Chapter-3

Comparative

Study of Consonant Systems
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Phonologically, the present study can be categorized mainly in two parts: (i) Segmental (ii) supra segmental. During a segmental study, vowels and consonants are normally focused upon for detailed study and therefore in this chapter an effort would be made to understand the consonant systems of English and Gujarati from a comparative point of view.

In the previous chapter, vowels have been studied comparatively. Certain similarities and distinctions emerged very clearly during the study. This comparison of sounds indicates that resemblances herald the common root of both the races [Indo-European]. On the other hand, distinctions, of course, suggest the voyage of development of both the races during the centuries, through the medium of language. Emergence, utterance and articulation of a phoneme is a continuous minute changing process, very similar to the existence of the world that is unreal, futile and changing at every moment. Shankaracharya also remarks similarly, ‘brahmastya jaganmithyaa’.

The same thought can be applied to the study of ‘sound’. It may differ from person to person. That is why certain common features have been identified for this present study.

3.1 Defining Consonant:

Consonant is generally defined as the sound during the production of which friction is heard. However all consonants, Cruttenden mentions, are not
produced with friction.¹ In another definition, Michael Ashby and John Maidment writes, “Sounds made with a relatively close constriction or complete closure in vocal tract and that occur singly or in clusters at the edges of syllables are consonants.”²

In Gujarati also, consonants are described as those segments, which in a particular language, occur at the edges of syllables, while vowels are those, which occur at the centers of syllables, for instance, in words like ‘red , bed, lead, said ’, the sound represented by / r, w, d, l, ӡ / are consonants. Such a reference to the functioning of the sounds in syllables in a particular language has some limitation and complexity as in words like, ‘agree, eye, image’ etc. as they would be excluded from the above definition. Cruttenden also opines:

“This type of definition might define consonants as median [air must escape over the middle of the tongue, thus excluding lateral [l]], oral [air must escape through the mouth, thus excluding nasals like [n]] frictionless [thus excluding fricatives like[s]], and consonants [thus excluding plosive like [p]]; all sounds excluded from this definition would be consonants. But difficulties arise in English with definition (and with other of this sort) because English / j, w, r /, which are consonants phonologically (functioning at the edges of syllables) are vowels phonetically. Because of this, these sounds are often called semi-vowels. The reverse type of difficulty is encountered in words like ‘sudden’ and ‘little’, where the final consonant / n / and / l / form syllables on their own and hence must be the centers of such syllables even though they are phonetically consonants, and even though / n / and/ l / more frequently occur at the edges of syllables, as in ‘net’ and ‘let’. When
occurring in words like ‘sudden and little’, nasals and laterals are called syllabic consonants.’”

Peter Roach discusses consonants with almost the same argument. He focuses on the distribution of the sounds:

“Study of the sounds found at the beginning and end of English words has shown that two groups of sounds with quite different patterns of distribution can be identified, and these two groups are those of vowels and consonants. If we look at the vowel-consonant distinction in this way, we must say that the most important difference between vowel and consonant is not the way that they are made, but their different distribution. Of course, the distribution of vowel and consonant is different for each language.”

There are many theoretical problems connected with the vowel consonant distinction. Nevertheless, the latest research of two physicians has made this problem a bit easy. Because of studying stroke patients who cannot vocally produce certain letters, Alfonso Caramazza and Doriana Chialant have found that the brain perceives and processes vowels and consonants as two distinct types of objects. Differences between vowels and consonants are real. The Harvard University Gazette recognizes this with the following headline:

“Researchers solve one of the grand mysteries of language.

February 17, 2000

While working with colleagues in Rome, two Harvard researchers serendipitously met two women with intriguing
speech deficits. As the result of a stroke, one patient could not reproduce the sounds of vowels properly. Another patient experienced the same trouble with consonants. After studying the two women, the Harvard team concluded that the difference between vowels and consonants must be real, not arbitrary. "It's a happy ending to many years of work," said researcher Doriana Chialant. "We're excited about answering a question that has been around for such a long time, excited about reaching a definite conclusion that people possess separate mechanisms to process vowels and consonants. Such mechanisms must be in the brain. Where else could they be?"5

However, for describing consonants phonologically, the philologists generalize the phenomenon in the following manners:

(i) The nature of air stream
   a. Whether it is pulmonic or not
   b. Whether it is egressive or ingressive.

(ii) Whether the sound is voiced or voiceless

(iii) Whether the soft palate is raised or lower i.e.,
    Whether the air stream passes
    a. through the mouth only (oral sounds)
    b. through the nose only (nasal sounds)
    c. through the mouth and the nose (nasalized sound)

(iv) The place of articulation, i.e., where exactly the closure or narrowing takes place

(v) The manner of articulation, i.e., the kind of closure or narrowing
3.2 Consonants in Tabular – Form: A General View

International phonetics Association has given the charts of pulmonic international consonants and consonants of British Received Pronunciation (BRP) and in the portion of languages of the world, consonants of Gujarati Phonology have been mentioned. All the three charts in the form of tables are stated as follows for general comparative study respectively:

(1) Chart of International consonants (pulmonic)
(2) Chart of British R. P. consonants
(3) Chart of Gujarati consonants

(These charts are given at the end of the chapter)

53 distinctive phonemes are articulated as international consonants, British R. P. consists of 24 distinctive phonemes while Gujarati Phonology has 31 distinctive phonemes as consonants.

After the over view of the consonants, English and Gujarati consonants are compared in detail. They are discussed in order of their manner of articulation.

3.3 Production of Plosives:

A plosive is a consonant articulation with the following characteristics. One articulator is moved against another, or two articulators are moved against each other, to form a stricture that allows no air to escape from the vocal tract. The stricture is, than, total.
• After this stricture has been formed and air has been compressed behind it, it is released; i.e., air is allowed to escape.

• If the air behind the stricture is still under pressure when the plosive is released. It is probable that the escape of air will produce noise loud enough to be heard. This noise is called plosion.

• There may be voicing during parts or all of the plosive articulation.

