



SUBLIMINAL PERCEPTION AND MUSIC. A BRIEF SURVEY.

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1. The threat of free will. In 1962 appeared Anthony's Burgess worldwide famous novel *A Clockwork Orange*. The delinquent Alex, arrested for his crimes and put into prison, undergoes the so-called *Ludovico Technique* which is said to "cure" criminals in removing man's ability to make ethical choices. After Alex is subjected to this bizarre drug-and-film technique, he cannot act violently or think about violence without becoming ill, experiencing great physical pain. Alex had been a classical music *aficionado*, adoring in particular some of the more "violent", powerful works of Beethoven. When he underwent the Ludovico procedures, there was musical accompaniment and now he finds himself feeling as much revulsion for music as he does for violence. The doctors recognized that there could be no "delimitation" and that "the world is one, life is one". Feelings of violence overlap with feelings involved in the sexual act and feelings produced by art, music and literature. Alex is no longer capable of enjoying these things. The rehabilitating technique used on Alex is *responsive conditioning* – analogue to that discovered by I. Pavlov between 1903 and 1905¹ – with the use of drugs and visual aids. Conditioning is either teaching or forcing one to feel or think a certain way when given a decision. Alex is therefore forced to feel and think negative responses when shown evil sites or thoughts. This matches exactly, in my view, what is the

¹ In 1903, at the 14th International Medical Congress in Madrid, Pavlov read a paper on *The Experimental Psychology and Psychopathology of Animals*. In this paper the definition of conditioned and other reflexes was given and it was shown that a conditioned reflex should be regarded as an elementary psychological phenomenon, which at the same time is a physiological one. It followed from this that the conditioned reflex was a clue to the mechanism of the most highly developed forms of reaction in animals and humans to their environment and it made an objective study of their psychic activity possible. Experiments carried out by Pavlov and his pupils showed that conditioned reflexes originate in the cerebral cortex, which acts as the «prime distributor and organizer of all activity of the organism» and which is responsible for the very delicate equilibrium of an animal with its environment. In 1905 it was established that any external agent could, by coinciding in time with an ordinary reflex, become the conditioned signal for the formation of a new conditioned reflex. In connection with the discovery of this general postulate Pavlov proceeded to investigate «artificial conditioned reflexes». From *Nobel Lectures, Medicine*, Elsevier Publishing Company, Amsterdam 1964-1970, vol. 9.

main goal of the so-called *subliminal perception*. Subliminal literally means "beneath the threshold of conscious awareness"². Interesting enough, after the Ludovico treatment, not only Alex does he feel physically sick when he thinks or looks at violence but also when he hears classical music: "It was that these doctors *bratchnies* had so fixed things that any music that was like for the emotions would make me just sick like *viddying* or wanting to do violence"³: this is what he says in A. Burgess' novel. As a matter of fact, after the Government decides to brainwash him by the "Ludovico therapy" (the name *Ludovico* concerns with Ludwig van Beethoven) he'll be no longer able to appreciate the music of his most favorite composer. Within the conditioning techniques of repulsing him to violence, the State has also forced him to hate music. May such and similar consequences affect also those individuals who nowadays are administered *subliminal messages* in form of music, i.e. acoustically encoded speech-acts? We don't know. All we can do is to make suppositions⁴.

2. Subliminal Perception: its dubious origins. In his prophetic novel *1984*, another great novelist, George Orwell, foretold of a future in which our thoughts, attitudes, and behaviors would be controlled almost entirely by the media. This startling prophecy seemed to gain plausibility in the late 1950's after James Vicary reported significant increases in Coke and popcorn sales after flashing directives to "*Drink Coke*" and "*Eat Popcorn*" during a movie. Although Vicary never actually published these findings, his reports created a frenzy of consumer concern and government legislation aimed at stopping these forms of seemingly insidious mind control. There was, however, one significant and often unknown problem with Vicary's study -- it was all a hoax. Years later, Vicary himself admitted this scam was simply an attempt to save his dying advertising agency. The notion that stimuli presented outside conscious awareness could influence cognition was

² Nick Epley, *Science or Science Fiction? Investigating the Possibility (and Plausibility) of Subliminal Persuasion*, Department of Psychology, Cornell University, Laboratory of Cognitive Studies.

³ In italics in the text.

⁴ While Newton in his *Principia* stated his intention not to accept in his system of physics "whatever is not deduced from the phenomena" ("I frame no hypothesis", or *hypotheses non fingo*"), and our knowledge about *subliminal perception* is mostly made out of subjective and still debatable argumentations, notwithstanding we shall describe the findings related to it in the same terms as those used to describe any other scientific law.

not new. In 1884 Pierce and Jastrow reported that people could perceive small differences in pressure to the skin without conscious awareness of different sensations⁵. Vicary, however, was the first to report impressive behavioral influences in a domain with tremendous money making potential. Regardless of its truth or falsity, Vicary's report spurred what has now been over 30 years of research into the effectiveness of a new marketing tool: *subliminal advertising*. The resulting body of work, not surprisingly given its dubious origin, has produced far from impressive results and has led to the strong conclusion that subliminal advertising cannot influence the type of laundry detergent you buy, the type of underwear you wear, or the candidate you vote for. In short, research on subliminal advertising suggests that subliminally presented stimuli have little or no influence on our thoughts, attitudes, preferences, or behavior. Such an assumption would be false. Cognitive and social psychologists are now learning that *stimuli presented subliminally can not only be perceived, but can have a considerable influence over a variety of cognitive processes (possibly even behavior)*. Up-to-date music theoreticians, on their side, are not less convinced of the fact that *auditory stimuli presented subliminally* – i.e. as adequate anticipations of musical patterns still to come, may they be isolated melodic “chunks” or entire phrases – *presumably have a consistent influence over those cognitive processes* which lead first to the *cortical awareness* and finally to the *internalization and appraisal* of musical event itself. “Embedded” stimuli are obviously difficult to characterize in terms of signal-detection theory, and threshold-determination procedures are also, since most of them remain unidentifiable even when focal attention is directed to them. This makes the use of *SP*-related tools even more desirable for those composers whose aim is rather to influence than to persuade, to affect emotionally rather than intellectually.

