

## The representation of time among different cultures and musical systems

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**Practical background.** People from different countries generally present different lifestyles, depending, for example, on geographic and economic features, or on historical and social heritages. This is also reflected in different ways to manage time. Such differences can possibly contribute to the construction of stereotypes that alienate one culture from another, as do racial prejudices.

**Research background.** The contrast between the mechanistic models of Western scientific thought and the holistic cosmologies of many non-European cultures is rather obvious. However, little scientific research has been undertaken until now to specifically underline and understand the implications of the different perception of time within music performance among different peoples.

**Aims.** As an hypothesis, we propose that music can be read as an index of a culture's understanding of time, and therefore different forms of musical and terminological expression indicate different cosmological understanding of time, and consequently, of space.

**Main contribution.** We compare terminology regarding the perception of time in different cultures and languages, specifically in the Western classical musical system, Japanese court music, Arab and Turkish classical music, and Western Amazonian magical songs.

**Implications.** The results show that the intriguing dichotomy of European thought about musical time – if it pertains to the *external* or the *internal* – is not shared in non-Western cultures. Moreover, the handling of time in music seems to connect and interrelate individual times and therefore “good” timing in music appears as a social phenomenon. From the critical analysis of the meaning of temporal aspects connected to single sounds, melodies and/or musical pieces, we hope to contribute to a constructive dialogue on epistemological contents of respective cultural traditions, within a connubium of music and science.

### Introduction

Migration causes serious problems of intercultural communication in many societies. Immigrants often try to retain their own cultural identity, which makes dialogue with representatives of other cultures difficult, due to different behavioural patterns proper to different socio-cultural systems.

The contrast between the mechanistic models of Western scientific thought and the holistic cosmologies of many non-European cultures is rather obvious. This is revealed through different experiences of time and space in everyday experience. Differences in the understanding of time and space (which are often formulated in religious

cosmologies) can result in severe misunderstandings between people from different cultural origins.

Our idea is to relate intercultural communication with the perception of time in different cultures. People from different countries generally present different lifestyles, depending, for example, on geographic and economic features, or on historical and social heritages. This is reflected in different ways to manage time: for instance, people who are anchored in rural traditions suffer less distress caused by the rhythms of technological applications and therefore organize their life in different, mostly slower, temporal patterns than people directly involved in industrial or post-industrial societies. In this sense, it has been demonstrated that understanding the concept of time in physics widely varies between students of European origin (whose viewpoint is much more formal and abstract) and of African precedence (who tend to subjectively relate “their” time to sequences of events in nature) (cf. Lemmer et al., 1999). Such differences in learning success can possibly contribute to the construction of stereotypes that alienate one culture from another, as do racial prejudices. On the other hand, helping to understand the differences in time-related cosmology may improve intercultural communication, and cross-cultural music performance can possibly be fairly valueable in that issue.

Our hypothesis is that music can be read as an index of a culture's understanding of time, and therefore different forms of musical expression indicate different cosmological understanding of time, and consequently, of space. We propose that comparing the role of timing in musical genres from different cultures can lead to significant insights about their cosmologies, and therefore about their religious and social organization.

### Perspectives on temporality

Following a common opinion among many anthropologists, psychologists and musicologists – that music is a symbolic representation of time (Disoteco, 1998b, Blacking, 1973) – we analyze temporal organization in different musical cultures in order to improve our understanding of their respective backgrounds and foundations.

The development of music in time can be resumed in three main manifestations:

- the *duration* of single sounds,
- local variations of *timing* (i.e. variations in the durations of performed sounds relative to the durations notated on the score), determined by expressive purposes,
- and the *rhythmic organization* (the sequence of sounds in time).

Formal agreements and variations within these aspects of musical temporality can lead to particular aesthetic paradigms. Such paradigms may be connected to the philosophy of time among different people. Therefore, we compare the musical system of European tonal tradition, classical Arabic and Turkish music, the traditional Japanese *gagaku* repertoire and ritual music of indigenous peoples of the Amazon basin.

We observe salient musical and terminological differences related to time and timing among the respective communities. We can further show that conceptualization of time and space in music is different among these four examples.

**Western classical music.** Scientific approach to European classical music traditionally assumes that sound contains all cues for musical communication. This means that sound can be described in terms of physical variables – like duration and intensity – whose relationships are generalized to provide rules for “good” music performance (i.e., expressive and communicative) (cf. Friberg and Battel, 2002).

