

Constructing the Conceptual Meaning in Music: Imaginative Dimensions and Linguistic Descriptions

Marcos Nogueira

Department of Composition, Federal University of Rio de Janeiro, Brazil

mvinicionogueira@gmail.com

Abstract

The theoretical-methodological contribution of the so-called embodied cognitive sciences became absorbed by musicological research in the 1990s. Throughout the 20 years of development of a musical enactivism, several researchers have faced the challenge of overcoming the representational model of the academic tradition to explain what happens to the mind when we interact with music creatively. This paper argues for the validity of the hypothesis according to which the attentional focus of the descriptor regulates the linguistic descriptions of his or her musical understanding. In the process of producing meaning the listener emphasizes one or another of the imaginative dimensions that this study recognizes as categorization of movements, production of formal images, and the establishment of symbolic predicates. Moreover, the present study argues that events that elicit more meaningful orienting of attention trigger a cognitive device called *orienting response* which regulates the attentional focus of the listener. Before this, the development of a strictly enactivist model for the investigation of the modes of conceptualization of the musical understanding expressed in the linguistic descriptions of the listeners offers unprecedented access to the path that goes from the concept towards the meanings (mostly unconscious) that are not yet concepts. These are the meanings with which we invent our musical worlds before conceptualizing the world musically.

Introduction

The *orienting response*, also known as "orienting reaction" or "orienting reflex," is an immediate action of the organism in response to a particular change it perceives in its environment. A striking feature of the orienting response is that in noticing the event that extrapolates a threshold of discrepancy in the surrounding environment, the individual directs his or her attention to the event before even identifying it. We can understand the orienting response as a set of responsive body indicators that signal the perception of a stimulus that stands out as relevant. The phenomenon would, however, be a response to the "non-aversive" novelty. For example, in the auditory domain, a sonic event perceived as novelty will elicit a spontaneous response unless it presents itself at such an extraordinary level of sound intensity that it overcomes the auditory comfort zone and inflicts on the individual a kind of threat. Also, this last situation provokes another type of reaction, generally understood as the "defensive reflex" of the individual, which emerges as a "blocking" action to the threatening event. In short, simple orienting responses occur when the perceived change in the surrounding environment does not cause another type of reaction known as the "startle reaction," or "startle reflex," the *scare*.

Ivan Sechenov first described the phenomenon of the orienting response in his *Reflexes of the Brain* (1863/1965),

but it was Ivan Pavlov who, in *Conditioned Reflexes: An Investigation of the Physiological Activity of the Cerebral Cortex* (1927), identified it in the terms in which it has been studied until now—Pavlov also referred to the phenomenon as "a reflection of 'what is this?'" He noted that the perception of *novelty* or even a significant event is the central cause of the phenomenon. For him, in the face of the novelty, the individual immediately interrupts what he or she is doing and directs his or her cognitive resources to the source of stimulation—it is, therefore, a behavioral component of orientation. Years later, Evgeny Sokolov (1960, 1963) systematically devoted himself to the phenomenon, describing the primary object of his investigations: habituation as a process of gradual familiarization with a new event that becomes repetitive. According to him, the repetition of the event provides a progressive reduction of the activation of orientation responses. Thus, the original introduction of a change in the currently active neuronal model, that is, the one in which the individual is focused, results in an orientation response. However, when one becomes familiar with the event, the individual gradually evaluates it as inconsequential and unimportant and no longer allocates effort of attention to it. Nevertheless, the orienting response toward novel and salient stimuli may not constitute a unitary process (Barry, 1979). Currently, changes in the currently active neuronal model has been interpreted as an event-related potential (ERP) sign of the orienting response, sharing the antecedent conditions of the traditional theory as well as the orienting response sensitivity to habituation (Barry, MacDonald, & Rushby, 2011).