To give a complete description of a plosive consonant it is necessary to describe what happens at each of the following four phases in its production:

i) The first phase is when the articulator or articulators move to form the stricture for the plosive. It is called the closing phase.

ii) The second phase is when the compressed air is stopped from escaping. It is called the compression phase.

iii) The third phase is when the articulators used to form the stricture are moved so as to allow air to escape. This is the release phase.

iv) The fourth phase is what happens immediately after (iii), so it will be called the post-release phase.

3.3.1 English Plosives:

English has six plosive consonants /p, t, k, b, d, g/. The glottal plosive /ʔ/ occurs frequently but it is of less importance, since it is usually just an alternative pronunciation of /p/, /t/ or /k/ in certain contexts. The plosives have different places of articulation. The plosive /p/ and /b/ are bilabial since the lips are pressed together.
/t/ and /d/ are alveolar since the tongue blade is pressed against the alveolar ridge. Normally the tongue does not touch the front teeth as it does in the dental plosives found in many languages. The plosives /k/ and /g/ are velar; the back of the tongue is pressed against the area where the hard palate ends and the soft palate begins.

The plosives /p/, /t/, and /k/ are always voiceless; /b/, /d/ and /g/ are sometimes fully voiced, sometimes partly voiced and sometimes voiceless.

All six plosives can occur at the beginning of a word (initial position), between other sounds (medial position) and at the end of a word (final position). The detailed discussion of the plosives at all the three positions is given as follows:

- To begin with plosive - preceding vowel: CV
- Between vowels: VCV
- Following the vowel: VC

(Here ‘C’ stands for a consonant and ‘V’ stands for a vowel.)

**Initial position (CV):** The closing phase for /p/, /t/, /k/ and /b/, /d/, /g/ takes place silently. During the compression phase there is no voicing in /p/, /t/, /k/; in /b/, /d/, /g/ there is normally very little voicing – it begins only just before the release. If the speaker pronounces an initial /b/, /d/, or /g/ very slowly and carefully there may be voicing during the entire compression phase (the plosive is then fully voiced), while in rapid speech there may be no voicing at all.
The release of /p/, /t/, /k/ is followed by audible plosion, that is, a burst of noise. There is then, in the post-release phase, a period during which air escapes through the vocal folds, making a sound like /h/. This is called aspiration. Then the vocal folds come together and voicing begins. The release of /b/, /d/, /g/ is followed by weak plosion, and this happens at about the same time as, or shortly after, the beginning of voicing. The most noticeable and important difference, then, between initial /p/, /t/, /k/ and /b/, /d/, /g/ is the aspiration of the voiceless plosives /p/, /t/, /k/. The different phases of the plosive all happen very rapidly, of course, but the ear distinguishes clearly between /p/, /t/, /k/ and /b/, /d/, /g/. Peter Roach notices that if English speakers hear a fully voiced initial plosive, they will hear it as one of /b/, /d/, /g/ but will notice that it does not sound quite natural. If they hear a voiceless nonaspirated plosive they will also hear that as one of /b/, /d/, /g/, because it is aspiration, not voicing which distinguishes initial /p/, /t/, /k/ from /b/, /d/, /g/. Only when they hear a voiceless aspirated plosive, they hear it as one of /p/, /t/, /k/.

In the initial position /b/, /d/, /g/ cannot be preceded by any consonant, but /p/, /t/, /k/ may be preceded by /s/. When one of /p/, /t/, /k/ is preceded by /s/ it is nonaspirated. From what was said above it should be clear that the nonaspirated /p/, /t/, /k/ of the initial combination /sp/, /st/, /sk/ have the sound quality that makes English speakers perceive a plosive as one of /b/, /d/, /g/; and if a recording of a word beginning with one of /sp/, /st/, /sk/ is heard with the /s/ removed, an initial /b/, /d/ or /g/ is heard by English speakers.
**Medial position (VCV):** The pronunciation of /p/, /t/, /k/ and /b/, /d/, /g/ in medial position depends to some extent on whether the syllables preceding and following the plosive are stressed. In general, it can be said that a medial plosive may have the characteristics either of final or of initial plosives.

**Final position (VC):** Final /b/, /d/, /g/ normally have little voicing; if there is voicing, it is at the beginning of the compression phase; of /p/, /t/, /k/ and /b/, /d/, /g/ is very weak and often not audible. The difference between /p/, /t/, /k/ and /b/, /d/, /g/ is primarily the fact that vowels preceding /p, t, k/ are much shorter. The shorting effect of /p, t, k/ is most noticeable when the vowel is one of the long vowels or diphthongs.

3.3.2 **Fortis and lenis:**

“Are /b, d, g/ voiced plosive?” Roach raises the question and discusses the issue that the above description makes it clear that it is not very accurate to call them “voiced”; in initial and final position, they are scarcely voiced at all, and any voicing they may have seems to have no perceptual importance. Some phoneticians say that /p, t, k/ are produced with more force than /b, d, g/ and that it would therefore be better to give the two sets of plosives (and some other consonants) names that indicate that fact; so the voiceless plosives /p, t, k/ are sometimes called fortis (meaning ‘strong’) and /b, d, g/ are then called lenis (meaning ‘weak’). It is probably true that /p, t, k/ are produced with more force (though nobody has really proved it – force of articulation is very difficult to define and measure).7
The plosive phonemes of English can be presented in the form of a table as shown here:

<table>
<thead>
<tr>
<th>Place of Articulation</th>
<th>Bilabial</th>
<th>Alveolar</th>
<th>Velar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fortis (“voiceless”)</td>
<td>p</td>
<td>t</td>
<td>k</td>
</tr>
<tr>
<td>Lenis (“voiced”)</td>
<td>b</td>
<td>d</td>
<td>g</td>
</tr>
</tbody>
</table>

Tables like this can be produced for all the different consonants. Each major type of consonant (such as plosives like / p /, / t /, and / k / fricatives like / s / and / z / and nasals like / m / and / n /) obstructs the airflow in a different way, and these are classified as different manners of articulation.

