Phonetics and Phonology: A broad overview
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Lecture 21
Distinctive features, feature economy and markedness

Hello, and welcome to NPTEL MOOC course in phonetics and phonology, a broad overview, we are continuing with phonology and this is the second week of phonology.

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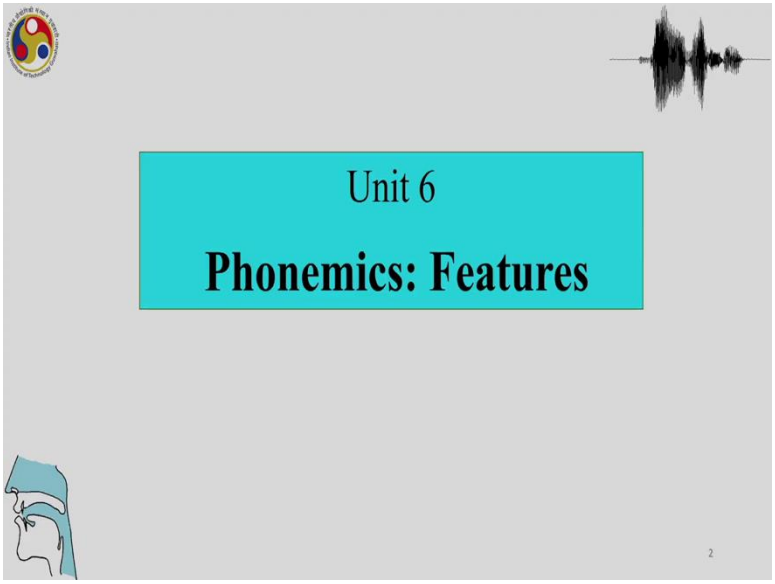

And we are discussing features. We discuss features quite a bit in the last lecture also we are following up in this lecture and showing a few other features which are not shown very much in the last lecture. So, going over what we did in the last lecture.

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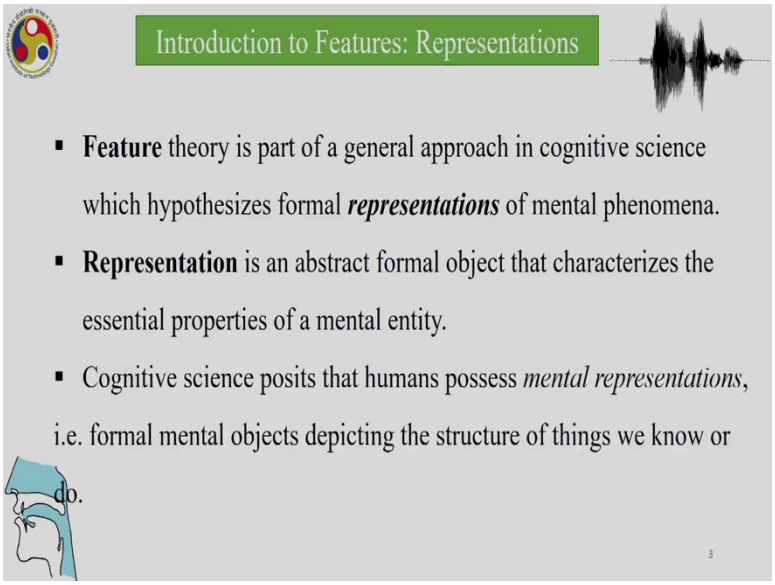

Feature theory is part of a general approach in cognitive science which hypothesizes formal representations of mental phenomena. Hence, we see representations and we saw those representations of these formal objects, and we saw what the different features are, and why they are considered representations etcetera, in the last lecture.

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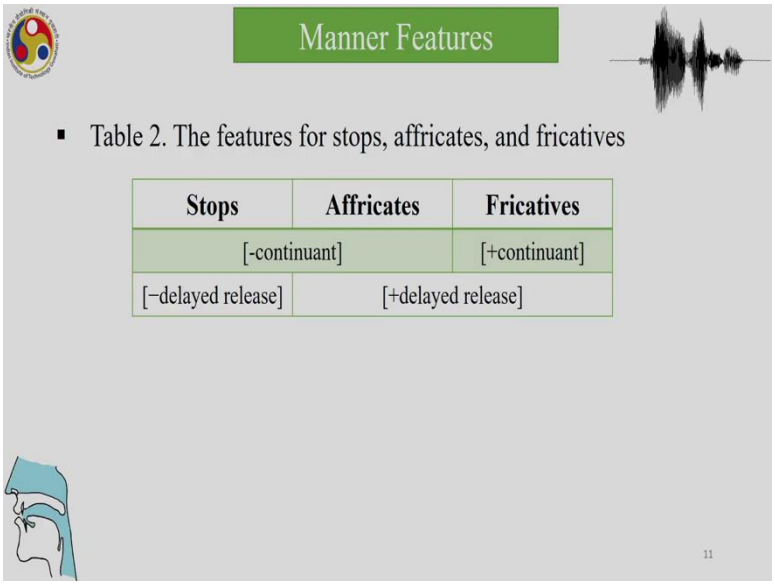

And in this lecture, we will go into feature matrices a bit more, and also show that what we learned in the last lecture that how we can represent rule using features. And if we use more pertinent features, then our rules give us more general ideas about phonological processes happening in the data.

So, in the last lecture, this is what we had shown with regard to stops and fricatives that both stops and affricates are within the natural class of minus continuant whereas fricatives fall within plus continuant. And on the other hand, affricates and fricatives fall within the domain of plus delayed release and stops alone belong to the natural class of minus delayed release. Also, we looked a bit at vowel features like backness and height and tenseness.

So, these are all vowel features. And also, we looked at all the different combinations of features which lead to the different vowels that we have seen in all the previous lectures in articulatory phonology also, and the tense and lax vowels differ phonetically, the lax vowels tend to be shorter and more centralized, and the plus tense vowels, diphthongize towards a higher vowel and minus tense vowels diphthongize with an inserted schwa as in bed. So, we have seen the feature chart for vowels in the last lecture.

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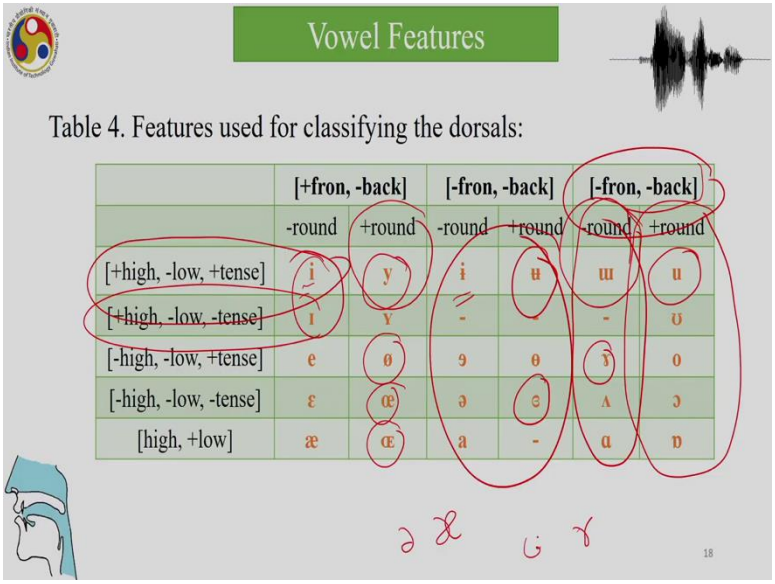

So, let us summarize the vowel features and show you what are the combinations of features that gives us the particular vowel, so we have plus high, minus low, plus tense, and then minus high, minus low, minus tense would give us this contrast here. And similarly, depending on whether the vowel is front or back, round, or unrounded, we can show the vowels in a matrix like this.

And then we have the unusual vowels like these vowels, which are minus round, yet central, so central vowels are represented as minus front and minus back, which means a neither front nor back. And whereas, u, these are plus round and plus back vowels, so these are the plus

round plus back vowels. These are the minus round vowels, and we also have the rounded and unrounded counterparts of the vowel C and U.

And so, we have these vowels which are minus round, and this is also minus round, but this vowel is front and this is not the front counterpart, whereas this is the front counterpart which is surround for e. So, we have all these vowels which are possible in the languages of the world. And hence, these corresponding symbols which are therefore these vowels are remembered for transcription purposes.

And that is something, this few of the familiar vowels we know the transcriptions for instance, the schwa is written like this, the a vowel is like this, but some of the vowels which do not exist in English, like this vowel, which is minus front minus back yet, it is plus round and which means it is a centralized plus round vowel and this is a centralized minus round vowel. So, all these vowels are not very common in the languages of world. So, we may not know their transcriptions very well, but these are given here.

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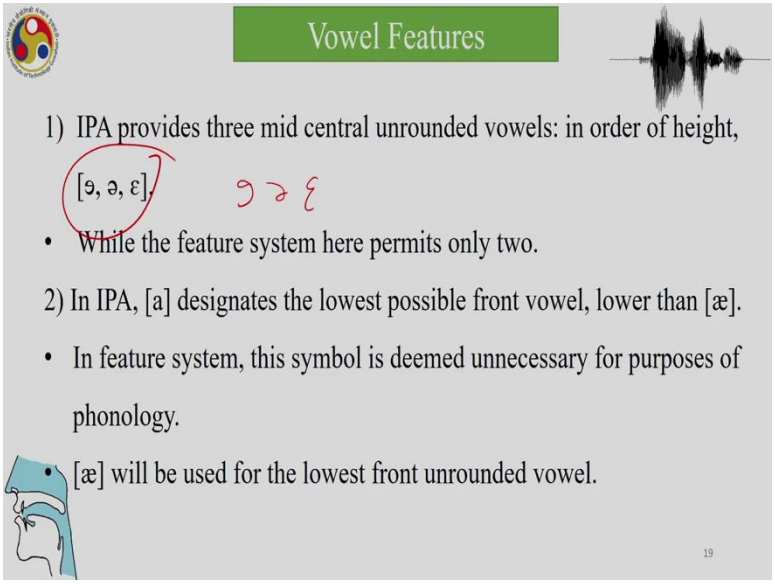

So, IPA provides the three mid-central vowels. These are the mid-central vowels, which is this vowel, this is the schwa and this is the a. And central unrounded vowels, and the feature system permits only two but we can show them with the additional features. In IPA, a designates the lowest possible front vowel, lower than a. And in future system, this symbol is deemed unnecessary for the purpose of Phonology, most of the time a is used for lowest front unrounded vowel.

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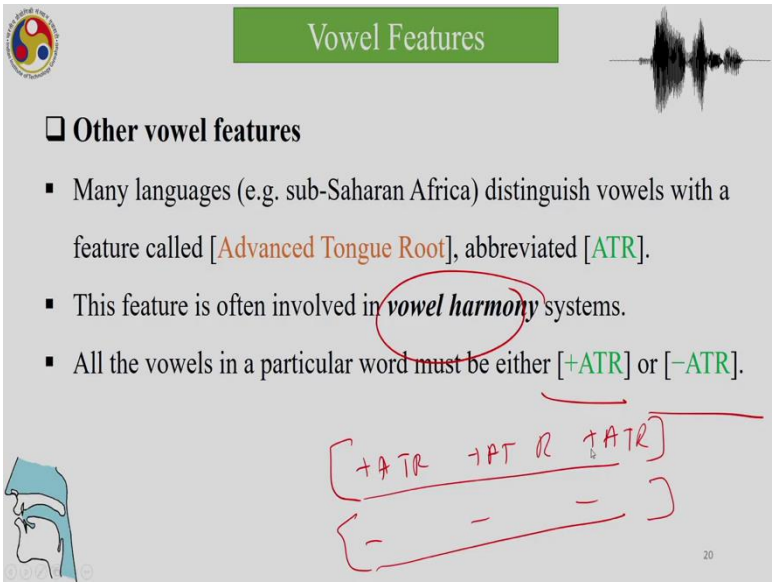

And then there are other vowel features like advanced tongue root, which is very much seen in the vowel harmony systems of the world. So, all the vowels in a particular word must be plus ATR or minus ATR, and that is called vowel harmony. So, all the vowels will beplus ATR, plus ATR, or there will be minus ATR, minus ATR, minus ATR, and when this happens when one vowel makes a change of value in all the other vowels, then that is called a vowel harmony system.

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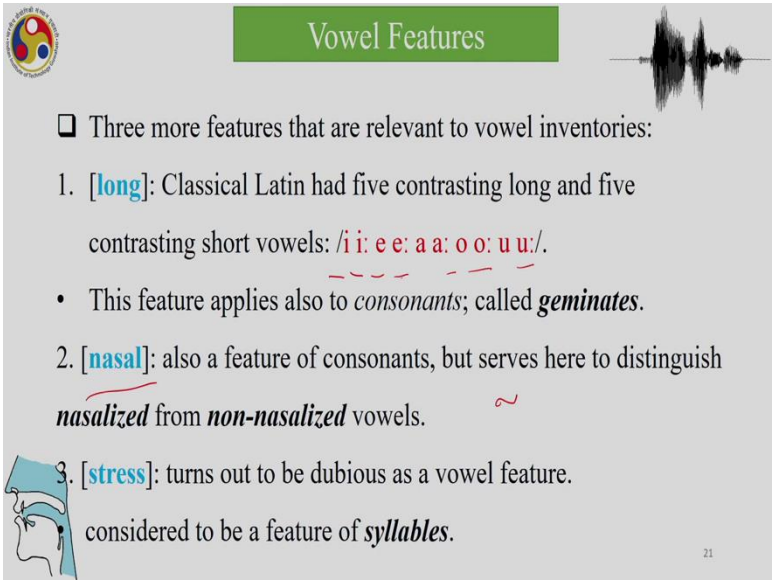

And in vowel, three more features are relevant for vowel inventories and these are long and nasal and stress. So, vowels can differ on the basis of length. So, we have in English itself,

we have e, e and we have long u and o and a and a. And then the other feature is that of nasal, vowels can be nasalized, it can be shown with the nasalization symbol and then vowels are also stressed. So, the vowels bear stress in a language.

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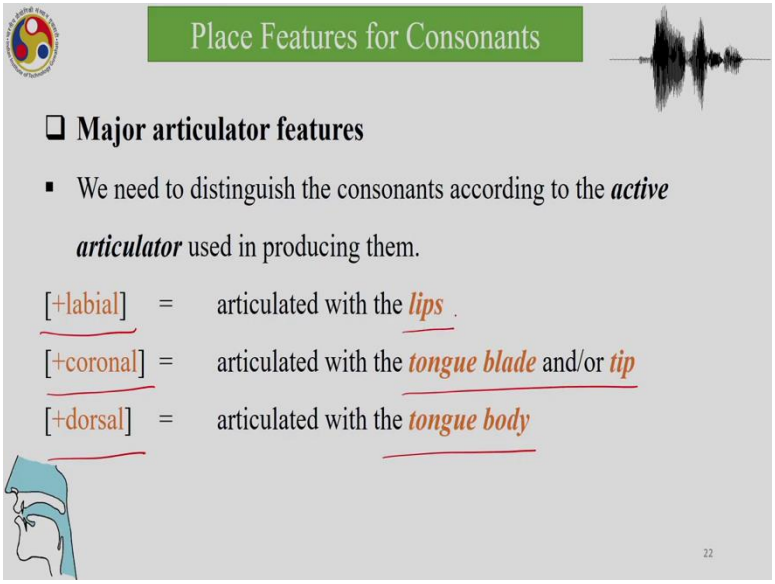

So, we have the major articulator features and after the vowels now, let us have a look at the major articulator features. And the major articulator features are plus labial, plus coronal, and plus dorsal and dorsal are those consonants which are articulated with the tongue body, and coronal are those features which are articulated with tongue blade and tip and labial are articulated with the lips.

