The Turkish Call to Prayer: Correlating the Acoustic Details of Vocal Timbre with Cultural Phenomena

Eve McPherson, Department of Music, University of California Santa Barbara, United States of America
eve_mcpherson@umail.ucsb.edu

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Abstract
This study begins with the premise that cultural phenomena inform the production of vocal timbre, especially since the voice has communicative capabilities that transcend language. If this is true, then correlations between the acoustic details of vocal sound and social events should be observable. This paper is a case study that examines a methodology by which such correlations can be made. Specifically, it is a study of the Turkish call to prayer and the relationship of timbre to socio-cultural factors. The ezan underwent significant changes when the Turkish Republic was established, including the institution of Turkish language recitation. Today it is again recited in Arabic, maintaining aspects of Ottoman practice. Many claim there is a unique Turkish recitation style. As such, an examination of the ezan’s acoustic details may provide evidence of this style.

Introduction

Discussion of sub-disciplines of musicology
When I originally wrote the abstract for this paper, I designated the two disciplines from which my work is drawn as ethnomusicology and acoustics. In retrospect I find that perhaps a better designation for the second discipline is that of voice science. Ultimately, I rely more on the analytic techniques and terminology of this field.

As to the second discipline, ethnomusicology, what I am attempting to do in this paper is to show how ethnomusicologists might apply techniques and knowledge from a field such as voice science in larger fieldwork projects in an attempt to connect timbre with cultural phenomena (as has been done with rhythmic and melodic analyses). In this case I focus on social and historical processes in Turkey as they concern the call to prayer and hypothesize that, as I work on this project in the field, by using the techniques of spectral analysis in combination with fieldwork techniques such as interview and observation, I may be able to isolate indigenous listeners’ perceptions of that which is a distinctly Turkish concept of the call to prayer.

The Assumptions and purpose of this study
This study begins with the premise that cultural phenomena inform the production of vocal timbre, especially since the voice has communicative capabilities that transcend language. If this is true, then correlations between the acoustic details of vocal sound and social events should be observable. This paper is a case study that examines a specific methodology by which such correlations might be made. At the end of this paper I will comment on the usefulness of this particular methodology.

Subject of investigation
Very specifically, I am investigating the call to prayer as it is recited in Turkey and the relationship of social change to voice quality. However, before I address the singular history of the call to prayer in Turkey, I will briefly introduce the call to prayer, its significance in Islamic religious practice, and the role that timbre plays in the perception of this practice.
Sometime between 622 and 624 A.D., the Prophet Muhhamad established the call to prayer in order to create a practice that distinguished Islam from other locally practiced religions. As it was historically, today a muezzin recites the call to prayer, known in Arabic as the *adhān*,¹ five times daily. Prayer times differ based on the position of the sun and the geographic location of the community. They are precisely determined to the minute and may change daily. When Muslims hear the call to prayer, they are called to reflect on the Islamic faith and their duty to pray. The text of the call serves the purpose of reinforcing core religious beliefs. It consists of five lines (with an extra line included at dawn). A translation of the text is as follows:

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Allāhu akbar, Allāhu akbar
Ashhadu an lā ilāha illā llāh
Ashhadu anna Muhammadan rasūl
     Allah
Hayya 'alā 'l-salāt
Hayya 'alā 'l-falāḥ
al-Salāt khayrun min al-nawm

Allāhu akbar, Allāhu akbar
Lā ilahā illā llāh
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While the text and its message are for the most part standardized (with slight variations used in some Islamic sects), historically and culturally however, it has not been uncommon for differences to exist melodically, modally and rhythmically.

Rhythmically, the call to prayer is recited as unmetered text. Concerning melodic line and modal practice, these elements are generally chosen by the individual muezzin and have tended to be reflections of his personal training and cultural background. Another dimension of the sound is its acoustic structure. Unlike rhythm and melody however, acoustic analyses of the call to prayer have not been undertaken.

