# Musical Metaphors in Serbian and Romani Children – an Empirical Study

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Abstract

This study tested to what extent young listeners metaphorically conceptualize basic musical relations. Ninety children aged 11 (30 attending a music school, 30 Serbian and 30 Romani children with no musical education) were played five stimuli with mutually opposed musical elements and asked to respond what the first and what the second one was like. Their answers were classified into metaphors according to the tenets of the conceptual metaphor theory. The results suggest an overwhelming dominance of metaphorical replies, where most mappings were based on image schemas within a predominantly visual-spatial modality. There were some differences in conceptualizations, however, with “high and low” tones also perceived as “big and small”, or “upward” musical motion seen as “forward”. The paper analyzes the possibility to find a common denominator for seemingly disparate replies, where the study of musical conceptualization might be instrumental in the cognitive semantic quest for metaphorical universals.

# Musical Metaphors in Serbian and Romani Children – an Empirical Study

This study presents the results of an empirical research in which we attempted to test the basic tenets of the cognitive metaphor theory (CMT, Lakoff and Johnson, 1980, 1999) involving music as the target domain. The goal was to confront young participants from Serbian and Romani communities, with and without musical experience, with five diametrically opposed tonal relations and ask them to describe the musical structures they just heard, verbally, by answering what the first and what the second part was like. The analysis of answers has led to a discussion whether the conceptualization of basic musical relations is based on conceptual metaphor and/or the embodied mind theory, and, if so, whether there might be some underlying universal principles behind participants' seemingly different responses. Such a prospective finding would support the thesis that "musical semantics" could be based on the study of metaphor.

Musical metaphorology, as we may attempt to call the discipline of interest in the present study, has aroused some interest in the cognitive circles. Research linking music and metaphor has included theoretical discussions (Cumming, 1994; Saslaw, 1996; Treitler, 1997; Guck, 1997; Brower, 2000; Aksnes, 1998; 2002; Zbikowski, 1998; 2002; Johnson & Larson, 2003; Adlington, 2003; Spitzer, 2004; tentatively also Barcelona, 2003; Zangwill, 2007) and anthropological studies (Zemp, 1979; Feld, 1981; Cox, 1999; Perlman, 2004; Feld, Fox, Porcello & Samuels, 2004; Ashley, 2004). Distinctly psychological research in the field dates back to the psychoacoustics of Pratt (1930) or later Roffler & Butler (1968), while recent papers often relate the cognition of music to other domains (Rusconi, Kwan, Giordano, Umilta & Butterworth, 2006; Lidji, Kolinsky, Lochy & Morais, 2007; Cabrera & Lorimoto, 2007). Yet, experimental research explicitly

viewing musical conceptualization as metaphor and assuming a viewpoint closer to Lakovian cognitive semantics is still comparatively rare (Eitan & Granot, 2006; Eitan & Timmers, 2006).

The first expectation of the present study stems directly from the principal tenets of CMT: conceptualization of music is ultimately metaphorical and largely comes from the extension of the early interaction of our bodies and the environment (hypothesis 1). The remaining three theses center around the question of the universality of metaphor. Following the claims that "musical training […] advances one's listening from a nonconceptual to a conceptual level" (DeBellis, 1995: 1-2) and that "metaphorical conceptualization appears to vary from ethnic group to ethnic group" (Kövecses, 2005: 92), we predict differences in the metaphors depending on the level of musical training and ethnic background (hypotheses 2, 3). Since "the cognitive processes that human beings use are universal, [even though] their applications are not" (Kövecses, 2005: 293), potential differences may serve as a means to reveal a deeper universality, which is perhaps the ultimate goal of CMT (hypothesis 4).

More precisely, our expectations are as follows:

1. The language used by participants to describe the five basic musical relations is metaphorical and grounded in their early bodily interaction with the environment (embodied mind).

2. There are significant differences in the conceptualizations between musicians and nonmusicians.

3. There are significant differences in the conceptualizations between Serbian and Romani participants.

4. Even if there are differences between the metaphors provided by different participants, a comparative mapping analysis may reveal a deeper universal system behind their construction.

## Method

### *Procedure*

The participants were played five short musical sequences. In each of them two strikingly opposing musical elements were presented – a high and low tone, a quick and slow succession of pitches, etc. The task of the listener was to verbally describe each relation. The research assistants were instructed to obtain pairs of antonymic adjectives or antonym-like expressions. As the goal was to allow the children to describe the musical elements they had just heard as freely as possible, we avoided suggesting any answers. Instead, repeated questions such as "what was the first, and what the second one like?" were used to lead children into using antonyms to describe the sequences.

Everything uttered by the participants was recorded as a sound file and then transcribed. The transcript was later searched for antonym pairs. Once registered, the pairs were entered into the database and used for further analysis.

### *Participants*

The sample included 90 randomly selected eleven-year olds from five primary schools in the city of Nis, Serbia. The age was chosen with two problems in mind: on the one hand, to provide "natural" metaphors, the children needed to have as little familiarity with the vocabulary of standard music theory as possible. On the other, they still had to be old enough to verbally express abstract relations. After consulting the literature (Epstein and Gamlin, 1994; Seitz, 1998) and local developmental psychologists, we opted for the age of 11. The participants were further divided into three strata. Thirty children

attended the local school of music, where at the time of the research they had two to three years of prior formal musical training. These children were all Serbian. In addition, there were thirty Serbian children and thirty Romani children who had no formal training in music (apart from compulsory musical education classes in primary schools).

