

Indian Institute of Technology Madras

Presents

NPTEL

NATIONAL PROGRAMME ON TECHNOLOGY LEARNING

Introduction to Modern Linguistics

Lecture- 18

Phonemes & Allophones:

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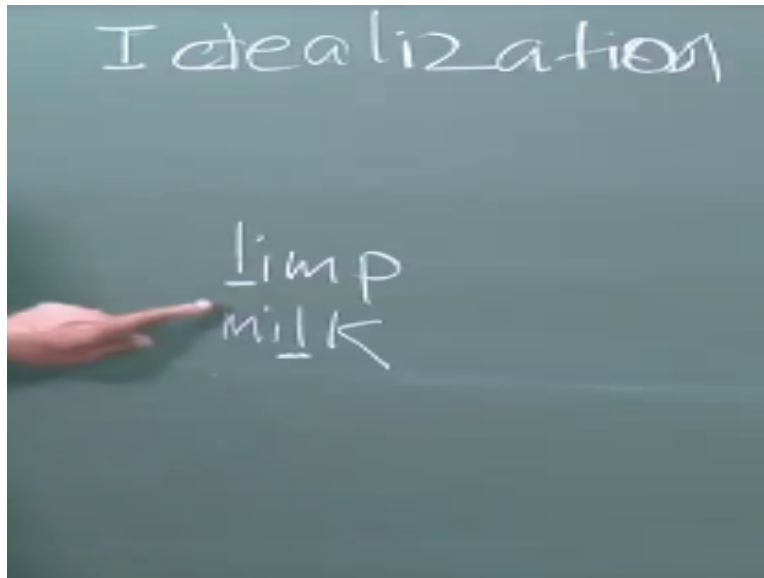
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Good evening are you all right comfortable shall we start okay lovely ,so this evening we are going into you know or we have already started got into another module called phonology how speech sounds are organized do you remember. I told you phonetics is the study of sounds in isolation single sound one sound at a time but phonology is the study of sounds in combination sounds in use sounds together actually none of us you know exceptional situations apart there may be exceptional situations.

When we just say ah ooh when we are too tired when we are too sick or when we shout to call somebody we say hey but ordinarily we do not speak one sound at a time we have several sounds coming together and when these several sounds come together. I told you the other day they no longer remain please pay attention the ideal or the idealized sound that are described all of last week's please right that is an idealization.

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Phonetics describes an idealized sound generally when you describe it in isolation of course there can be phonetics of sounds in use you can take up one particular sound study it in as great detail as you like but whatever I told you last week is an idealized description when, I say but is a bilabial plosive voiceless okay, it is true only a part in isolation it is but we never say we say but with a part we say P we say boo there is some other sound and when there is some other sound it may or may not be the same sounds very.

I told you the other day that because of sociological reason because of social reasons and because of phonological reasons speech sounds have great variants so much so that we do not produce the same sounds alike on two occasions correct we do not produce the same sounds alike on two occasions then the question is and that is the question we will be dealing with today if with speech sounds have such a great variety how do we recognize them you know people speak differently on different occasions we know when I speak in class it is one kind of tone tempo.

Where I speak at home with my wife or children it is another kind of tone and tempo when I speak with you guys outside on the road it is another kind of tone or tempo same thing is true for you okay. none of us speaks alike in all social situations similarly phonological content it is also change you know what coming before E is produced with spread lips it is pin but pas coming before o is produced with the rounded lips we say put okay, we do not say put dewy can you say put with a spread lips try can you say pin with rounded lips you cannot okay.

Similarly you know sounds lose gain values actually every little sound that is produced in his page on each occasion it is different if you take a spectrogram of his page sounds you will find that they differ on different occasions then there is a theoretical question and this theoretical question can be important for you if you do a speech engineering and that sort of thing if each sound is different each time then how do we recognize them had car or car or girl has the same sound is not there a contradiction yes or no is not there you know if they differ every time.

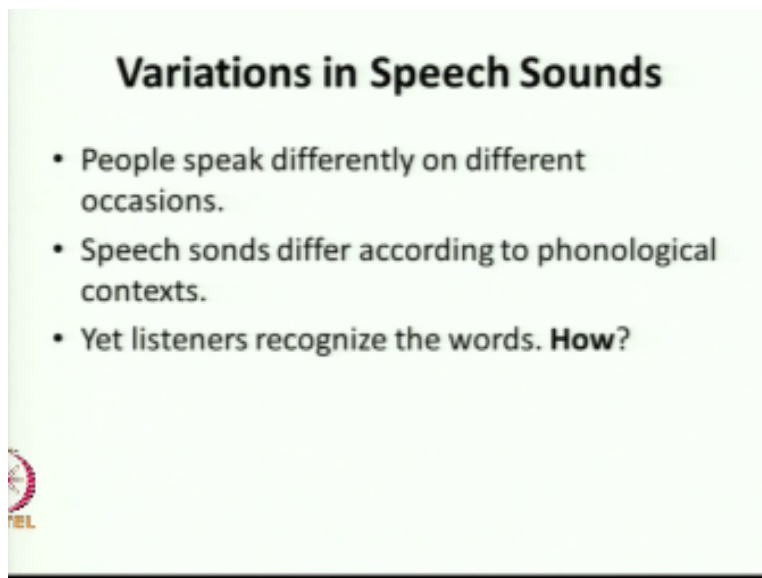
Then how do we recognize them that this is X or this is Y or this is a or this is me actually it is a larger question it is a question of philosophy pertaining to nature each of us differ each of us changed look at your photograph when you were 10 year old is there any similarity there are some similarities but there are lot of differences in spite of these differences are you with me in spite of these differences when you look at your photograph receiving the prize in your school when you were in class one do you have a photograph like that at home do.

