

Musical Metaphors: Innate and Objective

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Abstract

As in the recent approach cognition is embodied and metaphor theory of meaning metaphoricity of music is a topic that is mostly studied in cognitive musicology and cognitive linguistics and should be studied from the perspective of cognitive scientists. Musicologists use metaphors to describe the musical system itself in the music theory, music psychologists also use metaphors to describe perceptual facts like a tone is higher as in it resonates somewhere higher in the body or conceptual as in the tone's place in the musical spectrum. This conceptual part tells us that this kind of metaphor derives from a more complex activity of the cognitive system, a complex interaction of the environment with human posture and bodily movement during cognition of music. Metaphors are always in account when describing music. In my research I will try to determine if the musical metaphors are innate and objective by analysing how human posture and movement interacts in describing music by researching on bodily metaphors called image schemas using methods similar to Mihailo Antovic(2014) where he presents 5 different sound stimuli to children subjects and asks them to describe their experience and then analysing the subject answers using the image schemas and conceptual metaphor theory. The results showed musical comprehension is metaphorical and image schemas employed in subjects metaphors. In this research I examined a broader age range and compared musical instrument players and non players to see if their comprehension of music is also metaphorical and which image schemas they employ in metaphors. I used 9 different sound stimuli and 7 different image schemas to analyse with. According to results of this study, body-environment interactions which are related to force image schemas utilized in the metaphors the most.

Keywords: Conceptual blending theory; conceptual metaphor theory; embodied mind; image schemas.

1. INTRODUCTION

In Conceptual Metaphor Theory (CMT), it is argued that understanding occurs by simulating one concept via another and thinking is metaphor. (Lakoff & Johnson, 1980) It became an issue that metaphors are not only an artistic tool for poetry but a way of thinking and understanding in the Lakoff and Johnson's book "Metaphors we live By". The definition for conceptual metaphor is "to understand one thing in terms of another" (Lakoff & Johnson, 1980) means that thinking and trying to understand the elements of experience A by matching them to the elements of another (experience B). We try to map the new concept's elements to the one we already know.

Image schemas are the basic, primary concepts for metaphors; they are the ones that we cannot liken to another concept and they are about body's postural adjustments, movements and interactions.

Conceptual Blending Theory (CBT) is another theory of thought and meaning (Fauconnier & Turner, 2008) it differs from CMT with its domains and interactions of the domains' and it is possible that some of the basic image schemas or metaphors emerged by blending. As they (image schemas) emerge they are also functioning to help emerge others," image schemas are connectors to create meanings" in CBT (Ox, 2015).

Metaphors occur not only in language but also in and between other modalities like music, visuals, spoken language, gesture. If it is true that metaphor is the way of thinking, understanding, reason and action; metaphors should be multimodal (Forceville & Urios-Aparisi, 2009), it should appear in other modes such as understanding music. There are many empirical studies about music and metaphor which shows music comprehension is metaphorical and also in music theory most of the terms to explain musical rules are metaphorical and the metaphors are about bodily movement and posture.

In my thesis I will determine if music perception is metaphorical in different age groups, gender groups and musical instrument player and non player groups and which image schemas people mostly use in their metaphors and if the schemas employed are similar when explaining what they hear among these groups by analysing the metaphors used for describing musical experience and similarities of schemas in metaphors in different groups. In Antovic's study he tested musically trained and non trained children with 5 different sound stimuli and examined the children's descriptions of the stimuli with 5 different image schemas, he presented stimuli to the subjects and asked them to explain verbally "how was the sounds like ?" after the responses gathered he analysed the responses to see if metaphors are engaged in the responses and which schemas employed in the metaphors. As a result he found out that music cognition

is metaphorical and image schemas were applied and matched with specific sound stimuli. He did the research with image schemas to see if human posture and body movements play a role when constructing metaphors about music. He also determined which metaphor process CMT or CBT was utilized in subjects' metaphors by analysing the domains of metaphors. I will do the analysis with 7 schemas and 9 stimuli and with different groups of subjects than Antovic's (2009) and with different description methods.

1.1. Summary and Relationship Between Topics

The diagram (See Figure 1) shows the interrelationships between the topics related to the present research.

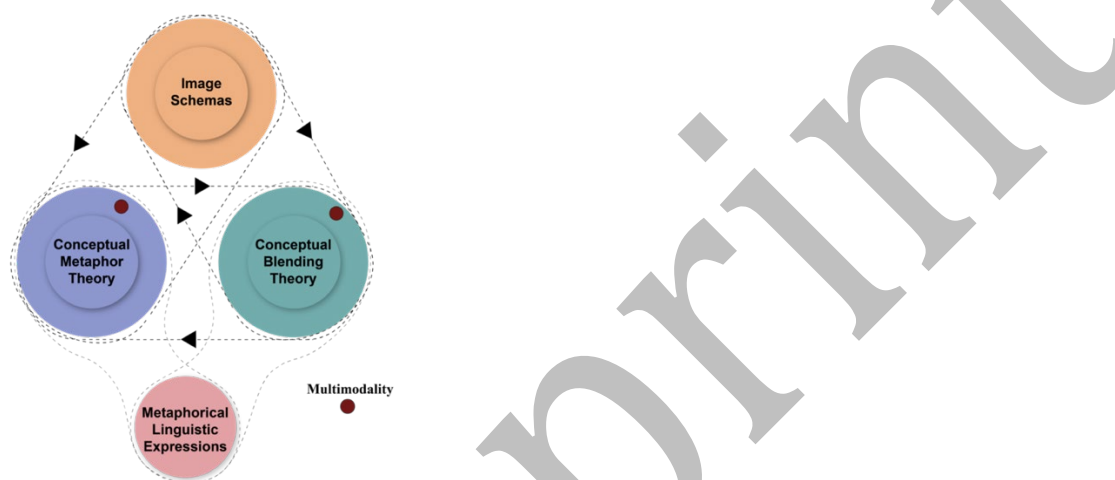


Figure 1

Relationship of the Topics

Image schemas represent root concepts that cannot be simulated by another concept, for metaphorical mappings these image schemas are the cognitive tools to provide the understanding of concepts. In CBT image schemas play a twofold function. They can be emergents of CBT and they can be bridges for mappings in CBT. Additionally, they can also function as source domains within CMT.