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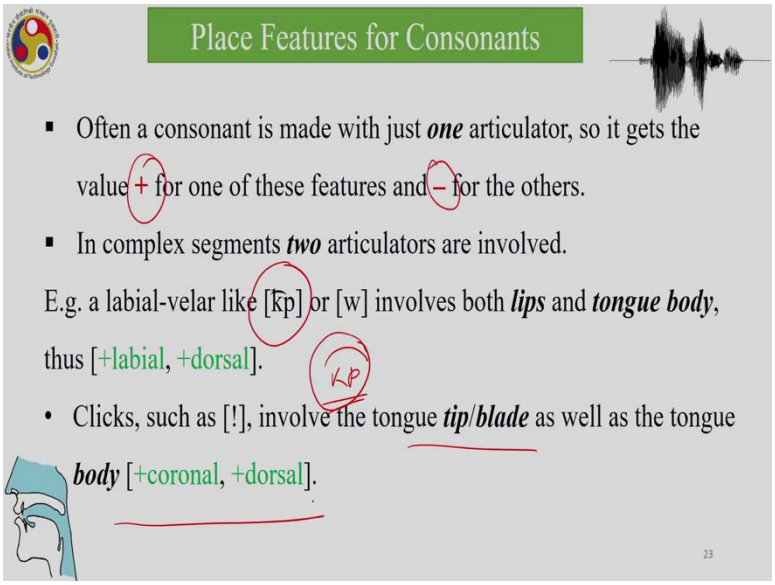

So, often a consonant is made with just one articulator, so it gets the value plus for one of these features and minus for the others. In complex segments two articulators are involved and they are represented like this, with a symbol like that showing that two articulators are involved in the production of that segment and these are not two different segments. So, this is the one and this is shown with this symbol.

And clicks, which we looked at a lot in the articulatory phonetics section. So, clicks involve tongue tip, we saw that clicks could be based on, because when we were looking at clicks, we saw that clicks have two places where the occlusion occurs. So, one of them could be tongue tip blade, it could be dental, it could be a bit more back. So, there could be either plus coronal, or plus dorsal along with being a click sound.

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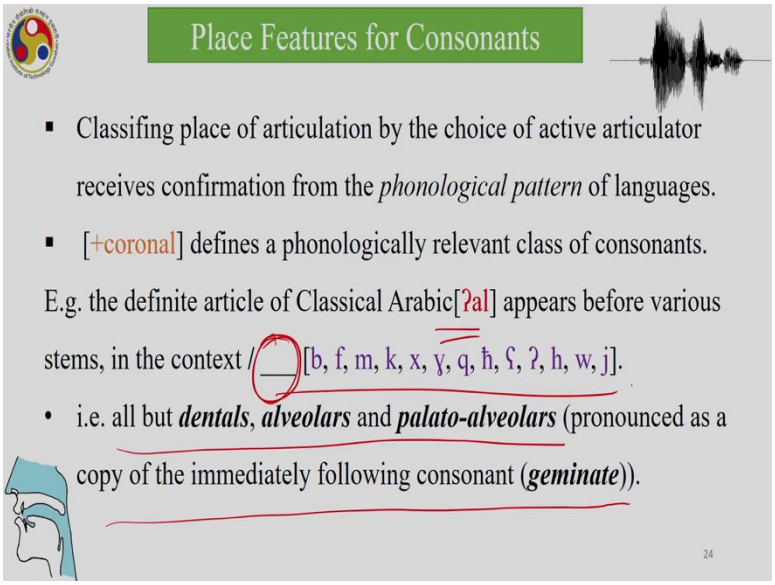

And classifying place of articulation by the choice of active articulator receives confirmation from phonological pattern of languages. And we saw that a little bit in the last part of the lecture on features that you saw in the previous lecture on features. And the plus coronal defines of phonologically relevant class of consonants.

And the definite article of classical Arabic ?al appears before various stems in context like this, and showing that there is only one feature class before this. So, we saw that what is the purpose of features that with the purpose of features that you capture the idea of a natural class that rules processes in phonology are happening not in a vacuum, but because they are natural classes, which are the targets of rules and processes.

And we saw here, all about dentals, alveolars and palato-alveolars pronounced as a copy of the following consonant geminate. So, except dentals, alveolars and palato-alveolars, all others copy the following consonant, so that is why this can be expressed like this, that is the context.

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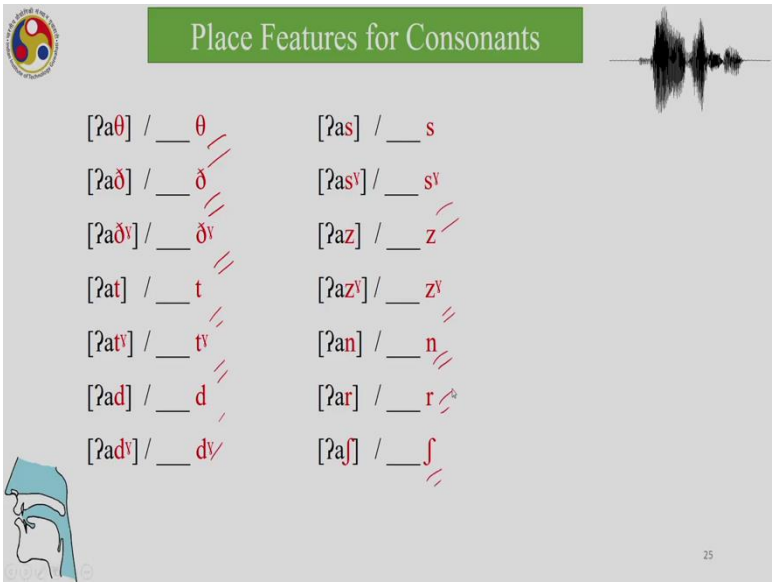

So now, what is the environment for gemination? So, we have all these environments here, we have th, th, d, we have dentals, we have alveolars, we have also nasals. And we have approximants. And these are all coronal or dental.

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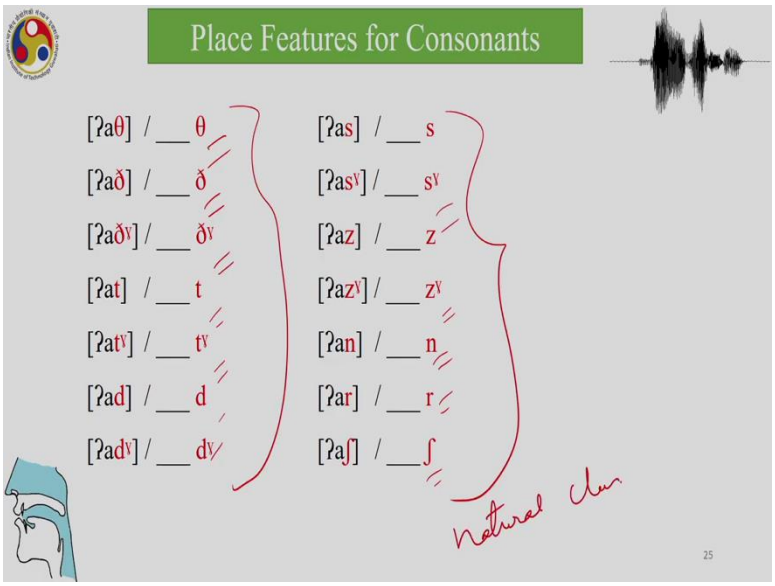

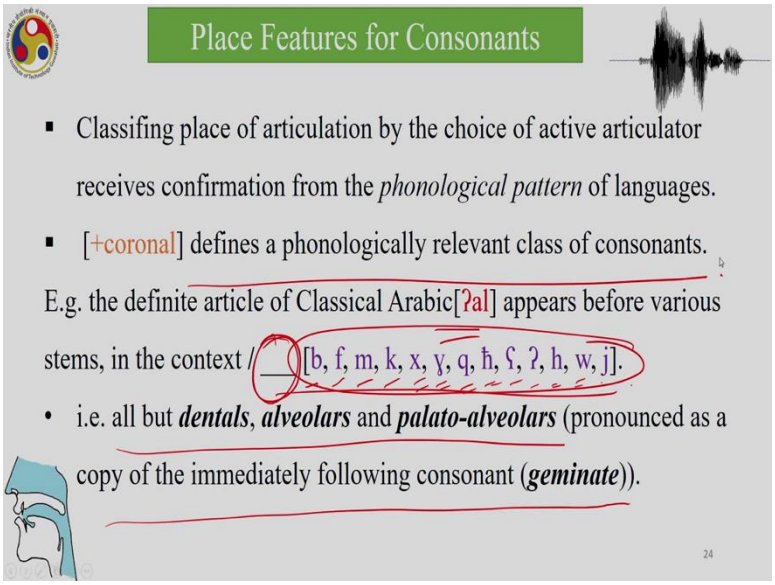

So, they could be all expressed with one feature if they belong to one natural class. So instead of the whole purpose of doing feature theory is that instead of putting down in inventory of sounds, you have to capture the generalization of why a process targets all the sounds. And always it seems that it is not random, because the sounds belong to a phonologically relevant class of consonants and that phonologically relevance comes from feature theory.

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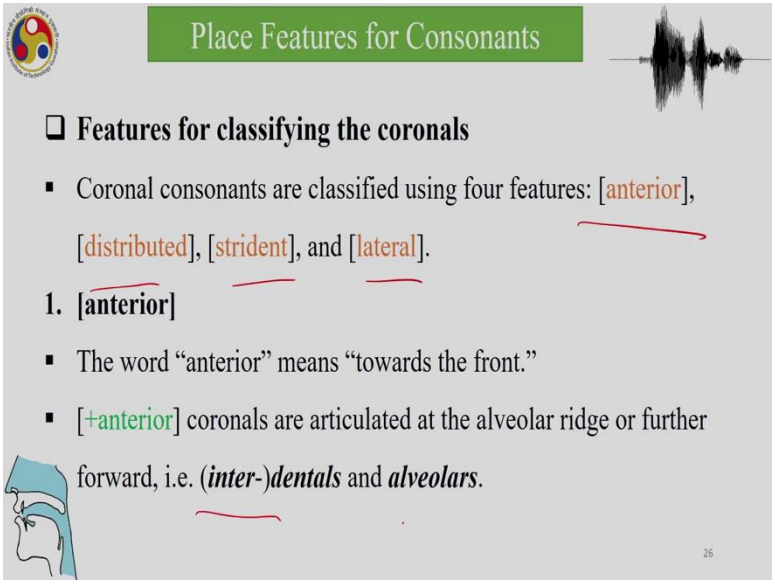

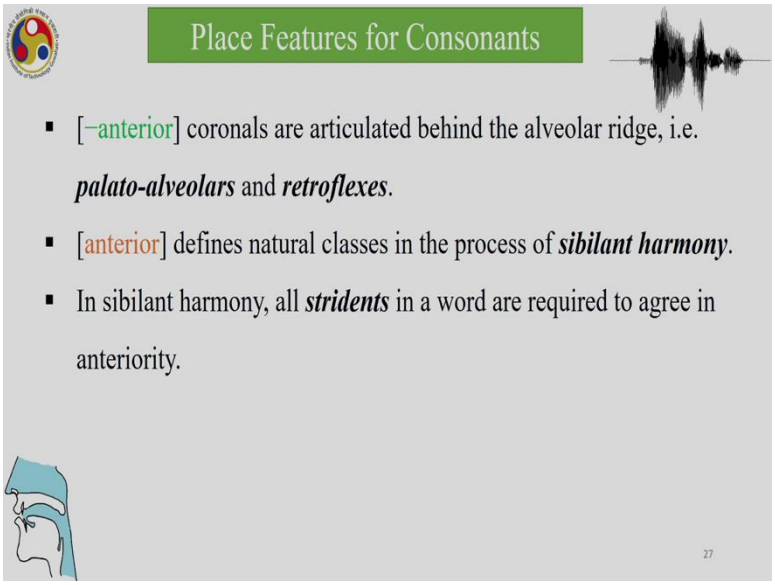

So, coronal consonants are classified using four features, anterior, distributed, strident, and lateral. So, we saw a bit of this in the previous lecture also, the word anterior means towards the front and anterior coronal are articulated at the alveolar ridge offers a forward into dentals and alveolars. And minus anterior coronals are articulated behind the alveolar ridge and palato-alveolars and retroflexes.

So, minus anterior plus anterior plus distributed minus distributed plus strident minus strident and plus and minus lateral. So, there could be eight ways in which you can express coronal consonants. So, we saw plus anterior and minus anterior, plus anteriors are inter-dentals and alveolars. Minus anteriors are articulated behind the alveolar ridge mostly palato-alveolars and retroflexes.

And anterior defines natural classes in the process of sibilant harmony. In sibilant harmony, all stridents in a word are required to agree in anteriority. Again, when phonological processes happen, it targets only groups of sounds and in very often that groups of sounds have some phonological regularity, and that regularity is seen from the lens of features, can be explained from feature theory.

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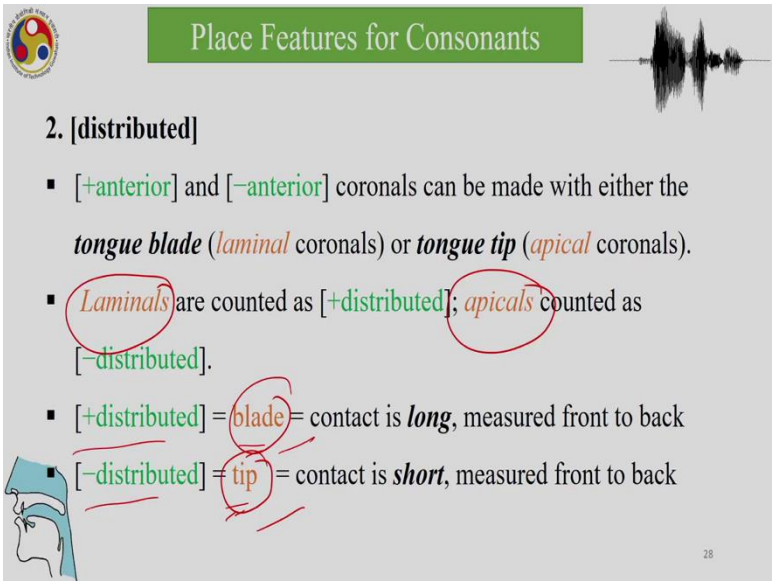

And if we talk about distributed, we have plus anterior and minus anterior coronals can be made with either the tongue blade or tongue tip. And laminals are counted as plus distributed, apicals counted as minus distributed and plus distributed is when we have the blade of the tongue and minus distributed is when we have the tip of the tongue. So, distributed involves what we studied before.

Remember, when we talked about articulatory phonology, we looked at the linguistic diversity in languages of world and we had looked at laminals versus apicals. So, laminals are the consonants and laminals can be both dental and alveolar. And apicals can also be either of them, and whereas, one involves the tip of the tongue, and the other involves the blade of the tongue. So, plus distributed uses the blade and minus distributed uses the tip. So, laminals and apicals can be understood in terms of feature theory as plus distributed and minus distributed consecutively.

