of impression or perception (which is an esthesic process directed from sign vehicle to addressee) and the "process of reconstructing the message"[428], which I regard as a cognitive process in the addressee's brain: the process of creating a decoded message by decoding the sign vehicle and of interpreting the decoded message. The model of communication

[425] Umberto Eco, *La structure Absente: Introduction à la Recherche Sémiotique*, translated by Uccio Esposito-Torrigiani, Mercure de France, 1972, p. 117. Quoted in English translation in: Jean-Jacques Nattiez, *Music and Discourse: Toward a Semiology of Music*, translated by Carolyn Abbate, Princeton University Press, 1990, p. 21 [my italics].
[426] See: Jean Molino, *Musical Fact and the Semiology of Music*, translated by J. A. Underwood, Music Analysis, Vol. 9, N°2, 1990, pp. 128-30. See also: Jean-Jacques Nattiez, *Music and Discourse, Toward a Semiology of Music,* translated by Carolyn Abbate, Princeton University Press, 1990, p. 16-7, or: Robert Samuels, *Mahler's Sixth Symphony, A Study in Musical Semiotics*, Cambridge University Press, 1995, p. 8.
[427] Craig Ayrey, Introduction to: Jean Molino, *Musical Fact and the Semiology of Music*, translated by J. A. Underwood, Music Analysis, Vol. 9, N°2, 1990, p. 106.
[428] Craig Ayrey, Introduction to: Jean Molino, *Musical Fact and the Semiology of Music*, p. 106.

developed in the present dissertation is therefore more akin to the unidirectional model "preferred by Barthes and Eco"[429], from sender, over encoded message, to receiver.

6.8 Verbal and non-verbal knowledge

So far, I have not specified the type of code used in the expression or communication of a message. Many models of communication are specifically directed towards linguistic communication; that is the communication of verbal knowledge. Not all conceptual knowledge can be expressed in language (in words and sentences), however. In order to be expressible in language, there has to be a cerebral link between the conceptual knowledge to be expressed (the message) and linguistic[430] procedural knowledge or linguistic codes (procedural knowledge for the generation of words). In other words: the subject needs to have words for the concept he or she wants to express. Concepts that can be expressed in language, because there is a link between the concept and a linguistic code, are called **verbal concepts**. The set of an individual's verbal concepts is his or her **verbal knowledge**. All the other conceptual knowledge of an individual is **non-verbal knowledge**, knowledge that cannot be expressed in language because there is no link between the concepts and linguistic procedural knowledge in an individual's brain (that is: the individual has no words for the concept). Since a subject's brain contains many more concepts than the number of words in any known language, the number of non-verbal concepts is necessarily much higher than the number of verbal concepts. Non-verbal knowledge consists of all possible kinds of conceptual knowledge[431]: pure as well as empirical knowledge; explicit as well as tacit, intuitive and emotional knowledge. Non-verbal knowledge may be intuitive; intuitive knowledge may be non-verbal.

Noam Chomsky states: "We do not understand, and, for all we know, we may never come to understand what makes it possible for a normal human intelligence to use language as an instrument for the free expression of thought and feeling[432]; or, for that matter, what qualities of mind are involved in the creative acts of intelligence that are characteristic, not unique and exceptional, in a true human existence."[433] Despite this lack of understanding, "discoveries in neuroscience have shown that non-verbal signs are produced differently from words. Spoken language is processed in the cerebral cortex, a more developed area of the brain that is unique to human beings. In contrast, nonverbal cues—such as smiling, staring, and clenching the fists—are processed in lower, more primitive areas such as the limbic system. People often produce and receive nonverbal cues without conscious awareness of doing so."[434] In this statement, Marcel Danesi seems to be referring to bodily responses when he talks about "nonverbal signs". Although those non-verbal *responses* differ from verbal sign vehicles (words), non-verbal *concepts* are *expressed* in communication in a similar way as verbal concepts, albeit with different codes.

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[429] Craig Ayrey, Introduction to: Jean Molino, *Musical Fact and the Semiology of Music*, p. 105, referring to: Roland Barthes, *Elements of Semiology*, trans. Annette Lavers and Colin Smith, Beacon Press, 1967, to: Roland Barthes, *S/Z: An Essay*, trans. Richard Miller, Hill and Wang, 1974, and: Umberto Eco, *A Theory of Semiotics*, Indiana University Press, 1976.

[430] Throughout the present dissertation, I will restrict the meaning of the concepts 'language' and 'linguistic' to verbal language (sometimes also called "natural language", "the domain of proper linguistics", of which music is not a member (see: Umberto Eco, *La structure Absente: Introduction à la Recherche Sémiotique*, translated by Uccio Esposito-Torrigiani, Mercure de France, 1972, p. 15-7). Whenever the term language occurs, it refers to verbal language only. The very interesting question whether music or art forms are languages will not be addressed. For a concept of language in a broader sense, see for instance: Göran Hermerén, *Representation, Truth, and the Languages of the Arts*, In Veikko Rantala, Lewis Rowell & Eero Tarasti (eds.), *Essays on the Philosophy of Music*, Acta Philosophica Fennica, Vol. 43, 1988, pp. 179-209, quoted in: Stephen Davies, *Musical Meaning and Expression*, Cornell University Press, 1994, p. 5. Davies lists seven conditions for a "something" to be a language "or significantly like a language". According to those conditions, music would not be a full-fletched language, since, according to Davies, "music meets, at best, only the weakest three [conditions]".

[431] With the exception of verbal knowledge, of course.

[432] In the present context, "expression of feeling" should be read as "expression of emotional knowledge".

[433] Noam Chomsky, *Language and Mind*, Cambridge University Press, 3rd edition, 2006, pp. 88-9. What is said about language can be extended to any procedure of expression or communication.

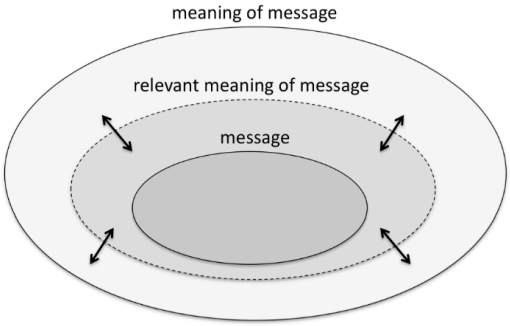
[434] Marcel Danesi, *Messages, Signs, and Meanings: A Basic Textbook in Semiotics and Communication Theory*, Canadian Scholar's Press Inc., 3rd edition, 2004, p. 64.

Every conscious thought[435] can, in theory at least, be expressed by an individual if the individual possesses expressive procedural knowledge, but, as was suggested above, in order to be successfully communicable, addresser and addressee need to possess highly similar codes. If I possess the procedural knowledge of linguistic expression, for instance, I can connect a word to any thought that would occur in my mind. If an adequate word for a particular thought doesn't belong to any language (or any language I know), there is no reason why I should not be able to invent and utter a new word, such as "gavagai"[436], to express my exact thought. The sign vehicle thus created may be perceived by an addressee, but if the addressee doesn't possess the procedural knowledge to decode the sign vehicle (because he or she doesn't know the word "gavagai", for instance), the addressee would not be able to attach meaning to the word that would enable him or her to understand my message, which makes the act of communication unsuccessful (supposing that it was my aim to be understood).

It should be clear that the concept of meaning developed above is not restricted to linguistic meaning (the meaning of verbal concepts or propositions). Concepts of any kind—verbal or non-verbal—have meaning as soon as they are interconnected with other concepts in a web of knowledge.

6.9 Relevant meaning and levels of communication

We have seen that the meaning of a message is usually broader (contains more concepts) than the number of concepts contained in the message. In many situations an individual aims at communicating at least part of that broader meaning that is not included in the message. I call the meaning (the set of concepts) that an individual attempts to communicate the **relevant meaning** of the message. The scope of the relevant meaning of a message varies between the set of concepts contained in the message and the whole meaning of the concepts contained in the message for the addresser, as is shown in example 6.14. This scope of relevant meaning depends on the context or the situation of the communication that I call the **level of communication** in which the message is expressed.



Example 6.14: The scope of relevant meaning of a message in relation to the message and its complete meaning.

The idea of 'level of communication' corresponds to the idea of "language levels"[437] developed in the context of (natural) language by the Signific Movement[438]. According to a theory of this movement,

[435] At least some unconscious thoughts can also be included in expression, but it is beyond the scope of the present text to address the topic of unconscious thought.
[436] The word "gavagai" was invented by W.V. Quine (see Willard Van Orman Quine, *Word and Object*, MIT Press, 1960, p. 29).
[437] The idea of "language levels" (Dutch: taaltrappen) is an important idea of Dutch author Frederik van Eeden, mathematician and philosopher Gerrit Mannoury, and the Signific Movement.
[438] the Signific Movement was a Dutch group of linguistic thinkers who based their ideas around Victoria Lady Welby's term "significs". The movement included a.o. novelist Frederik van Eeden and mathematician and philosopher Gerrit Mannoury. "Significs was defined by Mannoury as the theory of mental associations which underlie human speech acts, with exception of theories of language in a narrower sense." (H. Walter Schmitz (ed.), *Essays on Significs: Papers presented on the occasion*

the use of language (verbal expression and communication) can be categorized in different "language levels", according to their "volitional and emotional content and the conceptual content of general and specific speech acts"[439].

> This theory [of language levels] is implied by a pragmatic conception of language. Language always has a specific purpose. When for example the purpose is a specialized one, such as the building of a bridge, we need a specialized, technical language which has a clear meaning to all those who participate in the building of the bridge. But we do not need such a specialized language when we want to express that we have a headache. The language levels given by Mannoury […] are the following:
>
> 1. basic language (has no word connections; e.g. the primordial language of children);
>
> 2. emotive language (word connections exist but are not rigid; e.g. poetical language, and the not formalized language of mathematics, esp. intuistic mathematics);
>
> 4. scientific language (word connections are based on explicit agreement. Therefore the margin of misunderstanding becomes very narrow. E.g. the language of laws and regulations, technology and science);
>
> 5. symbolic language (word connections are based exclusively on preconceived rules of combination. Misunderstanding is hardly possible. e.g. the language of symbolic logic)[440].
>
> These levels form a hierarchy according to increasing stability of word connections. However, according to Mannoury the transition from one level to another is a gradual one.[441]

The "stability of word connections"[442] mentioned by Schmitz relates to the scope of relevant meaning of a message in verbal communication. At the highest level (the level of symbolic language), the relevant meaning of the concepts contained in a message is strictly limited to their pre-established definition. Any purely mathematical proposition, for instance, belongs to this language level. In the proposition "A point is that which has position but not dimensions"[443], the only part of the meaning of

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of the 150th Anniversary of the Birth of Victoria Lady Welby (1837-1912), Foundations of Semiotics 23, John Benjamins Publishing Cie., 1990, p. 262).

[439] "de wilsinhoud, de gevoelsinhoud en de voorstellingsinhoud van algemene en biezondere taaldaden." Gerrit Mannoury, quoted on http://frederik-van-eeden.clubs.nl/nieuws/detail/212273_significi [last accessed: 09 February 2012], and H. Walter Schmitz (ed.), *Essays on Significs*, p. 263: "the best known distinction of significs, namely the one between the indicative, the emotional, the volitional and the formal elements of a speech act."