You have a photograph like that okay you still recognize yourself how do you recognize yourself come on tell me now give me some oneself please how do you recognize you did not have mustache you do not you did not look as villainous then as you look now then you a sweet innocent little kid okay everyone felt like loving you today everyone is frightened of you your Dean your director your professor okay, what similarity is there come on tell me there is some similarity and the similarity is that it is not that we have entirely changed the basic or what we call relative geometry.

It is still the same your eyes are still at the same distance from your nose as they wear your chin still makes the same triangle as it did your jaws are still the same shape in spite of the fact that you lose here when you are 60 65 like me when I was your age I look at those photographs and they look like me and I am surprised with this young man okay even then you recognize yourself right how do you do that you do that because that is an important point and that is where what computer science uses in artificial intelligence and expert systems.

In the speech recognition variation is there please make a note make a mental note variation is there but it is not complete variation it is not that it had changed entirely it is not that a lion has become dog and dog has become lion it is not that a B-Tech has gone into you know study some other things some elsewhere there may be some change but a lot of features remain number one number two patterns remain patterns of use remain okay.

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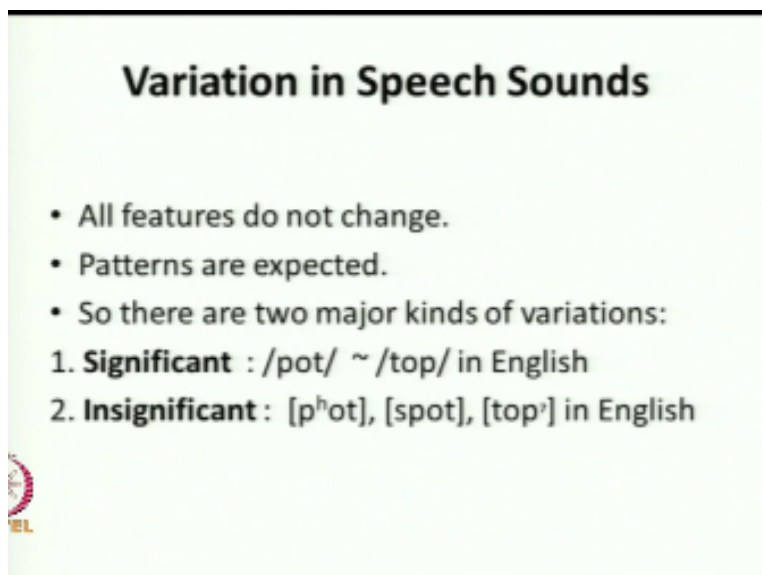


Variations in Speech Sounds

- People speak differently on different occasions.
- Speech sounds differ according to phonological contexts.
- Yet listeners recognize the words. **How?**

So the question how do we recognize the same word when they are so distorted same sound when they vary so much how do we recognize them we recognize them because number one.

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Variation in Speech Sounds

- All features do not change.
- Patterns are expected.
- So there are two major kinds of variations:
 1. **Significant** : /pot/ ~ /top/ in English
 2. **Insignificant** : [p^hot], [spot], [top^ɹ] in English

All features do not change you know all features do not change power may become sometimes bar okay temple may become temple , but it is still while avian it is still positive two-thirds of the features not is still there it is only that voiceless has gone and voicing has come in similarly

you know when become front sound becomes back sound when something which was rounded becomes unrounded maybe one feature had changed to three four five other features still remain as the well okay it is not that everything has changed moreover okay moreover and this is what is significant again in human behavior.

In the behavior or natural elements you know in actually nonliving things you can do a lot of engineering with finite element methods because you know their behavior is predictable its cement under water in eight hours at a particular temperature will behave everywhere alike but we cannot say that about human beings ,a human being under water for one hour will behave in one way if it is there with friend another way if it is there with mother yet another way if it is there with somebody else human beings are more dynamic much more dynamic.

Therefore statistics may not be the best way of predicting their behavior however please give me all your attention however it is not that our behaviors do not have patterns our behaviors also have predictable patterns when you greet another B-Tech when you greet another B-Tech from another hostel okay ,when you greet another B-Tech from another hostel another gender when you greet a teacher who is looking at your project report the point is you know I am trying to make.

It light for you the point is our behavior is predictable to a large extent though not entirely we cannot say I can say that a large number of students after this class will go to football ground or go to Goren earth but maybe ,I cannot say nobody will go to the library that cannot say nobody will go to the room and nobody will sleep in the case of a speech sounds also these two things remain number one enlarged to a large extent features survive some features change and patterns remain some sound occurs at the beginning of the world some sound occurs at the end of the world some sound occurs.

