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The embodied and the cultural in the conceptualization of pitch space in Croatian

Most conceptual metaphors that conceptualize musical pitch rely heavily on human perception, images and experience structured through spatial and orientation image schemas such as the schema of VERTICALITY. The paper analyses conceptual metaphors that structure pitch relations in terms of vertical space, thickness and size as they appear in the Croatian musical terminology. The image schemas of VERTICALITY and SIZE are analysed within the conceptual metaphors PITCH RELATIONS ARE RELATIONS IN VERTICAL SPACE and PITCH RELATIONS ARE RELATIONS IN SIZE in order to define to what extent their motivation is embodied and universal, and what can be attributed to cross-cultural and cross-linguistic influences present in the creation and understanding of music terminology in Croatia.

Key words: conceptualization; music; pitch space; image schema; embodiment; music theory.

1. Introduction

Music has inspired a lot of research in the field of cognitive science, especially in cognitive psychology and neuroscience. The perception and conceptualization of music has been vastly studied within cognitive semantics, too, in particular two of

the most interesting aspects of music conceptualization in language: music as motion and the spatial conceptualization of musical pitch.

Most conceptual metaphors applied in the conceptualization of musical pitch rely heavily on human perception, images and experience structured through spatial and orientation image schemas such as the schema of VERTICALITY. The conceptual metaphor PITCH RELATIONS ARE RELATIONS IN VERTICAL SPACE, the universally used metaphor in Western music, maps the up – down spatial orientations onto the pitch continuum, and provides a system of metaphors used to describe pitch contour, gesture and musical space (Zbikowski 2002: 66f). The same conceptual mapping is also applied in the naming of human voice types, scale degrees, manual pitch representation (cheironomy), or in the representation of tonal relations (e.g. *ascending and descending fifth relation*).

Although the present metaphoric representation of the Western pitch space in terms of verticality, originating in Medieval Latin, is still the dominant mode of musical pitch conceptualization (Deutsch 2013; Park 2015), there are many languages that use other metaphors to refer to pitch relations. In some languages there is a metonymic connection between the process of music performance and the instruments used, which results in the attribution of small and large to the pitches typical of the musical practice. Musical pitch relations can also be described in terms of thickness or width (Dolscheid et al. 2013).

The paper presents an analysis of the conceptualization of musical pitch space and pitch relations as manifested in the Croatian musical terminology. Spatial and orientation image schemas applied in the conceptual metaphors that form the basis for the conceptualization of pitch relations, such as VERTICALITY, HORIZONTALITY, SIZE or PATH, are analyzed in order to see to what extent their motivation is embodied (Johnson 1987; Lakoff & Johnson 1999; Gibbs 2006; Kemler 2001), and what can be attributed to cross-cultural and cross-linguistic influences, e.g. from Latin and German. Examples of linguistic metaphors are extracted from a specialized corpus of historical and contemporary Croatian music theory texts that is used within a research project Conmusterm.[1]

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2. Theoretical framework and related research

Three major lines of empirical research can be distinguished concerning the conceptualization and perception of music: anthropological approaches (Zemp & Malkus 1979; Feld 1981; Ashley 2004), corpus based studies relying mostly on Conceptual Metaphor Theory (Adlington 2003; Aksnes 2002; Brower 2000; Cox 1999; Johnson & Larson 2003; Saslaw 1996; Spitzer 2004; Zbikowski 2002), and psychological research (Cabrera & Morimoto 2007; Lidji et al. 2007; Révész 1913; Roffler & Buttler 1968; Rusconi et al 2006; Zuckerkandl 1969) including experimental work investigating the connection of music perception to other human cognitive abilities.

Although a vast majority of related research shows general agreement on the conceptualization of pitch in terms of vertical positions and movements, as manifested in expressions *high* and *low* or *rise* and *fall*, different approaches do not agree on the sources of verticality metaphors and their role in perceiving music (Eitan & Granot 2006). Western musical notation is perceived by many to be the main influence in the shaping of the concept of pitch, which would imply a culturally and historically motivated relationship. Zbikowski (2002) lists several examples of different characterizations of pitch positions in favour of this viewpoint: from "sharpness" and "heaviness" in ancient Greece, "small and "large" in Bali and Java to "young" and "old" among the Suyá of the Amazon basin. The notion of pitch verticality had evidently existed long before the Western musical notation was developed (Cox 2016: 86), which supports the claim of a culturally based influence in the spreading of the concept. Cox (2016) suggests ten different sources of the pitch height conceptualization: frequencies, staff notation, head voice and chest voice, propagation, magnitude of exertion, magnitude of sense of effort, loudness, timbral intensity, emotional states, and correlation of frequency and elevation. Seven of the listed sources are based on metaphoric height via the conceptual metaphor GREATER IS HIGHER (2016: 92).

