Musical Metaphor Revisited: Primitives, Universals and Conceptual Blending

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Abstract

The present paper builds on experimental results from earlier research to offer a new theoretical approach to the way elementary musical concepts are constructed. In an attempt to go beyond the frequent interpretation of the data by the Conceptual Metaphor Theory, the text proposes the utilization of the four-space Conceptual Blending model, with a reinforced role of the generic space, enriched by some contributions of Perceptual Meaning Analysis and Conceptual Semantics. In two sample analyses of typical conceptualizations of basic musical relations from my prior work with children I propose that the musical concept comes from blending the perceived physical properties of the stimulus (input space 1) and an appropriate experiential domain (input space 2). To produce an acceptable blend, both inputs must share a schematic topological structure, which in turn constitutes the generic space. The paper discusses whether some typical descriptions from input 2 reveal that this abstract structure can in fact be shared not only by the two input spaces in a single blending operation, but also by a number of typical blending networks that describe the same musical stimuli crossculturally. The proposed model aims to: (1) help further clarify the notion of the image schema and conceptual primitive, and (2) assist in the search for musical conceptual universals, by accounting for some crosscultural and crosslinguistic differences in the conceptualizations.

Key words: music, conceptualization, image schema, conceptual primitive, generic space, conceptual blending.

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This paper aims to provide an integrative theoretical framework for interpreting the growing number of experimental data on the way basic musical relations are conceptualized. Specifically, it proposes the four-space Conceptual Blending model, with a reinforced role of the generic space, to account for the complex image schematic structure deducible from particular conceptualizations. The organization of the text is as follows: In the first section I discuss why musical conceptualization is relevant to linguistic semantics and provide a short outline of its empirical research, with specific emphasis on two recent papers testing the problem with young and adult respondents (Antović, 2009a; Eitan & Timmers, 2010). In the second section I discuss the advantages and disadvantages of the frequent interpretation of such data within the framework of the Conceptual Metaphor Theory, and consider how approaches based on conceptual primitives, such as Perceptual Meaning Analysis and Conceptual Semantics, may assist in the appreciation of the experimental results. The third section proposes that the four-space model of the Conceptual Blending Theory, with a reinforced role of the generic space, can be a suitable approach for a more thorough interpretation of the empirical data. Two sample analyses of results from my earlier research are offered (the conceptualization of musical pitches and musical scales), followed by suggestions as to how some other responses gathered so far can be interpreted along the same lines. The fourth section discusses implications of this approach for further studies of (musical) conceptualization.

Introduction

How children build concepts is a big stumbling block of cognitive science. More formal approaches, dating back at least to the school of generative semantics, propose that concepts contain a variable set of 'atomic portions of meaning', usually labeled 'primes' (Wierzbicka, 1995) or 'conceptual primitives' (Jackendoff, 1990). These semantic building blocks are thought to create

lexical meaning compositionally. They need not themselves be fully innate, but are likely based on inborn cognitive mechanisms. In the field of cognitive linguistics, while not always rejecting nativism, most scholars think that our adult conceptualization is strongly conditioned by early sensory data. There are many candidates for the possible 'primary' sensory modality responsible for the construction of concepts: the broad notion of 'embodiment' (Lakoff and Johnson, 1999; Gibbs, 2006), visual perception (Arnheim, 1969; Sweetser, 1991), spatial cognition (Jackendoff, 1987; Landau, 2002; Mandler, 2005), or the experience of ‘force’ (Johnson, 1987; Talmy, 2000). These different positions irrespective, authors following this line of thinking seem to agree that most, if not all, conceptual patterns come from early inferences made by infants exposed to sensory stimuli, perhaps earlier than 6 months of age (Mandler, 1992).

Given the partly contradictory positions of these two large groups of theories, it would be of interest to see how experimental data from a somewhat understudied type of cognition may help corroborate one view or the other, or both. Music is an abstract, non-discursive cognitive domain, and the only way to approach it conceptually seems to be to use metaphor. Indeed, whether we talk of the simplest concepts from music theory, such as 'high and low' musical pitches, more complex constructions, e.g. 'overlapping progressions awaiting resolution', or fully referential descriptions, for instance 'the cadence which depicts the parting of the beloved', we use complex, metaphorical conceptualizations. This tendency is not specific to Western cultures. Though perhaps not employing the same domains as we in the occidental world do, other communities still have their own systematic, metaphorical vocabulary to describe music. People from different regions of the globe describe pitch relations, for instance, as parts of a 'bamboo' (Zemp, 1979), 'waterfall' (Feld, 1981), 'fathers and sons' (Ashley, 2004), 'stable and mad persons', even 'crocodiles and those who follow crocodiles' (Eitan & Timmers, 2010).

In addition to anthropological approaches, most empirical work on the conceptualization of music can be broadly described as either corpus-based (Adlington, 2003; Aksnes, 1998, 2002;

Ashley, 2004; Brower, 2000; Cox, 1999; Johnson & Larson, 2003; Saslaw, 1996; Spitzer, 2004; Zangwill, 2007; Zbikowski, 1998, 2002), or psychological (Cabrera & Morimoto, 2007; Casasanto, Phillips & Boroditsky, 2003; Lidji Kolinsky, Lochy, & Morais, 2007; Pratt, 1930; Roffler & Buttler, 1968; Rusconi, Kwan, Giordano, Umilta, & Butterworth, 2006 among numerous others). In particular, two recent studies have aimed to test 'musical metaphor' experimentally. In Antović (2009a) ninety 10-year-old children of two ethnicities and varying degrees of musical education were asked to verbally describe five basic musical relations (a high and low tone, a slow and fast succession of pitches, a soft and loud tone, a five-tone staccato and legato sequence, and an ascending and descending major scale). Responses turned out to be metaphorical and largely based on the visuo-spatial modality, however with occasional differences in conceptualizations. For instance, 'high and low' tones were often perceived as 'big and small' and 'thick and thin', while scales were equally going 'up and down', 'forward and backward', and 'towards a goal and back'. In a related study focusing specifically on pitch relations, Eitan and Timmers (2010) took an opposite approach: in one of four interconnected tasks, they exposed 63 Israeli students with various degrees of musical experience to conceptualizations of 'high and low' pitches available in numerous historical periods and non-Western contexts (ranging from 'active/passive' and 'alert/sleepy' over 'feminine/masculine' and 'grandma/grandpa' to 'light/heavy' and 'sharp/blunt' - 35 pairs in all). Their search for a possible deeper universal basis of pitch terms resulted in respondents correctly ordering antonym pairs offered, in almost all instances, in levels statistically above chance. While refraining from too broad conclusions, both studies propose that musical conceptualization is potentially based on some deeper perceptual modalities. In Antović (2009a) I suggest that for the five musical relations this is the 'visuo-spatial' modality, while Eitan and Timmers (2010) list that there might be at least three groups of schemas underlying pitch relations: verticality, size (magnitude) and intensity (as originating from pitch producing objects). The tactile grounding for pitch, among other musical elements, has also been considered recently (Eitan & Rothschild, 2011). The mentioned

articles agree that some form of embodiment may serve as a starting point in all these conceptualizations. The central question of the present paper, however, is more theoretical: can a sufficiently appropriate model be proposed from the pool of accepted semantic theories, such that it could preserve the importance of image schemas in the comprehension of music but also account for the hypothesized underlying similarities among various crosscultural musical conceptualizations?

