

A Cross-Cultural Comparative Study of the Role of Musical Structural Features in the Perception of Emotion in Greek Traditional Music

Kyriaki Zacharopoulou and Athanasia Kyriakidou

Department of Music Studies, Aristotle University of Thessaloniki, Greece

Background in music psychology. Music is widely acknowledged as a powerful elicitor of strong emotional experiences; this is partly attributed to its inherent features. Previous research has found a relationship between certain features of music and their emotional connotations. However, research has been mainly limited to Western art music and its inherent qualities, neglecting the cultural effects on perception of emotion in music.

Background in historical musicology, music theory and analysis. 'Ethos' is a notion found in notable civilizations, such as Chinese, Indian, Greek, Arabic, etc. Researchers of Byzantine music, studying the notion 'ethos', have up to now mainly concentrated on discussing similarities and differences with the characteristics of 'ethos', as described in treatises of ancient Greek music theory and philosophy, as well as in medieval and post-medieval theories of the byzantine modes.

Aims. The present study expands the area of music research to the field of non-Western music, focusing on Greek traditional music, which is based on Byzantine music theory. The researchers' main goals were a) to pinpoint cultural similarities and differences in the perception of emotion in music, and b) to shed light on the role of musical structure in the decoding of emotional messages when listening to a familiar or unfamiliar musical tonal system.

Main contribution. 14 Italians, 15 British, and 30 Greek adult listeners rated the level of communication of certain basic and secondary emotions while listening to 10 Greek traditional musical excerpts. Subsequently, the relationships between certain structural features of the musical excerpts and the subjects' judgments of the intended emotions were examined. Results showed that basic emotions were accurately recognized (except for the emotion of fear), along with some secondary emotions. Moreover, familiar and unfamiliar listeners seemed to rely more or less on different structural parameters during the emotional decoding process. Conclusions from previous empirical research on the role of certain structural features, as well as theoretical descriptions of 'ethos' were partly confirmed.

Implications. It is once more confirmed that people perceive music in both a culture-specific and a universal manner via the decoding of various perceptual cues. Such a conclusion could strongly influence educational practice, being an incentive for music educators to focus more on teaching students how to listen and decode acoustic cues, and how to improve structural communication during instrumental performances, or in music composition.

Keywords: Musical emotion, musical structure, music, Byzantine music, ethos, cross-cultural

Introduction

A principal virtue of music is its ability to evoke and communicate emotions, a virtue that is acknowledged worldwide. Musical cultures have used organised sounds as a medium of emotional expression throughout their history. In other words, music constitutes a central part of a people's cultural identity.

The literature on emotion and music has been growing considerably in the last decades, although cross-cultural research in this field is still in its infancy, characterized by the lack of an agreed-upon theoretical framework, and by inconsistencies in methodological approaches. The scarce comparative studies of different cultures have demonstrated a general agreement on the recognition of intended emotion -at least when it comes to basic emotions- and also the existence of cultural differences (e.g., Adachi, Trehub, & Abe, 2004; Balkwill & Thompson, 1999; Balkwill, Thompson, & Matsunaga, 2004; Bhatti & Gregory, 2000; Gregory & Varney, 1996; Hoshino, 1996; Keil & Keil, 1966; Meyer, Palmer, & Mazo, 1998).

A few past studies on perception of emotion in unfamiliar music have highlighted the important role that musical structural features play in the communication of emotion. Balkwill and Thompson in their study (1999) demonstrated that Western listeners were able to identify the intended emotion in unfamiliar music, by asking Canadian participants to identify and rate the dominant emotion of Hindustani ragas. The participants rated also the degree to which they perceived certain structural cues in each raga (tempo, melodic complexity, rhythmic complexity, pitch range and timbre). According to their findings, listeners' ratings of the structural cues in the ragas were significantly correlating to their ratings of emotions. Based on these results, Balkwill and Thompson (1999) constructed a model theory of the perception of emotion in music, the 'cue redundancy model', according to which: "The more cues that are present in the music -both culture-specific and perceptual- the stronger the expression of emotion" (p. 45). In other words, listeners engage their cultural background knowledge along with decoding of different parameters of the musical structure, when judging the emotional communication of a musical piece.

The 'cue redundancy model' was once more supported by a more recent analogous report. Balkwill, Thompson and Matsunaga (2004) asked Japanese listeners to rate joy, anger, sadness and a number of acoustic cues (tempo, loudness and complexity) in Japanese, western and Hindustani musical excerpts. In line with the 'cue redundancy model' theory, the Japanese listeners were sensitive to identification of emotion conveyed by both familiar and unfamiliar music. Moreover, it was illustrated that they were capable of perceiving certain acoustic cues in familiar and unfamiliar music, and their perception of these cues affected directly the perception of the intended emotion.