3. The Preconscious System and the “Working Memory”. Here, I do not intend to review the long history of psychological investigations of unconscious perception, nor do I want to summarize the current status of

⁵ C.S. Pierce, J. Jastrow, “On small differences in sensation”, *Memoirs of the National Academy of Sciences*, 1884, 3, pp. 73-83.

experimental research in this area of investigation. The research findings described in many serious investigations done by well-established scientists illustrate enough well how it is possible to distinguish experimentally between *conscious* and *unconscious perception*. Freud's old model, the one already outlined in his letters to Wilhelm Fliess⁶, is in my opinion still valid: it assumes that the human mind is divided into three separate and autonomous entities, basically the *conscious* and the *unconscious* with an intermediate area called the *preconscious*⁷. Modern cognitivism would refer us to the brain area specialised in "working memory" and STM (*Short-Term Memory*), namely the *lateral prefrontal cortex* which, as LeDoux states in one of his books, is believed to exist only in primates and is considerably larger in humans than in other primates⁸. It is important to point out from the very beginning that the phenomena related to the so-called *subliminal perception* (which is generally taken as synonymous for "unconscious perception") do result in the activation of the *preconscious system* (one should therefore speak of a *preconscious* rather than of an *unconscious* perception). It is more difficult to say what is assumed to happen at a neuro-functional level. Emotions are generally thought of as being of two kinds, new ones as sudden: unexpected events of a pleasant or unpleasant nature; and older or even archaic ones as a result of an ingrained experience of the past, of which the ongoing event is a partial and limited yet effective recall

⁶ S. Freud, *Psychological Writings And Letters*, vol. 59, ed. by Sander L. Gilman, Continuum Publishing, New York 1993; in Italian, *Lettere a Wilhem Fliess 1887-1904*, Boringhieri, Torino, (1986). See also W.I. Grossman, "Hierarchies, boundaries and representation in a Freudian model of mental organization", *J. Amer. Psychoanal. Assn.*, 1992, 40: 7-62.

⁷ Having adopted such a model, Freud was forced to conclude that if whatever is *conscious* is noticed then whatever is not noticed is *unconscious*. But here he came upon two possibilities. Something may just happen to be unnoticed and be easily capable of becoming conscious by having attention turned to it, and something may be unnoticed and very difficult if not impossible to notice. In other words, a distinction must be made between "what is *unnoticed*" and "what is *unnoticeable*". This Freud recognized, and he made it quite clear that the case he was really interested in was the case of something being not only unnoticed but unnoticeable. He wished to reserve his concept of the unconscious to refer to 'what is unnoticeable' as distinct from what is merely unnoticed. He made the distinction by describing the case of 'what is unnoticed' as a case of what is unconscious in the descriptive sense and the case of 'what is unnoticeable' as a case of what is unconscious in the dynamic sense. He created the term *preconscious* to refer to what is merely unnoticed or unconscious *only* in the descriptive sense and reserved the term *unconscious* for what is unnoticeable or unconscious in the dynamic sense (see S. Freud, *The Ego and the Id*, in J. Strachey (ed.), Standard Edition, vol. 19 (Hogarth Press, London 1961), p. 15.

⁸ J. LeDoux, *The Emotional Brain*, Touchstone/Simon & Schuster, New York 1998, p. 274.

and “reinforcement” (in the sense the behaviorist F. Skinner would speak of with his “superstitious” pigeons)⁹.

4. The role of the amygdala in listening to music and the emotional outcome. There seems to be, according to Joseph LeDoux, a first emotional pathway consisting of an *amygdala-dependent emotional arousal* related to current emotional outcome; and a second pathway dwelling upon the *Explicit Memory system of the hippocampus* related to “conscious awareness of stored knowledge”¹⁰. It appears obvious to us that the subliminal perception refers not to the Explicit Memory of the *hippocampus* but rather to the activity of the *amygdala*, which is in charge of the so-called *emotional memory*. Touching, so to say, the crucial setting of actual emotions, but overriding the discriminatory function of the *thalamus* and leaving untouched the cortical internalization (“*awareness*”) of the past¹¹. This would be part of what LeDoux himself calls, in another passage of the same book, the “quick and dirty processing pathway” of perception: that of “perception without awareness”¹². Now, if the role of the *amygdala* in overriding the cortical aspects of conscience and in establishing a functional *shortcut* with the *unconscious* is clear; it will be even more astonishing for us to learn how close the *limbic system* – of which the *amygdala* could be figuratively said to be the backbone and mainstay – is to the pathway through which man perceives, processes and internalizes music. J. LeDoux was the first one, in an article of 1992, to have stressed the importance of the *amygdala* in our listening to music and the emotional outcome that it provides¹³. Another important study related to the importance the *amygdala* has in listening to music and the cognitive processes related to it can be

⁹ B.F. Skinner, “Superstition in the Pigeon”, *Journal of Experimental Psychology*, 1948, 38, pp. 168-172.

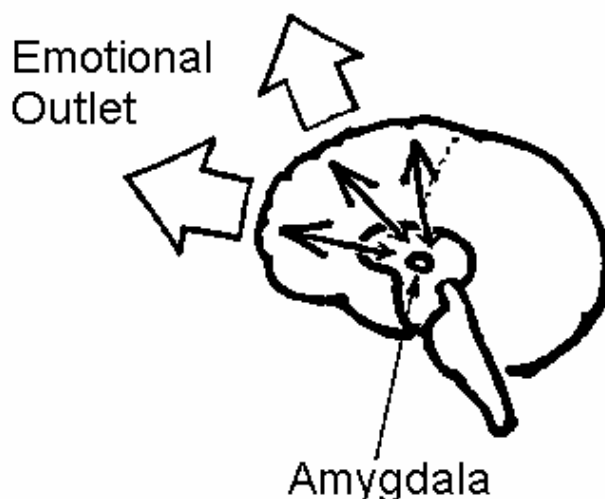
¹⁰ J. LeDoux, *op. cit.* p. 204.

¹¹ In need of a more precise definition of the term *cortical system*, we prefer to rely on the work by the Nobel Prize winner Francis Crick and his co-worker Christof Koch: by *cortical system* – which is exactly what the *SP* does not refer to – we mean “the *cerebral cortex* plus other regions closely associated with it, such as the *thalamus* and the *claustrum*, and probably the *basal ganglia*, the *cerebellum*, and the many widespread brainstem projection systems” (F. Crick, C. Koch, “A Framework for Consciousness”, *Nature Neuroscience*, Feb. 2003, vol. 6, 2, pp. 119 – 126).

¹² J. LeDoux, *op. cit.*, p. 164.

¹³ J. LeDoux, “Emotion and the amygdala”, in: J.P. Aggleton (ed.), *The Amygdala: Neurobiological Aspects of Emotion, Memory, and Mental Dysfunction*, Wiley-Liss, New York 1992, pp. 339-351.

found in two studies: one conducted by an equipe of scientists based at the Stanford University School of Medicine¹⁴; the second leading to the investigations done on the *limbic* and *paralimbic system* and auditory priming by Robert Zatorre and his equipe based at the Canadian McGill University of Montreal¹⁵. It is interesting to note that the *amygdala* has since always been related to *fear* and *recognition of emotions*¹⁶. This would suggest, on one hand, some obscure link between listening to music and the outburst of fear and anger; on the other hand, there is evidence of a major link between the emotional encoding provided by the *limbic system*, the triggering role of the *amygdala* in the emotional outlet, and the *extra-cortical* storage of memory-related patterns, as the one provided by the *subliminal perception*.