Furthermore, rather than image schematic concepts, other concepts can be comprehended through CMT can be effectively used in CBT, also concepts emerged from CBT can be applied in CMT.

It is evident that mapping from different modalities has an important role in these processes. Image schemas that emerge through CBT develop through multimodal interactions involving the world, body and brain, various modes including the ones relating real-world surroundings, sensations' interactions and cognitive functions. For both CBT and CMT it is considered a wider set of modes rather than language alone. Transitions amongst modalities

may language to music, music to images, images to emotions, and even combinations of emotions, images, and music and among other diverse modes, all strongly connected with multimodal usage.

Through the use of metaphors in language, metaphorical linguistic expressions act as outputs and tangible evidence of metaphor mappings. These processes take form of full sentences that embody those connections, they carry and transfer metaphorical meanings.

In the experiment, the participants' descriptions of sounds which are their responses are the metaphorical linguistic expressions. In this research by examining these expressions the underlying image schemas in the metaphors will be discovered.

1.2.Aim and Hypothesis

This study differs from others with participants being not oriented to use spatial or bodily movement metaphors while describing they were free when describing. My aim is to determine if people use metaphorical language to describe their experience of different musical experiences and if they use image schemas in their metaphors. Beside the other studies I will explore not only verticality, force or path image schemas but also if schemas like containment, balance, center-periphery, cycle being applied to metaphors.

My first hypothesis aims to discover that if subjects will use metaphorical language when describing their experiences with the sounds and if metaphorical language use would change according to demographic features like age and gender. Also if playing a musical instrument would affect the metaphorical language utilization.

My second hypothesis is that the image schemas employed in metaphors in the responses would be similar for different demographic and instrument player and non-player groups.

Third hypothesis is to see if typing and drawing part metaphors are different.

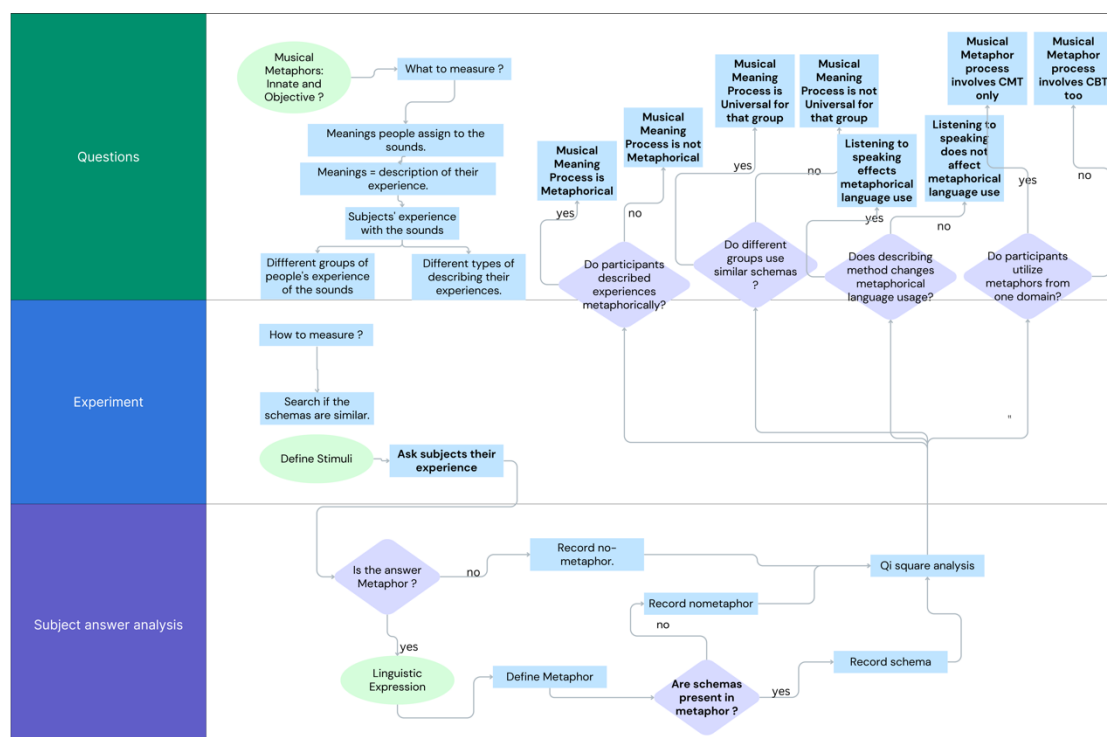


Figure 2
Flow Diagram of the Study

So my hypothesis are as follows; (1) Participants will use metaphorical language to describe their experiences. Musical instrument playing and demographics will not affect the metaphorical language rates. (2) Demographics and instrument playing will not affect the image schema types in the metaphors of the subjects. (3) Schemas utilized by respondents in typing and drawing parts in their metaphors would differ.

1.3.Methods

In this study I tried to discover metaphorical language use and the image schema utilization during conceptualization of some basic musical rules. 77 Subjects presented with 9 different sound stimuli and asked to describe their experiences with the sounds with 4 different description methods in 4 parts. Experiment conducted online as a website. After all subjects completed the experiment three different researchers analysed the subject answers to create a subjective result from the responses. Researchers analysed the subjects' responses by deciding one or two of the seven schemas and they filled a table with their decided schemas.

Metaphorical language use rates and the schemas utilized by the participants analysed according to age, gender and instrument player or non-player groups.