Many other hypotheses, however, claim that the relationship between pitch and vertical space is embodied due to our own experience of vocal production and the manner in which our chest resonates when we produce high sounds (Zbikowski 2002: 69). The existence of conceptual primitives bound in an abstract schematic structure governing the conceptualization of pitch is another theory in favour of the innateness of pitch in humans, tested by Antović, Mitić & Benecasa (2018) in their study of pitch-sequencing.

Regardless of the origin of linguistic manifestations of pitch conceptualization in different languages, empirical research suggests that pitch height is strongly as-

sociated with spatial verticality. This association was proved in experiments involving musicians and nonmusicians alike, affecting both conscious cognitive processes and the unconscious perceptual ones (Eitan & Granot 2006). Dolscheid et al. (2014) provided evidence suggesting that musical pitch may rely on unimodal visuospatial representations (2014: 425), i.e. that areas in the primary visual cortex are activated both during processing spatial height and pitch-related stimuli, which supports the key assumption of the embodiment theory on metaphorical mental representation. Recent investigations have also provided evidence for the neurological basis of the connection of pitch changes and musical motion, proving that music, language and motion are intertwined. Research done by Kunert et al. (2015) gave direct evidence that suggests an interaction of music and language syntactic processing in Broca's area.

Results are conflicting, however, with regard to the nature of the pitch-verticality association. Some studies suggest the existence of an innate or at least an easily learned perceptual relationship, like a study done with infants to determine whether they could match static visual events signalling verticality to a dynamic auditory event of an ascending tone (Wagner et al. 1981) or a study done by Roffler & Butler (1968) with preschool children, where they tested their association of words *high* and *low* with the location of tone appearances on the vertical plane. A more recent study in favour of the innate conceptualization of pitch showed that members of an isolated community in northeastern Cambodia associate pitch direction with vertical direction although their language lacks spatial related vocabulary for pitch (Parkinson, Kohler, Sievers & Wheatley 2012). Others indicate a learned response, probably related to linguistic and notational convention (Abril 2001; Costa-Giomi & Descombes 1996; Flowers & Costa-Giomi 1991).

Two studies suggest that musical conceptualization is based on deeper perceptual modalities. In a study performed with 10-year-old children of varying degrees of musical education, who were asked to 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), Antović (2009) suggests that their responses were based on the 'visuo-spatial' modality. Eitan & Timmers (2010), on the other hand, claim 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 analysis of pitch related terms in the Croatian musical terminology is based on the propositions that suggest grouping all image schemas that conceptualize pitch relations into several basic schemas: VERTICALITY, SIZE or MAGNITUDE, and

INTENSITY (Eitan & Timmers 2010) or FORCE, MAGNITUDE and PATH (Antović 2011).

All observed conceptual metaphors can be grouped into two basic metaphors: PITCH RELATIONS ARE RELATIONS IN VERTICAL SPACE and PITCH RELATIONS ARE RELATIONS IN SIZE, which encompasses the metaphor PITCH RELATIONS ARE RELATIONS IN SPACE. They serve as the basis for more elaborate metaphors of pitch relations, which can also conceptualize motion.

3. The conceptualization of pitch in Croatian in terms of verticality

The English term *pitch*, denoting the perceived tone quality which depends on its frequency, is metaphorical in itself. Although the history of its musical sense seems to be obscure, some sources indicate that the word could stand for the fixed *point* in space (related to the verb '*prick*', Harper 2018; see also Partridge 2006: 494, paragraph 14) one *picks* (grasps or perceives) while listening to music. The figurative meaning of the English musical term *pitch* is derived from a spatial metaphor that refers to a discrete, fixed point in space, but it does not display a relationship with the VERTICALITY schema. *Pitch* thus differs from most of its European equivalents, which can be literally translated as *height*:

(1)

Croatian	German	Italian	French	Russian
visina tona	*Tonhöhe*	*altezza (del tono)*	*hauteur (tonale)*	*высота (тона)*
'tone height'[2]				