In the middle of the world and we know how it will look like in the middle of the world we know how it will look like at the beginning of the world we know how it will look like at the end of the world and that is how we recognize these words by enlarge these are the answers there may be some variations some changes let us look at the examples say for example you know look at pot and top in English when you say in part both who lips part but when you say top lips do not part they are not by in that sense you know there is no release.

They are not closing they are definitely bilabial are definitely voiceless but not closing one feature has gone two features is still remain yet we know the pattern that unreleased you can write on the notebook you can write in your head unreleased plosive will occur only at the end of the word only before silence okay it cannot occur at the beginning of the word is so obvious on the other hand released you know and under pressure you can say pot.

In English they do that okay this occurs only at the beginning of the word when you have it the same sound in the middle of the word it is in its neutral form Sport spear okay there is neither power nor power it is neither there is extra breath pulse night sorry neither, there is extra puff of air nor it is the case that it is unreal this kind of sound can only occur in the middle of the word okay and at the end of the word again.

You see this symbol can you see this symbol this diacritic looks like seven okay this indicates that purr is unreleased the poison hasn't taken place you have just said top and the lips are closed it is not released but this H here indicates extra puff of air we call it aspiration okay this can occur aspirated plosive can occur only before a stressed vowel in English okay in similarly in English and unreleased similarly in English and unreleased bilabial plosive can occur only at the end of the word so we know the pattern.

We know the features and therefore we know how to predict how to recognize by a large you can write rules about them and we will let us see how we go look at some more example.

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Insignificant Variations

- /p/ in [p^hi:k], [kept] and [ki:p^ʔ] are different.
- /t/ in [t^hæks], [kæts] and [sæt] are different.
- /k/ in [k^hæp], [tæks] and [pæk] are different.

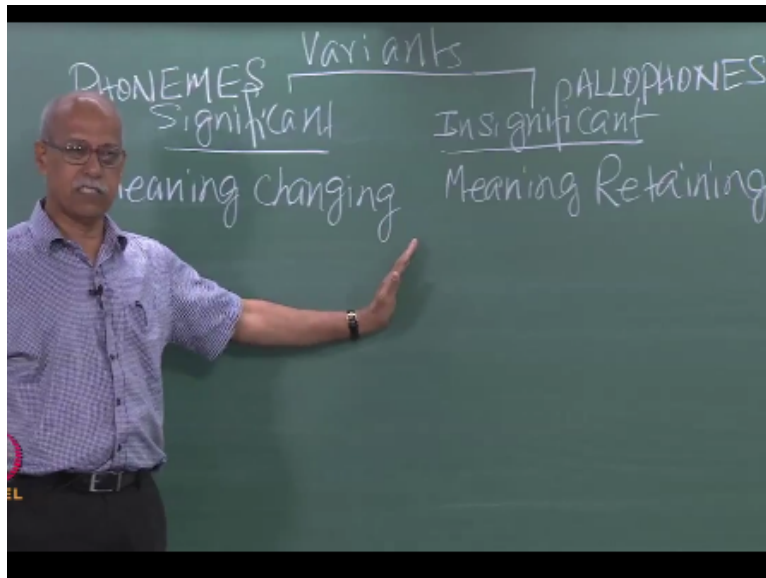
- [kh], [k] or [k^ʔ] can not replace one another.
- They are bound by their contexts.
- But some variants are free, they can occur anywhere, yet they do not change meaning.

There are variations but all are all variations equally important equally significant whether you pronounce ,with a spread lips as in pin or with rounded lips as input or push how does it matter for consonants we saw that rounded and unrounded lips are important only for vowels do you remember yes or no please right for consonants other things are important voicing is important place of articulation is important place of manner of release is important manner of obstruction is important but shape of lips is not important for confident.

Similarly all variations do not change meanings some variations do but all variations do nor change meaning whether you come to the classroom in three-piece suit or you come to the classroom in shorts that is a very trivial kind of variation okay ,but a significant variation will be when you come to class with a loud speaker you speak and I talk then the class does not happen the class will happen if only one person speaks at a time okay so you know there are variations in behavior as of human beings.

So of his beat sounds but all variations are please note all variations are not equally significant okay there can be two kinds of speech variations or variants okay.