1.3.1. Participants

Table 1

Participants

	X ± SS	M (Min - Max)
Age	32,01± 7,39	30 (20 - 51)
	N	%
Gender		
Male	46	59,7
Female	31	40,3
Instrument Playing		
Yes	28	36,4
No	49	63,6
Total	77	100

Research included a group of volunteer subjects total 77 (31 females and 46 males) ranging from ages 20 to 51 years old (M=32,01; STD=7,39). This experiment took part as online in the domain of doexponline.com. 49 of the subjects were not playing a musical instrument and 28 of them were playing (See Table 1). None of the subjects stated having any hearing disorders or any history of hearing disorders. None of the participants were familiar with the material used in the study. Participants signed a consent form before the experiment. The study was approved by the Science-Ethics Committee of Yeditepe University.

After the subject answers collected three different researchers independently will determine which schemas are present in each subject answer and record in the table for statistical analysis.

1.3.2.Apparatus

All participants completed the experiment on their own personal computer or mobile devices and on their preferred browser. They were free to use their headphones or speakers of their personal computers or mobile phones to listen to the auditory stimuli and also free to use their preferred microphone for the sound recording session of the experiment.

1.3.3. Sound Stimuli

1.3.3.1.Stimuli

In this research I am investigating the interaction of human posture and bodily movement in describing different pitch, tempo, articulation and tone relations via metaphors and which image schemas are employed in those metaphors. I choosed basic relations to see if these relations' correspond with the interaction of human body with the sounds would differ

for different groups. I choosed 9 different pitch, tempo, articulation and tone relations; nine different sound stimuli were prepared by recording piano and çello on ableton 9 live software(See Figure 3). First stimulus is about articulation of the pitches; the same note piano (soft,weak) and forte (strong) this basic rule in previous studies associated with force schemas (Antovic, 2009),stimulus 02 is about the articulation(Antovic, 2009); same sequence played staccato and legato this sound associated with link schema before which is not in this study (Antovic, 2009) I wanted to see if it corresponds with another schema, third stimuli is again related with low and high pitches (pitch change) this time moving sequentially from low to high(Antovic, 2009); same sequence upward and downward, this sound was also perceived as motion(Antovic, 2009) , recorded playing on piano, stimulus 04 is about the tempo change(Antovic, 2009) which perceived as musical motion before (Antovic, 2009); same sequence with 70 bpm and 140 bpm, stimulus 05 is low and high pitches; C4 -C5 (Antovic, 2009) as low and high pitched sounds were perceived before as coming from up and down locations (Antovic, 2009), stimulus 06 is gliss up and down, stimulus 07 is a tone relation; dissonant and consonant notes recorded playing with piano, I thought this sound will have the conceptualuzation with balance schema the most., stimulus 08 is arpeggios with three different octaves which are again low to high. Stimulus 09 crescendo and decrescendo, this articulation relation perceived as movement of an object from near to far in Eitan and Granots research (Eitan & Granot, 2004), I also thought stimulus 06 and stimulus 09 can be perceived via containment or cycle schemas since they have repetitions they can be perceived as circular movement around.All the stimuli arranged in ableton. Sounds arranged as listenable with all kinds of audio transferring tool not special frequencies included for people to listen with any device and hear the same.

Stimulus 01

1

p (soft) *f* (loud)

Stimulus 02

1

(staccato) (legato)

Stimulus 03

1

(upwards) (downwards)

Stimulus 04

1

70bpm 140bpm

Stimulus 05

1

(low) (high)

Stimulus 06



Stimulus 07



Stimulus 08



Stimulus 09



Figure 3
Sound Stimuli

1.3.3.2. Sound Stimuli Features

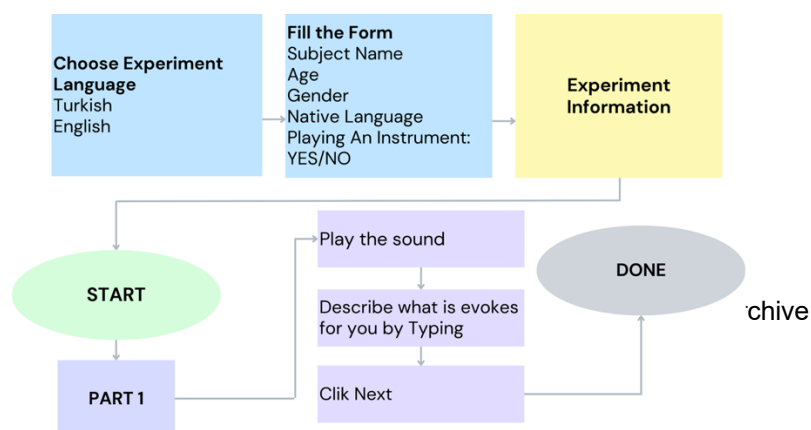
A table of the sound features was created to analyse the subject answers (See Table 2). The features of sound stimuli were described because they will be the target domains or one of the mental spaces in mapping processes to find which schemas are present in the subject answers.

Table 2
Features of Sound Stimuli

Sound Stimuli	Features
Stimulus 01 (S01) Piano- Forte	Sound Piano Tone Forte Tone Synamic Change of Dynamic
Stimulus 02 (S02) Staccato - Legato	Sound Tone Duration Shortest Tone Short Tone Longest Tone Pauses Between Tones

Stimulus 03 (S03) Upward - Downward	Sound Organization of Tones Tones Pitch Sequencing Towards Final Pitch Sequencing Towards Initial
Stimulus 04 (S04) 70 bpm – 140 bpm	Sound Sequence of Tones 70 Bpm 140 Bpm Change of Tempo
Stimulus 05 (S05) High-low	Sound Low Frequency High Frequency Key Change of Frequency
Stimulus 06 (S06) Glissando 3 Times	Sound Organization of Tones Pitch Sequencing Towards Final Pitch Sequencing Towards Initial Iteration
Stimulus 07 (S07) Dissonance - Consonance	Sound Tense Tones Stable Tones Tension Change of Tension
Stimulus 08 (S08) Arpeggios in 3 Octaves	Sound Organization of Tones Sequence of Tones High Frequency Mid Frequency Low Frequency Key Change of Frequency Iteration
Stimulus 09 (S09) Crescendo – Decrescendo	Sound Loud Tone Quiet Tone Loudness Change of Loudness

