The Sound System of Baghdadi Arabic in the Light of Distinctive Feature Theory
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Abstract:
This paper is an attempt to look at the sound system of Baghdadi Arabic in view of the Distinctive Feature Theory, in order to see how far such a theory would be applicable to the language variety being dealt with in this paper. The main purpose, here, is to see how far is it possible to group the sounds of Baghdadi Arabic into classes according to their phonetic (distinctive) properties. Thus, on one hand, the paper is meant to deal with the sounds of Baghdadi Arabic in terms of Trubetzkoy's distinctive oppositions, using the method of contrasting the classes of sounds according to such oppositions.

(1) Introduction:
The sound system of Baghdadi Arabic will be approached by means of adopting analyses presented in Trubetzkoy's Theory of Distinctive Features. The researcher will make use of distinctive oppositions that exist in English in order to make a contrastive analysis of those sounds that belong to Baghdadi Arabic. The analysis will include both consonantal and vocalic distinctive features and will be illustrated by tables that reveal details about such features. In this respect, Hyman(1975:25) states that "it is a significant fact about phonological systems that segments typically group themselves into phonetically definable classes". He further says that "the phonetic features are ultimately the factors responsible for the way phonological systems function ". On the other hand, the paper proceeds further to present a different, but related, analysis of the same sound system in terms of Jakobson and Halle's distinctive features (Sloat, et.al., 1972:79). Such features are primarily designed to capture the phonological oppositions found in languages rather than the different phonetic realizations of these oppositions. Thus, the features to be employed, here, do not account for every phonetic detail of the phonological segments of Baghdadi Arabic.
Table (1)

(A representation of phonetic symbols in Baghdadi Arabic)

| Manner of Articulation | Place of Articulation |
|------------------------|-----------------------|
|                        | Voice | Bilabials | Labiodentals | Interdentals | Alveolars | Alveopalatals | Palatals | Velars | Uvular | Pharyngeal | Glottal |
| Nasals (Nasal stops)   |       | m         | m            | ±            |           |               |          |        |        |             |        |
|                        | -     | +         |              |              |           |               |          |        |        |             |        |
| Plosives (oral stops)  |       | P B       | ±            |              |           |               |          | K      | q      |             |        |
|                        | -     | +         |              |              |           |               |          |        |        |             |        |
| Fricatives             | ±     | f v       | ±            | ±            | S S z     | ±            | ±        | x      | h      | y           | ?      |
|                        |       |           |              |              |           |               |          |        |        |             |        |
| Affricates             | ±     |           | ±            | ±            | tʃ dʒ     | ±            | ±        |        |        |             |        |
|                        |       |           |              |              |           |               |          |        |        |             |        |
| Glides                 | -     | ± W       |              |              |          |               |          | y      | w      |             |        |
|                        |       |           |              |              |           |               |          |        |        |             |        |
| Liquids                | -     | ± L       |              |              |          |               |          |        |        |             |        |
|                        |       |           |              |              |           |               |          |        |        |             |        |

Notes relevant to this table

(1) The table is largely based on the IPA chart presented in Katamba (1989:13), with some modifications or/and additions.

(2) The sound segments below the interdental and alveolar voiceless sounds represent sounds in Baghdadi Arabic that carry the additional features [+emphatic] in addition to the features common to their corresponding non-emphatic ones shown in the table. I used a dot under those sound segments to signify that there is some articulatory and/or acoustic correspondence between segments of each pair, (the tongue is retracted a little bit behind the positions of the segments below. (A personal viewpoint based on long experience).
(3) The sound segment \( |w| \) is identified as having some features of bilabials on the one hand, and some features of velars on the other hand. Thus it may be suggested that the sound would be labeled as (labiovelar).

(4) To the best of my knowledge and awareness, some Christian speakers of Baghdadi Arabic produce the sound \([\tilde{z}]\) as a variant of \([\tilde{ʃ}]\) but not as a phonemically distinct sound.

For example, they would pronounce the expression \([\text{haji } /bik]\) (هادي شبيك) 'what is the matter with you' as \([\text{hajI } \tilde{ʒ} \text{ bik}]\). However, /\tilde{ʒ}/ does exist in Baghdadi Arabic, as in the expression \([/?i\tilde{ʒ}g\text{i̯}l\text{ɪt}]\) (أشكلت) 'what did you say?!'.

