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Aural Analysis of Arabic Improvised Instrumental Music (Taqsīm)

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This study addresses the perception of Arabic improvised music. The modal musical system (maqām) as well as the model *par excellence* of instantaneous musical exposition and composition—instrumental improvisation (taqsīm)—are presented. The classical Arabic maqām (plural maqāmāt) is defined in terms of other fundamental interactive elements. The role of modal perception in the mental organization of a taqsīm performed on the `ūd was explored with tasks involving the identification of musical elements, the segmentation of the musical work, and verbal descriptions and performed melodic "reductions" of the segments. Strong differences in identifications and segmentations are found between listeners of European and Arabic cultural origins. Both groups make segmentations on the basis of salient surface features such as pauses and register changes, but Arab listeners make segmentations that are defined by subtle modal changes that often go unnoticed by the Europeans. However, not all of the Arab listeners agree on where such changes take place or even sometimes on which maqāmāt are being played. One major ambiguity in maqām identification in the taqsīm studied is discussed in detail. The melodic reductions of segments in a given maqām reveal the nature of Arabic modes as involving not just a tuning system, but also essential melodico-rhythmic configurations that are emblematic of the maqām. A music-analytic approach to the deployment of the maqāmāt within the form of the taqsīm that is informed by the perceptual results is developed. This approach involves the factors that lead to implicit recognition of maqāmāt, including ambiguities in identification, and those that inform the hierarchical organization of the form on the basis of larger-scale movements among maqāmāt.

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The study of Arabic music presents a challenge to the discipline of music psychology, the principle tenets of which are grounded in European rational thought, on the one hand, and in conceptual and structural elements derived primarily from Western tonal-metric music, on the other. An examination of music theoretic and ethnomusicological documents concerning Arabic musical systems and styles reveals many abstract aspects that are similar to Western music, but other abstract aspects and many concrete details that are quite different. Of interest in the present article is what the study of listening to Arabic music may bring to a certain cultural relativization of Western-based music psychology. The domain of music psychology is essentially devoid of any experimental research on the perception of Arabic music, and there are no books or tests that delimit music perceptual and cognitive abilities of Arab listeners.

The present work is part of a larger endeavor to study Arabic modal musical structures, the hierarchical structure of forms of instrumental improvisation, as well as the aesthetics and foundations of Arabic modal musical thought (Ayari, 2003). As a first step in a research program on the psychology of Arabic music, we explore the mechanisms implicated in the perception and mental representation of a particular kind of improvised Arabic musical form. In our study, we have chosen the case of instrumental improvisation (taqsīm). However, aspects of Arabic modal listening could also be manifested with forms of nonrhythmic vocal improvisation (layālī) or with other musical forms having complex, and especially periodic, rhythmic structures (e.g., Egyptian waṣlā and Tunisian mālūf). On the basis of experimental results from listening tests and musical analyses performed by Arab and European professional musicians, we describe the dynamics of auditory perception in the elaboration of interactive levels of perceptual and cognitive processing. We deal more particularly with the implications of modal musical competence in musical listening: perceptual schemas, processes of representation, extraction of emblematic figures, grouping, and melodic reduction of syntactic sequences brought into play during modal musical listening. We adapt certain pragmatic conceptions of Western cognitive psychology to the vast and little explored domain of Arabic music listening. We compare listeners from different cultures by way of explicit, online aural music analysis, a descriptive, quasi-experimental approach at the boundary of music theory and music psychology. To our knowledge, it is the first attempt to take an experimental approach to listening to Arabic modal music. We have voluntarily taken a descriptive analysis approach in this initial study to lay the groundwork for more controlled experimental and systematic music analysis in the future.

One of the main tools used to organize the inquiry into the perception of improvised music will be segmentation, that is, the delimiting of meaningful musical units by establishing boundaries at relevant points in the musical flow.

Segmentation techniques have been used to examine the perceptual organization of Western musical sequences on the basis of low-level surface features such as discontinuities in pitch, dynamics, timbre, duration, and articulation (Deliège, 1987), melodic contour (Drake, 1993), underlying harmonic structure (Bigand, 1990a; Imberty, 1979, 1991), and large-scale sections on the basis of pitch content, instrumentation, and musical texture (Deliège, 1989; Clarke & Krumhansl, 1990). During the segmentation of Arabic improvised music and its verification over several successive listenings in the present study, listeners were asked to identify simultaneously the nature of each segment in terms of scale or key, melodic features, modulations, or other appropriate musical categories. Following the segmentation phase, a final phase involved asking listeners to "reduce" the indicated segments to their essential or core melodic structure. We considered this approach to be particularly appropriate to Arabic improvised music as it is organized on the basis of melodic/rhythmic patterns derived from the tetrachordal cells composing the theoretical scale, as is discussed later. This whole process of online, aurally based music analysis was conceived as appropriate to revealing aspects of the mental representation and perceptual organization of improvised music.

We first present a few of the basic features of the Arabic maqām system and the taqsīm musical form to familiarize Western readers with the aspects that will be necessary for understanding the ensuing analyses.

THE ARABIC MODAL SYSTEM (MAQĀM)

The Arabo-Islamic scales are heptatonic. They are defined on a tuning system that has been rationalized in the modern era in terms of 24 quarter steps (50 cents) to the octave (see Ayari, 2003; d'Erlanger, 1949; Marcus, 1989a, 2002, for reviews). Intervals in the scales are generally of 2, 3, 4, or 6 quarter steps (5-quarter-step intervals exist but are very rare). In certain modes, some of these pitches are raised or lowered slightly (Marcus, 2002). The scales underlying a given maqām are most commonly organized in terms of series of four to five pitches, called tetrachords and pentachords, respectively. In Arabic , such a cell or *genre* is called `īqd (plural `uqūd) or jins (plural ajnās). We will use primarily the latter term, an Arabic derivation of the Greek word *genus*, as it is more commonly accepted in the contemporary literature, but many of the Arab listeners used the former term in their descriptions in the experiment. The Arabic musical language is constructed on a horizontal, generally monodic, line made of successive sounds defining melodic sequences that have modal roots and origins. The concatenation of repetitive musical motifs and melodic cells composes the internal fabric of the maqām. The structure and nomenclature of the tuning system, the ajnās, and the maqāmāt will be described before proceeding to the experimental work itself.

Tuning System

The Arabo-Islamic tuning system began to be conceptualized in terms of a quarter tone underlying scale in the mid-18th century (de Laborde, 1780, vol. 1, pp. 437–439). The fundamental heptatonic scale (of which there are many variants) is composed of the notes rāst (C), dūkā (D), sīkā (E half-flat), jaharkā (F), nawā (G), ḥusaynī (A), awj (B half-flat), with their Anglo-American equivalents indicated in parentheses. We will use the latter throughout this article. Note that two of the notes are labeled half-flat, indicating that they are a quarter tone below E or B. In Western musical notation, these notes will be indicated by a flat sign with a slash (see Fig. 1). The intervals in the fundamental scale are successively 4, 3, 3, 4, 4, 3, and 3 quarter tones, the last interval being between B half-flat and C at the octave (kirdān). The scale predates the modern era, but its conceptualization in terms of quarter tones was new. An attempt was made to standardize the system at the Cairo Congress of Arabic Music of 1932 (Recueil des Travaux du Congrès de Musique Arabe, 1934). Marcus (1993a) suggests that this may have been the first major rethinking of the Arabic pitch system since Safiyyu d-Dīn (also referred to as Safi al-Din) in the 13th century.

One of the striking features of Arabic music, however, is the systematic deviation of pitches from this equal-tempered system, which some Western and Arab authors hypothesize as being intonational variants of the standard pitches (cf. Marcus, 1989a), whereas some Arab authors of the Pythagorean tradition consider as structural features that distinguish maqāmāt as well as their regional variants (e.g., Ayari, 2003; Ibn Dhurayl, 1969). There are a number of clear cases in which systematic flattenings or sharpenings (the "plus or minus a Pythagorean comma" concept; Marcus, 1993a) of scale degrees in certain maqāmāt are recognized and were admitted in the Cairo Congress: the "shrunken" augmented seconds in maqām Ḥijāz, or the different mean pitches adopted by the same note sīkā in different maqāmāt (the E half-flat in Rāst being systematically higher than that in Bayyātī). All of these cases are related to the E half-flat (the Medius of Zalzel) being more or less flattened or sharpened, a source of much heated debate among Arabs, Persians, and Turks at the Cairo Congress that led to the Turks leaving the Congress. Of course, the realization of these scales in practice does not always conform exactly to the equal-tempered or "minus-a-comma" variants. Cohen and Katz (1997) have shown in Israeli Arab folk singing that the variation of the performed pitches from their theoretical values can be on the order of 15–35 cents on average, with standard deviations around the average pitches on the order of 30–40 cents. Note that a Pythagorean comma is theoretically about 24 cents.

Ajnās

The basic cell that is joined with others to create maqāmāt is the jins, which is a tetrachord or pentachord, and more rarely a trichord. There are 9 to 11 commonly recognized ajnās that are distinguished by their interval structure and the note upon which they are traditionally based. For example, jins rāst is composed of C, D, E half-flat, F, although it can be transposed to the G above or below its traditional middle-C root, to the C the octave above, and less commonly to D. We will thus use a labeling scheme that indicates the interval pattern and the starting note, for example, rāst C. Another jins that will be encountered in this study is ḥijāz, which is composed of D, E♭, F♯, and G, including its characteristic augmented second between E♭ and F♯. Some of the ajnās present in the piece studied here, or evoked by Arab musician listeners, are presented in Figure 1. Some ajnās share names with the maqāmāt they compose. Two will be distinguished here by using an initial lower-case letter for the former and an initial upper-case letter for the latter, for example, jins rāst and maqām Rāst.

The Maqām System

A maqām is formed by joining two or more ajnās (see below for examples drawn from the music used in this study). Each maqām comprises a tonic note (qarār) or fundamental note (asās), which is the lowest note of the root jins that defines the character of the maqām, as well as pivot places at the junctions of two ajnās. The ajnās can be

1. disjunct (munfaṣil) as in maqām Rāst formed of jins rāst C plus jins rāst G (C/D/E-half-flat/F + G/A/B-half-flat/C; see Fig. 1a),
2. conjunct sharing one note (multaṣil) as in maqām Bayyātī formed of jins bayyātī D plus jins nahāwand G (D/E-half-flat/F/G + G/A/B♭/C; see Fig. 1g) or
3. overlapping (mutadākhil) sharing more than one note as in maqām Ṣabā formed of jins ṣabā D plus jins ḥijāz F (D/E-half-flat/F/G♭ + F/G♭/A/B♭; none of this kind are present in the taqsīm under consideration).

A maqām is also characterized by the use of other degrees (semi-pivots) that are privileged or mobile according to the jins and maqām employed and as a function of the hierarchy of the degrees.

Beyond the scalar structure upon which a maqām is based, other aspects must be considered (Marcus, 1989b, 2002). In some maqāmāt with three ajnās, for instance, the jins at the octave may not duplicate the root jins. Each maqām also has a common progression or path for moving through

the various regions of its scale, and additional ajnās can at times be substituted for those commonly presented in theoretical presentations of the maqām scale. Finally, there are a standard set of modulations from one maqām to others (Marcus, 1992). The theory of maqām modulations reveals certain properties of Arabic musical syntax that have commonalities with Western harmony. For example, some maqāmāt are considered "closer" to each other than to other maqāmāt, evoking the concept of key distance. The concept of family relatedness (faṣilah) exists in Arabic music theory and is generally determined by the sharing of a common root jins. Finally, modulations can be sudden or gradual, passing, or full-fledged.

A maqām is more of a schema (*Encyclopédie de l'Islam*, 1991, p. 94) than simply a scale. It is a process of melodic movement, and an operational protocol of improvisation according to the models and forms of melodic and rhythmic organization. It is a complex system that implies the illustration of its structures in modal melodic development. On the continuum between abstract scale structure and tune families, the maqām is clearly closer to the tune-families end, although perhaps not as far in that direction as the Persian dastgah or the Indian rāg. In fact the *Concise Grove* emphasizes the complex melodico-rhythmic nature of the maqām in Arabic classical music ("intervals, tonal emphases, cadence formulæ, characteristic melodic contours, and final tones," p. 27, under the entry "Arab music"; Sadie, 1988). For this reason, and to avoid confusion, we will retain the Arabic term maqām throughout the article rather than the Western term "mode. "

In summary, the maqām is a recalling of a cultural identity, a modal system, and a form of improvisation (Guettat, 1980, p. 278). It forms an organic whole comprising a characteristic scale (with substitutable jins), but above all a set of conventions theoretically allowing it to be easily identified, whatever the variations to which it is subjected by the performers. The complexity and ambiguities that the listener encounters in Arabic modal music reside most of all in the formation of a modal image that is appropriate for the sequencing and combination of several maqāmāt. However, the identification task is not always easy, as will be shown by the experiment below. Nonetheless, when a single maqām is developed, it is relatively easy for a listener familiarized with this kind of modal listening to identify it.

SCHEMATIC TRANSCRIPTION OF THE SCALE MATERIALS USED IN THE STUDY

A recording of a taqsīm performed by the Iraqi `ūd (lute) player Jamīl El-Bashīr was used in this study. The theoretical scales of maqāmāt employed in the taqsīm or mentioned in the listeners' identifications are presented in Figure 1 with their theoretical nomenclature as used in Arabic music theory.

The theoretical scale of maqām Rāst G contains two tetrachordal jins, the first being rāst G [interval pattern in quarter steps: 4, 3, 3] and the

second, rāst D, an exact transposition a perfect fifth higher (Fig. 1a). This scale structure is sometimes preceded by jins rāst D an octave lower (Fig. 1a). The theoretical scale of maqām Sūznāk is derived from that of Rāst G by changing the second jins to ḥijāz D [2^{+}, 6^{-}, 2, where the $^{+}$ and $^{-}$ indicate increase and decrease by a comma, respectively] (Fig. 1b). In some developments, a third jins called jaharkā G is used and is an octave transposition of rāst G but with the B-half-flat raised by a comma [4, 3^{+}, 3^{-}] (Fig. 1c). The third jins must be developed in a particular way melodically and rhythmically to make the comma-sharped note evident. In general, the first jins is never modified, serving as a kind of reference point or landmark in the

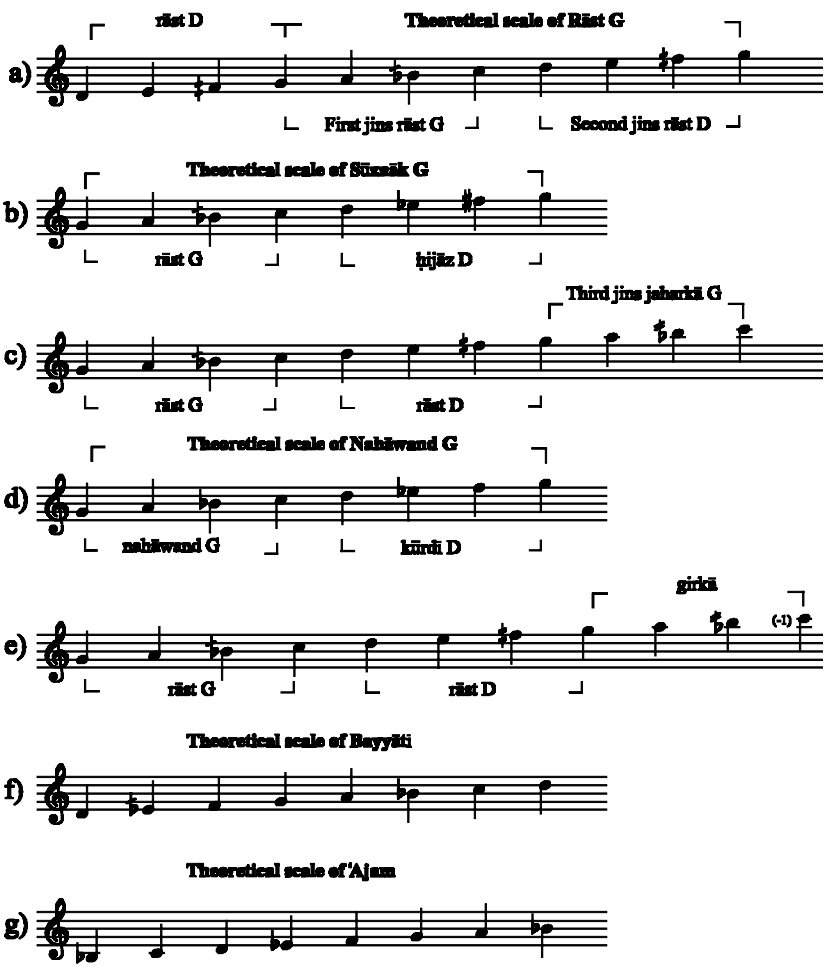


Fig. 1. Reconstruction of improvised Arabic musical modes used in the taqsīm of Jamīl El-Bashīr or referred to by Arab musician listeners. The flat sign with a slash indicates a quarter-tone flat (half-flat). The sharp sign with a single vertical line is a quarter-tone sharp (half-sharp). The flat sign with a double bar (1c and 1e) indicates a half-flat raised by about a comma. The sign (-1) lowers the C in girkā (1e) by a comma.

improvisation. One exception, however, is a case in which the performer changes the first jins to create a big rupture toward maqām Nahāwand. The theoretical scale of Nahāwand G [4, 2, 4, 4, 2, 4, 4] (Fig. 1d) is different both at the level of the scale structure and in the way it is played in order to bring out this change during the improvisation. Another jins that appears in the piece is girkā, which is a jaharkā G with the C flatted by a comma (Fig. 1e). It is actually considered to be an ancient jaharkā by some theorists (Ayari, 2003). It is of great interest to note that a change of a comma in one note is not just an expressive intonation device applied to an invariant underlying jins structure. For many Arab listeners, it produces a change in the identity of the jins that will be accompanied by a different kind of melodic/rhythmic incarnation that together define a change in maqām. The theoretical scales of two other maqāmāt referred to by some of the Arab listeners (Bayyātī and `Ajam) are shown in Figures 1f and 1g, respectively.