In a series of three experiments by Adachi, Trehub and Abe (2004), adults and children of Canadian and Japanese origin judged happy and sad performances of two well-known English songs, performed by Canadian children. In addition, different expressive cues of the children's performances were rated, including tempo,

dynamics, pitch, breathy voice, nasal voice, suppressed contour, tenuto, non-legato, portamento, implied voice, lyrics and dotted rhythm. The findings showed that listeners of the same or different age, coming from the same or different culture, successfully recognized the intended happy or sad version of songs performed by untrained 8-10 year-old children. Adults and children relied on expressive structural cues to judge the performances and that was predictive of their accuracy in decoding emotion.

‘Relative’ and ‘absolute elements’ in the theory of ‘ethos’ in Byzantine chant

The term ‘echos’ preserves in Byzantine theory specific and perceptual details both for the composer/performer and the listener. The term ‘echos’, as defined after the Reform in 1814 by the Three Teachers, is a homonym of a class of characteristics, such as: the tonic, the main signature (*αρχική μαρτυρία*), the intervallic structure within the scale, the introductory melodic formulas (*απηγήματα*), the dominant tones, the pitch attraction (*έλξεις*) towards the dominant tones (pitch attractors), the scale systems (*συστήματα*) and the cadence tones (Chrysanthos of Madyta, 1832/1976-77; Karas, 1982; Mavroeidis, 1999; Panagiotopoulos, 2003).

One could categorize the notion of ‘echos’ as an a priori ‘absolute and objective element’, because it is a notion of ‘technical’ nature, based on well defined intrinsic information. ‘Echos’ cannot exist by itself in a composition, but instead has to be combined and coupled with other musical parameters (such as rhythm, kind of melourgy, coexistence or not of an eligible text, etc.). Through the fusion of all the above, it has been stated that during the musical performance some members of a set of characteristics having emotional content emerge. These emotional characteristics, in their potential form, are grouped under the generic term ‘ethos’ of the ‘echos’.

We could therefore say that the notion of ‘ethos’ is a ‘relevant element’, because it is referred to uncalibrated emotions, being also a ‘subjective element’, as ‘ethos’ characteristics (adjectives), such as joyful, serious, mourning, source from the subject–target. These characteristics can even be of contradictory emotional character. (For example, the first plagal mode, in correlation with the tempo and different scales, dominant tones and melodic formulas, can either have mourning ‘ethos’ or, the opposite, an ‘ethos’ expressing enthusiastic and dancing character).

In a complementary role, ‘ethos’ cannot exist by itself in music, as it prerequisites the carrier of ‘echos’ in order to come upon. Therefore, in the musical application field, within a wider framework, as a basic structural material of the composition serves the meta-notion of ‘echos equipped with ethos’, expressing the fusion of ‘echos’ with the superset of the potential emotional characteristics of its ‘ethos’.

Under the a posteriori view of the researcher within this framework, the ‘echos equipped with ethos’, as a protogenous structural material in a composer’s palette, becomes a ‘relative element’, as different manipulations of the same ‘echos’ can lead to potential compositions of different characters. (For instance, from the Enkomia «Η ζωή εν τάφω» [i zoi en tafo], in first plagal ‘echos’, has a profound mourning character. On the contrary, the resurrection’s hymn «Πάσχα ιερόν ημίν σήμερον»

[Pascha ieron imin simeron], also in first plagal ‘echos’, has a festive character. With this in mind, one can categorize descriptive adjectives of ‘ethos’, such as those of Chrysanthos (1832/1977) -which express well the general paradigm-, as ‘relative elements’, because they can be reduced according to the composer’s virtual palette.

On the other hand, focusing on an ‘accomplished’ musical piece, the application of ‘echos equipped with ethos’ in the composition this time becomes an ‘absolute element’, because the composer has chosen and organized her/his musical material in such a way as the certain emotional characteristics of ‘ethos’ that s/he wishes can emerge.

Which of these characteristics could be recognized in a series of given musical pieces can be further investigated within the framework of statistical methodology.

The present study

The general question examined in the present study is whether there are any universals or differences in the perception of emotion in music by three different cultural groups. The musical stimuli were selected from a wide range of Greek traditional music, which is a non-Western musical system based on Byzantine music theory.

Another aim of this study was to examine possible effects of different structural features of the musical stimuli on the perceived emotions. Previous research on the role of musical structure, which is summarized and reviewed in an effective way by Gabrielsson and Juslin (2003), and Gabrielsson and Lindström (2001), is mainly confined to Western art music and listeners familiar with it. In this study, research was expanded to a cross-cultural setting, investigating the emotional responses of listeners familiar with, and unfamiliar with the sample music, and their possible engaging of musical structural factors, focusing on different levels of tempo, rhythm, pitch, harmony, loudness, and the notion of ‘ethos’, which is described by Byzantine theorists as a fundamental structural characteristic of the Byzantine tonal system.

Method

Participants

In the present study, 14 Italian, 15 British, and 31 Greek adults participated voluntarily (mean age: 32.7 years). The subjects reported various musical backgrounds.