3.3.3 Comparison to Gujarati Plosives:

Gujarati Phonology also produces the plumonic egressive plosive or stop. It also contains three stages:

(i) Closing stage
(ii) Compression stage
(iii) Release stage

In comparison to British R. P., the first stage of closing is smoother and shorter in Gujarati plosive. The second stage is of a bit long duration. In the final stage of release burst is also not having that much force as it is found in British R. P.
Gujarati Phonology comprises of eight (8) pairs (16 consonants) of plosive manners. These are discussed in the group of four phonemes.

The first four plosives are articulated at the place of bilabial. They are / p, pʰ, b, bʰ /. / p, b / are also described as bilabial plosive in British R. P, but two more phonemes / pʰ, bʰ / are produced in Gujarati Phonology. Bharati Modi quotes Prabodh Pandit’s remarks of his works of 1955 that / pʰ / and / bʰ / are not separate phonemes but in 1966, he accepted / pʰ, bʰ / as separate phonemes. Bharati Modi also has a complaint for the undecided position of / pʰ /. She says which / pʰ / should be recognized as the standard one - / f / the bilabial plosive that is aspirated, or / pʰ / the identical bilabial plosive.

/ pʰ / is articulated as an aspirated bilabial plosive but it is not similar to the /pʰ/ the aspirated phoneme of / p / of British R. P. Aspirated / p / as / pʰ / in British R. P. is not treated as a separate phoneme. On the other side, / pʰ / of Gujarati is also different from / f / of British R. P. In Gujarati / p / phoneme remains non-aspirated in all the three positions of its occurrence: initial, medial and final. / p / is a voiced bilabial plosive in Gujarati Phonology. / pʰ / is also a voiced bilabial plosive. Babu Suthar mentions / p / and / pʰ / as aspirated and non aspirated consonants but in the chart of IPA – Gujarati Phonology and even in P. K. Pandey’s chart this category is not mentioned. It seems / pʰ / or / bʰ / should be treated as separate phonemes even besides the category of aspiration – non-aspiration.
In British R. P / p, t, k / do occur aspiratedly in initial position as / pʰ, tʰ, kʰ /, but in Gujarati they do not have such practice. Thus, / p, pʰ, b, bʰ / are separate phonemes, the following examples of the words may help to make the point clearer:

<table>
<thead>
<tr>
<th>Gujarati word</th>
<th>Phonological Transcription</th>
<th>English Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paadi</td>
<td>/ pa:dI /</td>
<td>A female calf of Buffalo</td>
</tr>
<tr>
<td>Faadi</td>
<td>/ pʰa:dI /</td>
<td>Tear</td>
</tr>
<tr>
<td>Saap</td>
<td>/ sa:p /</td>
<td>Snake</td>
</tr>
<tr>
<td>Saaf</td>
<td>/ sa:pʰ /</td>
<td>Clean</td>
</tr>
<tr>
<td>Baal</td>
<td>/ ba:l /</td>
<td>Child</td>
</tr>
<tr>
<td>Bhaal</td>
<td>/ bʰa:l /</td>
<td>News / Information</td>
</tr>
<tr>
<td>Daab</td>
<td>/ da:b /</td>
<td>Pressure</td>
</tr>
<tr>
<td>Dabh</td>
<td>/ da:bʰ /</td>
<td>Grass</td>
</tr>
</tbody>
</table>

Why should / f / of British R. P., phoneme be symbolized like aspirated /pʰ / in Gujarati phonology when the phoneme is deliberately accepted as an identical one? However for better clarity; throughout this dissertation / f / will be symbolized as / pʰ / for Gujarati phonology. In IPA portion of Gujarati Phonology, Cardona & Suthar in ‘Gujarati’ mentions that ‘/ pʰ / is usually realized as / f / in the standard dialect’

Another pair of four plosive consonants is / t, tʰ, d, dʰ /, / t, d / are articulated at alveolar position while in Gujarati phonology / t, d / are at dental position and they should be treated as the allophones of British R. P./ t, d / phonemes. Babu Suthar mentions / t / as non-aspirated voiceless dental and
/ q / as non-aspirated dental while / tʰ, qʰ/ are articulated as aspirated voiceless dental plosive. On the contrary, IPA chart of Gujarati phonology articulates them at alveolar without the distinction of aspirated and non-aspirated.

/ qʰ / phoneme resembles British R. P. phoneme / ð /. As mentioned above, it is produced with less friction, so it is categorized as plosive in Gujarati Phonology instead of fricative. Peter Roach notices one important emerging variation for the phoneme / ð / of British R. P. as follows:

“The dental fricative / ð / is something of a problem: although there are not many English words in which this sound appears, those words are ones which occur very frequently – words like ‘the’, ‘this’, ‘there’, ‘that’ and so on. This consonant often shows so little friction noise that on purely phonetic grounds it seems incorrect to class it as a fricative. It is more like a weak (lenis) dental plosive.”13

As it is said earlier these four phonemes / t, tʰ q, qʰ / are separate and / tʰ / is not an aspirated phoneme of / t /, moreover / qʰ / is not an aspirated phoneme of / q /, as it is in British R. P.. / tʰ / is aspirated when / t / occurs in initial position. For instance the word ‘table’ is pronounced as / tʰebl /. The following example will help to identify the above four phonemes as separate ones.