THE ARABIC INSTRUMENTAL IMPROVISATION (TAQSĪM)

Arabic instrumental music assumes different forms. Istikhbār is an improvised instrumental solo that is inserted between (or during) instrumental and vocal pieces of Egyptian waṣlā or Tunisian mālūf (forms traditionally composed of a succession of pieces). The performer explores the sound space, the formal aspect of the maqām, and reconstitutes its most determinant melodico-rhythmic structures, in a manner adapted to vocal song. The taqsīm is an expansion of the istikhbār (Ayari, 2003). It is an improvisation protocol with a complex set of traditionally established rules and conventions. It is a solo played by an instrumentalist following a given maqām to illustrate its fundamental hierarchical structures. The entire taqsīm is a gradual unfolding of a maqām's unique characteristics. It is multisectional with the sections separated by moments of silence. Each section is characterized by a focus on one melodic idea, usually a specific maqām and commonly only one aspect of a maqām's melodic features (Marcus, 1993b). Beyond the presentation of the mechanism of creating and developing the formal structures and the edifice of the maqām, the performer relies on personal taste in trying to illustrate its expressive and affective content.

During a taqsīm performance, Arabic traditions define for each maqām a departure point, a process of melodic motion, stopping points, and specific melodic figures for the opening and closing of the improvised ideas. These figures are models or schemas that are repeated and represent cues and signatures that allow one to perceive what Arab musicians and listeners call the “soul” of the maqām. There certainly exists, for each maqām, a set of melodic/rhythmic configurations, a multitude of dynamic developments of musical ideas, which the musician must keep in mind during the performance (Ayari, 2003). Of course, the variety and richness of these

images depends on the personal style and genius of each performer, but they especially depend on knowledge that the musician possesses of the hierarchical structure, as well as of all the formal aspects and characteristics of the maqām.

A taqsīm is organized into several phases in the presentation and development of each maqām, the precise ordering of which is not fixed: introduction, presentation of the jins, exposition, re-exposition, and confirmation. Some performers linger on a given phase of modal improvisation before passing to the execution of another idea. The duration of each phase depends on the artistic mastery and the subtlety of each performer. The set of these improvisational phases constitutes the hierarchy of the maqām, defined by the concatenation of melodic/rhythmic syntactic sequences and, thus, by the notes that carry the scale tuning and that serve as creators or resolvers of tension (i.e., polar scale degrees).

Experimental Rationale

This study sought to explore the perceptual mechanisms implicated in the perception of the hierarchical form of the maqām. We presume these mechanisms to be influenced by, or to embody, individual listening predispositions (focus on local, global, intermediate levels of structure) and listening strategies that affect the perceptual organization and evaluation of newly arriving musical materials in a given context. Such individual cultural differences concern the manifestation and emergence of perceptual competences that can be acquired by an experienced listener. We are particularly interested in the present study by how such cultural differences, related deeply to implicitly and explicitly acquired knowledge of the rules of musical organization and style, affect a listener's organization of the musical surface into a grouping hierarchy (Lerdahl & Jackendoff, 1983) on the basis of the melodic/rhythmic structures in the music. At other levels of perceptual processing, listeners elaborate meaning and musical function according to the syntax of the maqām to the extent that they have been acculturated to these structures. It is important to remember that the Arabic notion of maqām involves implicit rules for melodic/rhythmic generation on the scale structure. The elaborated meaning and function of a maqām are hypothesized to appear in the form of conceptual, symbolic mental representations, in generative schemas and cognitive frameworks adapted to the development of the phases of modal improvisation. These would be expected to differ greatly between members of the culture and outsiders. In the case of Arab listeners, these mental structures are expected to be involved in the elaboration of anticipations of similar or contrasted musical materials depending on the place one feels to be in the structural schema of the improvisation. Of importance here are the processes that serve to form

basic models of musical development, to detect roots in the maqām structure, and to generate what Ayari (2003) has called a "modal image," corresponding roughly to the feeling of "being in the maqām." These latter elements derive from the sequencing of melodic/rhythmic figures and from the representative agglomeration of large- and small-scale phases of melodic development appropriate to each maqām.

From another point of view, we are interested in the limits and the validity of the grouping principles, described by the Gestalt psychologists and subsequently developed by Lerdahl and Jackendoff (1983) for Western tonal music (similarity, proximity, etc.), as applied to Arabic modal musical listening. Indeed, we would like to approach the mechanisms of data extraction related to this principle of melodic/rhythmic group formation in the perception of primary articulations of the taqsīm. A comparison of Arab and European listeners was thought to provide potential insight into the relative roles of (presumably universal) bottom-up processing of surface features of the music (present in both groups) and (probably more culturally determined) top-down processing on the basis of recognition and expectation of musical units derived from cognitive cultural schemas of the maqām system and of taqsīm practice.

The basic aims of the study are thus to find out:

1. how listeners (acculturated or not to Arabic music) locate the elements of melodic articulation such as fundamental notes (asās), pivot notes, silences, the instantiation of modal identities, and so on;
2. the basis upon which listeners segment the melody of a taqsīm;
3. how different levels of acculturation affect the listener's experience of the musical structure.

To this end, and in an attempt to employ an experimental paradigm that would be amenable to the sensibilities of both Arab and European listeners, an aural analysis approach was used that started with several listenings to the whole piece, during which online identifications of structural elements or segmentations and descriptions were performed. The segmentations were progressively refined over several listenings, and then listeners were asked to "reduce" the segments to a kind of essential melodic form that represented the segment.

Method

CHOICE OF THE MUSICAL WORK

The chosen taqsīm was performed in 1973 by the Iraqi `ūd (lute) player Jamīl El-Bashīr and recorded by Jean-Claude Chabrier of the French Centre National de la Recherche Scientifique (CNRS). At the beginning of his career, the performer was influenced by two

schools: the oriental school and then the Iraqi school. By his subtle instrumental playing, he created a school known throughout the Arab world as the Jamīl El-Bashīr school of Iraqi `ūd. The performer played the taqsīm used in this study at the beginning of his career when he was influenced by the oriental school. This improvisation presents a certain ease at the level of the perceptual grouping of small, well-sequenced melodic/rhythmic structures, and was thus considered appropriate for an initial study on this subject. Further, at times the taqsīm presents perceptual ambiguities at the level of the sequencing of small melodic ideas having different modal "colors." There are also new transitions that are unusual in classical Arabic improvisation. Figure 2 contains a transcription of the taqsīm. It should be noted that the durations are approximate because this is not a metric piece, and this improvisation style often employs dramatic changes in tempo and dynamics, which are also indicated in the score. It should be emphasized, however, that any transcription of improvised music is a gross oversimplification of the musical subtlety present in the performance, and all the more so for unmeasured musics such as taqsīm.

LISTENERS

Two categories of listeners were used: 16 Arabs (1 woman, 15 men) and 10 Europeans (5 women, 5 men). The Arab listeners (referred to in the tables as A1–A16) included 11 professional musicians currently practicing modern Arabic music, nine of whom had completed university-level musicological research, and five who were either amateur musicians without formal training or nonmusicians. They originated from Iraq (1), Lebanon (1), Egypt (2), Algeria (2), and Tunisia (10). All of the Arab participants had been in France for at least 5 years, but all of the musicians performed Arabic improvised music regularly with the exception of one who was a classical Western guitarist. The European category comprised a collection of professional instrumentalists, musicologists, and composers currently practicing Western tonal and/or electroacoustic music (referred to in the tables as E1–E10). The ages of the listeners varied between 25 and 40 years, and none reported having hearing problems.

PROCEDURE

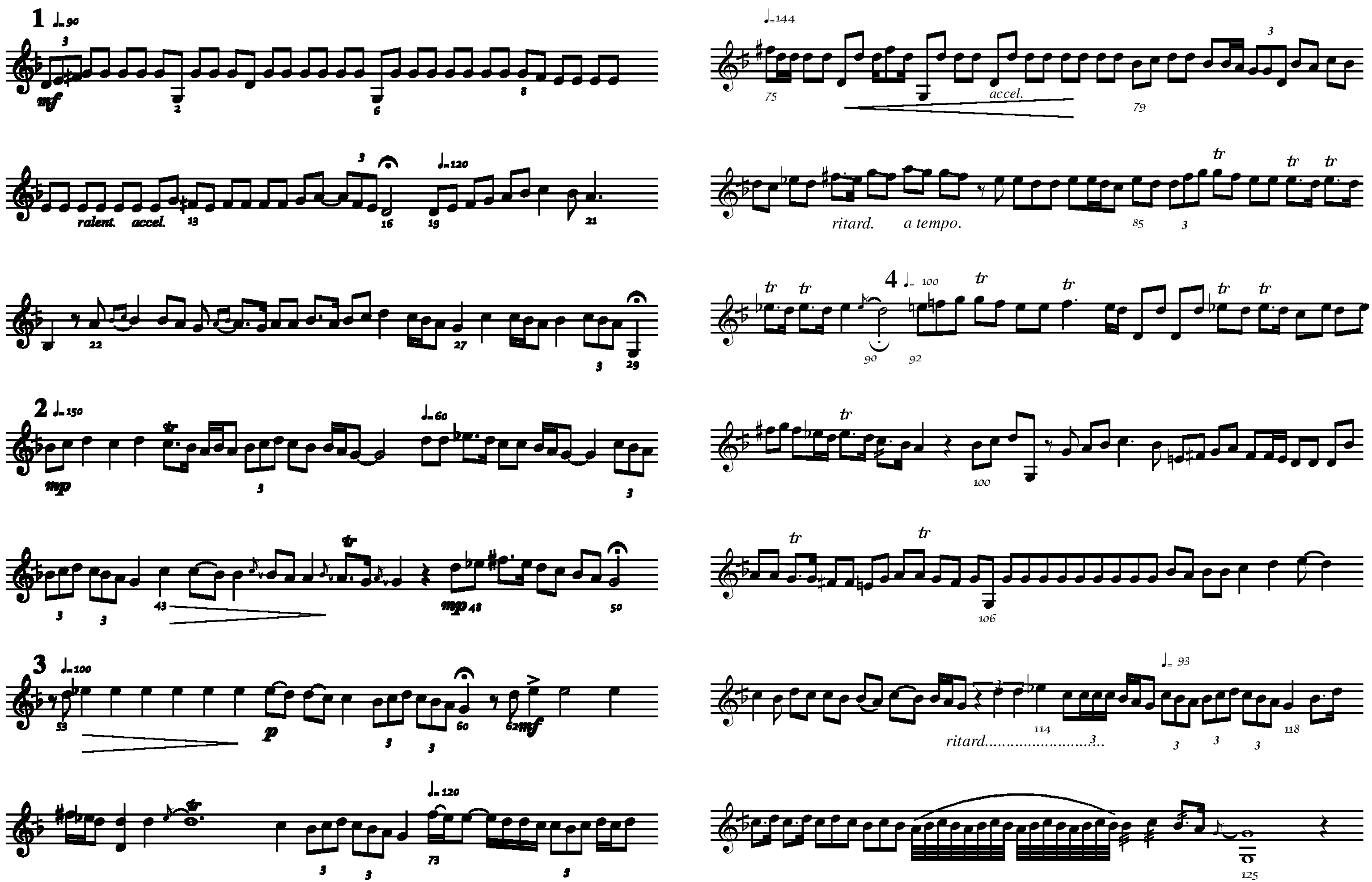
The experiment was performed in four stages: identification of structural elements while listening, segmentation of the piece, melodic reduction of the final segments, and confrontation between the listening experience of the participants and the musical analysis of the piece by the first author (a Tunisian-trained musicologist of Arabic music and a professional `ūd player). During the first two parts of the experiment (identification and segmentation), the recording of the taqsīm was played over loudspeakers in a sound isolation booth, and the listeners indicated the temporal position of musical structural elements or segmentations in real-time by pressing a key on a MIDI keyboard. Identifications, descriptions, and explanations were produced vocally and recorded simultaneously. The music was played at a level sufficient for subjects to be able to hear while simultaneously speaking. The playing of the piece was synchronized with a Pro V sequencer for timing and the recording of responses on a MIDI device, in order to be able to locate precisely the responses with respect to the transcribed score of the taqsīm.

Identification

Listeners were asked to press a key as soon as they detected a relevant change in the musical ideas, which could be a rhythmic, melodic, structural, or formal change, and to identify it out loud if possible. The verbalization was not obligatory.

Segmentation

During the second listening, participants were asked to segment the taqsīm into chunks that were each as musically coherent as possible. They were asked to press a key as soon as



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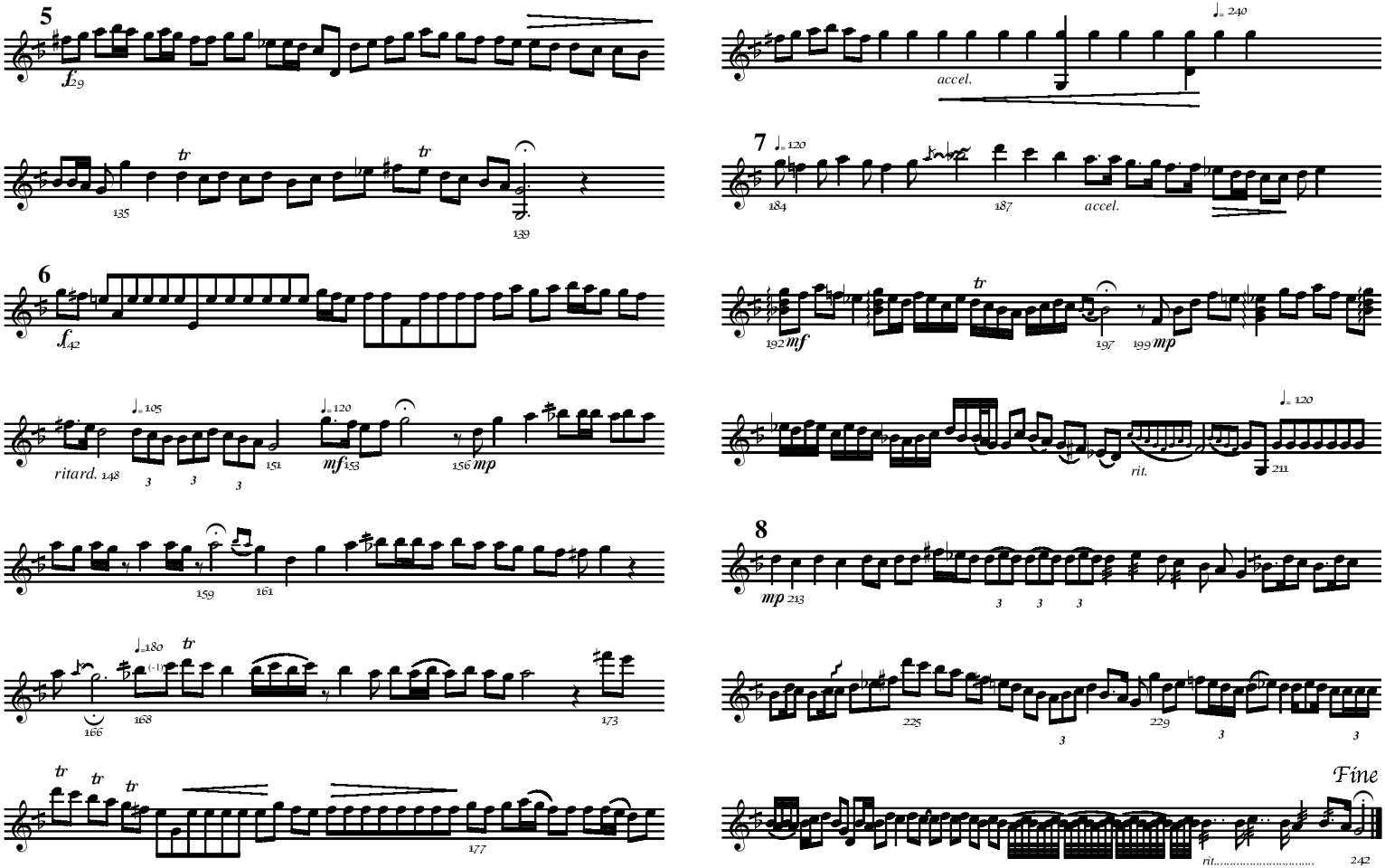


Fig. 2. Transcription of the taqsīm improvised by Jamīl El-Bashīr on the `ūd. The small numbers under each stave refer to time in seconds from the beginning of the piece. The large numbers in squares above the staves refer to the sections of the music analysis in the latter part of this article.

a segment boundary was detected, that is, a change of musical idea, and to verbalize what characterized the new material. In order to make the task more comprehensible for Western listeners, we asked them to describe the musical sequence in terms of Western music analysis conventions. For the third and fourth listenings, the participants were asked to adjust, correct, and refine their localizations of segment boundaries. In the Results section, we present only the segmentation results finalized by the participants at the end of the third segmentation pass.