This paper deals with the process of musical meaning formation. The literature in music theory that dialogues with the results of experimental psychology, especially from Leonard Meyer's *Emotion and Meaning in Music* (1956) to David Huron's *Sweet Anticipation* (2006), emphasizes the role of emotion and expectation (especially the ability to anticipate the occurrence of specific events imaginatively) and its implications as primordial experiences that condition the emergence of the musical meaning. I propose a change of this focus in the investigation of the meaning produced in the act of listening to music, recovering the "behaviorist" concept of the orienting response addressed, however, in the context of enactivism-based cognitive semantics. The background hypothesis of this research is that throughout the experience of music, we do not grasp it properly "by expectations," that is, we do not remain motivated to engage with music simply regulated by imaginative beliefs and anticipations of future events of the piece of music we experience. This study admits that such imaginative acts are more or less conscious and largely conditioned by the listener's expertise, driven by the desire for a reward of meaning. Instead, I believe that in the

unfolding of the listening experience, the contextual conditioning—cognitive *schemes* of memory—with which we are facing a new musical experience, should not be reduced to stylistic expectations and anticipations. I argue that, throughout musical listening, the experiences of stylistic expectation are in fact punctual (Nogueira, 2016a, 2016b). Otherwise, I understand that the events perceived as "novelty," those we evaluate, in the act of listening, as ruptures or variants of the *stream* (Bregman, 1990) stasis we infer at each moment, usually regulate the production of perceptual hierarchies of the listener.

Therefore, I propose to discuss the validity of the hypothesis according to which the attentional focus of the listeners regulated by their orienting responses configures the linguistic descriptions of their musical understanding. I also want to believe that the orienting responses of the listeners trigger the production of meaning in three non-exclusive experiential domains of imaginative production: the categorization of movements, the production of formal images, and the establishment of symbolic predicates.

Novelty and Attentional Process

I intend to argue that the process of construction of the musical meaning is inexorably started in contingent situations of the interaction of a complex of potentially relevant events of the musical work—*affordances* (Gibson, 1977, 1979)—and a listener in whose cognitive apparatus the processes that we can understand how musical orienting responses unfold. I understand that this cognitive device, operating in a preconceptual condition (strictly unconscious), determines the selection of the events of the musical stream that will regulate the imaginative production of the listener and the formation of its meaning. It should be admitted that the formation of meaning in music develops as in any other knowledge domain. The search for the origin of meaning in the experience of music must therefore consider, first and foremost, how the listener selects, on the musical surface, the events that will condition his or her construction of meaning. It is this original stage of apprehension of the musical stream that will determine in which configurations the stream will participate in the preconceptual process of formation of the musical meaning. I am referring to inherent schematizations and cross-domain mappings (Lakoff, 1987; Lakoff & Johnson, 1980; Johnson, 1987) with which we engage in musical listening, even before we engage in conceptualization acts that will be revealed in the linguistic descriptions of our musical understanding.

Novelty as something that represents some significant change (discontinuity) in the environment—or, particularly, in the musical stream—is not always something that is easy to identify or classify. Besides, the significance of an event is an issue that also imposes some difficulty for a theory of the musical orientation response. In auditory environments where multiple sonic events compete for attention, the challenge is to find relevant information and to ignore events that are unrelated to current task goals. To understand the attentional process in aural experience is useful to consider how it operates in real time. In the visual search, Eimer (2014) observed that each of the stages of attentional selectivity is temporally and functionally distinct and performs a specific function. *Preparation* is related to “representation of the search goals in working memory”; the *guidance* stage is a “parallel accumulation of information about presence of task-

relevant features”; *selection* implies “allocating visual processing resources to candidate target objects at specific locations”; and *identification* is related to “maintaining select objects in working memory” (p.528). I intend to test this model in the investigation of attentional control in the music experience. However, the approach in the present study focuses on the stages Eimer calls “guidance” and “selection”: a stage of orientation that does not yet involve the selection of the musical resources assumed by the listener's cognitive apparatus as relevant and the moment when selection is properly assumed.