<table>
<thead>
<tr>
<th>Gujarati word</th>
<th>Phonological Transcription</th>
<th>English Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tali</td>
<td>/ taːli /</td>
<td>clapping</td>
</tr>
<tr>
<td>Thali</td>
<td>/ tʰaːli /</td>
<td>Plate</td>
</tr>
<tr>
<td>Saat</td>
<td>/ saːt /</td>
<td>Seven</td>
</tr>
<tr>
<td>Word</td>
<td>IPA</td>
<td>Meaning</td>
</tr>
<tr>
<td>----------</td>
<td>-------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Saath</td>
<td>/saːtʰ/</td>
<td>To accompany</td>
</tr>
<tr>
<td>Paatar</td>
<td>/paːtʰər/</td>
<td>Plate</td>
</tr>
<tr>
<td>Paathar</td>
<td>/paːtʰər/</td>
<td>Lay Off</td>
</tr>
<tr>
<td>Dam</td>
<td>/dʰaːm/</td>
<td>Money</td>
</tr>
<tr>
<td>Dham</td>
<td>/dʰaːm/</td>
<td>pilgrimage</td>
</tr>
</tbody>
</table>

[Babu Suthar also differs here in using symbols for these phonemes, he has not put diacritical marks as /t, tʰ, d, dʰ/ and therefore I propose to follow the IPA symbols]

Retroflex plosive phonemes, the third pair of four plosives, are /t, tʰ, d, dʰ/. They are similarly symbolized and articulated by most Gujarati philologists. /t, tʰ/ are voiceless retroflex plosive aspirated and non-aspirated consonants respectively. /d, dʰ/ are voiced retroflex plosive aspirated and non aspirated consonants respectively. Coline Masica’s observations says that /d, dʰ/ are realized as such initially, geminated and post nasally; as flapped /t, tʰ/ intervocalic, finally, and before or after other consonants.14

The last four velar plosive phonemes are /k, kʰ, g, gʰ/. British R. P. contains two phonemes /k, g/ and /k/ is produced as an aspirated when it occurs in the initial position. In Gujarati Phonology, all these four phonemes are separate and identical. /k, g/ are articulated as non-aspirated velar plosive-voiceless and voiced respectively. While /kʰ, gʰ/ as an aspirated velar plosive-voiceless and voiced respectively. /gʰ/ and /kʰ/ are separate phonemes and not in aspirated form only. /gʰ/ is found in Gujarati Phonology regularly with its unique use. It is not at all found in British R. P. anywhere, not in aspirated form also. All these four phonemes occur at all the three
positions: initial, medial and final. The following minimal – pair of words help to make it clear how these phonemes are articulated separately and identically in Gujarati Phonology.

<table>
<thead>
<tr>
<th>Gujarati word</th>
<th>Phonological Transcription</th>
<th>English Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kanu</td>
<td>/ ka:ɳu /</td>
<td>Hole</td>
</tr>
<tr>
<td>Khanu</td>
<td>/ kʰa:ɳu /</td>
<td>Meal</td>
</tr>
<tr>
<td>Shak</td>
<td>/ ja:k /</td>
<td>Vegetable</td>
</tr>
<tr>
<td>Shakh</td>
<td>/ ja:kʰ /</td>
<td>Prestige</td>
</tr>
<tr>
<td>Gam</td>
<td>/ ga:m /</td>
<td>Village</td>
</tr>
<tr>
<td>Gham</td>
<td>/ gʰa:m /</td>
<td>Suffocation</td>
</tr>
<tr>
<td>Mag</td>
<td>/ ma:g /</td>
<td>Demand</td>
</tr>
<tr>
<td>Magh</td>
<td>/ ma:gʰ /</td>
<td>A name of a month of Gujarati calendar</td>
</tr>
</tbody>
</table>

### 3.4 Affricates of English:

Affricates are produced by a complete closure of the air passage and a slow release causing friction. In the production of the British R. P. sounds / ʧ / and / ʤ / the air passage in the mouth is completely closed due to a contact between the tip and the blade of the tongue and the teeth ridge, the rims of the tongue making a contact with upper teeth. The front of the tongue is also raised towards the hard palate. The soft palate is raised to shut off the nasal passage.

When the air is released slowly, it escapes with friction from between the front of the tongue and the hard palate and between the blade of the
tongue and the teeth ridge. The vocal cords are wide apart for /ʧ/ but they vibrate for /ʤ/. 

Peter Roach remarks that affricates are rather complex consonants. They begin as plosives and end as fricatives. He argues further,

“However the definition of an affricate must be a little more restricted then what has been said so far. We would not class all sequences of plosive plus fricative as affricate.”  

He gives the example as in the middle of the word ‘breakfast’ the plosive /k/ followed by the fricative /t/. English speakers would generally not accept that /kf/ forms a consonantal unit in the way that /ʧ/ seems to. It is usually said that the plosive and the following fricative must be made with the same articulators – to use a technical term, the plosive and fricative must be homorganic. The sounds /k/ and /f/ are not homorganic, but /t/ and /ʃ/, both being made with the tongue blade against the alveolar ridge are homorganic. 

3.4.1 Comparison to Gujarati Affricates:

Gujarati Phonology produces four affricates as compared to two phonemes of British R. P. They are /ʧ, ʤ, ʧʰ, ʤʰ/. Babu Suthar places them as palatal plosive phonemes, while in IPA they are shown as post-alveolar/palatal affricate phonemes. /ʧ, ʤ/ are articulated as palato - alveolar voiceless and voiced respectively very similar to British R. P.. Two more phonemes /ʧʰ, ʤʰ/ are shown as aspirated to /ʧ, ʤ/. However, all these four are separate phonemes. /ʧʰ, ʤʰ/ are articulated at palatal position as
voiceless and voiced respectively. Roach also observes for /ʃ, ʒ/ of British R. P. that /ʃ, ʒ/ are the only two affricate phonemes in English. As with the plosives and most of the fricatives, we have a fortis/lenis pair, and the voicing characteristics are the same as for these other consonants. /ʧ/ is slightly aspirated in the positions where /p, t, k/ are aspirated, but not strongly enough for it to be necessary for foreign learners to give much attention to it. The place of articulation is the same as for /ʃ, ʒ/; that is, it is post-alveolar. This means that the ‘t’ component of /ʧ/ has a place of articulation rather further back in the mouth than the /t/ plosive usually has. When /ʧ/ is final in the syllable it has the effect of shortening a preceding vowel, as do other fortis consonants. /ʧ/ and /ʤ/ often have rounded lips.17

It is also observed that /ʧʰ/ requires more force and frication than /ʧ/. It seems /ʧʰ/ is very near to fricative phoneme. British R. P. does not produce /ʧʰ/ phoneme at all. No doubt, /ʧʰ/ is produced as an aspirant in comparison to /ʧ/ in Gujarati Phonology, but /ʧʰ/ is also an individual phoneme which occurs at all the three positions initial, medial and at the final position.