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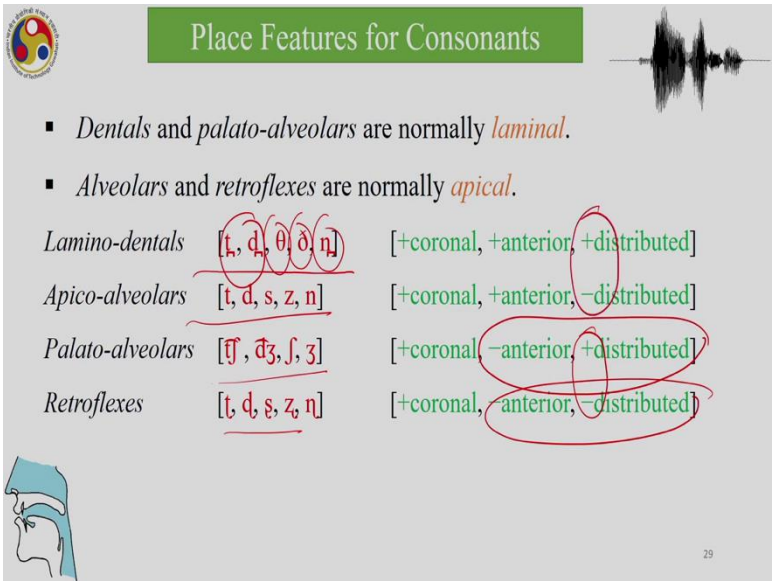

And dentals and palato-alveolars are normally laminal, alveolars and retroflexes are normally apical. So, lamino-dentals are all these, which are these dental, stops, fricatives and then nasal and then we have the apico-alveolars, and then we have palato-alveolars and then we have retroflexes, and palato-alveolars fall within minus anterior plus distributed category and retroflexes fall within minus anterior and minus distributed category.

So, the difference between Palato-alveolars and retroflexes is that in terms of distribution, feature of distributed, one is retroflexes minus distributed, palato-alveolars are plus distributed. Similarly, lamino-dentals are plus distributed and apico-alveolars are minus distributed.

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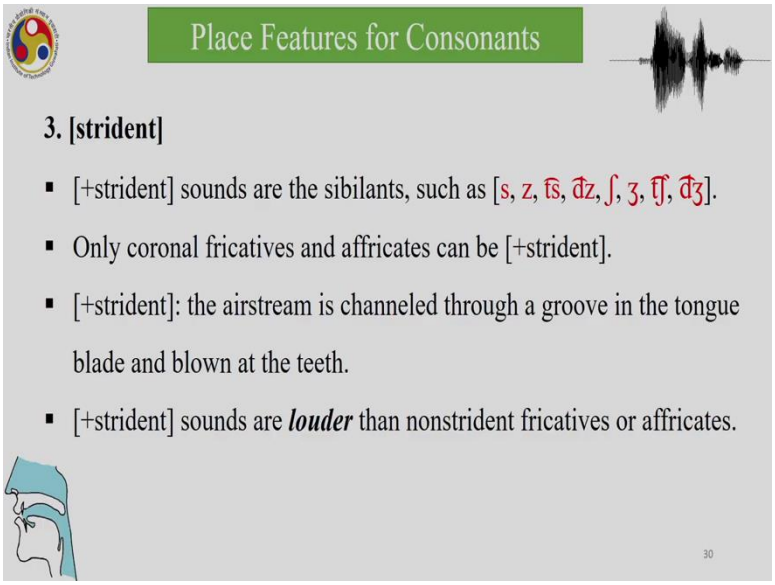

The other category relevant for coronal is strident. Plus strident sounds on sibilants, such as s, z, cha, z, sh, z, ch, j and only coronal fricatives and affricates can be plus strident and plus strident, the airstream is channelled through a groove in the tongue blade and blown at the teeth. So, strident sounds cannot be pronounced if the front teeth are missing in a person, so it is a bit of a trivia because the air with great force is channelled and it has to hit the front teeth to produce the special effect that is strident sound will produce likes of z.

Strident sounds are louder than non-strident fricatives or affricates, we had seen the acoustic properties, when we had looked at acoustic properties of sounds of different sounds like fricatives and stops, we had seen that the fundamental frequencies show not just fundamental frequency, the noise created because the production stridents are different for different stridents, for different fricatives.

And for s versus sh and versus f all these sounds which are fricatives have their noise component and it can be identified in a spectrogram. And again, even in the phonology strident sounds behave differently because they are louder than non-strident fricatives or affricates.

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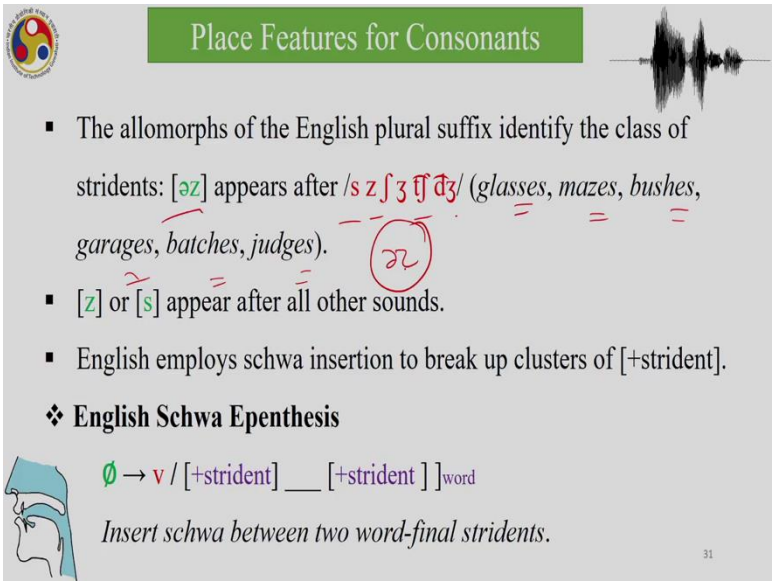

And the allomorphs of the plural suffix identify the class of stridents. So, for instance, in English az, whenever the last consonant is one of these stridents, it is always the plural is glasses, or mazes, or bushes, or garages, batches, or judges. And English employs schwa insertion to break up clusters. And so, before strident a schwa is inserted, and then we have this form.

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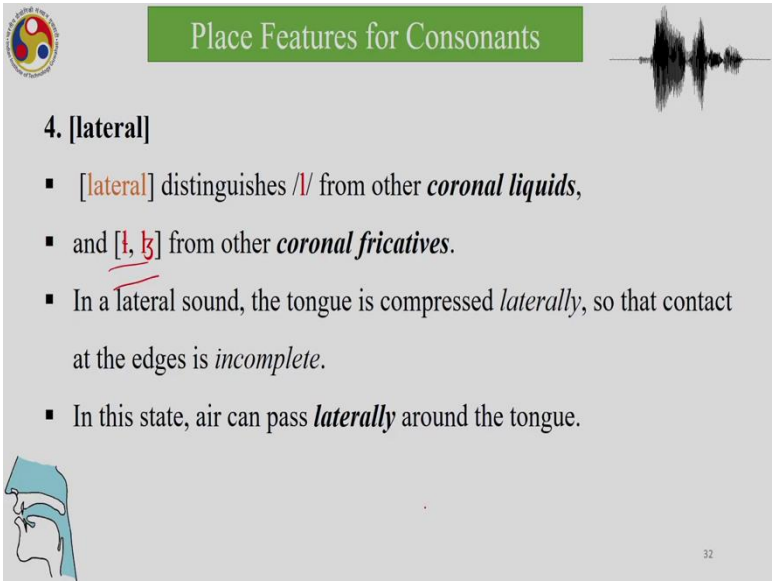

So, lateral distinguishes l from other coronal liquids and there could be lateralized fricatives, like a coronal fricative. In the lateral sound, the tongue is compressed laterally so that contact at the edges is incomplete. And in this state, air can pass laterally around the tongue. So that

is what lateral means that there is two sides. And that is why in lateral sounds, air can pass from both sides of the tongue.

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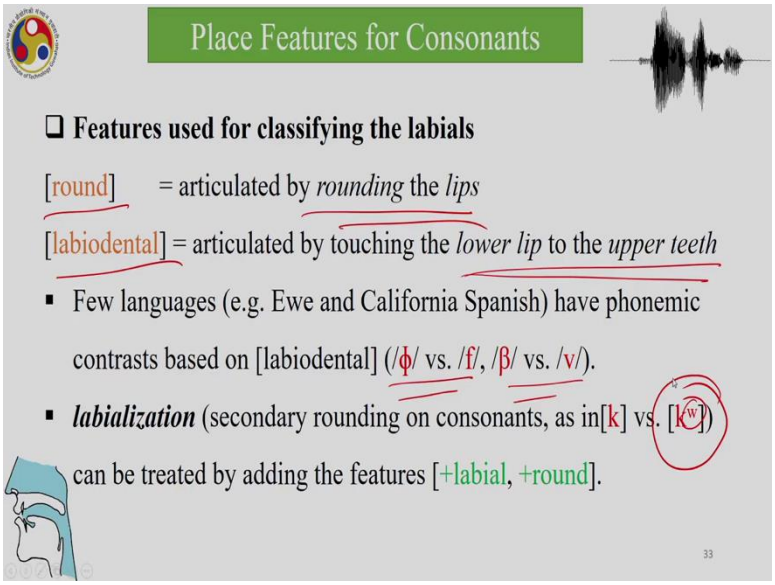

And in features such as round or labio-dental, round is produced by rounding the lips and then labio-dental, which involves touching the lower lip to the upper teeth. And then a few languages have phonemic contrast based on labio-dental and like Spanish ph verses f, b verses v. And then we have labialization where even a stop sound can have a secondary articulation of labial and then it is represented like this as a superscript and can be treated by adding the features plus labial and plus round.

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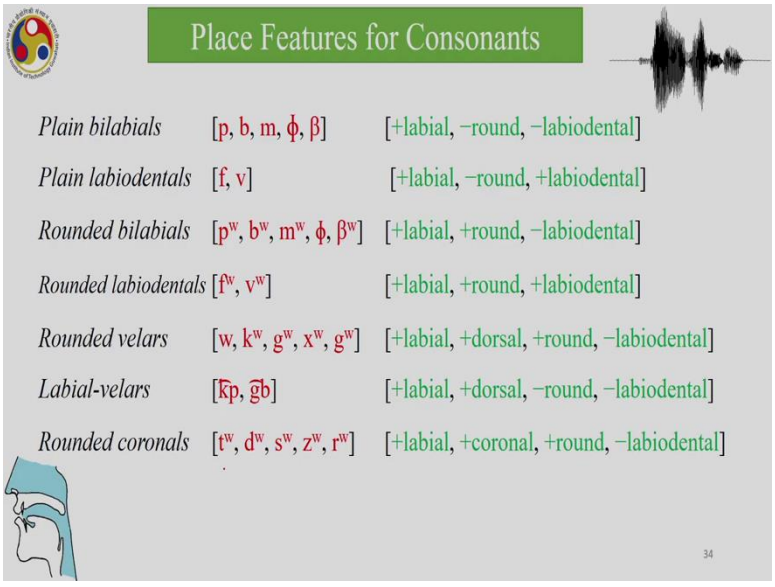

So, in place features for consonants, there are plain labials, there are plain labiodentals, there are rounded labials, there are rounded labio-dentals, there are rounded velars, there are labial-velars, and there are rounded coronals.

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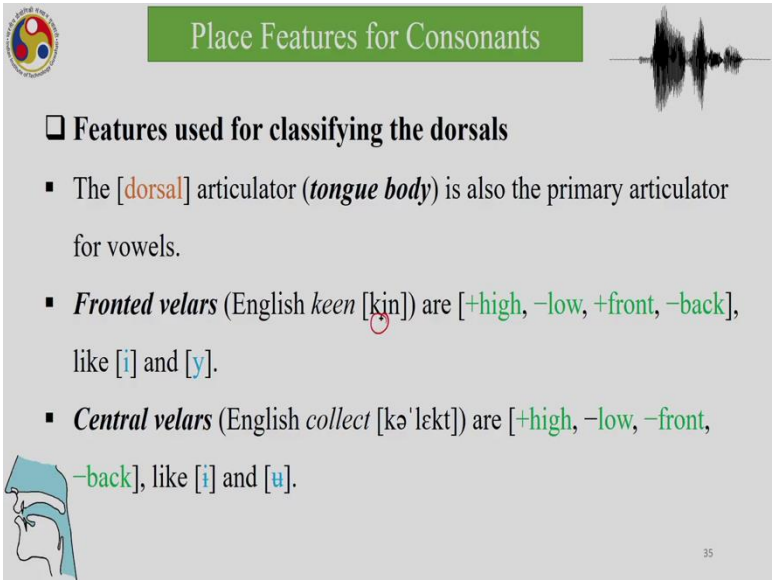

Features used for classifying the dorsals, the dorsal articulator is also the primary articulator for vowels and fronted velars are there. So, this is the subscripts used here to show that this is a fronted velars and as in keen means fronted because the front vowel and then central velars like English collect, because of the following central vowel.

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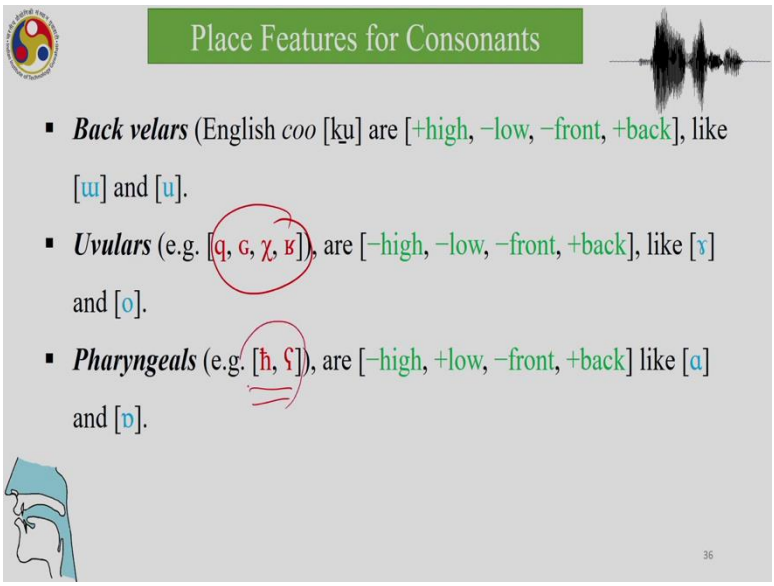

And back velars as in coo are produced a bit back and uvulars which are not there in English at all like h and a have their special symbols. And then we have the pharyngeals, which we studied when we looked at linguistic diversity, these are the two symbols for the pharyngeals.

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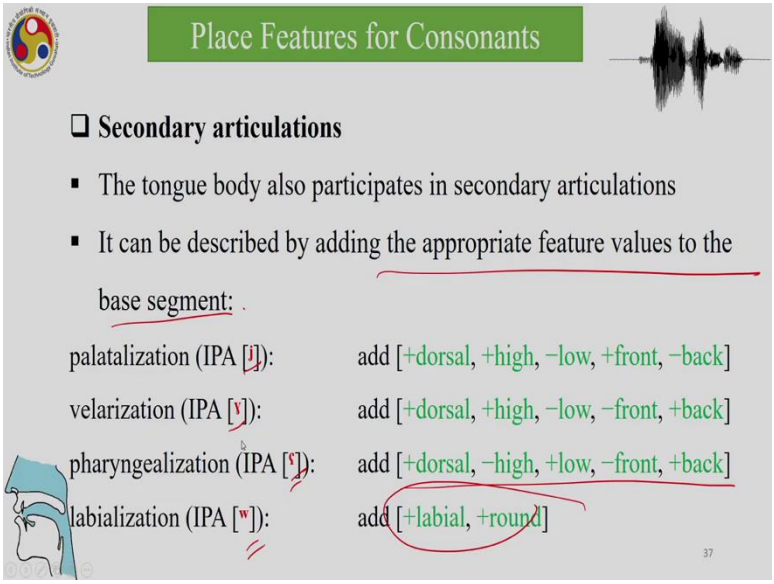

So, secondary articulations are such that they are shown with a superscript like this, like ya or like kha or this pharyngeal sound or the labialize sound. And additionally, these other features that they have, because of the additional secondary articulation, and the appropriate feature values are added to the base segment. So, that is how secondary articulations are represented in the phonology.