Although it is essential for organisms to detect novelties in their means, there is no way to predict when an event will be relevant as a modifier of environmental conditions. In the particular case of listening to music, we often find situations in which we initially attribute relevance to specific events of a piece of music that we hear for the first time and which, throughout the experience, are irrelevant. However, it is plausible to consider that the higher the density of "new" events in a given musical stream—which I shall call commutative events, by enabling and even promoting the interruption of a given stream stasis, by replacing the object of the listener's attention—the greater the possibility that any of these become significant in the act of listening. Thus, musical stretches with few potentially "new" events would be virtually less difficult to assimilate since they present themselves as fluidly and consistently coherent configurations. As such, they elicit less attention from listeners in their ongoing process of understanding. Finally, if the musical stream does not provide reorientation challenges to the listener, it will require less attention—which I will understand here to be less interest. On the other hand, if everything in the musical stream to seem like a novelty to the listener, music will present itself as something insuperably confusing.

Considering the direct relationship between commutative events which promote discontinuities, and the attentional process, it is necessary to point out attention here can be understood as mental "allocation of resources" to treat a specific stimulus. The attention should be treated as a limited capacity to process the data of consciousness, and this allocation can be intentionally controlled. Studies developed in the last decades focus on the attention device in different paradigms. "Task-defined" attention is a purely descriptive method of attention, demonstrated when the subject could satisfactorily fulfill a task that required the selection of a specific stimulus over other present stimuli (Brignani, Lepsien, & Nobre, 2010; Desimone & Duncan, 1995; Folk & Remington, 1999; Yantis & Egeth, 1999). That is, attention is inferred based on the quality of the fulfillment of a task that would have required the subject to isolate the given stimulus. An understanding of attention as a psychological process accurately describes it as a “process-oriented” mind-focusing activity (Luck & Vecera, 2002), an active device for selecting one of many possible sensory stimuli or threads of thought, with the purpose of optimizing the data quality focused and the effectiveness of the mental process. Thus, attention would be needed when faced with an extraordinary density of stimuli and tasks mental processes require to operate satisfactorily.

Finally, what must be stressed is that attention is captured whenever the system detects the presence of novelty, that is, what motivates the capture of attention is, in theory, the

phenomenon of discontinuity. There are significant clues that this phenomenon reflects an "intentional" orientation of attention, so this makes way for the hypothesis that a complete understanding of the factors that determine whether an event automatically captures the individual's attention may be virtually unreachable, for example, habituation factors and cultural conditioning (Atchley, Kramer, & Hillstrom, 2000; Folk & Remington, 1999). Desimone and Duncan (1995) proposed a framework for the conceptualization of attentional control. It is the *biased competition model*, in which two classes of parameters influence the attentional control: the *bottom-up* parameters, based on the medium stimulation, and the *top-down*, directed at the target (in the environment), revealing distinct flow strategies in the perceptual process (Yantis, 2000). According to the model, bottom-up parameters include the sudden onset of a stimulus—which I want to understand here as a *sensory transient*—or discontinuity in the environment. Top-down parameters, in turn, include both a target pattern, that is, a mental representation of the target being intended (Desimone & Duncan, 1995; Duncan & Humphreys, 1989), and the individual's intentions about the stimulus spatiotemporal configuration, resulting from his or her conditioning.

In this study, I am understanding that model in enactivist terms. Thus, I must warn that a "mental representation" means a conceptual representation of the "target experience," that is, a process that starts from one or more cognitive schemes unconsciously activated in the act of perceiving the target to give meaning to the current experience. The linguistic statement of the understanding then formed is a mental representation "of that experience."

Orienting Response and the Musical Meaning

It is essential, however, to distinguish the process that triggers the attention-directing response—the orienting response—from the process that maintains attention—which begins at the *selection* stage as mentioned above. This is because there are pieces of evidence that may be distinct. Human sensitivity to changes in the environment is well known. The exposure to deviant stimuli in many sensory modalities can result in consequences on the attentional focus (Theeuwes and Chen, 2005; Vachon, Labonté, & Marsh, 2017). Research focusing on the auditory modality has shown that the presentation of a commutative sonic event that deviates from the recent auditory past can induce changes in attentional focus and like this diverting attention from the ongoing task. This disengagement of attention from the current task toward a commutative element in the musical environment refers to an orienting response. Such vulnerability to changes in the auditory environment can be explained by the application of an orienting response theory to music semantics and should be understood as the initial stage of the process of musical meaning construction.