*Stimuli*

The stimuli were sequenced on the sampled instruments simulating the sound of the grand piano or twelve violins playing in unison. Below we present the stimuli and typical antonym pairs used to describe them in standard Western music theory (Figure 1):

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Figure 1

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*Data analysis*

Coding the answers proved to be the principal methodological difficulty. The children were always asked to respond what the first and what the second segment (tone or sequence) was like, where the initial idea was to lead them into using antonyms to describe what they were hearing. Yet, the practical freedom they were given to say what they wished about the sequences posed a problem for subsequent classification of answers. As a rule, we opted not to exclude any responses. The exception was the situation in which the children persistently remained silent or responded “I don’t know” (coded as “no answer”). Likewise, situations in which children named tones and instruments or provided technical expressions in Italian were also considered nonmetaphorical. Relatively infrequent responses in which the participants gave seemingly unrelated adjectives (“longer and easier”, “higher and faster”) were coded as “unclear”. Such a coding label came from our unfulfilled expectation that the children

would readily recognize the musical examples as diametrically opposed and provide antonyms to describe them. However, as will be seen from the utterances from this category, some of the participants in effect mapped not one, but two source domains onto the target domain of music, refusing to provide clear-cut oppositions. Though comparatively rare, this tendency should also be taken into account when discussing the ultimate merit of CMT in musical comprehension. Finally, most responses provided the clearly antonymous relations that we anticipated. If the participant produced a number of antonyms, as a rule we entered the first pair only into the base, since we were interested in the initial, intuitive reaction.[1] In addition to full-fledged adjectives, we also incorporated implicit antonymous relations into the base ("as if someone is running, and here walking", "it looks like some kind of droplets, and this sounds like bigger drops"). After this procedure, we obtained twenty to fifty different responses for each stimulus.

For the purposes of statistical analysis individual responses were coded into classes according to four criteria, two of which were internal (accorded with CMT) and two external (imposed by statistical constraints for the given sample size). Excluding the categories "unclear" and "no answer", the criteria for the entire sample were as follows: (a) There had to be a single dominant conceptual structure, preferably an image schema, relating all utterances from the same class (*common denominator*); (b) A single antonym pair had to comprise at least 30% of the responses within the class (*prototype*); (c) The number of classes had to be between two and five per stimulus; (d) The smallest share of a class within the distribution of all responses had to be 5%. Thus, for instance, in the first class of the first stimulus ("*PITCHES ARE HEIGHTS"*), the utterance "*lower and higher*" was used in 27 out of 44 utterances (61.3%), the conceptual structure of "*HEIGHT"* or the VERTICAL ORIENTATION image schema was the common denominator

for all the utterances from the class ("*lower and higher*", "*deep and shallow*", "*lower and upper*"), the total number of classes in the distribution excluding "unclear" and "no answer" was 3, and the share of this class in the distribution was 48.9%.[2]

At the end of the coding procedure, we separately listed three most commonly used individual utterances for each stimulus, attempting their analysis by cross-domain mapping. This, final, part of the discussion section will pave the way for the debate on the relevance of musical metaphorization studies to the issue of universality of metaphor.

To ensure accurate translation equivalents, we used back translation from Serbian and Romani into English. Rare instances in which Serbian and Romani terms from standard music theory are strikingly different from their English equivalents will be specifically pointed out [in square brackets]. Accordingly, infrequent antonym pairs which resisted accurate back translation will be marked with an asterisk (*).

## Results

The first stimulus tested the metaphor "*PITCHES ARE HEIGHTS*". The children were played tones $f_4$ and $f_5$, equal by all characteristics except for pitch, and asked what the first and what the second one was like. After the interviews and transcription, the base incorporated 27 antonym pairs, which we subsequently coded as in Table 1:

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Table 1

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The distribution of responses is presented in Table 2:

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Table 2

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Results suggest that our population overwhelmingly describes this difference in pitches metaphorically (only 2.2% respondents did not use a metaphor). Furthermore, our participants experienced the different frequencies of the two tones mostly as differences in heights (48.9%). This was most likely based on the VERTICAL ORIENTATION (UP-DOWN) image schema introduced by Lakoff (1987: 283). Conceptualizations of pitches as sizes, forces, and qualities followed, respectively. Comparing the metaphorical responses by three population groups, we note a statistically significant difference in the distribution of coded categories ($\chi^2$=47.504 *df*=10; *p*=.00). The young musicians overwhelmingly conceived of the two tones as being in vertical space (90%). The Serbian musically untrained children mostly did the same (46.7%), but they also tried to describe the relation as that of forces (26.7%) and sizes (13.3%). A bit unexpectedly, Romani nonmusicians comprehended the tonal relation mostly as that of sizes (43.3%), purportedly along the EXPANSION schema proposed by Turner (1991: 58).

Three most frequent individual verbalizations for this stimulus, which we will use for the mapping analysis at the end of discussion, are: "*high and low*", "*big and small*" (nine instances), and "*thick and thin*" (four repetitions).

The second stimulus tested the common metaphor of "*MUSICAL FORCE*", through the construct of "*weaker*" and "*stronger*" tones [the strict English equivalents here would be "*softer"* and "*louder*"]. Two tones were played, equal in all segments but dynamic (piano and forte). There were 20 adjective pairs, classified as in Table 3:

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Table 3

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The distribution for the entire sample and by stratum is presented in Table 4:

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Table 4

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Quite clearly, the perception of tones as "*stronger*" and "*weaker*" is dominant in respondents: there was a total of 67 such responses, or 74.4%. The obvious image schema that these utterances were based on belongs to the FORCE group, most likely COMPULSION (Johnson, 1987: 45). The musicians and Serbian nonmusicians understood the relation as that of forces in 93.3% and 90% of the cases respectively. Though much less frequent, this was the most prevalent response in Roma children, too (40%). The metaphor of sizes was also common among the Romanies (30%). Altogether, there were three nonmetaphorical replies and six unclear categorizations, and they were all provided by the Romani population. In short, the difference in the responses of the Roma children, as compared with musicians and Serb nonmusicians, is significant ($\chi^2$=31.337 *df*=6; *p*=.00).

The commonest responses we will use for cross-domain mapping below will be "*weak and strong*", "*letting go and pushing*", and "*sparser and denser*" (the final two were mentioned twice each, in the Romani stratum).