Materials

Musical Stimuli (CD). The musical material consisted of a CD with 10 excerpts of Greek traditional music, between 36s to 77s in duration (see discography in Appendix). The musical excerpts were edited in Wavelab (V.5, distributed by Steinberg Media Technologies) for length and to add the ‘fading out’ and ‘fading in’ effect.

Questionnaire. A questionnaire was distributed to participants, which gathered personal information on gender, age, nationality, previous musical training and familiarity with Greek traditional music. The translation from Greek to English and Italian was made by professional translators.

Music test. A music test was created, which contained specific questions pertaining to the musical excerpts on the CD. The music test was translated from Greek to English and Italian by professional translators. Scoring of the participants' answers was done according to a general consensus criterion, based on the responses of the majority of Greek participants. For example, if 56% of Greek individuals who took part in the experiment said that there is a moderate amount of happiness in a particular musical excerpt, then an individual participant's score (British, Italian, or Greek) was incremented by 0.56 if she or he gave that particular response, and so on. In other words, consensus scoring is based on the average response of people from the culture the music samples are taken from. This was the same scoring method used by Mayer, Salovey, and Caruso (2004) for the MSCEIT, the emotional intelligence test, that was also distributed to the subjects.

Emotional Intelligence Test. Finally, part of the MSCEIT, V.2.0 Emotional Intelligence Test was distributed along with the CD and the music test, with versions in Greek, Italian and English. This instrument was developed by Mayer, Salovey, and Caruso (2002) in order to measure different dimensions of emotional intelligence. Results of this phase of the study will appear elsewhere.

Procedure

In the first phase of the study, participants read the general instructions they were provided with and filled out the questionnaire, answering demographic questions and giving information on their previous musical education and familiarity with Greek traditional music. All subjects then continued with the music test and the MSCEIT test. The whole procedure took place at the participants' houses using their own CD players, under the guidance of three colleagues of the first author (two in Italy, one in Great Britain), and the author herself (in Greece).

The listeners were given written instructions for the music test, which asked them to rate on a five-point scale the degree to which they believed that the provided emotions (happiness, sadness, anger, fear, tenderness, power, brightness, melancholy, relaxation, grace) were conveyed to them, with '1' representing 'not at all' to '5' representing 'very much'. It was noted that they should not focus on the emotions they were feeling, but on the emotions communicated by the performers of each musical piece. In the case of Greek listeners, they were instructed to ignore the lyrics of the songs, so as to avoid potential emotional connotations. The listeners could listen to the musical pieces as many times as they needed to complete their ratings. Finally, participants answered whether they found the previous (heard) musical excerpt familiar, where familiarity denoted knowledge of the musical excerpt being listened to. The experiment lasted approximately 30 minutes. The procedure was the same for all groups.

In the second phase of the study, different structural features of the 10 musical excerpts were judged by 5 music experts on a 5–point scale, with 1 representing ‘not at all’ and 5 representing ‘very much’. The experts were four professors at the Department of Music Studies of the Aristotle University of Thessaloniki, and a graduate student in musicology. Consensus was considered to be present, when the mean standard deviation between the experts’ ratings of each structural element was smaller than one scale point. Agreement was achieved for tempo, rhythmic clarity, rhythmic complexity, pitch level, pitch range, harmonic complexity, variation of loudness, variation of tempo, rapid changes of loudness, and rapid changes of tempo.

Results and discussion

Music Test

The ratings of emotions in the music test revealed that British listeners tended to perceive and evaluate the emotions to be more intense than did the other groups, except for the case of brightness. Similarly, Italian participants tended to give lower ratings when judging emotions, while Greek listeners seemed to be somewhere between the other two groups (Figure 1).

No significant effect from age, previous musical training, familiarity with Greek music, or gender was found upon the music score. Accordingly, these variables were excluded from the main analysis.

An interesting result was that both familiar (Greeks) and unfamiliar groups (British, Italians) of listeners strongly agreed on the judgment of the three most dominant emotions of each musical piece (emotions highlighted in *bold italics* in Table 2), although they disagreed on the judgment of the relative intensity of the same emotions. As Table 2 illustrates in the fourth and fifth columns, a tendency appears of people to agree on the dominant emotions evoked by familiar or unfamiliar music.