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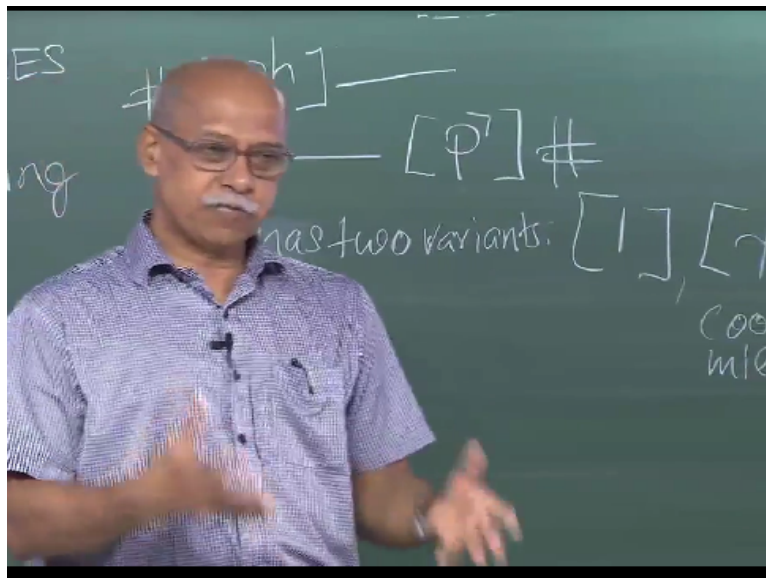
There can be two kinds of variants one kind can be significant it changes meaning okay, the other kind be insignificant does not matter you can ignore it okay, insignificant look at the examples, I have given you on the screen say Paul for example you know under stress when you emphasize when you stress when you say I am not talking at the bottom. I am talking about the pake okay then you are as parroting it but when it comes in the middle of the word as you say well the book has been well kept okay or when it comes at the end are you going to keep these books okay.

So keep and there is silence then pearl has three variants one is under stress when you add an extra aspiration extra pop of air the second is neutral fault third is unreleased for these are three variants upper voiceless bilabial plosive usually units of a class behave in one kind behave in one manner that is why you can make generalizations you can say all audience will behave in this manner all X will behave in that manner all Y will behave in they are all members of the class called Y will behave.

In this manner that is why you can make predictions about molecules about variety of elements in nature from water to mountain from sea to mountain okay, you can make predictions about human beings as well similarly you know what is true is true of all faceless plosive 2 also has three variants you can say after all we pay tax what you are doing is under stress in English you are adding an extra puff of air but you can have neutral thing okay there are lots of cats on the campus.

And you can have a very neutral thing are you going to appear at sat there is an examination called sat there you do not release it because it comes at the before silence so all of these things you know part go have variants these are predictable but look at the behavior of these variants all of these variants cannot replace one another released per cannot come at the end unreleased per cannot come at the beginning are you with me okay, released per cannot come at the end this you know this for cannot come at the end it can only come. At the beginning of the world.

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Similarly unreleased this is unreleased but cannot come at the beginning of the world it can only come at the end okay this is how we indicate the end of the word and this is how we indicate the beginning of the world okay, so this can come only at the beginning of the world this can come only at the end of the world the neutral thing can come anywhere else so you know these are in a certain sense quote-unquote.

In a certain sense these are in significant variations why do we call them insignificant because they are their predictable space it can come only here that can come only there then they are bound by their contexts okay finally some variants may be free like par but you know they make they do not change meaning where you say whether you say tax how do you say tax it still remains in English the same thing on the other hand there may be significant variations you try you have a word called pit.

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Significant Variations

/pit/, /pin/, /pil/, /pik/, /pip/, /pitʃ/...

/pen/, /pein/, /pæn/, /pin/, /pɪn/

/pæn/, /bæn/, /kæn/, /mæn/, /tæn/, /ræn/

- /k/ , /t/ and /p/ can replace one another.
- Where one can occur, another can occur too.
- But meaning will change.



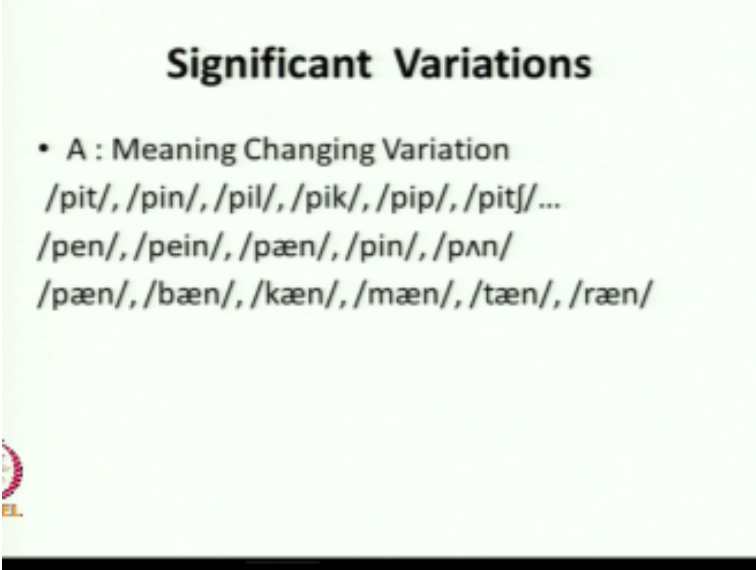
Change tour with any other consonant change it if you take no meaning changes if you bring in meaning changes you know , if you bring curve meaning changes if you bring meaning changes if you bring sure meaning changes okay, so those variations are important meaning will change after all we communicate with meaning for meaning okay, so you have to pay attention and not only at the end of the word middle of the word changed the vowel we have pen changed the vowel a to a what is the word now pain.

It is another meaning change the vowel again pen it has yet another meaning what is the meaning of the word pan where are you know that some kind of a tool some kind of a utensil you use in the kitchen you COO or it can be a verb you pan you know satellite antenna pan the universe you can say that or you have changed another vowel again it becomes pin you've changed another vowel again it becomes pawn so these changes are significant okay or you know change the last or change the first consonant.