¹⁴ D.J. Levitin, J.E. Schmitt, V. Menon, S. Eliez, C.A. Traube, C.D. White, G.H. Grovers, J. Kadis, J.R. Korenberg, U. Bellugi, A.L. Reiss, "On the Difference Between Music and Noise: Evidence from Williams Syndrome and fMRI", *unpublished paper*; and D.J. Levitin, U. Bellugi, "Musical Ability and Williams Syndrome", paper presented at the *Meeting of the Acoustical Society of America*, Columbus (OH) 1999.

¹⁵ A.J. Blood, R. Zatorre, "Emotional Responses to Pleasant And Unpleasant Musci Correlate with Activity in Paralimbic Brain Regions", *Nature Neuroscience*, vol. 2, 4, april 1999, pp. 382-387.

¹⁶ Cfr. R. Adolphs, D. Tranel, H. Damasio, A. Damasio, "Impaired Recognition of Emotion in Facial Expressions Following Bilateral Damage to the Human Amygdala", *Nature*, 1994, 372, pp. 669-672; R. Adolphs, D. Tranel, H. Damasio, A. Damasio, "Fear and the Human Amygdala", *The Journal of Neuroscience*, 1995, 15, pp. 5879-5892; R. Adolphs, H. Damasio, D. Tranel, A.R. Damasio, "Cortical Systems for the Recognition of Emotion in Facial Expressions", *The Journal of Neuroscience*, 1996, 16, pp. 7678-7687.

5. Subliminal Perception and the Arts. The most successful experimental strategy nowadays has been to show that a stimulus can have qualitatively different consequences on cognitive and affective reactions depending on whether it was consciously or unconsciously perceived. Taken together, the results of these recent psychological investigations provide empirical support for the importance of unconsciously perceived information in determining cognitive and affective reactions. So, if other scholars – like Daniel Goleman¹⁷, Joseph Ledoux¹⁸ and Antonio R. Damasio¹⁹ – have focused on a topical subject basically consisting of one question: what happens in our brains to make us feel fear, anger, love, pleasure, today it should be investigated as to how these findings may apply to the aesthetic realm of perception, and to what extent the unconsciously perceived information may be important, and even essential, in determining cognitive and affective reactions and how every one of us confronts himself/herself with a work of art. Since the unconscious part of perception underlying our emotions – a mechanism that is not being revealed to our conscience, because this platform of awareness would undoubtedly take away a great deal of the pleasure we experiment – is very important, if not essential, in the cascade of reactions that follow any cortical response to an *oeuvre d'art*, it is my aim to point out the importance which a cognitive approach of the “subliminal perception” herein involved would have on establishing a conscious appraisal and evaluation of art. Let me trace a brief history of those experiments which I consider the most suitable to possibly receive a further application to music, both as a protocol of creation and analysis. In fact, this is a crucial point for me and my investigation: whether it is possible to apply the findings related to this topic both on:

(a) the system of rules encompassed by current music analysis, as this unfolds and enhances the listeners’ and performers’ understanding of what they are hearing and playing;

¹⁷ D. Goleman, *Emotional Intelligence*, Bantam, New York 1995.

¹⁸ J. LeDoux, *op. cit.*

¹⁹ A. Damasio, *Descartes’ Error. Emotion, Reason and the Human Brain*, Grosset/Putnam, New York 1994.

(b) the creative processes in the realm of music and arts in general, as intended to help pave the way for a kind of compositional thought based less on aesthetic dialectics than on the growing understanding of the musical mind and its infinite potentials.

6. Introspective and behavioral methods. Investigations of unconscious perception have a long history in psychology²⁰. In fact, some of the very earliest studies conducted in psychology laboratories in North American involved demonstrations of unconscious perceptual influences. However, despite this interest in unconscious perception since the late 1800s, it has only been within the past 15 to 20 years that our understanding of unconscious perceptual processes has advanced considerably. A major reason it took so long to make significant progress is that initially an unanswerable question was asked. The question that most research studies addressed was “Are stimuli unconsciously perceived?” In other words, the primary goal of these studies was to prove the existence of unconscious perceptual processes. Two different experimental approaches were followed in these attempts to prove the existence of unconscious perceptual processes. One approach was based on *introspective* measures of awareness and the other approach was based on *behavioral* measures of awareness. Neither approach was completely successful: the first one seem to deal more than the second one with the subterranean processes of the psyche (the so-called

²⁰ The most notable contribution to this history is undoubtedly represented by the important contribution whose author is Philip M. Merikle, presently teaching in the Department of Psychology, University of Waterloo, Ontario, Canada. From his paper (“Psychological Investigations Of Unconscious Perception”, *Journal of Consciousness Studies*, 1998, vol. 5, 1, pp. 5-18) we have borrowed the brief review relating to the history of psychological investigations of unconscious perception and the summarization of what one could consider to be the present status of experimental research in this area of investigation. Beyond the findings described in his paper, in which Merikle illustrates how and to what extent it is possible – it should be possible, we better ought to say – “to distinguish experimentally between conscious and unconscious perception” (P.M. Merikle, *art. cit.*, p. 1), the Author recalls how recent studies of patients having undergone general anaesthesia have shown that the effects of stimuli perceived unconsciously during surgery can last for approximately 24 hours (*ivi*). We should ask ourselves whether these findings may or may not apply to unconscious visual or auditory primes of *aesthetic nature*, not implying a command or a conative use of language, as R. Jakobson would say, but solely an assessment in terms of *aesthetic avaluation and appraisal*. How long would then the post-suggestion effect of a visual or auditory subliminal suggestion fit into the frame of *LTM* (“*Long-Term Memory*”) and build up the compelling evidence of a blossoming out *taste* or *sense of taste*?

“cognitive unconscious”), but is far less reliable in terms of data standardisation; while the second often underlies a stronger version of psychological functionalism, where consciousness appear as the end result and principal aim of the entire psychical process, without an understanding of the subjective aspects implying specificity of the individuum as such, but is more reliable in terms of testing informations and collecting data.