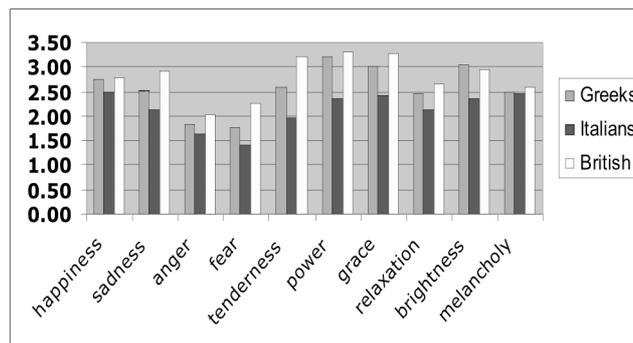


Figure 1. Graph illustrating differences between total mean ratings of emotions by British, Italian, and Greek participants in the music

Moreover, Greeks seemed not to have been biased – at least to a big extent – by lyrics. Two of the musical pieces (musical excerpts 1 and 9), despite having exactly the same lyrics, elicited different emotional reactions to the Greek participants, who apparently relied mostly on musical structural cues. In particular, the most dominant emotion communicated by musical excerpt no 1 was melancholy ($M=3.97$), while musical excerpt no 9 elicited mainly happiness ($M=4.03$) (Table 2). Similarly, Greeks perceived sadness ($M=2.97$) as the most intense emotion in musical excerpt 5, despite being actually a wedding song. Obviously, the lyrics of the fifth musical excerpt: “I haven’t seen such a couple, despite having attending many weddings”, could have biased Greek participants towards happiness. On the contrary, Greek listeners rated sadness ($M=2.97$) as more intense than happiness ($M=2.35$) (Table 2).

Music scores. Music scores were calculated for each respondent according to the average response of Greek participants, and represented the level of accuracy of the specific subject in evaluating the intensity of the intended emotion according to the judgment of the Greek subjects. Music scores ranged from 23 to 38.4 ($M=31$, $SD=4.21$).

Greek participants’ music score was higher ($M=32.6$), while Italian participants ($M=30.39$) ‘outperformed’ British participants ($M=28.19$). One-way ANOVA analysis revealed significant differences between groups in the case of music scores ($F(2, 57)=6.97$, $p=.00$). Subsequently, a Tukey HSD test revealed that significant differences existed between Greek and British subjects in the music score (I-J (Greeks vs. British)=4.44, $p=.00$).

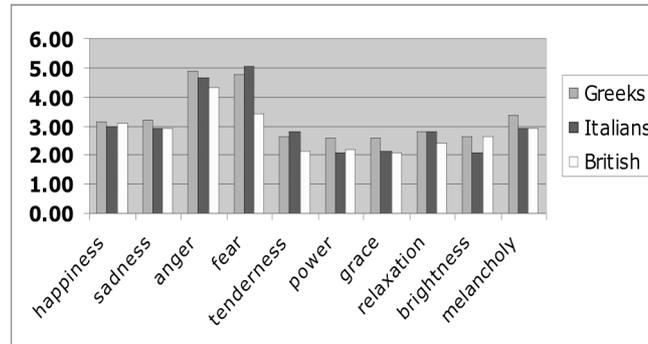


Figure 2. Graph illustrating differences between mean sub-scores of British, Italian, and Greek listeners in the music test.

Except for the general music score, multiple sub-scores were calculated in the same way as music score, each one representing the accuracy of participants in judging one out of ten different intended emotions (Figure 2). Our target was to explore the performance of the different cultural groups on the judgment of each emotion separately, again in relation to the judgment of the Greek subjects. One-way ANOVA analysis illustrated that there were no significant differences between the mean sub-scores of Italians, British, and Greeks as far as it concerned five emotions (happiness,

sadness, anger, melancholy, relaxation). In particular, there was a significant level of accuracy in decoding the basic emotions of happiness ($F(2, 57)=.54, p=.59$), sadness ($F(2, 57)=1.75, p=.18$), anger ($F(2, 57)=.91, p=.41$). On the other hand, fear was not decoded successfully ($F(2, 57)=7.3, p=.02$).

The secondary emotions that were more easily communicated than others were relaxation ($F(2, 57)=1.6, p=.21$) and melancholy ($F(2, 57)=2.34, p=.11$). On the other hand, participants displayed quite different responses when judging tenderness ($F(2, 57)=5.54, n.s.$), power ($F(2, 57)=16.91, n.s.$), brightness ($F(2, 57)=18.85, n.s.$), and grace ($F(2, 57)=16.79, n.s.$).

Correlations of structural elements with judgments of emotions

We performed a Kendall correlation analysis between the emotions most successfully recognized by the subjects (happiness, sadness, anger, melancholy, and relaxation), and the ratings of the structural elements of tempo, rhythmic clarity, rhythmic complexity harmonic complexity, pitch level, pitch range, variation of loudness, variation of tempo, rapid changes in tempo variation, and rapid changes in loudness variation by experts. The results of the correlation analyses are displayed in Table 1. Significant correlations are marked with asterisks.

Some of the results replicate previous findings, as reported by Gabrielsson and Juslin (2003), and Gabrielsson and Lindström (2001), such as the positive relationship found between harmonic complexity, or variation of tempo and happiness when rated by Greek participants, the negative relationship between tempo and melancholy when judged by Italian and Greek participants, the negative relationship between tempo and sadness rated by Greek subjects. Other findings do not confirm previous studies, such as the negative relationship between pitch level and anger when rated by British subjects, the positive relationship between happiness and variation of loudness when rated by Greeks, the positive relationship between tempo and melancholy when rated by Greek participants, or the negative relationship of pitch level and happiness when rated by Italians. However, terminology and other methodological differences make it difficult to compare findings with results from previous studies. It is possible though that the correlations found in the present study reveal that subjects relied on certain structural features, when they judged different emotions. Indeed, interactions between different structural features may also have a significant effect on the production of emotional connotations (Gabrielsson & Juslin, 2003; Gabrielsson & Lindström, 2001). Finally, it seems that different cultural groups relied on different structural features, a fact that may reveal a tendency for different structural cues to vary in importance in the perception of music in different cultures.