So far we have changed them last consonant we have changed the vowel in the middle now change the first consonant instead of pan right band is it the same word yes or no can is it the same word no man is it the same word no tan is it the same word no ran is it the same word no meaning changes so some variations the point is some variations are significant some variations are insignificant they are significant because significant variations are meaning changing on the other hand insignificant variations are give me.

The word please if this is meaning changing this is come on make an effort sorry not altering its meaning retaining they retaining any meaning unchanging meaning not changing future keeping you know you are right we will use meaning retaining minor changes does not matter yesterday he came in tie today he is in t-shirt does not matter it is still the same person it is still my friend okay he has not seen so you know significant variants are those who change meaning insignificant variants are those which do not change meaning what is another important thing here is okay.

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Significant Variations

- A : Meaning Changing Variation
/pit/, /pin/, /pil/, /pik/, /pip/, /pitʃ/...
/pen/, /pein/, /pæn/, /pin/, /pɪn/
/pæn/, /bæn/, /kæn/, /mæn/, /tæn/, /ræn/

EL

Significant variation change meaning in significant variations do not change meaning.

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Classification of Variants

- Significant variants of speech sounds are called **PHONEMES**.
- Insignificant variants are called **ALLOPHONES**.



Let us make a table significant variations have a technical name these variants are called please write these variants are called phonemes individual sounds phone is sound aim is discrete sounds phonemes and insignificant variants are called allophones allo is like phones like sound similar sounds matching so you see a lot of scientific terminology in Europe comes from Greek and Latin just as we draw from Sanskrit that is why in other words it says these are discrete sounds and these are variants of the same sound do.

You understand yes or no please are they are we together okay am i speaking too rapidly or is it okay shall we go on okay the basic the point basic point is that all variants are not significant only some variants are significant when are the significant when they change meaning when they do not change meaning they vary by labial or rounded lips or etcetera or released or unreleased it does not matter because they do not change meaning so mind recognizes these patterns in speech.

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Phoneme

- **Phoneme:**
 - 1. Free Distribution
 - 2. Substitution changes meaning
 - 3. Significantly Different Feature
- /pit/, /pin/, /pil/, /pik/, /pip/, /pit]/...
- /pen/, /pein/, /pæn/, /pin/, /pʌn/
- /pæn/, /bæn/, /kæn/, /mæn/, /tæn/, /ræn/

What are the differences between these two phonemes that is significant variants are they occur anywhere wherever pokers both can also occur talking occurred organic chalk in occur so can occur a lot and occur okay, where one can occur another can also occur but insignificant variant of a sound its context bond part can occur only in the beginning of the word unreleased part can occur at the end of the word other things can occur only in the middle okay so there are differences for phonemes.

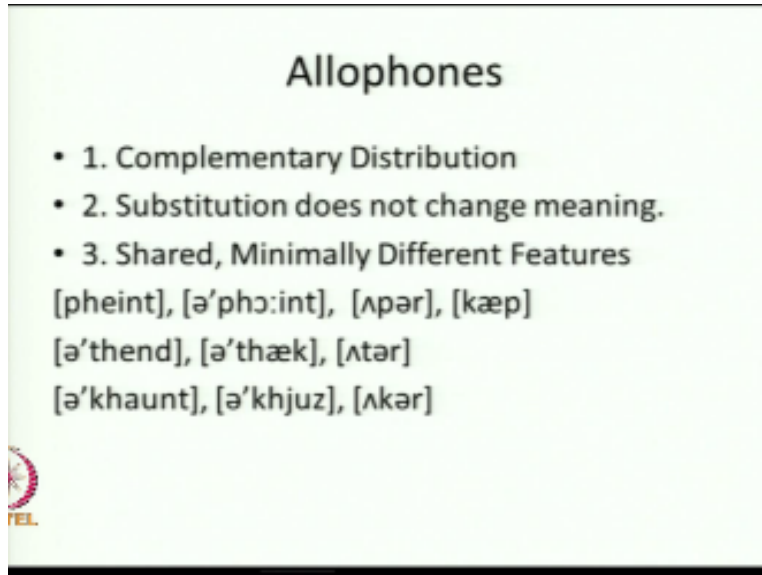
We can say they can occur freely there in free distribution beginning of the word middle of the word end of the world okay substitution changes meaning we said that and third we said that there features are different between per and BA voicing is important between Ponte alveolar Ridge or bilabial is in place of articulation is important so significant variants are those can you can you say can you listen to me significant variants are those number one with change meaning number two which occur freely number.

Three which have significant differences in features on the other hand in significant variants are those which do not change meaning which do not occur freely and where there are minor differences of features can we repeat okay, right phonemes or significant variants are those number one which change meaning number two which occur really freely number three which have significant differences in features whereas allophones are those variants.

Which do not occur freely which do not change meaning which do not differ significantly in features you see all you have to remember then is to answer the question how do we recognize

we will say we recognize phonemes as phonemes and we recognize allophones as allophones okay in significant variants allophones.

