

## Semiotic Niche Construction in Musical Meaning

Pedro Atã et João Queiroz

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### Résumé de l'article

Selon la sémiotique pragmatiste de Peirce, le sens (sémiose) n'est pas un concept réifié, mais une puissance à engendrer des interprétants. La sémiose est un processus dynamique triadique, sensible au contexte (positionné), relatif à l'interprète (dialogique), se déployant matériellement (incarné et diffus). Bien que sensible au contexte et se déployant matériellement, son milieu n'est pas bien cerné par la notion d'environnement. Inspiré par les concepts biologiques, nous suggérons que le milieu propre à la signification est une *niche*. Nous élaborons une conception sémiotique de la signification musicale qui met l'accent sur la localisation des signes musicaux dans des niches sémiotiques.

# Semiotic Niche Construction in Musical Meaning

Pedro Atã & João Queiroz  
Federal University of Juiz de Fora

## I. Introduction

Meaning is the object of investigation of semiotics, the “formal science of signs” as defined by Charles S. Peirce (*CP* 2.227).<sup>1</sup> His definition of Semiotics and his pragmatic notion of meaning as the “action of signs” (semiosis) have had a deep impact in several fields (see Freeman 1983; Fetzer 2004; Freadman 2004; Hookway 2002; Queiroz & Merrell 2009; Queiroz *et al.* 2011). Speculative Grammar, a branch of Peirce’s theory of sign, is dedicated to the empirical studies of the nature of signs as they emerge and develop, and the conditions that determine the sign’s further development, its intrinsic properties, and its interpretation (*CP* 2.83). It is concerned with sign relations, the necessary and sufficient conditions for representing, and classification of different possible kinds of representation and how they merge with one another (Houser 1997 : 9).

Differently from internalist views that conceive meaning as communicative intent (Bach 1999), Peirce’s pragmatic semiotics tells us that meaning (semiosis) is not an infused concept, but a power to engender interpretants (effects on interpreters). In concert with this idea, semiosis is a triadic, context-sensitive (situated), interpreter-dependent (dialogic), materially extended (embodied and distributed) dynamic process. It emphasizes process and development (Queiroz & El-Hani 2006). It cannot be dissociated from the notion of a situated agent (potential or effective). It is context-sensitive in the sense that it is determined by the network of communicative events within which the interpreting agents are immersed with the signs (Queiroz & Merrell 2009). It is both interpreter-dependent and objective, but is not a thing or an entity. Meaning is not in the sign,

in some talking head (intracranial or neuronally-based system of signs or symbols), in the referent of the sign, or in the medium by which the sign is transmitted to its potential receiver and interpreter.

Although meaning is context-sensitive and materially extended (situated, embodied and distributed), its *locus* is not well-captured by the notion alone of a physical *environment*. Inspired by biological concepts, we suggest the locus of meaning to be a *niche*, instead of an environment. In ecology, while ‘environment’ indicates the physical habitat of an organism, ‘niche’ indicates not only the organism’s ‘address’ but its ‘profession’ (Odum 1959), *i.e.* its ecological role and way of life, or, in a more modern definition, a niche is an imaginary n-dimensional hypervolume whose axes correspond to several ecological factors for the welfare of the organism (Hoffmeyer 2008). Extending the concept of ecological niche to cognition, the notion of “cognitive niche” stresses the environmental offer of opportunities (and boundaries) for thought as a major process in cognitive development. A cognitive niche can be understood as materially extended sets of problem spaces that demand or select a set of cognitive abilities. The construction of niches has been related to the enhancement of problem solving activities (Clark 2008), cultural evolution (Laland & O’Brien 2011) and the birth of language (Clark 2006; Sterelny 2008; Bickerton 2009).

In this work, we develop a semiotic account of musical meaning that emphasizes the *location* of musical signs in *semiotic niches*. In section 1, we define semiosis as medium for the communication of a *semiotic form*. In section 2, we see examples of semiotic forms in the investigation of musical meaning. In section 3, we argue that semiotic forms are made available in semiotic niches through the process of niche construction. In the final section, we identify some consequences of this model for the investigation of musical meaning.