Reduction

The third part of the experiment consisted of playing sections of the taqsīm to listeners as they had segmented them. They were asked to "reduce" the sections to a single, small, generative melodic/rhythmic figure. This figure should conserve the simplest expression that gives an idea of the temporal progression of the melodic segment. To perform this task, the participants were allowed to sing and/or transcribe the figure or the "core structure" of each sequence. Note that the emphasis here, which is consistent with Arabic maqām theory, is more on a core pattern with emblematic melodic figurations that are musical in and of themselves than on an abstract middle-ground pattern as proposed by Schenkerian-based Western music theory and explored experimentally by Serafine, Glassman, and Overbeek (1989) and Bigand (1990b). This is a habitual practice for Arab musicians, detection of emblematic melodic figures being a process of maqām identification for them. Although many of the Arab musicians reported to the first author that this process is practically second nature in modal listening for them, hence its justification as an experimental tool, it is not taught or used explicitly in music theory. It was an implicit and intuitive practice discovered in the early stages of this research project.

Results

IDENTIFICATIONS (FIRST LISTENING)

European Listeners

The times at which the European listeners identified structural elements in the music and their descriptions during the first listening to the taqsīm were compiled. Of the 43 descriptions recorded during this identification phase, 41 can be classed under three types of reactions:

1. At the level of melodic listening, participants identified the notes they considered as pivot notes or resting notes: G, D, G', and sometimes B (8 identifications). Some said that it was a question of the principal characteristic of modal music based on the use of structurally stable note degrees. They considered these notes as major landmarks (in time) in the form of tonic notes and pivot notes. Around these notes, the listeners noted that the performer played scales and melodic/rhythmic structures that gave different modal colors, but which they had difficulty analyzing further.
2. Some musicians used the concepts of Western music analysis to describe formally the phases of development and structural events: introduction, first part, re-exposition of the theme, cadence, return (11 identifications).

3. As concerns the identification of the modal scales used in this taqsīm, some musicians reacted by noting a change in mode or color (22 identifications), noting passages in a minor or major scale or mode, in a particular key, a change of mode or color, or the presence of nontempered or modified scale degrees. However, we did not generally observe a consensus in the behavior of European participants for the identification of change in the modes as predicted by Arabic music theory, and they didn't often correspond to the structure of the taqsīm. In addition to these identifications, specific melodic and harmonic structures were mentioned (58", 155", 200").

The remaining two identifications noted the occurrence of an unspecified change and some jazz melodic structures.

The broad distribution of moments at which listeners identified important structural features reveal that each person reacted differently. In only two places (125", 200") do responses of two participants coincide within 1 s of each other, but in both cases they each defined different musical features.

Arab Listeners

The indications of changes in musical material were more detailed (8.2 identifications per Arab listener on average compared with 4.3 for the Europeans) and more similar among Arab listeners than among Europeans, as indicated by the greater number of coincidences (22 for Arabs, 2 for Europeans). The descriptions clearly indicate a theoretical vocabulary and a developed strategy of listening to fundamental formal features of the maqām system. This modal listening competence led several Arab musicians to detect and describe small modal structures in the process of changing, or even the general maqām of large-scale melodic passages presented in the taqsīm.

Using the same categories (structural notes, formal features, and modes) that were employed to characterize the European identifications, a quite different picture emerges. Only one mention of a repeated note was made, and only one formal feature (modulation with structured return) that was not associated with a specific maqām or jins was produced. However, 84 mentions of specific ajnās or maqāmāt (75) or of a modal change or note implying a modal change (9) were recorded. An additional 33 verbalizations identified structural features related to the maqāmāt (e.g., confirmation of Rāst D, return to the first jins of Rāst , preparation for Sūznāk, modulation through Nahāwand, qaflā (closure) on Rāst G, development of Rāst G at the octave). Finally, unlike the Europeans, the Arabs identified specific melodic features (tremolo, appogiatura, arpeggio, ornament, melodic run).

FINAL SEGMENTATIONS AND THEIR DESCRIPTIONS (FOURTH LISTENING)

European Listeners

Figure 3 (upper panel) presents the segmentations produced by the European participants during the fourth listening to the taqsīm. In the figure, the theoretical sections indicated by section numbers (1–8) in the score (Fig. 2) are included at the top so that comparisons can be made with the transcription. This representation shows the coincidence of segmentations across participants, which is higher in the segmentation task than in the identification task. Table 1 presents the verbal descriptions produced for each segmentation performed by each participant. A dash in the table for a given segment indicates that no description was produced for that segment. There were large differences among listeners in the number of segmentations (0–33) and thus in the segment durations (3–246 s). Indeed, one listener made no segmentation, two made a single one, and two others made only two. It should be noted that listeners did not describe their segments in 67% of the cases. In the remaining third, different musical percepts were described such as presentation of a mode, changes in mode, exposition of, variation of and return to a theme, tempo changes, rhythmic explorations, and a simple denumeration of parts of the piece. During this last listening, the majority of musicians kept to the strategies used previously and segmented the taqsīm each time they heard a rising or falling melodic contour. This attempt at analysis, and the level of perceptual processing evoked, did not lead to the development of other listening dimensions that approach the formal hierarchical structure in the taqsīm form: the small cells or jins of the maqām and the large phases of exposition that are at times organized on the basis of a combination of different modal figures.

Further, certain European musicians tried to group into a single sequence the phrases that were repeated differently but that belonged to the same mode. We have noted that often they didn't distinguish several modulations between modes presented successively in the same melodic phrase, such as in the Sūznāk movements. This is made evident by the relatively small number of segmentations in sections 2–5 in the score (33–142 s) compared with Arab listeners. The European musicians remarked that the performer often developed small fragments in the microstructure that they couldn't perceive. However, they noted a global change with respect to a previous development of a larger-scale improvised idea (at the level of the macro-form): note the peaks of segmentation between transitions from sections 1 to 2, 2 to 3, 3 to 4, 4 to 5, and 5 to 6. These were described as change, second part, return (transition from section 1 to 2), change of mode, variation then return (from 3 to 4), re-exposition (from 4 to 5), change of mode, and return (from 5 to 6).

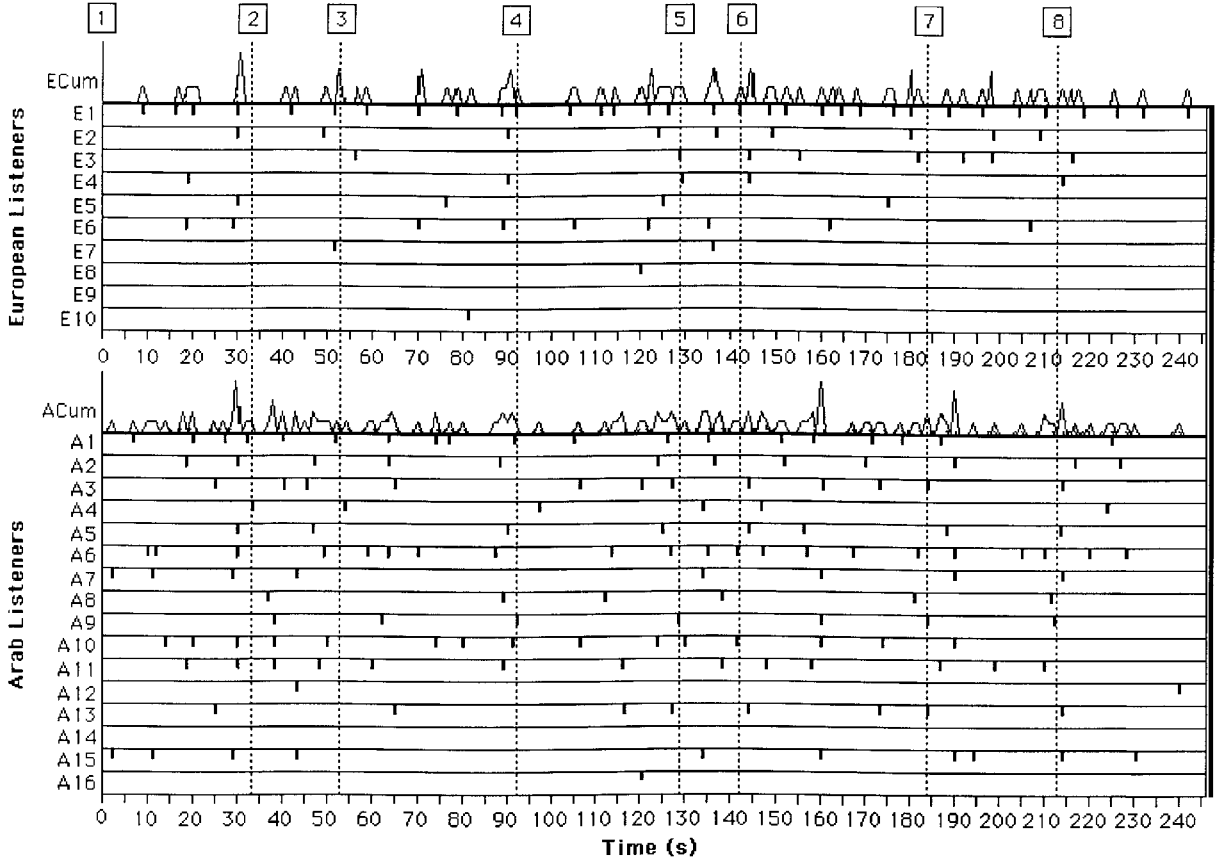
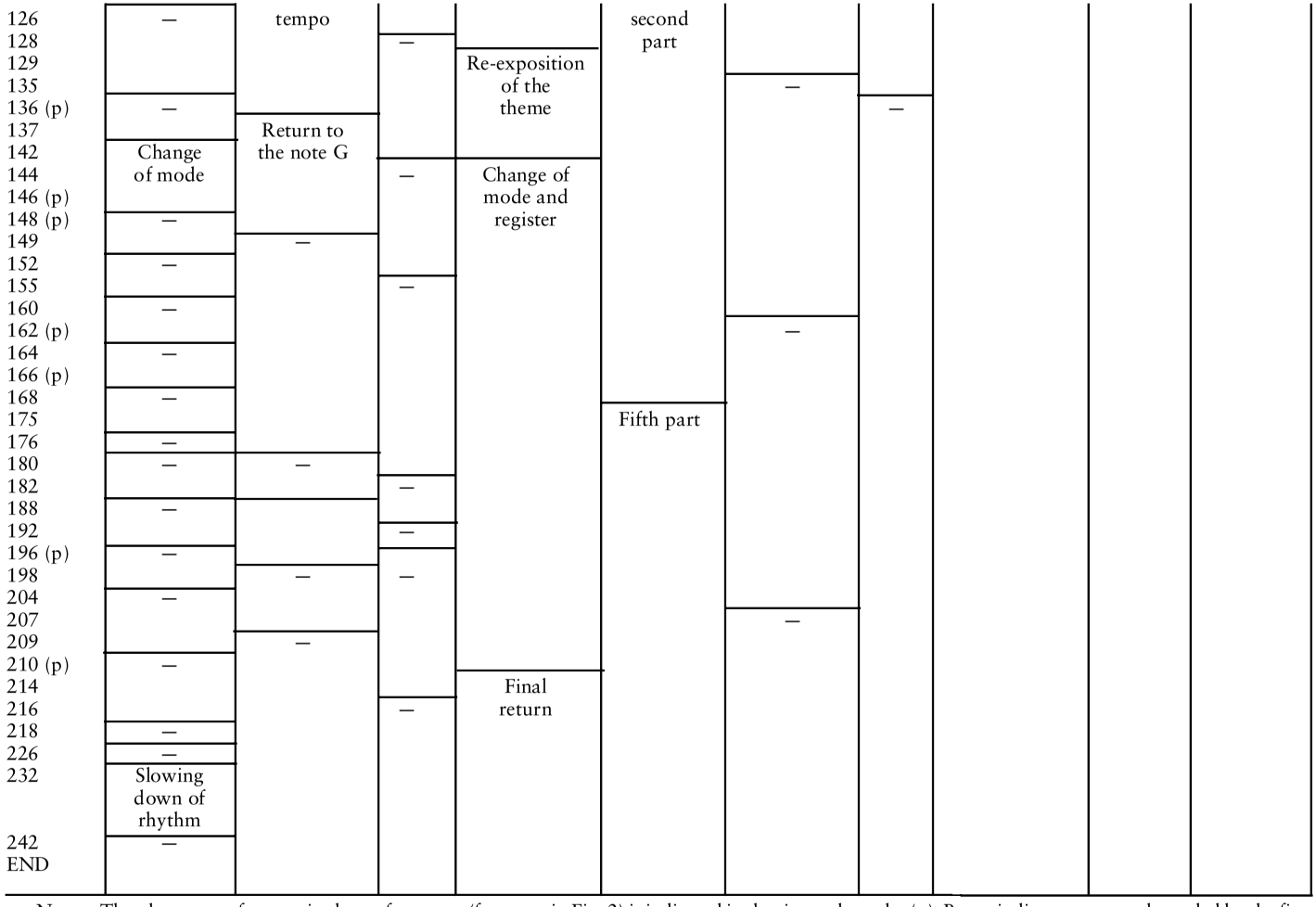


Fig. 3. Places in time at which the listeners segmented the taqsīm (Europeans in the upper panel, Arabs in the lower panel). On the time axis (horizontal), the short vertical lines correspond to key presses by a given participant within a 1-s window. The vertical axis of the accumulated graph (Ecum, Acum) represents the proportion of participants responding within that window. The maximum of the vertical axis for these accumulated graphs corresponds to 0.35 in both cases. The section boundaries discussed in the music analysis part of the article are indicated.

TABLE 1
Segmentations and Their Descriptions by European Listeners

	Segment Descriptions									
Time (s)	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10
0	First phase of mode	—	—	Presentation of the mode in G	First part in G major	First presentation of the key	—	—	—	—
8	Second phase of mode									
16	—									
18 (p)						Second presentation				
19				Exposition of the theme						
20	—									
29						Return to the fundamental note				
30 (p)	—	Change			Second part in minor			Acceleration of the rhythm		
40										
42	—									
49 (p)		Change								
52	—						—			
56			—							
58	—									
64 (p)										
70	—					Change of tempo and rhythmic exploration				
76					Fourth part					
78	—									
81										—
88	—									
89						Repetition keeping the same idea				
90		Repetition of the same idea		Variation then return to the theme						
92	Change of mode									
98 (p)										
104	—									
105						—				
111	—									
114	—									
120								—		
122 (p)	—					—				
124		Acceleration of the								
125					Return to					



NOTE—The placement of pauses in the performance (fermatas in Fig. 2) is indicated in the time column by (p). Boxes indicate segments bounded by the first time value within the box and that of the succeeding box. For example, the second box of E1 extends from 8 s to 16 s.

Arab Listeners

As can be observed easily in Figure 3 (lower panel), the number of segmentations (0–21) is greater for Arab listeners than for Europeans. The median number of segmentations performed by Arab listeners was 7.5 compared with 4.5 for Europeans. As with the Europeans, some Arab listeners made very few segmentations (three listeners with 2 segmentations or less), although proportionally their number is much less for Arabs (19%) than for Europeans (40%). If the infrequent segmenters are removed, the medians of the two groups are about the same. The number of coincidences within 1-s intervals were collected into categories corresponding to counts of 0, 1, and more than 1 for the two groups. A chi-square analysis on the distribution of counts for the two groups was highly significant, $\chi^2(2) = 14.0$, $p = .0009$, indicating that Europeans had more zeros (i.e., fewer segmentations) than Arabs (74% vs 61% of the 1-s bins, respectively), and that Arabs had a higher proportion of coincidences between two or more listeners than did Europeans (10% vs 4%, respectively). In fact, there are 20 moments when several (3–7) Arab musicians segmented at approximately the same place (within a 2-s interval). In nine of these, at least half of the listeners identified the same maqām. We thus observed a stronger similarity among the behaviors of the Arab listeners. Table 2 presents the individual descriptions of segments for each Arab participant.