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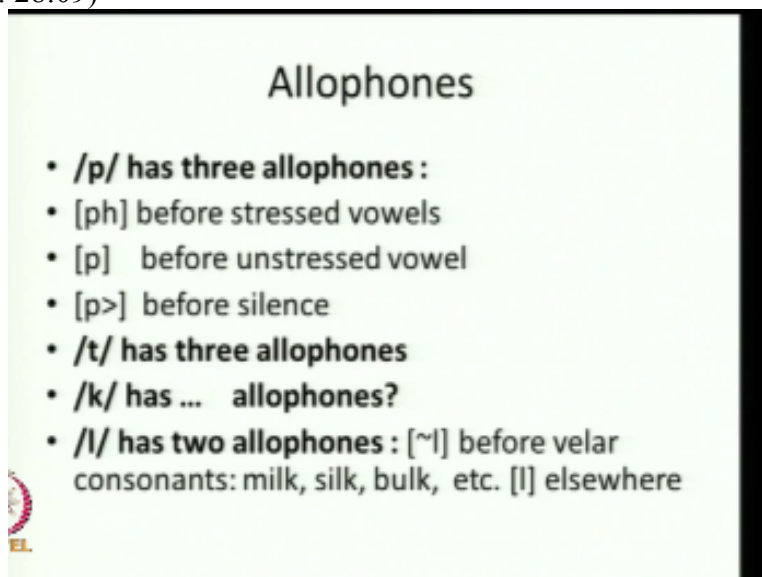
Allophones

- 1. Complementary Distribution
- 2. Substitution does not change meaning.
- 3. Shared, Minimally Different Features

[pʰeɪnt], [ə'pʰɔ:ɪnt], [ʌpər], [kæp]
[ə'thend], [ə'thæk], [ʌtər]
[ə'khaunt], [ə'khju:z], [ʌkər]

Are in complimentary distribution which means one can occur at home another can occur abroad where one occurs the other does not that is complement okay whereas in phonemes there is no such restriction where one occurs another can also occur okay let us do some exercise.

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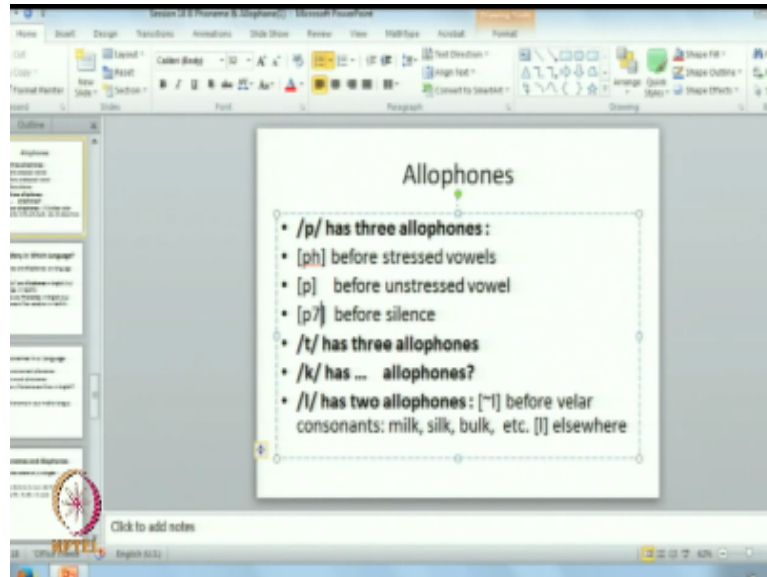


Allophones

- **/p/ has three allophones :**
- [pʰ] before stressed vowels
- [p] before unstressed vowel
- [p>] before silence
- **/t/ has three allophones**
- **/k/ has ... allophones?**
- **/l/ has two allophones :** [~l] before velar consonants: milk, silk, bulk, etc. [l] elsewhere

Right in English has three variants you know first is a spirited extra puff affair second is neutral third is unreleased please ignore this you know.

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I made a mistake we could use the and you know I, I usually write seven and then use a superscript to change it the superscript can be found here you can also use it in your term paper okay, you can also use it in your term paper please right similarly you know toy has as many variants car has as many variants look at in English okay do you remember we said English has consonants like Earl and little is a glide you know now has two variants in English allophonic variants one is clear which comes before vowels.

You say look okay you say luck but there is another which comes after vowels such as or before back sounds say look at compare your before in words like milk and in limp look at these two words limb and see here pay attention produce these two words and pay attention to this sound please say first limp now say milk ,milk do they come from the same point of tongue say it again Limp ,Limp milk, milk do they come from the same point of tongue yes or no once again named milk is it the same point no it is not because of curve.