The two highlighted studies, and also many earlier ones (Aksnes, 1998, 2002; Ashley, 2004; Brower, 2000; Cox, 1999; Johnson & Larson, 2003; Saslaw, 1996; Perlman, 2004; Zbikowski 1998, 2002) have embraced the theoretical framework of the Conceptual Metaphor Theory (CMT) to interpret the data. In further text, I would like to assess some advantages and disadvantages of the CMT approach to the conceptualization of music, and also propose that theories based on the notion of conceptual primitives, such as Perceptual Meaning Analysis and Conceptual Semantics, may assist in a more elegant interpretation of the experimental data.

Possible Theoretical Accounts

Conceptual Metaphor Theory

Originating from the seminal work of Lakoff and Johnson (1980), the Conceptual Metaphor Theory has provided an intuitive way to explain how abstractions are conceptualized by metaphorizing concrete, perceptually salient data, among other domains also in music. On this view, the very concept of 'musical structure', for instance, is already metaphorical, based on the conceptual metaphor 'MUSICAL ENTITIES ARE PARTS OF A BUILDING': here the relatively concrete domain of physical construction maps onto the abstract organization of music. By analyzing this metaphor and numerous others, the approach to music by CMT has provided a lot of insight on how two important constructs of cognitive linguistics – image schemas and embodiment – could lie at the basis of musical conceptualization, too.

However, the drawback of the Conceptual Metaphor Theory lies in its inability to explain possible similarities among apparently different musical conceptualizations, acquired either in anthropological research or in experimental studies. Consider, for instance, the frequent description of musical pitches as "low and high", "small and big", and "thick and thin" . There seems to be an intuitive notion that the three pairs of adjectives might have something in common on a more abstract level. Yet a CMT approach can provide only separate cross-domain mappings (Antović, 2009a : 196):

PITCHES ARE HEIGHTS → low and high

SOURCE DOMAIN		TARGET DOMAIN
Series of dots along the line	=	Musical scale
Low position	=	Low frequency
High position	=	High frequency
Vertical axis, proportion of lines	=	Key
Change of position along the line	=	Change of frequency

PITCHES ARE SIZES → small and big

SOURCE DOMAIN		TARGET DOMAIN
Spectrum of sizes	=	Musical scale
Smaller object	=	Low frequency
Bigger object	=	High frequency
Sphere, geometrical proportion	=	Key
Expansion of the sphere	=	Change of frequency

PITCHES ARE THICKNESSES → thick and thin

SOURCE DOMAIN		TARGET DOMAIN
Spectrum of thicknesses	=	Musical scale
Thicker object	=	Lower frequency
Thinner object	=	Higher frequency
Horizontal axis, width proportion	=	Key
Expansion of the axis	=	Change of frequency

What one gets are three independent analyses. While at least some common points are noticeable by virtue of just looking at the elements that map onto one another, the underlying

connections are not explicable by the tools of CMT. Note, however, that the problem does not revolve around *tools* only: a major epistemological assumption of CMT and early cognitive linguistics was that concepts (by analogy also musical concepts), though based on somewhat abstract preconceptual image schemas, are *purely* experiential and inferred from the observation of prototypical tokens (inter alia Rosch, 1975; Lakoff, 1987, later 'experiential realism', Lakoff and Johnson, 1999). In addition to this apparent rejection of nativism, the movement also argued against the atomism of many earlier approaches to categorization, from Aristotle over the logical positivists to semantics in the original generative grammar (including Lakoff himself from an earlier phase, e.g. Lakoff, 1971). It seemed at that time to such authors that the dismantling of concepts deeper and deeper towards abstractions, rather than reaching a small set of fundamental categories, failed to reveal anything at all. It might as well be that the reversion to the prototype approach was thus originally directed more against this *terminal atomism* of generative semantics than the possibility that postulated schematic structures could themselves be composed of units (inborn or not). Perhaps the reluctance of scholars to make this distinction has resulted in the image schema concept remaining underspecified to the present day (Hampe, 2005).

When conceptualizing music is considered, a standard CMT approach seems to stop halfway in explaining empirical data. While metaphorization based on embodiment is certainly an important process in creating musical concepts, the possibility remains that there is a common denominator beneath at least some mappings available crossculturally and crosslinguistically. The two experimental papers highlighted above do not go so far as to reject CMT in their interpretation. They do, however, attempt to find a subtle way to acknowledge that there must be something deeper behind the apparently different crosscultural conceptualizations. Eitan and Timmers suggest that "diverse cross-domain mappings of pitch exist *latently* beside the common verticality metaphor" and later speak in favor of "underlying dimensions" behind the responses (Eitan & Timmers, 2010: 419, italics mine). Likewise, not to criticize others, my study

with children has proposed a quest for the "universal basis of musical metaphor" (Antović, 2009a: 200), but theoretically remained in the realm of CMT. I have proposed elsewhere, however, that "more abstract connections should be sought in collaboration with other theories" (Antović, 2009b: 128). For instance, just saying that the differences in children's verbal responses come from different experiential patterns in their native languages/cultures/social milieus, though certainly true from a descriptive standpoint, restates the problem rather than solving it. What, if anything, motivates the children to provide different responses, and what, if anything, constrains the range of possible conceptualizations?

Beyond the Classical Image Schema Conception

Crosscultural empirical research has recently prompted some authors in cognitive linguistics to search for an extended definition of the image schema in order to account for differences in the ways particular languages construe lexical items and/or grammatical structures. Some examples may include “compound image schemas” (Kimmel, 2005), “mimetic schemas” (Zlatev, 2005), and “complex primitives” (Correa-Beningfield et al, 2005). Trusting that for an appropriate analysis of experimental results from musical conceptualization studies one should go still further in clarifying the image schema conception, I here wish to analyze the possible contribution of two schools vouching for 'conceptual primitives', Perceptual Meaning Analysis and Conceptual Semantics.

The experiential realism of cognitive semantics and conceptual primitives of more atomistic approaches to meaning are brought closer together (though not reconciled) in Perceptual Meaning Analysis (PMA). The system has been devised by Jean Mandler and associates as a notation for their abundant empirical data on how infants build early concepts (Mandler, 1988, 1992, 2005, 2010, in press). Mandler remains careful to assert that image schemas are experiential and not atomistic in the sense used in formal semantics. Yet “primitive in this sense means foundational. It does not mean that image schemas are atomic, unitary, or without structure” (Mandler, 1992: 591). The schemas seem to be primitive for infants acquiring concepts, but we adults can analyze

them into simpler units. She also adds (ibidem: 139) that schemas are experiential, but infants "come equipped" with resources that reduce them to a more abstract form. Thus, balancing between nativism and empiricism, and insisting on the spatial origins of the conceptual system, Mandler proposes a minimal set of about twenty such primitives, for instance THING, LOCATION, LINKED PATH, MOVE, and SEEING (Mandler 2010, in press).