[440] Note that according to this definition music (or any artistic idiom) cannot be a symbolic language. According to Susanne Langer, music is emotive expression as well as symbolic form; "form" as well as "feeling". "[T]he conclusion reached in *Philosophy in a New Key* is that the function of music is not stimulating a feeling, but expression of it; and furthermore, not the symptomatic expression of feelings that beset the composer [emotional response] but a symbolic expression of forms of sentience as he understands them. It bespeaks his imagination of feelings rather than his own emotional state, and expresses what he *knows about* the so-called 'inner life' [emotional traces]; and this may exceed his personal case, because music is a symbolic form to him through which he may learn as well as utter ideas of human sensibility." (Susanne langer, *Feeling and Form*, Scribner's, 1953, p. 28).

[441] H. Walter Schmitz (ed.), *Essays on Significs,* pp. 263-4.

[442] Charles Rosen talks about "a certain looseness of meaning" to indicate the unequivocal signification or function of elements of language. He claims "[p]oetry seizes upon this looseness, upon the possibilities of misunderstanding inherent in language, and creates form in which the meaning of the elements derives as much (sometimes more) from their place in the individual work as from their use in speech." (see: Charles Rosen, *Arnold Schoenberg*, University of Chicago Press, 1975, p. 18).

[443] John Casey (ed.), *The first six books of the Elements of Euclid*, Hodges, Figgis & Co., 1885, p. 2.

the concepts "point", "position", "dimension", and of all the other words in the proposition, that is relevant in the act of communication is their mathematical definition. As long as the subjects involved in the communication (addresser and addressee) apply the same definitions for those concepts, there will be "stability" in communication; the subjects will have perfect understanding[444] (assumed, of course, that there is no noise in the process of communication). Perfect understanding of the message by the addressee occurs when the relevant meaning of the decoded message is identical to the relevant meaning of the (original) message. This generally only occurs on the highest language levels; the symbolic and, to a lesser extent, the scientific. The scientific language level of Significs is what Umberto Eco calls (without reference to the Signific Movement however) "laboratory language": "the language we use to send a business telegram or the one we use to talk with our personal computer are examples of laboratory language"[445].

When, for instance, we restrict the relevant meaning of the word "gav" to the fact that it is an instance of "agai"[446] (whatever an agai may be)[447], meaning that there is nothing else relevant to know in the conversation, then the English version of the proposition "every (or a) gav is an agai" can be exactly translated. For instance in French: "chaque (ou un(e)) gav est un(e) agai"; in Russian: "(каждый) гав Агаи", and so on. Other words may even be used in the other languages, as long as they refer to gav and agai only in the indicated way. If the French word for "gav" would be "vag", and if "agai" would be "iaga" in French, then the English "every (or a) gav is an agai" could still be exactly translated into French as "chaque (ou un(e)) vag est un(e) iaga". If we want to know more about an agai, we have to extend the meaning of the concept, such as: an agai is an "animal", whatever "animal" may mean (even if it is translated into French as "animal" and in Russian as "животное"). Exact translation only becomes impossible if the relevant meaning of the concepts involved is not explicitly limited (such as the meaning of the concept 'animal' in everyday communication). This is the case in most forms of human communication, where fine nuances are commonly part of the relevant meaning expressed. Everyday inter-subjective communication does not generally happen on the level of symbolic or scientific language, but is situated on the levels of emotive and utility language (or in some cases even on the basic language level)[448]. This means that the scope of the relevant meaning communicated is broader, than is the case in scientific and symbolic language. Nuance, double meanings, 'reading between the lines', irony, sarcasm and humor, emotions, political demagoguery, sophistry, and the like play a role at this level. Although these elements may make perfect understanding impossible, they enable us to verbally express thoughts and ideas that would otherwise be impossible to communicate. Or, as Umberto Eco puts it: "If, in every communicative interaction of everyday life, we practiced the severity that must characterize a logician or a lexicographer, life would become a hell."[449]

The stability of the word connections decreases when the language level decreases (from symbolic to emotive language), because the meaning of the concepts contained in the message and the decoded message will necessarily be different for the communicating individuals. In everyday communication, the relevant meaning of even very 'simple' concepts such as 'tree' will be very different for a carpenter, for whom trees—or at least the wood they provide—are a source of income, than for a person who fell out of a tree as a child and remained paralyzed ever after. "Beneath the uniformity that

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[444] According to R. G. Collingwood, "[u]nderstanding what some one says to you is […] attributing to him the idea which his words arouse in yourself; and this implies treating them as words of your own." (Robin George Collingwood, *The Principles of Art*, Oxford University Press, 1938, p. 250).

[445] Umberto Eco, Introduction to: C.K. Ogden & I.A. Richards, *The meaning of Meaning*, Harcourt Brace Jovanovich Publishers, (1923) 1989, p. viii.

[446] The similarity of "gav" and "agai" with Quine's "gavagai" is deliberate (see Willard Van Orman Quine, *Word and Object*, MIT Press, 1960, p 29).

[447] As soon as reference is made to an empirical source (e.g. by pointing at an object, like Quine's "gavagai") the meaning of the concept is already changed, so the concepts have to be pure (or their relevant meaning be restricted to pure concepts) in order for exact translation to be possible.

[448] It may be argued that the relevant meaning of a message on the basic language level of the Signific Movement is even narrower than that of the definitions of the concepts expressed in the message and that even those concepts may not have clear connections between them (i.e. gibberish). In that case, the comparison with extending scope of relevant meaning reaches its limit at the level of emotive language.

[449] Umberto Eco, Introduction to: C.K. Ogden & I.A. Richards, *The meaning of Meaning*, Harcourt Brace Jovanovich Publishers, (1923) 1989, p. viii.

unites us in communication there is a chaotic personal diversity of connections, and, for each of us, the connections continue to evolve."[450] The broader the relevant meaning of the communicated concepts gets, the more non-verbal concepts will be involved, and this makes even verbal communication ever more ambiguous, delicate, and prone to misunderstanding. The more the language level of a message moves towards the poetic level[451], the higher Quine's indeterminacy of translation[452] of the message becomes. The term translation can be used here in its broadest sense; not only the translation from one language into another (from one code to another), but also the transformation from message to encoded message and to decoded message.

I use the term 'level of communication' rather than the Significs' term "language level" because the idea is not restricted to verbal language alone[453]. It applies to all types of communication and therefore to non-verbal communication as well. Non-verbal communication can happen at all 'levels'. On the one hand, words are not always necessary to communicate even on a symbolic level, and on the other hand, at the level of broadest relevant meaning verbal communication may be (and often is) utterly and completely insufficient. Another distinction with the ideas of the Signific Movement I want to make is that they describe the lowest language level as the level of emotional language. The level of communication with the broadest relevant meaning, however, is not only about expression of emotional knowledge, although emotional knowledge usually constitutes an important part of the relevant meaning on this level of communication.

Finally, the idea of relevant meaning may be applied to the meaning of the *decoded* message interpreted by the addressee as well as to the meaning of the (original) message expressed by the addresser. Both may differ to a smaller or larger extent according to the level of communication. Effective communication can only happen when the communication happens at the same level for both actors in the process.

[450] Willard Van Orman Quine, *Word and Object,* p. 13.
[451] The poetic level of communication belongs to artistic expression and communication discussed below.
[452] Willard Van Orman Quine, *Word and Object,* pp. 26-79.
[453] Granted that the term "language" refers to verbal language alone or to every type of communication that has the (semantic and syntactical) structure of language. It is beyond the scope of the present dissertation to discuss this topic further.

Chapter 7. Artistic communication and the aesthetic universe

7.1 Artistic communication and expression

All expression is expression of ideas, of concepts and propositions within a message. Neither the concepts belonging to a message, nor the concepts belonging to the relevant meaning of a message have to be verbal concepts. Non-verbal concepts can be expressed as well. Language can be used to express verbal concepts belonging to a message only (since words are required in the process), but non-verbal concepts may be part of the relevant meaning of a verbal message. Language is by definition inappropriate as a tool to express those non-verbal concepts in its message. This can only be done through media of non-verbal communication, such as music or other artistic media. Indeed, it is often because ideas cannot be expressed verbally or rationally that artists resort to art to express them.

According to Susanne Langer, "works of art are 'presentational' symbols […]. Her account of presentational symbolism is developed by contrasting this mode of symbolism to the discursive symbolism of language"[454]. Langer "argues that it is above all the arts, and in particular music, which trade in [what she calls] presentational symbols [in contrast to discursive symbols][455]. Garry Hagberg neatly summarizes Langer's view, capturing the way it differs from Wittgenstein's: whereof we cannot speak, thereof we must compose, paint, write, sculpt, and so forth."[456] Indeed, art is often the only way to successfully communicate ideas that cannot be successfully[457] communicated in words. This idea is formulated by pianist Jan Michiels as: "What cannot be said should be played"[458], and by Helmut Lachenmann as: "Whatever composers cannot speak of they should work on."[459] These claims can be extended to the more general "what cannot be verbally expressed should be expressed artistically".

Artistic expression and communication happen at the lowest possible level of communication. This is the level where the relevant meaning of the message coincides with its complete meaning. Art can therefore be defined as the expression of the complete meaning of a message.

The relevant meaning communicated in Percy Shelley's verse "Unfathomable Sea! Whose waves are years"[460], for instance, is not restricted in any way. The relevant meaning of "sea", "waves" and "years" exceeds the dictionary meaning of the words, further even than the meaning that is created by the metaphor. Poets relevantly express the complete meaning the verbal concepts (represented by the words) have for them at the moment they write their poems. In addition, the mental image of the

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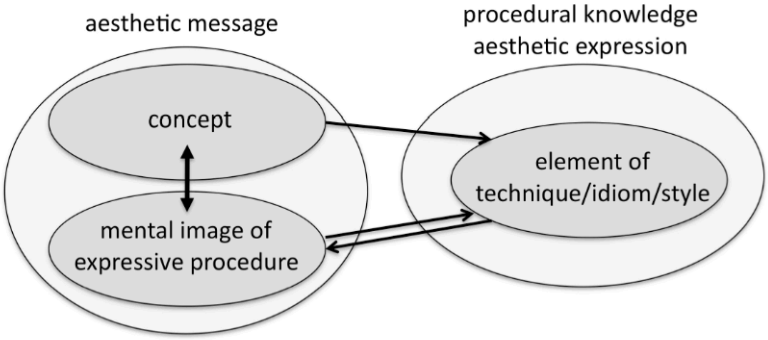
[454] Stephen Davies, *Musical Meaning and Expression*, Cornell University Press,1994, pp. 123-4.
[455] A "presentational symbol" is a symbol that presents an object (a feeling, according to Langer) rather than representing it. See: Susanne K. Langer, *Philosophy in a New Key: A Study in the Symbolism of Reason, Rite, and Art,* Harvard University Press, 1942, pp. 79-102.
[456] Stephen Davies, *Musical Meaning and Expression*, p. 125; referring to Susanne K. Langer, *Philosophy in a New Key*; to Susanne langer, *Feeling and Form*, Scribner's, 1953; to Ludwig Wittgenstein's "Wovon man nicht sprechen kann, darüber muß man schweigen", in Ludwig Wittgenstein, *Tractatus Logico-Philosophicus*, 1922, in: *Werkausgabe Band 1*, Surhrkamp, 1984, p. 85; and to Garry Hagberg, *Art and the Unsayable: Langer's Tractarian Aesthetics*, British Journal of Aesthetics, n°24, 1984, pp. 325-40.
[457] As was discussed before, words may be invented to express all possible thoughts, but this does not necessarily result in successful communication.
[458] "Worüber man nicht sprechen kann, muss man spielen" is the subtitle of dr. Michiels' doctoral dissertation *"Teatro dell'ascolto"* (VUB, Brussels, March 2011, unpublished).
[459] Helmut Lachenmann, *Philosophy of Composition: Is There Such a Thing*, in *Identity and Difference: Essays on Music, Language and Time*, Collected Writings of the Orpheus Institute, Leuven University Press, 2004, p. 68.
[460] Percy Bysshe Shelley, *Time*, in *Complete poetic works of P.B. Shelley*, forgotten books, 2008, p. 188.

words in the poem (Saussure's signified) and the complete meaning of these mental images also belong to the relevant meaning of the poetic message.

