Knowledge Construction in Music Listening: Deixis as a Cognitive Tool

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ABSTRACT

Traditionally, music theory has stressed the analysis of musical artefacts as objective entities. More recently, the field of musicology has seen the emergence of ‘music cognition’, but even this approach espoused an ‘objectivist’ and ‘realist’ conception of dealing with music. This paper stresses the importance of the music user besides the music and argues for an ‘experientialist’ approach as against a merely ‘conceptual-symbolic’ approach to music cognition. The latter is characterized by ‘distancing’ and ‘polarization’ between the cognizer and the object of cognition; the former is ‘dynamic-vectorial’ and ‘directive’ in nature, stressing the ‘field of pointing’ rather than the ‘symbolic field’ of meaning.

The field of pointing—commonly known as the deictic field—is likely to provide valuable tools for the listener’s making sense out of the perceptual flux in gathering the objects the listener is pointing at. Two questions can be raised here: (i) how does an individual listener delimit these denotable things as signified? and (ii) what are the relations between these entities? The questions are related to ‘listening strategies’ rather than to an objective analysis of the music in taking seriously the idiosyncrasies and subjectivity of each individual music user.

Keywords: knowledge construction, music listening, deixis, deictic space, route-description, cognitive maps

1. DEIXIS AND DEICTIC ELEMENTS

In order to consider the delimitation of denotable things, it is useful to introduce deictic elements in our descriptive vocabulary [12] and to rely on deictic terms as words that ‘pick out’ or ‘point to’ things in relation to the participants in a speech situation [5]. These words are related to the notions of indexicality and pointing and their correlates—such as ‘deixis’, ‘demonstrative’, ‘ostention’—and are used in the same way as Bühler [4] talks about ‘pointing words’ as opposed to ‘naming words’

The concept of ‘deixis’ goes back to Bühler who drew an explicit analogy between gestural and linguistic means for showing direction or place. He presented as a main thesis that deictic expressions refer to a deictic field of language whose zero point—the Origo—is fixed by the person who is speaking (the I), the place of utterance (the here) and the time of utterance (the now) [4].

Deixis, as a source of reference, locates individual elements in context, rather than simply tagging them. It has its origin within the speaking situation, with the meaning of deictical expressions depending crucially on when, where and by whom they are used. As such, each ordinary speech situation can be systematized in terms of personal, spatial and temporal deixis (the socio-spatio-temporal axes) [10]. Deictic expressions, therefore, have to be defined with reference to the speech event, its participants and its settings [9].

Deictic procedures, further, focus the hearer’s attention towards a specific item of the deictic space [8] and realize a form of joint attention, a sharing of overlap in the focal attention of the parties of a referential exchange. As such, the concept of pointing acts as a heuristic tool for sense-making, both as a primitive marking system and as a mechanism of selection. The means for doing so comprise a set of procedures, varying from evolved linguistic devices such as anaphora (referring back to text) and deixis (referring back to context) to simple ostentive pointing [3].

2. DEICTIC AND INDEXICAL ELEMENTS IN MUSIC

Deictic devices stress the role of the actual situation and the typical context of utterance in providing socio-spatio-temporal anchoring. As such they are related to the concept of indexicality and the notion of pointing which entails a process of singling out the elements that are eligible for denotation. But also the notion of reference is important here. It allows an operational description of space/time moments and their relations to a reference point. Deixis, in fact, is centered with the position of utterance as the centre of the act of communication and the time of utterance as the time of coding [9].

Dealing with music, accordingly, can be described in deictic terms, conceiving of music and listeners in terms of a referential exchange. Listeners, in fact, experience the music as a sequence of sounds which are presented to the senses through a temporal window that constitutes the centre of a system of coordinates. Like speakers in an act of communications, they can use their current situation for anchoring referential acts in space and time [10]. As such, they should be able to hold step with the temporal unfolding of the sounding music and to give an adequate identification of the place and time in its unfolding. This is the identification problem in deictic reference which must solve a number of problems such as setting up a common deictic space, fixing a basic reference point (the
The concept of deictic space will be explained below. The fixation of a reference point, however, is another major topic of concern. Music, as a temporal art, presents itself as a sequence of instantaneous states which are perceived by the listener at each moment through the window of acts of focal attention. In order to have access to the music as a whole, however, the listener must have access to the flow of the musical discourse as a whole, where parts may be re-taken up and anticipated. The listener, in this view, must be able to refer back and forward in the musical unfolding, somewhat analogous to the use of anaphora in a text—referring back (catadexis) to things just treated (this, that...) or to things that are to be treated immediately (anadeixis) [8].