For instance, the hierarchical structure which characterizes most tonal music can be expressed by combining *timing* (i.e., local *accelerando* and *rallentando*), *dynamics* (*crescendo* and *diminuendo*), and *articulation* (*legato* and *staccato*), so that important events (like the climax corresponding to the highest *melodic* and/or *harmonic tension* in the piece, as well as musical *accents*) are emphasized in terms of salience and emotional intensity. Also the global tempo can vary substantially among different pieces and interpretations, and these variations are related to other expressive cues (cf. Bisesi and Vicario, 2009). Moreover, preferred tempo depends on the melodic event density and the rhythmic subdivision of the beat: it has been shown that melodies with fewer events per beat have faster preferred tempos when these are expressed in beats per minute, and these tempos are confined to a narrower range of tolerance (cf. Bisesi and Vicario, 2010).

This approach to musical tempo is very positivistic, as it demands that the complexity of music can be reduced and accounted for with a small number of parameters and laws. At the same time, Western classical music has been developed and built by analytical principles; therefore this attitude may sound self-consistent.

On the other hand, modern Western thought has always considered time as a linear and measurable entity – with past, present and future clearly distinguishable from each other and with the arrow of time pointing in a unique, positive direction. A caveat is represented by the conflict between physical and perceptual domains, as physical time is objective and real, while psychological time is subjective and phenomenic. In spite of big efforts carried out by philosophers and scientists over centuries, this problem still remains unsolved: the paradigm adopted to explain physical phenomena does not account for psychological experience of time and, vice versa, the perception of time (in this case, of musical tempo) is somehow far from and unconceivable through the laws of physics. Although special relativity rejected the idea of absoluteness of time and claimed an intrinsic relationship between time and space, the problem whether time is *internal* to human perception (the psychological perspective) or an *external* fact of nature (the cosmological paradigm) is one of the trickiest points of modern thought.

In this sense, music acts like a watershed: is the musical tempo intrinsically related to the physics of sounds (i.e. their duration, timing and rhythm), or should it be brought back to human experience and brain competence? In other words, how could music help to understand one of the most intriguing matters of Western philosophy?

**Japanese court music.** The temporal and aesthetic conceptions of Asian music are often different from those of Western cultures. For instance, the choice of a precise musical speed carries no weight in traditional Japanese *gagaku* performance. Instead of focusing on the preciseness of musical speed, performers aim to achieve the particular condition of *chowa* (調和), *harmony* as human unity through music. Through the *harmony*, musicians create a sense of unity among themselves and the audience, as well as a spiritual uplift which is understood as a base of Shinto aesthetics. Although musicians are usually not aware of a changing tempo during the performance, these particular aesthetical implications naturally result in an increase of the tempo (*susumu*, 進む – i.e., a gradual acceleration of performing speed) toward the end of the composition (cf. Fujita, 2009).

Another important aspect of temporality in *gagaku* performance is *periodicity*: recurring cyclical units consist of a combination of different rhythmic patterns played by different percussion instruments. As each instrument section is responsible for different melodic and rhythmic elements, melody and rhythm are not blended together, but proceed independently from each other. Furthermore, the rhythmic patterns accumulate towards the end of the

composition (*kuwaeru*, 加える), resulting in an intensification of the music's sonic elements. Moreover, musical speed *fluctuates* during the performance, therefore causing rhythmic forms to influence the duration of single units of temporal organization.

Fluctuation of time in music corresponds with the philosophical concept of *ma* (間). This term is commonly used to indicate an artistically placed interval in time and space. When used in describing *gagaku* music, as well as in other traditional Japanese music and arts, *ma* refers to the idea of a time (here, a unit of musical time) that can expand or contract according to the needs of artistic expression (cf. Fujita, 2009; Hoshi, 1994). Besides, it denotes a *synchronic* aesthetic understanding of the artistic process: according to *ma*, music production constitutes an ever-present idea of events rather than a sequence. *Ma* expresses the superposition and identity of space and time in aesthetical perception – a principle which originates in the Taoist philosophy. *Ma* is both a time *between* events, and a space *between* things. It is neither time nor space; it rather defines the frame of silence and vacuum whose tension circumscribes sounds and events (cf. Galliano, 1998).