## II. Meaning (or the Action of Signs) According to Peirce

First and foremost, Peirce’s semiotics is grounded on a list of categories – Firstness, Secondness, Thirdness – which corresponds to an exhaustive system of hierarchically organized classes of relations. This system makes up the formal foundation of his philosophy (Parker 1998) and of his model of semiotic action (Murphey 1993 : 303–306). In brief, the categories can be defined as : (1) Firstness : what is such as it is, without reference to anything else; (2) Secondness : what is such as it is, in relation with something else, but without relation with any third entity; (3) Thirdness : what is such as it is, insofar as it is capable of bringing a second entity into relation with a first one in the same way that it brings itself into relation with the first and the second entities.<sup>2</sup>

As it is well-known, Peirce defined semiosis as an irreducible triadic relation between a Sign, its Object and its Interpretant. We will hereafter refer to this triad as S-O-I. That is, according to Peirce, any description

of semiosis involves a relation constituted by three irreducibly connected terms, which are its minimal constitutive elements (MS 318 : 81; CP 2.242). In Peirce's words :

My definition of a sign is : A Sign is a Cognizable that, on the one hand, is so determined (*i.e.*, specialized, *bestimmt*) by something other than itself, called its Object, while, on the other hand, it so determines some actual or potential Mind, the determination whereof I term the Interpretant created by the Sign, that that Interpreting Mind is therein determined mediately by the Object (CP 8.177).

Peirce (see De Tienne 2003; Bergman 2000) also defines Sign as a medium for the communication of a form or a habit embedded in the Object to the Interpretant, so as to determine (in semiotic systems) the interpreter's behavior :

[...] a Sign may be defined as a Medium for the communication of a Form. [...] As a medium, the Sign is essentially in a triadic relation, to its Object which determines it, and to its Interpretant which it determines. [...] That which is communicated from the Object through the Sign to the Interpretant is a Form; that is to say, it is nothing like an existent, but is a power, is the fact that something would happen under certain conditions (MS 793 :1-3. See EP 2.544, n.22, for a slightly different version).

In short, a Sign is both "a Medium for the communication of a Form" and part of "a triadic relation, to its Object which determines it, and to its Interpretant which it determines". If we consider both definitions, we can say, then, that semiosis is a triadic process of communication of a form from the Object to the Interpretant through Sign mediation (see figure 1 below).

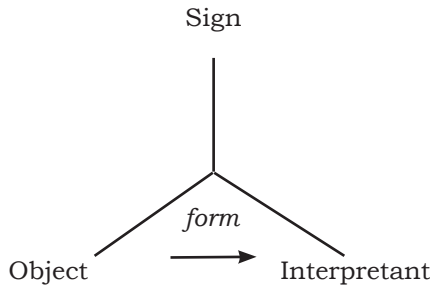


Figure 1

Figure 1 : Sign (S) as medium for the communication of a form embedded on the object (O) to the interpretant (I). A sign can be an external artifact, as well as a mental representation. The object is that for which the sign stands. The interpretant are the effects caused by the relation between sign and object to an interpreting mind.

In Peirce's works, form is defined as having the "being of predicate" (EP 2.544) and it is also pragmatically formulated as a "conditional proposition" stating that certain things would happen under specific circumstances (EP 2.388). It is something that is embodied in the Object (EP 2.544, n. 22) as a habit, a "rule of action" (CP 5.397, CP 2.643), a "disposition" (CP 5.495, CP 2.170), a "real potential" (EP 2.388) or, simply, a "permanence of some relation" (CP 1.415).

### III. Examples of Semiotic Forms in Musical Meaning

Investigations of musical meaning have used notions such as schemas, patterns, templates and conceptual metaphors to account for how heard sounds are framed as meaningful structures. In our Peircean-inspired terminology, such notions correspond to semiotic forms. We are aware that the notion of semiotic forms is being applied to a broad scope of phenomena, but we are concerned here more with a logical-phenomenological level of analysis that examines conditions for the emergence of meaning than with specific instantiated mechanisms of this logic : the focus of the present work is on the semiotic *locus* of these structures – which we will explore in the next section – and not their functioning. In this section we briefly introduce examples of concepts in the research of musical meaning that we characterize as semiotic forms.