This synoptic overview is exemplified most typically in the visual approach. The interrelationships between spatial and temporal decoding, however, are complex. A possible starting point is Lakoff’s metaphorical treatment of time as space. ‘Time’ is understood in term of things (entities and locations) and motion, and the observer functions as a deictic centre with the present time at the same location, future times in front of and past times behind the observer. As to the’ motional’ aspect, there are two possibilities: times are entities that are moving with respect to the observer or the observer moves with respect to time ([17] and [23] for a musical analogy). The approach is exemplified in figure 1.

![Figure 1. Music as motion.](image)

The distinction is related to the observer’s listening strategies, especially with respect to his/her ‘windows’ on the time-line with, on the one hand, a kind of 'panoramic' listening with the music unfolding and the listener as a stationary centre and, on the other hand, a kind of focused scanning of the temporal unfolding. The former represents the music at a glance, reducing its sequential aspects to a simultaneous image, the latter keeps step with the discrete particulars and idiosyncrasies of its unfolding.

Both modalities can be approached in an operational way by relying on the concept of ‘resolution’, which, according to Godoy, offers the possibility of “thinking a musical object in different temporal representations, from “real time” versions to extremely compressed, i.e. “instantaneous” or “synoptic” kinds of representations, which have also been called “outside time” representations of musical objects ” [11: p.11]. What matters in this approach, is the emergence of relatively stable forms on the basis of a rather unstable, complex and distributed substrate, allowing a “quantal orientation” of meaning [11: p. 54]. It brings us to the grasping of a meaning out of a flux with the possibility to interpret “something as something” and to give it some semantic weight. It is a powerful epistemological tool which allows us to conceive of the act of mental pointing as a tool for sense-making in the act of listening.

### 3. POINTING AS A DEICTIC DEVICE

The act of pointing is a primitive marking system for singling out the noteworthy. It can emancipate itself from an object-oriented movement (merely grasping) to an act of pointing as an internal reconstruction of an external operation [27]. This process of internalization can go so far as to ‘mentally pointing to things’ that are not physically present. Such an act of pointing—externally or internally reconstructed—mostly begins with the emergence of a kind of quality in combination with an insistent particularity, e.g. ‘this is important’, ‘that is difficult’ [28]. As such it presents a heuristic guide for sense-making which allows the listener to conceive of perceptual elements in terms of salience, value, valence and semantical weight, somewhat related to the mechanism of cue abstraction [6] which focuses attention on salient elements that are prominent at the musical surface and summarize the sequences from which they arise. As such they provide key structures that play a foreground role in the musical work and help to grasp its design.

The multiplicity of facts, however, requires a selection with respect to the possible objects of denotation, and this, in turn, requires the notion of relative importance. We thus take as an essential aspect the construction of reality and the elevation of some entities to a special level of prominence within predications. This ‘designation’ is one of the pivotal constructs of cognitive grammar, as advocated by Langacker [18], but it is essential also for all constructivist claims of reality. To quote Varela: “...all of these items that we come to consider more or less permanent must, at some point, have been isolated and “individualized” in the field of our experience. This isolating and individuating necessarily had to be achieved by us, for it is we who say that we are aware of..."
This singling out of entities is dependent upon the conceptual organization of the parties of a referential exchange. It demands that both speaker and listener know three things about objects: that they have an independent existence, apart from speaker and listener, that they can be individuated and that they belong to classes [5]. One can question the first assumption (independent existence), since it challenges the more modern conception about cognition and categorization. The act of singling out, however, is important, as is obvious from the use of pragmatic anaphora (deictic expressions accompanied by a pointing gesture, e.g. ‘I bought that [pointing] last week’).