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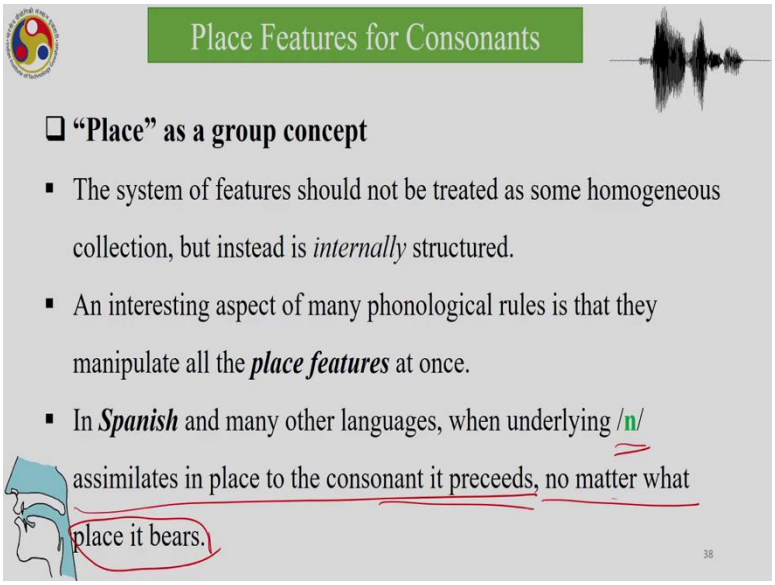

So, a place as a group concept, the system of features should not be treated as some homogeneous collection, but something which has some internal structure to it. And an interesting aspect of many phonology rules is that they manipulate all the feature places at once. So, in Spanish in many other languages when unlike n assimilates in place to the consonant proceeds.

And so, no matter what place it bears, so it is a complete change to the place of the consonant proceeds. So, if the previous consonant is preceded, it is preceded by p then it can become m which becomes bilabial if it is a k it can become n, because velar, etcetera.

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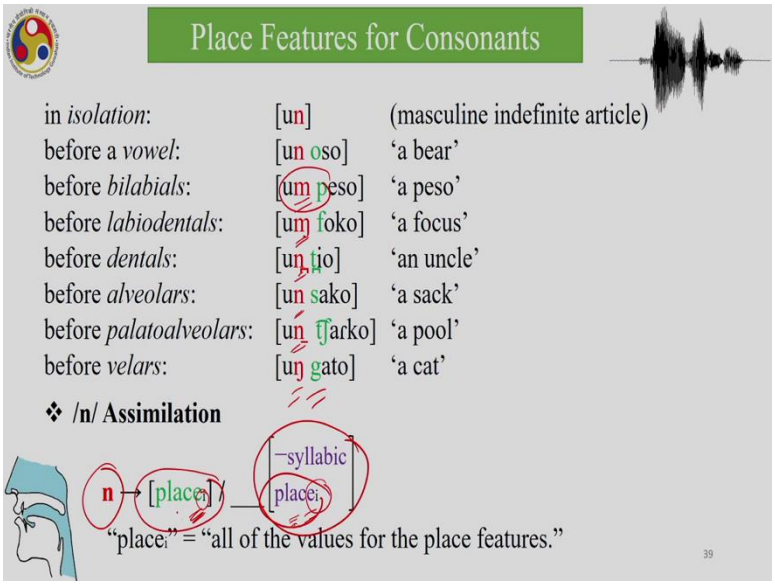

Hence, we have data like this, where, as we just said, depending on the feature of the consonant, it can change to a labial or a labio-dental or a dental or alveolar or palato-alveolar or velar. So, hence data like this have to be represented like in this way, so where the nasal takes the place of articulation of the following consonant.

So, whatever the place of articulation of the following consonant if it is nasal, if it is velars or palato-alveolar or dental or labio-dental, it just takes that exactly the same place of articulation. So, complete replacement of the same place of articulation and that is why it has to be indexed with i. The indexation means that whatever the place of articulation of this is, this will just change to that.

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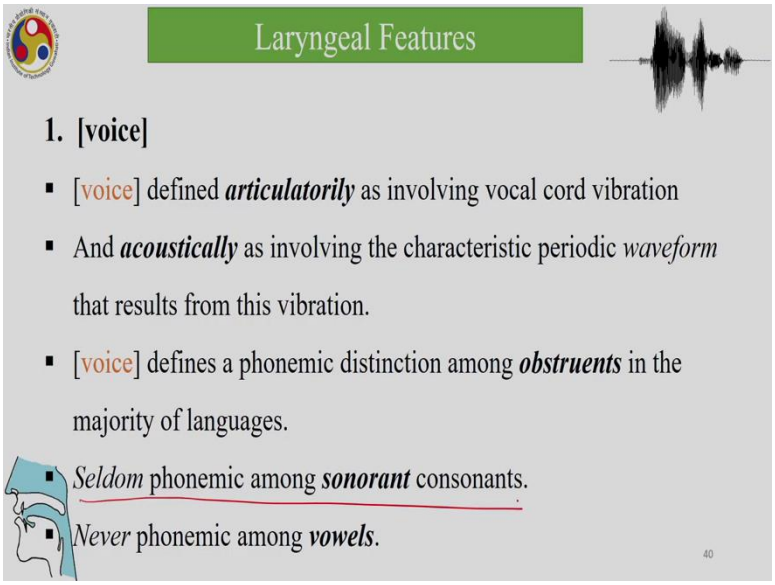

Voice, a voice define articulatory as involving vocal cord vibration, and acoustically as involving the characteristic periodic waveform that results from this vibration and we have seen the category voice and its articulatory as well as acoustic properties in the previous lectures. And voice defines a phonemic distinction among obstruents in the majority of languages and voice is seldom phonemic among sonorant consonants, and never phonemic among vowels. So, the contrast feature for voice and sonorant and vowels is pretty restricted.

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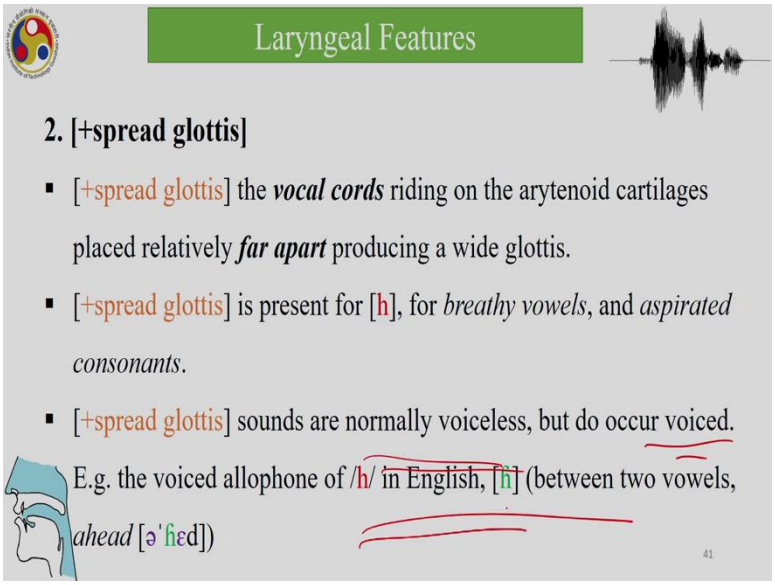

And then we have a plus spread glottis, when the vocal cords riding on the arytenoid cartilages placed relatively far apart producing a wide glottis and plus spread glottis is present for h, for breathy vowels, and aspirated consonants, plus spread glottis sounds are normally voiceless, but do occur voiced, example, the voice allophone of h in English, and h between two vowels. So, there are normally voiceless but also do occur voiced as in the English examples we have seen here.

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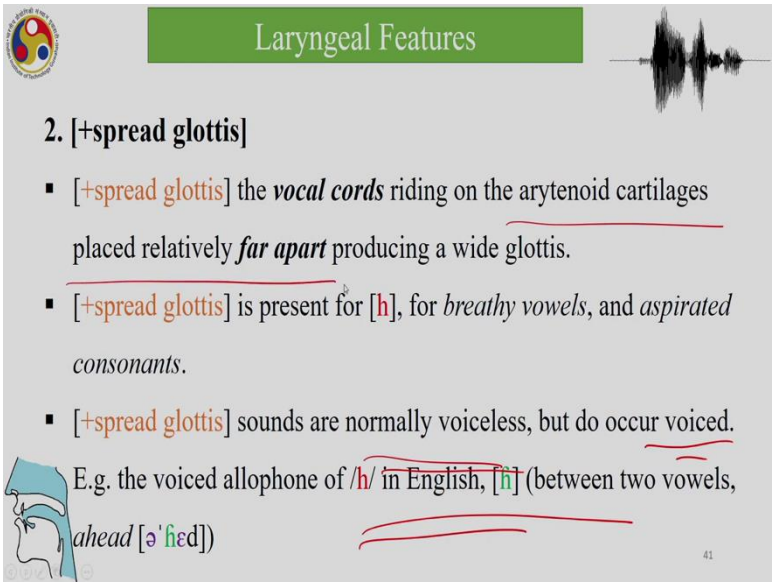

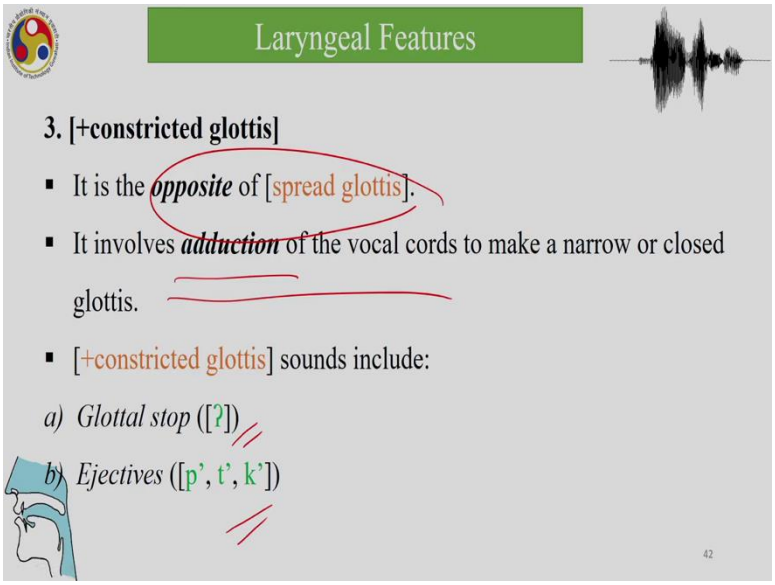

And in plus constructed glottis, it is the opposite of a spread glottis involves the arytenoid cartilages place relatively far apart, producing a wide glottis and pushing out a lot of air. And then in constricted glottis, we have the abduction of the vocal cords to make a narrow-closed glottis. And in plus constructed glottis sounds include the glottal stop and ejectives, which we have seen in the articulatory phonetics diversity in the world's languages, classes, lectures.

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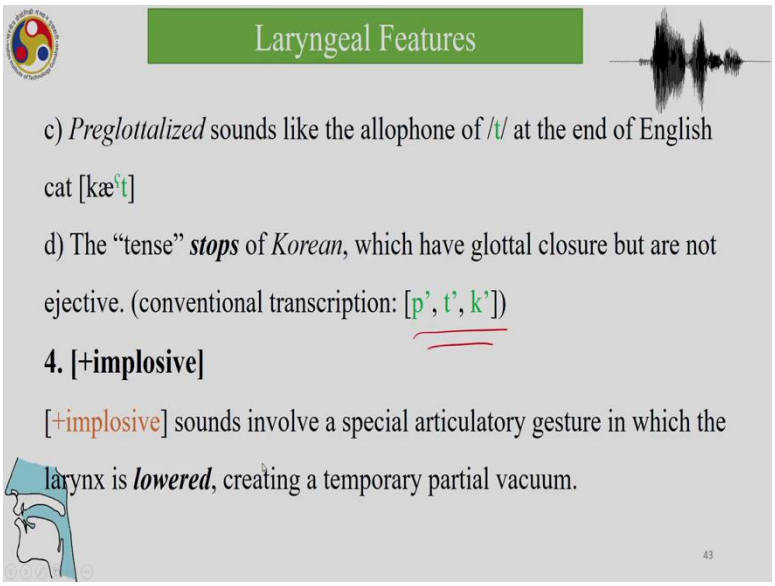

Preglottalized sounds like the allophone of t at the end of English cat. And then the tense stops of Korean, which have glottal closure but are not ejectives. So, these are preglottalized or tense stops, and then implosive which we have seen a bit in the previous lectures. Implosive involve a special articulatory gesture, in which the larynx is lowered, creating temporary partial vacuum.

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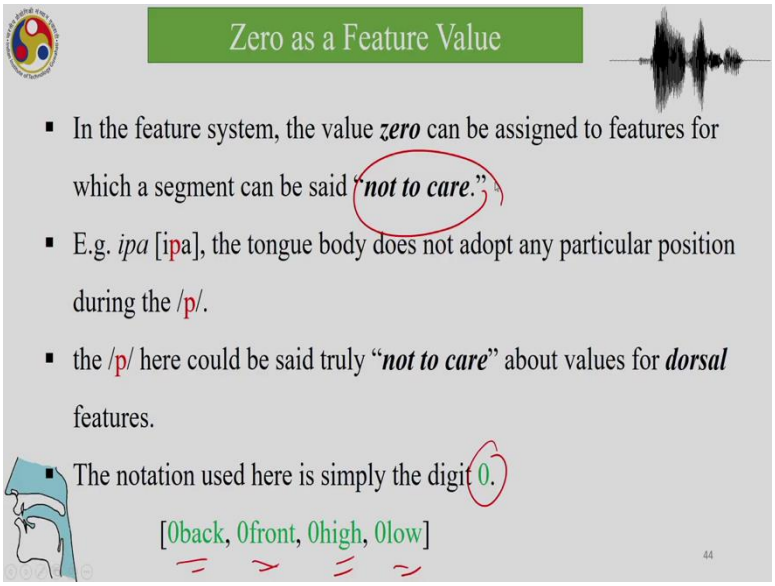

And then in the feature system, the value zero can be assigned to features for which a segment can be said not to care. So, in the tongue body does not adopt any particular position during the p, the p here could be said truly not to care about the values for dorsal features. The notation here is simply null. So, it is either null back or null front or null high or null low. So, what does null mean it does not care. So, in the zero there assigned features inches, the feature does not matter.

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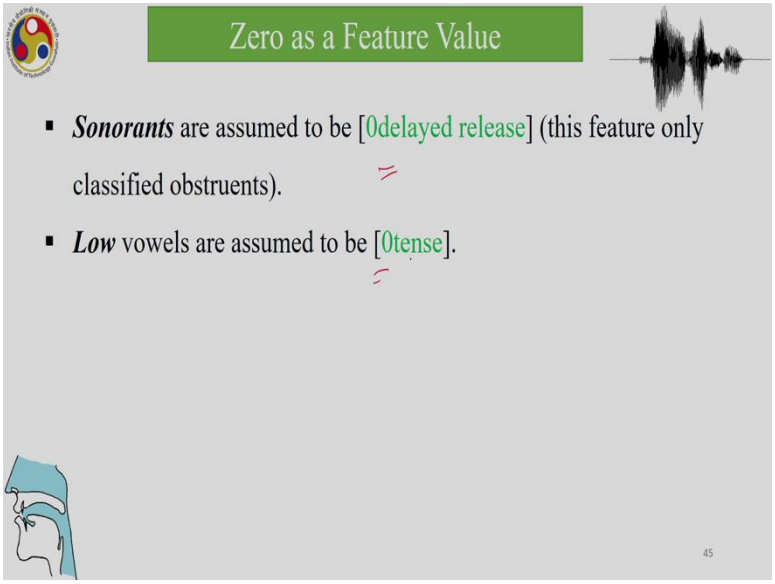

Sonorants are assumed to be zero delayed release, and low vowels are assumed to be zero tense, because low vowel never contrast for tense. And sonorants never contrast for delayed release.