2. Trubetzkoy's Views

Trubetzkoy is one of the leading figures of Prague school of linguistics. He classified distinctive oppositions on the basis of (1) their relationship to the entire system of oppositions, (2) the relationship between opposition members, and (3) the extent of their distinctive force. (Hyman, 1975: 26)

Trubetzkoy's main interest, then, was in the classification of phonemic oppositions (or contrasts). In other words, he was concerned with the classification and comparison of the sound systems of different languages. Let's see, then, to what extent would this classification be successfully applicable to the sound system of Baghdadi Arabic.

2.1 Bilateral and Multi-lateral Oppositions

Trubetzkoy tried to establish phonemic distinctiveness within the framework of the relationship that holds between members of a particular system. In bilateral oppositions, for instance, the sum of phonetic features common to both members of the opposition is common to these two members only. Now, if we try to apply this principle to Baghdadi Arabic, we find that \([p]\) stands in a bilateral opposition to \([b]\). The same thing is also true of each of the following consonantal oppositions:
Table (2)
(Bilateral Oppositions in Baghdadi Arabic)

|        | ت | ث | ظ | ز | ج | خ |
|--------|---|---|---|---|---|---|
| t      | k | f | s | j | tf | x |
| d      | g | v | z | d3 | y | h |

Here are some illustrating examples for the above-mentioned oppositions:—— [parda] (پرده) 'curtain' versus [bardə] (برده) 'a spill of coldness'. Notice also the following oppositions:

— [ti:n] (تين) 'figs' vs. [di:n] (دين) 'religion'.
— [kʊbba] (كبة) 'a kind of food' vs. [gʊbba] (گبة) 'room.

It is also significant to note, here, that a relationship of bilateral opposition can be maintained between │m│ and │b│ in terms of nasality, because the same feature holds between the following pairs, too : - │n│ vs. │d│ and │η│ vs. │g│ (Katamba , 1989).

Meanwhile, in addition to │t│ and │d│, the Baghdadi Arabic sound system contains the emphatic\(^{(2)}\) alveolar plosive │ṭ│. Since this segment shares the properties common to both │t│ and │d│, it is said to be in a Multilateral opposition to │d│. The relationship among these three sound segments can be illustrated by the words: [ti:n], [di:n] and [ṭi:n] (طيب) 'mud'.( Ali , and Daniloff , 1974 )

However, the sound segment │t│ also stands in a bilateral opposition to │t│ in terms of the feature 'emphatic', as it is evident by the Baghdadi Arabic minimal pairs [ti:n] vs. [ṭi:n], and [ṭa:b] (طيب) 'recovered' vs. [ta:b] (تام) 'repented'.

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(1) I think that │v│ is not widely used in Baghdadi Arabic. It does exist but occurs only in few words, especially those which are borrowed from other languages, such as (فیزا) (visa).

(2) Some linguists who are non-native speakers of English, use the term [mufaxξama] (Rahim, 1980: ch.8). However, I preferred to use the term 'emphatic' following Chomsky and Halle (1968: 306). The term 'emphatic' is also used by Ali (1974: 225).
Similarly, a relationship of multilateral opposition can be set up between the emphatic interdental \( \delta \) in relevance to the two non-emphatic interdental fricatives \( \theta \) and \( \delta \). The same is also true of the three alveolar fricatives \( s \), \( z \) and \( \varsigma \) of Baghdadi Arabic. (ibid)

### 2.2 Proportional and Isolated Oppositions

Another distinction can be made in relation to the whole system yielding either proportional or isolated oppositions. Trubetzkoy is quoted by Hyman (1975: 27) as saying that an opposition is proportional if the relation between its members is identical with the relation between the members of another opposition.

Several other oppositions of the same system are proportional. Otherwise the opposition is said to be an Isolated one. If one tries to apply this statement to Baghdadi Arabic, it would be found that the opposition between \( p \) and \( b \) is proportional because the relation between these two members of the sound system of Baghdadi Arabic is similar to the relation between each two members of the following oppositions:

- \( t \) vs. \( d \)
- \( k \) vs. \( g \)
- \( s \) vs. \( z \)

Similarly, another proportional opposition can be distinguished through relating \( t \) to \( \gamma \) where the relation is similar to the one between \( d \) and \( \gamma \).