Together with most other European languages, Croatian borrowed the spatial model of pitch representation from Latin, which was the medium of written music theory in most parts of Europe until the turn of the 18th century. In Croatia, however, Latin remained the official language of public institutions (e.g. schools) even longer, until the middle of the 19th century. Despite the fact that Latin lost its privileged position in written discourse on music, the technical terms derived from classical languages are still dominant in treatises and reference literature in many modern languages. The earliest documented examples of the Latin terms referring to the

[2] In musicological discourse the term *tone height* refers to a specific component of musical pitch dependent directly on the tone frequency, according to the two-component theory of musical pitch by Géza Révész (Gabrielsson 2001; the other component is called *tone quality* or *chroma*). A similar use occurs in physics. In both cases the English term *tone height* represents a false friend of the equivalents of *pitch* from other European languages (1). The two-component model of pitch space is represented as a helix, but there are also other spatial models of mental organization of pitch relations as described in Deutsch (2013: 266f), which will be discussed later.

perceived quality of musical pitch – the adjectives *altus* 'high' and *bassus* 'low' – appeared in treatises on music theory as early as the 7th century (Ehrmann-Herfort 1997: 2), although the VERTICALITY schema itself might have developed much earlier. Their literate translations appear in both Croatian and English musical terminology:

(2)

Latin	Croatian
altus/bassus	*visok / dubok, nizak*
'high' / 'low', 'deep'	'high' / 'deep', 'low'

The roots of the VERTICALITY schema that is at the basis of pitch conceptualization could probably be found in a kind of bodily experience of sound; however, once established, the sense of verticality in relation to the musical pitch is being transferred *culturally*. Contemporary research has confirmed that the notion of pitch verticality is learned rather that innate (Eitan & Granot 2006: 224), which goes in line with Eitan's claim that "linguistic metaphors and other cultural practices do not create CMC, but modify the expression of pre-existing tendencies, such as those revealed in infant studies" (Eitan 2017: 218).[3]

3.1. *The VERTICALITY schema: PITCH RELATIONS ARE RELATIONS IN VERTICAL SPACE*

The earliest examples of musical terms already clearly point towards the VERTICALITY schema as the governing principle in conceptualizing pitch quality in most European languages, including Croatian. English is certainly not an exception, although the very term *pitch* does not include the notion of vertical position in the so-called tonal space; pitches may be *high* or *low*). The universally employed conceptual metaphor PITCH RELATIONS ARE RELATIONS IN VERTICAL SPACE maps the concepts of *up* (Cro. *gore*) and *down* (Cro. *dolje*) onto the imaginary space made of tones of different pitches, the tonal space (Cro. *tonski prostor*). The *high* tones (Cro. *visoki* tonovi) reside in the upper part of this space, while the *low* ones remain rather on the bottom.

The conceptualization of *pitch contour* (Cro. *obris melodije* 'melody contour', the shape of an imaginary line connecting the positions of the consequent pitches) or *musical gesture* (Cro. *glazbena gesta* 'musical gesture', a succession of pitches with a specific directionality and contour, Zbikowski 2002: 66) is only a more complex, special case of spatial representation of musical sound within a wider

[3] CMC stands for *cross-modal correspondences*. See Spence (2011) for an introduction.

context. Further conceptual mappings of vertical spatial relations are evident in musical terms denoting general sound qualities of musical instruments, human voice types, tunings, manual pitch representation (cheironomy), representation of tonal relations (e.g. *ascending* and *descending fifth relation*) and many others.

3.1.1. *Vertical spatial models of mental pitch representation*

The VERTICALITY schema lies at the heart of most spatial models of mental pitch representation. Among them, two schemas prevail in contemporary discourse on music: the basic, traditional *linear model* (Cro. *linearni model*), and the psychoacoustically based *helical model* (Cro. *spiralni model*).

The usually vertically oriented linear model of mental pitch representation was in use at least by the beginning of the 7th century (Ehrmann-Herfort 1997: 2).[4] The perceived tone is being located on an imagined vertical scale representing the musical pitch. High pitch (Cro. *visoki ton*) is thereby associated with the sensation of tones with high sound-wave frequencies, and low pitch (Cro. *niski ton*) with low sound-wave frequency values.

Zbikowski (2002: 63) mentions the ancient Greek expressions for high and low pitches that did not share the same quality as *high* and *low* (3):

(3) a.