/ʤʰ/ is produced as an aspirated voiced palatal affricate phoneme that is identical with the /z/ phoneme of British R. P.. In British R. P. /z/ is produced as voiced alveolar fricative. Modi & Yogendra Vyas also write about the variation of /ʤʰ/, as observed in daily speech of the people of Gujarat who very frequently misuse and replace /ʤ/ and /ʤʰ/.18 & 19 P. K. Pandey observes this variation as, /z/ ~ /ʤ/ or /ʤʰ/, which is found in the speech of some speakers.20
These observations are very near to generalization because in script also the confusion can be seen as in the word ‘/ səmdʒəɳ / or / səmdʒhəɳ /’ (understanding). This word is mentioned in both the ways in many standard Gujarati Journals. I noticed this variation in my recording of speeches at different places that people, generally, are not conscious in using / dʒ / and / dʒh / at proper places but it should also be taken into consideration that this is mostly found in the people of town places and not at district places. Of course, they get more inaccurate when they have to pronounce / ʒ / phoneme of British R. P., but this will be discussed after a while.21 The following words substantiate the point:

<table>
<thead>
<tr>
<th>Gujarati word</th>
<th>Phonological Transcription</th>
<th>English Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chal</td>
<td>/ ʧə:l /</td>
<td>Gait</td>
</tr>
<tr>
<td>Chhal</td>
<td>/ ʧhə:l /</td>
<td>growl</td>
</tr>
<tr>
<td>Jada</td>
<td>/ dʒa:da: /</td>
<td>Fat</td>
</tr>
<tr>
<td>Zada</td>
<td>/ dʒhə:da: /</td>
<td>Loose-motion</td>
</tr>
<tr>
<td>Maji</td>
<td>/ ma:dʒI /</td>
<td>Old woman</td>
</tr>
<tr>
<td>Mazi</td>
<td>/ ma:dʒhI /</td>
<td>Sailor</td>
</tr>
</tbody>
</table>

3.5 Fricatives:

Fricative consonants are produced by bringing two organs of speech nearer to each other in such a way that the air stream passes out through a narrow passage with audible friction. One can hear clear hissing sounds. Most languages have fricatives; the most commonly found is something like / s /. Fricatives are also described as continuant consonants, which mean that one
could continue making them without interruption as long as one has enough air in the lungs. Peter Roach mentions two important features of fricatives:\(^{22}\)

i) Make a long, hissing /s/ sound and gradually lower your tongue so that it is no longer close to the roof of the mouth. The hissing sound will stop, as the air passage gets larger.

ii) Make a long /f/ sound and, while you are producing this sound, use your fingers to pull the lower lip away from the upper teeth. Notice how the hissing sound of the air escaping between teeth and lip suddenly stops.

### 3.5.1 The fricatives of English:

British R. P. has nine fricative phonemes. They can be tabularized as follows:

<table>
<thead>
<tr>
<th>Place of Articulation</th>
<th>Labiodental</th>
<th>Dental</th>
<th>Alveolar</th>
<th>Post-alveolar</th>
<th>Glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fortis (&quot;voiceless&quot;)</td>
<td>f</td>
<td>e</td>
<td>s</td>
<td>f</td>
<td>h</td>
</tr>
<tr>
<td>Lenis (&quot;voiced&quot;)</td>
<td>v</td>
<td>ð</td>
<td>z</td>
<td>ʒ</td>
<td></td>
</tr>
</tbody>
</table>

It can be seen that the fricatives are articulated from almost all the places from labio-dental to glottal and with the exception of glottal, each place of articulation has a pair of phonemes, one fortis (voiceless) and one lenis (voiced). Some common characteristics can be summarized as follows.
The fortis fricatives are produced with greater force than the lenis and their frication noise is louder.

The lenis fricatives have very little or no voicing in initial and final positions, but may be voiced when they occur between voiced sounds.

The fortis fricatives have the effect of shortening a preceding vowel, as do fortis plosives.

All the fricatives described so far can be found in initial, medial and final positions. In case of /ʒ/, however, the distribution is much more limited. Very few English words begin with /ʒ/ (most of them have come into the language comparatively recently from French) and not many end with this consonant.

3.5.2 Comparison to Gujarati Fricatives:

Gujarati Phonology has only three fricatives /s, ʃ, h/ in comparison to British R. P. only because compression or hissing is not found strong enough in Gujarati speakers. It is due to habit that Gujarati speakers produce the same consonants, which are produced in British R. P. as fricatives, as plosives or affricates.

British R. P. fricative /f/, /θ/, /ð/, are produced as plosives in Gujarati Phonology. They are symbolized as /ph/, /th/, /dh/. English fricative /z/ is produced as an affricate in Gujarati Phonology symbolized as /dz/. Babu Suthar shows the phoneme /v/ as a voiced labio-dental fricative that may be true for the speakers of Gujarat who have acquired education in English medium schools. Here in Gujarat also, the new generation coming out from
English medium schools produces / f, v / as labio-dental but not with the same compression of British R. P. They might be made habituated to produce / f, v / in such a manner but the inner force for which Laver uses the terms ‘grooved’ and ‘flat’ cannot be found appropriately.  

/z/ fricative phoneme of British R. P. is produced as an affricate in Gujarati Phonology but P.K. Pandey places (z) –as an allophone of / dʒʰ / - a voiced alveolar fricative. He further remarks that / z / occurs only in the borrowed vocabulary of some speakers. As mentioned earlier, P. K. Pandey also refers to the same / dʒ / or / dʒʰ / variation found in the speech of some speakers. But in IPA it is not mentioned at all.

/s, ʃ/ phonemes are produced as fricatives in Gujarati Phonology also. / s / as voiceless alveolar fricative and / ʃ / as voiceless post-alveolar fricative. In Rajkot, a center region of Saurashtra, / ʃ / is mostly articulated at the place of / s /.  