7. The importance of unconscious perceptual processes. As far as art and its different pathways are concerned, I would like to say that another question – in my eyes an even more relevant one, especially when art and its autonomous processes are involved – is worth to be made. This question assumes that the conceptual distinction between conscious and unconscious perception is meaningful and asks “Are the consequences of unconscious perception qualitatively different from the consequences of conscious perception?” This possible difference involves both cognitive and affective reactions to stimuli. In the field of music and visual arts, this same difference to some extent opposes the *history of art* as a *vectorial* quantity, as a mathematician would say, in terms of received tradition and the hereto related knowledge, which appears as a network of consciously retrievable data and informations scattered off in time; and *art* as the scalar product of a crucial, though inexplicable emotional experience²¹. Taken together, the

²¹ In the one dimensional world in which the dynamic equations of human creativity take place, the quantities for Position, Velocity, and Acceleration of mental processes can be treated as scalar quantities, i.e. as normal numbers. As soon as we translate the problem from one dimension to a multi-dimensional reference frame, as it is the case of History and History of Arts, these quantities become *vector quantities*. Conceptually, the main difference between a scalar and a vector is that a *scalar* has a *single value* associated with it, while a *vector* has essentially *two values* associated with it. These are the *magnitude* of the vector (the alleged magnitude of an Idea as it should be implied in an ideological perspective of unfolding events) and the *direction* (that of History, which we suppose to be progressing through time). Notice that, if we were to go to a three dimensional reference frame there would be three components for the vector. To wrap up the concept of a vector, it can be defined in as many dimensions as you want with the provision that if your system is defined in *n-dimensions*, the vector has *n-components*. The question is whether we should make use of the latter model of a *n-dimensioned* frame of mind also in regards to human creativity. An intuition, for example, as implied by the “normal” process of *subliminal perception*, may bounce off in one of many (unpredictable) directions: it is, generally speaking, impossible to predict in advance what the outcome in any given case will be for a stimulus as for its bodily and/or psychic response. Heisenberg’s *uncertainty principle*, according to which nature is inherently indeterministic, implies an *open future* and, for that matter, an *open past*: this is why I would tend to consider the History of Art a *vectorial process* implying *n-dimensioned* time-components for a variety of *n-dimensioned* events). If this indeterminism manifests itself most conspicuously on an atomic scale of size, it also dictates that the

results of all these studies provide rather compelling evidence for the *importance of unconscious perceptual processes*. In fact, if namely by establishing how unconscious and conscious perceptual processes differ, it has been possible for scientists to obtain stronger evidence for the existence of unconscious perceptual processes than it would be possible to obtain via direct attempts to demonstrate that stimuli are unconsciously perceived; for the very same reason, the difference between a conscious and an unconscious (or preconscious) approach to a work of art, the difference between conscious and unconscious emotional responses to a work of art, would provide stronger evidence for the existence of unconscious (or preconscious) perceptual processes than it would be possible to obtain via direct attempts (including the most recent *Brain Imaging Techniques*).

observable properties that characterize a mental frame of unconscious, multiple and rebounding actions and reactions – as are those bound up to *subliminal perception* – are generally *undecided from one moment to the next*.

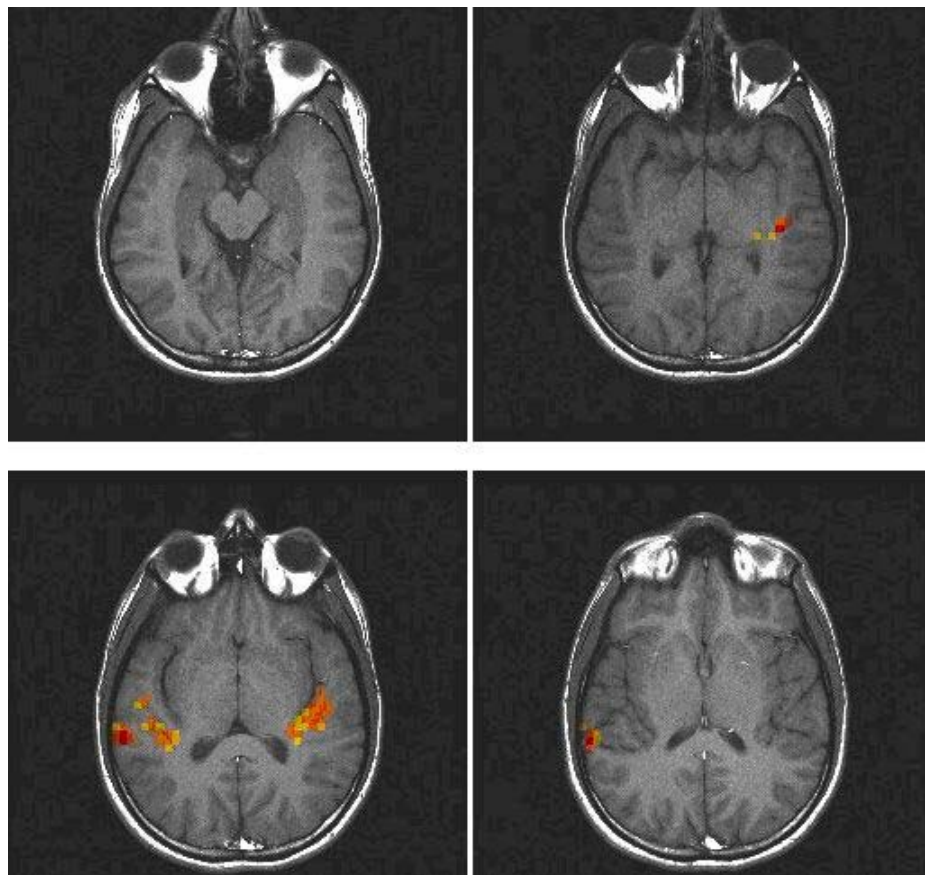


Fig. 2. Dealing with the use of fMRI Technology to probe musical comprehension and competence. Test made on a right handed 20 year-old-man involving passive hearing of music (single notes, unfamiliar tune) in binaural-monophonic presentation. As for the brain activity, there is proof of an asymmetric activation which is greater on the left in Heschl's gyrus and more extensive on the right supramarginal gyrus. The findings proof A. Tomatis' hypothesis on a possible dominant left-brain activation during music listening to be right. Still, an evident *lag* exists between the beginning of neural events leading to conscious (i.e. cortical) perception of music (left hemisphere) and the moment one experiences emotionally the consequences of those events (right hemisphere). From the physical time of a given stimulus to the successive moment of *psychological time* there could be the critical step and arising of *subliminal perception*. As B. Libet's studies have given proof of, conscious subjective experience in general has a unitary

character that is not evident in the multitudinous neural activities that give rise to it²².