Greek	Latin	Croatian
oxys	*acutus*	*visok*
'sharp'	'sharp'	'high'

b.

Greek	Latin	Croatian
barys	*gravis*	*dubok*
'heavy'	'heavy'	'deep'

A literal translation of *oxys*/*acutus*/*sharp* into Croatian would be *oštar*. As a tone quality, *oštar* 'sharp' would refer to a tone with a significant lack of harmonics, and this quality is not connected with its height. The Croatian translation of *barys*/*gravis*/*heavy* would be *težak*. A sound might be *težak* 'heavy' regardless of its pitch. Earlier Latin expressions *acutus* 'sharp' and *gravis* 'heavy' appeared in treatises synonymously with *high* and *low* until well into the 15th century, when they disappeared in favour of *altus* 'high' and *bassus* 'low' (Ehrmann-Herfort 1997: 2–4).

[4] Zbikowski (2002: 63) mentions the beginning of the 10th century, but historical sources such as the treatises by Isidore of Seville prove that the phenomenon is at least three centuries older than that.

Croatian musical terminology, which developed relatively late in the course of time, does not reflect any features of the Greek *oxys* 'sharp' and *barys* 'heavy' as related to the pitch. However, one may notice that the English musical terminology (which developed some centuries earlier than the Croatian) preserved some of the *oxys* and *barys* semantic contents in the names of notational signs for alterations, *sharp* (which lifts a pitch up by a semitone) and *flat* (which lowers a pitch by a semitone). The Croatian equivalent terms stick to the verticality schema, which is directly culturally influenced by the situation in the languages the Croatian musical terminology was borrowing from, Latin and, particularly, German (4).

	German	Croatian	English
(4) a.	*Erhöhungsvorzeichen* 'heightening presign'	*povisilica* 'heightening agent'	*sharp*
b.	*Erniedrigungsvorzeichen* 'lowering presign'	*snizilica* 'lowering agent'	*flat*

Another model of the mental representation of pitch is the three-dimensional *helical model* of pitch space. The model is derived from the Géza Révész' psychoacoustically based two-component theory of musical pitch, where the tone height (the absolute pitch value, dependent mostly on the frequency) is represented by the vertical dimension, and tone quality (*chroma*) by the helical curve (Révész 1913). The tone quality values are repeated in each octave (each new round of the rising helix); e.g. all tones with the quality *c* will find their places on the same vertical axis, while their absolute vertical position will depend on their tone height. The helical model can thus be considered to be an expanded version of the linear model, where the line is not straight, but curved in order to represent the periodicity of *chroma* in pitch space.

3.1.2. *Manual pitch representation*

Both the linear and helical models of pitch representation rely heavily on the embodiment of musical sensations. It is thus not surprising that most methods of manual pitch representation comply with Zbikowsky's explanation of bodily sensations of resonance during sound production:

> … when we make low sounds, our chest resonates; when we make high sounds, our chest no longer resonates in the same way, and the source of the sound seems located nearer our head. (2002: 69)

Manual pitch representation systems serve as a teaching and learning tool for showing the position of a tone within a tonality by positioning one's hand in front of the body according to the convention. All historical and contemporary manual pitch representation systems employ the VERTICALITY schema, where high tones are shown in the upper parts of the body or above it, and the lower tones usually take place at the lower part of the performer's body. Some systems, such as the worldwide used Curwen hand signs, correspond with both linear and helical (periodical) logic of the perception of musical pitch. While absolute height of the showing hand displays an analogy with the tone height, the very hand sign marks the periodicity of the helical schema: every time the hand reaches the tone with the same *chroma*, it shows the same sign, thus confirming the idea of the helical mental representation of pitch.

3.1.3. *Human voice types terminology*

In Croatian, like in most other European languages, the names of human voice types are also in accordance with the VERTICALITY schema. There are usually two sets of terms denoting human voice types.

The first set, consisting of substantivized Latin adjectives, belongs to the oldest representations of verticality schema in Western music. The terms from this set are more precise in terms of range, tone colour and character than the other ones. Most such human voice terms derived from the verticality schema denote the *height* of the pitch each voice type can perform (5):

	Latin	Croatian
(5) a.	*sopranus (supremus)* 'upper', 'highest'	*sopran* 'soprano'
b.	*altus* 'high'	*alt* 'alto'
d.	*bassus* 'deep'	*bas* 'bas'

The Italian loanword *mezzosoprano*, indicating the voice singing in the middle register, could be added to the above.