Kendall (2010) stresses the fact that listeners make associations among things, and that these can be related to typical patterns or schemas. These schemas are central to the effort of listeners to discern meaning (2010 : 63-64). An example is how listeners are able to discern musical events. According to the author, listeners make use of an "event schema" that help them not only to listen in terms of events, but also to access past experiences in terms of a history of events. For example, continuous felt experience of energy flow dynamics in a musical passage can be discerned and remembered as musical events and be ascribed general labels such as "rough, bumpy, grainy, smooth or flowing" (*ibid.* 2010 : 66). Note that such labeling rests on the assumption that adjectives commonly used to describe qualities of texture can be used to describe qualities of sound. We refer to this assumption here as the "texture metaphor".

This event schema can be regarded as a semiotic form that is communicated from O to I through S as depicted in Figure 2 :

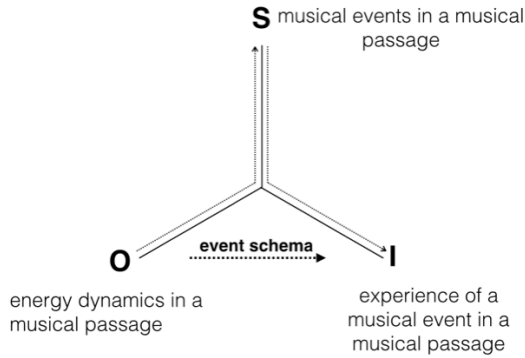


Figure 2

Figure 2 : The “event schema” (semiotic form) is communicated, through a musical event (sign), from the energy dynamics of a musical passage (object) to the listener’s experience of musical events (interpretant). In an alternative description, an event schema, embedded in the energy dynamics of a musical passage, allow these dynamics to be regarded as musical events and experienced as such. More details about the nature of this kind of embedment will be given in the next section.

The “texture metaphor” that allows a retrieving a musical event in memory due to labeling it as “rough” is also a semiotic form as depicted in Figure 3 :

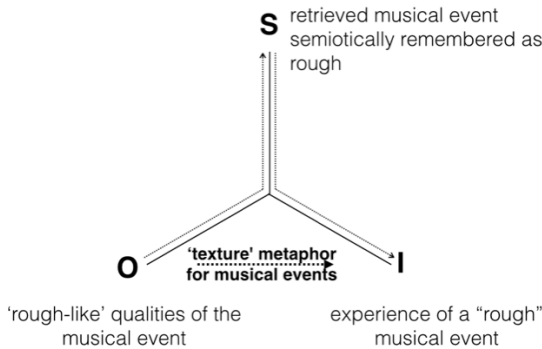


Figure 3

Figure 3 : The “texture metaphor” (semiotic form) is communicated, through a retrieved musical event (sign), from the “rough-like” qualities of the musical event (object) to the listener’s retrieved experience of a “rough” musical event (interpretant). In an alternative description, the

texture metaphor embedded in the rough-like qualities of the musical event allow such these qualities to be retrieved as a musical event remembered as rough so as to produce the experience of a “rough” musical event.

Lakoff & Johnson (1980 / 2003 : 3), stressed the importance of “conceptual metaphors” for human cognition : “our ordinary conceptual system, in terms of which we both think and act, is fundamentally metaphorical in nature”. Conceptual metaphors operationalize a target domain in terms of a source domain. Johnson & Larson (2003) apply the Theory of Conceptual Metaphors to the cognition of musical motion, arguing that musical motion is metaphorically conceptualized as physical motion :

Our claim is that people have no robust way of conceptualizing musical motion without metaphor and that all reasoning about musical motion and musical space inherits the internal logic of such metaphors. If this claim is correct, and if the source domain for musical motion is motion in space, then the ways we learn about space and physical motion should be crucial to how we experience and think about musical motion. (2003 : 68)

The authors consider three ways through which we experience and learn about motion : (a) we see objects move; (b) we move our bodies; (c) we feel our bodies being moved by forces (Johnson & Larson, 2003 : 68). These three ways give rise to three main metaphors to conceptualize musical motion : the “moving music” metaphor, the “musical landscape” metaphor and the “music as a moving force” metaphor.