In terms of the musical examples from my earlier study that I wish to discuss in the next section, some of Mandler's spatial conceptual primitives seem relevant to the comprehension of musical concepts. If anything, UP/DOWN is important in the typical Western conceptualization of pitch relations, while START PATH/END PATH is reminiscent of the underlying basis for understanding musical scales. Naturally, some conceptualizations will be difficult to fit into Mandler's system. “Thicker and thinner” pitches, that I originally discussed in terms of Turner's (1991) schema of EXPANSION, do not seem easily interpretable by PMA. Likewise, the notion of scales going “towards a goal and back” is hard to analyze without invoking intentionality. Yet one should note that Mandler's research focuses on infants, while the study I am about to reanalyze in the next section had 10 year-old participants.

To go still further, one can briefly discuss another approach to the meaning of concepts based on conceptual primitives. While retaining many epistemological features of generative linguistics (parallel architecture, the lexicon/grammar distinction, formal rules of inference, compositional concepts based on inborn capacities), Ray Jackendoff's Conceptual Semantics (Jackendoff 1983, 1990, 2002) provides some points of interest for cognitive linguists. Not much unlike Mandler, this author insists on the spatial origin of (most) concepts that we use. Jackendoff also claims that "the concept [...] must be some sort of *finite schema* that can be compared with the mental representations of arbitrary new objects to produce a judgment of conformance or nonconformance." (Jackendoff, 1990: 9, italics mine). The connection with Cognitive Linguistics is striking here.

In a way comparable to that of Mandler, this author proposes a few spatial primitives such as BE, GO, STAY, CAUSE, INCH(oative), EXT(ension), REACT, EXCH(ange), ORIENT and also prepositions such as IN, ON, TOWARD, FROM, BEHIND, AT, linked by elementary spatial relations (cf. the list in Gutierrez, 2001). In terms of the two musical examples whose analysis follows in the next section, it seems that the conceptualization of pitch relations and musical scales could be based on the following two functions from Jackendoff's system (Jackendoff, 1990: 43):

$$[\text{PLACE}] \rightarrow [_{\text{Place}}\ \text{PLACE-FUNCTION}\ ([\text{THING}])]$$

$$[\text{PATH}] \rightarrow \left[\left\{ \begin{matrix} \text{TO} \\ \text{FROM} \\ \text{TOWARD} \\ \text{AWAY-FROM} \\ \text{VIA} \end{matrix} \right\}_{\text{Path}} \left(\left[\left\{ \begin{matrix} \text{THING} \\ \text{PLACE} \end{matrix} \right\} \right] \right) \right]$$

The somewhat more formulaic notation provides a way to interpret the position of entities, situated in particular locations (such as pitches in a vertical, horizontal, or any other spectrum) and their change of locations (such as the metaphorical ‘movement’ of musical tones in scales, irrespective of this movement's vertical, horizontal or ‘teleological’ directionality).

In all, even though the three approaches differ in notation, terminology and, to a point, underlying epistemology, they all seem to offer useful tools for explaining the process of basic musical conceptualization in children. Along that line, the end of this section introduces the argument that I will attempt to defend in the central analysis that follows. The responses from the two experiments of interest make it extremely hard to accept the idea that various related conceptualizations of musical phenomena in different languages or cultures emerge as instances of metaphorical extension. Why would, for instance, "high and low" tones be any more ‘primary’ than "thick and thin" or "big and small" ones? Given the CMT mapping analysis, the interpretation that the conceptualizations have nothing in common is not plausible, either. Rather, at least some of them seem to be based on a more abstract set of features, grounded in image schematic

patterns. In search for a theoretical framework to encompass all these elements, one can draw a perhaps unexpected parallel yet again, now a direct quotation from one of the protagonists: "... cognitive linguistics tends to view cross- field parallelisms as derivational. [...] By contrast, I view them as parallel instantiations of a more abstract schema [...]. *Fauconnier and Turner (1994) propose a somewhat similar view in terms of a 'generic space'*" (Jackendoff, 2002: 360, italics mine).

Following this statement, in the next section I will reanalyze three typical conceptualizations of two musical stimuli obtained in my study (Antović, 2009a) in order to consider whether a combined theoretical approach could lead to some new insights. I would like to offer a framework that will be able to (1) preserve the image-schematic, embodied motivation behind the particular conceptualizations, but also (2) account for the crosscultural and crosslinguistic differences that regularly emerge in experimental work. The proposed model is based on the Conceptual Blending Theory with a notion of the generic space enriched by some insights of Perceptual Meaning Analysis and Cognitive Semantics.

Conceptual Blending as a Model of Musical Conceptualization

Blending and Music

Conceptual blending (Fauconnier and Turner, 1994, 1998, 2002) is hypothesized to be an all-encompassing multi-level cognitive phenomenon, providing underlying basis for a wide variety of human faculties, from the understanding of counterfactuals and metaphors over the mastery of language and mathematics to the appreciation of art. In essence, it proposes a network of at least four conceptual information packets, mental spaces (Fauconnier 1985), where two "inputs" interact in such a way as to create a "blended" space. In the blend, new meaning emerges, containing at least some information not present in the inputs. In addition, there is a "generic" space which hosts preconceptual topological elements common to both inputs: among other things, it allows for new blends to emerge based essentially on structures from previous blending operations. A functional theory of online meaning generation, broadly grounded in the connectionist epistemological milieu,

conceptual blending is most strikingly noticed (and easily explained) in somewhat unusual linguistic material, such as idiosyncratic counterfactuals or deliberate puns used in newspaper commercials. The more important insight that has become apparent in the fifteen odd years of the development of the theory, however, is that numerous "ordinary" phenomena may also be interpreted as instances of blending: complex numbers, telling the time, fictive motion, or even simple grammatical constructions. One of the fields in which the theory has provided some contribution is music cognition.

To my knowledge there are two lines of reasoning in the explication of musical phenomena based on blending. Zbikowski (1999, 2002) has proposed that music and text often blend to create emergent structures. For instance, if the word "trembling" is sung as a trill, the musical input space (the trill with its intramusical significance and perhaps connotations) and the text space (the word with its linguistic meaning) blend to create an effect which is not only augmented but also contains novel attributes, such as emotions invoked in listeners. This is known as ‘text painting’ and is arguably more structured than a simple onomatopoeic effect. The interesting argument given here by Zbikowski can be broadened to include other instances of musical referentiality, such as film music (Sayrs, 2003; Chattah, 2006), where the auditory material is conventionally followed also by visual extramusical context. Importantly, in such examples, the mapping goes *both ways* – from language to music, but also from music to language, which is one of the principal differences between Blending Theory and CMT (Zbikowski, 2009). The second approach to music by the Conceptual Blending framework has targeted a wider scope of phenomena with a purpose to explain how humans understand music on at least three levels (Kühl, 2007; Brandt, 2009). Brandt proposes that the entire human experience of music is recursive, based on successive levels of conceptual blending, accounting for at least three distinct types of musical appreciation – *formal*, *gestural/emotional*, and *referential*. On the first of these levels, the rhythmical structures and pitch hierarchies blend to create a 'melodic' level of representation, which then goes on to integrate with

the harmonic patterns in order to create a 'musical utterance' that would then project onto a 'base space'. On level two, this integrated intramusical experience itself becomes an input which can now blend with the gestural and semiotic components of our imagination while we listen to the music. This creates an internalized motoric simulation, a 'mental dance', which strongly relates the musical experience to the Lakovian notion of embodiment. Finally, on the third tier, the resulting embodied experience interacts with an extramusical context, giving rise to what authors often call musical 'connotation': a high level of meaning relating the music with our world of experience. In this classification, Zbikowski's instances of blending music and text would belong to level three blends.[1]

I wish to position my view on blending in musical conceptualization close to Brandt's level two – the simplest embodied musical experience which results in elementary musical metaphor. To accommodate various crosscultural instances of conceptualization, however, my analysis adopts a slightly modified view of the generic space, with some epistemological assumptions of Perceptual Meaning Analysis and a notation similar to that of Conceptual Semantics.