Example 7.1 shows the presence of a mental image of an expressive procedure in an aesthetic message. The reversed arrow connecting mental image and procedural element indicates that the mental image of the expressive procedure may be expressed[461], that a signifier may become a signified in artistic expression, thus blurring the distinction between mental images and other concepts in an aesthetic message.



Example 7.1: Concept and mental image of procedure in an artistic message.

It is because in art the mental image (knowledge) of procedures is relevantly expressed, that art cannot be explained verbally or poetry cannot be translated. The exact wording, images, sounds or other symbols in the artwork are essential. Berthold Brecht pointed out the intranslatability of poetry when, during his interrogation before the House Committee on Un-American Activities, he was asked whether he wrote the poem *Forward, we've not forgotten*. The questioner recited (part of) the poem in English. Brecht answered quite laconically: "No, I wrote a German poem, but that is very different"[462]. On a scientific or symbolic communication level, in contrast, the exact procedure of expression (the exact wording or symbols used) is unimportant (other words or symbols would do as well, as can be illustrated by the different notation systems used by Isaac Newton and Gottfried Wilhelm Leibniz when they developed calculus independently in the 18th Century[463]).

The mental image of musical procedures is what is sometimes called the 'inner ear'[464], the mental image an individual (i.c. a composer) can make of sound and music. In general, artistic expression is the expression of the complete Saussurean sign (extended to non-verbal signs[465]), in such a way that the distinction between concepts and mental images of the expressive procedures used to express the concepts cannot always be made. Artistic expression is generally a mixture of both. Mental images of formal and expressive procedures are as much part of the message as are non-procedural concepts. Formal or procedural concepts (mental images of expressive procedure, related to technique, idiom and style) are generally part of the aesthetic message. There is, in other words, no clear functional distinction between formal content of an artistic message and non-formal conceptual content. An artistic idea can originate from both. The original concept (the initial idea of the artwork) may be verbal (as is possibly the case in Wagner's *Leitmotivs*) or non-verbal, emotional or intuitive but it may

[461] It may be argued whether the arrow from procedural knowledge to mental image is always necessary. This discussion would bring us too far in the present context.
[462] Source: https://www.youtube.com/watch?feature=player_embedded&v=GkiqGxD4CZ8#! [last accessed: 23 December 2012].
[463] See for instance: Hans Niels Jahnke (ed.), *A History of Analysis*, American Mathematical Society, 2003, p. 100.
[464] 'Inner ear' is here defined as a mental ability, not as the part of the vertebrate ear comprising the cochlea and the vestibular system.
[465] Non-verbal signs are signs that have non-verbal concepts as their signified.

also be a mental image of an artistic procedure. A sonic idea may be at the origin of an aesthetic message or may even represent the whole message. A melodic *trouvaille*, a particular sound idea or technique may be the initiating sparkle of an aesthetic message.

In my own artistic practice, the knowledge of my serial technique and the formulas I developed in Part 1 may not belong to the messages I communicate, but they certainly belong to their meaning. My research may in itself not be artistic expression, but it adds to the knowledge contained in my aesthetic universe and thence to the meaning of my musical messages. However, the tonality and consonance formulas form the basis of my technique and this technique is part of the artistic messages I communicate. In this way, theory and technique become homogeneously integrated in my artistic expression, and cannot always be clearly distinguished.

It should be clear now that, in artistic creation (and performance), *what* is expressed is (or may be) as important as *how* it is expressed. Some artists focus on what is expressed, others on the form of the message and the procedures of expression. The former is the focus of expression theory, the latter of formalism.[466] Formalists such as Clive Bell and Roger Fry claim that "'significant form' alone may be considered as the 'essence' of art"[467]. The formalist aesthetic theory of Eduard Hanslick, in contrast, stresses the idea that "in music we see content and form, material and configuration, image and idea, fused in an obscure, inseparable unity"[468]. The ideas developed in the present dissertation correspond more to Hanslick's idea, which, in the present context, can be interpreted as a synthesis of formalism and expression theory, rather than as a pure formalist theory like that advocated by Bell and Fry.

'Expression' should in the present context be understood as expression of ideas, not of emotions. For an emotion to be expressible it should be present in the artist's mind. This is generally not the case. If it were true that composers or performers express emotions, the only emotions they could express would be the emotions they feel while composing or performing. Since composition is generally a long-lasting activity and since most composers experience a whole range of sometimes contradicting emotions during the entire composition process, scores would result in a pall-mall expression of those different emotions. And also, how could Giuseppe Verdi ever have expressed the emotions of Violetta, since he cannot possibly ever have experienced what it is like to be a "fallen woman".

Performers, in turn, are supposed to be able to play cheerful music (music through which *ideas* related to the *idea* of cheerfulness are expressed) even if they are feeling sad. Contrary to Susanne Langer's claim that "music (and the art in general) is an iconic symbol of mental state identifiable as emotions"[469], I claim that art, or any other type of communication, does not express emotions. This is however not to say that no emotions are *involved* in the processes of artistic (or other) expression and communication. Possibly, in normal conditions[470], no human expressive (or any other cerebral) activity happens without the involvement of emotions. "It is entirely feasible to devise information-processing models of language, memory and even decision making that do not make reference to emotion."[471] Indeed, in theory, it is possible to imagine human thought without the involvement of emotions, but in reality it is very unlikely that we ever have thoughts that are not in one way or another connected to emotional processes in our brain as the result or the cause of the thought process.

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[466] "The concept of formalism signifies an aesthetic perspective […] that prioritizes formal detail above other factors (such as identity, meaning, expression and interpretation)." (David Beard & Kenneth Gloag, *Musicology, The Key Concepts*, Routledge, 2005, p. 65).

[467] Anton A. van den Braembussche, *Denken over Kunst: Een Kennismaking met de Kunstfilosofie*, Dick Coutinho, 1996, p. 101 [my translation], referring to Clive Bell, *Art. The Classic Manifesto on Art, Society, and Aesthetics* (1913), re-edited: Book Jungle, 2008; and Roger Fry, *Vision and Design* (1920), re-edited: Dover Publications Inc., 1998.

[468] Eduard Hanslick, *On the Musically Beautiful: A Contribution towards the Revision of the Aesthetics of Music*, translated by Geoffrey Payzant from *Vom Musikalisch-Schönen: Eine Bezitrag zur Revision de Ästhetik der Tonkunst* (1891), Hackett Publishing Company, 1986, p. 80.

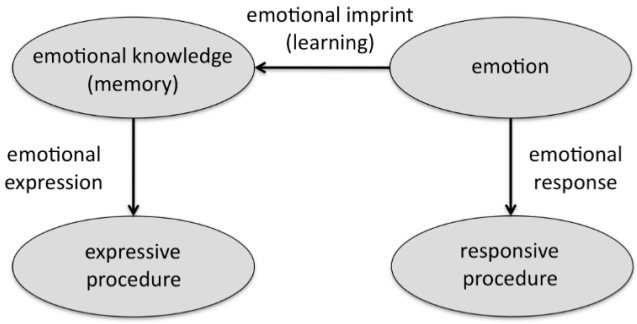
[469] Stephen Davies, *Musical Meaning and Expression*, Cornell University Press,1994, pp. 123-4.

[470] Emotional numbness (the lack of feeling) or distortion of feeling as may occur in such cases as posttraumatic stress disorder or schizotypal personality disorders, are here not considered as 'normal conditions'. (see: Douglas A. Bernstein, Edward J. Roy, Thomas K. Srull, Christopher D. Wickens, *Psychology*, Houghton Mifflin Company, 2nd edition, 1991, p. 512 & 613).

[471] Jamie Ward*, The student's Guide to Cognitive Neuroscience*, Psychology Press, second edition, 2010, p. 337.

Collingwood may well be right in claiming that "words in a living language are never used without some practical and emotional colouring, which sometimes takes precedence of its descriptive function"[472], and that "sensa never come uncharged with emotion"[473].

Although emotions may be involved in all human cerebral activity, this is not to say that they can be expressed. Emotions can only be imprinted or responded to, as was discussed above (see Example 6.5). If emotions are to be expressed, this can only happen indirectly. Emotions have to be imprinted as emotional knowledge *before* the emotional concepts they result in can be expressed. Collingwood's statement: "the poet's labour can be justly described as converting emotions into poems"[474] should therefore be interpreted as referring to an activity of indirect conversion. The distinction between emotional response and emotional expression, and the indirect character of emotional expression via emotional imprint, is shown in Example 7.2.



Example 7.2: Emotional expression vs. emotional response.

An emotional response is never an artistic expression. Expression requires an expressive procedure that belongs to procedural knowledge. Emotional response on the other hand is an unmediated, involuntary process. In some cases the distinction between emotional response and emotional expression may not be clear however.[475] The outcome of some responsive procedures, such as smiling or crying for instance, may be used as expressive procedures. There are actors who can cry on command and most of us can smile without it being the response to an emotion. Emotional responses too may in some cases be in contradiction with experienced emotions.[476]

If it is true for all human expression that it only involves emotions indirectly, how much more does this apply to art. As was said before, much of an individual's emotional knowledge is non-verbal. Who has never experienced the inability to say in words what he or she feels, the frustration: "Oh word, you word that I lack"[477]? Art may be the only way to communicate the non-verbal emotional knowledge resulting from those unspeakable feelings. This is why, for many artists, the expression of emotional knowledge is considered the purpose of their art. They stress the emotional link in their expression of aesthetical ideas. For them, Jakobson's "expressive function", aimed at expressing (knowledge resulting from) feelings and attitudes, is central in artistic expression. Expression theorists such as Leo

[472] Robin George Collingwood, *The Principles of Art*, Oxford University Press, 1938, pp. 8-9.
[473] Robin George Collingwood, *The Principles of Art*, p. 163.
[474] Robin George Collingwood, *The Principles of Art*, p. 23.
[475] In order not to over-complicate matters, "emotional behavior" is here left out of the picture (see: Leonard B. Meyer, *Emotion and Meaning in Music*, The University of Chicago Press, 1956, p. 17).
[476] This is a.o. the case in such neurological diseases as amyotrophic lateral sclerosis. See: Douglas A. Bernstein, e.a., *Psychology*, pp. 491-2.
[477] "O Wort, du Wort, das mir fehlt! are the last words of Arnold Schoenberg's unfinished opera *Moses und Aron*.

Tolstoy even claim that "art is purely and solely a matter of emotions"[478]. Anton van den Braembussche rightly objects that this claim is "without doubt unsustainable"[479].