Nine of the 16 Arab listeners made specific descriptions of maqāmāt and/or ajnās throughout the piece, some following quite closely modal changes, modulations, and tetrachord substitutions. On the basis of these descriptions, assigned to specific time segments, five main regions of the piece emerge (Fig. 4). The first (0-40 s) is largely considered to be in Rāst with a few segments labeled Bayyātī. The second region (40-135 s) is primarily labeled as Sūznāk, although there remains some ambiguity with respect to Rāst. There are numerous segments heard as being in Ḥijāz (by two listeners) and three listeners noted a modulation through Nahāwand in the latter part of this region (≈90-115 s). The third region (135-175 s) is globally heard in Rāst, but it seems to be modally complex with momentary identifications of Bayyātī, Ḥijāz, Girkā, Jaharkā, Kūrdī, and even G major being made. The fourth region (175-210 s) is predominantly labeled as Nahāwand, the modulation toward this maqām being increasingly noticed near the end of the third region. However, this region remains modally complex with mentions of Bayyātī, Kūrdī, `Ajam, Girkā, and Ḥijāz. In the latter half of this region, the mentions of Rāst and Sūznāk increase toward the final region. The last region (210 s–end) is ambiguously identified as being in Rāst, Sūznāk, or Sūznāk to Rāst, with identifications of modal mixtures including either of these two maqāmāt and Nahāwand, Ḥijāz or Bayyātī occurring in the early part of the region. As can be seen in Figure 4, the listeners were divided concerning whether the piece ended in

TABLE 2

Segmentations and Their Descriptions by Arab Listeners

Time (s)	Segment Descriptions															
	A1[a]	A2[a]	A3[d]	A4[a]	A5[a]	A6[a]	A7[a]	A8[a]	A9[d]	A10[b]	A11[a]	A12[d]	A13[c]	A14[d]	A15[c]	A16[d]
0	`iqd rāst G	Rāst D	—	Classic Rāst	First entry in Rāst D and Rāst G	Rāst and Bayyātī	Entry into Rāst	Rāst G	—	Intro-duction	First `iqd of Rāst	Change of mode	Bayyātī	Rāst G	Rāst G	Rāst
2							Possibly bayyātī									
7	`iqd rāst D (below G)					Rāst										
10							Qaflā Rāst									
11						Rāst										
12										Repetition						
14		Rāst G									First `iqd of Rāst					
18 (p)										First conclusion			Change			
20	Confirma-tion of rāst															
25	Rāst G															
27							Sūznāk									
29		Sūznāk			Second entry in Sūznāk	Hijāz				Beginning of theme	Modula-tion in second tetrachord					
30 (p)	Exposition of `iqd rāst G			Appear-ance of Sūznāk				Sūznāk								
32									—	Second conclusion	Modula-tion in second tetrachord	Return				
33							Re-exposi-tion of Sūznāk									
37																
38	Entry into Sūznāk		Sūznāk													
40			—													
43		Confir-mation of Sūznāk			Develop-ment of Sūznāk	Rāst					Presenta-tion of 2nd `iqd of Sūznāk					
45										Tremolo						
47																
48																
49 (p)																
50																
52	Confir-mation of Sūznāk			Exposi-tion of second		Hijāz					Develop-					
54																
59																
60																

TABLE 2 (CONTINUED)

Segmentations and Their Descriptions by Arab Listeners

Time (s)	Segment Descriptions															
	A1[a]	A2[a]	A3[d]	A4[a]	A5[a]	A6[a]	A7[a]	A8[a]	A9[d]	A10[b]	A11[a]	A12[d]	A13[c]	A14[d]	A15[c]	A16[d]
62				cell of Sūznāk					—		ment of 2nd `iqd of Sūznāk					
63	`iqd rāst G															
64 (p)		Hijāz				Rāst										
65													—			
70						Rāst sūznāk										
74	Sūznāk									Change of scale Change of mode of 2nd part						
77	Sūznāk															
80																
87						Rāst sūznāk										
88		Sūznāk														
89								Modulation and return to Sūznāk			Modulation in 2nd `iqd of Sūznāk					
90					Modulation through Nahāwand and return to Sūznāk											
91	Modulation of Sūznāk through Nahāwand									Return to the theme						
92									—							
97				Variation at beginning through Nahāwand D (minor) then return to same Sūznāk idea, with rapid development of rhythmic structures												
98 (p)																
106										Conclusion						
112								Sūznāk								
114						Hijāz										
115	Sūznāk															
116											Exposition of a complete Sūznāk		—			
120			Rāst													
121																—
122 (p)																
124		Sūznāk								Change of mode						
125					Rāst D											
126	Confirmation of															
127						Rāst							Change			
128									—							

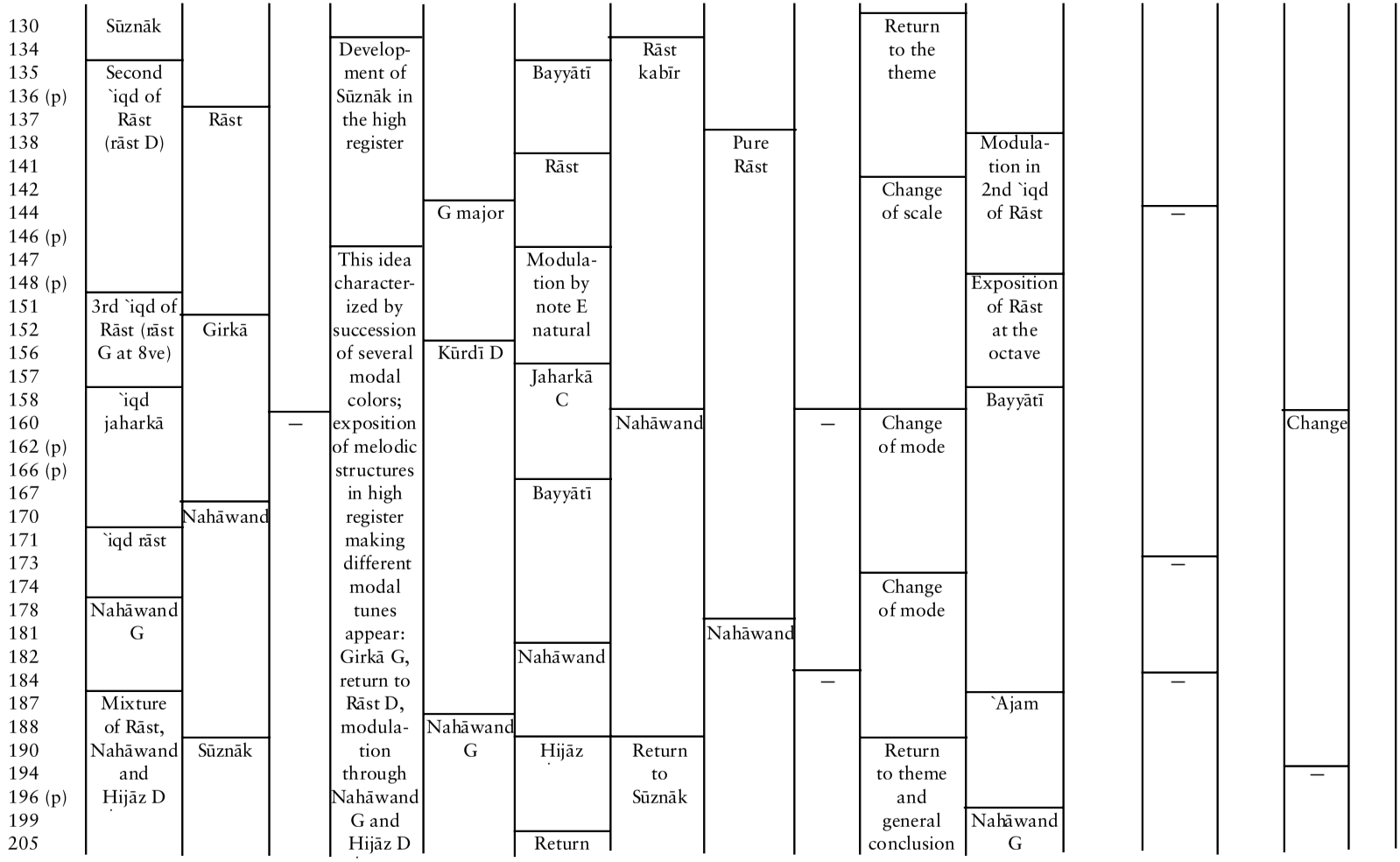

130
134
135
136 (p)
137
138
141
142
144
146 (p)
147
148 (p)
151
152
156
157
158
160
162 (p)
166 (p)
167
170
171
173
174
178
181
182
184
187
188
190
194
196 (p)
199
205
Sūznāk
Second `iqd of Rāst (rāst D)
3rd `iqd of Rāst (rāst G at 8ve)
`iqd jaharkā
`iqd rāst
Nahāwand G
Mixture of Rāst, Nahāwand and Hijāz D
Rāst
Girkā
Nahāwand
Sūznāk
—
Development of Sūznāk in the high register
This idea characterized by succession of several modal colors; exposition of melodic structures in high register making different modal tunes appear: Girkā G, return to Rāst D, modulation through Nahāwand G and Hijāz D
G major
Kūrdī D
Nahāwand G
Bayyātī
Rāst
Modulation by note E natural
Jaharkā C
Bayyātī
Nahāwand
Hijāz
Return
Rāst kabīr
Nahāwand
Return to Sūznāk
Pure Rāst
Nahāwand
—
Return to the theme
Change of scale
Change of mode
Change of mode
Return to theme and general conclusion
Modulation in 2nd `iqd of Rāst
Exposition of Rāst at the octave
Bayyātī
`Ajam
Nahāwand G
—
—
—
Change
—

TABLE 2 (CONTINUED)

Segmentations and Their Descriptions by Arab Listeners

Time	Segment Descriptions															
(s)	A1[a]	A2[a]	A3[d]	A4[a]	A5[a]	A6[a]	A7[a]	A8[a]	A9[d]	A10[b]	A11[a]	A12[d]	A13[c]	A14[d]	A15[c]	A16[d]
210 (p)						to Rāst Hijāz										
211								Sūznāk			Return to Rāst through a mixture of Bayyātī, Nahāwand and Sūznāk					
212									Return to Rāst							
214					Qaflā Sūznāk		Qaflā Sūznāk						—			
217		Melodic descent in Hijāz														
220						Nahāwand										
224	Rāst G			Exposition of whole range of scale (top to bottom) with presentation of Sūznāk then Rāst G (1st cell of general mode)												
225		Sūznāk														
227																
228						Qaflā Rāst										
230															—	
240												—				
END																

NOTE—The placement of pauses in the performance (fermatas in Fig. 2) is indicated in the time column by (p). Boxes indicate segments bounded by the first time value within the box and that of the succeeding box. For example, the second box of A1 extends from 7 s to 20 s. The categories of Arab listeners are indicated by the superscript letters: [a] professional musician with formal training in Arabic music, [b] professional musician with formal training in Western music, [c] professional musician with no formal training, [d] nonmusician or amateur musician with no formal training.

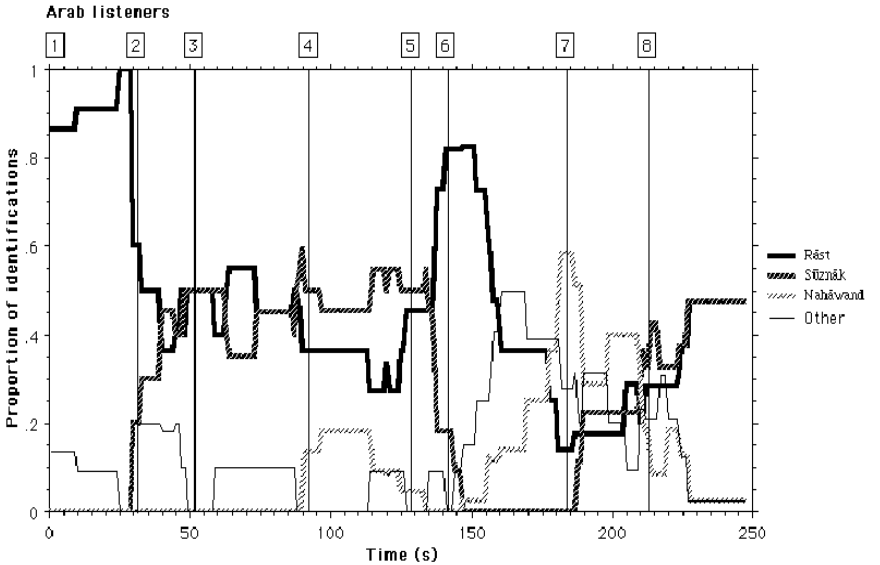


Fig. 4. Real-time identification rates of ajnās and maqāmāt by Arab musicians during the third segmentation pass (fourth listening). Proportions of total identifications are shown. The total number of listeners identifying these elements by name varied over the course of the piece and can be ascertained from Table 2. For clarity only the main maqāmāt (Rāst, Sūznāk, and Nahāwand) are specifically labeled. The section boundaries discussed in the music-analytic part of the paper are indicated.

Rāst or Sūznāk, a point to which we will return in the music analytic section.

REDUCTIONS

European Listeners

The last stage consisted of "reducing" the musical surface of each segment into a single generative melodic/rhythmic figure that summarized the modal musical idea. This reduced figure could be either described verbally or produced by singing. Remember that the emphasis here is on a core melodic pattern that is musical in and of itself.

In this stage, we observed that the European musicians had difficulty describing or singing the modal cores that define the melodic passages that they had segmented into independent sequences. Some musicians tried to sing the melodic/rhythmic structure that often recalls the first jins of Rāst G (Fig. 5a). Other musicians reduced the musical surface of the segment to surface features such as ornamental structures that were repeated several times in the melody (trills, appoggiaturas, etc.) (Figs. 5b, 5c).

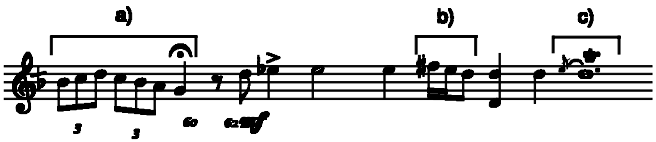


Fig. 5

In the taqsīm, the strong presence of this jins constituted the fundamental basis of the general maqām often modulated in its second and, sometimes, in its third jins (see Fig. 1c). The majority of the European musicians were not able to perceive the changes that appeared in the higher-register jins (jaharkā) of the maqām. They identified only this first fundamental jins of Rāst G that is transformed only once in this taqsīm into Nahāwand G (Fig. 1d).

Arab Listeners

Different principles of reduction were apparently used by Arab listeners and lead to a richer basis for discussion than was the case for the European listeners. During the segmentation phase, three Arab musicians had already sought out the small melodic/rhythmic cells and the ajnās that formed the phases of a given maqām. In particular, the musicians that had a "local" listening strategy segmented the taqsīm into several small sequences that did not exceed four or five notes of the theoretical scale (see listener A11, Table 2, for example). The reduction task was thus already performed to some extent for some listeners during the stages of identification and segmentation. This suggests that the process of reduction was also one of the first strategies employed to approach the internal microstructure of the taqsīm. During attentive listening, the listeners would seem to probe the sound substance and seek a link between the melodic/rhythmic structures in order to find the key figures and melodic cells in the musical development and exploration. In addition, it is interesting to note that these Arab musicians were able to remember long musical sequences, because they were easily able to locate and identify the core structures and relatively similar phases of development. Consequently, it seems that the reduction process was the fundamental perceptual element for memorization. One might speculate that having grasped it, an efficient hierarchical organization of longer time spans became possible (although a more clear demonstration of this will require further research).

In listening several times to the sequences that had different musical ideas, some Arab musicians stated that a string of their segments had the same modal roots. As an example, take the passage in Sūznāk presented in Figure 6, which is formed of three segments as indicated (48–50 s, 53–60 s, 62 s onward), all in Sūznāk. In order to reduce these sequences, the listeners were obliged to produce nearly the same generative melodic/rhythmic structure of maqām Sūznāk.

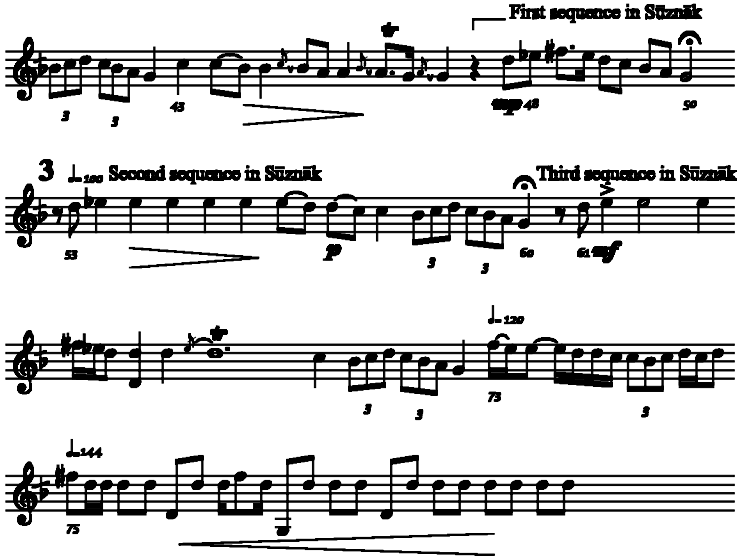

First sequence in Sūznāk
3
Second sequence in Sūznāk
Third sequence in Sūznāk

Fig. 6

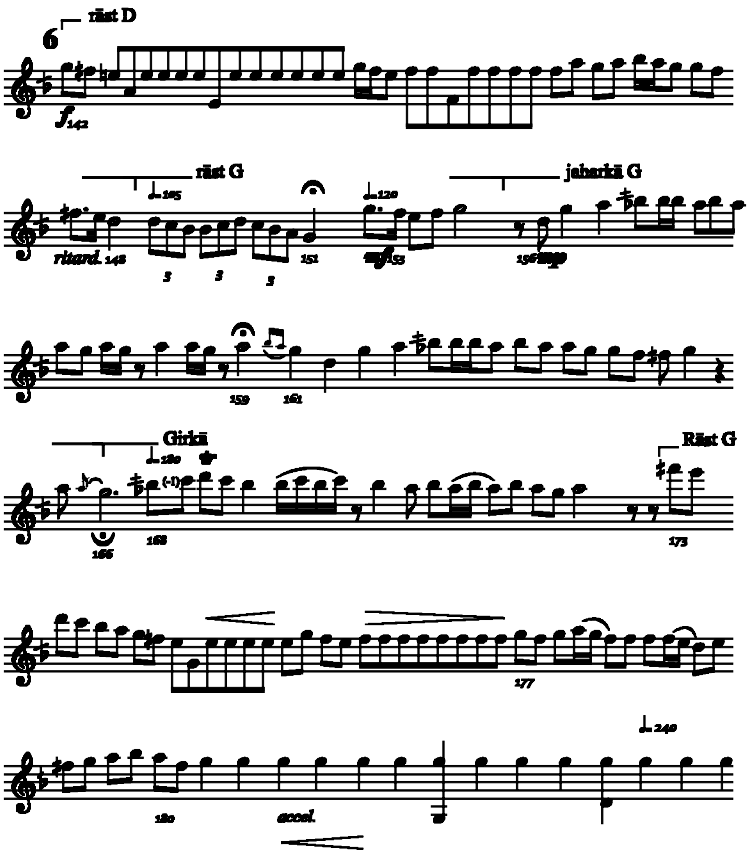

6
rāst D
rāst G
jaharkā G
Girkā
Rāst G
ritard.
accel.