The third stimulus tested the metaphor of "*MUSICAL MOTION*", i.e. perception of pitch progressions as velocities. Children heard two short melodies, equal in all segments but tempo – the first one was played at 60 and the second at 120 beats per minute. There was a total of 20 different responses, coded as in Table 5:

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Table 5

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With such a classification, we get the following distribution (Table 6):

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Table 6

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The metaphor of musical motion, i.e. pitches moving at different velocity, is dominant here (60 replies, or 66.7%). The remaining categories contained but a few responses, while the number of unclear replies increased (13.3%). There were no statistically significant differences among the strata ($\chi^2$=12.400 *df*=10; *p*=.26). Therefore, the metaphor of "*MUSICAL MOTION*", in particular its variant "*MOVING MUSIC"* proposed by Johnson & Larson (2003: 70), seems to be well rooted in all three population groups.

In this stimulus we had fewer interesting metaphors for the mapping analysis. In addition to "*slow and fast*" tones, we opted for the response of one child that tones were "*becoming heavier and lighter*", and also for the referential construction of a musician "*as if they're competing who's gonna arrive first*".

The fourth stimulus offered two short tunes, equal in all respects but articulation (staccato and legato), played on the digitally sampled instrument which simulated the simultaneous sound of twelve violins. We did not use the sound of the grand piano in this stimulus only as true legato cannot be properly played on that instrument. This musical excerpt caused the most responses - 44 antonym pairs in all (Table 7):

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Table 7

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From this classification, the answer distribution followed, as presented in Table 8:

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Table 8

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With only 3.3% of nonmetaphorical replies, this example managed to arouse a lot of imagination in the participants. However, the creativity resulted in quite a few unclear categorizations (16.7%) and the need for us to classify a number of responses into two broad groups (extramusical motion and extramusical description). In the distribution, the most dominant are the "*LINK*" and *"EXTRAMUSICAL MOTION"* metaphors (26.7% each). Articulation viewed as quality, extramusical description and size follows. By group, we notice the increase of referential descriptions among the Romanies and in particular Serb nonmusicians as opposed to musicians, and also the dominant position that the "*LINK*" metaphor has taken in musicians ($\chi^2$=21.977 *df*=12; *p*=.04). A likely interpretation is that this commonest response represents a very basic form of the LINK schema originally proposed by Johnson (1987: 117).

This pair of stimuli offered a lot of individual utterances interesting for analysis. By frequency, we selected three: the most typical one, labeling tones "*short and long*", the one depicting two tunes as "*abrupt and linked*" (three repetitions) and as movement resembling "*hopping and walking*" (three repetitions).

The final, fifth stimulus brings us back to another typical relation of western tonal music, the metaphor of "*SCALE*", commonly visualized as a vertical axis along which tones move back and forth. In this example, we received a total of 38 responses, which we subsequently coded as follows (Table 9):

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Table 9

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The distribution of answers provided the result in Table 10:

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Table 10

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This pitch sequence was predominantly perceived as motion along the vertical axis: the first eight tones "*moved upward*", and the next eight went back, "*downward"*. Second by position, but considerably trailing behind, is the perception of the same tones on the horizontal axis, where the former "*move forward"*, and the latter "*backward"*. Apart from the rare instances of musical force and size (10.0%), five nonmetaphorical and five unclear replies (11.1% in all), the metaphor of vertical movement seems to be quite well rooted in our population. By stratum, we notice a $p<.05$ statistical significance for the differences in distribution ($\chi^2$=18.050 *df*=8 *p*=.02). Musicians predominantly conceived of this musical motion as vertical (83.3%). The tendency is a bit less obvious among Roma (53.3%) and Serb nonmusicians (50%). However, this conceptualization occupies the first position in all three groups. Serb nonmusicians viewed this relation more as horizontal movement (30.0%), while Roma nonmusicians provided the most unclear and nonmetaphorical replies. Even though the SCALE image schema (Johnson, 1987: 122) might be a possible motivation behind these responses, there also seems to be a sense of a starting and ending point in musical scales. Thus, our proposed underlying structure here is the SOURCE-PATH-GOAL schema, which Saslaw (1996: 220) quotes as ubiquitous in music theory.

The metaphorizations from this example that we will use for the mapping analysis will be presented as three versions of musical motion produced by our respondents:

"*upward and downward*" (the most typical verbalization), "*forward and backward*" (seven instances), and "*start and goal*" (three instances).

## Discussion

The first hypothesis claimed that the language used by our participants to describe music would be predominantly metaphorical. Metaphor indeed was the dominant mechanism in the construction of "musical meaning" so defined. Yet, it was not all-present. In certain cases, children were not able to say anything about the tones they had heard ("no answer"), or they named instruments or used technical expressions in Italian ("legato and staccato", "forte and piano").[3] Such cases turned out to be very rare. The percentage of nonmetaphorical replies per stimulus ranged from 1.1% to 5.6%. On average, the inability to verbalize a musical relation by means of a metaphor emerged in only 3.1% responses in all five stimuli. This tendency is even better seen in absolute figures. Our research contained a total of 450 responses (five stimuli by ninety respondents). Out of this, we had only 14 clearly nonmetaphorical replies.

In some cases, children did not construct a coherent antonym pair ("unclear"). Strictly speaking, these answers were also metaphorical, but they failed to fulfill our original expectation that clear antonyms would naturally emerge from the perception of strongly opposed musical elements. In effect, what our respondents did here was map concepts by means of two source domains instead of one ("smaller and louder", "deep and strong", "thinner and longer", etc). To our knowledge, such a situation is not predicted by Lakoff and Johnson's theory and may require attention in further research. Still, even if we count both nonmetaphorical and unclear replies together as instances of absence of conceptual metaphor, the number of such cases remains comparatively small, amounting, on average, to 12.64% responses, or, in total figures, 58 replies out of 450. In

other words, even if this stricter criterion is applied, the number of clearly metaphorical responses remains convincingly high (87.36% - almost nine tenths of all answers).

This result suggests that the first hypothesis has been confirmed: if not fully so, our respondents' experience of the five fundamental musical relations is predominantly metaphorical. This, perhaps, provides some confirmation that metaphor is the basic means the human mind uses in conceptualizing music. Furthermore, this might mean that the conceptual theory of metaphor may give us a solid grounds for the theoretical coverage of the problem we sometimes call musical meaning.