Instrumental practice can also reflect certain features of traditional Japanese music. For instance, *sawari* (さわり) is a particular device, used to transmit energy from the fundamental component of a string vibration to higher components, prolonging the decay and generating inharmonic components (cf. Ando, 1993). This technique produces a more brilliant and complex timbre, that can be perceived like a succession of movement, a “dynamism” inside single sounds – a feature which finds no correspondence in Western music. This overlapping of *timing* between different overtones could be related to the idea of *atemporality*, where two or more different “times” overlap and penetrate each other (Takemitsu, 1987).

Time is understood as being fluid, eternal and permanent, so that the events of life flow progressively from one to another (cf. Tamba, 2004). When applied to *gagaku* music performance, this idea of “becoming” (*naru*, 成る) translates into a supreme aesthetical and spiritual achievement.

**Arab and Turkish classical music.** Both Arab and Turkish classical music ascribe high importance to non-metrical improvisation. The rhythmic freedom of *taqsim* (the instrumental improvisation, similar to Indian *alap*) does not only implicate non-metrical structure, but can also represent a mystic and independent understanding of time, far from the idea of objectivity in European tonal music. (cf. Disoto, 1998a; 1998b). If this mystic aspect is actually

expressed, however, depends on contexts and the individual musicians.

The topic of a *taqsim* is a presentation or exposition of the mode (*maqam*). Note durations and pauses in a *taqsim* are, to a certain extent, determined by the role of notes in the *maqam* and the modal architecture: although the modes of oriental music do not include rhythmic aspects, the architecture of a *maqam* as well as its characteristic phrases do influence the temporal structure of the music, especially in non-metric improvisation (cf. Touma, <sup>3</sup>1998). For example, one form of *taqsim* is played over a rhythmic *ostinato*. Here, it is important that the improvisation remains independent of the accompanying rhythm. The soloist should find his own breath, and the improvisation should sound rhythmically free. However, in the Coffee houses around 1900, for example, also *taqsim* with a semi-rubato structure were established, e.g. in intersection with *diyyek* rhythms. Rhythm cycles in Turkish music are called *usul*, in Arab music *wazn* (Touma, <sup>3</sup>1998: 75-83). The plentiful standardized rhythms (cf. Özkan, <sup>6</sup>2006: 601ff) are memorized and notated with syllables which mimic timbre sequences of the percussion sound (similar to the *bol* syllables in Indian *tala*). Changes of rhythm within a piece and between metrical and non-metrical sections in performances are common. Such rhythmic cycles do not only occur in the parts played by percussion instruments, but also influence the melodic flow. Typically, there is some freedom in the way that melodies follow the rhythmic cycles, but the *usul*-pattern helps to understand the melodic structure. Long rhythmic cycles (up to 124 subdivisions, e.g. see Özkan, <sup>6</sup>2006: 797) also determine the formal structure of the music. In this case every *hane* (Turkish word for “house”, here used for “part”, “verse”) of a piece may consist of just one (or two) cycle(s) of that rhythm. In that case, the melodic line in that part is a result of the structure of the *usul*.

Although music performance like *dhikr* is connected to cosmological and religious knowledge in Sufism, the interrelation of cosmological time and *timing* in this context is still an area to be explored. In Turkish *Rufai* Derwish ceremonies, for example, *taqsim* are mostly played in non-metric manner, but rhythmically determined forms of *taqsim* can also occur.

**Amazonian magical songs.** In their indigenous terminology, the Peruvian lowland people known as Shipibo-Konibo (comprised by about 50.000 individuals, linguistic family: Pano), do not separate time from space. The noun *nete*, for example, can be translated with “day” (time), “world” (space), or “light” (cf. Illius, 1999). Shipibo musical performance mainly consists of vocal music. At