Fig. 7

Some large-scale ideas of the musical improvisation covered several modal passages, such as the sequence rāst D, rāst G, jaharkā G, girkā, the return to rāst G (Fig. 7). Some musicians encountered difficulties in reducing such sequences as they searched for their roots. In spite of a conscious effort to sing the core of the melodic/rhythmic structure of this complex musical idea, we observed a loss of data since it was necessary to combine several small melodic movements each having a relatively autonomous modal sense.

Below are presented only the common points of the different reductions of the taqsīm having the same mode or origin described by the majority of Arab musicians. Unless stated otherwise, each reduction was produced by a single listener and its verbal description is included above the score. Separate reductions on a single stave are distinguished by a bar line.

The Melodic Passage in Rāst D Followed By Rāst G [0–33" in the Taqsīm]

The first section of this improvisation comprises two complementary melodic phases: a melodic opening in rāst D followed by a small development in rāst G. Three Arab musicians considered the melodic formula in Figure 8 as a thematic melody for the development of Rāst G.

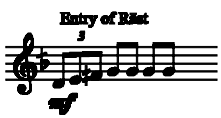


Fig. 8

The repeated play on the note E in Figure 9 raises perceptual ambiguity concerning the modal origin. During the first listening to the taqsīm, four Arab musicians hesitated between Rāst D, Rāst G, and Bayyātī (signaled in particular by the E♮).

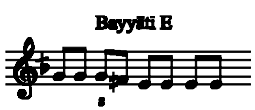


Fig. 9

Eight musicians produced the reductions shown in Figure 10. Note a preponderance of reductions including a rising E F♯ G pattern (b, c, d, e)

and a falling (and at times ornamented) C B-half-flat A G pattern (b, d, e, f, g, h).

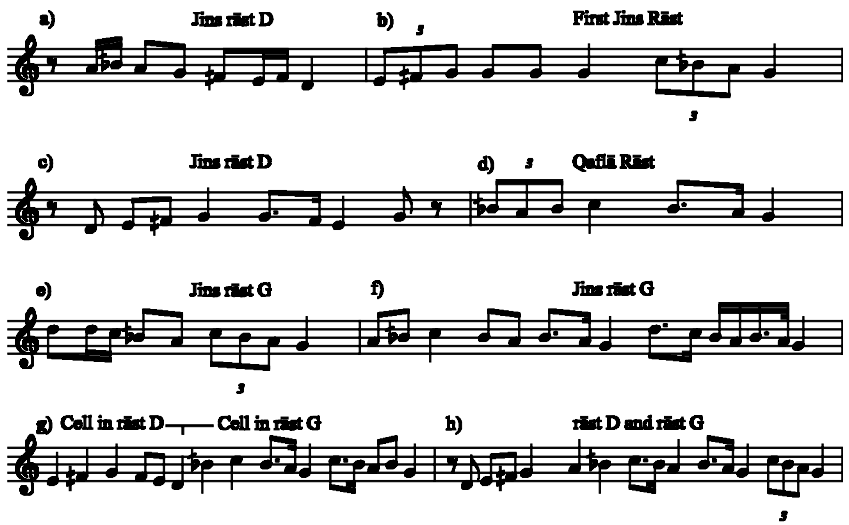


Fig. 10

Reductions of the Melodic Passage in Sūznāk [33–142"]

We have noted that the majority of Arab musicians distinguished between the combination of Rāst G with Ḥijāz D and Sūznāk G. In fact, in the case of Sūznāk, the tonic note G resonates in the ear. Although the performer paused several times on the note D (a sort of "imperfect cadence"), these musicians considered this passage to be in Sūznāk rather than in Ḥijāz with a permanent return to Rāst G. The eight reductions in Figure 11 reveal the re-exposition of the first jins of Rāst G and the modulation by way of the E♭, alerting the listener to the first modal variation in Sūznāk.

Four musicians considered this melodic passage as an opening into a new space in the underlying scale of Sūznāk and produced the reductions shown in Figure 12. The performer takes his play into the high register to explore Ḥijāz D with repetition of the E♭ and by moments of partial suspension. He composes ascending melodic structures to reach the G in the high register (the octave of the fundamental note of the main maqām), and to extend the play to the upper end of Ḥijāz. Although he pauses from time to time on the note D, these listeners considered this passage more as in Sūznāk than as in Ḥijāz D with a return to Rāst G.

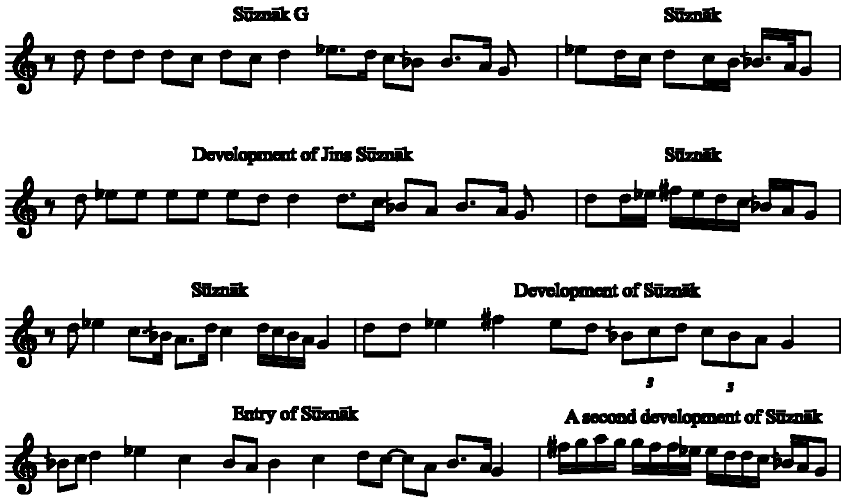


Fig. 11

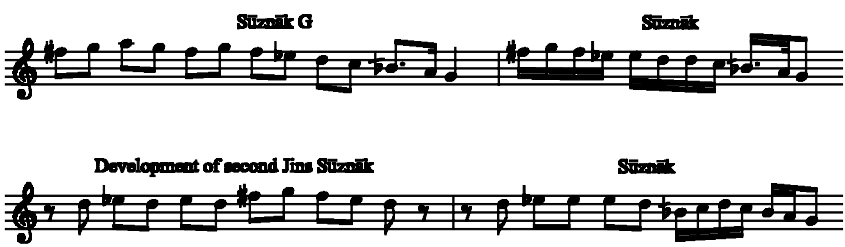


Fig. 12

Reductions of the Melodic Passage in Rāst G Followed By Jaharkā, Girkā and the Return to Rāst [142–184"]

The five reductions in Figure 13 show the complexity of this section composed of several modal discontinuities. Some listeners identified a change in mode, but did not succeed in describing the modal origins of their segments and had difficulty singing the melodic pattern that could communicate the idea of the musical development. Others considered the beginning of the section as an expansion of Rāst G at the octave (Rāst kabīr) and did not perceive the modal variation in Jaharkā. The rest of the Arab musicians, on the contrary, recognized the improvised modes, specifying the origin of the quarter tones used in certain Turkish modes.

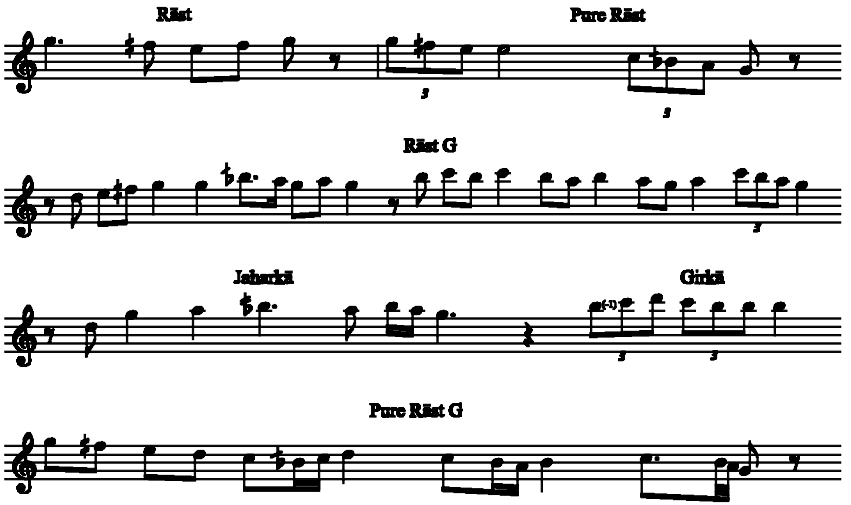


Fig. 13

Reductions of the Melodic Passage in Maqām Nahāwand [184–213"]

The melodic transition that characterizes this part of the improvisation relies on resolutions in B♭ major, Nahāwand G, and Ḥijāz D, as indicated by the first two reductions in Figure 14. The performer often recalls the *jins* below the fundamental G of the improvised maqām as captured in the last two reductions in Figure 14.

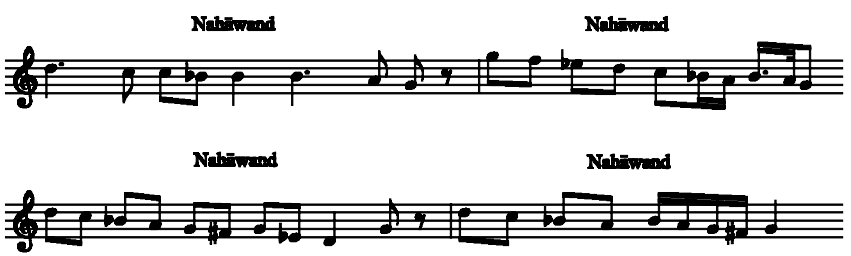


Fig. 14

Reductions of the Final Phase [213–246"]

Many of the listeners heard the piece as ending in Sūznāk and produced an appropriate descending cadential reduction, exemplified by the first four reductions in Figure 15. Others produced reductions demonstrating a clear return to Rāst G, such as the last reduction in Figure 15.

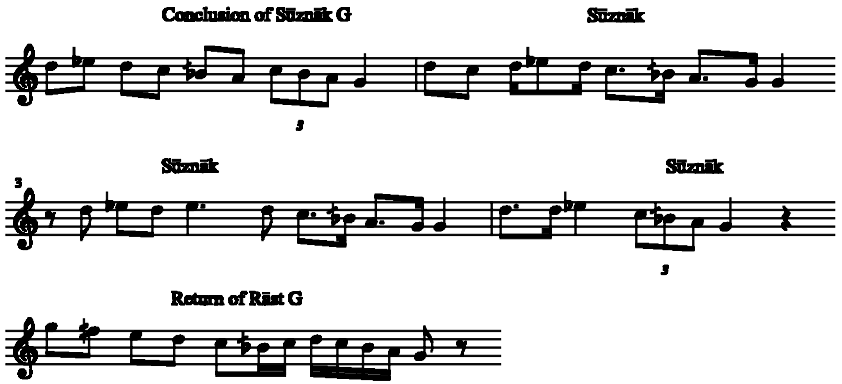


Fig. 15

Interim Discussion

This experimental part of this study has certainly raised more issues than it has resolved. However, our aim was to open up a new avenue of research that is critical for the eventual generalization of established principles in music psychology developed nearly exclusively on the basis of musical and proto-musical materials derived from the Common Practice period of Western music. As a first step to accompany the few studies that have addressed Indian and Indonesian music (Castellano, Bharucha, & Krumhansl, 1984; Kessler, Hansen, & Shepard, 1984), we studied listening by both European and Arab listeners to Arabic modal structures in improvised music. The results are vastly different between the two groups, both in terms of perceptual organization as determined by segmentation, and of hierarchical representation as determined by reduction. In particular, the kind of harmonic and tonal reduction to structurally important notes common to Western music theory and as evidenced weakly in the identifications made by European listeners in our study is very different from Arabic modal reduction to generative melodic/rhythmic structures. Of course, the ability to name the theoretical musical modal elements brought into play by Jamīl El-Bashīr in his performance are also very different, the Europeans having had no contact with Arabic music theory. These differences lead us to conclude separately concerning the two groups.

ARABIC MODAL LISTENING IN EUROPEAN LISTENERS

Some European musicians identified the same principle of play in the taqsīm. They considered that the performer developed his melody around three stable notes (G, D, G'), which they described as tonic or pivot notes. As such, they considered the other degrees as tension-bearing notes on the basis of which the performer organized his modal melodic structures. In

using only these cues for recognition, these listeners preferred to segment the melody each time they identified an arrival on the tonic or dominant. Their results are thus concordant with harmonic segmentation as revealed by Bigand (1990a). We observed, not surprisingly, that they used the concepts of Western music analysis to describe formally the phases of development, which they called "introduction," "first part," "re-exposition of the theme," and so on. Other listeners, however, segmented the taqsīm each time they detected a rising or falling in the melodic line. This kind of segmentation has been found in simple Western musical materials by Drake (1993).

In fact, the results of the segmentation task demonstrate that this cultural knowledge and this attempt at analysis do not allow the listeners (at least rationally and consciously) to approach more deeply the hierarchical structure of the taqsīm. Some listeners stated that the performer often developed small fragments in the microstructure that they could not succeed in perceiving independently. They at times identified a global change in the development of the large-scale ideas of the improvisation. However, these musicians felt themselves incapable, because of their acculturation, of representing and forming in their analytic listening certain perceptual cues or dimensions of listening to judge and/or interpret the musical content of the modal melodic phrase being heard. We noted that they were unable to distinguish several modulations presented successively in the same melodic phrase. Further, they were unable to recognize explicitly an exploration of what was perceived by Arab listeners as a new melodic idea by comparison with a continuation of the same idea presented differently.

Concerning the identification of modes appearing in this taqsīm, some listeners reacted by saying only that a "change in mode" or a "change in modal color" had occurred. However, we did not generally observe a similarity in behavior among the European listeners when identifying the modal changes described by the Arab musicians. Therefore, during the last task in which the listeners were asked to reduce the melodic sequence, the European musicians had difficulty describing or singing the modal core elements or the prototypical melodic figures that define the melodic passages they had previously segmented into independent sequences. In fact, faced with unfamiliar musical structures from another culture, they would seem to have been unable to describe what they were unable to recognize or represent mentally in a structured fashion, in spite of being all professional musicians or musicologists.

STRATEGIES OF MODAL LISTENING IN ARAB LISTENERS

In this study, we have tried to raise issues concerning the different dimensions of Arabic modal listening. Two categories of Arab listeners can be distinguished that allow us to raise issues concerning local and global strategies in Arabic modal listening.

A first category followed the evolution of the melody, specifying at each instant the modulations, the tetrachords, and the `uqūd or ajnās of each mode. As a result, their listening was *local* in nature: they segmented the taqsīm into small cells and melodic figures that formed the principal phases and the possible directions of modal improvisation. In their segmentation strategies, we observed that these musicians distinguished three kinds of melodic phases:

1. A phase consisting of a preparation and melodic *overture* as an introduction to the modal ideas. The modulation and certain melodic/rhythmic structures stated the appearance of an incomplete and unfinished modal auditory image.
2. Another melodic phase was characterized by a *development* of the structures consisting of the confirmation of a previously presented modal idea.
3. The third was a melodic phase representing the *exposition* of a sequence of several cells and modes. In this case, the listener had to progressively construct a (personal) image appropriate to the general modal atmosphere of the entire passage.