According to Lakoff and Johnson's thesis of embodied mind, metaphors obtained from our children would be based on the extension of the early experience in which their bodies interacted with the environment. If we are correct in the assumption that the commonest conceptualizations our children have provided can be based on image schemas, then we might conclude that musical metaphorization is based on embodiment. More precisely, it seems that pitches are typically mapped according to the VERTICAL ORIENTATION (Lakoff, 1987) or EXPANSION schema (Turner, 1991). Dynamics seems to be largely based on the FORCE schema (Johnson, 1987), while scales are comprehended according to the schema SOURCE-PATH-GOAL (Johnson, 1987; Saslaw, 1996). Legato and staccato articulation are commonly interpreted in keeping with the LINK schema (Johnson, 1987), but there is much less agreement among the respondents here than there is in the remaining examples. Finally, tempo change seems to be based not on a single image schema, but on "*MUSICAL MOTION*", a more complex metaphorical construct (Johnson & Larson, 2003).

Of course, any semantic generalization has a grain of arbitrariness to it. It remains the task of the embodied mind theory to further substantiate its theses by both theoretical

arguments and empirical research. From our perspective, the embodiment idea in musical comprehension seems plausible. However, it strongly depends on the acceptance of the theoretical position of embodied realism. While our findings seem to support it, some caution is necessary and further research warranted.

The second hypothesis claimed that there would be significant differences in the conceptualizations of musicians and nonmusicians. This hypothesis has been corroborated, too. In the results section we listed distributions classified into three strata. Subsequently, we recoded the sample into only two strata – musicians and nonmusicians (both Serbian and Roma). The distribution of conceptual metaphors for such two groups was different in all examples but the third (velocity) and fourth (articulation) ($p<.05$). Since the moving music metaphor and its constituent concept of speed of motion seem to be well-rooted, the lack of difference in that particular example sounds logical. In the articulation example there were no differences either, but even here musicians used standardized terms from Western music theory much more commonly. This can be best seen by looking at the extramusical motion and extramusical description categories taken together: there were 45% such responses provided by nonmusicians, and only 23.3% given by musicians.

This finding can tell us a bit about the influence of enculturation on the development of metaphorical constructs. In naïve respondents, there seem to be more possibilities for constructing metaphors than in educated musicians. Let us take "*high and low*" pitches as an example. With musicians (90%), these are almost denotations, as the metaphor is fully conventionalized. In Serb nonmusicians (46.7%), the conventionalization is partly complete, while in Roma nonmusicians (10.0%), this seems to be an instantly made metaphor, equal in importance to the concept of "*big and small*"

tones. Novel musical metaphor seems to emerge from biological and experiential necessities, while conventionalized metaphor might be a consequence of pressure imposed by education. From all the mappings possible, society chooses one, adopts it into its language, and encourages its use in the educational system, eventually conventionalizing the term. The age of eleven, that we considered here, seems to be the borderline around which metaphorical concepts become rooted. On the one hand, much younger children would not have had fully developed mental abilities to construct metaphors.[4] Again, eleven year olds had already had enough contact with the terminology, at least in musical education classes in primary schools, so that, in some examples, musically untrained Serbian children provided responses similar to those of young musicians. Thus, it was on the Roma participants, children from an allegedly very musical community, but still an ethnic minority, who speak a different language, and unfortunately often come from the social fringes and do not care much about musical education classes, to provide for the differences and give us the suspected "natural" metaphors. This leads us to the third prediction.

The third hypothesis claimed that there would be differences in the construction of musical metaphors between Romani and Serbian children. To test this thesis, we separately compared the distributions of coded responses between the Roma and the Serb nonmusicians, and also between the Roma and the musicians. In order to reach a balanced judgment in this sensitive part of the study, we also compared the achievement of musicians and Serb nonmusicians. It turned out that Serb nonmusicians and musicians differed in two distributions out of five ($f_4$-$f_5$, octave up-down, $p<.05$). The difference between Serb nonmusicians and Roma nonmusicians occurs in two cases, too ($f_4$-$f_5$, $c_4$p-

$c_4$f). Likewise, the distribution of answers of the Roma statistically differs from that of Serb musicians in two out of five examples *(*$f_4$-$f_5$, $c_4$p-$c_4$f).

Thus, the third hypothesis remains uncorroborated. There are differences in musical conceptualization between Serbian musicians and Romani respondents in two cases out of five and this is not very different from the situation between Serbian musicians and Serbian nonmusicians. Reasons for this may be numerous, and this study will not speculate about them. We wish to stress that the partial difference between the conceptualizations of young persons from the two ethnic groups should not be interpreted in a value-based way. Rather, it should be used as an impetus to find a more universal basis for metaphor generation. In that respect, the occasional different reaction of the Romani children was valuable: much more than musicians, and a bit more than Serb nonmusicians, they were the real naïve population in terms of being unfamiliar with the musical jargon. Precisely their verbal reactions have helped us arrive at the metaphorical common ground which may lie beneath surface differences.

Along the lines of the fourth hypothesis, a mapping analysis of some of the metaphors the children have uttered might suggest a more universal basis for seemingly different conceptualizations. We shall now present three typical individual responses for all five stimuli and attempt to analyze them by cross-domain mapping. The goal is to test if apparently different conceptualizations are actually mapped by similar relations between source and target domains, which would suggest that there is a common underlying basis beneath the seemingly divergent metaphors.

The three typical utterances from the first stimulus pair ("*low and high*", "*small and big*", "*thick and thin*") may be mapped as follows:

PITCHES ARE HEIGHTS low and high

| SOURCE DOMAIN | → | TARGET DOMAIN |
|---|---|---|
| Series of dots along the line | = | Music |
| 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 | = | Music |
| 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 | = | Music |
| Thicker object | = | Lower frequency |
| Thinner object | = | Higher frequency |
| Horizontal axis, width proportion | = | Key |
| Expansion of the axis | = | Change of frequency |

The domains metaphorizing pitches seem to be different. Yet, these are actually all basic quantities related to length, and clearly involve proportions. All three relations are geometric and conceptualize music through the visual-spatial domain. The lower frequency tone is at one end of the spectrum, and the high frequency tone is at the other. The spectrum is comprehended as a space in which tones within a key are physically stored. The change of the tone means the change of the position in the spectrum, or the change of the spectrum's shape, from one extreme towards the other. A universal interpretation, based on the VERTICAL ORIENTATION and EXPANSION image schemas, seems plausible.