Alternatively, human voices can be named using the terms of Croatian origin that are mostly translations of the Latin ones (6), which exist in most European languages. This set of terms is not considered to have such precise technical mean-

ing, and is rather used in a less formal situation than in the professional discourse.

Croatian

(6) a. *visoki glas*
'high voice'

b. *srednji glas*
'middle voice'

c. *duboki glas*
'deep voice'

3.1.4. *Scale degree names* (*tone functions*)

The existence of the VERTICALITY schema is also evident in the names of scale degrees, which refer to the position of tones in a musical system (mode or tonality). Most scale degree names, also known as the *tone functions*, point to the relation of a scale degree to the first degree, the tonic, or to one of the other two important scale degrees, the V (dominant) and the IV (subdominant). The prefix *sub-* 'below' and the prefixoid *super-* 'above', as well as the terms such as *medijanta* 'mediant', 'being in the middle' (see Figure 1), prove the presence of the VERTICALITY schema in the spatial conceptualization of pitch.

scale degree	**term** (Cro. – Eng.)	**position in tonal space**	
V	*dominanta* – dominant		
IV	***sub****dominanta* – **sub**dominant	**below** dominant	
III	***medijanta*** – **mediant**	in the **middle** (upwards): **between** tonic and dominant	
II	***super****tonika* – **super**tonic	**above** tonic	
I	*tonika* – tonic	**central** position	
VII	***sub****tonika* – **sub**tonic	**below** tonic	
VI	***donja*** *medijanta* – **lower** mediant	in the **middle** (downwards): **between** tonic and subdominant	
V	*dominanta* – dominant		
IV	***sub****dominanta* – **sub**dominant	**below** dominant	

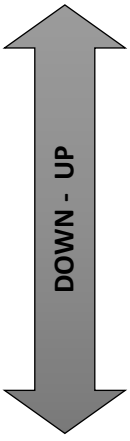

Figure 1. Scale degree terms in English (regular font) and Croatian (italics). Terms related to the VERTICALITY schema are given in bold.

Most modern European languages preserved the Latin-rooted variants without creating native constructions.

4. Other figurative aspects of pitch conceptualization in Croatian

4.1. *The* SIZE *metaphor*

Apart from the metaphor based on the VERTICALITY schema, musical pitch relations sometimes reflect the conceptual metaphor PITCH RELATIONS ARE RELATIONS IN PHYSICAL SIZE, which encompasses the concepts of thickness and distance in space.

4.1.1. *Expressing pitch as thickness*

Dolscheid et al. (2013) give examples of Farsi speakers describing pitch as thin (*nāzok*) or thick (*koloft*), concluding that speakers who use different linguistic space-pitch metaphors also think about pitch differently. A 19th century example from the first modern music theory treatise published in Croatian is another example that pitches and their relations can be referred to in terms of thickness:

> *Glas je pravilno trepteći vesak pogledom na odnošaj visine mu. Polagani treptaji daju krupne, a brzi treptaji sitne veskove.*[5] (Kuhač 1875: 1)

Croatian

(7) a. *polagani treptaji* → *krupni veskovi*
'slow oscillations' 'big sounds'

b. *brzi treptaji* → *sitni veskovi*
'quick oscillations' 'tiny sounds'

Examples (7a, b) demonstrate the connection between the frequency (i.e. the speed) of the sound wave and the resulting pitch. This interdependence has been well known since the age of classical antiquity, and has appeared in the medieval written sources on music theory. *Commentarius Anonymus in Micrologum Guidonis Aretini* (around 1070) established a clear relationship between speed, gravity (*acutus* 'sharp' and *gravis* 'heavy') and pitch (Ehrmann-Herfort 1997: 2). Such medieval treatises may represent the cultural influence that helped shape the concept of pitch and strengthen its relation to the concepts of thickness and speed.

[5] "Tone is a regularly oscillating sound with respect to its pitch. Slow oscillations result in big sounds, and quick ones in tiny sounds" (Kuhač 1875: 1).