Artistic expression becomes artistic communication when it is part of the inter-subjective process chain of knowledge transfer between addresser (composer or performer) and addressee (performer or listener). In the process of composition, composers encode an aesthetic message in a score. The score is subsequently decoded and mentally interpreted by the performer. This results in a decoded message in the brain of the performer that becomes part of the message expressed (encoded) by the performer in the process of performance. The performance is the sign vehicle for this second encoded message, which is then decoded and interpreted by the listener. In order for the messages to be decoded, composer, performer, and listener have to possess a similar aesthetic code. But even then, there will only be *similarity* between messages and decoded messages in the brains of the different individuals involved. There is no one-to-one mapping of complete meaning in the procedures of artistic communication (encoding and decoding). Perfect encoding and decoding of meaning of an artwork is impossible. The meaning of an artwork is therefore necessarily different from subject to subject. On top of that, the relevant meaning of the message behind a composition changes constantly, even for the composer, during the whole process of conception and composition, as well as after the completion of the score. So does the meaning of a score and performance[480] for the performer during the process of practice, with every performance, and in the intervals between performances, as well as the meaning of the performance of a piece for the individual listeners every time they listen to the piece, read about it, or when their mind is confronted with it in any other way. Trying to discover the composer's meaning of a composition in order to be able to express it in the performance of a score is therefore not a mere futile enterprise, but rather a sheer impossibility, and should, in my opinion, not be an aspiration of performers or listeners. I presume this might have been a comforting idea to Arnold Schoenberg when he said: "I want to express myself—but I hope to be misunderstood."[481]

7.2 The Aesthetic Universe

An individual's personal knowledge can be grouped in different but usually overlapping subsets of knowledge according to the different domains of thought that require and activate that specific knowledge. A mathematician's professional activity, for instance, demands a different set of knowledge, a different area of thought, than his or her participation in a political debate. Whenever such a subset of personal knowledge is highly developed and structured, and occupies a prominent place in the person's activities (such as the mathematician's set of mathematical knowledge), I call the subset a **cerebral universe**. Cerebral universes can be a.o. social (professional, private[482], political,…), ethical or moral (containing knowledge in the realm of right and wrong), logico-mathematical (the domain of true and false), or aesthetic (the domain of beauty and the arts).

The **aesthetic universe** of an artist (or an informed non-artist with highly developed aesthetic interests) is the set consisting of all the artist's aesthetic knowledge. A musician's aesthetic universe, for instance, contains not only all the musician's theoretical and historical knowledge of music, and his or her knowledge of the repertoire, but also the procedural knowledge necessary to play an

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[478] Anton A. van den Braembussche, *Thinking Art*, Springer, 2009, p. 39, translation by Michael Krassilovsky e.a. of, *Denken over Kunst: Een Kennismaking met de Kunstfilosofie*, Dick Coutinho, 1996; referring to: Leo Tolstoy, *What is Art?,* translated by Richard Pevear & Larissa Volokhonsky, Penguin books, 1995.

[479] Anton A. van den Braembussche, *Thinking Art*, p. 40.

[480] An individual's meaning of a score or performance is the meaning of the individual's aesthetic idea for which the score or the performance is the sign vehicle.

[481] Arnold Schoenberg in a letter to Alma Mahler (07 October 1910). Quoted in Bryan R. Simms, *"My Dear Hagerl": Self-Representation in Schoenberg's String Quartet No.2*, in 19th-Century Music, Vol. 26, N°3, University of California Press, 2003, p. 258.

[482] It is frequently said that becoming a father or a mother, for instance, changes one's "whole world". There is indeed a completely new private social universe that comes into being with the birth of a child: a parental universe that will have a major influence on one's thought for the rest of one's life. This universe contains entirely new knowledge but also rearranged existing knowledge.

instrument, read a score, or compose a new piece, and the emotional traces left in the musician's brain by aesthetical experiences.

Arnold Schoenberg stated that "[c]omposition […] is above all the art of inventing a musical idea and the fitting way to present it"[483]. I extend this claim as follows: The musician's artistic practice—creation or performance—is the expression of the complete meaning of aesthetic ideas within his or her aesthetic universe. I define an **aesthetic idea** as any idea that belongs to an artist's aesthetic universe and that can become part of a message that is expressed artistically. The meaning of an aesthetic idea for an artist is the web of all concepts that are connected to the aesthetic idea within the artist's aesthetic universe. An **artist** can thus be defined as a person who is able to—feels the urge and has the skills (the procedural knowledge) to[484]—express the meaning of the aesthetic ideas belonging to his or her aesthetic universe through the creation and/or performance of artworks. An **artwork** (as a physical object or procedure external to the brain) is the sign vehicle—the external outcome of the process of encoding— of aesthetic ideas resulting from the expression of the whole meaning of those aesthetic ideas.

As we have seen, in formal communication, the relevant meaning of the concepts used is normally restricted. In some cases only the definition of the communicated concepts is relevant. In colloquial communication, connotations, nuance, ambivalence, humour, irony or sarcasm, 'reading between the lines', sophistry or demagoguery may play a more or less important role in the extension of the relevant meaning of the concepts expressed. In artistic expression the *complete* meaning of the aesthetic message, of which the artwork is the sign vehicle, is relevantly expressed without limits to the possible connections between the concepts contained in the artist's aesthetic universe. This results in an arborescent structure of the web of meaning of an aesthetic idea, or the aesthetic universe in general, in a constantly evolving web of metaphoric, intuitive, logical or completely free connections between concepts, wherein, to use Gilles Deleuze's phrasing: "any point […] can be connected to anything other"[485]. The continuous creation of new connections between concepts in the aesthetic universe is not unlike a steadily proliferating Deleuzian **rhizome**. New relevant knowledge of any origin (be it rational, emotional or of any other kind) is added to the aesthetic idea—and, by extension, to the subject's aesthetic universe—every time the aesthetic idea is activated in thought. Kant phrases this idea as follows:

> An aesthetic idea is a presentation of the imagination which is conjoined with a given concept and is connected, when we use imagination in its freedom, with such a multiplicity of partial presentations that no expression that stands for a determined concept can be found for it. Hence it is a presentation that makes us add to a concept the thoughts of much that is ineffable, but the feeling of which quickens our cognitive powers and connects language, which otherwise would be mere letters, with spirit.[486]

Turning a web of meaning into a rhizome and the effect it has on emotional experience is what **aesthetic experience** consists of. It is not the perception of an artwork, but what is *done* with it by the individual (be it the addresser or the addressee). The web of meaning of an aesthetic idea, is turned into a rhizomatic web when all concepts belonging to the meaning of the aesthetic idea are—or can be—interconnected, as long as those interconnections are physiologically possible (that is, on a neuronal level). The aesthetic idea is then no longer the centre or node of a butterfly or bowtie-shaped web of meaning as shown in Example 7.3. Since any concept of the web may be connected to any other concept, its centre disappears.

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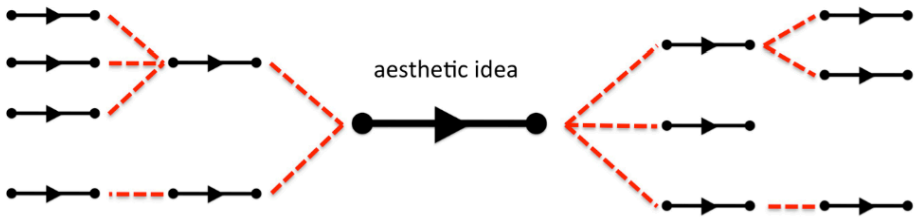
[483] Arnold Schoenberg, *Style and idea*, Leonard Stein, ed., Leo Black, transl., University of California Press, 1975, p. 374.
[484] Schoenberg claims "art is born of 'I must' [I feel the urge], not of 'I can' [I possess the skills]" (Arnold Schoenberg, *Style and idea*, p. 365). It seems improbable to me however that urge without artistic skills could lead to the creation of an artwork.
[485] Gilles Deleuze & Félix Guattari, *A Thousand Plateaus*, Volume 2 of *Capitalism and Schizophrenia*, translation: Brian Massumi, Continuum, 2004, p. 7.
[486] Immanuel Kant, *Critique of Judgment*, Werner S. Pluhar, translator, Hackett Publishing Company, 1987 (originally published in 1790), § 49, p. 185.



Example 7.3: Bowtie-shaped web of meaning of an aesthetic idea before it is turned into a rhizome.
A rhizome may be obtained when any concept in the web can be interconnected to any other concept.

The construction of the aesthetic rhizome is not limited to logical or even to metaphoric interconnections of concepts; any concept can be connected to any other concept without exception. In an aesthetic rhizome, triangular circles 'exist', "Colorless green ideas [may] sleep furiously" and add to the relevant meaning of the artwork. Although the latter sentence is "nonsensical" according to Noam Chomsky[487], on the communicative level of art, it can be meaningful. Intuition (the faculty of acquiring intuitive knowledge) and voluntary suspension of disbelieve play an important role in the process of constructing an aesthetic rhizome, which is the core of aesthetic experience.

It is not unthinkable that the scope of the aesthetic universe of an artist may coincide with the complete web of knowledge of the artist. Every aspect of an artist's life, all his or her thoughts, may belong to his or her aesthetic universe. The artist's every breath may be part of his or her artistic life.

7.3 Cultures and their borders

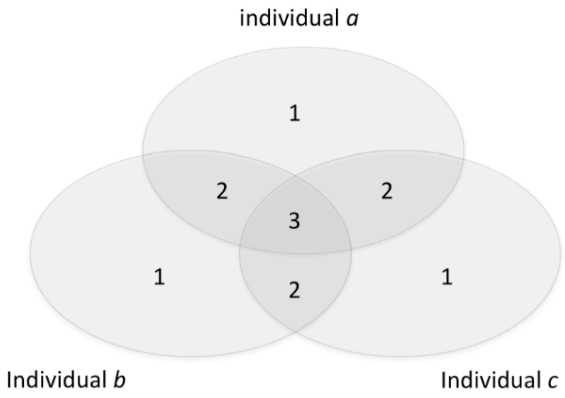
Most artists share common aesthetic knowledge or ideas with other people (artists and non-artists alike). This common knowledge is what I call a **culture**. People sharing a common set of aesthetic knowledge are said to belong to the same aesthetic culture.[488]

The set of knowledge shared by two individuals is their common culture. In theory it is possible to determine this set of knowledge. In practice this is impossible, since, although an individual's set of knowledge may be a very concrete set of interconnected neurons in the neo-cortex, it is impossible to list; not only because an individual's knowledge continuously changes—this would still make synchronic listing possible—but also because listing knowledge is a form of expressing knowledge, and, similarly to what we have seen in relation to aesthetic meaning, this is not a one-to-one process when applied to a complete set of knowledge. Determining a common set of knowledge between two individuals can therefore only be done approximately or in the form of a theoretical model. This doesn't have to be a practical problem, though, because for practical cases, the set of knowledge that is relevant in the determination of a culture can be limited to very specific elements.

But even if one would limit the relevant set of knowledge, as soon as three or more individuals are involved, the set of common knowledge shared by all the members of the population decreases quickly and considerably. There might be no relevant element of knowledge[489] that is shared by all of

[487] The sentence "Colorless green ideas sleep furiously" was composed by Noam Chomsky as an example of a sentence that is grammatical yet nonsensical (Noam Chomsky, *Syntactic Structures*. Mouton de Gruyter, 1957, p. 15).
[488] More precise would be to say that a common aesthetic culture belongs to the aesthetic universes of those people.
[489] The elements of knowledge can be conceptual as well as procedural (e.g. knowledge of ritual procedures). Moral values are here, for the sake of simplicity, also considered as knowledge. When a moral value belongs to a culture, there is a shared knowledge of the value of moral judgment (appreciation or condemnation) of certain procedures within the culture. Elements of knowledge may be individual concepts or propositions, but also larger combinations of both, and also complete procedure (rituals, habits,…).

them. In a population of three individuals, the set of knowledge shared between the three members will probably be smaller (in any case never larger) than the sets of knowledge shared between every couple of them. In example 7.4 the set of knowledge shared between all three is contained in zone 3; the knowledge only two members of the population share, is represented in zones 2. Zones 1 contain knowledge that is possessed by one member of the population only; the latter contain what I call **idiosyncratic knowledge**.



Example 7.4: Shared knowledge for three individuals.