The second stimulus provided the metaphors of "*weak and strong*" [soft and loud], "*letting go and pushing*", and "*thin and dense*". Potential mappings follow:

PITCHES ARE FORCES, weak and strong

| SOURCE DOMAIN | ⟶ | TARGET DOMAIN |
|---|---|---|
| Physical force | = | Music |
| Weaker force | = | Piano tone |
| Stronger force | = | Forte tone |
| Force range | = | Dynamic |
| Change of force intensity | = | Change of dynamic |

PITCHES ARE PRESSURES letting go and pushing

| SOURCE DOMAIN | ⟶ | TARGET DOMAIN |
|---|---|---|
| Physical pressure | = | Music |
| Weaker pressure | = | Piano tone |
| Stronger pressure | = | Forte tone |

| | | |
|---|---|---|
| Pressure range | = | Dynamic |
| Change of pressure intensity | = | Change of dynamic |

PITCHES ARE DENSITIES thin and dense

| SOURCE DOMAIN | ⟶ | TARGET DOMAIN |
|---|---|---|
| Physical density | = | Music |
| Smaller density | = | Piano tone |
| Bigger density | = | Forte tone |
| Density range | = | Dynamic |
| Change of density | = | Change of dynamic |

Here, too, we find physical quantities and a spectrum containing two extremes. Tones are conceptualized as entities whose properties change under external influence, where the intensity of the influence is proportionate to the loudness of the resulting tone. The spectrum of all influences provides the range of tone dynamic. The three conceptualizations seem to share a common ground in at least these three elements, strongly based on the idea of FORCE, in particular the COMPULSION schema.

Typical metaphors in the third stimulus were: "*slow and fast*", "*becoming heavier and lighter*", and "*competing who will arrive first*". The mappings that follow elaborate on the proposal by Johnson & Larson (2003: 70):

PITCHES ARE VELOCITIES slow and fast

| SOURCE DOMAIN | ⟶ | TARGET DOMAIN |
|---|---|---|
| Velocity | = | Tempo |
| Musical motion | = | Sequencing of tones |
| Bodies moving | = | Tones |

| | | |
|---|---|---|
| Smaller velocity | = | 60bpm tune |
| Bigger velocity | = | 120bpm tune |
| Change of velocity | = | Change of tempo |

PITCHES ARE WEIGHTS heavy and light

| SOURCE DOMAIN | ⟶ | TARGET DOMAIN |
|---|---|---|
| Weight | = | Tempo |
| Movement of different weights | = | Sequencing of tones |
| Bodies of varying weight | = | Tones |
| Motion of greater weight | = | 60bpm tune |
| Motion of smaller weight | = | 120bpm tune |
| Change of weight moving | = | Change of tempo |

PITCHES ARE RACES arrive first, second

| SOURCE DOMAIN | ⟶ | TARGET DOMAIN |
|---|---|---|
| Race | = | Tempo |
| Competition, who comes first | = | Sequencing of tones |
| Runners | = | Tones |
| Slower runner | = | 60bpm tune |
| Faster runner | = | 120 bpm tune |
| Change of running speed | = | Change of tempo |

All three mappings metaphorize music as motion. This tendency was obvious in all stimuli in which we compared tone sequences, rather than individual tones, so it seems

to be potentially close to musical conceptual universals. In all three cases, tones are physical bodies, and the succession of the tones corresponds to the movement of those bodies. The motion is metaphorized as a pure ratio of velocities, but also as movement from heavier to lighter objects, where this might be the physical quantity of weight, but also the tendency of the slower melody to move with more difficulty (weighted), and the faster one with less problems (lighter). The third example uses a referential metaphor, where the musical event is related to images from the extramusical world. Still, in this association, too, the concept of velocity remains important for the description. Thus, following Johnson and Larson, we find an underlying universal basis, even more so since the velocity metaphor was overwhelmingly dominant in the entire sample.

In the fourth example, we analyze the responses describing staccato and legato tones as "*short and long*", "*abrupt and linked*", and "*hopping and walking*".

PITCHES ARE LENGHTS short and long

| SOURCE DOMAIN | ⟶ | TARGET DOMAIN |
|---|---|---|
| Straight line | = | Music |
| Line length | = | Tone duration |
| Dot | = | Shortest tone |
| Short line | = | Short tone |
| Long line | = | Long tone |
| Blanks between lines | = | Pauses between tones |

PITCHES ARE LINKAGES abrupt and linked

| SOURCE DOMAIN | ⟶ | TARGET DOMAIN |
|---|---|---|
| Linked elements | = | Music |

| | | |
|---|---|---|
| Amount of linkage | = | Tone duration |
| Abrupt element | = | Shortest tone |
| Separated element | = | Short tone |
| Linked element | = | Long tone |
| Link interruptions | = | Pauses between tones |

PITCHES ARE WAYS OF WALKING hopping and walking

| SOURCE DOMAIN | ⟶ | TARGET DOMAIN |
|---|---|---|
| Way of walking | = | Music |
| Type of walking | = | Tone duration |
| Hopping | = | Shortest tone |
| Stepping | = | Short tone |
| Walking | = | Long tone |
| Distance between steps | = | Pauses between tones |

In this case the participants have used visual constructs as target domains, where the first two seem to be image-schematic, while the third one introduces another variant of the motion metaphor. Objects (dots, lines, abrupt and linked elements, legs that walk) become tones, their size and relatedness decides whether the tones are of long or short duration, while the interruption of any action the elements are performing is experienced as a pause (blank space between the lines, interrupted link, distance between steps). These seem to be three abstract elements lying behind the allegedly different metaphorical actualizations and all of them may be based on the LINK image schema.