With that regard, the interesting connection with the generic space that Jackendoff proposes (p. 12) is not quite complete. The abstract schema that he is offering is typically based on innate capacities, it seems to be given prior to the conceptualization process, and aims to govern conceptual content that appears crosslinguistically (Jackendoff, 2002, chapter 11). In classic Conceptual Blending Theory, on the other hand, the generic space contains a shared constellation of preconceptual topologies, often an image schematic structure common to the two inputs. Yet it is not necessarily

[1] There has been some discussion in CBT on the number of mental spaces and the role of the generic space in blending operations. Some prefer to call the two inputs the "presentation space" and "reference space" (Brandt & Brandt, 2002). Instead of the generic space, there have been proposals for "ground"(Coulson & Oakley, 2005), or a six-space model, with a "base space" and "relevance space" (Brandt & Brandt, 2002; Brandt 2005, 2009). Conversely, Pagán Cánovas (2010) postulates an entire separate system, a "generic integration network", to account for possible underlying commonalities in seemingly diversified examples of conceptual integration (originally in the analysis of poetic motives). Since it reinforces the role of the generic space, my proposal remains in the traditional, four-space model.

available before the conceptualization process begins. More likely, the generic space emerges online from the interaction of the inputs, where its contents can become further abstracted, allowing for other conceptual mappings to be framed (Fauconnier & Turner, 2002, chapter 3).

The generic space that I am proposing here is somewhat reminiscent of what Fauconnier & Turner (2002: 296-298) call a global generic. It is coherent with the classic CBT approach in that (1) it contains a combination of interrelated image schemas shared by the conceptualizations from the two input spaces; (2) it is not necessarily inborn or available prior to the conceptualization; (3) it is not where the blending originates from, as this space likely borrows schemas from at least one of the inputs. Still, I claim that, (4) once it has been inferred by the researcher, the generic space can serve as a theoretical construct to predict the range of possible conceptualizations of the same musical stimulus in various cultural and linguistic contexts. In that sense, my departure from classical CBT lies in the proposal that the generic space does not only allow for *further* elaborations of the conceptual content (e.g. the upward movement along a musical scale, emerging, among other things, from the conceptualization of pitch relations as vertical). Rather, I suggest that the generic space also constrains *which other conceptualizations of the same musical stimulus* (e.g. the pitch relations alone) are, in principle, possible. This in turn requires a bit more abstract notation, which resembles Jackendoff's in form, though not necessarily sharing his rather nativist background.

In a related phenomenon, I also propose that this kind of approach may target the issue of cognitive *motivation* for typical musical conceptualizations. While there are numerous different crosscultural descriptions of musical pitches and scales, not any conceptual opposite is possible. For instance, one would hardly get a response that "the first note is more like an apple [and] the second more like a banana" (Zbikowski, 2002: 70). Some constraints are inevitable and the only question is how explicit they are. While conceptual semanticists would likely press for mathematically reducible innate primitives, conceptual metaphor theorists in turn refer to the relatively vague notion of embodiment, providing suggestions of various, sometimes unrelated, ways in which the two tones

resonating in the body can cause a link between the perceived stimulus and the emergent metaphor. While I basically accept the embodiment thesis, in an additional step I wish to specify the *kind* of embodiment that seems to work overall (for pitches and scales).

As a result, my methodological decision likely puts the proposed cognitive constraints somewhere between the strict nativist quest for universals of Conceptual Semantics and the somewhat liberal embodied relativism of Conceptual Metaphor Theory. The result is a middle ground between nativism and empiricism, probably closest to Mandler's 'compromise' view (Mandler, in press). In such an approach, an element is needed in the system to store these shared schematizations. I propose that this be the generic space, a bit reinforced since here (1) it contains sets of causally interrelated image schemas that (2) could in principle account for crosscultural and crosslinguistic variation rather than just allowing for further elaborations within the same cultural and linguistic context.

Two Examples

The first example that I wish to analyze by this system is the conceptualization of musical pitches one octave apart. In the original experiment (Antović, 2009a), young Serbian and Roma participants, with and without musical education, were played tones F5 and F6 and asked to describe what the first and what the second one was like. There was a total of 27 individual responses, subsequently coded into conceptual metaphors viewing pitches as heights, sizes, qualities, and forces. The commonest individual conceptualizations in all three participant groups were "low and high", "small and big" and "thick and thin" tones, apparently based on VERTICALITY and EXPANSION image schemas. In further text I consider whether these three verbalizations may have something in common on a more abstract level.

In the first example, the two pitches are conceptualized in a spectrum along a vertical dimension, storing the tones in a particular range. Low and high positions along this verticality schema correspond to pitches of varying frequencies, and the change of the position along this spectrum amounts to the change of frequency. In the second example, the pitches are understood as

a spherical object changing in size, which, when smaller or 'deflated', corresponds to low pitches, and, when bigger or 'inflated', amounts to higher ones. The expansion of the sphere thus maps onto the change of frequency. Finally, in the third example, the music again expands and shrinks, not radiating along a sphere, but rather becoming thicker or thinner along a linear dimension (width). The thicker object corresponds to a lower frequency, and the thinner object to a higher frequency. The different tones are now conceptualized along a single axis, whose expansion (‘thickening’) or contraction (‘thinning’) maps onto the change of frequency.

Different as they may seem on the surface, these three typical conceptualizations of musical tones are grounded in basic physical quantities, and view pitch relations as relations derived from force and magnitude. They can all be diagrammed geometrically, where the embodied motivation for the three combines force dynamic and spatial schemas (cf. Zwarts, 2010) (Figure 1):