The culture of the population of three is the set of all knowledge contained in zones 2 and 3. Each element of knowledge in those zones has a **cultural weight** that is equal to one less than the number of individuals in the population possessing that knowledge (in Example 7.4 the cultural weight of knowledge in zone 2 = 1; in zone 3 = 2). This way, idiosyncratic knowledge is excluded from the culture (it has no cultural weight).

Let us consider the model case of 12 relevant elements of knowledge contained in a population P (consisting of at least 11 individuals), as shown in Example 7.5. The cultural weight of an element *e* of knowledge is one less than the number of people in the population that know *e*. Elements known by many people of the population have a higher cultural weight (e.g. element 6 in Example 7.5 has the highest cultural weight (10) because it is known by 11 people). Element 1 is known by only one person of the population (i.e. individual *a*). Its cultural weight is 0. It is idiosyncratic knowledge and is not part of the culture of population P.[490] The culture C of the population P (C) is shown as the dark grey area in example 7.6 a.

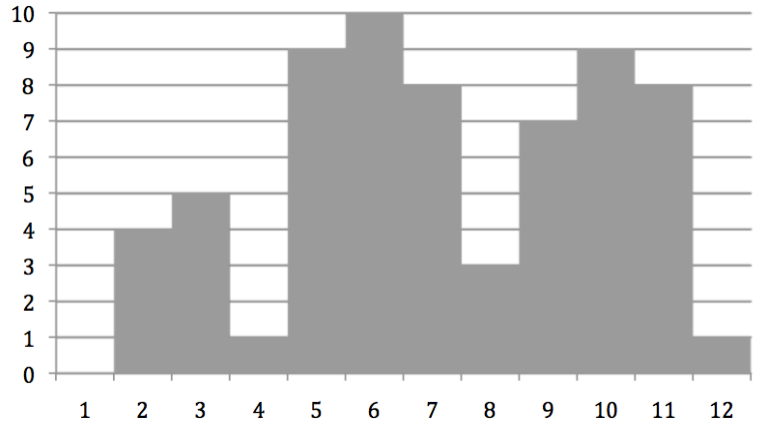
cultural element	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
cultural weight	0	4	5	1	9	10	8	3	7	9	8	1
individual *a*	x	x			x	x	x			x	x	

Example 7.5: The twelve cultural elements of knowledge in culture C and their cultural weight .
All elements of knowledge possessed by individual *a* are indicated with a cross (x).

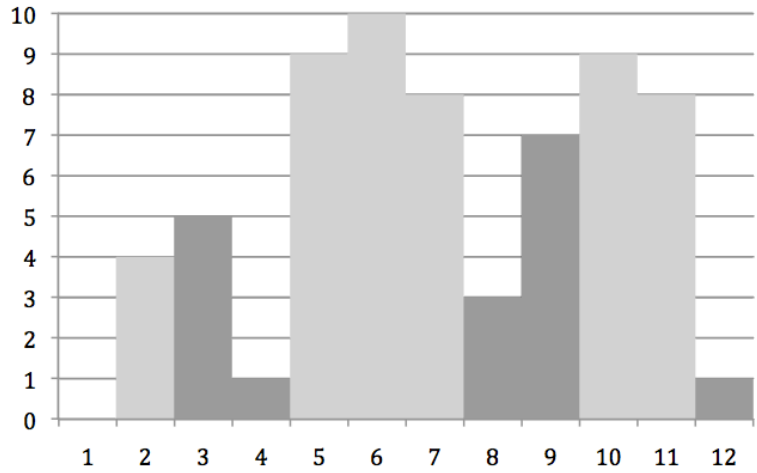
There will hardly ever be an individual that possesses all the knowledge of a culture of a large population. Still it is possible to determine how well the individuals fit in the culture. In other words,

[490] This model is a simplification where the weight added by each member is the same. In reality, the weight added by an individual to cultural elements depends on that person's cultural authority. The ideas of highly respected artists, for instance, add more cultural weight.

we can determine, at least theoretically[491], any individual's **cultural congruence** (more precisely the cultural congruence of the individual's knowledge) with a culture. Take for instance individual *a*, who knows elements 1, 2, 5, 6, 7, 10 and 11 (see Example 7.5). The cultural congruence of individual *a* with culture C is shown as the light grey area in Example 7.6 b.[492] For every element of culture C known by individual a, the light and dark areas overlap. All the cultural knowledge not known by individual *a* is shown in dark grey in example 7.6 b. The smaller the surface of the dark area is, the higher the cultural congruence an individual's knowledge with a culture. An individual's knowledge may be very congruent with one culture and at the same time highly incongruent with a different culture. Individuals whose knowledge is highly congruent with one and the same culture are said to belong to the same culture.



Example 7.6 a: Model of the culture (C) containing 12 elements of knowledge.



Example 7.6 b: Cultural congruence of knowledge of individual *a* (light) with culture C (light & dark).

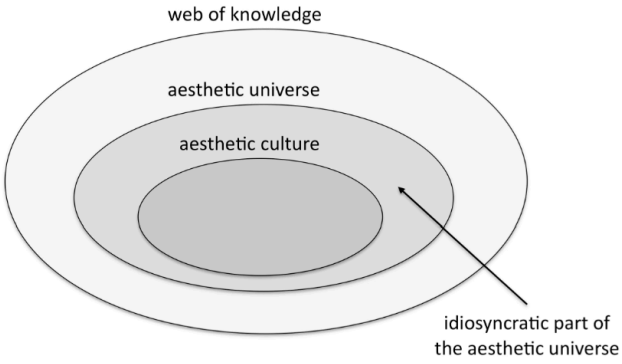
Although, as was discussed above, the meaning of an aesthetic idea behind a score or performance is different from individual to individual, people belonging to the same culture will usually possess

[491] In practice, cultural congruence is only determined intuitively. We have an intuitive idea of how well we (or someone else) fit in a given culture, and we may perceive an immediate culture shock when we are confronted with a culture with which we have very little cultural congruence.

[492] Note that the individual's cultural congruence is not the same as the weight of his or her knowledge within the culture (which is, in this case, 1 for every element of the individual's knowledge). The individual's cultural congruence is determined by multiplying the unit (1) of each element of the individual's contribution to the culture (each of his or her elements of knowledge) by the cultural weight of the element within the culture.

similar codes for artistic communication, and will, as a result, create and develop *similar* meaning for a particular score or performance, as long as the aesthetic idea of the piece or performance can be situated within the shared culture. There will in that case be common elements in the meaning of the different individuals. The stronger and more extended these common elements are, the more similar the meaning of the piece of music will be for individuals who are acquainted with the elements of the relevant meaning of the score or performance. This acquaintance is the result of acculturation. When we perform scores or hear performances that are considered conventional within our culture, we have no problems to attach meaning to the score or performance that is very likely to be similar to the composer's or performer's expressed meaning. This is, for instance, generally the case when Westerners perform or hear tonal music belonging to the common practice of their Western culture, where, for instance, minor scales are commonly associated with sadness. This means that there is a connection between the culture members' concepts of 'minor scale' and 'sadness'. 'Sadness' (and all its connections to individual emotional knowledge) is an element of the meaning of the concept 'minor scale' of most tonally acculturated subjects; not just the subject's concept 'sadness', but the entire cerebral activity related to 'sadness' (the concept being highly influenced by that activity). It is this commonality that enhances the strength of musical communication of pieces of music. Such pieces stay within "a *tonal universe* where [the score or performance] is accessible to us in all its warmth and charm"[493], as Leonard Bernstein put it. Similarity of meaning is the only thing we can strive for if we want to understand the intentions of a composer or performer. This similarity can be improved by the acquisition of additional information about the composer's or performer's aesthetic universe, intentions, life, and culture, resulting in what is called 'informed performance' and 'informed listening'.

Not all artists stay within Bernstein's "warm and charming" safe boundaries of existing and established culture, however. Some artists—the "true artists"[494] according to Arnold Schoenberg—consciously or (more often) unconsciously operate at the borders of the prevailing culture or radically venture into regions of their aesthetic universe far removed from the culture they belong to; the regions that I call the **idiosyncratic part of the aesthetic universe**. These are regions or territories of knowledge that are specific for the individual artists and that lie beyond the borders of the existing cultural space (see Example 7.7). Note that what may be idiosyncratic knowledge in relation to one culture may be cultural knowledge for another culture.



Example 7.7: Aesthetic universe and culture within an artist's web of knowledge.
The idiosyncratic part of the aesthetic universe is the area that belongs to
the aesthetic universe but not to the aesthetic culture of an individual.

[493] Leonard Bernstein, *The Unanswered Question, Six Talks at Harvard*, Harvard University Press, 1976, p. 307 [my italics].
[494] 'True artists' may also be defined as artists whose aesthetic universe coincides with their complete set of knowledge, as was discussed before.

Artists are not always aware of the fact that their artistic practice involves the expression of knowledge belonging to the idiosyncratic part of their aesthetic universe. To use the words of Arnold Schoenberg:

> [T]he young artist does not know himself; he does not yet sense wherein he is different from the others, different above all from the literature. He still adheres generally to the precepts of his education and is not able to break through it everywhere in favour of his own inclinations. He does not [consciously] break through; where there is breakthrough he does not know it. He believes that his work is at no point distinguishable from what is generally found to be in good art; and all of a sudden he is violently awakened from his dream, when the harsh reality of criticism makes him aware that somehow he is not really so normal after all, as a true artist should never be normal: he lacks perfect agreement with those average people who were educable, who could commit wholly to the *Kultur*.[495]

By leaving the familiar territory of prevailing musical aesthetics, musicians venture a quest on the untrodden "paths to new music" (*"Der Weg zur neuen Musik"*), as Anton Webern called it. "New music", Webern said, "is the one that has never been said"[496], music that expresses aesthetic ideas belonging to the idiosyncratic regions of the artist's aesthetic universe. "True artists", in the Schoenbergian sense, composers as well as performers, operate to an important extent in these idiosyncratic regions. Sometimes there may be an important gap between those idiosyncratic aesthetic regions and culturally accepted aesthetics. Gustav Mahler said: "Everything I write is too strange and new for the listener, who cannot find a bridge to me."[497] Expression of ideas belonging to these idiosyncratic territories opens up totally 'new worlds' of ideas in the process of artistic communication. This is how Pierre Boulez can be understood when he claims that Webern was "essentially on a conquest of a new world"[498]. New worlds of this kind often abide by laws that are different from the prevailing aesthetic laws, and, once accepted by a culture, the ideas contribute to the development of the culture, create musical paradigm shifts or even sometimes cause complete aesthetic revolutions.