This law goes backwards because of e law goes forward okay the following sound so in English we say English at two kinds of law phoneme is written within slanted bars and allophones are written within allophones are written within square brackets so phoneme curler has two

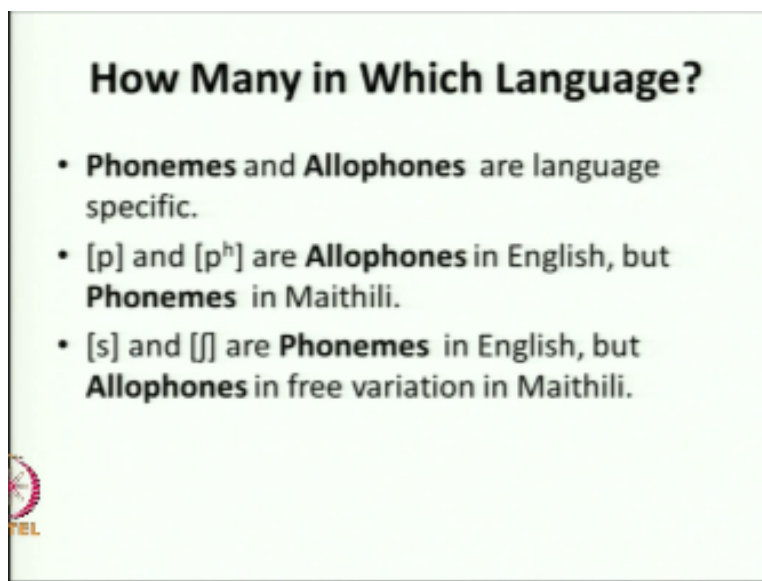
allophones two variants what are they one is hmm it comes at the beginning of the word it comes before front vowels etcetera.

You have luck it also come unit comes in for all luck limp okay like late letter let list all of these are clear look but when you have look coming before silence or before back sounds look at this okay this variant as in words like cool, cool milk sell bulk Hulk tool you know either before silence or before back sounds this is back sound good okay or this is silence after this there is no word okay so either before silence or before back sounds this moves backwards on the tongue does not remain.

So clear so phoneticians call it dark not dark l dark okay so English has two kinds of Allah if you go to Malayalam, Malayalam has five different kinds of law yet a learner will okay I do not have been pronounced it okay we call it really that sort of thing okay Malayalam is five different kinds are not nasals Tamil has five different kinds of nations these are variants of so maybe they are in phonemic distribution in some languages.

But these are also variants the point we are making now is the following.

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How Many in Which Language?

- **Phonemes** and **Allophones** are language specific.
- [p] and [p^h] are **Allophones** in English, but **Phonemes** in Maithili.
- [s] and [ʃ] are **Phonemes** in English, but **Allophones** in free variation in Maithili.

TEL

How many phonemes or allophones does he sound out does a language have is a language specific question okay because you know it changes meaning in some languages meaning may change in some languages meaning may not for example, look at English in English per and per

hour allophones they do not change meaning but in Hindi can you replace paw with fur Paul is moment okay ,right but Paul his fruit is not like English on the other hand or in Maithili or in many Indian languages in my mother tongue.

I speak mightily at home in my mother tongue and it does not matter whether you say slow or you say look it does not matter whether you say series or you say shish it does not matter whether you see of my hair or Mahesh actually my villagers will say why are you in sure like a snake you know why do not you speak like normal gentleman okay, so these things are languages specific but in English it is important in English whether you say sip how do you say ship very important do you take a ship of tea or do you take a sip of tea in English it is important so how many phonemes or allophones.

We have is a language specific question so second thing we learn about phonology you know all this big bridge I built for to say only one thing that phonology is please write phonology is the study of language speech sounds in use in context no more were number two phonology quite often is language specific though there are generalizations.

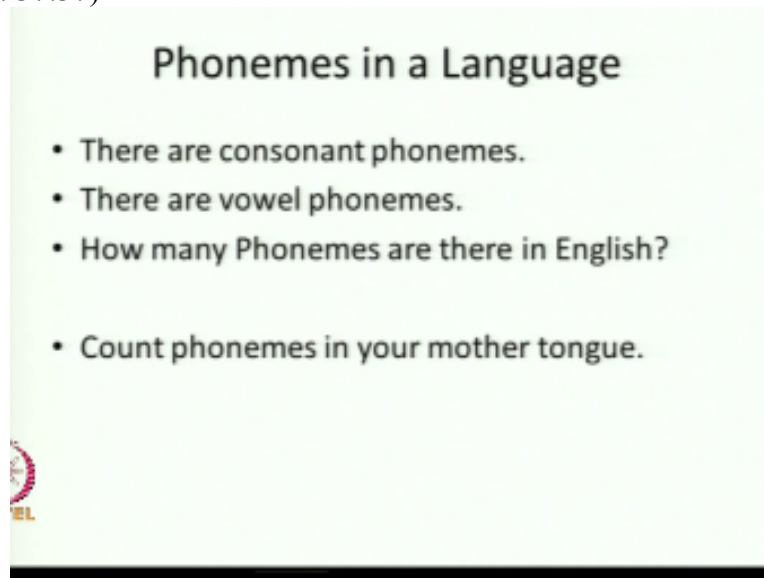
I will come to generalizations in a minute sorry not in a minute or tomorrow but you know there are generalizations even in phonology but remember phonology uses phonology studies sounds in actual use okay and in actually was there may be variations, but all variations are not significant some variations are significant the change meaning some variations are not significant but what is significant or what is not significant is a language specific question you cannot say that sir and sir are phonemes or allophones.