Why would such an investigation be useful? In addition to simply adding to a body of knowledge on the structure of sound, references in the literature indicate that there are in fact distinct timbral preferences that influence vocal production in the call to prayer (Nelson 1985, Stone 1989, Monts 1998, and Marcus 2002), but these preferences are ambiguously defined. Further, while any Islamic male may publicly recite the call to prayer (women study recitation but do not publicly recite), it is often said and even written that the preferred sound is that of the "beautiful voice." When asked to define this preference, a common answer can be "like that of David," a biblical reference. Thus we find an express preference for a particular sound, but at the same time the specifics of this sound remain obscure. To be fair, there are recitation competitions for both the call to prayer and Qur’anic recitation and the judging parameters for these competitions take into account timbre. However, the desirable qualities delineated in these competitions are only measured perceptually. In her study of Qur’anic recitation competitions in Kuala Lumpur, Lois Al-Faruqi writes that a beautiful sound is based on the following criteria:

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The features for which judges of the third category, Vocal Quality, are instructed to watch are 1) “clean,” “immaculate” and “melodious” quality in all three registers; 2) a “smooth and fluent” vocal quality; 3) a “clear intelligible and distinct sounds”; and 4) a vocal quality which is consistent from beginning to end of the recitation. In other words, the rules specify that the voice should not “snap,” become hoarse, sound weak or faint in low register or quivering on high notes. In addition, the good voice is described as “moving and lively.” It is specified that the male reciter should have a masculine sounding voice, the female a feminine voice (1987, 225).
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¹ Common alternate spellings and pronunciations of *adhān* include *azan* and in Turkish, *ezan*.
Such specifications provoke questions as to whether or not listeners consistently agree on the parameters of these sounds, if these parameters indicate a pan-Islamic aesthetic, and if so, can perceptions of these sounds be translated into acoustic pictures that correlate? As to my current work, I intend to devote much of my fieldwork research into an understanding of what a Turkish sound is perceived to be (as opposed to a pan-Islamic one – a topic which however also holds my interest) and, if I can ascertain what the perception of this sound is, then perhaps I can move on to the second step which is to see whether or not this perception has an acoustic correlate. I concentrate on the case study of the call to prayer in Turkey because Turkey has a fascinating history as it concerns the call to prayer – one which is tied to the agendas and bureaucracies of an empire and later a nation.

During the reign of the Ottoman sultans (approximately 1300-1920), an ezan administration regulated the recitation of the ezan. The administration trained and selected muezzin-s to recite the call to prayer. Ottoman practice also dictated that the ezan was recited in a different makam2 (most concisely defined as a modal entity) for each time of day. As Arabic is the official language of Islam, recitation of the ezan was in Arabic and not in Ottoman Turkish. However, with the establishment of the Turkish Republic in 1923, the ezan became a center of controversy. The new administration introduced a series of reforms as part of an overall modernization agenda. As part of these reforms, new language laws were instituted that called for Turkish as the national language of the Republic. Among them was the rapid shift from the Arabic script of Ottoman Turkey to that of the Latin alphabet. In line with this national linguistic modernization project, recitation of the ezan in Arabic was called into question, and in 1930 recitation in Turkish began. This linguistic change resulted in popular unrest in part because Arabic was (and is) considered the sacred language of Islam. Despite the opposition to recitation of the ezan in Turkish, this practice was maintained for almost twenty years before being restored to Arabic recitation. Today in Turkey the ezan continues to be recited in Arabic and in some of the mosques, particularly the larger and more famous ones, the Ottoman practice of recitation in different makam-s at different times of day is maintained (although at smaller mosques this practice is often not preserved). Muezzin-s train, compete for positions and are officially appointed to mosques by the Turkish Department of Religious Affairs (Diyanet İşleri Başkanlığı).