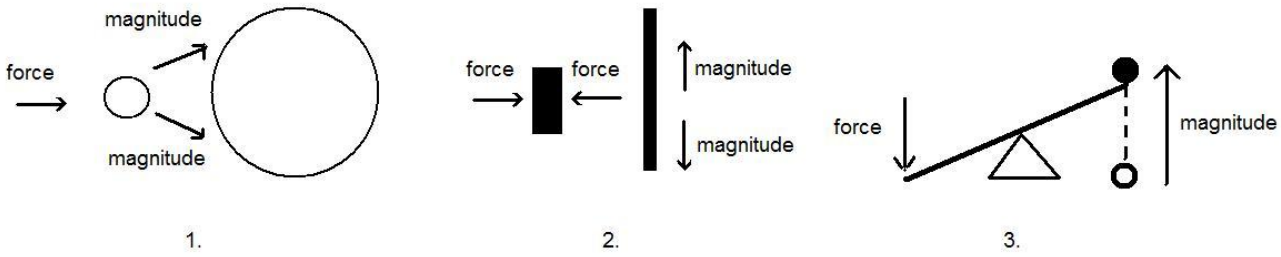


Figure 1: Force and magnitude as schemas underlying pitch conceptualizations

In the small-to-big example, a spherical object, for instance a balloon, is inflated as more air pressure is applied to it. This added tension (Granot & Eitan, 2011) results in an increased magnitude of the sphere, mapped on the higher frequency. In the thick-to-thin example, the pressure applied to a thick object, perhaps a piece of modeling clay, on both sides, results in its ‘thinning’, followed by elongation and thus increased magnitude. In the low-to-high example, to overcome gravity, some pressure or force needs to be applied for any physical object to be lifted from a ‘low’ to a ‘high’ position in space. Whatever way this is done, it results in an at least apparent increase in spatial magnitude. For instance, if a person is lifting a stone, the person is shifting from a squatting or bent

position to an upright one, and thus becomes ‘bigger’ in perceived size. Alternatively, if a lever is used to lift the stone, its getting from a ‘low’ to a ‘high’ position results in the increased magnitude of the imaginary line connecting the object’s new (elevated) position and its original position at the bottom of the lever.

Whatever form is assumed by this ‘musical spectrum’ in which pitches operate, the lower frequency tone is at one end of it, and the high frequency tone is at the other. The spectrum is experienced as a physical space in which tones of discrete frequencies are stored. The change of the tone means the change of the spectrum’s shape, from one extreme towards the other, caused by applying some pressure or force to the system.

Instead of providing three separate analyses by means of CMT, or assuming that all three are based on the conceptual metaphor MORE is UP[2], I will adopt a notation similar to that found in Conceptual Semantics and hypothesize a possible common basis underlying the utterances. Recall that for a similar relation Mandler offers the UP/DOWN primitives in the verticality image schema, and Jackendoff a bit more abstract system of conceptual primitives giving a FUNCTION to a THING relative to its PLACE in space. The two proposals do not seem to differ much from the standard image-schematic explanation of Cognitive Semantics. Therefore, if we label the two pitches X and Y and postulate that the three conceptualizations contain a set of interrelated schemas, "FORCE/MAGNITUDE", we get the following system:

[2] This is what Eitan and Timmers have done, but it results in a contradictory interpretation: "Importantly, pitch metaphors based upon the pitch-size correspondence may conflict with those based on the pitch-height analogy discussed earlier, since in the pitch-size association high pitch is 'less' (smaller) while in the pitch-height association it is 'more' (spatially higher)." (Eitan and Timmers, 2010: 407). In Antović (2009), I found the opposite correlation (smaller tones were ‘lower’ and bigger ones were ‘higher’) This apparent conflict could be avoided precisely if we do not presuppose that both conceptualizations are based on the conceptual metaphor "MORE is UP". Rather, the underlying dimension of force/magnitude provides more consistent results. If more pressure is needed to inflate a balloon in a small-to-big example, more pressure is also needed to squeeze a spherical object in one’s fist in the big-to-small conceptualization. Thus, essentially the same embodied motivation may lie beneath the two apparently opposite mappings.

Separate Schemas		**Interrelated schemas/primitives**
VERTICALITY	=	[$_{\text{Pitch}}$ FORCE/MAGNITUDE([Low X], [High Y])]
EXPANSION, AXIS	=	[$_{\text{Pitch}}$ FORCE/MAGNITUDE ([Thick X], [Thin Y])]
EXPANSION, SPHERE	=	[$_{\text{Pitch}}$ FORCE/MAGNITUDE ([Small X], [Big Y])]

Thus, in all three examples, the function of the pitch relative to its frequency seems to be conceptualized in terms of the basic schemas of force and magnitude, which are causally organized (the pressure results in the change in size) and have extreme values at the ends of a spectrum. Let me therefore make another step toward abstraction, and hypothesize a possible structure underlying the three verbalizations:

[$_{\text{Pitch}}$ FORCE/MAGNITUDE (Extreme position X, Y)]

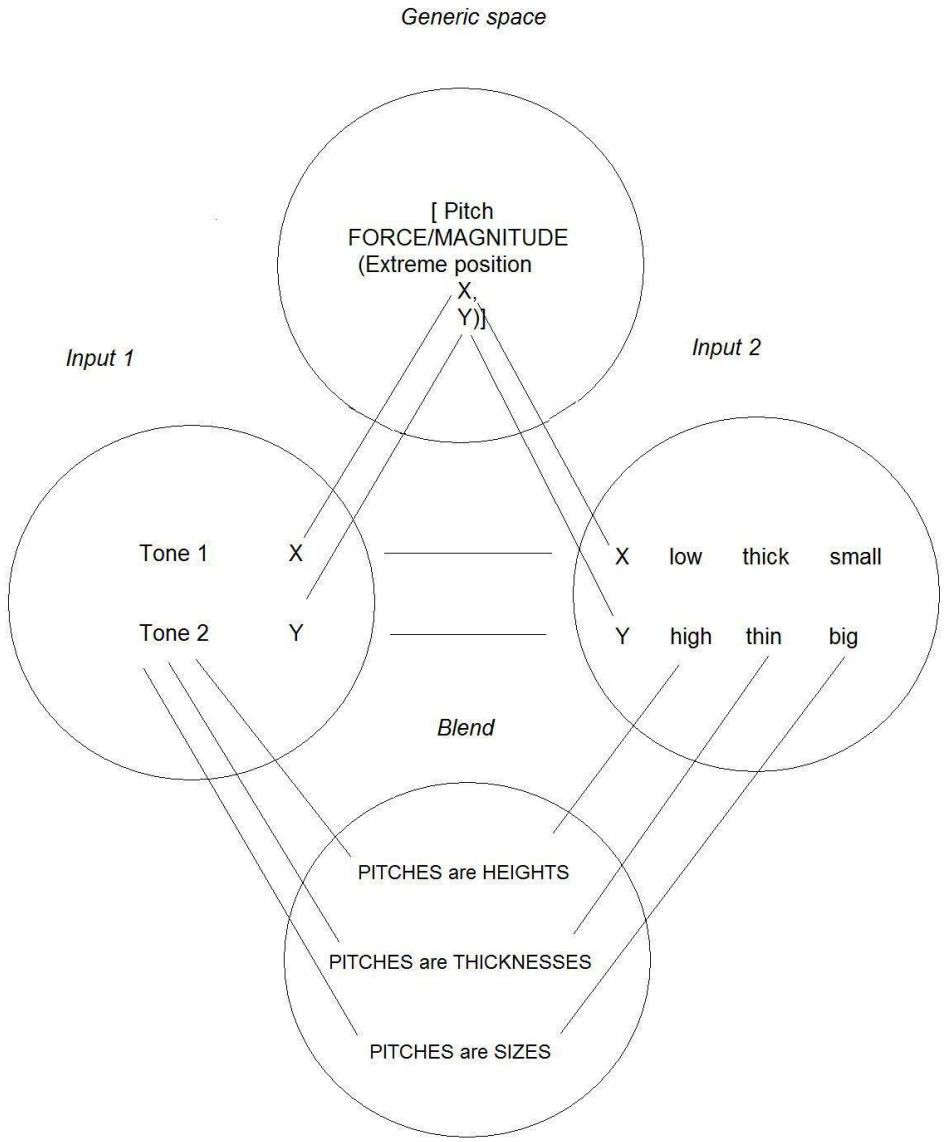
where X and Y map onto particular frequencies heard, and extreme position is what corresponds to their location in a musical spectrum, based on the interaction of force and magnitude.