Investigation of the relationship between ‘ethos’ and listeners’ emotional connotations

Theoretical treatises that described the notion of ‘ethos’ in circumlocution already existed from the 10th century (ms ΑΓ.Λ 249) and the 15th century by Gabriel Hiero monachos (Τι ἐστὶ ψαλτικὴ [Ti esti psaltiki]) according to Alygizakis (1985), yet it was Chrysanthos that gave a wide range of specific one-word-descriptive adjectives of the emotional character of each ‘echos’. These adjectives, being closer to modern

use of language on the other hand, serve well the correlation with the investigated basic and secondary emotions of phase 1.

As this study was not designed from the outset specifically to explore the applicability of Byzantine theoretical positions on 'ethos', direct comparison between emotional words from the phase 1 of our study and emotional adjectives proposed by Byzantine theory could not be made. Consequently, the results need to be verified with more research. Nevertheless, one can derive some conclusions by juxtaposing proposed adjectives by Chrysanthos and perceived emotions from phase 1.

Therefore, a comparison was made between the dominant emotions that each musical excerpt evoked according to the listeners familiar with it (Greek participants) and those unfamiliar with it (Italian and British participants), and the emotional content proposed by Chrysanthos (1976-77/1832), according to the 'echos' of each musical excerpt (Table 2).

It is obvious that while most musical excerpts belong to 1st Byzantine mode, they do not share a common emotional atmosphere, but they rather evoke quite opposite emotions in different cases. For example, compare musical excerpts 1 and 2, which both belong to 1st mode, but communicate contrasting emotions (melancholy versus happiness) (Table 2).

However, some similarities were also noticed between Chrysanthos' emotional adjectives and emotions reported by listeners.

The 7th musical excerpt belongs to 4th Byzantine mode. According to Chrysanthos, the 4th mode is festive, joyful, and provokes happy dancing. This description could be related to the agreed-upon dominant emotions of grace and brightness by both familiar and unfamiliar groups of listeners (Table 2).

The 8th musical excerpt, which belongs to 2nd plagal mode, evoked sadness to all cultural groups. In analogy, according to Chrysanthos, 2nd plagal mode produces a mourning effect (Table 2).

Finally, the 9th musical excerpt in 4th plagal mode generated positive in valence dominant emotions (happiness, grace, brightness) to both familiar and unfamiliar listeners, which could be related in a way to the charming and lustful character of the 4th plagal mode (Table 2).

Table 1. Kendall correlations among the total ratings of structural cues by the experts and the total ratings of happiness, sadness, anger, relaxation, and melancholy by the three cultural groups.

	BRITISH					GREEKS					ITALIANS				
	happiness	sadness	anger	relaxation	melancholy	happiness	sadness	anger	relaxation	melancholy	happiness	sadness	anger	relaxation	melancholy
tempo	.09	.01	.07	.01	-.03	.13	-.24*	-.08	.06	-.25*	-.10	.06	-.06	-.16	-.20*
rhythmic clarity	-.26*	.34**	-.11	-.01	.14	.10	.08	.13	.18	.13	-.17	-.06	.06	-.16	.01
rhythmic complexity	.03	.16	-.20	.08	-.12	.06	.16	.07	.22*	.04	-.02	-.03	.18	-.02	.13
pitch level	.01	-.02	-.31**	-.01	-.15	.08	-.10	-.10	.17	.28*	-.23*	-.15	-.09	-.23*	-.15
pitch range	-.07	.08	-.15	-.07	-.11	.05	.00	-.02	.07	-.09	-.02	.03	-.16	.03	.00
harmonic complexity	-.06	.05	-.36**	.11	-.13	.33**	-.02	-.03	.11	.09	-.07	-.01	-.09	-.01	-.07
variation of loudness	-.10	.10	-.33**	.08	-.06	.23*	-.05	-.03	.13	.04	-.08	.17	-.02	-.02	-.06
variation of tempo	-.18	.21	-.30**	.07	-.05	.21*	.11	-.04	.27*	-.01	-.02	-.19	-.15	.05	-.08
rapid changes of loudness	-.11	.07	-.33**	.11	-.03	.33**	.06	.03	.24*	-.01	.11	.06	-.07	.05	-.05
rapid changes of tempo	-.16	.25*	-.30*	.12	-.02	.17	.13	-.02	.16	.04	-.05	-.10	-.05	.03	-.13

** Correlation is significant at the 0.01 level (1-tailed).

* Correlation is significant at the 0.05 level (1-tailed).