Such events, and the fact that muezzins in the Turkish Republic undergo similar training before their official appointment to mosques, have led to what many claim is a unique Turkish recitation style.3 If this is the case, then an examination of the ezan’s acoustic details via spectral analysis, in conjunction with modal analysis, rhythmic analysis and information provided by indigenous practitioners and listeners about the perceptions of the Turkish call to prayer, might provide evidence of this distinct style. Today I will present one method of spectral analysis that I anticipate using as part of my fieldwork, discuss the results of this method and evaluate its potential for use in the field.

**Methodology**

In preparation for my fieldwork, I have been examining various methods of timbral analysis. The one I present below is the latest investigation that I have undertaken.

I began by examining the four recordings that I have of the call to prayer being recited in Turkey. Two samples are field recordings and two are commercial recordings. In order to control as many variables as possible, I isolated sound samples on the vowel [A] that were on approximately the pitch middle C. An important variable outside of my control was the fact that, with the exception of the two field recordings, the samples were not recorded under the same circumstances or with the same recording equipment. As is known, recording equipment and the recording environment can affect the type of information that is ultimately

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2 In simplest terms, makam refers to the basic building blocks of Turkish melodic composition. There are numerous distinct makam-s in Turkish practice.

3 Scholars have noted that secular vocal music has been informed by discourses surrounding perceptions of Ottoman vocal techniques versus national ones, but have yet to explore sacred vocal practices.
recorded, and I am particularly referring to the acoustic data, therefore it is desirable whenever possible to record samples under similar circumstances.

Returning to the method, after isolating these short samples, I then turned to trying to ensure that I did not simply set about determining the structure of an [A] vowel, a mistake I have made in the past. I did so by comparing the formants of each sample with the typical structure of most [A] vowels. To be fair, any analysis done using this method at this point in time is somewhat problematic. For a complete analysis, what I need to have are samples of the typical [A] vowel as native Arabic speakers pronounce it (taking into consideration the problems of the diverse dialects), as well as samples of when native Turkish speakers pronounce it in classical Arabic. Once I have control samples of the spoken [A] for comparison with the recited [A], the method I am currently describing will provide more accurate data. However, for the purposes of initial investigation, I used an [A] spoken by English speakers. My comparison of the [A] in the Turkish samples and the “typical” [A] revealed that the first two formants of the Turkish group tend to blend into one broad formant during recitation and that the third formant tends to be pushed to a higher “peak” in most samples. Figure 1 below is a schematic of a “typical” [A] vowel:

![Figure 1. Schematic Spectrum of Vowel [E], First Three Formants](image)

As we know from the work of scholars such as Ladefoged and Sundberg, the first two formants tend to be responsible for vowel quality, while upper formants tend to inform individual voice quality. Building on this information and on work that I have completed in the past in which I investigated the first two formant areas of approximately twenty samples, I decided to ignore this area (assuming that I would be testing more for vowel quality), and instead concentrated in this study on the third formant area in order to see if it consistently contributed to the voice quality in the samples.

In order to see how important that area was I employed analysis by reduction. I first examined the four Turkish samples and found that this area might be a significant contributor to the overall resonance in the voice (as I perceived it). But before I give details about these results, it is important to first note that the method would be flawed if I stopped at simply identifying this area as a common contributor to resonance in the Turkish samples. If you remember, my initial question concerned whether or not I could identify uniquely Turkish features of the sound. Therefore by simply making this comparison between Turkish samples, I had not determined the uniqueness of this area to the Turkish sound. It was important therefore, to have something to compare it against.

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'Schematic provided by Dr. Cornelia Fales.'
Thus, for comparison I used the same method to analyze five Egyptian samples (four field recordings from Cairo and one commercial recording) to see if the same results could be obtained. Why did I compare it to Egyptian samples? I did so because some scholars indicate that the Cairene call to prayer, like the recitation style, seems to have left Egyptian borders and become a common model for *muezzins* throughout much of the world, due to Egyptian prominence in terms of broadcasting and commercial recordings (*Bukhara: Musical crossroads of Asia* 1991, *The New Groves Dictionary of Music and Musicians* 2002, 602).