### 2.3 Privative, Gradual and Equipollent Oppositions

These three types of opposition are recognized by Trubetzkoy on the basis of the relationship between the members of oppositions. Privative oppositions, for instance, are distinguished on the basis of presence vs. absence of a feature in other words, the opposition would be considered privative because one of its members carries a phonetic 'mark' which the other member lacks. (Hyman, 1975: 27).
2.3.1 Privative Oppositions in Baghdadi Arabic

According to the criterion mentioned in 2.3, the sound segment |b| in Baghdadi Arabic would stand in a privative opposition to |p| because the former is characterized by the presence of voicing while the latter lacks it. Meanwhile, one may conclude that any two members of the Baghdadi Arabic phonology which stand in a relationship of bilateral opposition to each other would constitute a privative opposition as well. This is due to the fact that members of each opposition would contrast in terms of a single feature. This would lead the researcher to say that more than one type of opposition can be recognized between the very members of certain oppositions in a selected language. Thus, while the opposition between |p| and |b| in Baghdadi Arabic is bilateral, it is also privative. Accordingly members of each pair given in table (2) constitute a privative opposition.(The table is arranged by the researcher to show the comparison between sounds in English on one hand and Baghdadi Arabic on the other hand).

Knowing that the phonology of Baghdadi Arabic comprises nasal and non-nasal (oral) stops (see page (2)), it would be possible for us to recognize a number of privative oppositions in terms of nasality. Hence, the two members in each of the following pairs would constitute a privative opposition, (members of the left hand column are characterized by the feature 'nasality' while, those in the right hand column lack such feature):

| m | : | b |
| n | : | d |
| η | : | g |

2.3.2 The Vowel Sounds of Baghdadi Arabic

The vowel sounds of Baghdadi Arabic are normally characterized by various degrees or gradations of the same property. Thus the oppositions which relate the vowel members of the phonological system are said to be gradual. This can be exemplified by the opposition between |u| and |o| which is gradual in relevance to the vowel |o| because the latter is a third degree of the same property (vowel height) as it is shown in table (3):

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Table (3)
(Vowel Sounds of Baghdadi Arabic)

(After Slaot, et.al., 1978, p.21)

**Note:** the vowels |i, I, a, o, u| and |u| may be represented as |i:, i, a:, ə, u| and |u:| respectively.

In addition to gradual oppositions, the Baghdadi Arabic vowels can also be classified in terms of privative oppositions. Hence, while the relationship among |i|, |I| and |e| is gradual the relationship between |i| and |u| is privative in terms of either one of the two features 'rounding' and 'backness'.

### 2.3.3 Equipollent Oppositions

Oppositions in which the members are seen as "logically equivalent" to each other are called equipollent opposition. (Hyman, 1975:28). The contrasting features that hold among these oppositions are neither gradual nor binary.

In other words, the two members of such oppositions can not be viewed as one having a 'mark' (i.e. marked for a certain feature), which the other one lacks, nor is it possible to see the two members as having different degrees of some phonetic property. Looking at Baghdadi Arabic in terms of such criterion, one may distinguish members of equipollent oppositions as follows:

\[
P : t , t : k , k : q , q : ? , b : d , b : g , f : \theta \\
\theta : s , s : f , f : x , x : h , v : \delta , \delta : z , \gamma : ?
\]

In each of the above – mentioned oppositions there is a discrete change in the two articulators. Thus, the relationship between |p| and |t|, for instance, is equipollent because there is a discrete change from one place of
articulation to another; the labial consonant |p| involve the upper and lower lips, while the consonant |t| involve the tip of the tongue and the upper teeth : (Hyman; ibid).

2.4 Constant and Neutralizable Oppositions

This section deals with the distinction of oppositions according to the extent of the distinctiveness of an opposition. In this way, it is possible to draw a distinction between constant and neutralizable oppositions. In a constant opposition, the two members contrast wherever they occur. In other words, the opposition is said to be constant when its two members occur in all positions. In Baghdadi Arabic the opposition between |t| and |d| or |s| and |z| is constant because the two members of each opposition would contrast in all positions of Baghdadi Arabic words where they are possible to appear. Meanwhile, this variety, most likely, lacks an example of a neutralizable opposition. For the purpose of illustration, one may resort to standard German where the opposition between |t| and |d| is neutralized in word final position as in the two words Rat(advise) and Rad_(wheel), both of which are pronounced as [ra:t]. (Hyman, 1975:29).

3. The Sound System of Baghdadi Arabic in Terms of the Distinctive Features of Jakobson and Halle

3.1 The Major Class Features

According to Jakobson's theory of distinctive features, the sounds of Baghdadi Arabic can be generally classified into four major classes in terms of two binary features. These two features are defined as [Consonantal] and [Vocalic]. The four major classes of sound segments which are defined by these two binary features are:

(1) The major class of true consonants which includes all consonants being specified as [+cons.,-voc.] This class includes nasal and oral stops, fricatives and affricates.

(2) The major class of vowels which are specified as [-cons.,-voc.].

(3) The class of liquids which are specified as [+cons.,+voc.].