Pragmatic anaphora refer to designated objects (things), but also to other ontological category features as places, directions (paths or trajectories), actions, events, sounds, manners, amounts and numbers and all entities that can be raised to the level of identity and individuation. It is possible, of course to apply them also to the realm of music. There is, however, a difference between ‘categorical’ (the perceptual ‘event’) and ‘auditory’ perception (the ‘acoustic properties’) in listening to music. The former is related to the more global aspects of consciousness, the latter is related to the more experiential consumption of the time-varying properties of the sounding music [25].

Pointing—as a deictic tool—can be used to deal with this distinction: it can be directed to delimited segments of the musical unfolding rather than the more abstract kinds of structures encountered in some music theory. Continuous or analog representation is rate-dependent and time-consuming, discrete-digital representation is proceeding in a much more economic way, reducing temporal unfoldings to single representations with an all-or-none character and which can be dealt with also in a symbolic way.

Both representational formats are complementary to some extent: dealing with music is dependent upon the continuous sonorous display which proceeds in linear time as well as on its symbolic and discrete counterparts. Music, in fact, can be considered as a collection of sound/time phenomena which have the potential of being structured. As such, it entails processes of discretization of the sonorous unfolding, which involve, in turn, a “quantal aspect” of perception [11]. This allows us to conceive of music in geometric terms as a kind of distributed substrate with discontinuities and focal allocations of semantic weight.

4. POINTING AS A PREDICATION PROCESS

In pointing at something this thing is used as an ostensive component. It is an important tool in language learning and in providing the names of identifiable objects [2]. Pointing, however, is also predicative, if at least there is some generality to be ascribed to the entity that is pointed at. Predication, further, is either direct or mediated, somewhat analogous to the problem of immediate and represented knowledge and the distinction between ‘direct knowledge’ and ‘symbolism’ as advocated already by Whitehead [28]. The question of ‘presentational immediacy’ is important here in setting out the borders between perception and consciousness, with the latter involving complex mediated processes that supplant the immediacy of natural perception [27].

This combined ‘experiential’ and ‘mentalistic’ approach is likely to be fruitful also for the listening process. It is useful, however, to rely on additional theoretical grounding and especially the concept of processual predication, as advocated by Langacker, can be useful here. It gives an operational description of the temporal evolution of a situation, and involves a continuous series of states that represent different phases of the process as occupying a continuous series of points in conceived time. The span of time during which the evolution is tracked is referred to as its temporal profile [18]. Episodic nominalizations, on the other hand, refer to just one single instance of the process.

It is challenging to apply these claims to the actual unfolding of the sounding music. Godoy, e.g., has argued to cultivate the global qualities of delimited segments of the musical unfolding rather than the more abstract kinds of structures encountered in some music theory. These global qualities are dependent on the size of the segment under consideration at any given moment, but they can only emerge on the basis of a distributed substrate, as a collection of more ‘elementary’ units in succession [11]. What matters is the recognition of the dual status of the musical substance as both having a ‘distributed substrate’ and a more or less ‘unitary’ emergent quality.

Starting from the actual unfolding of music through time, one can select and (mentally) point at delimited segments of this unfolding, extending their position in a time-series from discrete slices of time to larger temporal spans. As such, it is possible to establish means of obtaining knowledge at different temporal levels (a single tone, a phrase, an entire movement) and dependent upon the listener’s strategies it is possible “to move between different musical objects of different sizes, to ‘zoom’ and ‘pan’ both in and out and sideways and ‘filter out’ different kinds of information.” [11: p. 40]. The claims are somewhat related to Langacker’s conceptions about focal adjustments as ‘perspective’ and ‘abstraction’. The perspective taken on the scene, in fact, influences the object of our cognition. What is meant here are the problems of figure/ground alignment, viewpoint and the related problems of deixis and subjectivity/objectivity [18].
What really matters, however, is the process of recognition through identification and differentiation. It allows the cognizer to manage complex environments in substituting a conceptual order for a perceptual one and to move from mere recognition and identification to more abstract processes of categorization.

The process of recognition involves units and their relations that can be structured with reference to previous experience [18]. The latter serves as a standard for an act of comparison in which some facet of current experience functions as a target. If the difference between standard and target approximates zero, then the overall event is one of recognition; if the similarity is slightly schematic, then recognition amounts to categorization. It allows the listener to categorize and not to react to every stimulus as if it should have its own name.