The final, fifth stimulus again introduced the metaphor of musical motion, the directed movement of tones in keys. Typical conceptualizations for this were "*upward*

*and downward*", "*forward and backward*", and "*start and goal*". It is not difficult to find a common source for the three mappings:

PITCH SEQUENCING IS VERTICAL MOVEMENT upward and downward

| SOURCE DOMAIN | ⟶ | TARGET DOMAIN |
|---|---|---|
| Vertical line | = | Music |
| Vertical axis | = | Organization of tones in the key |
| Points on the axis | = | Tones |
| Movement upward | = | Pitch sequencing toward final tone |
| Movement downward | = | Pitch sequencing back to initial tone |

PITCH SEQUENCING IS HORIZONTAL MOVEMENT forward and backward

| SOURCE DOMAIN | ⟶ | TARGET DOMAIN |
|---|---|---|
| Horizontal line | = | Music |
| Horizontal axis | = | Organization of tones in the key |
| Points on the axis | = | Tones |
| Movement forward | = | Pitch sequencing toward final tone |
| Movement backward | = | Pitch sequencing back to initial tone |

PITCH SEQUENCING IS DIRECTED MOVEMENT start and goal

| SOURCE DOMAIN | ⟶ | TARGET DOMAIN |
|---|---|---|
| Directed line | = | Music |
| Oriented axis | = | Organization of tones in the key |
| Point on the axis | = | Tones |

| | | |
|---|---|---|
| Movement toward the goal | = | Pitch sequencing toward final tone |
| Movement toward the start | = | Pitch sequencing back to initial tone |

The common image-schematic conceptualization is obvious here. In all three utterances one finds movement on points along the axis, where motion in one direction implies the change of tones toward the fourth octave, while the reverse pitch sequencing is experienced as the change back toward the third octave. Whether this motion is vertical, horizontal or more abstractly "directed" (toward a goal), seems secondary. The underlying SOURCE-PATH-GOAL schema is likely in the first two mappings, and obvious in the third.

These were some typical metaphors that our respondents uttered. They suggest that there might be a common underlying pattern in the seemingly disparate conceptualizations of musical relations. Yet, we must not forget the drawbacks of this analysis. The fact remains that we have chosen the utterances to analyze – not without a criterion, as they were selected by the rate of occurrence, but the frequency was often small in comparison to the entire sample. However, even if they are derived by means of a liberal induction from only a few examples, some tendencies are obvious and seem to support the thesis of the bodily basis of musical metaphor.

## Conclusion

In the present study, metaphor has shown to be dominant in children's description of five musical relations. There have been some differences between the groups, but many of them have only served to reveal deeper image schematic similarities. Especially in the examples of musical motion, force, and musical pitches distributed along an axis, children usually provided prompt and easy answers to our questions. This makes one

wonder whether such verbalizations are a mere artificially induced linguistic description or, at least in part, the children's authentic experience of music (as claimed by some music semioticians, for instance, Hatten, 1995).

More research is obviously needed to address this problem. After our little quest for a universal basis of musical metaphor, and the resulting prevalence of the visual and spatial concepts in the source domains, we believe that further studies should involve more diversified samples: to include respondents from various cultural and linguistic backgrounds, and, perhaps, respondents with congenital impairments (especially visual: for but one possible application see Rigas & Alty, 2005). This may help us better understand the nature of metaphor in general, and the construction of musical understanding in particular. With the few data we obtained, however, we remain convinced that metaphorization is one of the principal mechanisms humans use to comprehend music.

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## Footnotes

1) Still, we broke this principle in two cases: if a child would persistently classify all the examples with the same pair of antonyms (e.g. "*low and high*"), and if we noticed obvious transfer, where in each example that followed the child would use the antonyms it provided in the previous stimulus. In such cases, we asked the respondent to describe the relation "in another way" and took down this second verbal reaction (there were 32 such instances out of the total 450 responses).

2) The statistical constraints unfortunately resulted in blending some potentially diversifiable classes in stimuli 4 and 5. We hope to avoid such possible inconsistencies in future research with larger samples.

3) One should not forget that these terms have metaphorical origins, too: "legato" means tied together, and "staccato" is detached. "Forte" is strong, and "piano" is weak [soft]. Still, these are conventionalized metaphors, and also in a foreign language. For the children from our group, such examples were equally denotative instances of naming as the terms "violin" or "sound".

4) This was confirmed in our pilot research with children aged seven and eight – responses were overwhelmingly "*weak and strong*" [soft and loud], with no diversification comparable to the one we are describing in the present study.

Table 1.

*Metaphor 1. $f_4$-$f_5$. List of responses and coding.*

| |
|---|
| 1. PITCHES ARE HEIGHTS: lower and higher, deeper and shallower, deep and high, medium and higher, heightened and lowered, lower and upper |
| 2. PITCHES ARE SIZES: smaller and bigger, medium and bigger, thicker and thinner, shorter and longer, of medium size and bigger |
| 3. PITCHES ARE QUALITIES: happy and sad, sad and joyful, better and worse, harsher and gentle, harsher and cleaner, peaceful and gone wild |
| 4. PITCHES ARE FORCES (STRENGTH AND MOTION): slower and faster, stronger and weaker, more audible and softer, more audible and weaker, weaker and stronger |
| 5. UNCLEAR: *deep and shrill; normal and higher; smaller and higher, strong and smaller |
| 6. NO METAPHOR: don’t know, silence |

Table 2.

*Metaphor 1. $f_4$-$f_5$. Answer distribution.*

| *Metaphor* | *Musician* | | *Serb* | | *Roma* | | *TOTAL* | |
|---|---|---|---|---|---|---|---|---|
| *"PITCHES ARE HEIGHTS"* | 27 | 90% | 14 | 46.7% | 3 | 10.0% | 44 | 48.9% |
| *"PITCHES ARE FORCES"* | 0 | 0.0% | 7 | 23.3% | 9 | 30.0% | 16 | 17.8% |
| *"PITCHES ARE SIZES"* | 0 | 0.0% | 4 | 13.3% | 13 | 43.3% | 17 | 18.9% |
| *"PITCHES ARE QUALITIES"* | 2 | 6.7% | 2 | 6.7% | 2 | 6.7% | 6 | 6.7% |
| Unclear | 0 | 0.0% | 2 | 6.7% | 3 | 10% | 5 | 5.6% |
| no metaphor | 1 | 3.3% | 1 | 3.3% | 0 | 0.0% | 2 | 2.2% |
| TOTAL | 30 | 100% | 30 | 100% | 30 | 100% | 90 | 100% |

Table 3.