Retroflex / ş /- the phoneme produced in Sanskrit is not regularly produced in Gujarati but still it is found during the occurrence of clusters. Mistry observes, ‘The three sibilants of Sanskrit are now two in standard Gujarati: / s / and / ʃ /. Retroflex / ş / still appear in clusters in which it precedes another retroflex: [ʂpəʂt] (clear).’  

“The distribution of sibilants varies over dialects and registers. The standard set is [s] and [ʃ], while some speakers maintain [z] as well for the appropriate
borrowings. Some dialects only have [s], other prefer [ʃ], while another system has them non-contrastingly, with [ʃ] occurring contiguous to palatal segments. Lastly, a colloquial register has [s] or both [s] and [ʃ] replaced by [h]. This replacement does not extend to Sanskrit borrowing used by educated speakers speaking this register.\textsuperscript{27}

P.K. Pandey also notices /s/ ~ /h/ variation that occurs in some dialects of Gujarati phonology.\textsuperscript{28}

/ʒ/ - voiced post alveolar fricative consonant of British R.P. does not at all occur in Gujarati Phonology. Peter Roach remarks that /ʃ/ is a common and widely distributed phoneme, but /ʒ/ is not.\textsuperscript{29} It means, /ʒ/ is not produced in many languages of the world. All the fricatives described so far (f, v, ð, θ, s, z, ʃ) can be found in initial, medial and final positions but in case of /ʒ/, in English too, the distribution is much more limited. Very few English words begin with /ʒ/ (most of them have come with language comparatively recently from French) and not many end with this consonant; only medially, in words such as ‘measure’, ‘usual’ (meʒǝ, ju:ʒuǝl), /ʒ/ is found commonly.

The last glottal fricative /h/ of British R.P. is also articulated in Gujarati Phonology as glottal fricative with a slight difference. /h/ does not occur finally in British R.P., but it occurs frequently at all the three positions in Gujarati Phonology. The throbbing of glottis is heard more during the occurrence of /h/ in Gujarati Phonology.
3.6 Production of Nasals:

For the production of nasal consonant, a complete closure is made in the mouth, but the soft palate is lowered and the air comes out through the nose.

3.6.1 Nasals of English:

British R.P contains three nasal phonemes / m,n,ŋ /. They are articulated at bilabial, alveolar and velar position.

Peter Roach argues strongly for considering / ŋ / as an allophone of / n / and not as a separate phoneme. There are brief discussions of the phonemic status of / ŋ / in Chomsky and Halle (1968: 85), Hyman (1975:74) and Ladefoged (1993: 64); Wells (1982: 60) and Geigerich (1992: 297-301) can be referred for a fuller treatment. 30 English has at least two contrasting nasal phonemes / m / and / n /. However, there is disagreement about whether there is a third nasal phoneme.

Peter Roach puts forward three arguments against accepting /ŋ/ as a phoneme: 31

i) In some English accents, it can easily be shown that / ŋ / is an allophone of / n /, which suggests that something similar might be true of BBC Pronunciation.

ii) If / ŋ / is a phoneme, its distribution is very different from that of / m / and / n /, being restricted to syllable-final position (phonologically) and to morpheme-final position (morphologically) unless it is followed by / k / or / g /.
iii) English speakers with no phonetic training are said to feel that /ŋ/ is not a 'single sound' like /m/ and /n/. Sapir (1925) said “no native speaker of English could be made to feel in his bones” that /ŋ/ formed part of a series with /m/ and /n/. This is, of course, very hard to establish, although that does not mean that Sapir was wrong.

On this base of argument, he gives two rules to deal with /ŋ/:

1. /n/ is realized as /ŋ/ when it occurs in an environment in which it precedes either /k/ or /g/.
2. Finally, it is necessary to remember the exception, we have seen in the case of comparative and superlative.

3.6.2 Comparison to Gujarati Nasals:

In Gujarati phonology, usually three nasal phonemes /m, n, ŋ/ have been mentioned. The production process of nasals is almost identical. Even /m/ is articulated at the bilabial position as similar to British R. P. but /n/ is shown articulated at two different positions by Gujarati philologists. Babu Suthar, Kantilal Vyas, and Jayant Kothari have mentioned /n/ articulated at the dental position while in the charts of P. K. Pandey and IPA-Gujarati Phonology, /n/ is articulated at alveolar position.

Babu Suthar gives five nasal phonemes in his chart of consonants: /m, n, ŋ, n, ŋ/. It means, he adds /ŋ/ as a phoneme of Gujarati Phonology and also gives two variations /n, ŋ/. Here P. K. Pandey is with Suthar for he too gives the same five nasal phonemes. Prabodh Pandit also mentions four
nasal phonemes viz., / m /, / n /, / ŋ /, / ɳ / and nasalisation. This nasalization contains four allophones / ŋ, ŋ, ä, ~ /.

As it is mentioned earlier that / ŋ / should not be treated as a separate phoneme even in British R. P., similarly in Gujarati Phonology though / ŋ / is mentioned by some philologists as a separate phoneme. It is observed in my earlier work that / ŋ / is produced as / ŋg / and not separately. It is better to treat this phoneme / ŋ / as an allophone of / n / or / m /.

/ ŋ / is a separate phoneme in Gujarati Phonology. It is not produced in British R. P. If / n / is used at the place of / ŋ /, the meaning will be changed. / ŋ / is frequently produced by Gujarati speakers even in day-to-day speech. / m, n / occur at all the three positions, but / ŋ / does not occur at the initial position. About / ŋ, ŋ /, Mistry writes, “a fourth nasal phoneme is postulate for the phones / ŋ, ŋ / and the nasalization of a preceding vowel / ŋ / is unflapped before retroflex stops, and in final position varies freely between flapped - unflapped.”