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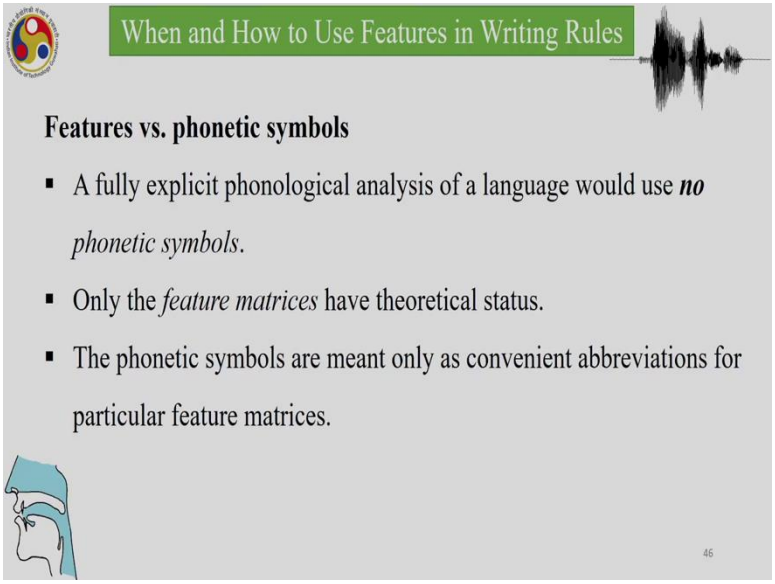

Features versus phonetic symbols fully phonological analysis for language would use no phonetic symbols, and only the feature matrices have theoretical status in a language and the phonetic symbols are meant only as convenient abbreviations for particular feature matrices.

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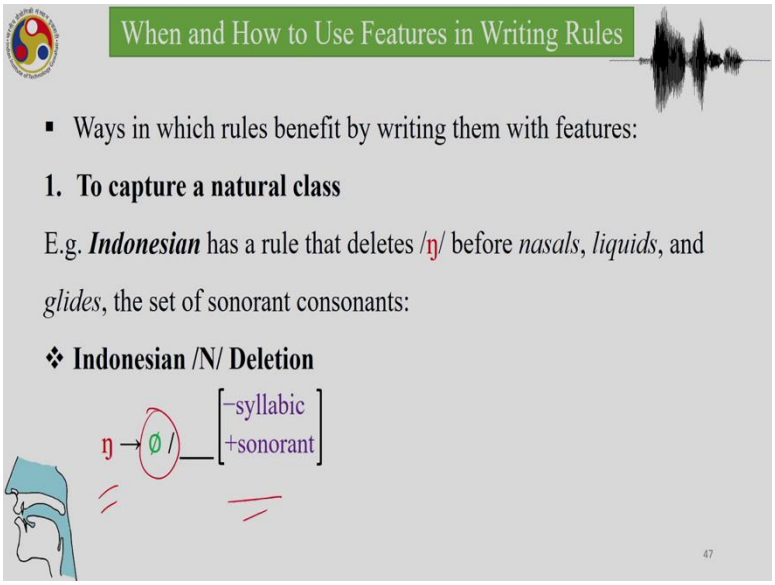

Ways in which rules benefit by writing them with features. So, we have seen a bit of this in the previous lecture, we will again show a little bit of Indonesian data where there isn't deletion. So, n goes to null in the presence of a following minus syllabic plus sonorant.

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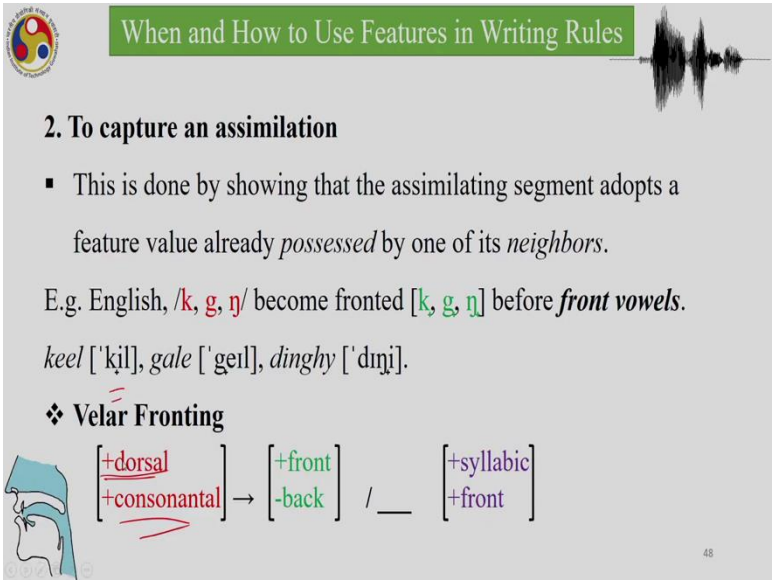

And then, to capture assimilation we write rules like this, velar fronting. So, velar is represented as plus dorsal minus plus consonantal, it becomes plus front and minus back. And that is how we express velar fronting in English keel, or gale, or dinghy.

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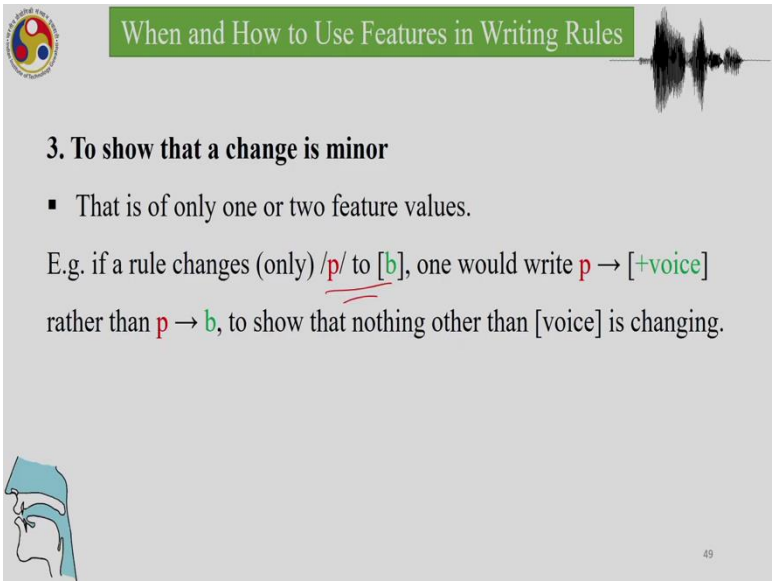

To show that a change is minor that is of only one or two feature values. So, and then if a rule changes only changes p to b, one would write p goes to plus voice rather than p to b, showing that nothing changes other than voice.

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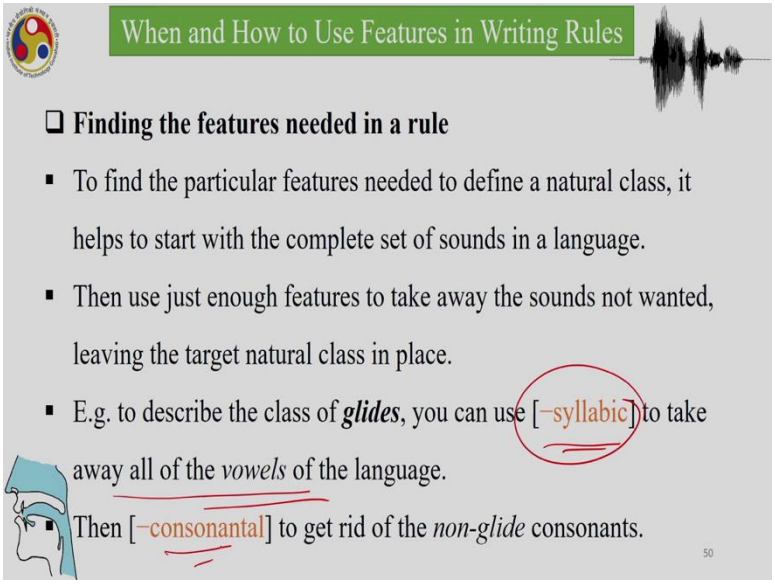

So, how do we find the features needed in a rule. To find the particular features needed to define a natural class, it helps to start with the complete set of sounds in a language. So, then we have to just use enough features to take away the sounds not wanted, leaving the target natural class in place. And to describe the class of glides, we can use minus syllabic to take away all the vowels of the language. So, once we say minus syllabic, then vowels are not there in the natural class, then minus consonantal get rid of all the non-glide consonants.

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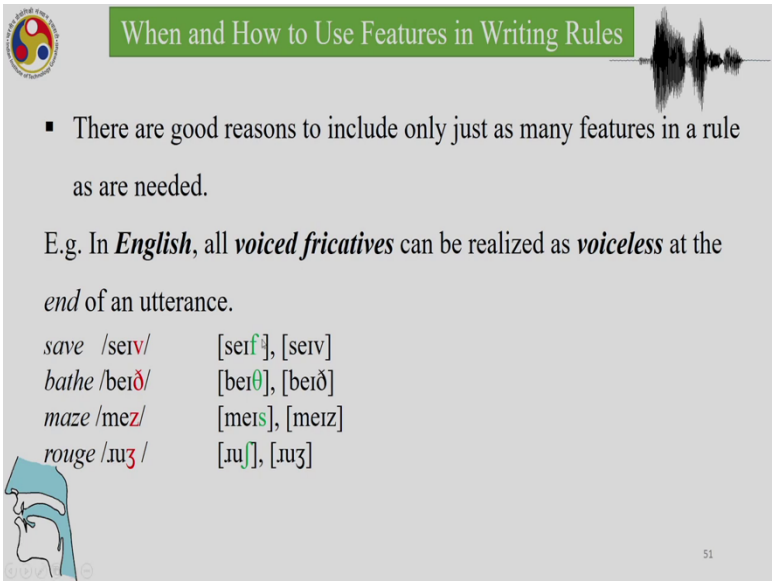

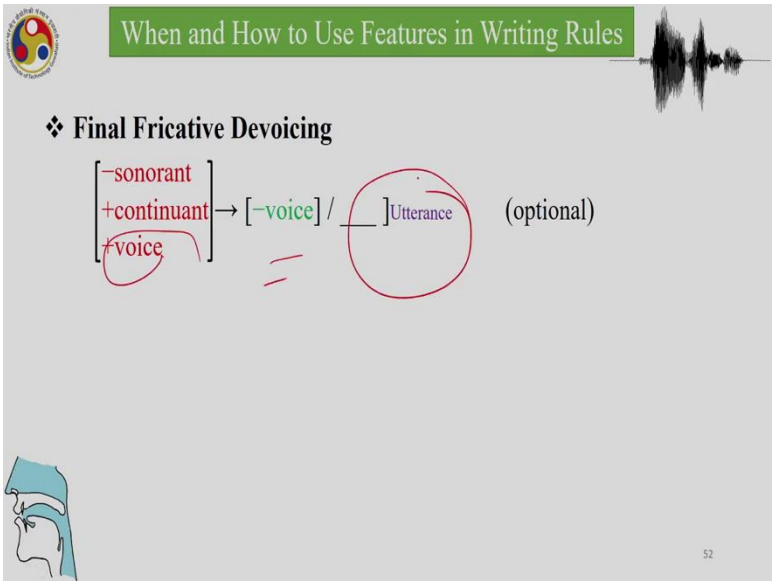

So, there are good reasons to include only just as many features that are needed. So, in English all voiced fricatives can be realized as voiceless at the end of utterance. So, save and bathe and maze etcetera. And final fricative devoicing can be just shown as plus voice going to minus voice at the end of an utterance.

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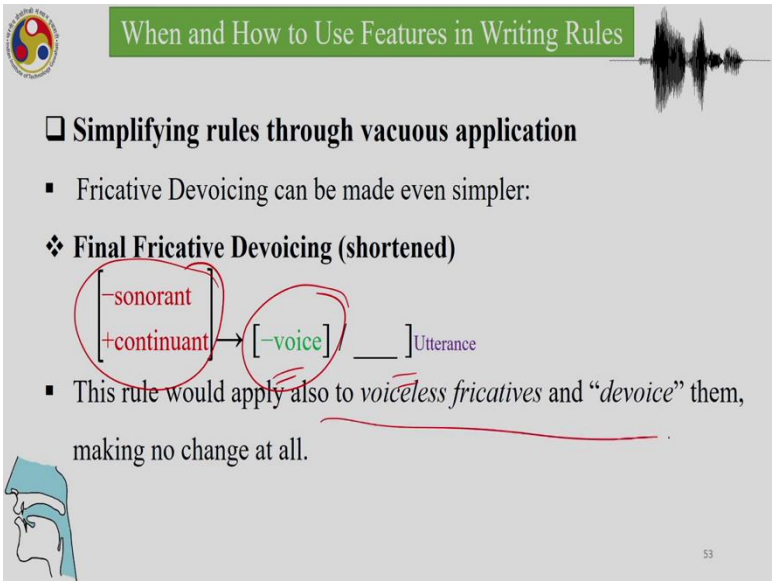

And simplifying rules through vacuous application. Fricative devoicing can be made even simpler. So, how do you make it simpler? We just say that sonorant minus sonorants become voiceless at the end of an utterance. This rule would apply to voiceless fricatives and devoice them. So, we are not saying anything about the voicing of voice property of minus sonorants, because we want to show that it loses a voice. So, this will also apply to voiceless fricatives and devoice them by saying this we mean that there is no change at all.

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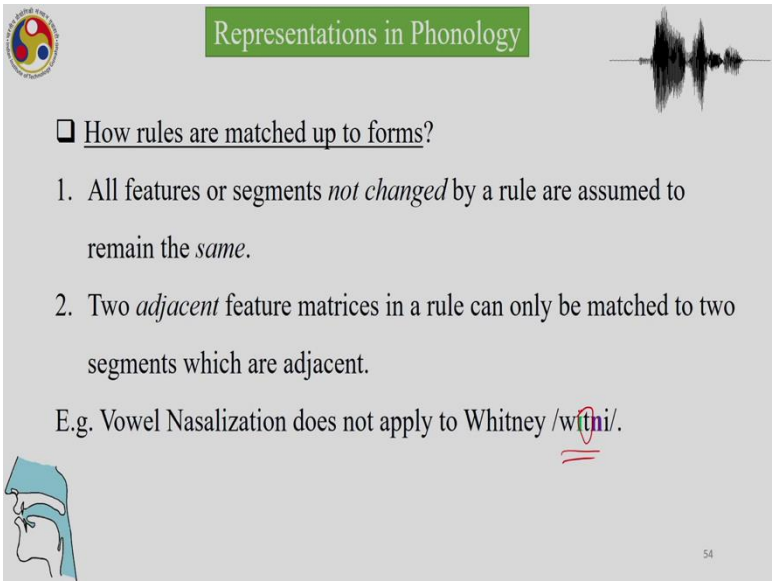

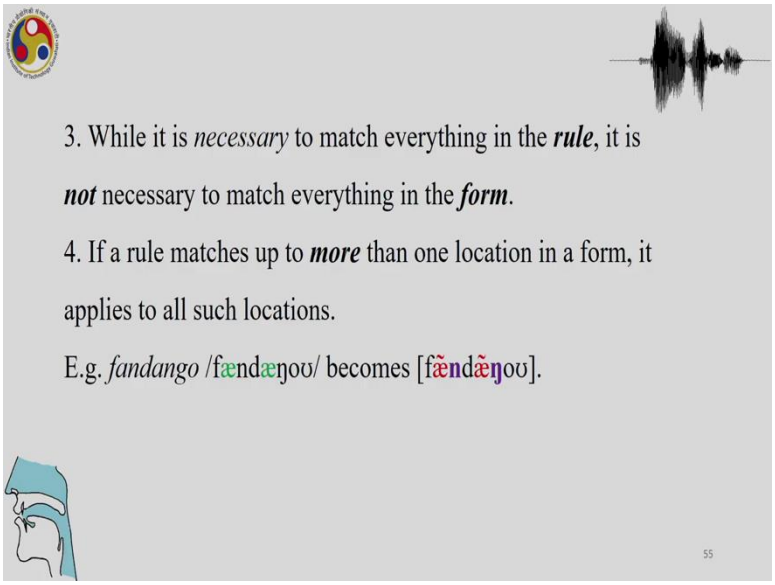

So, how are rules matched up to forms? All features or segments not changed by rule are assumed to remain the same. Two adjacent feature matrices in a row can only be matched to two segments which are adjacent. So, this rule of locality is important. Vowel Nasalization does not apply to Whitney, why not because there is a t in between, so adjacent features. While it is necessary to match everything in the rule, it is not necessary to match everything in the form. So, if a rule matches up to more than one location in a form, it applies to all such locations.