*Metaphor 2. $c_4$p-$c_4$f. List of responses and coding.*

| |
|---|
| 1. PITCHES ARE FORCES: softer and louder, softer and stronger, *a bit and more strongly hit, weak and louder, normally and strongly played, weaker and stronger, letting go and pushing |
| 2. PITCHES ARE SIZES: (height, width or density): lower and higher, deeper and shallower, it is heard less and more, longer and shorter, more and less long, the second one becomes bigger, sparser and denser |
| 3. UNCLEAR: smaller and louder, silent and higher, soft and high, deep and strong |
| 4. NO METAPHOR: piano and forte, silence |

Table 4.

*Metaphor 2. $c_4p$-$c_4f$. Answer distribution*

| *Metaphor* | *Musician* | | *Serb* | | *Roma* | | *TOTAL* | |
|---|---|---|---|---|---|---|---|---|
| *"PITCHES ARE FORCES"* | 28 | 93.3% | 27 | 90.0% | 12 | 40.0% | 67 | 74.4% |
| *"PITCHES ARE SIZES"* | 2 | 6.7% | 3 | 10.0% | 9 | 30.0% | 14 | 15.6% |
| Unclear | 0 | 0.0% | 0 | 0.0% | 6 | 20.0% | 6 | 6.7% |
| no metaphor | 0 | 0.0% | 0 | 0.0% | 3 | 10.0% | 3 | 3.3% |
| TOTAL | 30 | 100% | 30 | 100% | 30 | 100% | 90 | 100% |

Table 5.

*Metaphor 3. 60bpm-120bpm. List of responses and coding.*

| |
|---|
| 1. MUSICAL MOTION – PITCHES ARE VELOCITIES: slower and faster, as if they are competing who's gonna arrive first, slow and quick, of medium speed and quicker |
| 2. PITCHES ARE SIZES: lower and higher, smaller and bigger, smaller and higher |
| 3. PITCHES ARE FORCES: stronger and weaker, strong and soft, becoming heavier and lighter, strong and normal |
| 4. PITCHES ARE QUALITIES: simpler and more complex, uglier and more beautiful, happy and sad |
| 5. UNCLEAR: easy and quick, stronger and good, beautifully played and sort of..., smaller and medium, smaller and faster |
| 6. NO METAPHOR: silence |

Table 6.

*Metaphor 3. 60bpm-120bpm. Answer distribution (by stratum)*

| *Metaphor* | *Musician* | | *Serb* | | *Roma* | | *TOTAL* | |
|---|---|---|---|---|---|---|---|---|
| *"PITCHES ARE VELOCITIES(MOTION)"* | 23 | 76.7% | 21 | 70.0% | 16 | 53.3% | 60 | 66.7% |
| *"PITCHES ARE FORCES"* | 1 | 3.3% | 1 | 3.3% | 3 | 10.0% | 5 | 5.6% |
| *"PITCHES ARE SIZES"* | 3 | 10.0% | 1 | 3.3% | 2 | 6.7% | 6 | 6.7% |
| *"PITCHES ARE QUALITIES"* | 1 | 3.3% | 4 | 13.3% | 1 | 3.3% | 6 | 6.7% |
| unclear | 2 | 6.7% | 3 | 10.0% | 7 | 23.3% | 12 | 13.3% |
| no metaphor | 0 | 0.0% | 0 | 0.0% | 1 | 3.3% | 1 | 1.1% |
| TOTAL | 30 | 100% | 30 | 100% | 30 | 100% | 90 | 100% |

Table 7.

*Metaphor 4. Staccato-legato. List of responses and coding.*

| |
|---|
| 1. PITCHES ARE LINKS: broken and prolonged, hops and is linked, abrupt and linked, individual and put together, it is cut into pieces and it goes on, shortened and linked, separated and put together, shorter and longer tones |
| 2. PITCHES ARE SIZES: lower and higher, deeper and higher |
| 3. PITCHES ARE EXTRAMUSICAL MOTION: heading for a goal and reaching the goal, *hits and waits and holding to the full, old-fashioned and modern dancing, steps [as in walking] and ambulance, patting and treading, a watch and a ship, hopping and standing still, hopping and strolling, hopping and walking, running away and rushing, sneaking and expectation, sings and dances, walks slowly and quickly, sneaking and ambulance, jumping and walking, *stiller and stronger motions, stronger and walks slowly |
| 4. PITCHES ARE EXTRAMUSICAL DESCRIPTION: fairy tale and reality, like children and adults, droplets and bigger drops, alive and dead, the sun and the wind, white and black |
| 5. PITCHES ARE QUALITIES: bright and spooky, abrupt and slower, joyful and sad, cleaner and less clean, easier and more difficult |
| 6. UNCLEAR: thinner and longer, quicker and longer, *clacks and bows the violin, normal and more audible, “tra pra pra” and piano |
| 7. NO METAPHOR: staccato and legato, silence |

Table 8.

*Metaphor 4. Staccato-legato. Answer distribution*

| *Metaphor* | *Musician* | | *Serb* | | *Roma* | | *TOTAL* | |
|---|---|---|---|---|---|---|---|---|
| *"PITCHES ARE LINKS"* | 14 | 46.7% | 5 | 16.7% | 5 | 16.7% | 24 | 26.7% |
| *"PITCHES ARE MOTION"* | 6 | 20.0% | 9 | 30.0% | 9 | 30.0% | 24 | 26.7% |
| *"PITCHES ARE QUALITIES"* | 4 | 13.3% | 6 | 20.0% | 3 | 10.0% | 13 | 14.4% |
| *"PITCHES ARE DESCRIPTION"* | 1 | 3.3% | 5 | 16.7% | 0 | 0.0% | 6 | 6.7% |
| *"PITCHES ARE SIZES"* | 1 | 3.3% | 1 | 3.3% | 3 | 10.0% | 5 | 5.6% |
| Unclear | 3 | 10.0% | 4 | 13.3% | 8 | 26.7% | 15 | 16.7% |
| no metaphor | 1 | 3.3% | 0 | 0.0% | 2 | 6.7% | 3 | 3.3% |
| TOTAL | 30 | 100% | 30 | 100% | 30 | 100% | 90 | 100% |

Table 9.