Although rare in contemporary usage, the thickness-related expressions of pitch still exist in Croatian, and are mostly confined to the description of human voice features (*sitan/krupan glas* 'tiny/big voice'). Inspiring examples of pitch conceived as thickness can be found in the classical works of distinguished Croatian authors (Kumičić, I. B., Mažuranić, Dončević, Božić, Kušan, Kaleb, etc.), who often compare big voices with the growling of a bear, and the tiny ones with the squeaking of a mouse.[6]

4.1.2. *Pitch and size as attributes of musical instruments*

Examples of thickness-related terms denoting pitch in non-European languages have also been confirmed by Zbikowsky for Balinese and Javanese (2002: 67) and Ashley for the names of African musical instruments (2004: 66). The origin of these terms probably lies in a metonymic connection between the performance of music and the instruments used, which results in the attribution of size determinants to pitches typical of a music performance.

A similar conceptual mapping exists in the Croatian folklore heritage. The expression for a traditional singing practice in Istria was conceived in analogy with the thick and thin shape of traditional shawm-like double-reed instruments called *sopele*, *sopile* or *roženice*, which are always played in pairs (8):

(8) a. *kanat na tanko i debelo*
'singing thick and thin'

b. *velika sopela* → *kanat na debelo*
'big sopela' 'singing thick'

c. *mala sopela* → *kanat na tanko*
'small sopela' 'singing thin'

Example (8a) shows the term for such a two-part traditional singing practice, whereby a lower (thick) voice is singing the main melody, while the higher (thin) sings the accompaniment.[7] The vocal practice has developed from the instrumental one; therefore the attribute of the instrument of a bigger size, *velika sopela* ('big sopela'), namely the thickness, became the attribute of the lower voice (larger in-

[6] Examples used in the works of the above-mentioned authors can be found in the online literary corpus of the Institute of Croatian Language and Linguistics, http://riznica.ihjj.hr/philologic/Riznica.whizbang.form.en.html.

[7] This is a rather unusual practice in the context of European musical tradition, in which typically the higher part performs the main theme or melody, while the lower one accompanies it.

struments produce lower sounds), while the attribute of the smaller instrument, *mala sopela* ('small sopela') was mapped onto the higher voice, which became thin. During *singing thick and thin*, the singers (called *sopci* in accordance with the name of the instrument) imitate the sound of the instruments performing melodies in non-tempered parallel sixths or thirds in a specific Istrian musical mode. Such performing practice is often called *dvoglasje tijesnih intervala* 'two-part music in tight/narrow intervals', revealing another culturally conditioned metaphor: *pitch distances smaller than the usual (e.g. tempered) ones are uncomfortable or tight.*

4.1.3. *The SIZE metaphor as a determinant of the pitch space division*

The size schemata, deviating from the pervading verticality principle, are also commonly present in pitch class division nomenclature in most European languages. The typical Western division of the pitch space, where the vertical dimension corresponds with the pitch, is the octave division, whereby the pitches of the same quality (*chroma*) bear common names with different indexes, indicating the octave range they belong to (c^1 = c in the first octave, etc.).

In German,[8] Croatian and most other European languages, the metaphor PITCH RELATIONS ARE RELATIONS IN SIZE is evident in the terms denoting central registers of the pitch space, as shown in the example (9). The great and small octave, together with the first octave, corresponds with the middle range of human hearing (Huron 2001: 8).[9]

Although less commonly used in English,[10] some of the similar expressions (*great* and *small octave*) are still in use.

(9) *subkontra o.*[11] *kontra o.* ***velika o.*** ***mala o.*** ***prva o.*** *druga o. ...*
'subcontra o.' 'contra o.' **'great o.'** **'small o.'** 'first o.' 'second o.'
1-line o. 2-line o. …

[8] The Croatian octave names are borrowed from German, which makes them more a result of cultural contact than a direct reflection of embodiment.

[9] Frequencies in the middle range of hearing give rise to the most well-defined pitch sensation, i.e. they exhibit high toneness.

[10] English speakers prefer ordinal numbers–1st octave, 2nd octave, etc.–the so-called *scientific octave names*, in which octaves are labelled with numbers. The lowest C on a full-sized keyboard is labelled as C1, etc.

[11] O. = *oktava*/'octave'.

Example (9) shows the common Croatian names of the octaves, from the lower ones at the left side towards the higher ones on the right. Note that some of the most frequently used octaves (given in bold), appearing in the middle range of hearing where the toneness is at its best, bear size-related names and present the starting point in counting the octaves downwards (below the *great*) or upwards (from the *first octave*), while the rest of the pitch space is simply labelled using ordinal numbers or the prefixoids *contra-* and *sub-* (both meaning 'below').