1.4.Procedure



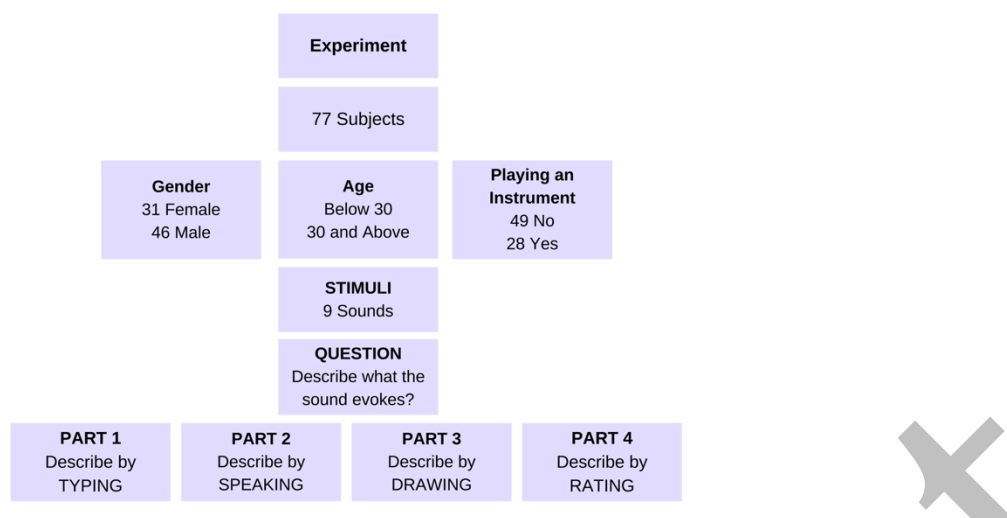


Figure 4

Experiment's Flow Diagram and Components

The experiment could be conducted in both English and Turkish languages. Participants were invited to describe their experiences evoked by sound stimuli. There were four sessions; typing on a keyboard; speaking and recording; drawing into a box with drawing tool; rating antonym pairs based on the relation of the pairs with participants experiences.

In summary, this approach differs from prior studies (Gaylord, 2014; Eitan & Granot, 2006; Pratt, 2017; Eitan & Timmers, 2010) in that participants could give the descriptions without any limitations and express themselves freely.

The experiment started with the typing session, where participants were presented with nine sounds and asked to type what each sound "evoked" for them. To proceed to the next question, participants could simply click the "NEXT" button.

In the second session they need to describe what the sounds evoke in them by speaking. They had the option to skip all the speaking questions. They needed to play the sound, click "RECORD" to record their speaking and click "STOP RECORDING" to stop and save their recordings. They can go to the next question by clicking to the "NEXT" button.

In the third session participants were instructed to describe their experiences through drawing. Drawing session aimed to see if listening to speaking effects the results to explore if there are differences in the metaphorical language usage and differences in types of image schemas used to depict their auditory experience.

Drawing responses as a method of expression have been used in previous studies, including Mark Leman's musical gestural study (Leman, 2010). The selection of drawing as a response method in this study was motivated by the anticipation of increased use CBT because

it would promote multimodality as suggested by Kövecses (2002) and to see if thinking to speaking changes the results.

Participants were instructed to listen to the sound and draw their response directly into the drawing box. On personal computers, participants could create lines by clicking the mouse clicker and moving the mouse. On mobile devices, participants were required to touch, hold, and move their fingers to draw on the screen. To see the participants drawings' start points a red mark was pointed as a visual cue for each line touch. Once participants completed their drawings, they could proceed to the next question.

In the fourth session, participants were assigned the task of rating antonym pairs on a scale of 1 to 5, according to the level of compatibility between the pairs and the evoked experiences of the sound stimuli. This part was influenced by a previous study of Eitan and Timmers (2010)

For grouping of image schemas there is not a definite answer. However there is the question to ask in the process of grouping "What properties are shared by the most significant image schemas and how can they be classified?" (Oakley, 2007). I used Urista's grouping of the schemas as I mentioned earlier. In her paper she discovers the schemas basic musical concepts and in different theories of tonalities (Urista, 2001). Her grouping is based on spatial orientation, time and casual interaction which are spatial schemas; containment, center-periphery, verticality, temporal schemas; path, cycle and force schemas; force, balance. (See Table 4)

Table 4

Schema Grouping of Urista

Group	Schemas
SPATIAL ORIENTATION	CONTAINMENT, CENTER-PERIPHERY, VERTICALITY
TEMPORAL	PATH, CYCLE
FORCE	FORCE, BALANCE

Note From "Embodying Music Theory: Image schemas as sources for musical concepts and analysis, and as tools for expressive performance", by Diane Urista, 2001, Bell & Howell Information and Learning, 300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA 800-521-0600

When determining which schemas to examine in this study "spatial orientation", "time" and "force" were the core considerations.

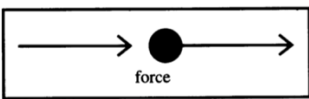
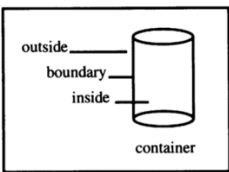
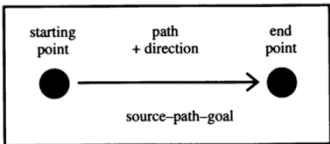
With this approach I could gain insights into the cognitive processes and metaphorical conceptualizations employed by participants. Determining the image schemas and their features will also give me the advantage of evaluating the participant responses with more confidence.

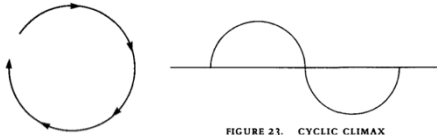
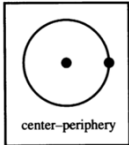
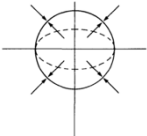
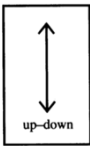
1.4.1. Image Schema Features

Table 5 for features of Image schemas were created for researchers to determine which schema is present in subject's metaphors.