We may admit the validity of theories that explain the musical understanding as a consequence of the comparison of the referential elements of the musical stream selected by the listener in the act of listening and his or her stylistic expectations. If so, we are operating at a level of memory that the researchers recognize as "maintenance of the attention." The present study focuses, instead, strictly on the mechanisms that trigger the allocation of attention in the act of listening to

music. The maintenance of attention, which is not discussed here, is most likely a distinct process that requires its approach and which would be more related to the experiences of listener's expectancy and anticipation. Instead, I advocate the need for deepening the research on an issue I recognize as neglected by contemporary musical semantics: what is the nature of the bottom-up and top-down factors that trigger what I am acknowledging as musical orienting responses. Also how do commutative events regulate the resource allocation involved in the act of listening? In this direction, I want to believe that the investigation of the linguistic descriptions nature of our musical understanding can reveal important data about the processes that conceptually translate this understanding—but also about which and how the events of the musical surface would have guided and regulated our understanding.

Reisenzein, Meyer, and Schützwohl (1996) understood the orientation response as a probabilistic syndrome of responses provoked, in particular, by the novelty, including several behavioral and physiological components. Addressing what they understood to be the conditions under which the experience of novelty occurs, Reisenzein, Meyer, and Niepel (2012) proposed by way of example that a simple musical event, a note, presented "for the first time" to the listener, would be a novelty in the first sense. A note perceived as an occasional deviation, a "strange" note that prevents the occurrence of a given expected melodic sequence would be a novelty in a second sense. Lastly, a melodic contour that does not follow the pattern of continuity established by the previous contours, contradicting them, would be a novelty in a third sense. Several researchers have investigated how the perceptual system interacts with the environment to structure it (Bregman, 1990, 1991; McAdams & Drake, 2002). In the present study, I am considering that the perceptual organization of concurrent sound events in an auditory scene can take three configurations. It may result in *perceptual fusion* when two or more potentially distinct events are perceived as a single event. It may also result in a *perceptual grouping*, when components of the auditory scene perceived as independent events are grouped perceptively, forming contours and distinguishable regions. Moreover, it may result in *perceptual segregation* when the complex components of the scene (groupings) are perceived as a competing "substream" of a complex stream. An auditory event refers here to a sonic unit with limited temporal extension, experienced when physical actions make vibrating sound sources; it is necessary to observe that the same source can produce sound effects perceived as simple or complex.

Recent research on the perceptual organization of the auditory scene has been reiterating that there is a relatively limited number of types of acoustic cues that signal the constitution of the scene in its components. These cues indicate various attributes of the scene, regulating the possibilities of their apprehension by the individual. The understanding of what happens in the scene will also result from the perceptual intent and cognitive and cultural resources that the perceiver involves in the process. The central question here is how acts of apprehension—musical orienting responses—can signal the presence of cues (be it a simple event, a point grouping or the starting point of a more extensive sequential grouping), from what the processes of selection and segregation of the musical auditory scene will begin.

What types of acoustic cues provoke orienting responses in the music experience? Considering both the task-defined and process-oriented paradigms, I propose a primary classification of fundamental attributes of musical acoustic clues in four categories. The *tonal* category considers the sound contents related to the perception of determined (or relatively determined) pitch and the conditions of compatibility between the tonal materials of the components of the music scene due to continuity, homogeneity, regularity, and symmetry. The *textural* category considers both the envelope of sound intensity and the spectral behavior (timbre) of the auditory scene events and the density of the stream, concerning the complexity of segregation. It occurs, because the listener perceives joint and common changes of these parameters as constituting clues for fusion and the sequential grouping of scene components, whereas independent and dissimilar (not "parallel") changes tend to signal potential stream segregation. I should recognize a *temporal* category, since sound events rarely start or disappear at the same moment, and therefore, the perceptual system assumes that components of the scene perceived as precisely synchronous must be fused as elements of the same event. On the other side, asynchronous components tend to generate "movement" and be grouped sequentially. Lastly, the *topographic* category, considering the emphasis given to the spatiality of the scene components, a mapping of positions in the phenomenal space of the musical stream, which emerges in the act of listening when the attentional process overlaps the event spatial position to the event.