*Metaphor 5. Octave up-down. List of responses and coding.*

| |
|---|
| 1. PITCH SEQUENCING IS VERTICAL MOTION: uphill and downhill, climbing and getting down, lower to higher and higher towards lower, upward and downward, elevating and lowering, scale up and down, *increase upwards and lowering, they are ascending and descending, going up and down, rising and falling, from deeper to higher and the other way round, climbing the stairs and going down, getting up and getting down, high and low motion, upwards and downwards, higher and reducing, walks more up and less up, upstairs and then you go back, climbing and descending, running up there and then getting back down |
| 2. PITCH SEQUENCING IS HORIZONTAL MOTION: octave forward and backward, I walk forward and then I come back, to the front and to the reverse, forwards and backwards, from the first to the last and the other way round, start and finish, from beginning to end and the other way round, softer then louder and then back, getting thicker and then thinner, butterfly flapping its wings forward and then back |
| 3. PITCH SEQUENCING IS THE SUCCESSION OF FORCES/SIZES: slower and faster, stronger and weaker, longer and shorter, longer and smaller, a short and long one, faster and slower |
| 4. UNCLEAR: up and then back; going forward and down. |
| 5. NO METAPHOR: silence |

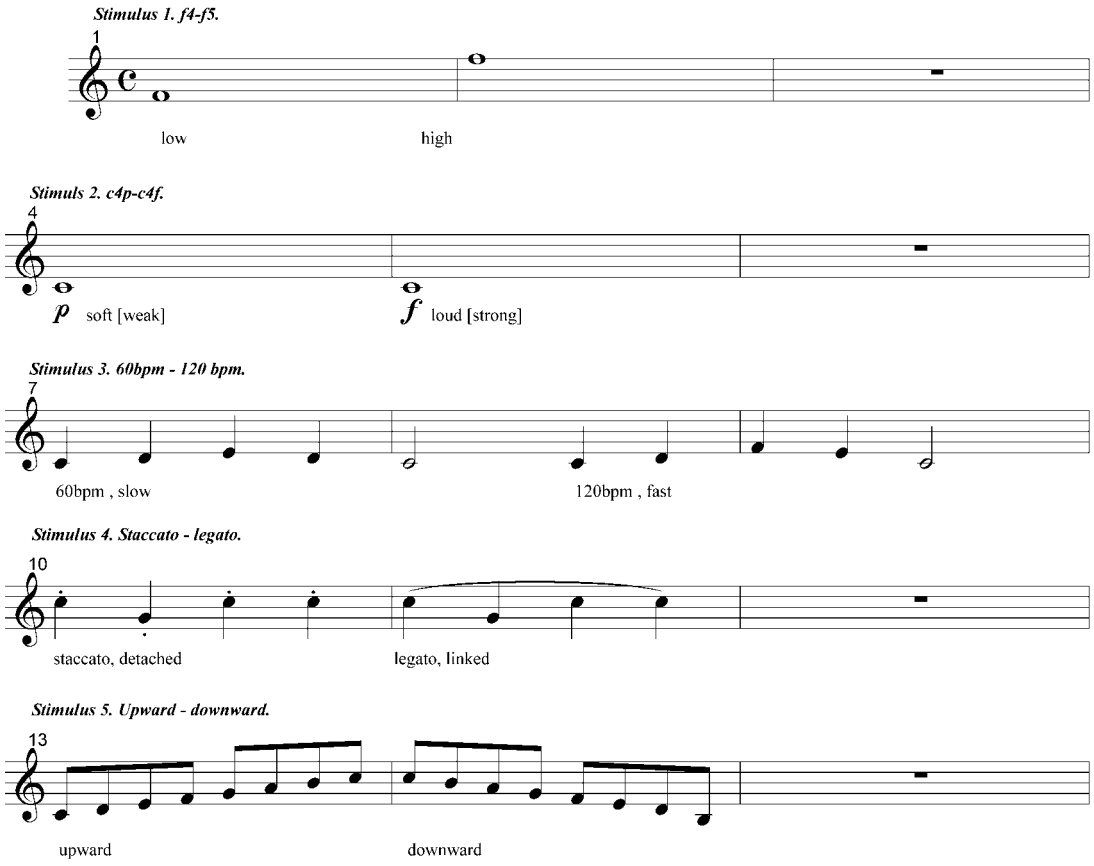
Table 10.

*Metaphor 5. Octave up-down. Answer distribution*

| *Metaphor* | *Musician* | | *Serb* | | *Roma* | | *TOTAL* | |
|---|---|---|---|---|---|---|---|---|
| *"PITCHES ARE VERTICAL MOTION"* | 25 | 83.3% | 15 | 50.0% | 16 | 53.3% | 56 | 62.2% |
| *"PITCHES ARE HORIZONTAL MOTION"* | 3 | 10.0% | 9 | 30.0% | 3 | 10.0% | 15 | 16.7% |
| *"PITCHES ARE FORCES AND SIZES"* | 1 | 3.3% | 4 | 13.3% | 4 | 13.3% | 9 | 10.0% |
| unclear | 0 | 0.0% | 2 | 6.7% | 3 | 10.0% | 5 | 5.6% |
| no metaphor | 1 | 3.3% | 0 | 0.0% | 4 | 13.3% | 5 | 5.6% |
| TOTAL | 30 | 100% | 30 | 100% | 30 | 100% | 90 | 100% |

Figure Captions

*Figure 1. The musical stimuli.*


Stimulus 1. f4-f5.
1
low
high
Stimuls 2. c4p-c4f.
4
p soft [weak]
f loud [strong]
Stimulus 3. 60bpm - 120 bpm.
7
60bpm , slow
120bpm , fast
Stimulus 4. Staccato - legato.
10
staccato, detached
legato, linked
Stimulus 5. Upward - downward.
13
upward
downward