While this notation resembles Jackendoff's rules of inference and conceptual primitives, I would like to stress that I partly diverge from the epistemology of Conceptual Semantics, in that: (1) the term 'primitive', if used here, should be interpreted in Mandler's sense: as an image schema which is interlinked with another schema in a coherent way; (2) these two schemas in the formula need not be innate and (3) the generic space and the schemas within it need not exist in the individual's mind prior to the conceptualization process. I *am* claiming, though, that the empirical data we have press for a more explicit discussion of the range of possibilities for the embodied grounding of this musical concept. I thus propose that in the blending process the generic space (1) stores the preconceptual structure with two interrelated image schemas, and (2) once there, reveals general constraints on the selection of the inputs for the given stimulus. The two input spaces should roughly correspond to the source and target domains of the original CMT analysis (target: the perceived structured musical pitches, source: the referential, experiential context describing them as heights, sizes or thicknesses). The difference of course lies in a much more dynamic, two-way interaction between

the spaces than in the original model. The perception of the physical change of frequency will thus trigger the conceptualization of the change (Input 1 -> Input 2), but in turn, the referential domain that the particular respondent chooses to metaphorize the relation between the two pitches will help him or her provide an online spatialization (and finally, linguistic description) of the perceived change (Input 2 -> Input 1). Therefore, the two input spaces influence one another, and it is not the case that the former just systematically maps onto the latter. Even more importantly, the musical input space itself (input 1, in CMT analysis "the target domain") is already a conceptualization based on embodied experience, and not a ready made set of two tones that need a "source domain" to be conceptualized at all. In other words, as cognitive musicologists have claimed for years now (Lerdahl and Jackendoff, 1983; Cross, 2003), music is *already an abstract mental construct*, and not a physically existing series of sounds. So, both the musical percept and its referential description are, in some sense, conceptualizations[3]: what enables their conceptual integration is most likely the structure of the musical input space that respondents intuitively infer, which can then be linked to an appropriate referential domain and represented more abstractly as a set of schemas in the generic space. The musical metaphor emerging in the blend will of course have selected elements of both inputs (the extreme values along the magnitude dimension, corresponding to perceived frequencies/antonyms describing them). The new quality that it provides is that in it the pitch system is perceived as based on orders of magnitude changed by applying some force to the system. Schematically, the analysis might look as follows:

[3] I use the term here in the sense close to Cognitive Grammar where not only semantic/referential but also grammatical structures are considered instances of conceptualization (after Langacker, 1999, in musicology Zbikowski, 2002, Kühl, 2007).

NETWORK ONE – GENERIC PITCH CONCEPTUALIZATION



Emergent property: pitch relations are based on the application of force resulting in a change of magnitude

What emerges from this network (more precisely, a system of three networks presented together for reasons of simplicity) is the idea that there is a 'distance' between the two tones, based on the metaphor of pitch relations as spatial relations, and grounded in a combination of force and magnitude schematizations. Importantly, the two are linked causally, as the application of force results in magnitude change. Why exactly these two and not some other image schemas remains an open issue. A possible hypothesis could claim that evolutionary pressure made it important for us to know

which sounds are produced by bigger and stronger objects or animals (Hauser, 1998: 479). This in turn may have helped the common pitch metaphors to develop in different cultural contexts.

As it may be, once the underlying basis is found, and the pitch system is seen as spatial and based on the interaction of force and magnitude, this can then open up the way for new networks to provide further, more complex musical constructions. One such instance, in which this blend becomes 'elaborated', is the second example that I wish to analyze in the present paper. It has to do with the notion of musical 'scales'. Here the conventionalized metaphor and its implicit conceptualization of movement cannot be avoided in naming the concept already. Indeed, why music 'moves' is a problem that has received much attention among music theorists affiliated with CMT. For instance, Johnson and Larson (2003) proposed "MOVING MUSIC", "MUSICAL LANDSCAPE" and "MUSICAL FORCE" as conceptual metaphors shaping the logic of musical motion. This proposal was later tested empirically by Eitan and Granot (2006), who inspected changes in pitch, tempo and loudness for the embodied experience of motion in adult speakers. Results suggested numerous tendencies, most notably musical abatements associated with spatial descent and musical intensifications related to increasing speed, rather than ascent. The study concluded that the link between music and motion could be much more multi-faceted than previously assumed. Similar findings were reported with children, albeit with a stronger tendency in this population to relate numerous musical phenomena to 'loudness' alone (Eitan & Tubul, 2010). In search of a theoretical explanation for the moving music phenomenon, Eitan (2010) suggests that the notion of anticipation should be more deeply considered, while Zbikowski (2008b) proposes a full-fledged analogue to linguistic construction grammar, and later calls upon four phenomena in contemporary cognitive science which could help shed more light on the issue, as follows: mirror neurons, simulation of experience, nonlinguistic constructs (such as image schemata), and analogy (Zbikowski, in press).

In the study of interest in the present paper, naive 10-year-old members of two linguistic and cultural communities, described a C major scale spanning one octave, from tones C5 through C6 and

back. For this stimulus, there were 38 separate responses in all, subsequently classified into conceptual metaphors that further specified earlier proposals of metaphorical musical motion, as follows: vertical motion, horizontal motion, and motion based on force. Once again, three most common individual conceptualizations will be given specific attention here: pitches going "up and down" (vertical movement), "forward and backward" (horizontal movement), and "to a goal and back" (teleological movement).

The CMT mappings for the three examples provide a strong sense of a possible joint underlying basis. In the first conceptualization, the musical scale is seen as a series of positions on a vertical continuum, where the change of positions along the verticality dimension corresponds to the change of pitches “along” the scale. In the second one, the same logic applies, except that the axis is horizontal, with tones along the scale going forward and backward, from one extreme pitch in the octave to the other. The final verbalization reveals a bit more complex system, where there is a sense of directionality in the conceptualization. In it the musical continuum is somewhat more abstract, yet it is still directed spatially, toward a goal (the “higher” C), from which one can get back to the beginning (start, the “lower” C).