The moving music metaphor describes musical events as objects that move past a stationary hearer from front (future events) to back (past events). Examples given by the authors include expressions such as “Here comes the recapitulation”, “The strings slow down now”, and “The music goes faster here” (69). The musical landscape metaphor conceptualizes music as a three-dimensional environment through which the hearer moves. Future events are the landscape ahead and past events are the landscape already crossed. This metaphor accounts for expressions such as “We are coming to the coda”, “Let’s see, where are we in the second movement?”, “The melody rises up ahead” (71). The metaphor of music as a moving force is based on the experience of being physically displaced by substances and processes such as water and wind currents or large objects. In the metaphor, music becomes the substance that acts upon the hearer. This metaphor accounts for conceptualizations of music as something that “blow you away”, “carry you along”, “take you on a roller coaster ride”, or make you “swing” (75).

The conceptual metaphors can be modelled as semiotic forms as depicted in Figure 4 :

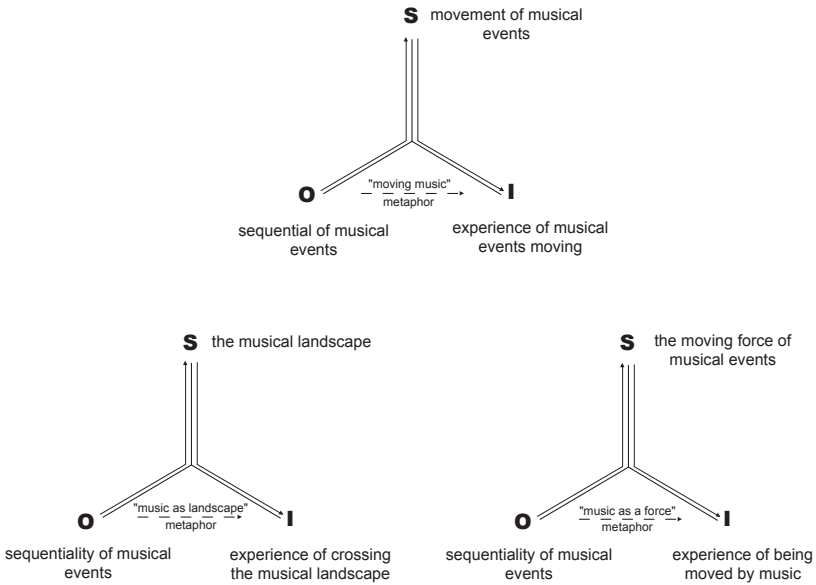


Figure 4

Figure 4 : Semiosis of conceptual metaphors of musical motions. 4A : The “music as motion” metaphor (semiotic form) is communicated, through the “movement of musical events” (sign), from the sequentiality of these events (object) to the experience of events moving past the hearer (interpretant). In an alternative description, the music as motion metaphor embedded in the sequentiality of musical events allow these events to be regarded as movement so as to produce the experience of observing the music move. 4B : The “music as landscape” metaphor (semiotic form) is communicated, through the “landscape of musical events” (sign), from the sequentiality of these events (object) to the experience of crossing the musical landscape (interpretant). In an alternative description, the musical landscape metaphor embedded in the sequentiality of musical events allow these events to be regarded as a landscape so as to produce the experience of crossing such landscape. 4C : The “music as a moving force” metaphor (semiotic form) is communicated, through the “moving forces of musical events” (sign), from the sequentiality of these events (object) to the experience of being moved by music (interpretant). In an alternative description, the music as a moving force metaphor embedded in the sequentiality of musical events allow these events to be regarded as moving forces that produce experience of being moved by music.