8. Does unconscious perception exist? Many psychological studies of unconscious perception have attempted to prove the existence of unconscious perceptual processes by demonstrating that stimuli are perceived when subjects are not consciously aware of the stimuli. The basic strategy followed in these studies is to establish conditions under which conscious perception does not occur and then to demonstrate that stimuli can nevertheless be perceived under these conditions. The success of these studies depends completely on the acceptability of the method used to establish the absence of conscious perception. In the earliest studies, inferences concerning the absence of awareness were based on subjects' introspective reports. In general, if the subjects' statements indicated an absence of relevant conscious perceptual experiences, it was assumed that the subjects were in fact unaware of the stimuli. In more recent studies, the absence of relevant conscious experiences has been defined in terms of behavioral measures that indicate an inability to discriminate between alternative stimuli. Studies based on both types of measures have not led to completely convincing results because it is always possible to question whether the measure of conscious perception was successful in guaranteeing a complete absence of all relevant conscious experiences.

9. Introspective measures of awareness. Studies of unconscious perceptual processes based on introspective measures of awareness date from the very beginning of experimental psychology in North America²³. As

²² The above image is property of Nolan Altman, MD and Byron Bernal, MD of the Miami Children's Hospital. See for this topic: B. Libet, E.W. Wright, C.A. Gleason, "Readiness Potentials preceding unrestricted 'spontaneous' vs. pre-planned voluntary acts", *Electroencephalography and Clinical Neurophysiology*, 1982, 54, pp. 322-335; B. Libet, A. Freeman, K. Sutherland (ed.), *The Volitional Brain. Towards a Neuroscience of Free Will*, Imprint Academic, Thorverton 1999. Also to be consulted: D.C. Dennett, M. Kinsbourne, "Time and the Observer", *Behavioral and Brain Sciences*, 1992, vol. 15, n. 2, pp. 183-247; A. Angrilli, P. Cherubini, A. Pavese, S. Manfredini, "The Influence of Affective Factors on Time Perception", *Perception and Psychophysics*, Aug. 1997, vol. 59, n. 6, pp. 972-982; S. Grondin, "From Physical Time to the First and Second Moments of Psychological Time", *Psychological Bulletin*, Jan. 2001, vol. 127, n. 1, pp. 22-44.

²³ For an exhaustive review of many early studies, see: J.K. Adams, "Laboratory studies of behavior without awareness", *Psychological Bulletin*, 1957, 54, pp. 383-405.

an example of this general approach, consider an experiment conducted in the Psychological Laboratory at Harvard by Boris Sidis and reported in his 1898 monograph, *The Psychology of Suggestion: A Research into the Subconscious Nature of Man and Society*²⁴. Sidis showed subjects cards containing a single printed digit or letter. “The subject was placed at such a distance from the card that the character was far out of his range of vision. He saw but a dim, blurred spot or dot”²⁵. In fact, “the subjects often complained that they could not see anything at all; that even the black, blurred, dim spot often disappeared from their field of vision”²⁶. However, when Sidis asked his subjects to name the characters on the cards, their responses were correct more often than would be expected on the basis of simple guessing, even though many subjects expressed the belief “that they might as well shut their eyes and guess”²⁷. Sidis concluded that his experiments indicated “the presence within us of a secondary subwaking self that perceives things which the primary waking self is unable to get at”²⁸. Other investigators reported findings very similar to the findings reported by Sidis²⁹. In fact, the basic results are so robust that Adams has suggested its use as a classroom demonstration³⁰. Thus, these early experimental results provide clear evidence that subjects can make accurate perceptual discriminations even when they believe, as indicated by their introspective reports, that their conscious perceptual experiences are inadequate to guide their choices. If one accepts the assumption that it is possible to measure and therefore define conscious perceptual experience solely on the basis of

²⁴ B. Sidis, *The Psychology of Suggestion. A Research into the Subconscious Nature of Man and Society*, Appleton, New York 1898; and Arno, New York 1973 (reprint). See also, of great interest for our purpose: B. Sidis, I. Van Gleason, [Reply to a review of] “The Psychology of Suggestion”, *Science*, August 5, 1898, 8, pp.162-3; and B. Sidis, The Doctrine of Primary and Secondary Sensory Elements, *Psychological Review*, 1908, 15, pp. 44-68; and pp. 106-111.

²⁵ B. Sidis, *op. cit.*, p. 170.

²⁶ B. Sidis, *op. cit.*, p. 171.

²⁷ *Ibid.*

²⁸ *Ibid.*

²⁹ C.S. Peirce, J. Jastrow, “On small differences in sensation”, *Memoirs of the National Academy of Sciences*, 3, 1884, pp. 73-83. M.A. Stroh, M. Shaw, M.F. Washburn, “A study of guessing”, *American Journal of Psychology*, 19, 1908, pp. 243-245.

³⁰ J.K. Adams, “Laboratory studies of behavior without awareness”, *Psychological Bulletin*, 54, 1957, pp. 383-405.

introspective reports, then the results of these studies provide strong evidence for unconscious perception.

10. Behavioral measures of awareness. However, the assumption that introspective reports give an accurate indication of a subject's conscious perceptual experiences has proved to be problematic. Many researchers feel very uncomfortable measuring conscious awareness solely in terms of introspective reports. A major reason for caution is that it is difficult to know what criteria individuals may use when reporting their conscious experiences³¹. Statements indicating an absence of relevant conscious experiences may simply reflect an individual's preconceived ideas concerning the value of particular types of perceptual experiences for making decisions. For example, it is clear from the subjects' statements in the Sidis experiments that, occasionally, they saw both the card and "dim, blurred spots or dots." Thus, introspective reports may only reflect an individual's own theory of how perceptual experiences guide behavior rather than a true absence of conscious perceptual experience. Given these interpretive issues, results from studies based solely on introspective reports have never been considered to provide conclusive evidence for the existence of unconscious perception. In the 1970s and 1980s, the attention of many psychologists was captured by the results of a number of studies that used behavioral measures of awareness³². The results of these studies suggested that stimuli were perceived under conditions that did not allow discriminations between alternative stimuli. These studies were based on the intuitively-appealing assumption that *an inability to discriminate between stimuli would indicate a complete absence of conscious perception*. Given

³¹ Merikle, P. M. (1984). Toward a definition of awareness. *Bulletin of the Psychonomic Society*, 22, 449-450.