It seems that a deeper system can be inferred in this example even more easily than in the previous one. In all three statements tones correspond to or move over points along an axis. Going in one direction implies that the pitches change toward the higher octave, while the reverse sequencing is experienced as the change back toward the lower octave. The only difference is that the motion is vertical, horizontal or more abstractly ‘directed' (toward a goal, thus teleological). A cognitive linguistic analysis can, of course, propose PATH or SOURCE-PATH-GOAL as the image schema underlying the three conceptualizations. Due to the clear verbalization of “start” and “goal”, I propose to treat only the teleological movement as a clear instance of SOURCE-PATH-GOAL, whereas horizontal and vertical movement could be considered instances of PATH. Other theories of interest in the present paper do not seem to diverge much from a standard cognitive

linguistic description: Jean Mandler offers START PATH/END PATH as the primitives responsible for this conceptualization, while Ray Jackendoff provides a formula in which a THING moves physically along a PATH, FROM/TO PLACES, and possibly also TOWARD, AWAY FROM them, and even VIA other PLACES. Since the constructs from the three theories are quite similar, let us again use the notation of Conceptual Semantics, and rename this function in music as an "eight tone-path", going eight tones in one direction, and then another eight tones back (or Pitch 8x2 PATH). Now we can interlink the FORCE/MAGNITUDE schematization needed to conceptualize individual pitches with the PATH schema needed for these pitches to span a certain range. We get the following system:

Separate Schemas		**Interrelated schemas/primitives**
PATH	=	$[_{\text{Pitch 8x2}}$ (FORCE/MAGNITUDE)/PATH ([Down X], [Up, Y])]
PATH	=	$[_{\text{Pitch 8x2}}$ (FORCE/MAGNITUDE)/PATH ([Backward X], [Forward, Y])]
SOURCE-PATH-GOAL	=	$[_{\text{Pitch 8x2}}$ (FORCE/MAGNITUDE)/PATH([Start X], [Goal, Y])]

Once again, more abstractly, all three verbalizations nicely conform to a deeper formula, based on the same set of three interdependent image schemas:

$[_{\text{Pitch 8x2}}$ (FORCE/MAGNITUDE)/PATH (Frequency, Discrete Distance X, Y)]

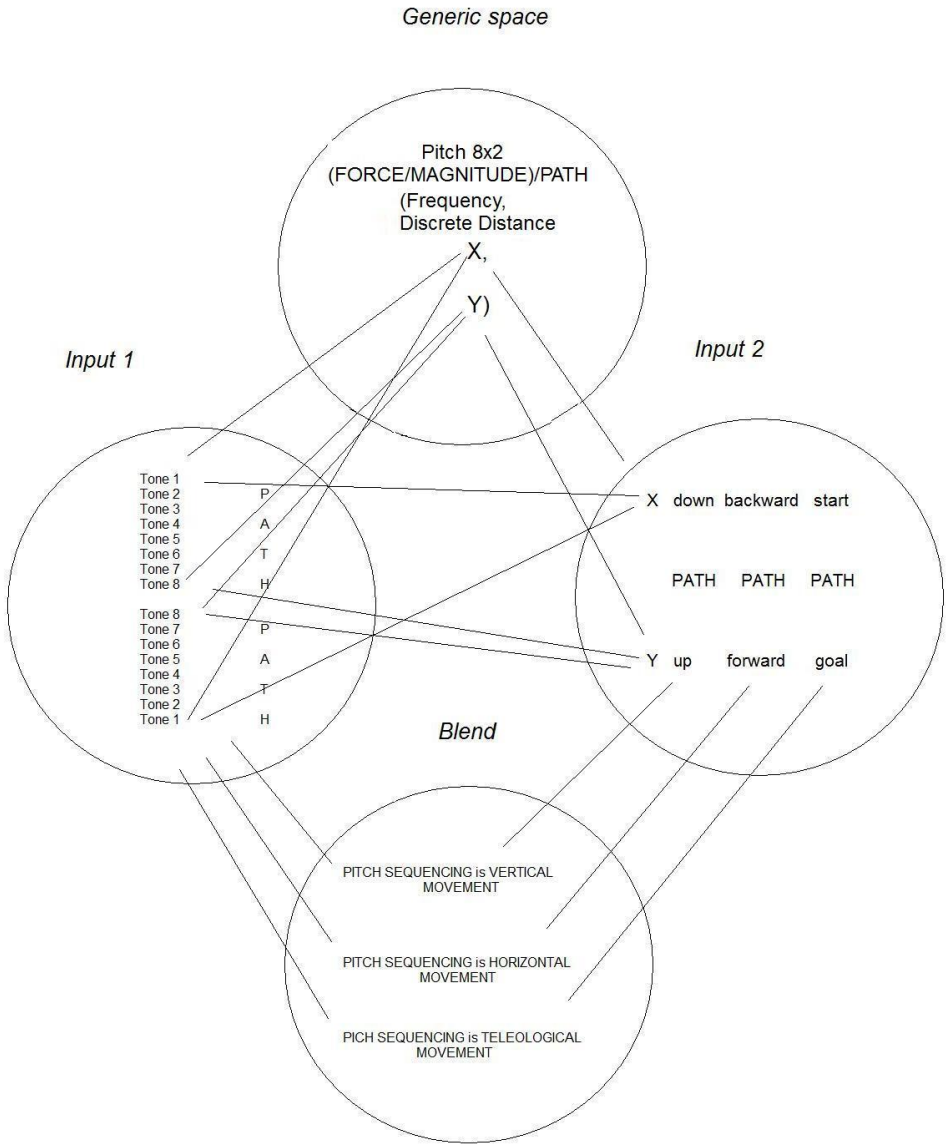
where the distance from one extreme element to the other (X, Y) is now instantiated in two discrete, ordered, inversely proportional successions of eight individual elements, realizing the image schematic notion of a path.[4]

Here, too, the three interrelated primitives (in Mandler's terminology) or causally linked image schemas (in the jargon of Cognitive Semantics proper) can be used as a preconceptual function

[4] The FORCE/MAGNITUDE dimension plays an important role in the three examples as some force has to be applied for the conceptualized pitches to start moving in any direction, thus increasing or decreasing the magnitude of the conceptualized continuum. Importantly, some other, less frequent conceptualizations from empirical studies can also conform to this pattern: four participants, three Roma (Antović, 2009) and one American (Antović & Bennett, in review), described the scale movement as going "towards the harder and towards the lighter", where the "force" segment of the underlying (FORCE/MAGNITUDE)/PATH schematization is even more easily noticed.

constraining the selection of the contents that can generally appear in the input spaces. Input 1 will contain the perceived musical material, i.e. the conceptualization of the successive change of eight pitches in the scale, in both directions (sixteen in all). Input 2 is experiential and contains referential concepts that best correspond to the intuitively inferred structure of the musical input. Here of course cultural, linguistic and individual differences may occur. Note that the musical space (Input 1) contains 16 successive pitches, 8 going in "one direction" and 8 "coming back". The reference space (Input 2), however, only contains the binary notion of "music going in a direction and back". In other words, out of the sixteen differentiated frequencies, the network labels only two extreme ones "relevant" and thus the musical space is mapped onto a reference space with only two values. The remaining 14 pitches are reduced to the idea that music is "moving". This is an instance of a typical blending operation: compression, perhaps based here on the so-called CHANGE or CATEGORY vital relations, where 14 entities "miraculously" become equal to motion, simplifying the resulting blend. It might be that the compression is made possible precisely due to the PATH topology coming from Input space 1. The embodied origins of such a topology can only be speculated. For instance, evolutionary pressure might have made it important for us to know not only what kind of object produces what kind of sound, but also to infer the direction of this object's movement based on the change of the sound it is producing (as in Doppler's effect, Changizi, 2011: 157). Ultimately, only the compressed notion of 'path' from Input 1 and the 'extreme locations' of the movement from Input 2 project onto the blend, creating the three musical metaphors. Again, the emergent property of the network is the musical scale conceived as a spatial system based on force and magnitude. However, in this example, there is an additional element that surfaces from the integration process: the idea that music 'moves'. Again schematically, I propose the following blending network underlying the three seemingly different descriptions of musical scales:

NETWORK TWO - GENERIC SCALE CONCEPTUALIZATION



Emergent property: music is spatial and it moves

As in the first example, this is a simplified presentation of three separate networks, built in such a way as to suggest some underlying properties possibly common to all three. Again, this blend could now be used as an input for a variety of further musical concepts involving the notion of scales and pitch sequencing.