Table 2. Juxtaposition of the emotional content of each musical excerpt a) as proposed by Chrysanthos of Madyta (third column), b) as defined by dominant emotions according to the judgment of familiar (Greek) and unfamiliar (British and Italian) listeners (fourth and fifth columns).

MUSICAL EXCERPT	ECHOS	'ETHOS' BY CHRYSANTHOS OF MADYTA	DOMINANT EMOTIONS AND MEAN RATINGS OF THEM	
			Judgments of Greek listeners	Judgments of British and Italian listeners
1	1 st mode	Modest, serious, authoritative character.	<i>Melancholy*</i> (3.97) <i>Sadness</i> (3.35) <i>Tenderness</i> (2.94)	<i>Melancholy</i> (4.00) <i>Sadness</i> (3.72) <i>Tenderness</i> (2.97)
2	1 st mode	Modest, serious, authoritative character.	<i>Brightness</i> (4.03) <i>Happiness</i> (3.97) <i>Power</i> (3.80)	<i>Happiness</i> (4.03) <i>Brightness</i> (3.48) <i>Power</i> (2.83)
3	1 st mode	Modest, serious, authoritative character.	<i>Power</i> (3.48) <i>Sadness</i> (2.97) <i>Brightness</i> (2.87)	<i>Sadness</i> (2.97) Grace (2.83) <i>Power</i> (2.66)
4	2 nd mode	Animating and encouraging character, sharply stimulates the souls, mourning and sad character, leading to lustful, cowardice.	<i>Power</i> (3.65) <i>Brightness</i> (3.23) <i>Happiness</i> (2.94) <i>Grace</i> (2.94)	<i>Power</i> (2.97) <i>Happiness</i> (2.62) <i>Grace</i> (2.46)
5	1 st mode	Modest, serious, authoritative character.	<i>Sadness</i> (2.97) <i>Melancholy</i> (2.52) Power (2.42)	<i>Sadness</i> (3.28) <i>Melancholy</i> (3.03) Tenderness (2.55)
6	1 st mode	Modest, serious, authoritative character.	Sadness (3.19) <i>Power</i> (2.94) Melancholy (2.87)	<i>Power</i> (3.66) Grace (2.90) Happiness (2.86)
7	4 th mode	Festive, joyful, happy dancing character, penetrates the soul, empowers the psychic strengths.	<i>Grace</i> (3.90) <i>Brightness</i> (3.68) <i>Tenderness</i> (3.48)	<i>Grace</i> (3.45) <i>Brightness</i> (3.41) <i>Tenderness</i> (3.32)
8	2 nd plagal mode	Lustful and joyful character, lust and amusement, twice in magnitude as the second mode, mourning character, used for funeral purposes.	<i>Sadness</i> (3.65) Melancholy (3.48) <i>Relaxation</i> (3.35)	<i>Sadness</i> (3.48) <i>Relaxation</i> (3.45) Tenderness (3.32)
9	4 th plagal mode	Charming, lustful, happy, used for comedies, modest when the tempo is slow.	<i>Happiness</i> (4.03) <i>Grace</i> (3.97) <i>Brightness</i> (3.61)	<i>Happiness</i> (4.38) <i>Grace</i> (3.38) Power (3.48) <i>Brightness</i> (3.48)
10	1 st plagal mode	Lament, mourning, merciful, stimulant, dancing, vivid, joyful, enthusiastic when the tempo is vivid.	<i>Power</i> (4.26) <i>Brightness</i> (3.90) Grace (3.32)	<i>Power</i> (3.10) Happiness (2.83) <i>Brightness</i> (2.55)

* Adjectives in *bold italics* were rated most highly (dominant emotions) both by familiar (Greek) and unfamiliar (Italian and British) listeners (mean ratings of each emotion shown in parentheses).

Conclusions

In general, listeners from different cultural backgrounds (British and Italians) were quite successful in decoding the intended emotions as identified by Greeks. It was also clear that communication of certain emotions may reach an accuracy well above that which would be expected by chance alone. However, there were discrepancies in the perception of certain emotions.

The performance of the different cultural groups on the music test revealed the existence of cultural effects. At first, an in-group advantage was noticed, since Greek participants performed 'better' than the other cultural groups. This result is partly due to the method of consensus scoring used, which was based on the average answers of the whole sample of the participating Greek people. It is also possible that recognition accuracy is higher when emotions are both expressed and perceived by members of the same cultural group (Elfenbein & Ambady, 2002).

Another cultural effect was the different perception of intensity of emotions by the different cultural groups, a phenomenon which may be due to personal differences (Larsen and Diener, 1987). Another explanation could be the different psychological dimensions related to culture, such as the degree of individual or group orientation of a given culture (Hofstede, 1980). For instance, Matsumoto and Ekman (1989) found a positive correlation in the judgment of negative emotions and index of individualism. In other words, British subjects may have perceived negative emotions as more intense because of the high index of individualism displayed in Great Britain (Hofstede, 1980). Obviously, more research is needed to clarify these cultural effects.