³² See: D.A. Balota, "Automatic semantic activation and episodic memory", *Journal of Verbal Learning and Verbal Behavior*, 1983, 22, pp. 88-104; E. Eich, "Memory for unattended events: Remembering with and without awareness", *Memory & Cognition*, 1984, 12, pp. 105-111; C.A. Fowler, G. Wolford, R. Slade, L. Tassinari, "Lexical access with and without awareness", *Journal of Experimental Psychology: General*, 1981, 110, pp. 341-362; A.J. Marcel, "Perception with and without awareness", Paper presented at the *Meeting of the Experimental Psychology Society*, Stirling, Scotland, July 1974; A.J. Marcel, "Conscious and unconscious perception: Experiments on visual masking and word recognition", *Cognitive Psychology*, 1983, 15, pp. 197-237; C. McCauley, C.M. Parmelee, C.D. Sperber, T.H. Carr, "Early extraction of meaning from pictures and its relation to conscious identification", *Journal of Experimental Psychology: Human Perception and Performance*, 1980, 6, pp. 265-276.

the plausibility of this assumption, *the results seemed to provide convincing evidence for the existence of unconscious perceptual processes*. In fact, the results were so compelling that there was a considerable resurgence of interest in the study of unconscious perceptual processes following the publication of these studies.

11. Awareness and unconscious perception. An excellent example of a study using a behavioral measure of awareness was reported by Kunst-Wilson and Zajonc in 1980³³. These investigators were interested in demonstrating that unconsciously perceived stimuli influence subsequent affective reactions. They designed an experiment to show that preferences for particular stimuli can be based on unconsciously perceived events. In their study, subjects were initially shown 10 meaningless, irregular, geometric shapes. Each shape was presented five times for 1-msec each time, and no subject ever reported seeing any of the shapes. Following these initial presentations, perception of the shapes was evaluated by both a forced-choice *recognition task* (i.e., the measure of *awareness*) and a forced-choice *preference task* (i.e., the measure of *unconscious perception*). For both tasks, the subjects were shown 10 pairs of shapes, with each pair consisting of one “old” shape that had been presented during the initial phase of the experiment and one “new” shape that had not been presented previously. For the recognition task, the subjects were instructed to select the member of each pair that had been presented previously, whereas for the preference task, the subjects were simply told to choose the shape that they preferred. The interesting result was that the subjects performed no better than chance (i.e., 50% correct) when they were asked to select the shape in each pair that had been presented previously, but they performed significantly better than chance (i.e., 60% correct) when they were asked to select the shape in each pair that they preferred. In other words, when the subjects were asked to discriminate “old” from “new” shapes, their performance suggested that they had never perceived the shapes. However, when the subjects were simply asked to select the shape they preferred, their performance revealed that *the previous brief exposures influenced their*

³³ W.R. Kunst-Wilson, R.B. Zajonc, “Affective discrimination of stimuli that cannot be recognized”, *Science*, 1980, 207, pp. 557-558.

affective reactions. If one accepts the assumption that forced-choice recognition provides an adequate measure of conscious perceptual experience, then these results provide strong support for the existence of unconscious perception. Transferring these results in the realm of art and art appreciation, this shows not only how deeply and to what extent *taste* and aesthetic appraisal can be brought back to preliminary unconscious processes, but how prevailing the influence of extracortical sensory processing can be on ongoing perceptions. This shows also that music, as all the other arts, from the first sensory-driven stimuli of perception to the unfolding of an autonomous poetic of vision and sound, if proven to be to some major extent tied up to *subliminal perception*, might be more a matter of *emotion* than of *attention*.

12. Why sceptics keep on distrusting. Generally speaking, the results of studies that have used behavioral measures of awareness provide stronger evidence for the existence of unconscious perception than do the results of studies based on introspective measures of awareness. However, it is still possible to question whether the findings from these studies provide compelling evidence for unconscious perception. For example, given that Kunst-Wilson and Zajonc³⁴ did not assess awareness until some time after the initial exposure to the shapes, it is always possible to argue that the subjects experienced a fleeting awareness of the shapes at the time they were presented. It is also possible that whenever stimuli are shown for a very brief duration, subjects do not believe that they have perceived sufficient information to discriminate between stimuli. If so, then subjects may be very unmotivated to perform any behavioral task requiring forced-choice discriminations between stimuli. More generally, it is always possible to question whether any particular behavioral measure is an exhaustive measure of *all* relevant conscious experiences³⁵, because there may be important aspects of conscious experiences that are just not captured by any single behavioral measure. For all of these reasons, studies based on

³⁴ *Ibid.*

³⁵ See: E.M. Reingold, P.M. Merikle, "Using direct and indirect measures to study perception without awareness", *Perception & Psychophysics*, 1988, 44, pp. 563-575; E.M. Reingold, P.M. Merikle, "On the inter-relatedness of theory and measurement in the study of unconscious processes", *Mind & Language*, 1990, 5, pp. 9-28.

behavioral measures of awareness have not provided completely convincing evidence for the existence of unconscious perception. Thus, it has been possible for skeptics to continue to argue that unconscious perceptual processes do not play an important role in determining cognitive and affective reactions³⁶. The one generally agreed upon conclusion from the studies using behavioral measures, as well as from the studies using introspective measures, is that attempting to prove the existence of unconscious perceptual processes has not been a particularly successful research strategy.

13. How do unconscious and conscious perception differ? Because of the preoccupation with trying to prove the existence of unconscious perceptual processes, the real potential value of the conceptual distinction between conscious and unconscious processes has sometimes been forgotten. Surely, the distinction between conscious and unconscious perceptual processes is much more significant and interesting if conscious and unconscious processes lead to qualitatively different consequences than if unconscious perception is simply a weak form of conscious perception³⁷. In fact, it has even been argued that the distinction between conscious and unconscious processes is of questionable value if conscious and unconscious processes do not have qualitatively different consequences³⁸. For this reason, one of the most important questions that can be asked regarding unconscious perceptual processes is: how does unconscious perception differ from conscious perception? Merikle suggested that a productive research strategy for investigating differences between conscious and unconscious processes would be to use introspective reports to distinguish conscious from unconscious perception, and determine whether consciously perceived stimuli lead to *qualitatively different* consequences than do unconsciously

³⁶ Among the skeptics is D. Holender, "Semantic activation without conscious identification in dichotic listening, parafoveal vision, and visual masking: A survey and appraisal", *Behavioral and Brain Sciences*, 1986, 9, pp. 1-23.

³⁷ See: N.F. Dixon, *Subliminal perception: The nature of a controversy*, McGraw-Hill, New York 1971; P.M. Merikle, "Perception without awareness: Critical issues", *American Psychologist*, 1992, 47, pp. 792-795; H. Shevrin, S. Dickman, "The psychological unconscious: A necessary assumption for all psychological theory?", *American Psychologist*, 1980, 35, pp. 421-434.