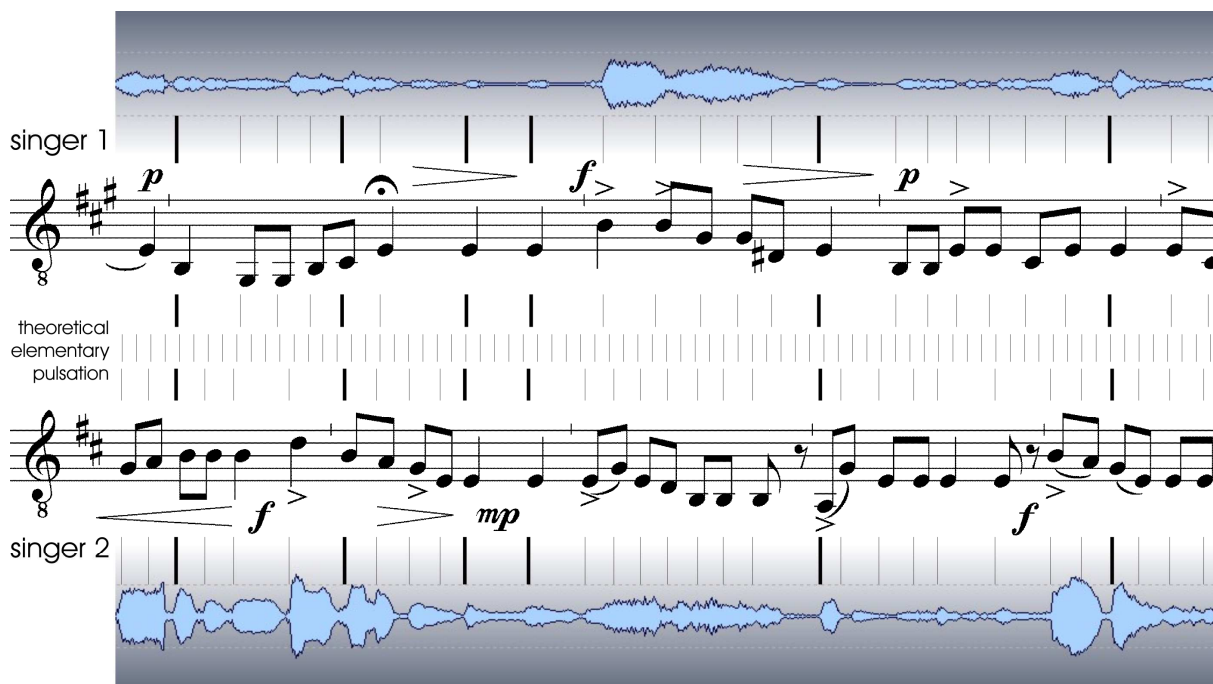


Fig.1: Excerpt from a Western Amazonian polyphonic magical song performed by two related Shipibo-Konibo healers. Wave amplitude graphs [WaveLab 5] and score for both parts are shown in the figure. “Ticks” in the score mark phrases in the lyrics (which are not shown). The vertical lines above and below each staff mark the exact onset positions for each tone (oriented on amplitude attack). Thick lines show synchronized onsets in both parts. The row of small lines in the centre shows the theoretical and inaudible elementary pulsation in equalized distances. One can observe that synchronization is not executed in mathematical exactness. In perception, however, the parts cling with each other and within the elementary pulsation (which is indicated at some points with tremor-like movements by both singers). Comparing the amplitude difference in the wave graphs, one can also observe that both singers either alternate or synchronize their respective dynamic accents. By the way, in this example excerpt, “singer 2” lead the performance.

public events, groups of singers (who can be male, female, or mixed) often perform songs in unison. When two groups perform at the same time, they usually refer to each other in both lyrics and musical structuring. Therefore, a certain degree of spontaneous coordination (conceptually different from “improvisation”) is applied. The tonal material is often pentaphonic or tetrachordal and therefore the parts sound together in consonance. However, timing issues are more complicated: both groups may sing in varying tempos and with different phrase lengths (lyrics are organized in phrases not unlike Western verses). In the resulting rhythmical structure, one will recognize a complex relation between the parts, as both parts will come together again after every few seconds.

In magical songs, which are performed in healing/sorcery contexts, these relations are often more complex but easier perceivable, as most often, only one singer performs one part. When two or more singers perform simultaneously, complex polyrhythmic relations in timing and accents between the two or more parts may occur (see figure 1). Temporal precision as an emic aesthetic category (*manei*, cf. Brabec de Mori, 2009: 134) in solo singing is most often achieved by successively

accelerating a regular beat, while in polyphonic singing *manei* manifests as a relative synchronization among the different parts. In the excerpt shown in the figure, *singer 1* successively accelerates his part, while *singer 2* keeps with his original tempo (which is currently faster than *singer 1*'s tempo in a relation of 19:16 for the depicted excerpt).