The second category of Arab listeners manifested a more *global* listening strategy. Among them, we observed three different kinds of behavior:

1. Some were able to describe the general spirit of the large-scale musical ideas presented in this taqsīm. They focused their attention more specifically on the logical development and evolution of the improvised ideas. During the identification and segmentation tasks, they grouped together and simplified at times the small modal images into more or less lengthy sequences in order to epitomize the global modal idea. However, we observed that they did not identify the constituents of the melodic phase that was characterized by the sequencing of small modal cells (rāst D, jaharkā G, etc.).
2. Others manifested the same large-scale segmentation principle, but were more apt to describe the small modal cells that they grouped into large sequences. In fact, while they clearly possessed an acquired local listening strategy, since they described the small nuances in the melody, they accorded a great deal of importance to the large organizational structures of the improvised ideas.
3. The third type of reaction was observed only in some of the nonmusicians. These participants reacted to changes in mode. We observed that they were unable to describe the meaning of the sequence. Their listening was relatively sensitive to the existence of a mode without having acquired, in parallel, the necessary vocabulary to express the useful theoretical concepts of modal

musical analysis. As for the other Arab nonmusicians, they reacted in a random fashion with no apparent concordance in their responses during all stages of the experiment.

The results of this analysis lead us to deduce that the musicians based their responses on perceptual cues that allowed them to articulate different levels of analysis of the information on the basis of different psychological mechanisms and a multitude of listening strategies for the perception and identification of modal musical meaning. (These strategies are developed more extensively in Ayari, 2003.)

The first strategy consisted of listening to the substance of the musical material in order to identify what it contained in terms of pitches, intervals (major, minor, neutral, etc.), ornaments, and notes that created tension or stability (passing notes, pivot notes), among others.

The second strategy consisted of seeking, in this musical material, a coherent link between the notes and the heard structures to form groups of syntactic sequences in the internal fabric of the melody appropriate to each phase of the development.

The third strategy represented a differential perception of the pitch of musical notes. On the one hand, it consisted of identifying the small changes in pitch that sometimes gave rise to different modal cells (the case of B half-flat in rāst G that becomes augmented by a comma in the development of jaharkā G). On the other hand, it allowed a feeling of the support and the intonation of groups of notes in order to perceive the importance of the fundamental note of each *jins*. Here it is a question of distinguishing the melodic passages corresponding to a development of a specific cell of the mode. In certain passages, the musicians declared that the presentation and organization of such a melodic phase allowed the power and subjective intonation of the fundamental note, which was at times absent from the modal cell, to resonate in memory.

The fourth strategy of modal listening consisted of reducing the set of similar units, structures, and phases in order to identify the modal core and generative root. Another level of matching to and comparison with references and standards conserved in memory then develops in order to recognize the color and general air of the modality. This strategy is consistent with the notion of maqām being on the tune-family end of the modal continuum.

Once the root, the fundamental cell, or the entire mode is recognized, a fifth strategy was necessary to follow, on the one hand, the dynamic progression of the phrase, and, on the other hand, the logical path of the development of the improvisation's hierarchical structure and the coherence of the phrases that are at times perceived as a continuation from one to the other, in spite of the modulations that they carry. A more global perception of the macrostructure allowed the nuances and global morphology of the

melody to be followed. This competence led to the distinguishing of the musical sequences that sometimes belonged to the same modal origin, but that differed at the level of the meaning, the idea, and the spirit of the improvised melodic phrase.

Some musicians demonstrated a sixth strategy and segmented the melody at a small modulation that did not change the general idea of the mode. In order to explain the basis of this principle of segmentation, we hypothesize that this modulation could have played a role in sensitizing the listener since the performer had prepared new modal movements or a new sound space to be realized later in the improvisation. In this case, the listener could foresee several possibilities for the direction of the improvisation and follow the logic and the thought process of the performer. It was also possible to identify the moments at which the performer hesitated, sought the right note that had to be played, since improvising is real-time composition.

Finally, we think that the identification of these types of listening strategies forms the basis for the development of a theoretical model of modal musical analysis that was set as the principal long-term objective toward which this experimental study was oriented. The following section presents a detailed analysis of the reductions and segmentations for individual listeners and groups of listeners, and there we derive an explicit interpretation of the segmentations and reductions from a music analytic perspective.

A Music-Analytic Approach to the Perception of Arabic Maqāmāt

DEFINITION OF THE APPROACH

In this study, the perception-inspired music-analytic approach is defined with respect to the modal musical listening competences manifested by the Arab musicians. On the basis of the segmentation, description, and reduction results, a paradigm of perceptual analysis of Arabic modal music is elaborated. The procedure consists of analyzing the reactions to the taqsīm observed during listening in individual listeners and in groups of listeners. Segmentations and score fragments are presented to reveal the degree of coherence between the proposed compositional grammar of the improvisation and the listening grammar of the Arab participants (the formation and representation of maqām schemas).

MUSICAL ANALYSIS

The taqsīm is considered to comprise eight sections that are indicated in the transcription by the numbers in squares. The sections correspond to the main maqāmāt and formal functions in the taqsīm. In each section,

reference will be made both to the perceptual results (segmentations, descriptions, melodic reductions) and to the transcribed score. The perceptual results are drawn primarily from the eight Arab musicians who made detailed and evolving modal identifications over the course of the piece (listeners A1, A2, A4, A5, A6, A7, A8, A11 in Table 2). The approach in the following development is more theoretical in order to trace the improvised melody, the musical materials adopted and the employment of the Arabic maqāmāt in the taqsīm (particularly relative tensions and stabilities between degrees of the scale). Then different perceptual analysis processes will be interpreted concerning the organization of the melody and its hierarchical function in the improvisation (referring to the Arabic theoretical tradition as well as to a more personal music analytic approach developed by Ayari, 2003).

Section 1: Introduction in Rāst G (0–33 s)

Arab listeners suggested in listening to this taqsīm that the first section was determined by two complementary melodic phases: a phase in jins rāst D followed by another in jins rāst G, the temporal evolution and dynamic forming a global image of Rāst . Rāst D and rāst G are conjunct tetrachords in maqām Rāst G.

In Figure 16, the timings and descriptions of sequences segmented by the eight Arab listeners are presented. The descriptions underscore the progressive construction of modal images appropriate to rāst D and rāst G.

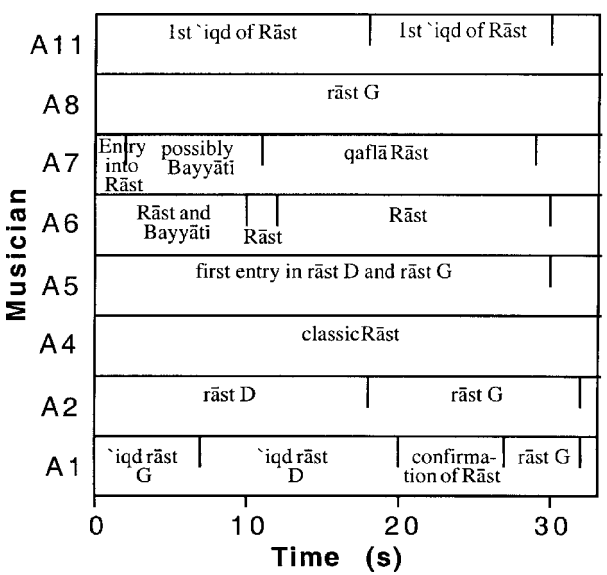


Fig. 16

From the point of view of modal melodic development, most of the Arab musicians were in agreement that the performer had exposed from the outset of the section a series of small melodic structures evoking three different modes: Rāst D, Rāst G or Bayyātī E. Once the melody was completed, some of them excluded Bayyātī E, finally settling on an introduction in Rāst. The melodic structures that created the divergence of opinion are shown in Figure 17.

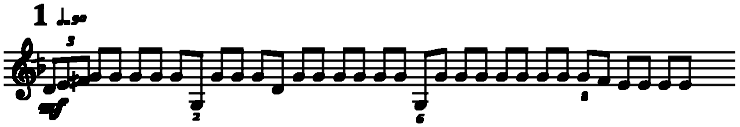


Fig. 17

Generally, the Arab musicians considered the melodic structure at the beginning of Figure 17 as a key melodic opening and introduction to the Rāst theme followed by a repetitive play on G (the asās of the maqām). Once this note had become the center of focus, a set of notes all around it forms an atmosphere developing tension as in the latter part of Figure 17. It is governed by a protocol of melodic organization preparing the presentation of two ajnās of Rāst: one above and the other below the asās G. Indeed we obtain jins rāst D with a brief cadence on D (Fig. 18; fermata at 16 s) followed by a small exposition of the fundamental jins of Rāst G (Fig. 19). This prototype of melodic development is considered one of the major characteristics of classic Arabic modal musical exposition.

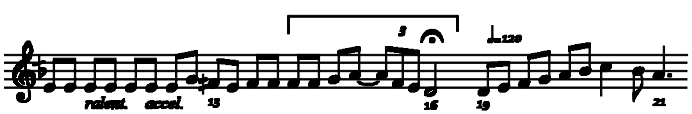


Fig. 18

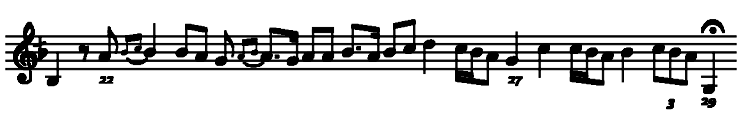


Fig. 19

Schematically, this section is determined by a play of notes around G (asās) and D (sub-asās). The other notes are considered as generating tension (Fig. 20) to the extent that they form the image of rāst D and rāst G according to a process of melodic improvisation. We have also observed that some European musicians identified this play around the notes G and D.

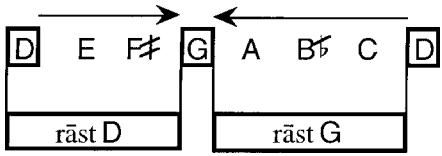


Fig. 20

The melodic reduction task consisted of simplifying and summarizing the musical surface into a generative melodico-rhythmic pattern expressing the modal essence of the segment. From the reduction samples collected, we can deduce that the musicians experienced in this kind of modal listening had no difficulty finding the representative pattern of the musical segment. One of the Arab musicians assembled the two rāst cells and reduced this first melodic phase of the taqsīm as shown in Figure 21.

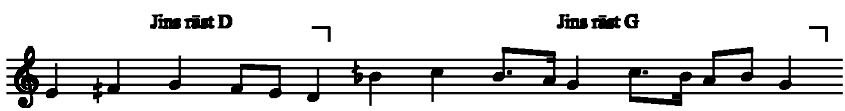


Fig. 21

Section 2: Sūznāk (33–53 s)

After the introduction, the performer re-exposes the first rāst G cell to confirm the tonal center of the principal phase of the maqām (the first jins). He next plays for the first time an E♭ (around 38 s, Fig. 22) with an agility of melodic organization to suggest a small change in modal color and to prepare a new idea in the improvisation.

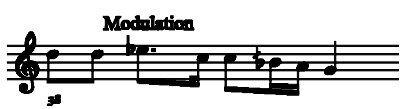


Fig. 22

Without stopping, he explores the rāst G cell, weaving different melodic structures around the fourth and fifth degrees so that the D becomes a pivot of the asās G. Once the melodic phrase arrives at a closure and a descending completion toward the fundamental note of the mode, the performer sweeps through a large part of the scale (at 48 s, Fig. 23), presenting the two ajnās of the new maqām Sūznāk, one of the variants of Rāst.

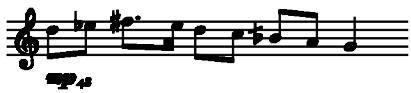


Fig. 23

In Figure 24, the timings and descriptions are presented for Section 2 in maqām Sūznāk.

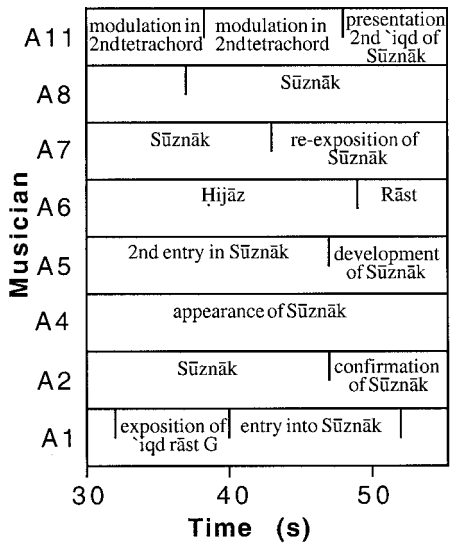


Fig. 24

During the identification phase (first listening), the listeners' reactions occurred just after the appearance of the note E♭ (at 38 s), which signals the beginning of the Sūznāk. However, during the segmentation phase (fourth listening), and as shown in Table 2, musicians involuntarily rectified the appearance of maqām Sūznāk (at 30–33 s, approximately at the beginning of the melodic phrase). They appeared to want to relate the exposition to the first jins rāst G to the development of jins Ḥijāz D (at 38 s). One example of a reduction produced by a listener that confirms this interpretation is a melody starting on the third degree (B half-flat), shown in Figure 25. The musician seems to be conscious that maqām Sūznāk has appeared because of the exposition of its first jins, rāst G.

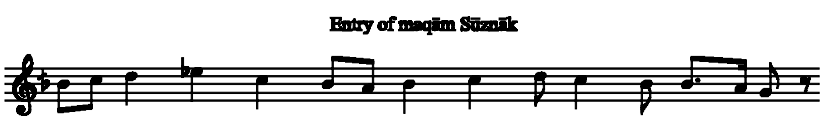


Fig. 25

Section 3: The Presentation of Sūznāk (53–92 s)

Figure 26 presents the timings and descriptions for the first development of Sūznāk. There is a generally high agreement on the description of this phase of the taqsīm, in spite of the small delays in marking the segmentations. Note however that the segmentations situated between 52 s and 64 s generally describe the confirmation and/or beginning of a development of the second jins of Sūznāk (Ḥijāz). Further, the other segmentations, between 88 s and 91 s, define the end of this exposition phase.

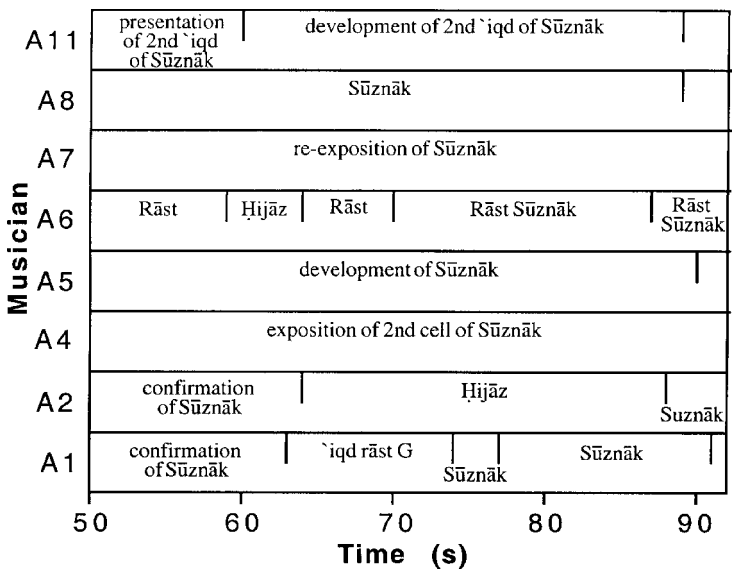


Fig. 26

In describing the principle of melodic exposition manifested in this third section, some Arab musicians reported that the performer had directly played the second jins of Sūznāk. He repeated several times the D pivot then started to elaborate jins Ḥijāz with a variety of melodico-rhythmic structures. He often played a cadence and a trill on the pivot note, then recalled the first jins, rāst G (Fig. 27). The listener consequently remembers the general spirit of the maqām being developed (Sūznāk G), having access to both the first and second jins.

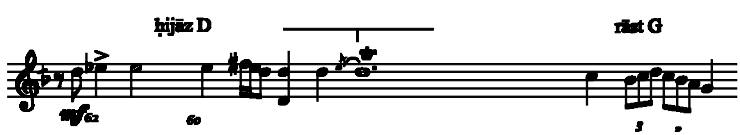


Fig. 27

Without leaving Sūznāk, a new organizational idea is presented, because the Ḥijāz in the higher register of the scale projects toward the G at the

octave of the fundamental note (Fig. 28). Here the performer presented the two successive ajnās of Sūznāk to cover maximally the range of the theoretical scale: rāst G and Ḥijāz D.

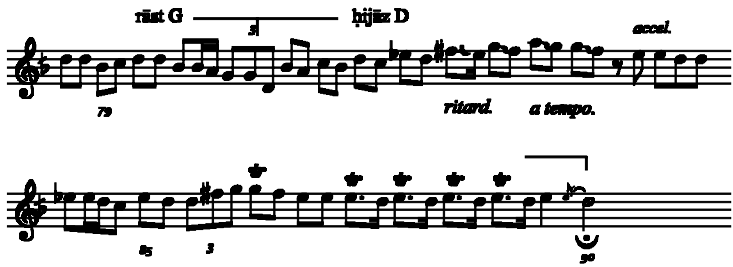


Fig. 28

Maqām Sūznāk, presented in this melodic passage, is characterized by a change in tempo, in rhythmic structure, and in varied ornamenations. The modal melodic organization governing this musical material creates attractions in all directions toward the principal notes of the maqām: the fundamental G (by recalling the first jins), the pivot D sustaining the two tetrachords (by way of the cadence and the trill), and the G at the octave. Schematically, the notes D and G at the octave each reveal themselves as being the center of a new atmosphere, whereas the other notes play the link between these two poles (Fig. 29). The main aim of this melodic exposition is to represent completely the second jins of Sūznāk (Ḥijāz D). The notes E♭ and C thus generate tensions toward the note D, and the notes F half-sharp and A toward the note G at the octave.