³⁸ See: E.M. Reingold, P.M. Merikle, "On the inter-relatedness of theory and measurement in the study of unconscious processes", *Mind & Language*, 1990, 5, pp. 9-28.

perceived stimuli. In the following four paragraphs we describe two studies that demonstrate qualitative differences for consciously and unconsciously perceived stimuli. Although each study has used a somewhat different set of procedures to differentiate between conscious and unconscious perception, the one common outcome of all of these procedures is that subjects' introspective reports indicate that they were aware of the stimuli in one set of conditions and they were unaware of the stimuli in another set of conditions. Each study provides a demonstration of a different characteristic that distinguishes conscious from unconscious perception. Together, the results of these studies provide not only compelling evidence for the importance of unconscious perceptual processes in influencing our reactions to stimuli, but tell us how affective reactions and proper coding of stimuli are both involved in the unconscious processes related to creativity and assessments in the field of arts. The *quality* of the emotional triggering in Wagner's *Tristan* can be related to any kind of human pulsions, including the least acceptable to our understanding and wish to understand: as a matter of fact, far away from debating the *quality* of unconscious auditory priming in Wagner's music, one thing should be clear: the impact Wagner's music has on its listeners leads to consequences of appraisal and internalization which are *qualitatively* and not only *quantitatively* different from T.W. Adorno's plead for the so-called *analytic listening* – uncompassionate but, as it is customary to say, quite “politically correct”.

14. “Good” and “bad” suggestions. As far as possible affective reactions are involved in the process, as discussed earlier, Kunst-Wilson and Zajonc attempted to demonstrate that unconsciously perceived stimuli can influence affective reactions³⁹. Recently, Murphy and Zajonc obtained an even more convincing evidence for the importance of unconscious perception in determining affective reactions by showing that affective reactions are more likely to be influenced by unconsciously perceived stimuli than by consciously perceived stimuli. In the experiments conducted by Murphy and Zajonc, subjects were shown a clearly-visible, Chinese ideograph on each of a series of trials. The subjects were asked to indicate

³⁹ W.R. Kunst-Wilson, R.B. Zajonc, “Affective discrimination of stimuli that cannot be recognized”, *Science*, 1980, 207, pp. 557-558.

on a five-point scale whether they thought each ideograph represented a “good” or a “bad” concept. The critical aspect of the experiment concerned what happened immediately before each ideograph was presented. For one group of subjects, the presentation of each ideograph was preceded by a picture of a human face that expressed either happiness (e.g., a smile) or anger (e.g., a scowl). For this group of subjects, each face was presented for such a brief duration (i.e., 4 msec) that no subject reported awareness of the faces. For the second group of subjects, the same ideographs and faces were presented, but the duration of each face (i.e., 1000 msec) was sufficiently long so that all subjects reported awareness of the faces. The subjects in this second group were told to ignore the faces and to concentrate solely on rating the ideographs⁴⁰.

15. The unconsciously vs. the consciously perceived information.

The important result found by Murphy and Zajonc is that only the briefly-presented, unconsciously perceived faces influenced the subjects’ ratings of the ideographs. When the subjects were unaware of the faces, they were more likely to rate an ideograph as representing a “good” concept if it was preceded by a smiling face and they were more likely to rate an ideograph as representing a “bad” concept if it was preceded by a scowling face. In contrast, when the faces were clearly visible and therefore consciously perceived, the faces had little or no influence on the subjects’ ratings of the ideographs. Thus, the subjects were able to ignore consciously perceived faces and not let these faces influence their ratings of the ideographs. However, when the subjects were unaware of the faces, the emotion expressed by the faces colored their judgments of the ideographs. These results demonstrate an important qualitative difference between conscious and unconscious perception in that *our affective reactions to stimuli may be influenced to a much greater extent by unconsciously perceived information than by consciously perceived information*. Against the notion of *saliency*, or to some extent refreshing it, this assumption authorizes us to believe that *background* might in many cases be more important than the surface layer of

⁴⁰ For this experiment, see: S.T. Murphy, R.B. Zajonc, “Affect, cognition, and awareness: Affective priming with optimal and suboptimal stimulus exposures”, *Journal of Personality and Social Psychology*, 1993, 64, pp. 723-739.

foreground, in visual arts as well as in music. Again, far beyond the simple attempt to prove the existence of unconscious perceptual processes, the experiment conducted in 1993 by Murphy and Zajonc clearly shows to what wide extent aesthetic appraisal can be lead back to previous unconscious stimuli and processes, and to what point prevailing the influence of extracortical sensory processing can be on the aesthetic realm of judgements. And that our affective reactions to music may be influenced to a much greater extent by *unconsciously – or preconsciously – perceived auditory primes than by consciously perceived and cortically processed informations*.

16. The auditory domain of awareness. But, upon what a type of coding should we rely when handling facts and data concerning unconscious perception? An interesting qualitative difference first demonstrated by the Surrey-based psychologist John Groeger is that *unconsciously perceived words are coded differently than are consciously perceived words*. In an experiment using visual stimuli, Groeger presented a single target word on each experimental trial and required subjects to select the target word from a matrix of 24 words that was presented immediately following the target word. The critical aspect of the experiment was that the matrix never contained the actual target word presented on the trial. Rather, the matrix included some words that were semantically similar to the target word and some words that were structurally (i.e., visually) similar to the target word. For example, if the target word was town, then a semantically similar foil was city and a structurally similar foil was time. The results of this experiment showed that in a situation in which the target words were presented for such a brief duration that the subjects did not report any awareness of the target words, the subjects tended to select the semantically similar foils. As Groeger clearly stated in his paper, “*unconscious semantic processing does occur*”⁴¹. He related these findings to a supposed “*unconscious structural processing*”⁴². However, in a situation in which the target words were presented for a duration that was sufficiently long for the subjects to report awareness of the target words, the subjects tended to

⁴¹ J.A. Groeger, “Evidence of unconscious semantic processing from a forced-error situation”, *British Journal of Psychology*, 1984, 75, pp. 305-314 (here p. 311).

⁴² *Ivi*, p. 312.

simply select the visually similar foils. Groeger found parallel results in a following experiment, when he presented the words auditorially rather than visually; semantically related foils were selected when words were unconsciously perceived, and phonologically similar foils were selected when words were consciously perceived⁴³.