3.7 Production of Lateral:

There is a complete closure in the middle and air comes out through the sides in the production of lateral sounds. There is one handy experiment to feel the complete closure along the center and the only way for the air to escape. It is along the sides of the tongue to make a long / l / sound you may be able to feel that the sides of your tongue are pulled in and down while the center is raised.
3.7.1 English Lateral:

British R. P has /l/ as a lateral consonant. It is articulated at alveolar in British R. P. /l/ is has two allophones clear /l/ and dark /ł/. Peter Roach exemplifies the differences between /l/ and /ł/:

“The realization of /l/ found before vowels sounds is quite different from that found in other contexts for example, the realization of /l/ in the word ‘lea’ /l:i:/ is quite different from that in ‘eel’ /i:l/. The sound in /i:l/ is what we call a ‘ark /l/’ it has a quality rather similar to a /u/ vowel, with the back of the tongue raised. The sound in /l:i:/ is what is called a ‘clear /l/’; it resembles an [i] vowel, with the front of the tongue raised.”  

Therefore it can be predicated that clear /l/ will never occur before consonants or before a pause, but only before vowels; dark /ł/ never occurs before vowels. In complementary distribution, it is to say that clear /l/ and dark /ł/ are allophones of the phoneme /l/.

3.7.2 Comparison to Gujarati Lateral:

/l, ł/ are two lateral approximants in Gujarati Phonology. They both are separate phonemes regarded by all philologists in Gujarati. They are articulated at alveolar and retroflex position respectively. /l/ occurs at all the three positions while /ł/ does not occur at the initial position. British R. P does not have /ł/ phoneme at all. Moreover, Gujarati Phonology does not distinguish between clear /l/ and dark /ł/. Thus, Gujarati Phonology does not have an allophone of /ł/ but it contains two phonemes /l/ and /ł/.
### 3.8 Consonant /r/:  

Many philologists in different accents of English and Gujarati describe this consonant differently. In British R. P., it is called a post alveolar approximant. R. K. Bansal says that the commonest variety of R.P /r/ is produced by raising the tip of the tongue towards the back of the teeth ridge, a slight retroflexion, so to say, the air comes out through the mouth without any friction. The soft palate is raised to shut off the nasal passage. In short; /r/ is articulated at post-alveolar / retroflex trill / approximant consonants.

The distributional peculiarity of /r/ in British R. P. is that the phoneme /r/ is pronounced only before vowels and if it is not followed by vowel, it is remained silent and the preceding vowel is lengthen in its pronunciation. The following examples clarify both the situations:

- **Words in which /r/ is followed by a vowel:**
  
  Red - /red/

  Arrive - /әrәɪv/

  Hearing - /hәәrәɪn/

- **Words in which /r/ is not followed by a vowel:**
  
  Car - /ka:/

  Hard - /ha:d/

  Ever - /evә:/

  Verse - /vә:s/

  Here - /hәә:/

  Cars - /keәz/
3.8.1 Comparison to Gujarati consonant /r/;

Gujarati philologists describe /r/ with a slight variation. In the IPA consonant chart /r/ is articulated as an alveolar tap or flap consonant while Babu Suthar places /r/ as an alveolar trill phoneme. Jayant Kothari\textsuperscript{43} and Kantilal Vyas\textsuperscript{44} articulate /r/ at dental but it does not seem to be an accurate point of articulation. Even to use the term ‘trill’ for the manner of articulation of /r/, does not sound appropriate. Gujarati /r/ should be articulated as tap/flap. It is also articulated similarly by P.K. Pandey in his esteemed forthcoming book \textit{Sounds and their patterns in Indian languages}.\textsuperscript{45}

In Gujarati Phonology /r/ occurs at all positions whether it is followed by vowel or not, it occurs properly that is another important feature, that differentiates it from British R. P. The function of /r/ in cluster will be described in the portion on consonant clusters.

3.9 Approximants:

An approximant is rather difficult to describe. Informally it can be said that it is an articulation in which the articulators approach each other but do not get sufficiently close to each other to produce a “complete” consonant such as a plosive, nasal or fricative. The difficulty with this is that articulators are always in some positional relationship with each other, and any vowel articulation could also be classed as an approximant but the term ‘approximant’ is usually used only for consonants.
3.9.1 Approximants in English:

/ j / and / w / are articulated as bilabial and palatal approximant consonants in British R. P. Peter Roach comments on / j / and / w / as, “The most important thing to remember about these phonemes is that they are phonetically like vowels but phonologically like consonants (in earlier works on phonology they were known as ‘semivowels’).\textsuperscript{46}

The articulation of / j / is practically the same as that of a front close vowel such as / i: /, but it is very short. In the same way the manner of articulation of / w / is very similar to / u /. For example, if the initial sounds of ‘wet’ or ‘yet’ are produced ‘very long’ i.e., in an elongated manner, one would be able to note this similarity.

3.9.2 Comparison with Gujarati Approximants:

Here also Gujarati Philologists have different opinions regarding the approximant phonemes / j, w /. In the IPA chart of Gujarati Phonology / w / is shown as /ʋ/ as labio-dental and / j / as palatal. Babu Suthar articulates only / j / as a palatal approximant and / w / of British R. P as / v / as labio-dental fricative. Both the observations regarding the phoneme / v / or / ʋ / are to be tested again. On the other side, P.K. Pandey mentions / w /, accurately as a bilabial and / j / as a palatal approximant.\textsuperscript{47} The symbol given by IPA as / ʋ / should be taken forward in this discussion. In the place of articulation, Pandey is quite accurate.

Thus, Gujarati Phonology does not have two phonemes like British R. P.: / v / - labio dental fricative and / w / - bilabial approximant. Gujarati Phonology produces only one phoneme / ʋ / - bilabial approximant while the
other is / j /. / v / has [v] and [w] as allophones.\textsuperscript{48} Both occur at all the three positions: initial, medial and final.