4.1.4. *Measuring and describing pitch space relations*

An interesting exception to the verticality principle is the term *interval* ('the pitch relation between two tones'), which is in itself a linguistic metaphor exploiting a horizontal space relation—the distance between the moveable walls (*inter vallos* 'between walls') of a Roman *castrum*. This is one of the earliest known metaphors in musical terminology with continuous usage since at least 50 BC (Beiche 1999). All European languages, including Croatian, have accepted the term in its Latin form, together with the musical concept behind it, despite the embodied verticality of our pitch perception.

Some terms denoting the size of musical intervals also indicate the presence of the SIZE metaphor. Depending on the number of semitones they encompass, musical seconds, thirds, sixths and sevenths can be described as Cro. *mali* 'small' (Eng. *minor*) and *veliki* 'small' (Eng. *major*), whereas all intervals can be altered into Cro. *smanjeni* 'diminished' or *povećani* 'augmented'.

Singular pitches and their relations in terms of intervals are further combined into more complex structures, the characteristics of which are also commonly referred to in terms of spatial relations. Zbikowsky (2002: 66f) emphasises static and dynamic features of various two-dimensional pitch collections, as well as relations in so-called musical space—an expression without an equivalent in Croatian language—meaning a three- or four-dimensional extension of the basic two-dimensional mapping.[12]

Furthermore, one could observe the *pitch contour* (Cro. *obris melodije* 'melody contour') as a succession of pitches located at different places in pitch space. Pitch contour is an imaginary curve that connects the perceived pitches, colloquially referred to as a *melody shape*, which could be static, but may also give the listener a

[12] The term *musical space*, which could be translated into Croatian as *glazbeni prostor*, includes the concepts such as *pitch space*, *time space*, *dynamics space* and possibly others.

dynamic impression, depending on the relations between the successive pitches. Although pitches cannot really move themselves, but rather appear and disappear at certain points in time, we usually have an impression of an ascending (Cro. *uzlazan*) or a descending (Cro. *silazan*) movement, which is probably embodied in and originates from various syncretic activities (although there is no actual motion, Zuckerkandl 1969; Johnson & Larson 2003: 69).

The aforementioned conceptual metaphors represent the foundation for building further conceptual models (e.g. *tonal space*, Cro. *tonalitetni prostor*) and conceptual metaphors such as TONALITY IS HOME and TIME RELATIONS ARE RELATIONS IN HORIZONTAL SPACE (Figure 2). The *tonal space* model is a variant of the pitch space "setting forth 'distance' relations between pitches, chords or keys, in accordance with the principles and procedures of tonality" (Mooney 2001).

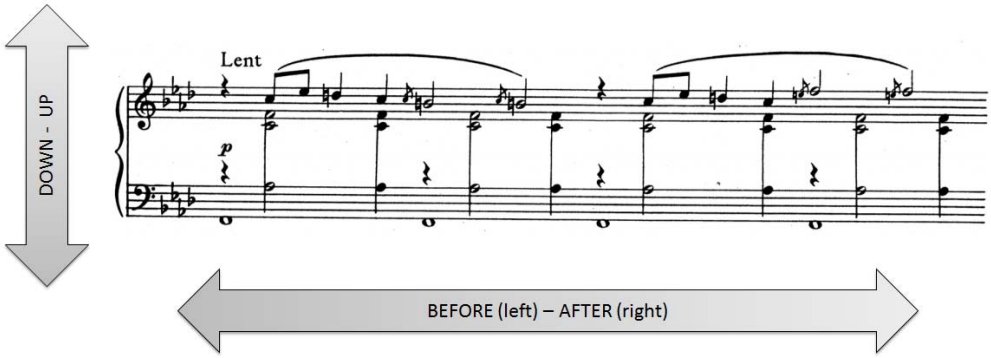

Figure 2. An example of spatial mapping in Western musical notation. The vertical axis represents the position of a tone in the tonal space, while the horizontal displays the temporal relations (duration).

4.1.5. *Tonal relations as spatial relations: etymologies and false friends*

The concept of the tonal space is culturally conditioned and it is therefore possible to find examples of very different spatial conceptualizations among various cultural traditions. Taking into consideration English and Croatian musical terminologies, we can trace two major paths of linguistic borrowing:

1. the so-called *Romanic tradition* of linguistic borrowing, connecting the classical Greek and Latin, vulgar mediaeval Latin, Old French and English, and
2. the so-called *Germanic tradition*, connecting the classical languages, vulgar mediaeval Latin and German to, among others, Croatian.