The task of the budding artists is to discover their own aesthetic universe (even to find out whether they do have a personal aesthetic universe!) in order to avoid becoming an epigone. The ideas and theories of others may help in this process, but should not be copied unless existing laws of the others' universes turn out to apply to the personal universe. This is of course possible. There can be similarities between the individual and distinct aesthetic universes of different artists (possibly caused by (cultural) upbringing, development and influence)[499], just like parallel physical universes would most probably show similarities in the laws that govern them. There is however a difference between constructing an aesthetic universe based on an existing example (like epigones do) and the adoption of existing laws that appear to apply in the newly discovered, explored and developed aesthetic universe of the budding artist. Marcel Danesi describes this creative force as follows:

> [T]here are creative forces constantly at work in individual human beings. The Neapolitan philosopher Giambattista Vico (1688-1744) termed these fantasia and ingegno. The former is the capacity that allows human beings to imagine literally anything they desire freely and independently of biological or cultural

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[495] Arnold Schoenberg, *Theory of Harmony*, translated by Roy E. Carter, Faber & Faber, 1983, p. 400 [Schoenberg's italics].
[496] *"Neue Musik ist jene, die nie gesagt wurde"*. Anton Webern (reedited by Willi Reich), *Der Weg zur Neuen Musik*, Universal Edition, 1960, p. 12.
[497] Gustav Mahler in: Herbert Killian (ed.), *Gustav Mahler in der Erinnerungen von Natalie Bauer-Lechner*, Karl D. Wagner Verlag, 1984; quoted in Constantin Floros, *Gustav Mahler, The Symphonies*, Breitkopf & Härtel, 1985, translated by Vernon & Jutta Wicker, Amadeus Press, 1993, p. 21.
[498] "…essentiellement à la conquête d'un monde nouveau". Pierre Boulez, *Relevés d'apprenti*, Editions du Seuil, 1966, p. 19 [my translation].
[499] As described in: James Joyce, *A Portrait of the Artist as a Young Man* (B.W. Huebsch (New York), 1916). This book describes the development of Stephen Dedalus from childhood to maturity and the way his (catholic) upbringing and his interest in art and literature formed and influenced his aesthetic universe and made him into an artist.

> processes; it is the creative force behind new thoughts, new ideas, new art, new science, and so on. The latter is the capacity to convert new thoughts and ideas into representational structures—metaphors, stories, works of art, scientific theories, etc. So, although human beings are indeed shaped by the cultural system in which they are reared, they are also endowed with creative faculties that allow them to change that very system.[500]

Semantics is the link between concepts as part of a cultural denotative network and a cultural procedure of encoding and decoding, and is therefore part of the communicative process. Although the aspect of semantics is limited in musical communication, there are culturally determined semantic elements in music too. In 'Western' musical culture, for instance, many aspects of the tonal idiom have semantic functions. Minor and major modes are typically linked to communication of specific emotional concepts. Indeed, for tonally acculturated people it is hard and sometimes sheer impossible not to attach certain (often emotional) concepts to music in minor or major mode, in the same way as it is hard or impossible for people who are familiar with a language not to make semantic connections between words they hear and verbal concepts in their minds. If Schoenberg wanted to express himself, yet wanted to be misunderstood, as was mentioned before, he had to avoid all possible associations of his music with existing semantic connections. Avoidance of tonality was therefore necessary for him. One may, of course, justly wonder why Schoenberg repeatedly resorted to linguistic texts and didn't restrain to purely instrumental music.

7.4 Artistic practice and artistic research

It is not only possible for artists to *express* (the meaning of) ideas belonging to their aesthetic universe, but also to *explore* that aesthetic universe. The conscious and deliberate *exploration* of the artist's aesthetic universe is how I define **artistic research**. Edwin Hubble's claim: "Equipped with his five senses, man explores the universe around him and calls the adventure Science"[501] can in the present context be restated as: "Equipped with reason and imagination, the artist explores the aesthetic universe within and calls the adventure artistic research."

It is obvious that, since the artists alone have unmediated, direct access to their own aesthetic universe, artistic research can only be performed by the individual artists themselves. It can happen within the cultural boundaries of the artist's aesthetic universe as well as across those cultural borders, in the idiosyncratic part, and it is aimed at gaining new knowledge about the aesthetic universe. When the new knowledge thus generated is situated entirely within an existing culture, it enlarges cultural knowledge or may lead to changes in existing knowledge. Sometimes, however, it is only after taking some distance, by leaving the familiar cultural territory, that certain facts about this familiar territory become clear, and that (sometimes short-sighted) misconceptions get exposed; misconceptions that may result from "the slovenliness of tradition"[502]. Artistic research therefore often happens in the idiosyncratic regions of the artist's aesthetic universe, or it can require or cause the extension of an aesthetic universe. It is in the latter two cases that the artist-researcher leaves the safety of familiar territory behind and ventures the experimental[503] quest on new and potentially perilous[504] untrodden paths of musical aesthetics, explores new aesthetic worlds, and seeks out new artistic possibilities.

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[500] Marcel Danesi, *Messages, Signs, and Meanings: A Basic Textbook in Semiotics and Communication Theory*, Canadian Scholar's Press Inc., 3rd edition, 2004, p. 42.
[501] Edwin Powell Hubble, *The Nature of Science, and other lectures*, Huntington Library Publications, 1954, p. 6.
[502] This refers to Mahler's "Tradition is laziness" (see a.o. Kirk Ditzler, *Tradition ist "Schlamperei": Gustav Mahler and the Vienna Court Opera*, in: International Review of the Aesthetics and Sociology of Music, Vol. 29, N°1, 1998, pp. 11-28.
[503] For the elaboration of the experimental aspects of artistic practice and research, I refer to the chapter "A New Path to Music" which I contributed to the ORCiM Sourcebook on Artistci Experimentation (Bart Vanhecke, *A New Path to Music: Experimental Exploration and Expression of an Aesthetic Universe*, In: Darla Crispin & Bob Gilmore (eds.), Artistic Experimentation in Music: an Anthology. Leuven: Leuven Universtity Press, 2014, pp. 91-104).
[504] Perilous and experimental have a common Latin root (*perire*), referring to the risk of perishing.

7.5 The endophysical laws of an aesthetic universe

Artistic practice and artistic research, as the exploration and expression of the artist's personal aesthetic universe, usually results in the development of that aesthetic universe. An artist is therefore not just a creator of artworks, but also a creator (in the demiurgical sense) or developer of a universe, of which the artwork is 'only' an expression. In this aesthetic universe, according to Jonathan Harvey (although he does not use the term aesthetic universe), artworks are rather discovered through inspiration than created. In his words:

> Beethoven's sketch books are perhaps the most eloquent witness to the idea of inspiration as a gradual, 'clarifying' process: in them we can trace the emergence not only of the themes but of entire structures, gradually becoming more and more crystalline.
> For composers who, like Beethoven, are inspired in this way, composition is perhaps less a process of *creation* than one of *discovery*.[505]

In my opinion, composition (or artistic creation in general) is a combination of discovering the aesthetic universe and the possibilities of the aesthetic idea (and its connections with the procedures of musical encoding) through exploration on the one hand, and the development of the aesthetic universe through the expansion of the meaning of the aesthetic idea on the other, as part of a larger procedure of artistic expression. This comes close to what the Romanian-French playwright Eugène Ionesco may have meant when he wrote: "A work of art is, for me, the expression of an innate intuition that owes almost nothing to all others: by creating a world, by inventing it, the creator discovers it."[506]

Many writers and artists consider artistic practice as the creation of "a world", as do Jonathan Harvey and Eugène Ionesco. Johannes Brahms expressed the idea of the artwork as "the creation of a world" in a letter of 1877 to Clara Schumann accompanying his transcription of Bach's *Chaconne* for solo violin as follows: "The chaconne is in my opinion one of the most wonderful and incomprehensible pieces of music. Using the technique adapted to a small instrument the man writes *a whole world* of the deepest thoughts and most powerful feelings."[507]

Gustav Mahler sees the composer as an instrument in the process of artistic creation. In the context of his *Third Symphony* he wrote: "Try to conceive a work so vast, that in *it the entire world is mirrored*—one is, so to speak, only an instrument on which the whole universe plays… In such moments I no longer belong to myself."[508] Although during the process of composition a composer does indeed sometimes get the *impression* to be "a mere 'vessel' through which the piece passes", as Stravinsky said about the composition of *Le Sacre du Printemps*[509], the process is still executed by the composer, so it is still the composer who is the active creator. Jonathan Harvey notes in this respect: "The composer frequently becomes so absorbed in the piece of music that it begins, for him, to constitute a separate, *self-sufficient world*. This is proved by the way in which composers write that they 'live in' or 'inhabit' their music."[510] This feeling of "being absorbed" in the piece is the result of a complete concentration of the composer's thoughts on the piece. It represents the creative activity called 'inspiration' or creative 'flow', which is the activation of the logic of thought of the aesthetic universe of the artist. **Inspiration** (or creative potential) is the ability of the artist to create rich and

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[505] Jonathan Harvey, *Music and Inspiration*, Faber and Faber, 1999, p. 35.
[506] "Une œuvre d'art est, pour moi, l'expression d'une intuition originaire ne devant presque rien aux autres : en créant un monde, en l'inventant, le créateur le découvre." (Eugène Ionesco, *Notes et Contre-Notes*, nrf Gallimard, 1962, pp. 62-3 [my translation]).
[507] Quoted in: Josiah Fisk ed., *Composers on music: eight centuries of writings*, 2nd edition, Notheastern University Press, 1997, p. 134 [my italics].
[508] Gustav Mahler, letter to Anna Bahr-Mildenburg, 18 July 1896, quoted in Jonathan Harvey, *Music and Inspiration*, p. 6 [my italics].
[509] "I am the vessel through which Le Sacre passed." (Igor Stravinsky & Robert Craft, *Expositions and Developments,* University of California Press, 1959, p. 148).
[510] Jonathan Harvey, *Music and Inspiration*, p. 33 [my italics].

consistent systems of links between concepts that comply with the inherent logic of their aesthetic universe. These links arise from cerebral activity that seems to have its own élan, that is not (entirely) controlled, and that therefore at times seems to be controlled by an autonomous aesthetic universe. It would therefore be better to say that, in inspirational moments, the composer no longer belongs to the physical, empirical world, but roams his or her aesthetic universe.

Contrary to what the composers quoted above claim, I do not consider the artwork as a universe. I see the artwork rather as the *expression* of (ideas belonging to) "a universe of its own" (the aesthetic universe) than as the *creation* of a world or universe. In my opinion, the artwork is like "a satellite image" of the aesthetic universe that is transmitted to the mind of other individuals (or to their aesthetic universe) via the physical universe. Since the artist alone has direct access to his or her aesthetic universe, "images" of that universe in the form of artworks are the only vehicles through which an artist's aesthetic universe can be made 'accessible' to other individuals. The artwork is thus like a wormhole connecting different aesthetic universes.

Jonathan Harvey wrote: "Music […] must obey its own laws, not those of the everyday world."[511] If musical creation and performance are considered to be the expression of ideas belonging to an aesthetic universe, this claim may be rephrased as: the aesthetic universe of an artist obeys laws that are (or may be) different from the laws that govern the physical universe. Artworks are constructed according to laws that are different from those of the physical world. Umberto Eco states that this is often typical for contemporary art. He says: "whereas classical art introduced original elements within a linguistic system whose basic laws it substantially respected, contemporary art often manifests its originality by imposing *a new linguistic system* with its own inner laws."[512] According to Jackson Pollock, "new needs need new techniques, and the modern artist has found new ways and new means of making his statement. It seems to me that the modern painter cannot express this age—the airplane, the atom bomb, the radio—in the old forms of the Renaissance or of any other past culture. Each age finds its own techniques"[513].