3.10 **Consonant clusters:**

Consonant cluster means a sequence of two or more consonants at the beginning or end of a syllable. For instance, ‘blue’ – / bl / can be treated as an initial cluster while the word ‘asks’, has the final cluster of three consonants / s, k, s / because all the three consonants belong to the same syllable. On the other hand T. Balasubramanian comments, “the consonants / ŋ / and / k / in the word ‘uncle’ do not form a consonant cluster because in the speech of most English speakers / ŋ / arrests the first syllable and / k / releases the next. In other words, the / ŋ / and the / k / belong to two different syllables. Such sequences of consonants that do not form a consonant cluster are called ‘abutting consonants’.”\textsuperscript{49}

3.10.1 **Consonant cluster in English:**

In English, as many as three consonants can begin a syllable and as many as four consonants can end a syllable. Thus the English canonical syllable structure is - (c) (c) (c) v (c) (c) (c) (c). The following are the consonant cluster sounds that usually observed in English:

**Initial two consonants cluster:**

/ p, b / as first element / l, r, j /
/ t, d / as first element / r, j, w /
/ k / as first element / l, r, j, w /
Three consonants cluster:

In English if three consonants form an initial consonants cluster, the first element is always /s/ and the second element of the three voiceless plosives:

/ spl /, / spr /, / str /, / stj /, / skr /, / skw /

Final consonants cluster:

/ p / as the final element / -sp, -lp, mp /
/ b / as the final element / -lb /
/ t / as the final element / -pt, kt, ñt, ft, st, jt, nt, lt /
/ d / as the final element / -bd, -gd, dʒd, vd, -ŋd, zd, md, nd, ŋd, ld /
/ k / as the final element / sk, ŋk, lk /
/ ñf /, / ñʒ / as the final element / ñf /, / ñv /
/ e / as the final element / pe, te, de, fe, me, ne, ŋe /
/ s / as the final element / ps, ts, ks, fs, es, ns, ls /
/ z / as the final element / bz, dz, gz, vz, ñz, mz, nz, ŋz, lz /
Three consonants cluster:

<table>
<thead>
<tr>
<th>Consonant</th>
<th>Example Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ t /</td>
<td>dst, kst, skt, mpt, nʧt, nst, lpt, lkt, lst /</td>
</tr>
<tr>
<td>/ d /</td>
<td>ndʤd, lvd /</td>
</tr>
<tr>
<td>/ e /</td>
<td>kse, lfe /</td>
</tr>
<tr>
<td>/ s /</td>
<td>pts, pes, tes, kts, fts, fes, sps, sts, sks, mps, nts, nes, njks, lps, lts, lks /</td>
</tr>
<tr>
<td>/ z /</td>
<td>ndz, ldz, lvz /</td>
</tr>
</tbody>
</table>

Final consonants cluster: four consonants:

<table>
<thead>
<tr>
<th>Consonant</th>
<th>Example Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ s /</td>
<td>-ksts, kses, mpts, lfes /</td>
</tr>
</tbody>
</table>

3.10.2 Comparison to Gujarati consonant cluster:

In Gujarati and English, a syllable can begin having three consonants but Gujarati can have only two consonants against four consonants in English at the end of a syllable. Thus, the Gujarati canonical syllable structure is -(c)(c)(c)v(c)(c).\(^50\)

Consonant clusters in Gujarati occur initially, medially and finally, while ‘Geminates’ occur only medially.\(^51\) Geminates were previously treated as long consonants, but they are now better analyzed as cluster of two identical segments. Mistry gives an illustration in his work ‘Gujarati Phonology’ as follows:\(^52\)

- The /u/ in geminated ‘uccār’ (Pronunciation) sounds more like the one in ‘clustered udgar (utterance) than the one in ‘shortened ucāṭ (‘anxiety)
• Geminates behave towards (that is, disallow) [ə] - deletion like cluster do.

He comments further, “Germination can serve as intensification. In some adjectives and adverbs, a singular consonant before the agreement vowel can be doubled for intensification. VCû → VCCû”³

<table>
<thead>
<tr>
<th>big</th>
<th>[mo[tũ]</th>
<th>[mo[tũ]</th>
<th>big</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight</td>
<td>[sid'ũ]</td>
<td>[sid'dũ]</td>
<td>straight</td>
</tr>
<tr>
<td>considerably</td>
<td>[k’asũ]</td>
<td>[k’assũ]</td>
<td>considerably</td>
</tr>
</tbody>
</table>

Initial – two consonants clusters:

In Gujarati, initial two consonants clusters are having many pairs as in English. Biconsonantal initial cluster beginning with plosives have / r /, / j /, / v / and / l / as second member. / s / biconsonantly clusters with / r /, / j /, / v /, / n /, / m /, and with non – palatal voiceless plosives. P. K. Pandey gives the list of some pairs as follows: ⁵⁴

/ sp- /, / st- /, / sk- /, / spʰ/ , / stʰ/ , / skʰ/ 
/ sm / , / sn / , / sw / , / sr / 
C+ / w/ , / j/ , / l/ , / r /
Initial – Three consonants cluster:

Initially, /s/ triconsonantly clusters with /ṭr, pr, mr/ - most of which occur in borrowing. Cluster of two and three consonants is found at medial position in most cases but because of inadequate availability of data, it is not possible to illustrate further.

Final – two consonants cluster:

In Gujarati, only two consonants can occur at the final position in a syllable against four consonants in English. P. K. Panday distributes them in following three parts:

1. /s/ + stop : /sp, st, sk, sb, sd, sg /
   /spʰ, skʰ, sbʰ, sdʰ, st, sgʰ/
2. r + /s, Ṫ /
3. stop + homorganic stop

It is noticed on IPA-Gujarati Phonology, that the occurrence of /r/ as a second member in consonants cluster is one of Gujarati’s conservative features as a modern indo-Aryan language. For example, languages used in ‘Asokan inscriptions’ (3rd Century BC) display contemporary regional variations, with words found in Gujarat’s Girnar inscriptions containing cluster with /r/ as the second member not having /r/ in their occurrence in inscriptions elsewhere. This is maintained even today, with Gujarati /ṭr/ corresponding to Hindi /ṭ/ and /ṭṭ/.
Thus, summarizing the discussion, the major views can be capsulated as both the systems English and Gujarati have almost similar types and numbers of places and manners of articulation. On the other hand, aspiration in Gujarati consonantal phonemes and consonant cluster occurring at the middle position in Gujarati are some of the distinctive features of the comparative study of English and Gujarati consonant systems.
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