**Results**

The filtering process provided interesting results. I will first describe the results of the Turkish samples.

In the first sample, a recording of Kani Karaca who was a very famous reciter of the *Qur’an* and of the call to prayer, I found that a salient feature of the sound that Karaca produces occurs between the frequencies of 3100 to 3600 Herz; when removed it seems to diminish some of the resonance of his voice.

In the second sample, a field recording from the Sultanahmet mosque in Istanbul by the muezzin Muzaffer Çelikendaze, through the same process I found what I would describe as a similar loss of resonance when I filtered out the frequencies between 3000 and 4000 Herz. Figure 2 below demonstrates the filtering process I used on this sample; the process is similar in all samples:

![Filtering Process](image)

*Figure 2. Filtering process as applied to sample recited by Muzaffer Çelikendaze*

The third sample, a field recording also from the Sultanahmet mosque in Istanbul, this time recited by another muezzin, Bunjamin Özçiftçi, provided a very different result. In this case I was compelled to filter from the first formant in order to produce any differences in resonance. Through filtering I found that a similar resonance was lost when the frequencies between 1200 and 1300 Herz were removed, but the vowel was not noticeably changed. This frequency range differs greatly from the first two samples.

When filtered, the fourth sample, a commercial recording recited by Hafiz Hüseyin Erek, showed a similar result to that of the first two. When removed, the frequencies between 2500 and 4300 Herz contributed to a change in overall vocal sound quality. It is important to note that while the frequencies occur in a similar region to that of the first two samples, the range is much wider.
Looking only at these four samples from Turkey, it seems possible to assert that the Turkish sound may have a unique and salient manifestation in the range of 3000 to 4000 Herz and that when a larger investigation is undertaken, a search for its presence may prove fruitful. However, when a comparison is made to the Egyptian samples, this theory becomes less viable.

Using the same methodology as I did for the Turkish samples, with the exception that two of the samples were in the range of B below middle C, while three were in the range middle of C, I found the following. In terms of that third formant area and the impact it has on the sound quality of the Egyptian samples, filtering indicated that the absence of the frequency ranges listed below contributed to an altered voice quality in terms of overall resonance:

Sample one: 3500-4200 Herz  
Sample two: 2800-3900 Herz  
Sample three: 3400-4700 Herz  
Sample four: 3300-4000 Herz  
Sample five: 8000-10,000 Herz

Aside from the surprising results found when sample five was filtered, all the other samples show that the frequency range I felt might be unique to the Turkish style is in fact present and salient in the Egyptian style as well.

Conclusion

For a variety of reasons, this method is incomplete. These reasons include among others my lack of data about spoken vowels in classical Arabic, the small number of samples from which I am currently working, the inconsistent recording conditions and most importantly, the fact that I have not yet conducted the crucial interviews that might lead me towards an understanding of what a Turkish sound is. And while indigenous listeners and practitioners may themselves not have a precise way of verbally expressing their perceptions of this sound, their comments may provide useful clues by which I can guess at correlates. All of that being said however, I find that the basic method I have utilized for analysis today, may very well be beneficial in the field. First, several aspects of the method could function nicely in fieldwork. The use of analysis by reduction in conjunction with feedback from indigenous listeners as to their perceptions of salient sounds is something that can be undertaken in the field and will remove my responsibility as sole designator of salient sounds. Also an understanding of which frequencies contribute foremost to vowel quality and which contribute primarily to voice quality will be valuable information in the context of fieldwork and an understanding of the acoustic data. Concerning the comparative aspect of the study, it is perhaps the most effective procedure in terms of determining what might be a uniquely Turkish sound and can include samples beyond Egypt for a broader understanding of Islamic practice.

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References


Eve McPHERSON