The premises of our approach (that meaning rests on the action



of contextually dependent, materially extended signs, as presented in section II) entail that semiotic forms – whether conceptual metaphors, event schemas or other theoretical concepts – are situated in some *locus*, where they are available as semiotic resources that can be recruited by interpreting minds. Meaning is shaped by the availability of these semiotic resources. Under this conception, the examination of the locus where these semiotic resources are available as well as the process that make them available become a fundamental part of the investigation of the meaning of something. In the following section we delve into this examination through the notions of semiotic niche and semiotic niche construction.

#### IV. Musical Niche Construction

In biology, the niche of an organism indicates its ecological role and way of life. A niche is an imaginary n-dimensional hypervolume whose axes correspond to several ecological factors for the welfare of the organism (Hoffmeyer 2008). Recently, Clark (2006 : 370) suggested that we are immersed in *cognitive* niches structured by language – “by materializing thought in words, we structure our environments, creating ‘cognitive niches’ that enhance and empower us in a variety of non-obvious ways”. Biologists and philosophers of biology have suggested other categories : Hoffmeyer (2006), mentions a “semiotic niche”, which can be defined as an environment built by “semiotic artifacts”; he later stressed that the term “semiotic niches” embraces “the totality of signs or cues in the surroundings of an organism – signs that it must be able to meaningfully interpret to ensure its survival and welfare” (2008 : 13). Farina (2008) suggests a “semiotic landscape”, which differs from the Uexkullian concept of Umwelt, or “phenomenal world”, and focuses on that which is made available physically in the environment in the form of signals, information and affordances (opportunities for action); Hutchins (1999) proposes the term “mediating structures” to refer to representational entities and processes whose manipulation confers new cognitive abilities and provides new problem spaces.

A niche develops and transforms over time. This transformation is often caused by ecosystem engineers (Jones *et al.* 1994) that alter their environment and ecosystem. Niche Construction Theory (Scott-Phillips *et al.* 2013; Odling-Smee *et al.* 2003) stresses the transformation of niches by organisms as having a major role in evolution, establishing a non-genetic system of inheritance that shapes selective pressures creating a feedback loop between organisms and niches. Examples include the construction of dams by beavers which reinforces an aquatic niche that selects for further adaptations fit for it (Pinker 2010 : 8995). In humans, examples include animal husbandry as basis for selection of lactose tolerance (Clark 2006 : 62).

We suggest that this biological evolutionary process can serve as

a model for cultural evolution and meaning development, avoiding the main problems usually found in attempts to use Darwinian evolution as a metaphor for cultural evolution (see Gabora 2015). In this case, we are dealing with semiotic niche construction : interpreting minds (analogous to the organisms in ecological niche construction) act locally according to sets of opportunities and boundaries for the generation of meaning, their action frequently alters these sets, which in turn feeds back into the interpretation activity and the mind. In other words, semioses depend on the availability of semiotic forms to generate interpretants through signs, and as semiotic activity transforms signs and semiotic forms, it evolves new interpretants.

The semiotic niche serve as the locus where semiotic forms are available as resources for semiosis. As we have seen, semiotic forms are embedded in the object of the sign (O in S-O-I). In our examples (above), the “event schema” is embedded in the energy dynamics of a musical passage, the “texture metaphor” is embedded in the rough-like qualities of a musical event and the “musical motion as motion in space” metaphor (in each of its three different possible instantiations) is embedded in the sequentiality of musical events. However, this may sound odd. How can an event schema be embedded in the energy dynamics of a musical passage? How can a texture metaphor be embedded in the qualities of a musical event? How can the musical motion as motion in space metaphor be embedded in the sequentiality of musical events? They are there not in the physical properties of musical passages and events *per se*, but in the role played by physical properties of musical passages and events to individual minds or communities of minds. A role which, because of niche construction with its feedback loop between minds and artifacts, constitutes the reasons and conditions for the musical passages and events to have semiotically evolved the way they did. That is, the “event schema”, the “texture metaphor” and the “musical motion is motion space” metaphor situatedness (“being there”) in musical passages and events is not only situatedness in an environment, but situatedness in a constructed niche.