Table 5

Image Schema Features and Figures

Schema Number In Experiment	Image Schemas and Figures	Image Schema Features
M01	Force Schema 	<ul style="list-style-type: none"> -A force vector (a force) with a certain magnitude -A certain direction -An entity acted upon by a force -A potential trajectory the entity follows with the force
M02	Containment Schema 	<ul style="list-style-type: none"> -Boundaries -In – out orientation -Protection from or resistance to external forces -In – out location -Accessible or inaccessible to observer
M03	Path Schema 	<ul style="list-style-type: none"> -Source point A – from point A -Terminal (goal) point B – toward point B -A vector tracing between them (path) - destination -A relation (force vector moving from A to B) – direction
M04	Cycle Schema	<ul style="list-style-type: none"> -Initial state -A sequence of connected events

	 <p>FIGURE 23. CYCLIC CLIMAX</p>	<ul style="list-style-type: none"> -End at the initial state(to start a new one) -Forward - moving sequence,-Built-up and release (climatic structure) -Multiple, overlapping, sequential -Both harmonious and conflicting relations -Temporality
M05	<p>Center-Periphery Schema</p>  <p>center-periphery</p>	<ul style="list-style-type: none"> -Near – Far -Scale to define nearness to the center -Superimpose a CONTAINER schema – center as inner and outer relative to it , -Inner – outer pattern -Center – Periphery Orientation -Imposition of subject-object orientation -Inmost dimension === Self – Other === Mine – Thine
M06	<p>Balance Schema</p> 	<ul style="list-style-type: none"> -Equilibrium -Loss of equilibrium -Center -Vertical, horizontal axis -Forces (gravity...)
M07	<p>Verticality Schema</p>  <p>up-down</p>	<ul style="list-style-type: none"> -Up-down /orientation -Up-down location

2.RESULTS

For results after creating chi-square tables two other tables created for every subject group. First tables contained the percentages of subjects who used metaphors (See Table 7). For second tables for each subject groups I put the mostly used schemas for each sound stimulus (See Table 6).

2.1.According to Age Difference

Age groups determined as below 30 and 30 and above years old. For stimuli 01 piano - forte, 02 staccato- legato, 03 upward-downward, 04 bmp change, 05 high - low, 06 3 times glissando, 08 arpeggios in 3 octaves and 09 crescendo – decrescendo there was no statistically

significant difference in two age groups and metaphor usage were high for both groups and for all three researchers ($X^2=3,055$, $p>0,05$).

In sound stimuli 07 dissonance - consonance for first ($X^2=4,820$, $p<0,05$) and third ($X^2=4,430$, $p<0,05$) researchers there is statistically significant difference with the age group of below 30 utilized metaphors more than the 30 and above age group.

Results for sound stimulus 07 dissonance – consonance did not support the first hypothesis for age groups but for other stimuli the first hypothesis supported.

The schemas utilized in metaphors for different age groups showed statistically significant differences for sound stimuli 01 piano-forte for first researcher ($X^2=15,611$, $p<0,05$) in utilization of schemas with below 30 years old age group is higher.

For other stimuli there was no statistically significant difference in utilizing of any schemas.

Results for stimulus 01 piano-forte sounds did not support the second hypothesis as the age difference affected the image schema types utilized in metaphors. For other stimuli the

second stimuli was supported; age difference did not affect the schema types employed by subjects.

2.2. According to Gender

According to gender groups there was no statistically significant differences both in metaphorical language use and schemas employed in the subjects' metaphors. There was also no difference found in three researchers' analysis for any of the sound stimuli.

Results supports that gender is not playing any role in metaphorical language use and the schema type differences in metaphors. Both first hypothesis and second hypothesis were supported for gender groups.

2.3. According to Playing an Instrument

For the groups that concerns playing an instrument and for the stimuli 01 piano – forte, 02 staccato - legato, 03 upward - downward, 04 tempo change, 05 high – low pitch change, 07 dissonance and consonance, 09 crescendo - decrescendo there was no statistically significant difference found in metaphorical language use.

For the stimulus 06 three times glissando according to second researcher the group of non-players of an instrument were higher in metaphorical language use ($X^2=9,092$, $p<0,05$).

Also for stimulus 08 arpeggios in three octaves according to first ($X^2=4,756, p<0,05$) and second ($X^2=5,053, p<0,05$) researchers there was difference in metaphorical language use with non-players on a higher rate.

Distributions showed that stimulus 06 which is glissando three times and stimulus 08 arpeggios in three octaves had differences in metaphorical language. This can show that instrument player group is more familiar with this kind of sound rule and they used terms without employing metaphors.

Schema usage in stimulus 02 staccato - legato for second researcher there was a statistically significant difference in schema usage ($X^2=12,362, p<0,05$), non-players used schemas more than instrument players when describing the stimuli 02.

There was no statistically significant differences in other stimuli for any researchers in between this groups.

Stimulus 02 staccato – legato sounds results are not supporting the second hypothesis, non-player group used image schemas more than player. Again this can mean that instrument playing group has the information of the sound rule and they did not use image schemas when describing their experiences.

2.4.Researchers Analysis

To prevent subjectivity three different researchers analysed the subject answers. Fleiss Kappa analysis conducted to determine if all researchers agree in their analysis.

Fleiss Kappa analysis was conducted to see the level of agreement of three researchers. After the Kappa value is determined the level of agreement is determined with the classification of Landis and Koch (1977).

Table 6

Landis and Koch (1977)

Value of K	Strength on Agreement
<0,20	Slight
0.21-0.40	Fair
0.41-0.60	Moderate
0.61-0.80	Substantial
0.81-1.00	Almost Perfect

Note From “The measurement of observer agreement for categorical data”, 1977, *Biometrics*, 33(1), 159–174.

According to Landis and Koch strength on agreement values I analysed the researchers agreement degrees.