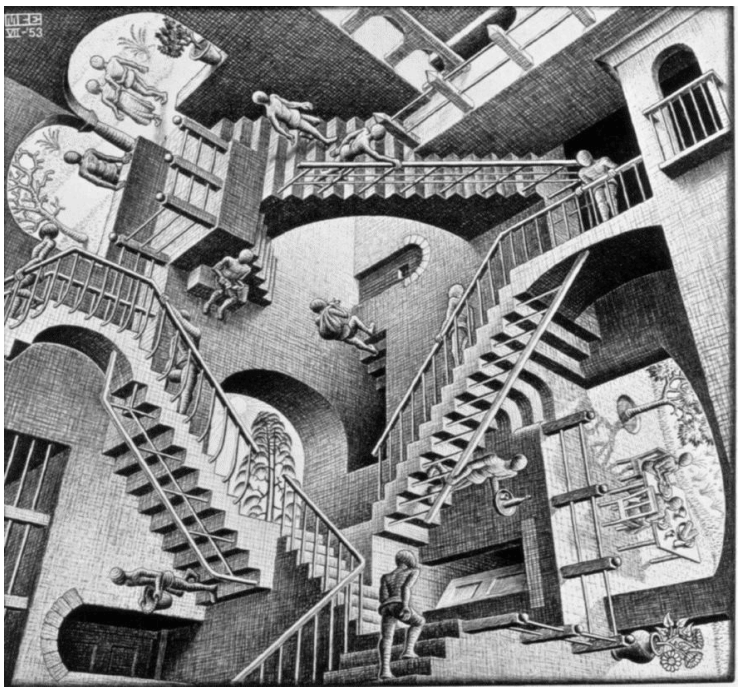
I call the laws that govern an aesthetic universe the **endophysical laws** of the aesthetic universe. The prefix "endo-" stresses the fact that, although the laws of the aesthetic universe may be different from those of the physical world, they are no metaphysical laws. The aesthetic universe is not a metaphysical universe, since it is not *beyond*[514] the physical world. An aesthetic universe, as a cerebral construction, is clearly a physical entity[515], but at the same time it constitutes a world of a different kind, governed by laws that do not exactly apply to the external physical world. The laws of cerebral activity are physical laws, but they may lead to constructions that abide by their own internal laws or logic, much like a game, with its own internal logic, its own possibilities, and its own restrictions. Therefore I call the aesthetic universe an endophysical world[516]; it is a world that is metaphysical—mystical, miraculous, transcendent, virtual— *within* the physical world.

As was suggested above, the endophyscial laws of an aesthetic universe, and those of the artworks that result from it, may differ from the laws governing the physical universe. Charles Peirce phrased this as follows: "There is a great distinction between reasoning which depends upon the laws of the inner world and reasoning which depends upon the laws of the outer world"[517]. In his unfinished book *The Musical Idea*, where "for the first time an attempt is made to extract a musical logic from the facts of the musical technique of presenting an idea"[518], Arnold Schoenberg states that art operates according

[511] Jonathan Harvey, *Music and Inspiration*, p. 141.
[512] Umberto Eco, *The Open Work,* translated by Anna Cancogni, Harvard University Press, 1989, p. 60.
[513] Jackson Pollock, opening statement of the 1987 Documentary *Portrait of an Artist: Jackson Pollock,* directed by Kim Evans. http://www.youtube.com/watch?v=4G5hQWPP74s&feature=player_embedded [last accessed: 28 December 2012].
[514] The Greek "meta" means "beyond".
[515] The human brain and cerebral activity are, after all, physical objects and processes.
[516] The aesthetic universe it is situated *within* (the Greek "endo" means "within, inside") the physical universe.
[517] Charles S.Peirce, *Of Reasoning in General* (1895), in *The Essential Peirce - Volume 2: Selected Philosophical Writings: (1893-1913)* volume 2, Indiana University Press, 1998, p. 24.
[518] Arnold Schoenberg, *The Musical Idea and the Logic, Technique, and Art of its Presentation,* Patricia Carpenter & Severine Neff (translators and eds), Indiana University Press, 2006, p. 90.

to its own laws of logic, determined by musical technique: "[I]n art the meaning of what is called logic has to be somewhat modified, even though fundamentally the human mind is capable of only a single manner of thinking."[519] He stresses that "[a]rt is different from science"[520], and "ideal and purely logical conclusions can claim no implications in an artistic realm"[521]. To illustrate this idea, let us have a look at the work of M. C. Escher and Panamarenko.

The work of the Dutch graphic artist Maurits Cornelis Escher (1898-1972) features many so-called "impossible worlds" or "impossible constructions", constructions that are impossible in the physical universe because they are not in accordance with some physical law. His famous litho *Relativity* (see Example 7.8) illustrates a world where the gravitational forces operate in three Cartesian spatial dimensions independently. The vertical gravitational force along one axis seems to have no influence on the objects and processes happening in the two superimposed spatial dimensions, where the other Cartesian axes are considered vertical. This is an impossibility in the physical universe, but not in Escher's aesthetic universe.



Example 7.8: M.C. Escher, *Relativity 1953*, litho.

The second example concerns the aircraft, submarines, ships and other vehicles, such as *Raven's Variable Matrix* (Example 7.9), created by the Flemish sculptor Panamarenko[522]. These are not meant to be mere artistic objects, elegant as they are. They have been engineered and technically designed by the artist in order to fly, float, or function in other ways, but, as a matter of fact, they don't. None of Panamarenko's vehicles function the way they are conceived. They are as helplessly clumsy, vulnerable, and weak in the physical world as Baudelaire's *Albatross* on the deck of a ship.[523] The laws according to which his works are designed don't seem to be valid in the physical world, but are laws of his imaginative aesthetic universe.

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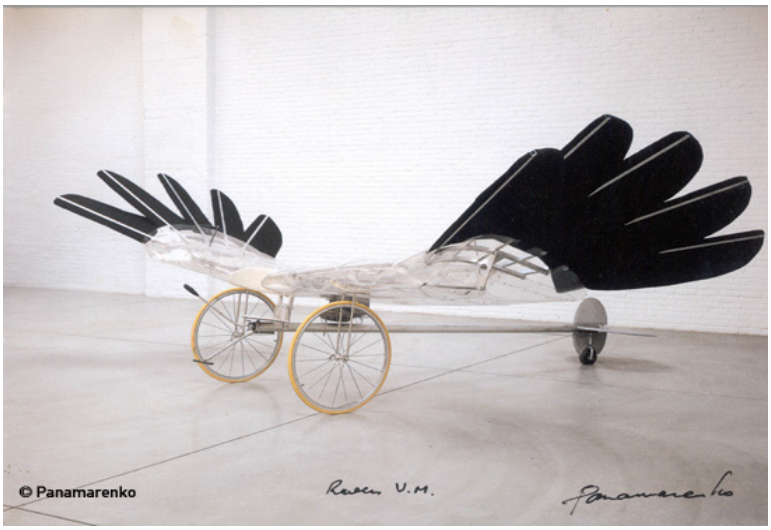
[519] Arnold Schoenberg, *The Musical Idea and the Logic,* p. 103.
[520] Arnold Schoenberg, *The Musical Idea and the Logic,* p. 91.
[521] Arnold Schoenberg, *The Musical Idea and the Logic,* p. 106.
[522] Panamarenko is the pseudonym of Henri van Herwegen (°1940).
[523] See: Charles Baudelaire, *L'Albatros*, second poem in*: Les Fleurs du Mal*, Poulet-Malassis et de Broise, 2nd edition, 1861.



Example 7.9: Panamarenko, *Raven's Variable Matrix*, 2000

I claim that even if the aesthetic universes of Escher and Panamarenko are different from the physical world, or from our own aesthetic universes or ideas, we can still appreciate their works because although their aesthetic universes obey laws that are different from those of the physical world, they are still *recognizable*. There is a *similarity* between the endophysical laws of Escher's or Panamarenko's aesthetic universes on the one hand, and the laws of the physical world we are acquainted with on the other. We can understand an artist whose aesthetic universe has a substantial *resemblance* with the "versions of the world"[524] we are most familiar with, be it the physical universe or the parts of aesthetic universes that belong to our culture. This resemblance makes recognition possible, in the way that similarity in code makes understanding of a message possible. In artistic communication, as in all kinds of communication, similarity of code appears not to be sufficient for understanding. Similarity in the universes to which the message and the corresponding decoded message belong is also crucial. When messages belonging to the cultural part of an aesthetic universe are communicated, this resemblance is evidently present. It is only when artists express ideas belonging to the idiosyncratic part of their aesthetic universe that effective communication may become problematic, even if the code used is part of the culture of both addresser and addressee. In the latter case, effective communication is only possible if there is enough resemblance between the addresser's aesthetic universe and the physical universe or cultural cerebral universes of the individuals involved in the process of communication. This is how I interpret Ionesco's claim: "The artwork […] is not the image of the world; it is *in* the image of the world."[525] Again, I rephrase this

[524] For the idea of "versions of the world", see Nelson Goodman, who claims that even physical worlds come in individually created versions: "For the man-in-the-street, most versions from science, art, and perception depart in some ways from the familiar serviceable world he has jerry-built from fragments of scientific and artistic tradition and from his own struggle for survival. This world, indeed, is the one most often taken as real; for reality in a world, like realism in a picture, is largely a matter of habit." (Nelson Goodman, *Ways of Worldmaking*, Hackett Publishing Co, 1978 p. 20). See also David Lewis's highly controversial idea of "modal realism, which holds that our world is but one world among many" (David Lewis, *On the Plurality of Worlds*, Blackwell Publishing, 1986, p. 2). According to Lewis, and in contrast to what Goodman claims, those worlds "are not of our own making" (David Lewis, *On the Plurality of Worlds*, Blackwell Publishing, 1986, p. 3). Aesthetic universes, on the other hand, are subjective (part of an individual's knowledge and thinking) and "made" (developed) by the individual.

[525] "L'œuvre d'art répond […] au besoin de faire œuvre de création. […] Le monde ainsi créé n'est pas l'image du monde; il est à l'image du monde." (Eugène Ionesco, *Notes et Contre-Notes*, nrf Gallimard, 1962, p. 127 [my italics]. Virginia Woolf is reported to have said: "Art is not a copy of the real world. One of the damn things is enough" (quoted in: Nelson Goodman, *Languages of Art*, Hackett Publishing Company, 1976, p. 3). In contrast to the manifold worlds of modal realism, there are spatiotemporal relations between aesthetic universes and the physical "worlds". If it is true that "[t]here are so many other worlds, in fact, that absolutely every way that a world could possibly be is a way that some world is" (see: David Lewis, *On the Plurality of Worlds*, p. 2), how much more does this apply to possible aesthetic universes.

claim into a statement that is of crucial importance for my entire artistic practice and research and for the present dissertation:

> The artist's aesthetic universe is not the image of the world; it is *in* the image of the world.

It is because of this resemblance or similarity between an artist's aesthetic universe and the (physical) world that effective artistic communication is possible. Let us return to the examples of Escher and Panamarenko to illustrate this claim. Although Panamarenko's *Raven* was designed in accordance with (endophysical) laws that differ from the laws of physics (and therefore doesn't fly in the physical universe), it is recognizable because it resembles flying objects we encounter in our physical world (airplanes, birds, …). We might therefore imagine that the *Raven* would really fly in Panamarenko's aesthetic universe if it were a physical universe, or if the raven were an endophysical object belonging to that aesthetic universe instead of a physical object. We could even claim that *the aesthetic idea* for which the *Raven*—as a physical object—is the sign vehicle, *can* actually fly in Panamarenko's aesthetic universe. This requires the same voluntary suspension of disbelieve as is necessary in the appreciation of plays or movies; although we know plays and movies are not real, we are willing to believe they are real in the fictional world they depict and we understand them because of the resemblance with reality. Mutatis mutandis, a similar thing can be said about Escher's litho *Relativity*.