With respect to music, however, the question is rather complicated. What are e.g. the units and the categories? And what kind of categorical judgments should be made (nominal or processual)? And what about the ontological and epistemological assumptions? Should we deal with musical categories in a ‘mentalistic’ or ‘experiential’ way?

The questions are related to the ongoing debate between classical (objectivist) and modern conceptions of categorization. There is no space to go in detail here. The special status of music as a temporal art, however, should be stressed, along with the role of mental pointing in allowing a gradual shift from mere pointing over classifying to identifying. Taking as a starting point the sonorous articulation through time—as a substrate for pure experience—it is possible to lay a categorization grid on the sonorous unfolding. This grid can be reduced to an existing grid of prototypes (a kind of lexicon of (pan)stylistic universals) but it can embrace variable categories (ill-defined categories without fixed boundaries) as well. Categories, however, must have at least some cue validity, in order to allow identification and differentiation.

Much has still to be done here, especially in the domain of music (see e.g. [20]). As such, there are three topics that are likely to be important for future research.

(i) There is, first, the difference between discrete and continuous categories. Most categorizations, as nominal predicates, refer to things, rather than to events. Music, however, is a temporal art, with musical things being events rather than things. The concept of processual predication is likely to be important here.

(ii) There is, second, the scope of predication. Music has temporal as well as atemporal aspects of organization, but in both cases there are many componental elements that must be handled at once. Langacker’s concepts of “sequential” and “summary” scanning are interesting here: “Summary scanning is basically additive, and the processing of conceptual components proceeds roughly in parallel. All the facets of the complex scene are simultaneously available, and through their coactivation [...] Sequential scanning [...] involves the successive transformations of one configuration into another.” [18: p. 248].

(iii) A third problem is the description of music, not in terms of perceptual properties, but in terms of schemas and frames. We only mention Lakoff’s “source - path - goal schema”: every time we move anywhere there is a place we start from (the source), a destination (end point), a path (a sequence of contiguous locations connecting the source and the destination) and a direction (toward the destination) [16]. It is not difficult to apply this to the act of listening.

5. MUSIC AS A DEICTIC SPACE: ROUTE-DESCRIPTION AND COGNITIVE MAPS

The process of mentally pointing to the music brings us to the conception of music as a deictic space. Such a space is set up mostly by summing up all possible denotata of local ‘deictics’ or localities (rooms, apartments, streets, cities, countries). But the denotata need not be localities. They can be abstract places in a train of thought as well, allowing the concept of deictic space to be broadened in order to give it a more abstract definition. To quote Klein: “In its most general sense, a deictic space is nothing but a set of elements provided with some structure (an order or a topology); its subsets or some of them, are the possible denotata.” [14: p. 163]. Deictic spaces, further, may differ in several of their characteristics, such as their elements or minimally discriminable units of perception, their subsets which are possible denotata, the kind of structure that characterizes the deictic space, the number of dimensions—one-dimensional (e.g. a train of thought), two-dimensional (e.g. a map) or three-dimensional (the space of visual perception)—, and a kind of metric (most deictic spaces have a concept of distance) [14].

It is arguable to conceive of music in terms of a deictic space. Music, in fact, can be considered as a sonorous unfolding through time, with the listener going from one place to another, or, as it commonly called in the technical jargon of route-description: ‘from here to there’ [14]. Listening, in this view, can enhance the referential exchange by working out route-descriptions of different kinds. The basic idea is simply to describe how to go from a starting point to a destination. Route-based techniques, however, allow the listener to navigate mentally through the music: to retrace or infer a route, to estimate the distance between the start and end nodes of a route or of the segments that make up that route, and to estimate the direction between the start and end nodes of the route or between various locations along its length [13]. In order to do so the listener should have access to a kind of cognitive representation of the area in question. This is a cognitive map which is the outcome of the structuring of previous and actual experiences and which can be used as a guiding tool for dealing with the music.
The concept of cognitive mapping is an interesting conceptual tool. It can be defined as the mental structuring process that leads to the creation of an overall mental image or representation of the space and layout of a setting [1]. It involves a tentative map, which indicates routes and paths and environmental relationships. Cognitive mapping research, further, focuses upon how individuals acquire, learn, develop, think about and store data relating to the everyday geographic environment and the actual knowledge acquired [7]. This information is useful to planners, mobility specialists and navigation aid designers but it can be helpful for the development of listening strategies as well.