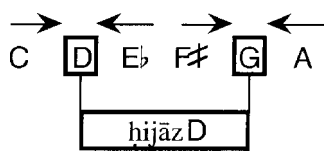


Fig. 29

Concerning the reduction of this melodic passage, three observations were made by European and Arab listeners.

1. Some European musicians reduced the musical surface of this segment to three notes: the asās G, the pivot D, and the octave G. Speaking of the modal melodic organization, they felt these notes were major landmarks placed in time as tonic and pivot notes. The other notes generated tension and manifested themselves in the form of ornamentations and embroiderings about the tonic and pivot. From these landmarks, the performer explored the intervals and melodic structures, making different modal colors emerge that these musicians felt they were untrained to perceive.

2. Concerning the rhythmic exploration, some European musicians mentioned an acceleration of tempo giving the impression of a dance rhythm. Consequently, they distinguished this phase of exposition with respect to the others, in spite of the similarity in modal color.
3. During the three phases of this experiment (identification, segmentation, and reduction), some Arab musicians encountered difficulties in defining the principal maqām of this section during its development. It was thus necessary to ask them to differentiate the combination of Rāst G and Ḥijāz D and Sūznāk G. Given that the tonic G always resonated to the ear in the development of maqām Sūznāk, the majority of Arab musicians succeeded in distinguishing the global maqām of the section. Aside from this, although the performer played pauses on the note D, these musicians identified this passage as Sūznāk rather than as Ḥijāz D with a return to Rāst G. If they spoke of Ḥijāz, it was in terms of the jins rather than the maqām and with the aim of simply describing where the development of the melodic ideas occurred in the scale of maqām Sūznāk.

One of the Arab musicians reduced his melodic segment in Sūznāk mode as shown in Figure 30.

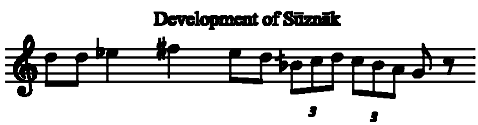


Fig. 30

Section 4: The Development of Sūznāk (92–129 s)

Figure 31 shows the segmentations and descriptions for Section 4.

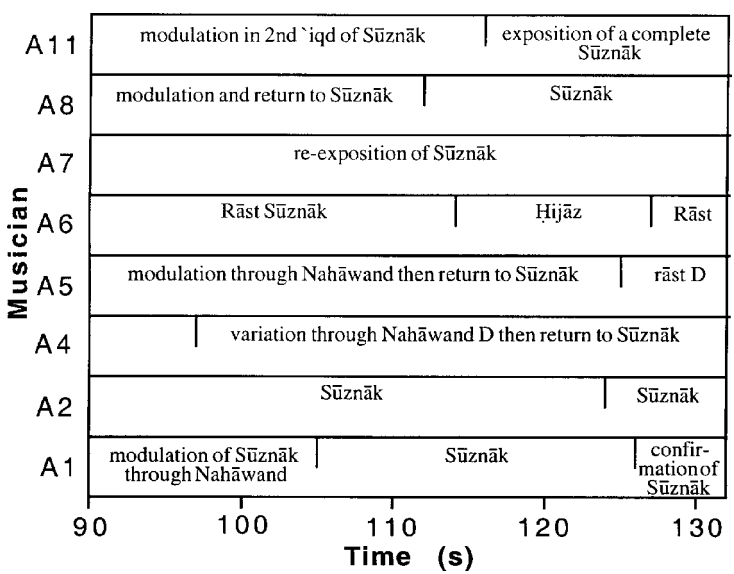


Fig. 31

Most of the Arab musicians recognized the modal origin of the melody, indicating that the performer, from the beginning of the section, preluded a new improvisational idea by a slight modal modulation to Nahāwand D, one of the characteristics of the classic play in pure Rāst G. They subsequently added that this melodic overture did not fully develop maqām Nahāwand D (Fig. 32).

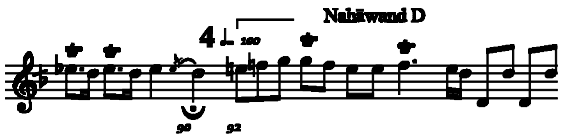


Fig. 32

In this sense, it may be deduced that the performer used a principle of modal color mixtures followed by a permanent return to the dominant modal idea. At the beginning of Section 4, he modulated by a small melodic movement in Nahāwand D (as shown in Fig. 32) to return afterward to Sūznāk by exploring the first ajnās of Rāst (rāst D and rāst G) throughout the rest of the section.

On the basis of the data presented up to this point, we observe that the choice of the performer was not arbitrary. He prepared a new passage to true Rāst by changing the second jins Ḥijāz D to another jins rāst D. In a classic modal improvisation, a true Rāst usually develops its two principal tetrachords (rāst G and rāst D). However, here the performer played a single note of the second tetrachord (E♮) which should be sufficient to recall for the listener the true Rāst G. The results collected in the segmentation tables lead us to think that the Arab musicians, because of their culture and modal musical practice, manifested a rather large sensitivity to the level of recognition of the modal origin of this melodic movement.

Concerning the melodic organization, characteristic of a true Rāst G, we noted that the performer developed a series of descending melodic gestures (E to B, D to A, C to G from the last two notes of the first stave through the middle of the second stave in Fig. 33). He then returns to maqām Sūznāk to complete the section by a relevant melodic closure (qaflā) in Rāst G.

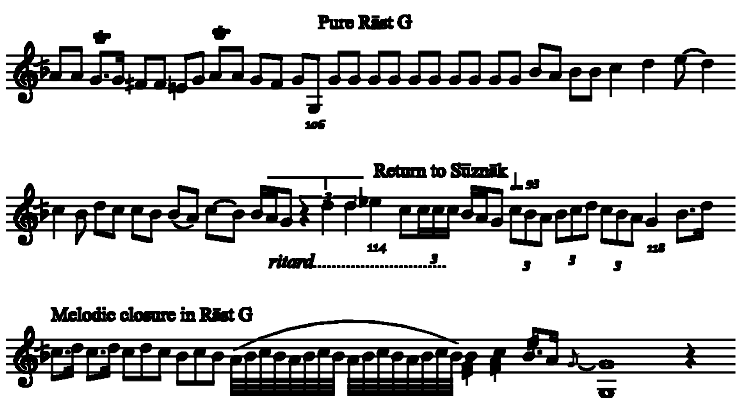


Fig. 33

Section 5: The Re-exposition of Sūznāk (129–142 s)

Figure 34 shows the segmentations and descriptions for Section 5.

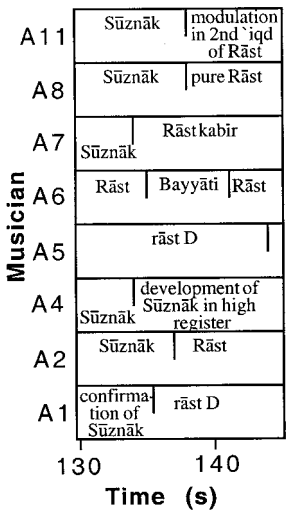


Fig. 34

As can be gleaned here, this phase of the taqsīm raises a small problem concerning where the beginning of the section is perceived to be. Some listeners considered this part of the piece as a continuation of the previous section since the modal idea in Sūznāk had not changed. However, viewed from the standpoint of the dynamic nature and of the coherence of the melodic phrasing, one might conceive this melodic phase as both a reminder and a confirmation of the preceding mode. The current section is characterized by a melody that seems to be a conclusion of the Sūznāk idea. As such, it could be a preparation for a new modal musical idea that would be presented in the next section. However, the performer pushed the improvisation toward the creation of a new sound space, elevated by the play of ascending and, especially, descending structures in the form of successive notes in the two ajnās of the scale underlying Sūznāk. In this case, some musicians considered the attainment of this new space as having a double function:

1. The performer wanted to recall the same Sūznāk in a larger time span to confirm the modal image already evoked.
2. He had for the first time approached this new elevated sound space to prepare the listener for a future development of other modal structures in the third register of the main maqām Rāst G.

Figure 35 shows one of the reductions by an Arab musician that manifests the elaboration of melodic structures in Sūznāk in a higher register of the scale.

Fig. 35

Section 6: Rāst (142–184 s)

After having finished the exposition of maqām Sūznāk, the performer paused to begin a new musical idea already portended in the preceding section. The melody of the current section contains a mixture of modal colors elaborated from a suite of small melodic cells. They are particularly exhibited in the second and third tetrachords of the main maqām (Rāst G).

The different reactions observed in the Arab musicians indicate that this section is characterized by the fusion of modal structures as well as by richly nuanced and ornamented melodic lines. In listening to this section, the Arab musicians reported recognizing divergent modal images. The segmentations and descriptions in Figure 36 show the extent to which the Arab musicians disagreed about the identification and timing of the melodic segments forming this section.

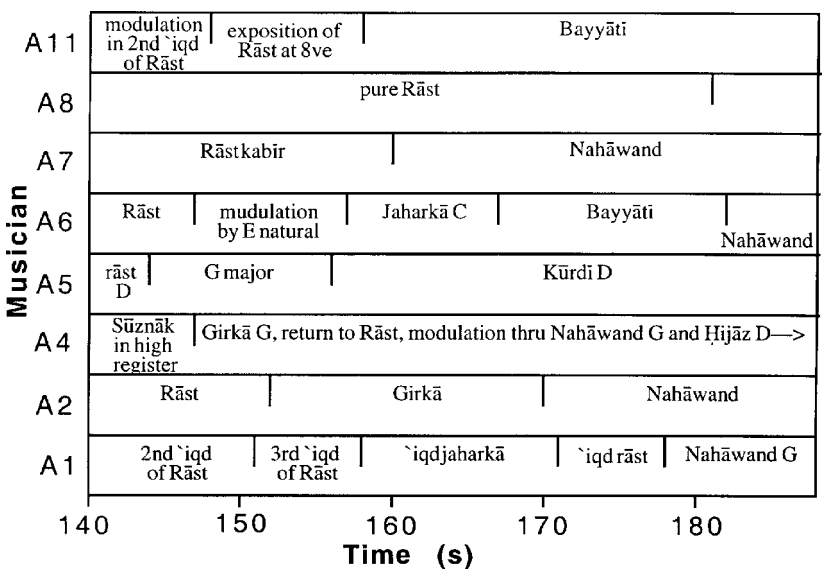


Fig. 36

We conclude that this sixth section starts with an exposition in pure Rāst G already foreseen earlier by the E♮ at the end of the fourth section. This exposition distinguishes itself by a play on the second jins (rāst D) of the main maqām, followed by a small cadence on the pivot note D at 148 s and a return to the first jins (rāst G) (Fig. 37).

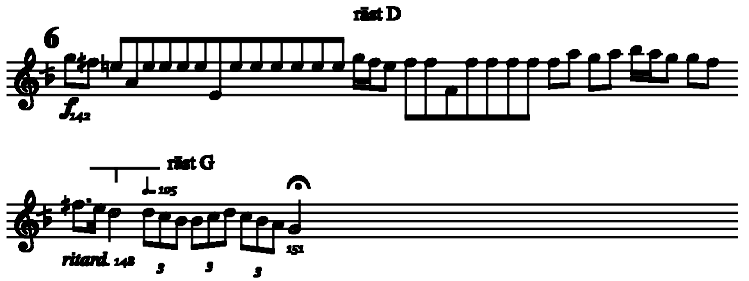


Fig. 37

Just after the melodic closure, the performer presents again one of the typical melodico-rhythmic thematic structures of Rāst G at the octave at 153 s to begin a new modal idea in Jaharkā G from 156 s (Fig. 38). This melodic phase is characterized by a play on the augmented B half-flat that becomes nearly a B♮ flatted by a comma.

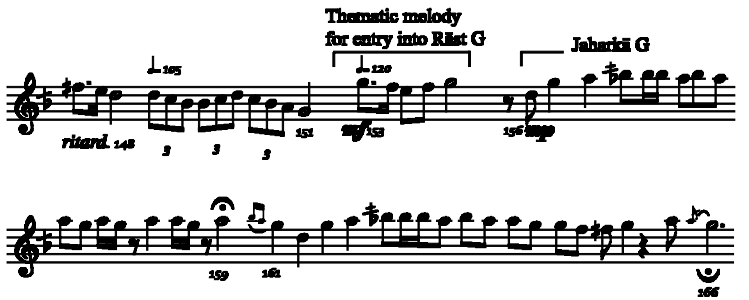


Fig. 38

During the third segmentation phase of the experiment, three types of reactions were observed in Arab musicians:

1. Five of the 16 listeners reported a change in mode, but were not able to describe the sequence.
2. For three others, this melodic phase was considered a development of Rāst G at the octave (Rāst kabīr). However, they identified neitherthe modal color of Jaharkā G, nor the change in pitch of the augmented B half-flat.
3. The rest of the Arab musicians succeeded in describing the real maqāmāt presented in this section, which are all Egyptian, some indicating the presence of a quarter tone known in Turkish modes. The style of execution of the Egyptian maqāmāt is influenced by El-Bashīr's origins (it's a question of a musical regional "accent" of sorts). The way the melodies are developed and the compositional schema of the improvisation are not completely Egyptian for the following reasons. The performer explores and empha-

sizes other aspects of the mode than are traditionally found in an Egyptian taqsīm. The transition and rupture into the minor mode appears in modern compositional tendencies known in Turkish maqāmāt (which are a mixture of different styles and have strongly influenced Iraqi taqsīm practice). The quarter tones of the Egyptian ajnās composed in the highest register of the maqām here are slightly sharpened by comparison with the true Egyptian quarter tones (B half-flat and F half-sharp).

In this phase of exposition, we have noted that the repetition of the B half-flat augmented by a comma became a semi-pivot note in the sense that it formed around itself a new space of notes (Fig. 39). The melodic motion process that governed the notes G, A, B, C, and D formed two different modal images: Jaharkā and Girkā.

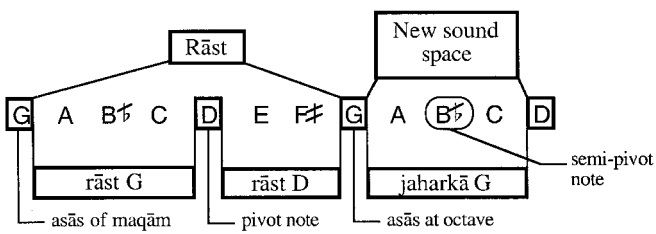


Fig. 39

The melodic passage that follows this small section in Jaharkā is also distinguished by a modulation that alters one of the degrees of the acoustic scale: the C♮ is flatted by about a comma. In playing the melodico-rhythmic structures of this type in this new acoustic scale, the performer briefly developed a new mode called Egyptian Girkā (Fig. 40). It is interesting here to note that only three of the Arab musicians identified this modal transition. They manifested a sensitivity to the intervals and a knowledge of the oriental modes involved in this sixth section in particular.

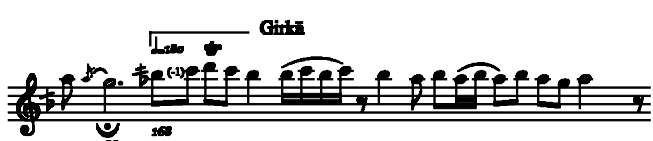


Fig. 40

After a small cadence on A (Fig. 40), the performer makes a leap to pick up the main idea of this section again: the Rāst G that is briefly elaborated

at the octave. He develops this idea by a descending melodic motion, partially closing it in Rāst D and then completing it with a final melodic closure on the first jins of Rāst G (Fig. 41).

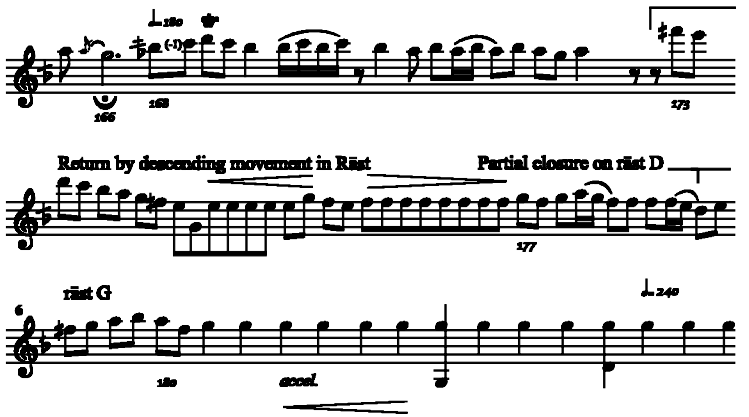


Fig. 41

Without stopping, the performer strikes the asās G of the maqām several times to announce the end of this section, on the one hand, and a transition to a new modal melodic idea on the other. However, the repetitive play on the G (Fig. 42) alternated with the notes F and A at the beginning of Section 7, evokes a certain ambiguity as concerns the segmentation and the recognition of the maqāmāt.