Table 7

Agreement Table for Stimuli

Stimulus	K value	Agreement
Stimulus 01 Piano - Forte	0,341	Fair
Stimulus 02 Staccato - Legato	0,295	Fair
Stimulus 03 Upward - Downward	0,509	Moderate
Stimulus 04 70 bpm – 140 bpm	0,327	Fair
Stimulus 05 High - Low	0,461	Moderate
Stimulus 06 Glissando 3 Times	0,233	Fair
Stimulus 07 Dissonance -Consonance	0,250	Fair
Stimulus 08 Arpeggios in 3 Octaves	0,235	Fair
Stimulus 09 Crescendo -Decrescendo	0,394	Fair

In stimuli 01 piano - forte, 02 staccato - legato, 04 tempo change, 06 3 times glissando, 07 dissonance - consonance, 08 arpeggios in three octaves, 09 crescendo - decrescendo researchers' agreement level is fair.

In stimuli 03 upward – downward scales and 05 high – low pitch change researchers agreement level is moderate. As a result researchers agreed in fair and moderate levels and we can count this test as reliable.

3.DISCUSSION

3.1. First Hypothesis: Metaphorical Language

The main hypothesis proposed that, descriptions to sounds of participants would mainly rely on metaphors. Although this proved true for most participants and played a significantly dominant role in constructing meaning and interpretation, exceptions were existent. In some

cases participants described musical tones without metaphors and instead they identified instruments or used technical unmetaphorical terms.

Findings support the first hypothesis and confirm that individuals predominantly used metaphors to describe nine different musical relationships. The Results provide evidence to metaphors serve as a key cognitive mechanism to perceive and understand the stimuli and embracing musical meaning.

As embodied mind theory posits the utilization of metaphors among participants can be linked to their bodily experiences that were shaped by their interactions with the environment. The inference that musical meaning is grounded in embodiment can be supported with the first hypothesis and with the participants conceptualizations which are based on image schemas.

For stimulus 01 piano-forte mapping of change in articulation linked with Force mostly as expected. Second stimulus staccato and legato associated with path and balance in typing and with cycle in drawing part. Upward and downward scale linked with verticality in both description parts but also with cycle in typing part. Tempo changes are mainly mapped to the path schema in both parts also with cycle in typing part. The mapping of pitches is linked with balance in typing part and with path and cycle in drawing part. Upward and downward scaling with repetition is linked to balance in typing and cycle in drawing part. Dissonance and consonance perceived as path in both parts, additionally with balance in typing part and force in drawing part. Arpeggios in three different octaves associated with path in both parts. Lastly stimulus 09 – crescendo and decrescendo anticipated which are mapped using schemas path in both parts, force in typing part and verticality in drawing part.

3.2. Second Hypothesis: Image Schema Utilizations

In the secondary hypothesis it was postulated that notable disparities would not exist in the conceptualizations among individuals within different demographics and musical instrument players and those non-players. I will discuss the results for each stimuli for this second hypothesis.

3.2.1. Sound Stimulus 01

First stimulus two tones, one played in piano (which means pressing the piano keys weakly and outputting a quiet sound) and the other in forte (strongly pressing the keys and creating a strong loud sound) tested the “musical force” metaphor. These tones had the change in dynamic.

In the distributions there was no statistically significant differences for any subject group and for three experts. The second hypothesis was supported for stimulus 01.

When we examine the results in terms of schemas employed in metaphorical descriptions there are no significant differences for stimulus 01. The schemas employed by subjects to the descriptions of sound stimuli 01 highest percentage schemas were force, balance, cycle.

As a result according to Urista’s grouping (See Table 4) the mostly used schemas; force and balance are belong to the force group. It can be asserted that perception of weaker and stronger sounds is closely connected with the aspects of body movement and postural adjustments as a reaction to force. As seen in the previous studies(Antovic, 2009; Eitan & Timmers, 2010).

3.2.2. Sound Stimulus 02

Stimulus 2 is composed of two same sequences played on piano with different articulations staccato and legato. Staccato is where player plays the notes with pauses between the notes and legato means player plays the notes connected, without pausing between the notes smoothly. This stimuli metaphorically associated with pitches are links metaphor which is not present in this study.

For image schemas employed in stimulus 02 metaphors in the distributions there was a statistically significant difference for instrument player and non-player groups according to second researcher ($X^2=12,362$, $p<0,05$). When discussing the schemas we can exclude second researchers analysis in instrument group.

There was no difference for other researchers or other subject groups.

The second hypothesis was approved for gender and age groups but not approved for musical instrument player or non-player groups for stimulus 02.

Table 8

Sound Stimulus 02 Schemas

		1.Expert	2.Expert	3.Expert
Age	Below 30	Path	Balance	Balance
	Above 30	Path	Balance	Path
Gender	Male	Path	Balance	Path
	Female	Verticality	Balance	Path
Instrument Playing	Yes	Path	Balance	Balance
	No	Path	Verticality	Path

If we examine the schema-sound matching the mostly perceived schemas are path and balance. Path and balance are belong to two different groups in Urista’s organization of

schemas (See Table 4). It can be concluded from this study that staccato and legato articulation relation was perceived both as temporal and force related body-environment interactions.

3.2.3. Sound Stimulus 03

Same sequence of notes played upward and downward meaning through lower to higher note in the sequence and thorough higher to lower note in the sequence. It has the change of pitch gradually.

For stimulus 03 distributions there is no statistically significant difference in any subject groups or in analysis of any researchers. Second hypothesis was verified for sound stimuli 03.

Table 9

Sound Stimulus 03 Schemas

Age	Below 30	1.Expert Verticality	2.Expert Cycle	3.Expert Verticality,Cycle
	Above 30	Verticality	Cycle,Balance	Balance
Gender	Male	Verticality	Cycle	Balance
	Female	Cycle,Verticality	Cycle	Balance
Instrument Playing	Yes	Verticality	Cycle	Path
	No	Verticality	Cycle	Balance

For gradually changing pitch towards upwards and downwards, schemas verticality and cycle had the highest rates. High and low pitch movement was perceived via up-down verticality schema which shows the sound data transferred and comprehended as up-down. Cycle schema perception can mean that the sound's gradual increase or decrease mapped with the cyclic climax structure's build up and release (See Table 5) during construction of this metaphor.