Finally, listeners who were familiar with the musical excerpts and those who were unfamiliar with them seemed to rely more or less on different musical structural features. This result is in accordance with Balkwill and Thompson's (1999) 'cue redundancy model'. Listeners depend on both culture-specific and structural musical cues, when they decode emotions in music. Obviously more research is needed to find whether there is a cultural effect on the preference of certain structural musical features that different people across cultures depend upon for their emotional judgments.

Nevertheless, the results highlight the importance of musical structure in communicating emotion. Karlsson and Juslin (2008) studied the lessons of a group of musical instrument teachers and found that most teachers, on the one hand, acknowledge the significance of expression in music, but on the other, rely on just asking their students to play more emotionally during their lessons, without providing them with the knowledge of handling the different musical structural cues. The students should understand how to manipulate different expression cues, in order to communicate their desired emotional atmosphere, whether they perform an instrument, they sing, or they compose a musical piece. Therefore, music teachers should use music analysis as a tool not only to explain and understand music, but also as a fine way to realise and take advantage of its communicative power (Lapidaki, 2000).

Descriptions by Byzantine theorists on the role of ‘ethos’ were partly confirmed, in opposition to Moutsopoulos’ (1981) aphoristic characterization of the modal ‘ethe’ as “fictitious inventions with no relation to the actual character of the mode they are attributed to”.

It is though, possible that the descriptions of the character of each mode apply mostly to Byzantine chant and not to traditional Greek music, although it is also based on Byzantine musical modes. Apparently, further research examining the impact of the series of intervals, the intervallic range, the tonic, the use of micro-intervals, the use of rhythmic and melodic figures in the Byzantine tonal system and other parameters of the ‘echos’, could shed more light on the issue.

In general, the findings of this study support the view that emotions in familiar and unfamiliar music are perceived in both a universal and a culture-specific way. Further analysis could focus on the manipulation of isolated structural features, and the exploration of their interacting behaviour.

Acknowledgments

We would like to thank Kostas Tsachalinas for fruitful discussions on ‘relative’ and ‘absolute’ elements in the theory of ‘ethos’, as well as Dr. Eleni Lapidaki for providing constructive comments and help on the research process.

References

- Adachi, M., Trehub, S. E., & Abe, J. (2004). Perceiving emotion in children’s songs across age and culture. *Japanese Psychological Research*, 46 (4), 322-336.
- Alygizakis, E. A. (1985). *Η Οκταηχία στην ελληνική υμνογραφία* [The Octaechos in the Greek liturgical hymnography]. Thessaloniki: Editions Pournara.
- Balkwill, L-L., & Thompson, W. F. (1999). A cross-cultural investigation of the perception of emotion in music: psychophysical and cultural Cues. *Music Perception*, 17 (1), 43-64.
- Balkwill, L-L., Thompson, W. F., & Matsunaga, R. (2004). Recognition of emotion in Japanese, Western, and Hindustani music by Japanese listeners. *Japanese Psychological Research*, 46 (4), 337-349.
- Bhatti, S., & Gregory, A. (2000). Cross-cultural study of affective responses to Qawwali. *Proceedings of the 6th International Conference on Music Perception and Cognition*. Keele (CD-ROM).
- Chrysanthos of Madyta (1832/1976-77). *Θεωρητικόν μέγα της μουσικής* [Great theoretical treatise on music], Trieste, reprint Athens: Kouloura.
- Elfenbein, H. A., & Ambady, N. (2002). Is there an in-group advantage in emotion recognition? *Psychological Bulletin*, 128, 243-249.
- Gabrielsson, A., & Juslin, P. N. (2003). Emotional expression in music. In Davidson, R. J., Scherer, K. R., & Goldsmith, H. H. (Eds.). *Handbook of affective sciences*, Oxford University Press, 503-534.