Umberto Eco describes the resemblance between the physical world and the world described in novels as follows:

> Fictional texts never take as their setting a world which is totally different from the one we live in, not even if they are fairy tales or science fiction stories. Even in such situations, if a forest is mentioned, it is understood that it should be more or less like the forests of our real world, where the trees are vegetal and not mineral, and so on. If by chance we are told that the forest consists of mineral trees, the notion of "mineral" and "tree" should be the same as in our real world.[526]

Although resemblance between aesthetic universe and physical universe is necessary for artistic communication, I am convinced that the strength of an aesthetic universe—and the relevance of an artist—resides in the *difference* of its laws with those of the physical universe. Or, to quote Ionesco yet again: "what is the purpose of music if it is not the revelation of other laws?"[527] The most interesting artists are, in my opinion (and, I suppose, also in Schoenberg's opinion), those whose aesthetic ideas deviate to a certain extent from the culturally accepted, those who explore the idiosyncratic parts of their aesthetic universe. In Ionesco's words:

> Renewing the language is renewing the conception, the vision of the world. Revolution is a change in mentality. All novel artistic expression is an enrichment that corresponds with a requirement of the mind, a broadening of the borders of the known reality: it is an adventure, it is a risk, it can therefore not be a repetition of a catalogued ideology, it cannot serve another reality than its own (because once it is expressed, it is already outdated).[528]

Ionesco wrote that art "is an objective discovery in its subjectivity, […] a testimony of the way the world appears to the artist."[529] In the present context, this can be rephrased as: art is a testimony of the way the aesthetic universe appears to the artist, a reflection of the aesthetic universe in the physical

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[526] Umberto Eco, *Confessions of a Young Novelist,* Harvard University Press, 2011, p. 79.
[527] "A quoi sert la musique sinon à être […] révélatrice d'autres lois?" Eugène Ionesco, *Notes et Contre-Notes*, p. 85 [my translation].
[528] Eugène Ionesco, *Notes et Contre-Notes*, p. 85 [my translation].
[529] "une découverte objective dans sa subjectivité, […] un témoignage de la façon dont le monde apparaît à l'artiste." Eugène Ionesco, *Notes et Contre-Notes*, p. 84 [my translation].

reality. This aesthetic universe is, in turn, influenced by, and connected to the physical world, since the artist exists in the physical world, and so does his or her aesthetic universe (as a conceptual world within the artist's mind). In that sense, art is a testimony of how the world (or at least that virtual part of it) appears to the artist. Ionesco stresses the fact that the universe created by the artist has both objective and subjective aspects: "[A]rtistic creation […] as a construction, as an autonomous universe, as a monument, becomes an objective reality, although, of course, it is subjectively interpreted."[530] He claims that this artistic testimony has objectivity "in its subjectivity".

> The witness tells a story, or not even that; he exhibits how the facts appear to him. He tells the truth… a subjective truth of course. […] The witness […] tells how the world appears to his consciousness. But all testimony is a kind of re-creation, or creation, since everything is subjective. We also know that subjectivities meet. Objective is, therefore, a consensus of subjectivities.[531]

When knowledge belonging to an artist's aesthetic universe is expressed, it results in facts in the physical world (the material object or procedure of the artwork) and in knowledge about those facts in the brain of the addressee. According to many authors there is at least a resemblance between the facts about the physical world (**scientific truth**) and the facts the aesthetic universe (**aesthetic truth,** the subjective truth referred to by Ionesco in the previous quote).

> From Nelson Goodman's *Languages of Art* and subsequent works, a general view of the arts as contributing to the understanding and indeed to the building of the realities we live in emerges. Ultimately, in Goodman's view, art is not sharply divided, in goals and means, from science and ordinary experience. Paintings, musical sonatas, dances, etc. all are symbols that classify parts of reality for us, as do such things as scientific theories and what makes up common, ordinary knowledge.[532]

Although, according to Stephen Davies, Monroe Beardsley criticizes Goodman's conviction by arguing that "[r]ather than aiming at higher truths, artists bend the truth for the sake of aesthetic effect"[533], many artists and writers attribute equal value to scientific and aesthetic truth. In *Ways of Worldmaking,* Nelson Goodman states: "The arts must be taken no less seriously than the sciences as modes of discovery, creation, and enlargement of knowledge in the broad sense of advancement of the understanding."[534] Ionesco backs this idea, claiming: "I don't believe there is a contradiction between creation and knowledge, because the structures of the mind probably reflect the universal structures."[535] Samuel Coleridge puts it this way: "Poetry […has] a logic of its own, as severe as that of science; and more difficult, because more subtle, more complex, and dependent on more, and more fugitive causes"[536].

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[530] "[L]a création artistique […], en tant que construction, *univers autonome* [my italics], monument, devient une réalité objective, même si, bien sûr, elle est subjectivement interprétée." (Eugène Ionesco, *Notes et Contre-Notes*, p. 51 [my translation].

[531] "Le témoin raconte une histoire, ou même pas ; il expose comment les faits lui sont apparus. Il dit la vérité… subjective bien entendu. […] Le témoin […] raconte donc comment le monde apparaît à sa conscience. Mais tout témoignage est une sorte de re-création, ou de création, puisque tout est subjectif. Nous savons aussi que les subjectivités se rencontrent. L'objectivité est donc un consensus des subjectivités." Eugène Ionesco, *Notes et Contre-Notes*, p. 94 [my translation].

[532] Alessandro Giovannelli, *Goodman's Aesthetics*, on: http://plato.stanford.edu/entries/goodman-aesthetics/, p. 1 [last accessed: 28 February 2013], referring to Nelson Goodman, *Languages of Art*, Hackett Publishing Company, 1976.

[533] Stephen Davies, *Musical Meaning and Expression*, Cornell University Press, 1994, p. 9, referring to: Monroe C. Beardsley, *In Defence of Artistic Value*, Proceedings and Addresses of the American Philosophical Association, 52, 1979, pp. 723-49.

[534] Nelson Goodman, *Ways of Worldmaking*, Hackett Publishing Co, 1978, p. 102.

[535] "Je ne crois pas qu'entre création et connaissance il y ait contradiction car les structures de l'esprit reflètent, probablement, les structures universelles." Eugène Ionesco, *Notes et Contre-Notes*, p. 85 [my translation].

[536] Samuel Taylor Coleridge, *Biographia Literaria; or Biographical Sketches of my Literary Life and Opinions*, volume I, Rest Fenner, 1817, p. 4, also quoted in the commentary to Arnold Schoenberg, *The Musical Idea and the Logic,* p. 44.

Umberto Eco goes a step further, making a distinction between what he calls "encyclopedic truth" (physical truth), which is the subject of constant revision, and the indubitability of assertions belonging to aesthetic expression (aesthetic truth), in the following statement:

> So let me use the term 'encyclopedic truths" for all those items of common knowledge that I learn from an encyclopedia (such as the distance of the Sun from the Earth […]). I take these pieces of information to be true because I trust the scientific community, and I accept a sort of 'division of cultural labor' by which I delegate specialized people to prove them. Yet encyclopedic assertions have limits. They are still subject to revision, since science is by definition always prepared to reconsider its own discoveries. If we keep an open mind, we must be ready to revise our […] beliefs about the Sun's distance from the Earth as a result of new astronomical measurements. […] In contrast, the assertion 'Anna Karenina committed suicide by throwing herself in the path of a train' cannot be cast in doubt.[537]

This striking idea of the irrefutability of aesthetic truth is also defended by Arnold Schoenberg, who claimed: "in the work of art there are no mistakes, no false doctrines, and for that reason a work of art can never be refuted, whereas it is the sad fate of all human sciences that each new perception, discovery, or invention topples many older theories and assigns a new explanation to the fact."[538]

7.6 The T-formula and PC-formula as endophysical laws

We have seen that an aesthetic universe may have its own laws, its own logic. Its laws may or may not apply to the physical universe. Its logic may contradict the rules of discursive reasoning but still be entirely plausible within an aesthetic universe. An aesthetic universe can, in other words, be a well-structured thought system. Artists who possess a consistent and well-structured aesthetic universe and who are able to express the ideas belonging to that aesthetic universe in a clear and consistent way are for me the most relevant artists, no matter how deviant or idiosyncratic their aesthetic universe and its ideas are. The Canadian pianist Glenn Gould had views on interpretation of Bach and Mozart's music that were very unlike—and sometimes even contradicted—prevailing ideas of historically informed performance. Yet, his unusual interpretations sounded totally convincing and acceptable to a large audience, because they represented the expression of well-thought-out and consistently structured aesthetic ideas. Not the performers who manage to approach the 'perfect' interpretation of a piece are in my opinion the most interesting musicians, but the ones who can give a clear expression of a highly original, well-structured and thoroughly developed aesthetic universe. I consider it my aim as an artist to ceaselessly try to approach this ideal through a combination of artistic creation and artistic research.

The goal of my artistic research is to discover, articulate, understand and develop the endophysical laws of my own aesthetic universe. The tonality and consonance formulas developed in Part 1 are a result of this ongoing endeavor. They describe the concepts of tonality and consonance of my aesthetic universe, the way I *perceive* tonality and consonance, but also the way I hear, interpret, and judge existing music according to its degree of tonality and consonance. Even if the criteria my concepts of tonality and consonance are based on (diatonicity in the case of tonality and frequency ratios in the case of consonance) may be controversial, they are as true for my aesthetic universe as Newton's laws of gravitation for the physical world we live in.[539] That means, of course, that they are never exact. In the first of his lectures on *The Character of Physical Law* Richard Feynman said:

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[537] Umberto Eco, *Confessions of a Young Novelist,* pp. 89-90.
[538] Arnold Schoenberg, *The Musical Idea and the Logic,* p. 103.
[539] We even saw that my law of gravitational pull of simple frequency ratio intervals is not unlike Newton's law of universal gravitation (see Section 4.4.5).

> Einstein had to modify [Newton's law of gravity], and we know it is not quite right yet, because we still have to put the quantum theory in it. That is the same with all our other laws—they are not exact. There is always an edge of mystery, always a place where we have some fiddling around to do yet. This may not be a property of Nature, but it certainly is common to all laws as we know them today.[540]

The formulas developed in Part 1 too will have to be revised if cases are observed where they proof not to be appropriate or accurate, or if my own subjective perception and understanding of tonality and consonance would evolve or suddenly change.

Although my aim is not to achieve knowledge about the physical universe but about my own aesthetic universe, the laws I developed prove not to be in contradiction with those of the physical world. There is clearly a resemblance between my aesthetic universe and the world around me. My aesthetic universe appears to be "in the image of the [physical] world". Pitch class sets with a high degree of tonality or prime consonance, according to my formulas, are not perceived as highly tonal or consonant to me alone, but seem to apply to music that is generally considered (highly) tonal and consonant by other members of the Western tonal culture. The method for tonality analysis developed on the basis of the T-formula appears to fit the historical evolution of tonal music as it was written over the centuries. Even if the T-formula is not a physical law, the music of other composers appears to abide by it. This proves that my subjective perception of tonality resembles the way other members of the aesthetic culture I am part of perceive tonality. In other words, although my research is not in the first place 'scientific' (in the sense of describing the physical world), it is not merely 'endo-scientific' either. It attempts to be 'trans-scientific', bridging the gap between my aesthetic universe on the one hand, and the physical universe and other aesthetic universes on the other.

Finally, I am aware of the fact that the formulas describing the laws of my aesthetic universe are highly technical and mathematical and have an apparent aspect of objectivity. This does not mean, however, that aesthetics is a cold and objective science to me. I try to describe my aesthetic universe in a manner similar to the way Richard Feynman so wonderfully approached physics. In his lectures, interviews, and writings, he passionately talked about the beauty of physics in a philosophical and at times almost poetic way, expanding the relevant meaning of scientific ideas to the poetic level. My aim is to *expand* the relevant meaning of the poetic aspects of my aesthetic universe to the (endo-) scientific level. This is indeed a process of expanding, not of narrowing down, since in it the poetic level is not replaced but complemented by the scientific level, and thus potentially amplified.

[540] Richard Feynman, *The Character of Physical Law*, Penguin Books, 1992, p. 33.