This schemas depict upward-downward scale created the sense of time and spatial orientation (See Table 4)

3.2.4. Sound Stimulus 04

Stimulus 04 again played on piano and recorded in ableton software. It contains of two separate same tone sequences differ in bpm(beats per minute). One is 70 bpm which is slower and the second is played at 140 bpm which is faster.

In stimulus 04 distributions there is no statistically significant difference in any subject groups or in analysis of any researchers. Second hypothesis was verified for sound stimuli 04.

Table 10

Sound Stimulus 04 Schemas

		1.Expert	2.Expert	3.Expert
Age	Below 30	Path	Balance	Balance
	Above 30	Path,Cycle,Balance	Balance	Balance
Gender	Male	Path	Balance	Balance
	Female	Path	Balance	Balance
Instrument Playing	Yes	Path	Balance	Balance
	No	Path	Balance	Balance

Tempo change perceived via balance and path schemas which are the groups of force and time (See Table 4). Metaphors related to balance and path utilized by subjects.

3.2.5. Sound Stimulus 05

Stimulus 05 testing pitches, metaphorically associated with the concept of heights, representing the verticality schema(ref). The pitches were played on piano and recorded. The sound composed of both low and high frequency tones, other characteristics of the tones were the same.

In the distributions there was no statistically significant differences of utilized schemas in any groups or researcher analysis. Second hypothesis again approved for sound stimuli 05.

Table 11

Sound Stimulus 05 Schemas

		1.Expert	2.Expert	3.Expert
Age	Below 30	Balance	Balance	Balance
	Above 30	Balance	Balance	Path, Balance
Gender	Male	Balance	Balance	Balance
	Female	Balance	Cycle	Path
Instrument Playing	Yes	Balance	Balance	Path
	No	Balance	Balance	Balance

Different than previous studies for relation of high-low pitched sounds, verticality schema was not the most frequently utilized schema in metaphors. The reason for this can be that in this study researchers were allowed to choose other schemas.

In high-low pitched sounds metaphors balance schema has the highest rate. High-low pitch change perceived with the balance schema in this study.

3.2.6. Sound Stimulus 06

Glissando up- down.

There was no statistically significant differences found in schemas employed by the subjects in their metaphors for sound stimuli 06 in different groups of subjects or according to three researchers.

Second hypothesis proved to be true for sound stimulus 06.

Table 1

Sound Stimulus 06 Schemas

		1.Expert	2.Expert	3.Expert
Age	Below 30	Balance	Balance	Balance
	Above 30	Balance	Balance	Balance
Gender	Male	Cycle	Balance	Balance
	Female	Cycle, Balance	Balance	Balance
Instrument Playing	Yes	Path	Balance	Path
	No	Balance	Balance	Balance

When discovering the schemas in metaphors of subject answers balance schemas again for this stimuli is the highest.

3.2.7. Sound Stimulus 07

Dissonance – Consonance.

There was no statistically significant differences found in schema usage of subjects in their descriptions of sound stimuli 07 for demographics or instrument playing groups and no differences in researchers analysis.

Second hypothesis has gain approval for stimuli 07.

Table 13

Sound Stimulus 07 Schemas

		1.Expert	2.Expert	3.Expert
Age	Below 30	Path	Balance	Balance
	Above 30	Path	Balance	Path
Gender	Male	Balance	Balance	Balance
	Female	Path, Balance	Cycle, Balance	Force
Instrument Playing	Yes	Balance	Balance	Force
	No	Balance	Balance	Balance

Balance and path is the mostly used schemas for disonance and conconance tones. It was expected to have balance schema in this stimuli because the tone relation is about the sounds that are harmonious with each other or not harmonious. Unexpectedly path schema was also utilized by the subjects. This shows that comprehension of diconant and consonant tones is related to force and time.

3.2.8. Sound Stimulus 08

Arpeggios 3 octaves

In distributions of subject answers for sound stimuli 08 there was no statistically significant difference for any groups or researcher analysis.

Second hypothesis approved for stimuli 08.

Table 14

Sound Stimulus 08 Schemas

		1.Expert	2.Expert	3.Expert
Age	Below 30	Path	Cycle, Balance	Path
	Above 30	Path	Balance	Path
Gender	Male	Path	Balance	Path
	Female	Path	Balance	Path
Instrument Playing	Yes	Verticality	Cycle	Path
	No	Path	Balance	Path

Arpeggios played in three different octaves perceived mostly via path schema.

3.2.9. Sound Stimulus 09

Crescendo – decrescendo .

There was no statistically significant differences in age, gender or instrument playing groups and in researchers' analysis.

Second hypothesis approved this time for the sound stimuli 09.

Table 15

Sound Stimulus 09 Schemas

		1.Expert	2.Expert	3.Expert
Age	Below 30	Path	Balance	Path
	Above 30	Path	Cycle	Path
Gender	Male	Path, Cycle	Balance	Path
	Female	Path	Cycle	Path

Instrument Playing	Yes	Force	Cycle, Verticality	Force
	No	Force	Balance	Force

For crescendo and decrescendo there was an expected schema which was center-periphery but it was not the highest rated schemas in metaphors. Reason for that was in previous researches (Eitan & Granot, 2004) this kind of sound stimuli perceived as near-far motion. In this study path was the mostly utilized schema and it can also be about near far motion. Also it is in time group. Force schema also has a higher rate of usage in metaphors. Crescendo and decrescendo creates a volume difference during the sound plays and this difference perceived with force and time groups of Urista (See Table 4).

In summary for the second hypothesis was that the subjects' demographics or instrument playing or not playing status would not change the schemas utilized in respondents' descriptions of the sound stimuli. It was not approved only for second stimulus instrument player and non-player groups for second researcher. It was approved for age and gender groups in second stimuli and for all other stimuli in the study.

Subjects applied similar schemas in their metaphors when describing sounds regardless of their groups.