17. Dubious findings. The role of music. Taken together, the results of both experiments suggest that the way a stimulus is coded varies depending on whether it is unconsciously or consciously perceived. *When a stimulus is unconsciously perceived, meaning or semantics is the predominant code. However, when a stimulus is consciously perceived, structural or surface characteristics become more important.* Thus, different aspects of a perceived stimulus may determine action depending on whether the stimulus is consciously or unconsciously perceived. From this argument could possibly arise a problem. If music is, among all the arts, the most *asemantic*, if music is, as Adorno used to say, “*eine intentionslose Sprache*” (“*an unintentional language*”)⁴⁴, we then should consider how it might be possible to administer *SP*-related stimuli of musical nature if it is true that on an unconscious level not the *asemantic* and structural appraisal of contiguity is predominant, yet the semantic one. Where and at which level of consciousness would then fit music? If the assumption formulated by Anthony G. Greenwald and Richard L. Abrams in 1999 is correct, there is “no evidence requiring the conclusion that subliminal priming uses word meaning”⁴⁵, then we would have a partial disavowal of Groeger’s findings. Musical priming effects, measured on the basis of what Keats used to refer to as “*the intensity of feeling*”, would then act subliminally quite

⁴³ J.A. Groeger, “Qualitatively different effects of undetected and unidentified auditory primes”, *Quarterly Journal of Experimental Psychology*, 1988, 40A, pp. 323-339. In particular, the Author says, “the influence of such primes is, however, qualitatively different, depending on whether it is undetected or unidentified (but correctly detected). In the former case the prime-target relationship must be semantic for influence to be observed. In the latter case the relationship must be phonological” (*art. cit.*, p. 336). Again, as stated by Groeger in his former paper, “semantic activation can occur without conscious identification of the prime” (*art. cit.*, p. 337).

⁴⁴ T.W. Adorno: “*Gegenüber der meinenden Sprache ist Musik Sprache nur als eine von ganz anderem Typus [...] Musik zielt auf eine intentionslose Sprache*” (T.W. Adorno, *Gesammelte Schriften*, Bd. 16, pp. 650-653).

⁴⁵ A.G. Greenwald, R.L. Abrams, “Dumb or smart? Subliminal perception of valence uses small pieces of words”, paper presented at the 1999 *Meeting of the Psychonomic Society*, Los Angeles.

independently from an alleged “meaning” – which music doesn’t have – yet on the basis of some intrinsic, structural characteristics. Whose nature is *formal* and not *semantic*.

18. Qualitatively different consequences. Continuing our debate about the implications which the *SP* possibly has on music, or better to say the other way round, which role possibly music may have on unconscious auditory priming, there is some evidence of subliminal perception in the auditory and tactile systems, but a discussion of these effects is unfortunately beyond the scope of the great part of essays written on this topic. Thus, audio self-help tapes with subliminal suggestions to “lose weight” or “be happy” are generally not considered, nor are “backmasked” messages instructing one to “smoke marijuana”. We do not know if it is true beyond any reasonable doubt – may or not researches have been reliable on this point in particular – that these methods “produce no effects other than those expected by the listeners”⁴⁶. Involving the concept of *musical expectation*, much is worth to be said about what is or isn’t necessary in order to keep the listeners’ expectation adequately *aroused*. But it would be hard to say what the authors of the above quoted article (Greenwald, Pratkanis and Eskenazi) may intend with “effects” and “expected” since music is said to have no other *effects* and to give forth to no other *expectations* than of purely musical nature. The here described research findings illustrate how it is possible to distinguish *conscious* from *unconscious* perception. In the early experimental studies, the goal was to prove that unconscious perception existed. This goal was never realized because the findings obtained in these studies were always open to alternative interpretations. However, beginning in the 1970s and 1980s, a different research strategy was adopted. This new strategy was based on the idea that conscious and unconscious perception can lead to qualitatively different consequences. To date, a number of qualitative differences between conscious and unconscious perception have been established. Not only do

⁴⁶ A.G. Greenwald, E.R., Pratkanis, J. Eskenazi, “Double-blind tests of subliminal self-help audiotapes”, *Psychological Science*, 1991, 2, pp. 119-122. See also the quoted above Nick Epley, *Science or Science Fiction? Investigating the Possibility (and Plausibility) of Subliminal Persuasion*, Department of Psychology, Cornell University, Laboratory of Cognitive Studies.

these qualitative differences show how conscious and unconscious perception differ, but they also provide stronger evidence for the existence of unconscious perception than was ever obtained in experiments designed to demonstrate unconscious perception directly. We expect that future studies will document additional qualitative differences that distinguish conscious from unconscious perception not only in regards of awareness and the priming of memory, but also in those of aesthetic appraisal.

19. The role of psychoanalysis. I would also like to point out the importance of an individual setting of experiment for the *SP*. As a matter of fact, since the *SP* deals with the so-called “working memory”, all the subliminal data are usually recorded in the buffer of *preconscious*. Now, the *preconscious* of hysterical individuals, among others, is since ever packed with so-called “*free associations*”⁴⁷. The question is: how is the *SP*-stimulus going to interact, i.e. to compete, with the material at hand in this intermediate system (*PC*) linked to *rêverie* and creative imaging? D. Deutsch and other experimental psychologists in the field of music-linked abilities have studied the average responses of a collectivity of individuals to *ST*-Memory settings. But we don’t know anything yet about how the borderline individual reacts, or could possibly react, to an overflow of subdued stimuli. Psychoanalysis should here play an auxiliary role in regards to the experimental psychology. Also, it shall be in the future important to establish whether individuals differ in their sensitivity to the effects of unconsciously perceived information. If it turns out that there are stable individual differences, then it should be possible to establish the characteristics that distinguish individuals who are particularly sensitive to unconscious influences from individuals who are not particularly sensitive to unconscious influences. Given that we now have some tools capable of

⁴⁷ Freud adopted the method of free associations during 1892-1898, starting from several criteria. The method was to replace the use of hypnosis in the exploration of neurotic antecedents in his patients. It relied on Freud’s belief in psychic determinism. According to that perspective, psychic activity is not subordinated to free choice. All our mind produces has an unconscious root we can reach by means of free associations, as debated upon in Freud’s work *The Psychopathology of Everyday Life*. It is in the same place that we find plenty of instances of free associations related to various failed and symptomatic acts, proving that involuntary psychic acts too are determined by specific causes. The method of free associations demands us to temporarily give up intellectual censorship and freely speak about any thought, an attitude dramatically prevailing in the case of the so-called *hysterical syndrome*.

letting us distinguish between the effects of conscious and unconscious perception, it should be possible not only to begin to tease apart the factors that determine how different individuals react and respond to unconsciously perceived information, but also to see whether it may be possible for an artist to encode subliminal messages in the background of his/her works so to confer to them *a sense of profound order – or disorder* – depending upon the circumstances and the aim of every single artist. Since it turns out that the unconscious perception deals more with pure emotions than it does with meanings and semantics, and if we accept the further assumption that artists deal mainly with emotions, it should be clear that in the field of art consciousness underlies a sort of secondary cognitive system of unconsciously based processes, which in no way do emerge onto the level of cortical appraisal and motivation. This applies to music as well as to other forms of art.

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