The differences between the two traditions are sometimes significant to the extent that originally common spatial concepts can diverge from each other through the processes of metaphorical conceptualization that they result in the creation of interlinguistic *false friends* with rather disparate meanings.

An example of such a relationship is the concept of *parallelism* of scales and tonalities in the Romanic and the Germanic terminological traditions respectively. The meaning of the English term *parallel tonalities* differs significantly from the meaning of the Croatian term *paralelni tonaliteti*. Although both terms denote the relation between a major and a minor tonality/key, there are essential conceptual differences.

	Croatian term	English equivalent
(10) a.	*paralelni tonalitet* 'parallel tonality'	*relative tonality/key*
b.	*istoimeni tonalitet* 'homonymous tonality'	*parallel tonality/key*

Example (10) shows the relations between the Croatian and English terms and the literal translations of the Croatian terms into English. The Croatian term *paralelni tonalitet* is equivalent to the English term *relative tonality*, and should not be interchanged with its English false friend, *parallel tonality*, which should be translated into Croatian as *istoimeni tonalitet.*

Romanic tradition	Germanic tradition
It. *tonalità parallele* Fra. *tonalités parallèles*	Ger. *Parallel-Tonarten/Tonalitäten* Cro. *paralelni tonaliteti*
same tonic	different tonic
different key signature	same key signature
same chromatic pitch collection	same diatonic pitch collection

Figure 3. Terminological and conceptual differences between the observed terms and concepts in several European languages.

Figure 3 shows that the semantic content of the Croatian term *paralelni tonaliteti* reveals the influence of the Germanic tradition of language borrowing, i.e. the *etymologia proxima* on the formation of a local term. The term was borrowed from German and has the same meaning as the German *Parallel-Tonarten/Tonalitäten*, while its English false friend shares its meaning with the

terms from Romance languages (Fra. *tonalités parallèles*, It. *tonalità parallele*). The Latin term is not included here because the concept was developed when Latin was no longer a language of scholarly discourse.

5. Concluding remarks

The analysis of pitch related spatial conceptual metaphors and their linguistic manifestations in Croatian, as presented in the previous paragraphs, has shown that several spatial schemas are visible in the conceptualization of music in Croatian. Both vertical and horizontal relations are mapped onto the pitch space, mostly by employing the VERTICALITY schema in the conceptual metaphor PITCH RELATIONS ARE RELATIONS IN VERTICAL SPACE. However, the PATH schema is also very much present in the conceptualization of musical pitch, as shown in the English terms *ascending* and *descending* and their Croatian counterparts *uzlazni* and *silazni*. The same terms reflect the conceptual mappings of the metaphor PITCH CONTOUR IS MOTION IN PHYSICAL SPACE, which gives evidence of the existence of a system of metaphors or the musical event structure metaphor.

The majority of the analysed terms prove that the concepts related to the conceptualization of musical pitch space are very much embodied. They are nevertheless also strongly influenced by the cultural forces intertwined with the language borrowing processes (especially the cross-linguistic influences of *etymologia proxima*) as well as by local folk tradition.

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UTJELOVLJENO I KULTURNO U KONCEPTUALIZACIJI VISINE TONA U HRVATSKOM

Konceptualne metafore kojima se konceptualizira visina glazbenoga tona uvelike počivaju na ljudskoj percepciji, predodžbi i iskustvu strukturiranom prostornim i orijentacijskim predodžbenim shemama kao što je shema vertikalnosti. U ovome se radu analiziraju konceptualne metafore koje strukturiraju odnose visina tonova s obzirom na vertikalni prostor, debljinu i veličinu, a koje se pojavljuju u hrvatskom glazbenom nazivlju. Predodžbene sheme vertikalnosti i veličine analiziraju se unutar konceptualnih metafora odnosi visina tonova jesu odnosi u vertikalnom prostoru i odnosi visina tonova jesu odnosi veličine da bi se odredilo u kojoj je mjeri njihova motivacija utjelovljena i univerzalna, a što se može pripisati međukulturnim i međujezičnim utjecajima koji su postojali tijekom stvaranja i razumijevanja glazbenoga nazivlja u Hrvatskoj.

Ključne riječi: konceptualizacija; glazba; prostor visine tona; predodžbena shema; utjelovljenost; teorija glazbe.