(4) The class of glides which are specified as [-cons.,-voc.].

The articulatory and acoustic correlates that are inherent in the above two binary features can be stated as follows:
Consonantal\non-consonantal: acoustic-low (vs. high) total energy; articulatory-presence vs. absence of an obstruction in the vocal tract. Vocalic\non-vocalic: acoustic-presence vs. absence of a sharply defined formant structure; articulatory-primary or only excitation at the glottis together with a free passage through the vocal tract.

3.2 The Distinctive Features of Vowels:

As it is mentioned before (cf. 3.1), vowels are assigned the features [-cons., +voc.]. In addition, the class of vowels are differentiated by the features Diffuse, Compact, Grave and Flat which are normally used to account for the three parameters of tongue height, tongue position and lip rounding. It is necessary, here, to define these features so that it can be possible to classify the vowels of Baghdadi Arabic in terms of such features.

Compact\diffuse: acoustic – higher (vs. lower) concentration of energy in a relatively narrow, central region of the spectrum, accompanied by an increase (vs. decrease) of the total amount of energy; articulatory-forward flanged (vs. backward) flanged.

Grave\acute: acoustic- concentration of energy in the lower (vs. upper) frequencies of the spectrum; articulatory- peripheral vs. medial positions.

Flat\plain: acoustic-flat phonemes are characterized by a downward shift or weakening of some upper frequency components; articulatory-the flat phonemes in contradistinction to the plain ones are produced with a decreased back or front orifice of the mouth resonator and a concomitant velarization expanding this resonator. (Hyman 1975:35)

On the basis of what is mentioned above, the vowels of Baghdadi Arabic would be assigned the features which are specified in the following table:

| F. | i | r | e | U | ū | O | ā |
|----|---|---|---|---|---|---|---|
| Consonantal | - | - | - | - | - | - | - |
| Vocalic | + | + | + | + | + | + | + |
| Diffuse | + | + | - | + | + | - | - |
| Compact | - | - | + | - | - | + | + |
| Grave | - | - | - | + | + | + | - |
| Flat | - | - | - | + | + | + | - |
Table (4) shows that the features shown are correlated to the vowels in the following way:

- [+diffuse] : high vowels 
- [-diffuse] : mid and low vowels 
- [+compact] : low vowels 
- [-compact] : high vowels 
- [+grave] : back and central vowels 
- [-grave] : front vowels 
- [+flat] : rounded vowels 
- [-flat] : unrounded vowels.

Knowing that in Baghdadi Arabic there is the short front vowel [ɪ], which is intermediate between [i] and [ɛ], as well as the back rounded vowel [ʊ], which is intermediate between [u] and [o], one may find it necessary to have another feature in order to differentiate between [i] and [ɪ] on one hand, and between [u] and [ʊ] on the other hand. So the difference can be accounted for by the additional feature 'Tense' which can be defined as follows:

Tense/lax: acoustically-higher (vs. lower) total amount of energy in conjunction with greater (vs. smaller) spread in the spectrum; articulatory-greater (vs. smaller) deformation of the vocal tract away from its rest position.

The vowels / i / and / u / are [+tense] while the corresponding lax vowels /ɪ/ and /ʊ/ are [-tense]. In such a way, the vowels / I / and / ṭ / would share the same features ([+diffuse, -compact, -grave, -flat]) but are distinct from each other by the feature [tense], the former being [+tense] and the latter is [-tense]. Similarly, the vowels / u / and / ʊ / have in common the features [+diffuse, -compact, +grave, +flat] but differ in that the former is [+tense] and the latter is [-tense].

It is significant to note that all the vowels that are mentioned above are fundamentally specific as [+voice, +continuant, -strident, -nasal]. Yet, one would bear in mind that there is a nasalized vowel, i.e., a [+nasal] vowel, within a certain phonetic context, e.g. when the long front vowel / i:/ is followed by a nasal stop as in [ti:n] (تنين) and [ṭi:n] (طين).
3.3 The Distinctive Features of Consonants

Within the framework of Jakobson's distinctive features, a consonant refers to any sound segment which is not specified as [-cons., +voc.]. If one tries to apply the feature specifications devised by Jakobson to the phonological system of Baghdadi Arabic one can have the advantage of defining both vowels and consonants in terms of the same features in a binary manner. The various placements of the two articulators, the tongue and the lips, which are required to produce vowels and consonants are related in Jakobson's system by means of the features 'Diffuse' and 'Grave'. The following table gives a full account of features which are usually assigned to consonants, liquids and glides in Baghdadi Arabic:

Table (5)
(Distinctive Features Representation of Baghdadi Arabic Consonants)

| Arabic Graphs | p | b | t | d | t̪ | d̪ | k | q | ǩ | g | ǧ | ḡ | h |
|---------------|---|---|---|---|----|----|---|---|----|---|---|----|---|
| English Graphs| f | m | t̪ | ŋ | s | z | y | j | ʃ | ʒ | ɣ | ʔ | ـ |

Notes Relevant to table (5):
(1) In Baghdadi Arabic, the phoneme ⟨δ⟩ represents the two phonemic segments  ض and ض which exist in standard Arabic as separate phonetic forms which differ only in the feature of emphaticness  ض being [+ emphatic] whereas  ض is [-emphatic].
(2) The emphatic form of the bilabial nasal stop is ⟨m⟩ which is distinctive in Baghdadi Arabic, as evidenced by the contrasting phonetic forms [ mái] 'name of a girl' vs. [māy] 'water'. Similarly, the emphatic form of the alveolar liquid (lateral) ⟨l⟩ is ⟨l⟩ which is also distinctive as exemplified by the contrast between [xali] خالي 'empty' and [xaḷi] خألي 'my uncle'.
Table (5) shows that it is possible to use the same distinctive features already used for vowel to capture the contrast among the consonant of Baghdadi Arabic. The table also shows that the features consonantal and vocalic are employed to distinguish true consonants from liquids and glides. The other specified features are correlated to their corresponding consonants in the following way:

- [+ diffuse] : labial and dental alveolar consonants
- [- diffuse] : palatal and velar back consonants.
- [+ grave] : labial and velar back consonants.
- [- grave] : dental alveolar and palatal consonants.
- [+ voice] : voiced consonants.
- [- voice] : voiceless consonants.
- [+ continuant] : fricatives, liquids and glides.
- [- continuant] : stops and affricates.
- [+ strident] : noisy fricatives (labiodental, alveolar, alveo-palatal), affricates.
- [- strident] : less noisy fricatives (interdental, palatal and velar), stops, liquids and glides.
- [+ nasal] : nasal consonants.
- [- nasal] : oral consonants.(Hyman 1975:39)

Still, one may need some other features in order to account more adequately for the distinction of some consonants in Baghdadi Arabic such as the emphatic sound segments. Concerning this point, the feature [+ flat] may be suggested to account for the emphatic sounds |m|, |ṭ|, |ð| and |ṣ| in Baghdadi Arabic. This feature would be significant to differentiate between the emphatic sound segments and their corresponding non-emphatic ones. Similarly, the uvular stop |q| would be assigned the feature [+ flat] to distinguish it from the velar stop /k/. Moreover, the glottal fricative |h| and the glottal stop |ʕ| are normally assigned the extra feature [+ checked].

5. Conclusion

To conclude this research, it is significant to state that the features which are discussed in this paper are meant to capture the phonological oppositions found in Baghdadi Arabic, but not the different phonetic realizations of these oppositions. If one is to deal with phonetic realizations, there would be a need for a detailed study of a wider scope than the one within which this paper falls. Furthermore, there would be probably a need to include some other features besides the ones which are specified for consonants and vowels in tables (4) and (5). This point can be illustrated by a phonetic context in which a consonant tends to be aspirated.
or geminated. The aspirated or geminated consonants would be assigned the extra feature [+ tense] in addition to their assigned phonological features, as in [pərdə] (پرده) 'curtain' and [ʔiṭṭiya] (اطه) 'I gave it to him', where the aspirated bilabial stop and the geminate alveopalatal stop respectively should be assigned the feature [+ tense] in addition to the assigned phonological features given in table (4).

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النظام الصوتي ل(اللهجة البغدادية) في ضوء نظرية الصفات المميزة

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الملخص:

هذا البحث هو محاولة لدراسة النظام الصوتي لللهجة البغدادية في ضوء نظرية الصفات المميزة لغرض معرفة إلى أي حد تكون هذه النظرية قابلة للتطبيق على اللهجة اللغوية المذكورة قيد الدراسة في هذا البحث. إن الهدف الرئيسي هنا هو معرفة إمكانية تصنيف الأصوات العربية البغدادية ضمن مجاميع معينة استنادًا إلى صفاتها الصوتية المميزة. لذا فإن البحث يركز على دراسة أصوات اللهجة البغدادية في ضوء الأضداد الصوتية المميزة التي جاء بها العالم اللغوي تروبتسكوي وذلك باستخدام طريقة مقارنة مجاميع الأصوات على أساس هذه الأضداد.