For instance, the commonest responses describing the remaining three examples from my

previous study also suggest a possible underlying structure derived from the proposed schematizations. When played a soft and loud middle C, the children most commonly described it as "weak and strong", "thin and dense", and "letting go and pushing", likely based on a singular force dynamic schematization. "Slow and fast" succession of pitches was also "movement towards heavier and lighter tones" and "competition to arrive first", where compressed motion, again combined with a force dynamic schema (most obviously in the second example), may serve as a potential deeper commonality. Finally, a legato and staccato sequence were typically described as "short and long", "abrupt and linked", and "hopping and walking". These last three conceptualizations also employ the metaphor of musical movement, likely originating from schemas mutually related as in the scales example: (FORCE/MAGNITUDE)/PATH. However, yet another elements seems to be present here: the LINK schema, where individual elements of music that move are either "disconnected" (short, abrupt and hopping tones) or "connected" to one another (long, linked, walking). The schema is also noticeable in conventional musical notation, as staccato is usually presented with dots ('punctuation') and legato with a solid curve ('slur') above or below the notes. Thus, the underlying generic set of schemas for this final example could look as follows: [(FORCE/MAGNITUDE)/PATH] + {LINK}, where the optional schema of LINK serves to *modify* ('articulate') the musical movement.

All things considered, it seems that a blending framework, with a notion of the generic space somewhat elaborated to account for possible common schematic structure, could be a good tool for studying elementary musical conceptualization in the future. As continued research with children of various ethnic groups, language backgrounds and also children with visual impairments is in progress, I hope that further studies will provide more empirical grounds for such a claim.

Conclusions

The goal of this article was to propose that the four-space model of the Conceptual Blending Theory, enriched by some insights of Perceptual Meaning Analysis and Conceptual Semantics,

could prove more comprehensive than the cross-domain mapping system of the Conceptual Metaphor Theory in interpreting some typical conceptualizations acquired in a study with ten year old children. In my opinion, the suggested system preserves some advantages of earlier approaches: the belief in abstract patterns underlying conceptualization of CS, the primitives of PMA and CS, image schemas of PMA and CMT, conceptual metaphor of CMT. It is also devised in such a way as to suggest improvements to the three models: for instance, CMT has no tools to account for underlying conceptual similarities, PMA focuses on infant data and has difficulties explaining emergent structure, while CS does not pay enough attention to the cultural and contextual grounding of the experiential information contributing to the final concept.

The model proposed here can take all these elements into consideration to explain how some musical metaphors emerge in children and also how seemingly different metaphors may result from a similar set of constraints. Upon the conceptualizer's perceiving the music, the constraints appear in the generic space. I have tried to define them abstractly enough to account for some different verbalizations, but hopefully not too abstractly to lose any explanatory power – in my view, some rules motivating the interaction of image schemas are necessary here and, at least in the notation, they might be reminiscent of more atomistic approaches to polysemy. Input space 1 views the musical percept as an instance of elementary conceptualization already, which somewhat diverges from the classical CMT approach in which the music is just 'waiting' for the experiential concept that would 'map' onto it. Input space 2 provides for the referential description which the particular respondent draws from his or her personal, linguistic or cultural circumstances – this is somewhat overlooked in the Conceptual Semantic approach, and perhaps in many analyses based on the generative paradigm in general. Finally, in the blend, we see how a novel conceptual property *emerges* from the system – in the two examples, this is the distance between the two pitches, a spatial organization based on force and magnitude, and then the notion that the pitches may additionally move, based on the schematization of path. I think that is the key advantage of the

approach since in a different analysis, including that based on CMT, we would have to *start* from this emergent property forgetting that we were supposed to *explain* it in the first place.

In essence, I hope the proposal is advantageous in that it (1) proposes a much more dynamic relationship between the perceived music and the referential system we use to describe it, and (2) provides a *motivation* behind the construction that young respondents tend to make through the notion of the generic space. If, with the help of experimental data, the construct of the generic space is further developed, this approach can also help (3) further specify the concepts of the image schema and/or conceptual primitive, and (4) account for some crosscultural and crosslinguistic differences coming from the work with subjects. A neat side effect of this analysis is found in the fact that the blending approach can suggest how more complex musical concepts may gradually emerge from simpler instances of conceptual integration, which then become inputs to further networks. The increasing complexity of blends in which children from my study conceptualized pitches, scales and musical movement could be comparable to that of complex numbers, as explained in detail by Fauconnier and Turner (2002). Thus, CBT may be useful in explaining how some constructs of a music theory conceptually evolve in children.

There are of course still many unanswered questions. The first caveat deals with the methodology of the experiments reanalyzed in this paper, as they requested explicit linguistic descriptions of music. When a verbal response is introduced as an intermediary between the auditory stimulus and the abstract concept, the question remains how much this description reflects an authentic musical experience, and how much it is artificially induced by the experimental paradigm. At least some of the verbalizations may have been a result of 'thinking for speaking', as described in the work by Dan Slobin (e.g. Slobin, 1996). This should be clarified in further work, perhaps with nonlinguistic responses (e.g. drawing lines and circles, selecting objects of different size for pitches, applying different pressure to tones heard, by sighted and blind participants).

For the second issue, the problem of universals remains a serious stumbling point between

approaches broadly based on cognitive and generative frameworks. With the data we have, I am certainly *not* claiming that there are substantive universals in children's musical conceptualization, even less that they are based on inborn properties. What I *am* suggesting is the middle ground: that some common instances of musical conceptualization acquired in experiments are perhaps based on more abstract principles which can be theoretically approached by a combination of *some* constructs used in cognitive and conceptual semantic approaches (namely interrelated image schemas in a somewhat more formulaic notation). The universalist thesis would only be fully corroborated if *all* examples available in the literature (e.g. at least the 35 pitch conceptualizations that we have) could be classified as instances of a single conceptual phenomenon, constrained by the same set of principles. Further empirical and theoretical research will tell if this is plausible. At present there are three possible answers: maybe the cognitive linguists that claim there is a "universalist bias" (Kimmel, 2005) in language research are right – in the sense that such an all-out quest for crosscultural cognitive universals, if it provides anything at all, results in very general constraints devoid of explanatory power (Evans & Levinson, 2009). Perhaps, however, there are ways to find commonalities behind even fully disparate responses (from "expanding spheres" over "fathers and sons" to "crocodiles followed"). In that direction, the suggestion that such deeper connections do not lie in the generic space but entire separate "generic integration networks" might be of interest in further work (Pagán Cánovas, 2010). Most likely, I think, the answer will be somewhere in the middle: there will hardly be a fully universal account, but individual instances might be classifiable in a relatively small number of abstract groups. With the framework that I am proposing, and hopefully more experimental data, the pursuit of this moderate goal can give us further insight into how people conceptualize music. I hope to have shown that, perhaps with slight creative amendments, the Conceptual Blending Theory can be helpful in such an endeavor.

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