Two options are possible here, somewhat analogous to the distinction between primary and secondary plans in providing route descriptions [14]: the primary plan involves the localization of a starting point and a destination. Building up this primary plan may be done in advance, or step by step (advance or stepwise planning). It is a first condition for each successful route description. The organizing principle of the secondary plan is that of an ‘imaginary journey’ through the primary plan from the starting point to a destination. During this journey certain points of the primary plan are selected and marked. This series of ‘fixed points’ form the skeleton of the final description [14].

Cognitive maps, further, are interpretative frameworks of the world. They exist in human minds and affect actions and decisions as well as knowledge structures. The cognitive map of space, e.g., is a structure of information which is physically unobservable and which is held in the mind to represent spatial knowledge [15]. Such a spatial map can be defined as the body of knowledge of a large-scale environment which is constructed by integrating observations gathered over time, in order to find routes and to determine the relative position of individual places [7].

The cognitive maps for listening may be differently structured for different listeners, but even if they are vague, incomplete, or even wrong in some respects, they may be very informative as to the way how individual listeners structure their own routes and how their attention may be focused on different objects. It allows a factual description of actual hearing strategies, but it provides operational tools for interfering in these strategies as well.

6. HALLMARKS AND SENSORY SNAPSHOTs

Building up cognitive maps entails the extraction of hallmarks and putting them together in some coherent way. Its utility is best demonstrated through tasks that demonstrate the map in action, such as wayfinding in a complex environment. Two strategies are possible here: an individual can use his/her cognitive map knowledge to guide the actions or he/she can use the cues in the environment [13].

The simplest way of constructing a cognitive map is to use the landscape landmarks. Common elements of the countryside (mountain, hill, rock, stone, valley, stream, island, lake, cottage, wood, field, grass, meadow, hedge, bush, path, cliff, coast, beach, dune, sea...) and outdoor objects (mailboxes, traffic signs, trees) are typical examples. But every other possible object of pointing can be useful here (objects, places, directions, actions, events ...). It is even possible to conceive of them not merely in terms of ‘perceptual attributes’ but also in terms of ‘functional qualities’ and ‘action words’ [19].

As such, the whole domain of cognitive map construction can be applied to dealing with music. It is related to the domain of data collection and analysis techniques, from simple (e.g. a sketch map) to complex (e.g. multidimensional scaling). The listener, then, can be considered as a navigator who is trying to find his/her way in a sounding environment. It is known that fewer landmarks are selected by bad navigators than by good ones and a navigator’s bad performance can be attributed to the inability to acquire enough information from the environment. Listening strategies, therefore, are related to the problem of acquisition of a cognitive map and its application in the process of navigation. In order to make these claims operational, we must consider the cues the listener extracts from the sounding environment. Much is to be expected here from the descriptive vocabulary of cognitive mapping research in 3D virtual environments [22] and the problem of wayfinding in large-scale virtual environments.

In order to make these claims operational, we propose a strategy which is centered on the concept of defining place as a sensory snapshot. A place is “wherever you are when you experience a given sensory image” rather than simply a set of Cartesian coordinates [21]. To create a cognitive map, the representation should involve the capturing and organizing of sensory snapshots together with a spatial information gathering strategy. A possibility for doing this is the ‘Space Structure Diagram’ which represents large-scale spaces using graphs [22]. In this conception of constructing virtual environments, space may be subdivided into functionally distinct regions, each of which is referred to as space-node, and which allows transitory relationships between them. Transit-boundaries provide interfaces between two space-nodes, with the possibility to enter (entries) and to exit them (exits). Views, further, are special points of views that reveal salient or landmarked sensory data of interest to the navigator within a given space-node. It is immediately clear that the generation of exits, entries and the creation of views allows us to capture and organize the pictorial representations of the virtual environment and to create a cognitive web. The application of this strategy to the problem of navigating through the music, however, still has to be done.
BIBLIOGRAPHY