## V. Final Comments

Our approach suggests that examinations of musical meaning involve the following questions :

- i. How the musical niche which the piece occupies is structured and shaped by musical artifacts?
- ii. What are the specific semiotic forms and features involved in the semiosis of the piece
- iii. How these forms and features act in the identified niche and how they participate in niche construction

This framework re-conceives dichotomies such as aural versus mimetic, sinesthetic *versus* pure, programmatic *versus* absolute, concrete

*versus* abstract as different strategies for establishing meaning relations (S-O-I) in music. These different strategies are situated in musical semiotic niches as semiotic forms that are developed in the process of niche construction. Following Peircean semiotics, we conceive musical meaning as a social-cognitive dynamic process. This process is context-dependent (situated), interpreter-dependent (dialogic), materially extended (embodied), and emphasizes process rather than product, development rather than finality.

With this framework in mind, musical meaning can be treated as system of relations between the signs (musical pieces themselves) and the semiotic forms which are part of semiotic (musical) niches but nevertheless are situated in the signs themselves because of niche construction. Since a semiotic form has the nature of a materially extended conditional proposition, the question of whether a certain quality of a musical piece is objectively present in the piece or is culturally constructed makes no sense anymore : it is objectively present in the piece because it is culturally constructed and vice-versa.

## Notes

1. Following a scholarship tradition, Peirce's works will be referred to as *CP* (followed by volume and paragraph number) for quotes from *The Collected Papers of Charles S. Peirce* (Peirce, 1866-1913); *EP* (followed by volume and page number) for quotes from *The Essential Peirce* (Peirce, 1893-1913); *MS* (followed by the number of the manuscript) for quotes from *The Annotated Catalogue of the Papers of Charles S. Peirce*; and *SS* (followed by page number) for quotes from *Semiotic and Significs : The Correspondence between Charles S. Peirce and Victoria Lady Welby*.
2. For further on categories, see Hookway (1985), Murphey (1993), Potter (1997).

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## Abstract

According to Peirce's pragmatic semiotics, meaning (semiosis) is not an infused concept, but a power to engender interpretants. Semiosis is a triadic, context-sensitive (situated), interpreter-dependent (dialogic), materially extended (embodied and distributed) dynamic process. Although meaning is context-sensitive and materially extended, its locus is not well-captured by the notion of an environment. Inspired by biological concepts, we suggest the locus of meaning to be a *niche*. Here, we develop a semiotic account of musical meaning that emphasizes the location of musical signs in semiotic niches.

**Keywords :** Musical Meaning; Semiotic Niche; Niche Construction; C.S. Peirce.

## Résumé

Selon la sémiotique pragmatiste de Peirce, le sens (sémiose) n'est pas un concept réifié, mais une puissance à engendrer des interprétants. La sémiose est un processus dynamique triadique, sensible au contexte (positionné), relatif à l'interprète (dialogique), se déployant matériellement (incarné et diffus). Bien que sensible au contexte et se déployant matériellement, son milieu n'est pas bien cerné par la notion d'environnement. Inspiré par les concepts biologiques, nous suggérons que le milieu propre à la signification est une *niche*. Nous élaborons une conception sémiotique de la signification musicale qui met l'accent sur la localisation des signes musicaux dans des niches sémiotiques.

**Mots-clés :** Signification musicale; niche sémiotique; construction de niche; C.S. Peirce.

PEDRO ATÃ is a student at the Post-Graduate program in Languages, Culture, and Arts at the Federal University of Juiz de Fora, Brazil. He is a researcher of the Iconicity Research Group and assistant editor of the *Commens Digital Companion to Charles S. Peirce*. His interests include distributed cognition, semiotic theory of mind, creativity, and abduction.

JOÃO QUEIROZ is a professor at the Institute of Arts and Design, at the Federal University of Juiz de Fora, Brazil. He co-edited two special issues of the

journal *Semiotica* : “Diagrammatical Reasoning and Peircean Logic Representations” (2011) and “Abductive Inference” (2005). He is co-editor of the *Commens Digital Companion to Charles S. Peirce* together with Mats Bergman and Sami Paavola. His academic interests include Peirce’s philosophy and semiotics, situated and embodied cognition, and abductive inference.