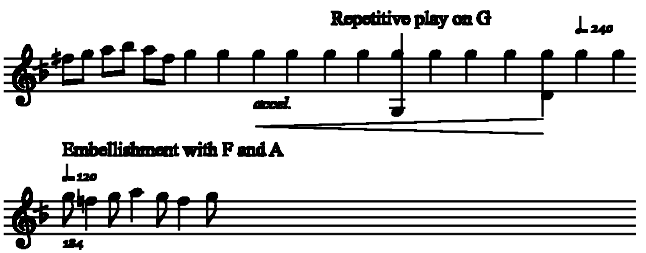


Fig. 42

In a classic modal improvisation, it is common to start or terminate a melodic idea on a cadence that is more or less long. The performer had produced several times the asās of the maqām being explored to announce a new section of the improvisation (the melodic opening by the presentation of the fundamental G right from the outset of this taqsīm, for example). But the segmentation problem that arises at the end of this melodic passage concerns the ornamentation (the notes F and A). The modulation by the note F should alert the listener to a new transition in the modal improvisation. Three of the eight Arab musicians under consideration here

still preferred, however, not to segment the melody in spite of the emerging modal change. They assembled the current section (6) and the next one (7) into a single section with two different modal spirits. As concerns the musicians who chose to separate the two sections, they considered the next melodic passage as a foreign transition that was not integrated into the whole of the classical variants of Rāst. The transition would thus modify the modal spirit of the taqsīm and bring modulations to the first jins rāst G. The modal transition was judged by these musicians as a novelty and a contemporary creation with respect to the traditional form of modal improvisation.

During the first listenings to the taqsīm, three musicians announced a conclusion toward the mode Bayyātī or Kūrdī. In passing into the next (seventh) section, they realized that the performer had covered another possibility of unexpected modal exposition in Nahāwand G. He also stopped intentionally exploring the melodic opening in Bayyātī or in Kūrdī to pass immediately into Nahāwand G. Frequently, in this kind of modal music listening, the experienced listener can remark the instant at which the performer hesitates and seeks his notes, his melodic and rhythmic figures or new directions in an instantaneous modal improvisation.

Section 7: The Transition to Nahāwand G (184–213 s)

The segmentations and descriptions for Section 7 in Nahāwand G are presented in Figure 43.

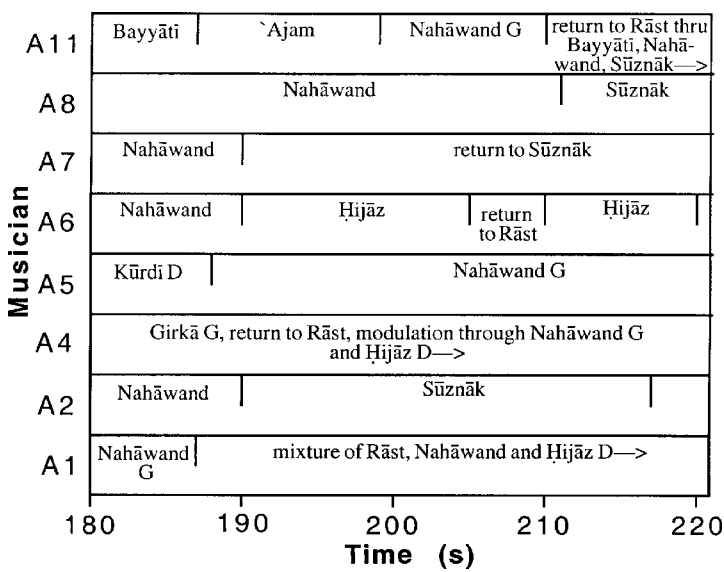


Fig. 43

The performer approached this section by an ascent to the pivot D at the octave (187 s). He subsequently modified the scale by lowering the "neutral" thirds (seven quarter tones between D and B half-flat) which became minor thirds with a B♭. The melody is thus organized by melodic structures that give a descending suite of small modal images. The first melodic descent is in E♭ major, which is followed by a melodic movement in B♭ major (Fig. 44). These Western scales make a clear "intrusion" into the improvisation at this point that to our ears vaguely evokes flamenco music, particularly when realized with the arpeggiated chords that recall guitar gestures.

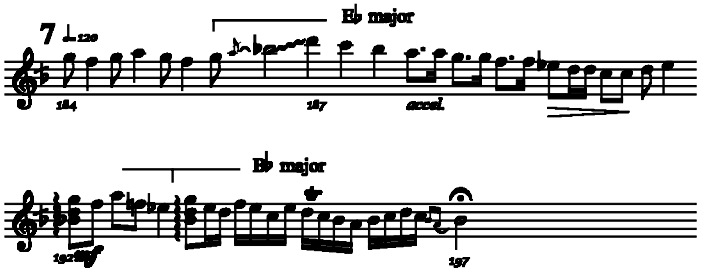


Fig. 44

Next the performer develops various melodico-rhythmic structures to attain the cell preceding the first jins of Nahāwand G, which is Ḥijāz D (Fig. 45). The same exposition principle had been previously observed in the case of Rāst . The performer often recalls to mind the jins preceding the first jins and then closes the melody on the first jins of the maqām being evoked.

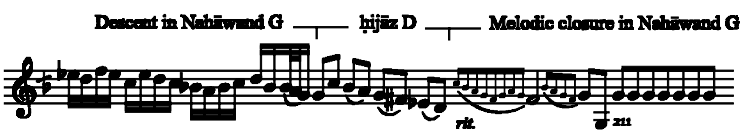


Fig. 45

The taqsīm by Jamīl El-Bashīr generally relies on knowledge of the rules of classic Arabic modal music. Nonetheless, in order to avoid certain automatisms, the performer disrupts the prescribed paths of traditional musical listening in the current section. He reorganizes differently the succession of modal cells and embellishes his melodic presentation with exotic instrumental playing techniques in form of chromatic and inverted minor-chord arpeggios. A majority of the Arab musicians appreciated this melodic passage and reported that the performer showed a shrewdness in his

melodic arrangements that would attempt to widen the field of improvisation and traditional modal musical organization.

Section 8: The Final Conclusion (Qaflā) (213–246 s)

This section contains the beginning of the conclusion, the melodic descent in true Rāst and the final qaflā of the taqsīm. The timings and descriptions of segments for this section are shown in Figure 46.

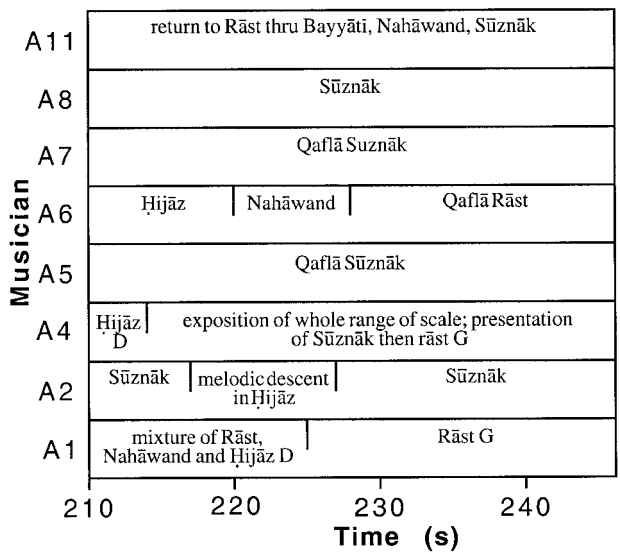


Fig. 46

At the end of the taqsīm, not many segmentations were recorded. The Arab musicians considered this melodic passage as a single musical idea, in spite of the modal modulations it contains. The small modal structures were finely linked with one another in such a way that the listener could not split them into independent segments. The approach of the performer consisted of replaying all of the conclusions and semi-perfect melodic closures presented previously. He mixed the three cells, nahāwand D, Ḥijāz D and rāst D, following an improvisational process, a virtuosity of play, and a subtlety of organization of small melodico-rhythmic structures that are inseparable as one listens. However, because each mode possesses a framework of signatures, a set of structures, of melodic patterns and an organizational protocol that defines modal improvisation, the experienced listeners trained themselves at each moment of the musical development to describe the function and meaning of the melodic phase. In this last section, we noted that all of the Arab musicians reported (from about 210 s)

that the music was in the concluding phase of the taqsīm. As such, the performer concluded his improvisational idea by returning to the fundamental jins: the subjective support of the general maqām, Rāst G. The reactions reported by the Arab listeners indicated that the performer, from the outset of this section, replayed in the same fashion, maqām Sūznāk developed in the second and third sections. He employs it starting from the pivot D (alternated with C and then E♭), to terminate his melody partially on the cell Sūznāk G (Fig. 47).

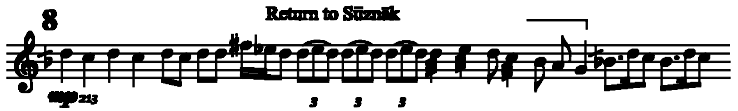


Fig. 47

Subsequently, after a rise in Sūznāk, he descends melodically along the whole scale of pure Rāst G (Fig. 48).

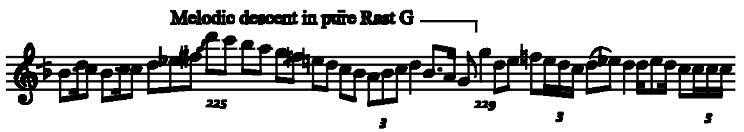


Fig. 48

Thereafter, he recalls the exposition principle that had been adopted at the beginning of the fourth section. He sharply changes the idea of the melodic descent in pure Rāst with two small successive modulations: the jins rāst D is rapidly transformed into nahāwand D and Ḥijāz D (D/E♭/F♯/G) to return again to maqām Sūznāk G (Fig. 49).

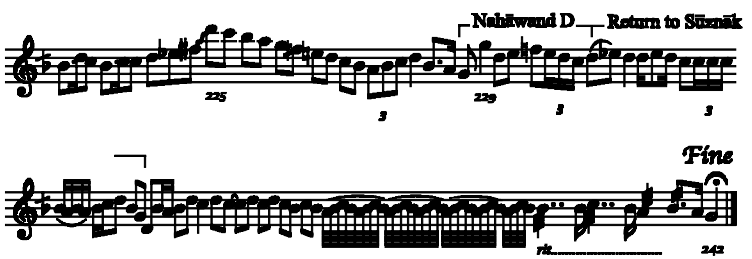


Fig. 49

After this return to Sūznāk, he finishes his melody on the first fundamental phase of the general mode (jins rāst G) by playing trills tremolos in order to close the section and the improvisation (Fig. 49).

From the standpoint of the recognition of modes and of the disjunctness of melodic phrases, we noted that the final melodic closing evoked various approaches to perceptual analysis. The Arab listeners were not in agreement with respect to the description of the general modal spirit of the end of the taqsīm.

As can be seen in Figure 4, roughly half of the Arab musicians making modal identifications specified that this taqsīm was characterized by continual return to the Sūznāk mode in spite of the notable presence of cells in Rāst, Nahāwand and Ḥijāz. To justify their viewpoint, these musicians referred to the presence of the note E♭ before the end of the section. One of these musicians reduced this section as shown in Figure 50.

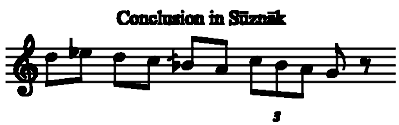


Fig. 50

The other half described the maqām of the taqsīm according to the global modal spirit of the conclusion. Whereas the section contains several modal cells (e.g., the return to Sūznāk), these musicians reported that the demonstrative exposition in the three registers of pure Rāst dominated considerably the elaboration of the concluding modal idea. Consequently, they felt that the modal spirit of this taqsīm was in maqām Rāst G. One of the musicians in this group reduced the conclusion as shown in Figure 51.

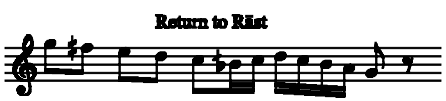


Fig. 51

These two opposed approaches reveal that the modal image appropriate to a richly nuanced melody raises a paradox for the recognition of the apparent maqām. We have nevertheless noted a nonnegligible divergence between the compositional grammar adopted by the improviser and the perceptual grammar that resulted from listening to the music produced. As such, the identification of the mode currently being developed depends on the sensitivity and the analytic musical approach of each listener.

The performer has shown here a high level of musical knowledge, a mastery of the modal material, and a subtlety in the improvisation and organization of the internal and external fabric of the taqsīm. He developed these maqāmāt at local and global levels in order to articulate the different degrees of the hierarchy of the modal system. All of these musical competencies allowed him to express and to play contemporary ideas across

the modal spirits composed instantaneously, ideas that will be inscribed in the framework of classic improvisation.

This approach to modal analysis and listening reveals some of the perceptual skills of informed listeners. The different reactions observed in the participants lead us to deduce that it is fairly difficult to manifest, at the same time and with the same sensitivity, all of the musical listening skills described in order to approach an understanding of the hierarchical structure of the taqsīm. Each musician employed different strategies. Everything depended on the content of the piece and the modal ambiguities that it manifested, on the listeners' skill and mood, on their abilities, and on their musical and intellectual intentions. Some found their listening pleasure in the microform, while others focussed more on the global morphology of the development of the improvised ideas.

All of the elements just discussed lead us to deduce that regularities in modal music, as with all other musics, have fashioned the manner of (musical) thought of its listeners and musicians. Further, it is the professional musicians who have developed, by way of explicit learning and implicit experience, the dimensions and perceptual skills necessary to appreciate what is incorporated in this music in terms of nuance and expression, at least as concerns their ability to perform explicitly musical analytic tasks. In this study, we have encountered some musicians who were able to go beyond the notes, the structures, and the forms. They spoke of the modal "meaning" and of the "metaphor" of the modal phrase, of the classical and contemporary styles of modal improvisation. However, it is highly likely that exposure to the harmonic/metric hierarchies in Western tonal music and the melodic/rhythmic hierarchies in Arabic modal music have led to very different organizing processes and result in different mental representations of the same musical materials.

General Discussion

The experiment and musical analysis that we have performed with the help of European and Arab professional musicians in order to study the hierarchical structure of a specific taqsīm allowed us to address the process of listening to a modal melodic improvisation. All of the representative characteristics of an Arabic modal improvisation, be it traditional or contemporary, are included in the piece studied. In our analysis, we have essentially deduced that the improvisation can be inscribed in two different forms: a classical form and a free form.

In the classical modal improvisational form, performers organize their melodies on the basis of generally pre-established structures playing the role of melodic openings and closures, and so on. They draw inspiration

essentially from these key melodic structures, borrowed from Arabic musical tradition to explore them in the shorter or longer ideas of modal improvisation. They thus fix the landmarks in time in the form of degrees that hold or attract tension (creating tension and resolving that tension toward stability in the Western musicological conception) in order to work with the homogeneity of the other degrees of the underlying scale of the mode.

In this way, the sound material is arranged according to a process of melodic movement and temporal unfolding defining the phases of improvisation. However, the listener recognizes the modal origin and distinguishes the function of the melodic sequence in relation to other levels of the hierarchy of the taqsīm (presentation of the mode, exposition of the second tetrachord, etc.).

During an improvisation, the performers foresee the possible melodic behaviors in order to move with ease between one section and the next of the global form. By taking into account the classic theory of the mode (the succession of ajnās, the range, the asās, the variations, etc.), they develop their melodies with finesse to explore the appropriate theoretical scale. With shrewd musical thought, the performer prepares at the same time the new sound space to be addressed in the next phase. Listening is thus adapted to the changes in sound (e.g., interval jumps in higher registers) and the modulations in the improvised melody.

Beyond the mechanism of melodic structure formation, the performers are free to prefer their melodico-rhythmic figures to illustrate a personal expressive and affective content. But some of these figures are models and schemas that repeat and represent in a way the imprints and signatures of the mode. It is certain that there exists a framework of melodico-rhythmic configurations for each mode that the improviser must keep in mind during the performance. The variety and richness of these images obviously depend on the style and talent of each performer, but they mostly depend on knowledge that he or she possesses (implicitly or explicitly) concerning Arabic modal music theory (Guettat, 1980).

Nonetheless, everything that does not belong to the theory and in particular what we have presented here is inscribed in a free system, a form of contemporary improvisation. In this case it is a question of escaping from habitual classic improvisation in order to create new structures, transitions, modal melodic ideas, and so on.

In this sense, we have illustrated in our analysis some of the aspects that evoke modal perceptions in listening that are at time ambiguous, due to unexpected changes in the trajectory of the melody (the melodic structure at the end of the sixth section in particular). We have notably emphasized the exhaustive transition into Nahāwand G (the seventh section) felt by the Arab musicians as a melodic passage that was not integrated into the traditional improvisational scheme. In the final analy-

sis, beautiful music is not that which is played as it is described in theory. To cite Imberty (2002):

> The perception of the continuity of musical duration cannot be reduced to mere cognitive mechanisms that allow a musician to organize and memorize the work during listening or performing: beyond, there is also an initial intuition, a personal emotion that comes to give the whole a unity, a continuity, a "movement," a meaning, something that is no longer on the order of abstract cognition but which comes also to enlighten the paradox of the perception of temporality. (p. 375, our translation)[1]

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