One can observe that the local variation of timing is flexible, as the durations of the single sounds are highly variable. It appears that the singers use their freedom in durations and local variations in order to maintain the overall synchronization between the two parts, which therefore will sound together in complex relations. This final “rhythm” emerges from the flexible combination of sound durations within the two (or more) parts.

In magical song lyrics, the term *kano* (which can be translated as “way”, “frame”, “air/atmosphere”, or “landscape”) denotes a virtual surrounding, which is constructed during singing and therefore inhabited by the singer. In polyphony, the same *kano* can be inhabited by various singers who therefore synchronize within an inaudible elementary pulsation (Kubik, 2004: 71-76). If the singers leave

their common *kano*, synchronization and harmonic consonance go amiss, resulting in dissonance.

These explanations are meant as an illustration, how closely musical timing and cosmological subject positionality can be related in corresponding cultural contexts: in Western Amazonian music performance, the interconnectedness of the performer(s) with his/her/their surroundings is anticipated by culturally determined cosmological deixis: “we” (humans) are always surrounded by “them” (non-humans, cf. Viveiros de Castro, 1998). Musical performance, and therein especially rhythmic and accentual synchronization, is understood as the leading mode of communication between “us” and “them”.

## Implications

The examples of Japanese, Arab, Turkish, and Amazonian music underline that within these societies, individual time and the relations between more than one time in group performance are prominent, but the idea of an *external* time is rather absent. Therefore, the understanding of time among these societies clings together with individuals and social interactions and could be regarded a *social* construction of musical time.

We could find, for example, a conceptual similarity between the Japanese *ma* – widely used to designate an artistically placed interval in time and space (Fujita, 2009) – and the way Western Amazonian Shipibo people address the topic of relativity of space and time (*nete*, *kano*) during music performance.

However, problems of *objectivity* similar to the Western perception of time can be observed in Turkish music as written in Western staff notation. Here, subjective interpretation of timing is assumed, but not written down as this would be an impossible task (to “objectivate” the subjective).

Based upon the results of an intercultural comparison of time in music, the idea gains sense that intercultural musical engagement can be a forum for confronting and negotiating cultural differences. From the critical analysis of the meaning of temporal aspects connected to single sounds, melodies and/or musical pieces, we plan to open a constructive dialogue on epistemological contents of respective cultural traditions, within a connubium of music and science.

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## Biographies

**Erica Bisesi** is post-doc researcher at the Centre for Systematic Musicology at the University of Graz. She completed a Ph.D. Degree in Mathematics and Physics at Udine University in 2007. She had previously worked as physicist on several large-scale research projects (theoretical astrophysics, experimental elementary particle physics, physics education). She moved to systematic musicology in 2007. She spent a research period at the Department of Speech, Music and Hearing at KTH – Stockholm, and then started collaborating in several projects and experiments on psychology of music, psychophysics and computational psychoacoustics at the Universities of Udine and Milano-Bicocca. In October 2009, Austrian FWF awarded Erica a Lise Meitner postdoctoral fellowship for a two-year project entitled “Measuring and modelling expression in piano performance”.

Erica has always shown interest in artistic activity. She received her first musical education at the age of five and completed a Bc.L. Degree in Piano Performance at Trieste Conservatorium in 1996. Then she further enhanced her piano techniques and repertoire by attending courses with Bruno Canino in Milano, the conductor Francesco Mander, Aquiles Delle Vigne in Salzburg, Firenze and Rome, Anna Kravtchenko, and Vladimir Krpan in Zagreb. She performs as a soloist and in chamber music ensembles in Italy and abroad.

Erica has also worked as a teacher of physics and music education up to undergraduate level, and taught acoustics and psychoacoustics at the Udine Conservatorium and at the Universities of Udine and Trieste.

**Bernd Brabec de Mori** is an ethnomusicologist specialised in indigenous music from the Ucayali valley in Eastern Peru. Together with his wife Laida Mori Silvano de Brabec who excels in translation and interpretation of indigenous poetics, he spent some years in the field and became integrated in the indigenous group Shipibo-Konibo. He now lives in Austria, accomplishing his doctoral thesis at the University of Vienna. He has been working at the audiovisual archive Phonogrammarchiv of the Austrian Academy of Sciences and as an assistant at the Centre for Systematic Musicology at the University of Graz. His publications cover the fields of Western Amazonian indigenous music, arts and history as well as the complex of music, ritual and altered states.