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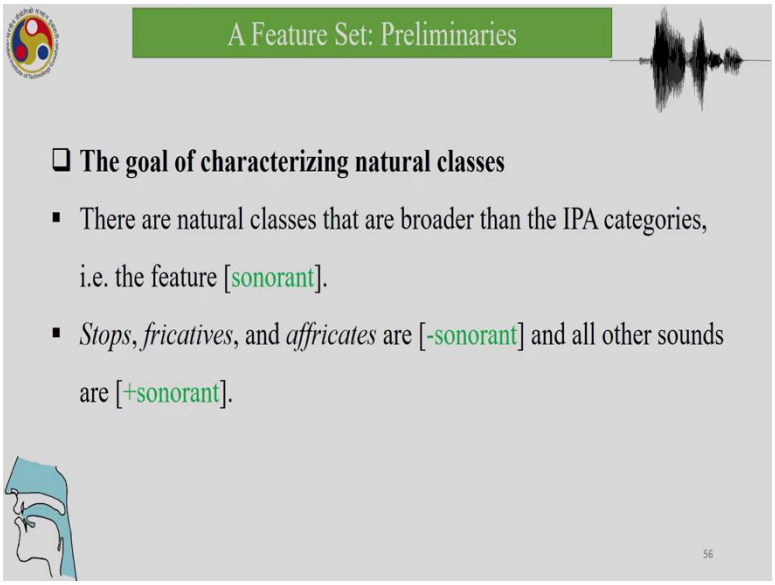

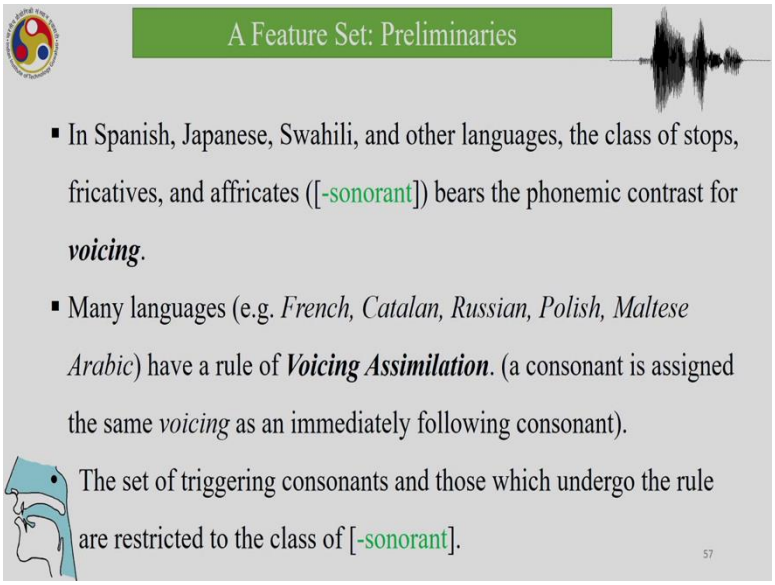

So, the goal of categorizing natural classes is that are broader than the IPA categories, the features sonorant. Stops, fricatives, affricates are minus sonorant, and all the sounds are plus sonorant. In Spanish, Japanese, Swahili, and other languages, the class of stops, fricatives, affricates bears the phonemic contrast voicing many languages have a voicing assimilation rule. And a consonant is assigned the same voicing as an immediately following consonant. And the set of triggering consonants and those which undergo the rule are restricted to class of minus sonorant.

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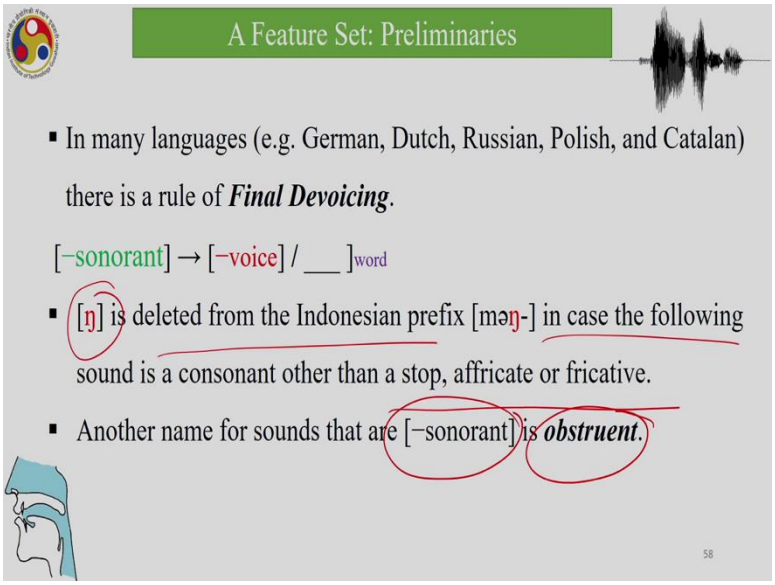

In many languages, example German, Dutch, Russian, Polish, and Catlin, there is a rule of final devoicing, so minus sooner and goes to minus voice, the end of a word and n is deleted from the Indonesian prefix man in the in case the following sound is a consonant as a stop, affricate or fricative.

So, n is deleted from prefix in case the following sound is a consonant other than a stop, fricative, or affricate. So, another name for those sound are minor sonorant, obstruent. So, n is deleted from an Indonesian prefix man in case the following sound is a minus sonorant or obstruent is a rule.

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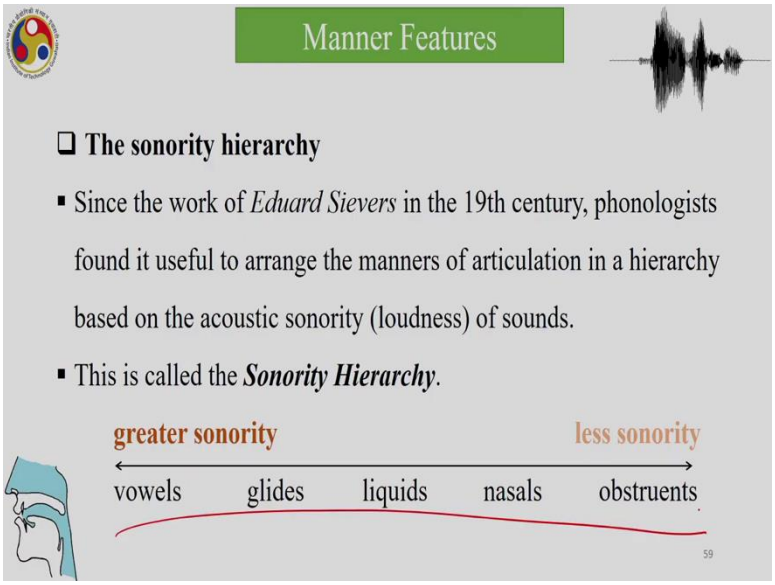

The sonority hierarchy which we have seen in the previous lecture also, since the work of Eduard Sievers in 19th century, phonologists found it useful to arrange the manners of articulation in a hierarchy based on the acoustic loudness of sounds and this is called the sonority hierarchy. So, greatest minority and less minority, vowels, glides, liquids, nasals, obstruents is a hierarchy.

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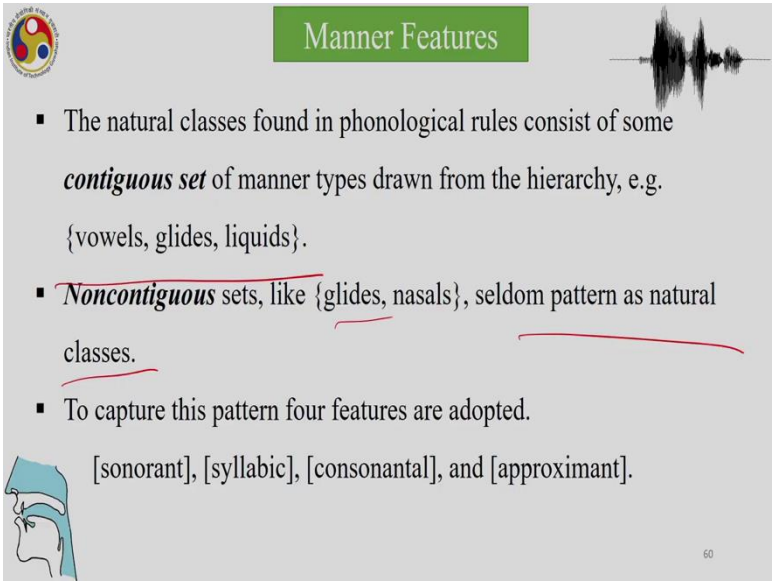

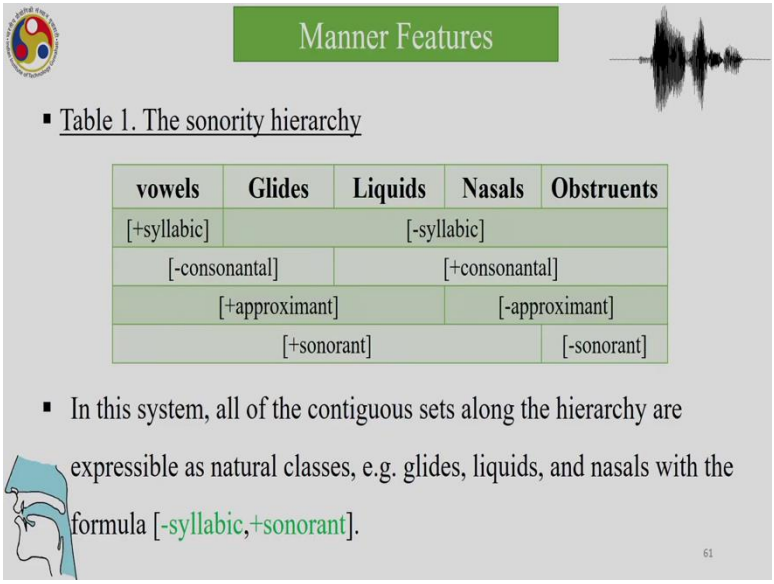

The natural classes found in phonology rules consist of some contiguous set of manner types drawn from the hierarchy example, vowels, glides, and liquids. So non-contiguous sets like glides, nasals, which means here, glides and nasals are non-contiguous. You have liquids between them, then they never pattern as natural classes and to capture this pattern four features are adopted sonorant, syllabic, consonantal, and approximant.

And this is the sonority hierarchy. In this system, all of the contiguous sets along the hierarchy are expressible as natural classes, glides, liquids, and nasals with a formula minus syllabic plus sonorant.

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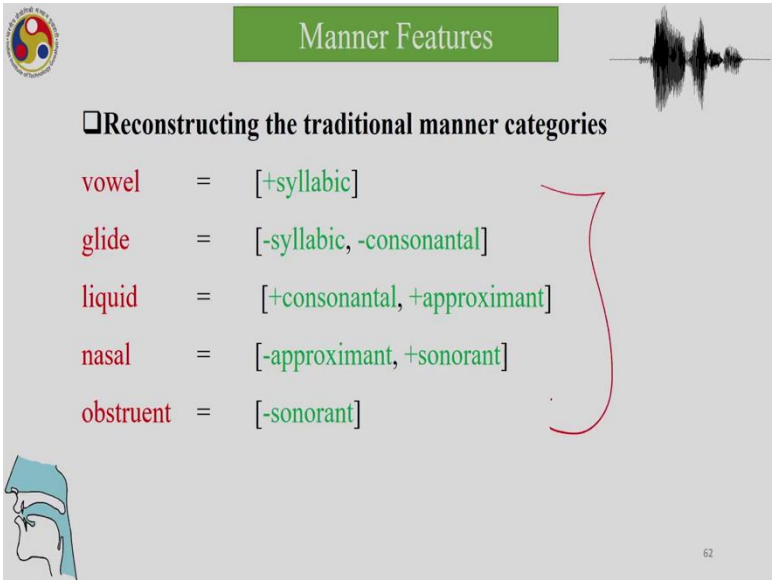

So, vowel is plus syllabic, glide is minus syllabic minus consonantal, liquid is plus consonantal plus approximant, nasal is minus approximant plus sonorant, obstruents are minus sonorant. So, this is your most important traditional manner categories.

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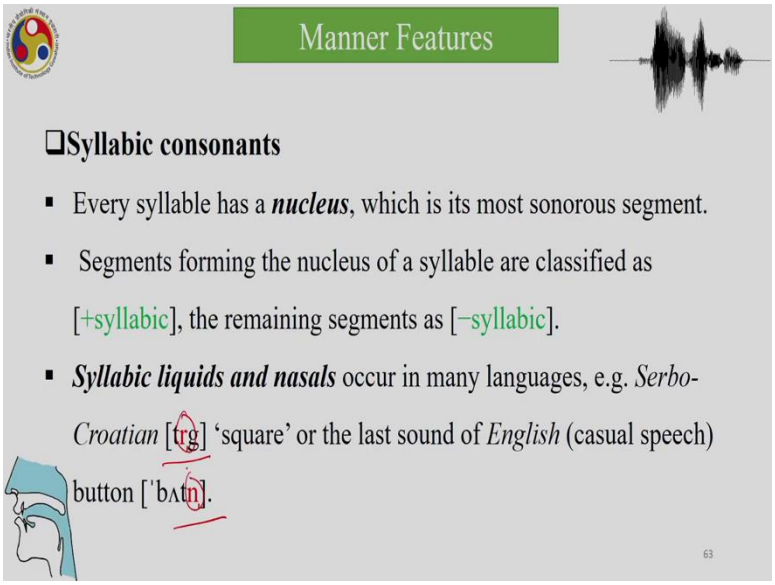

Syllabic consonants every syllable has a nucleus, which is its most sonorous segment. Segments forming the nucleus of a syllable are classified as plus syllabic, the remaining

segments is minus syllabic. And syllabic liquids and nasals occur in many languages example Serbo-Croatian trg ‘square’ or the last sound of English button, so here consonants like syllabic, liquids, and nasals the nucleus of syllable.