Conclusion

What I am discussing is not a conceptual model that allows us to anticipate—in the form of rules—"what" will be identified by musical orientation responses as more significant events in a given musical stream. The model developed here has the objective of revealing which events of the musical stream would have stood out as acoustic cues for the perceptual system and examining the reasons why such events would achieve this prominence. Besides, it investigates how the processes of perceptive organization develop from that and result in the musical understanding declared by a listener. Whether the model may or may not offer significant resources for compositional or interpretive elaboration is the subject of further investigation.

In the experience of music, the listener has his performance restricted by the transience of musical events that flow in sound complexes in general of remarkable potential of stimulation. The hypothesis that underlies the conceptual model under development in the present study is the musical orienting response can be considered the trigger for the construction of the music understanding in the act of listening. I think the cognitive operations provoked by the following changes of attentional focus throughout the listening experience constitute a crucial point for the investigation of the musical understanding. This understanding will be completed with the selection of the events for the confrontation with memorized cognitive schemes, thus conditioning the production of meaning. The musical meaning is intimately associated with tensions, whose perception is regulated in the interaction of affordances of the musical text and skills of the listener. I argue that the process of conceptualizing our understanding maps the

tensional narrative of the music we experience. This narrative consists of acoustic cues related to tonal, textural, temporal, and topographic factors of the musical auditory scene. The listener's orienting response to specific attributes of the musical stream implies an excludable choice of acoustic events that will determine a most stable process of selecting the configurations. So these configurations will be schemed, generating the preconceptual understanding of the experience. I believe that the conceptual descriptions of this understanding can reveal both the script of orienting responses occurred in the course of listening and the interdependent perceptual dimensions that predominated in the overall understanding of the piece of music or each of its sections.

The development of a research protocol that aims to attest the different dimensions of imaginative production involved in the hypothesis presented here should consider: (1) attentional processes based on "event" (musical object) and on "movement" (in the phenomenal space of the stream); (2) the class of bottom-up parameters (commutative events) that regulate attentional control; (3) the connectivity principle governing the partitioning of a musical stream by "contours" and "regions"; and (4) the sensorial transients of the musical stream related to changes of tonal, textural, temporal, and topographic content of the sonic components of the stream.

If the hypothesis discussed in the present study is valid, it is essential to investigate how the acoustic cues mentioned above are conceptualized in terms of what I have been debating since *O Ato da Escuta e a Semântica do Entendimento Musical (The Act of Listening and the Semantics of Musical Understanding)* (Nogueira, 2004). When we experience the musical stream, we appropriate it in three concurrent dimensions of imaginative production: a) categorizing its distinctive sonic traces in the form of "movements" from the variability of the sonic state of the stream; b) producing formal images profoundly stylistic, resulting from habituation and, hence, from the recognition of invariance, recurrence, and contrast of patterns; and c) establishing a communicative exchange between the imaginative aspects of the mind and the virtual symbolic predicates of the object of listening, which implies tensions, contrasts, and intentions.

Therefore, I believe that a conceptual model based on the overlapping of linguistic and commutative acoustic cues, that is, on the comparison between the conceptual understanding of a given musical segment and the mapping of the possible orienting responses that condition the understanding stated by the listener, can reveal essential perspectives of the semantic path that he or she performed. This calls for the development of an experimental protocol that involves both processes of identification of perceived and relevant acoustic cues in a given musical experience—regulated by their potential discrepancies in the stream, as well as by the schematic inferences of situated and culturally determined listeners—as monitoring of significant neurophysiological changes during the experiment, in order to corroborate the results of these processes.

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