- Gabrielsson, A., & Lindström, E. (2001). The influence of musical structure on emotional expression. In Juslin, P., & Sloboda, J. (Eds). *Music and Emotion: theory and research*. New York: Oxford University Press, 223-248.
- Gregory, A. H., & Varney, N. (1996). Cross-cultural comparisons in the affective response to music. *Psychology of Music*, 24, 47-52.
- Hofstede, G. H. (1980). *Culture's consequences : International differences in work-related values*. Beverly Hills, California: Sage Publications.
- Hoshino, E. (1996). The feeling of musical mode and its emotional character in a melody. *Psychology of Music*, 24, 29-46.
- Karas, S. (1982). *Μέθοδος της Ελληνικής Μουσικής. Θεωρητικόν* [Method of Greek Music. Treatise on theory.] 2nd Volume. Athens: Syllogos pros diadosin tis Ellinikis Mousikis.
- Karlsson, J., and Juslin, P. (2008). Musical expression: An observational study of instrumental teaching. *Psychology of Music*, 36 (3), 309-334.
- Keil, A., & Keil, C. (1966). Musical meaning: A preliminary report (The perception of Indian, Western, and Afro-American musical moods by American Students). *Ethnomusicology*, 10 (2), 153-173.
- Lapidaki, E. (2000). Stability of tempo perception in music listening, *Music Education Research*, 2 (1), 25-44.
- Larsen, R. J., and Diener, E. (1987). Affect intensity as an individual difference characteristic: A review. *Journal of Research in Personality*, 21 (1), 1-39.
- Matsumoto, D., and Ekman, P. (1989). American-Japanese cultural differences in intensity ratings of facial expressions of emotion. *Motivation and Emotion*, 13 (2): 143-157.
- Mavroeidis, M. (1999). *Οι μουσικοί τρόποι της Ανατολικής Μεσογείου. Ο Βυζαντινός ήχος, το αραβικό μακάμ, το τουρκικό μακάμ* [The musical modes of Eastern Mediterranean. The Byzantine echos, the Arabic makam, the Turkish makam.] Athens: Editions Fagotto.
- Mayer, J. D., Salovey, P., & Caruso, D. R. (2002). *MSCEIT User's Manual*. Toronto, Ontario: Multi-Health Systems Inc.
- Mayer, J. D., Salovey, P., & Caruso, D. R. (2004). Emotional Intelligence: Theory, findings, and implications. *Emotion*, 15 (3), 197-215.
- Meyer, R. K., Palmer, C., & Mazo, M. (1998). Affective and coherence responses to Russian laments. *Music Perception*, 16, 135-150.
- Moutsopoulos, A. E. (1981). Modal 'ethos' in Byzantine music. Ethical tradition and aesthetical problematic. Proceedings of the 16th *Internationaler Byzantinistenkongress*, Wien. Retrieved April 15, 2008 from <http://www.csbi.ro/ro/>
- Panagiotopoulos, D. G. (2003). *Θεωρία και πράξις της Βυζαντινής Εκκλησιαστικής μουσικής* [Theory and praxis of Byzantine Ecclesiastic music]. (7th ed.). Athens: Editions Sotyr.

Appendix

Discography* (Musical excerpts)

- 1) Aidonidis, Chr. (1998). 'Between two mountains'. [performed by Chronis Aidonidis]. On *Tunes and songs of Thrace*. Hellas, Democritus University of Thrace: Crete University Press, Foundation for research and technology.
- 2) Karas, S. (1994). 'Arta'. (Tsamikos Dance). On *Songs of Peloponnesos, & Roumeli*. Society for the dissemination of national music.

- 3) 'Even Tsambasin was burnt'. On *Songs from the lost homelands: Pontos - Kappadokia*. To Vima tis Kyriakis, FM Records.
- 4) Karas, S. (1994). 'Only once is there a flair for life' (Tsamikos Dance). On *Songs of Peloponnesos and Roumeli*. Society for the dissemination of national music.
- 5) Karas, S. (2000). Wedding song. [performed by Konstandinos Zambetoulas]. On *Songs of the Dodecanese*. Society for the Dissemination of National music.
- 6) Kaimakis, I. (2000). 'It is cloudy again'. On *Song of the dead brother*. [Performed by Polytropo] (unpublished).
- 7) Drandakis, L. (1994). 'Patinada' (wedding musical piece). On *Songs and Dances of Smyrna and Erythraea, Asia Minor*. Lyceum Club of Greek Women.
- 8) 'When you leave abroad'. On *Songs from the lost homelands: Minor Asia*. To Vima tis Kyriakis, FM Records.
- 9) Aidonidis, Chr. (1998). 'Between two mountains' (Zonaradikos dance) [performed by Chronis Aidonidis]. On *Tunes and songs of Thrace*. Hellas, Democritus University of Thrace: Crete University Press, Foundation for research and technology.
- 10) 'Blonde Girl'. On *Songs from the lost homelands: Pontos-Kappadokia*. To Vima tis Kyriakis, FM Records.

*The musical excerpts can be heard at http://users.auth.gr/~kyriakiz/musical_stimuli.html

Biographies

Kyriaki Zacharopoulou is a music teacher in a secondary public music school. She has received her MA from University of Sheffield in music psychology, and she is currently working on her PhD at the Department of Music Studies, Aristotle University of Thessaloniki in Greece, under the supervision of Dr. Eleni Lapidaki.
Webpage: <http://users.auth.gr/kyriakiz>.

Athanasia Kyriakidou is a researcher in the area of historical musicology, focusing on Byzantine music at the late 19th century. She holds a B.A. in musicology, and she is currently a PhD candidate at the Department of Music Studies of Aristotle University of Thessaloniki. She also holds diplomas in Flute performance, instrumentation, wind orchestra conducting and in Byzantine music. During the last five years she is working as a choir conductor, performing both Byzantine and classical repertoire.