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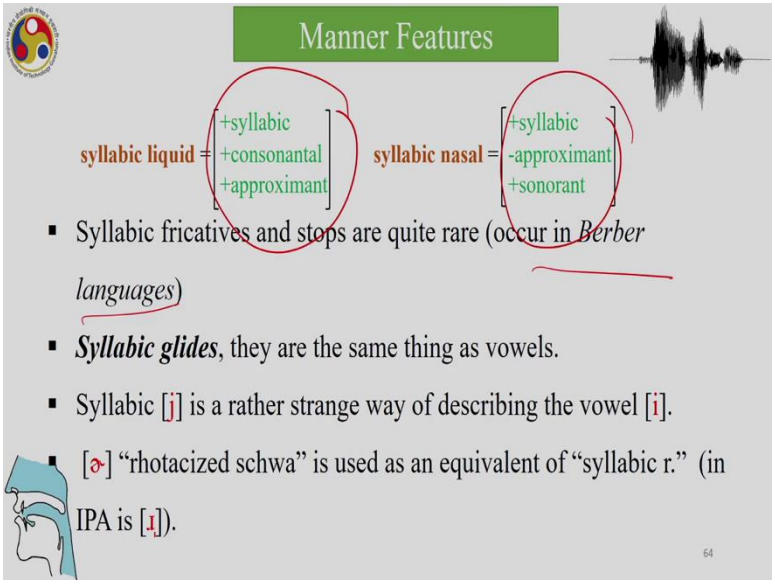

So, syllabic liquids even though they are liquids and consonants, they will have the feature of being plus syllabic. So, syllabic fricatives and stops are quite rare. They occur in languages like Berber and some slavic languages, and syllabic guides are the same thing as vowel syllabic j is rather strange way of describing the vowel I, rhoticized schwas used as an equivalent of syllabic r.

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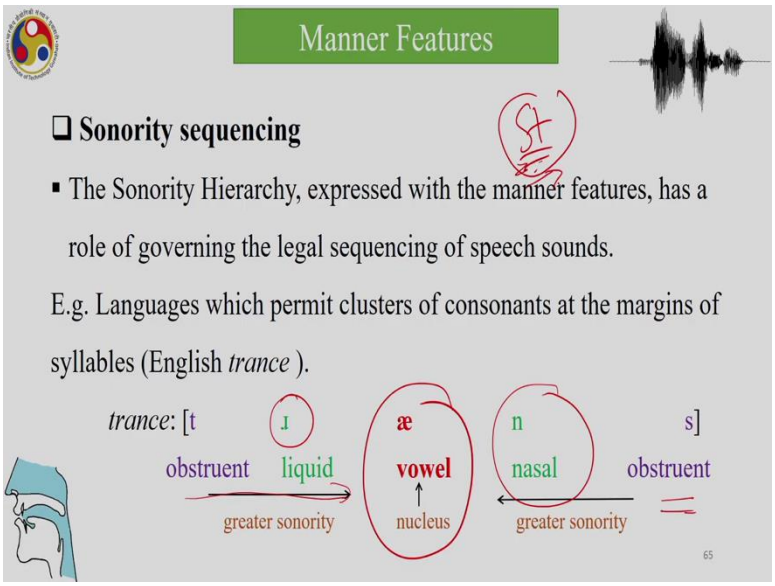

The sonority hierarchy expressed with the manner features has a rule of governing the legal sequence of speech sounds, example languages, which permit clusters of consonants at the margins of syllables. So, this is word trans, where vowel is the nucleus and we can see the sonority is increasing with the placement of the liquid after the obstruent and sonority has to decrease ideally in the end of a consonant and we have trans and then we have a nasal here.

However, the s in English does not follow the rules of syllabification in English, because we have many clusters in English which start with s and s has greater sonority then the obstruent for instance, t. So, in that way, for instance, t violates its sonority hierarchy. And because this is more sonorous and the sonority should increase, but it is considered to be an exception.

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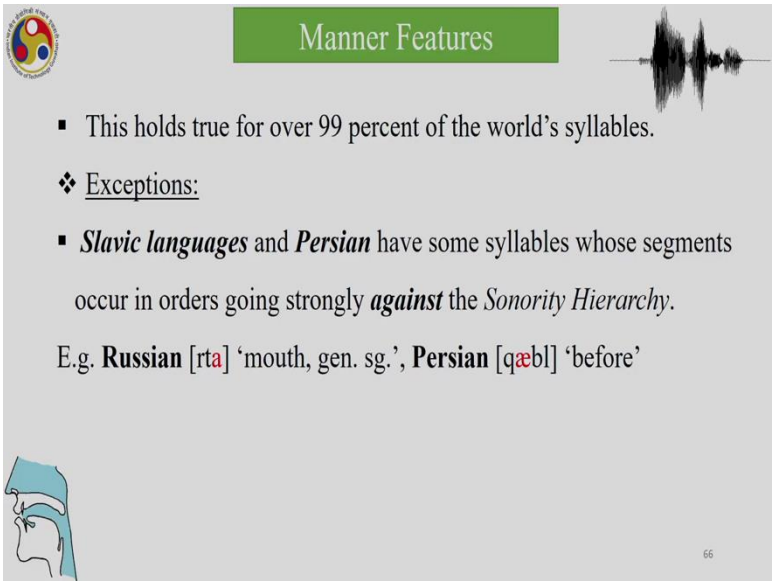

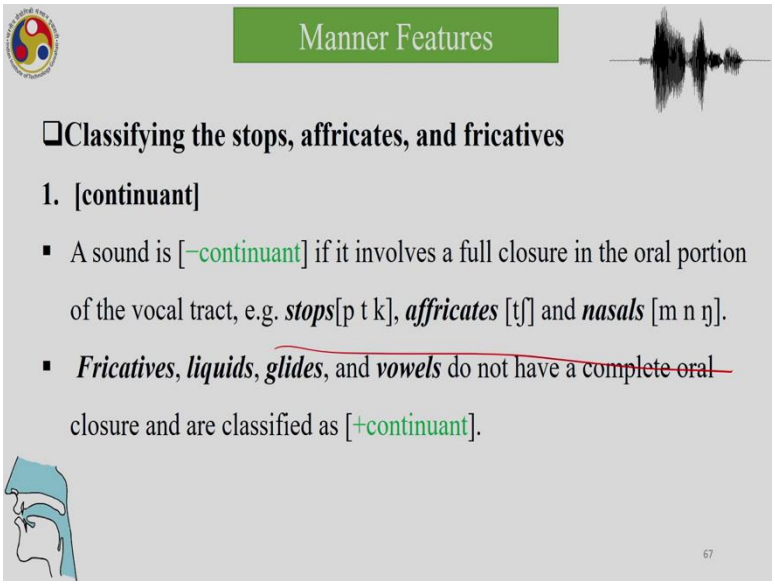

So, this holds true for over 99 percent of the worlds syllables, there are some exceptions like Slavic languages and Persian have some syllables whose segments occur in orders going strongly against sonority hierarchy. And then we have continuant which is most important when we talk about stops, affricates, and nasals. So, what is minus continuant? Stops are minus continuants and all these are belonging to category of minus continuant and fricatives, liquids, glides belong to category of plus continuant.

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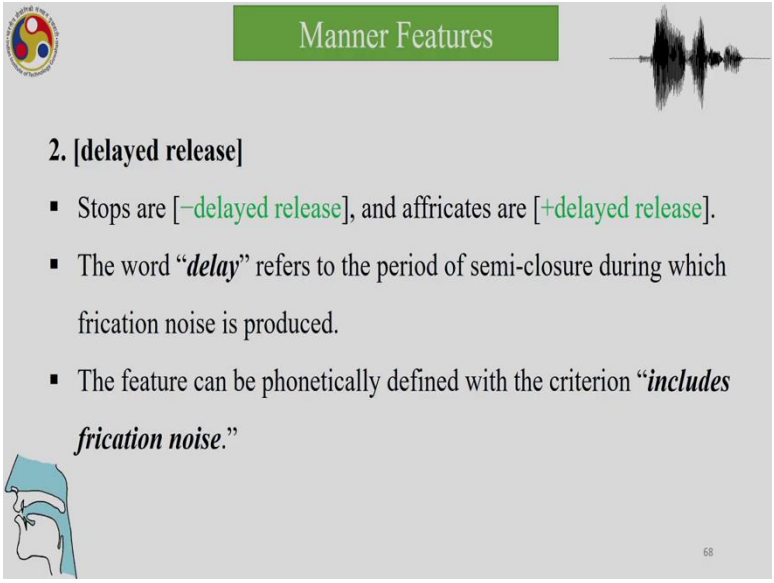

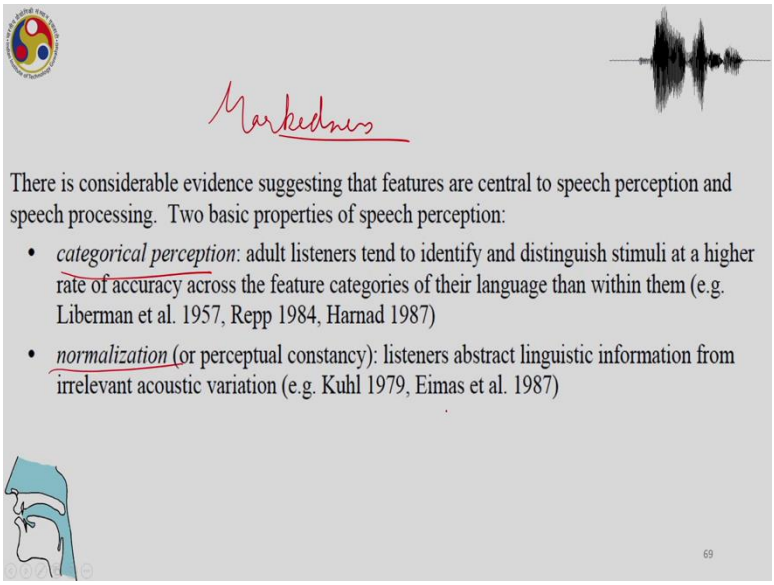

Delayed release stops or minus delayed release, affricates are plus delayed release. So, this is revision of what we have seen already, the feature can be phonetically defined with the criterion includes freakish and noise. So, we have come to the end of discussion of our discussion on features. So, I will say a few words about something called Markedness.

So, there is considerable evidence suggesting that features are central to speech perception and speech processing, two basic properties of speech perception and categorical perception which we have seen in our lectures on categorical perception and normalization, that is, listeners, abstract, linguistic information from irrelevant acoustic variation.

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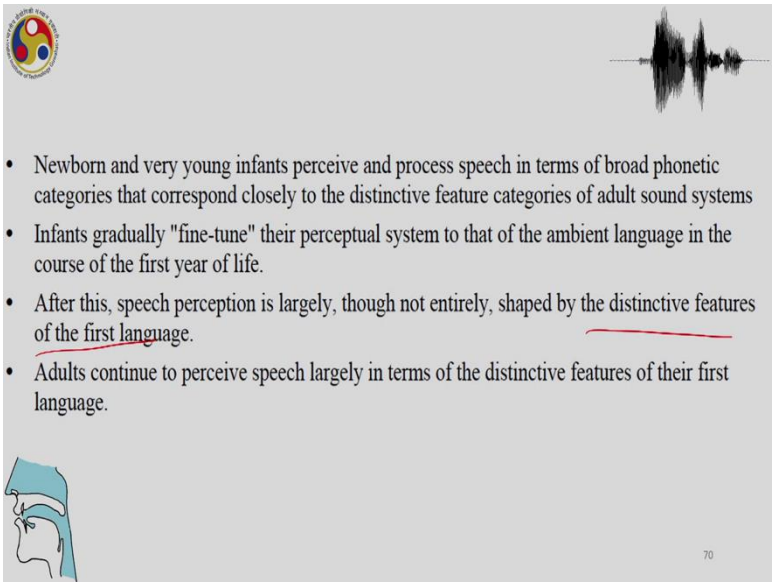

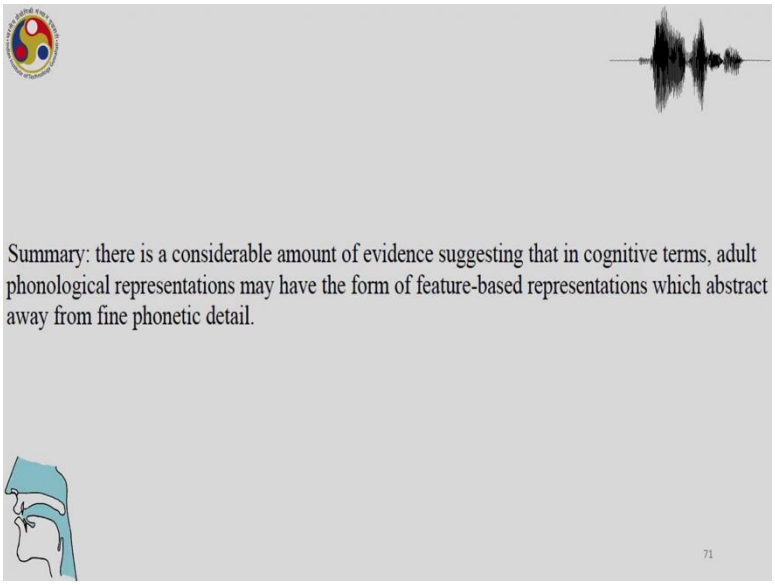

So, a newborn and very young infants perceive and process speech in terms of broad phonetic categories that correspond closely to the distinctive feature categories of adult sound systems. Infants gradually fine-tune their perceptual system to that of the ambient language. And after this, speech perception is largely shaped by distinctive features of the first language and adults continue to perceive speech largely in terms of distinctive features of their first language.

So, there are a considerable amount of evidence suggesting that in cognitive terms, adult phonological representations have the form of feature-based representations, which abstract away from fine phonetic detail.

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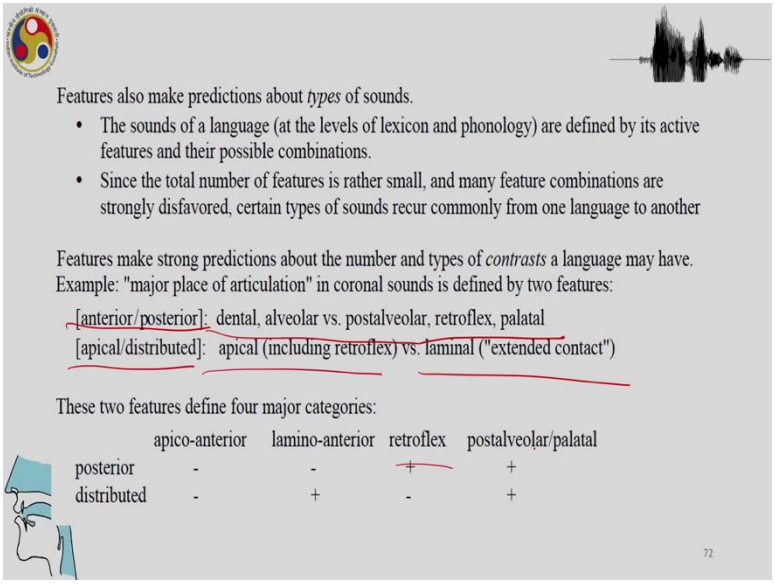

Features also make predictions about types of sounds. The type of sounds of a language, at the levels of lexicon and phonology are defined by its active features and their possible combinations. And features make strong predictions about the number and types of contrast a language may have. Example, major place of articulation in coronal sounds is defined by two features, anterior and posterior.

So, dental alveolar versus post alveolar, retroflexes, palatal, these can be divided along lines of anterior posterior or minus anterior plus anterior and apical distributed, apical including retroflexes versus laminal. So, we have seen these differences and we have also seen the difference between apico-anterior and the laminal-anterior, retroflexes, post-alveolar, etcetera.