3.3. Third Hypothesis: Sound-Schema Matching According to Description Type

Mostly used schemas matched with sound stimuli and compared the results with drawing to see if description method changes the schema matches. (see Table 16)

Table 16

Schemas According to Description Method

Stimuli	Schema	
	Typing	Drawing
Stimulus 01 Piano - Forte	Force, Balance	Force, Path
Stimulus 02 Staccato - Legato	Path, Balance	Cycle
Stimulus 03 Upward - Downward	Cycle, Verticality	Verticality
Stimulus 04 70 bpm – 140 bpm	Balance, Path	Path, Cycle
Stimulus 05 High - Low	Balance	Path, Cycle
Stimulus 06 Glissando 3 Times	Balance	Cycle
Stimulus 07	Balance, Path	Force, Path

Dissonance- Consonance		
Stimulus 08 Arpeggios in 3 Octaves	Path	Path
Stimulus 09 Crescendo - Decrescendo	Force, Path	Path, Verticality

For stimuli 02, 05 and 06 drawing and typing part showed differences. For other stimuli schemas used were same but with additional schemas too. Hypothesis three was supporting description type would change the schemas and it is approved.

In the processes of thinking for drawing and thinking for typing image schemas utilized by the subjects differed.

4.CONCLUSIONS

With the inspiration from Antovic's research on Serbian and Romani children (Antovic, 2009) this study designed to examine metaphorical language in relation to music cognition across different demographic groups. By presenting participants to stimuli and asking them to describe their experiences the aim was to reveal the metaphorical language usage and identify the underlying image schemas. First hypothesis suggested that metaphorical language employment may not differ among groups. It was supported for gender groups, gender was not a discriminative feature for metaphorical language use during describing musical rules. Instrument playing affected the subject answers metaphorical language usage for stimulus 06 glissando and for stimulus 08 arpeggios up and down three times. According to these results it can be concluded that familiarity with the musical rules changed the metaphorical description for some of the sound stimuli. Also for stimulus 07 dissonance and consonance sounds there was a difference between age groups, below 30 group used metaphorical language more than the older aged group. This can show that for the sounds which are harmonious together and not harmonious together perceived metaphorically by younger aged group and not metaphorical by older aged group. Second hypothesis that certain image schemas would not change across groups supported by the results except sound stimulus 02 staccato legato. Results showed differences among instrument player and non-player groups. For other stimuli there was no differences in any groups for image schemas in subjects metaphors. This showed the universality of metaphors and image schemas. Stimulus 02 staccato and legato is a much known musical rule maybe that is the reason why instrument players did not employed metaphors as much as non-players.

Third hypothesis discovered the image schemas used in two different processes, typing and drawing had different results for image schemas utilized, could be a research topic for future studies since it can highlight the metaphor process in two different modes of thinking.

The current study illuminated a prominent relationship between metaphor and nine musical relationships. These findings conform with the theory of embodied mind where metaphor and image schemas play an important role in the cognitive process of assigning meanings to musical experiences.

An interesting result this study showed was that variations among different groups provided more certain connections by image schemas. These embodying structures helped to deduce our perception of the external world surrounding us.

Researching on the role of metaphors to emerge meanings from music can help us to provide a better understanding of the nature of metaphor and how it relates with image schemas in the process of perceiving and expressing music.

In this research another aim can be to explore the theories of Conceptual Metaphor (CMT) Conceptual Blending (CBT) and the role of image schemas, in understanding how we perceive music with metaphorical language. I wanted to investigate whether music perception has a nature across different demographic groups, including age groups, gender groups and musical instrument player and non-player groups. Additionally, aimed to identify which image schemas are predominantly used in metaphors and whether these schemas show similarities across groups and different description processes.

According to Conceptual Metaphor Theory (CMT) by Lakoff and Johnson understanding happens when one concept is simulated through another as thinking itself is fundamentally metaphorical. Metaphors go beyond being tools; they are cognitive mechanisms that shape our thoughts, reasoning and actions. By connecting concepts with concrete ones through source domains and target domains we can grasp these abstract concepts better. Image schemas, rooted in our sensory motor interactions with the world around us serve as the building blocks of metaphors. Play a crucial role in how we perceive and interpret our environment.

Besides, Conceptual Blending Theory (CBT) by Fauconnier and Turner, emphasizes the blending spaces to create new meanings and concepts. According to this theory the blending of two or more domains can give rise to image schemas and metaphors, can clear up on how metaphors are formed and what their cognitive functions are. Based on the findings, it is concluded that metaphors emerge not only by CMT process but also through CBT. Specifically, participants didn't depend only on one schema when describing their experiences with the

sounds. They combined several schemas in their metaphors. This finding also confirms that comprehending music doesn't solely stem from mapping out one source domain. Rather, it should require blending several domains into one conceptualization process through CBT. Analyzing participant responses confirms to this since they assigned meaning to sounds through using more than two schemas.

This study takes these theories a step further by exploring in the perspective of music cognition. It is revealed that metaphors are not limited to language and extend to modalities like music. The presence of metaphors in everyday language and music theory shows the role that metaphors play in cognition of musical experiences. Through this research we delved into the connections between music and metaphors by explaining how they operate across different modes.

In conclusion this research contributes to the knowledge regarding the role played by metaphors and image schemas in music perception and cognition.

By expanding this research, we can have better understandings about metaphor theories, image schemas and how these schemas formed and structured physically in human bodies and brain and figuratively in human mind. It is important to research this topic from evolutionary perspectives too. Findings of this research or expanding it can provide more insight to the researchers of objective reality. Another topic this research is closely related to is the empathy process as a cognitive mechanism due to both metaphors and empathy roots in observing, imagery and interactions with environment.

Through the analysis, from participants with backgrounds the objective is to offer how people perceive, comprehend and metaphorically describe music. This research highlights the importance of considering modalities and cognitive processes to unravel the connection between language, music and cognition. Ultimately it supports that metaphors are not only tools but they are essential in understanding the world around us whether expressed through words, music or even bodily movements.

With these results we made a stride in understanding the interaction between music, metaphor, the human mind and the environment. This would help researchers, in uncovering knowledge in this rivetting field of study.

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