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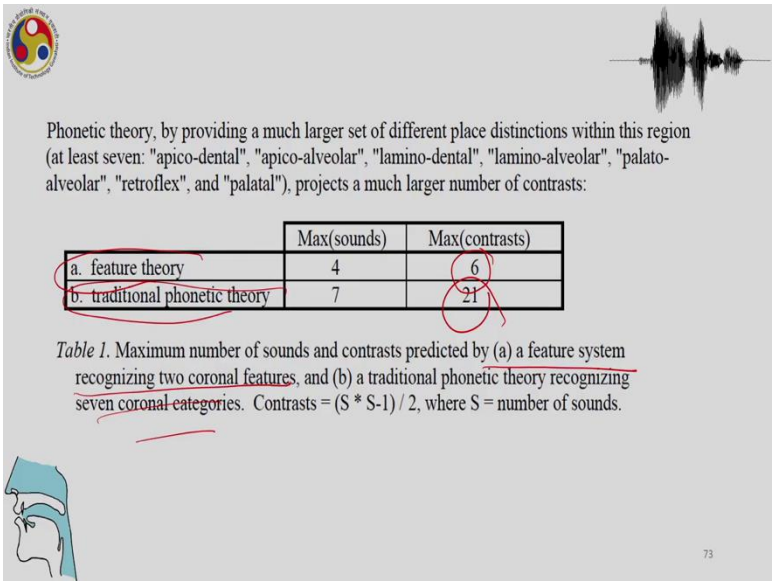

So, phonetic theory by providing a much larger set of different place distinctions within this region, projects a much larger number of contrasts. However, phonology predicts the right number of contrasts, which are available in the world's languages.

So maximum number of sounds and contrasts predicted by a) feature system recognizing two coronal features here and b) a traditional phonetic theory recognizing seven coronal categories which we saw in our lectures on articulatory phonetics, where we saw seven coronal categories, but if they were all present, then the max number of contrasts should have been 21. However, the phonology shows the right number of contrasts under the feature system, predicts the right number of contracts.

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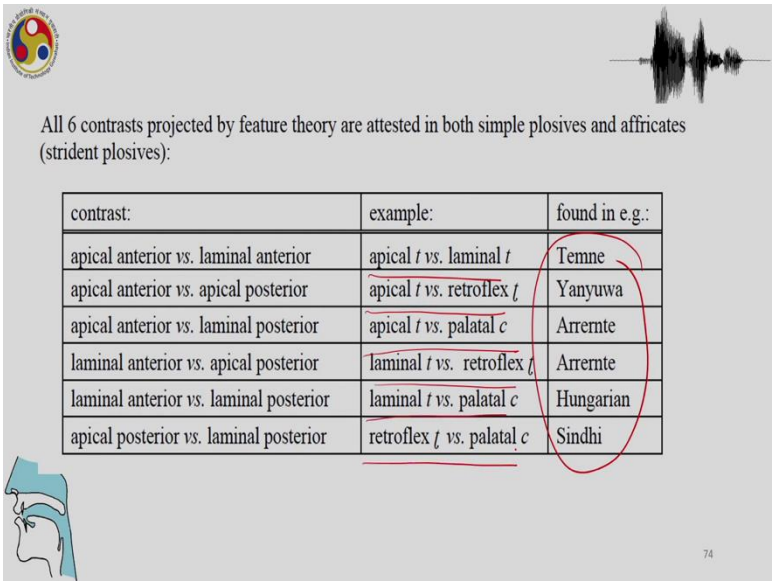

All 6 contrasts projected by feature theory are attested in both simple plosives and affricates (strident plosives):

contrast:	example:	found in e.g.:
apical anterior *vs.* laminal anterior	apical *t vs.* laminal *t*	Temne
apical anterior *vs.* apical posterior	apical *t vs.* retroflex *ʈ*	Yanyuwa
apical anterior *vs.* laminal posterior	apical *t vs.* palatal *c*	Arrernte
laminal anterior *vs.* apical posterior	laminal *t vs.* retroflex *ʈ*	Arrernte
laminal anterior *vs.* laminal posterior	laminal *t* vs. palatal *c*	Hungarian
apical posterior *vs.* laminal posterior	retroflex *ʈ vs.* palatal *c*	Sindhi

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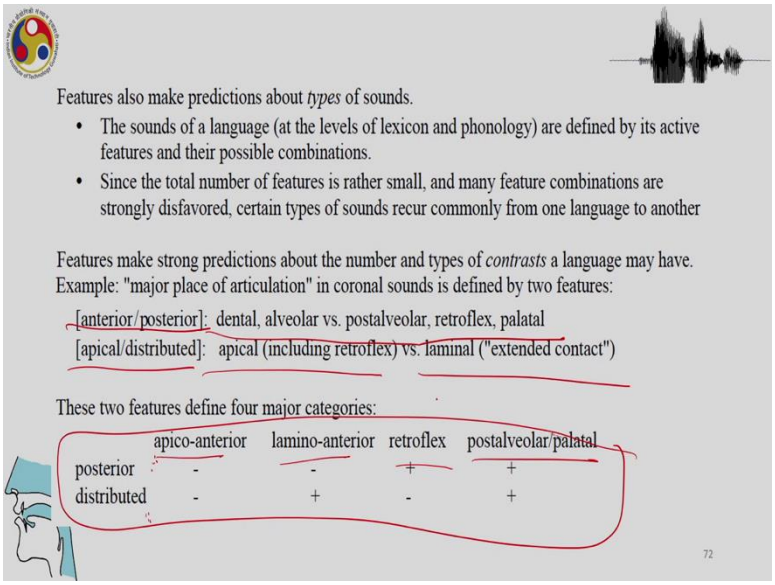

Features also make predictions about *types* of sounds.

- The sounds of a language (at the levels of lexicon and phonology) are defined by its active features and their possible combinations.
- Since the total number of features is rather small, and many feature combinations are strongly disfavored, certain types of sounds recur commonly from one language to another

Features make strong predictions about the number and types of *contrasts* a language may have.
Example: "major place of articulation" in coronal sounds is defined by two features:

[anterior/posterior]: dental, alveolar vs. postalveolar, retroflex, palatal
[apical/distributed]: apical (including retroflex) vs. laminal ("extended contact")

These two features define four major categories:

	apico-anterior	lamino-anterior	retroflex	postalveolar/palatal
posterior	-	-	+	+
distributed	-	+	-	+

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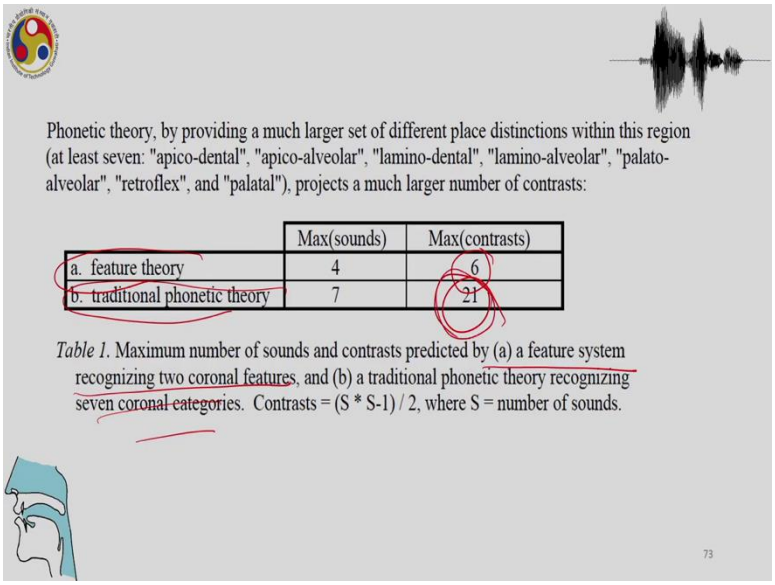

So, all six contrasts predicted by feature theory are tested in both simple process and affricates. So, these are the different languages which we have also seen in our previous lectures in the distinction between apicals versus laminal, apicals versus retroflexes, laminal apicals, palatal laminal versus retroflexes, laminal, palatal, laminal versus palatal.

So, feature theory predicts because of these categories post alveolar, retroflexes, lamino-anterior, and apico-anterior which can be divided along the lines of plus distributed minus distributed, we will get only these features, we will not get the 21 predicted by the distribution according to phonetic detail.

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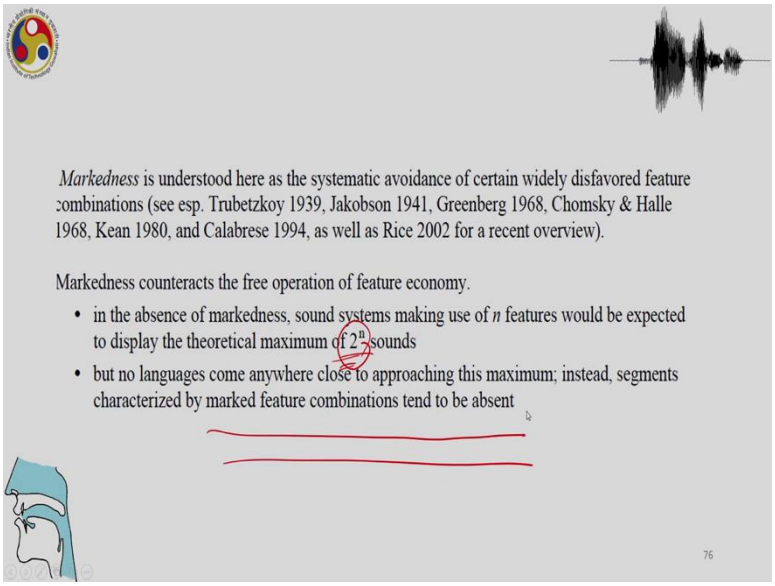

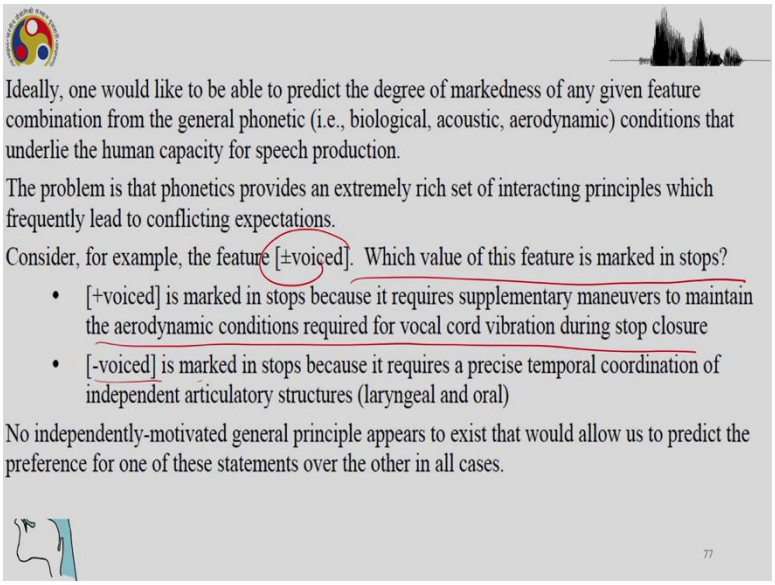

So, I will conclude this lecture with a word on markedness. So, markedness is understood here as a system of avoidance of certain widely disfavored feature combinations and markedness counteracts the free operation of feature economy. So, in the absence of markedness, sound systems make use of n features would be expected display the theoretical maximum of 2 to the power of n features, but no languages come anywhere close to approaching this maximum, because theoretical maximum because of number of features which you can have two values.

So, everything would be 2 to the power of n but no languages come anywhere close to approaching this maximum. Instead, segments characterized by marked feature combinations tend to be absent. So, feature combinations which are difficult in production in articulation are absent in languages of the world.

And so, ideally, one would like to be able to predict the degree of markedness of any given feature combination from the general phonetic conditions that underlie the human capacity for speech production. And the problem is that phonetics provides an extremely rich set of interacting principles, which frequently lead to some conflicting expectations.

So, for instance, plus minus voice, which of this feature is marked in stops? So, plus voice is marked in stops because it requires supplementary manoeuvres to maintain the aerodynamic conditions required for vocal cord. Also, minus voice is marked because it requires very precise temporal coordination of your articulatory structure's laryngeal, and oral. So, no independently motivated general principle appears to exist that will allow us to predict a preference for one of these statements over the other in all cases.

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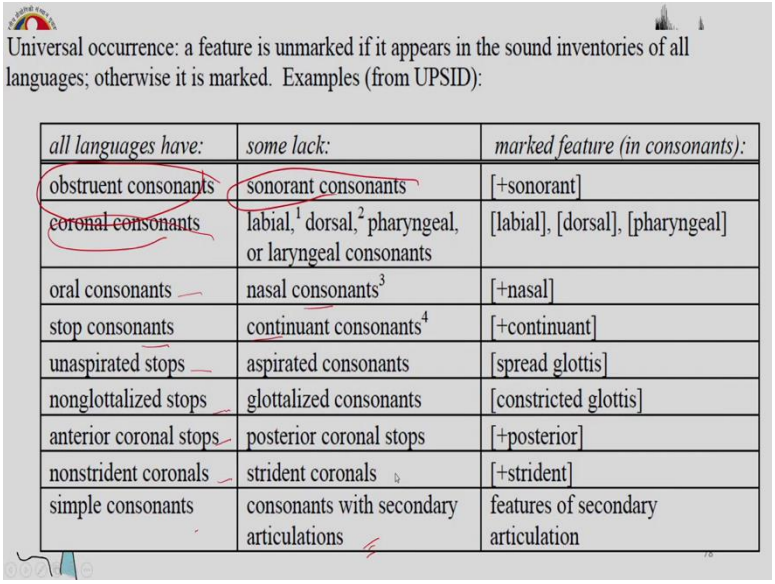

So, a feature is unmarked if it appears in sound inventories of all languages. Otherwise, it is marked, so marked features in consonants plus all languages have obstruent consonants, some lack sonorant consonants. So, all languages have coronal consonants, some lack these labial, dorsal, pharyngeal, laryngeal or oral consonants, but can lack nasal consonant, stop consonants but can lack continuant consonants, unaspirated stops, there are unaspirated stops but aspirate can be missing, non-glottalized can be there, glottalized can be missing.

Anterior coronal stops can be their posterior can be missing, non-strident coronals are there, strident coronals can be missing in simple consonants, but articulatory consonant, secondary articulations are maybe not there in many languages.

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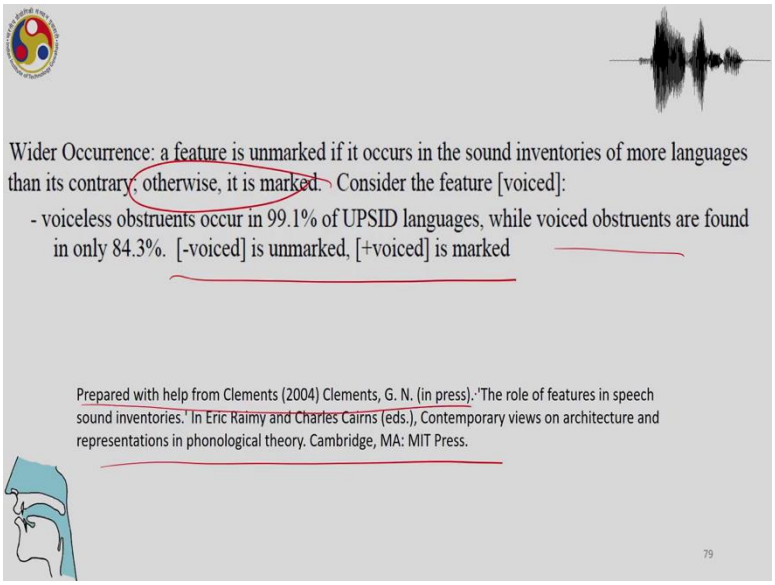

So, Wider Occurrence: a feature is unmarked if it occurs in the sound inventories of more languages, than it is contrary, otherwise it is marked. So, this is something we can assume to be correct for languages than the more a feature is preferred in languages, the more unmarked it is. So, voiceless obstruents occur in 99.1 percent of the UPSID languages, while voice substrings are found only in 84.3 percent of them.

So, minus voiced is unmarked plus voiced is marked. This part of the lecture was prepared with help from this paper by Clements 2004. So, thank you for your attention. And we will continue with phonology in the following lectures. Thank you.