In Telugu unless you have studied the behavior of these sounds in this language you cannot say where this sure they are phonemes in English unless you have studied it there in many of our Indian languages we do not have as many variants of Z we have either one or two we have Z and J but English has three French has two or three or who has three okay and it is important well they have and you know my mother talked we have only one we do not have you know we do not say you know once again people will tell you who are you behaving like you know uncivilized people okay these things are language specific.

But please note the second thing principles are not language specific the principle that you apply to reach these conclusions what are the principles you apply number one does it change

meaning where does it occur what features does it remain retain or lose please write what are the principles where you decide by or by which you decide whether it is funny or allophones can you tell me number one meaning change does it change meaning number two where does it occur number three how many features does it lose attain or lose okay. These principles are universal let us do some exercise.

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Let us see well in all languages there are consonantal phonemes there are vowel phonemes English has altogether 24 consonantal phonemes 20 by English .I mean standard British English American English as fewer London English as fewer but standard British English as 24 how many do we have that can be a good term paper for you that can be you know you can study vowel phonemes in Telugu consonant phonemes in Telugu are only plazas in Telugu are only fricatives in Telugu and you are in Maithili . In the any other language you like let us do some exercise.

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Phonemes and Allophones

- Look at the variants of /l/ in English :

lip, mi-lk, lid, bʌ-lk, liv, ku:l, let, hil, belt,
sʌlk, klip, flik, lik, silk, lʌk, pu:l

Look at the variants of /l/ in English you know in words like lip, lid, live, let, belt-clip, flick. It is a clear law but when you have words like please, pronounce it and feel it on your tongue, you know these subjects are practical subjects. You must feel them. Say milk, it goes back on your tongue, okay, when you say bulk or when you say salt or when you say cool or when you say fool before silence, okay, there it is another kind of thing so you have similar variants not necessarily. So in other languages as well.

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Phonemes & Allophones

- Look at the variation of /a/ /a~/ in Maithili :

ka:t "cut",	ka~t "thorn"
bas "home",	ba~s "bamboo"
kap "blade",	ka~p "tremble"
hak "call",	ha~k "drive"
Pak "cooked"	pa~k "slush"
char "thatch"	cha~r "support"
mar "assault"	ma~r "rice-water"
tat "fence"	ta~t "dehydrated"

Look at this variation in my mother tongue okay, is it phonemic or allophonic look at this variation there is a vowel ah and it has a variant called arm okay it has a nasalized variant and unless allies menu or ingredient is it significant or insignificant significantly is it significant yes or no yes sir yes why meaning changing because it changes meaning everything else is the same god means cut and cut means thorn okay, in this language you know you know that is the beauty of principles.

You do not have to know the language you apply the principles and you get the result okay bass means home but boss means bamboo okay cop means blade but cop means tremble so obviously in this language we can say these vowels are they in allophonic distribution or in phonemic distribution they are aiming phonemic distribution they are phonemes they stand for individual status.

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Phonemes & Allophones

Look at the variation of /ə/ and /ə:/ in Maithili

• dhər	"hold"	dhə:r	"torso"
• kər	"do"	kə:r	"morsel"
• chər	"graze"	chə:r	"paddy field"
• sən	"as"	sə:n	"jute"
• dzən	"person"	dzə:n	"labourer"

Similarly look at an earth in Maithili okay. You have dhar which is hold but a long all dhar okay pronounce it how is it the you are speaking with you know you can be a citizen of Nepal or India you have a larger choice now as many people speak wisely in Nepal as the number of people in India okay and this is the you know these distinctions are important there okay you can seeker which it do but core as you eat a morsel Archer great Archer paddy field you know son.

Which is as or Sun which is it for anemic or allophonic it is phonemic obviously you know it is phonemic but look at this now.

(Refer Slide Time: 41:23)

Phonemes & Allophones		
• ræg	"vein"	gəR "drip"
• rəs	"juice"	səR "rot"
• re:l	"rail"	le:R "dripping saliva"
• rɔ:k	"block"	koR "edge"
• rutsi	"taste"	tsu:Ri "crush", tsu:Ri "bangle"
• rɔ:p	"sow"	pɔ:R

Tell me is it for you there are two kinds of is it for rag or allophonic now comes some problem okay one is rag the other is gar the one is ras the other is sar okay, study the pattern please there are no words with minimal pairs you know a pair of minimal pair of word is where everything change except that particular sound but their distribution one occurs at the beginning of the word.

And the other occurs at the end of the word these are the things we have we have to look at okay the distribution the meaning change if we could have had a word you know where it made a minimal pair like you know pin and bin make a minimal pair only one feature differs what meaning changes you know .I have not been able to give you that kind of thing here but even from whatever little we have we find that these are in complimentary distribution where one occurs the other does not occur okay.

They are not in free distribution they do not occur anywhere you like they occur in restricted contexts and these are the things we have to look at you.

(Refer Slide Time: 43:10)

Allophones in Maithili

- b^hɔ:r "morning" bhoRukba "morning-like"
 - tsɔ:r "thief" tsɔ:Rukba "thief-like"
 - rəudi: "drought", kəuRi: "shell"
 - nəuRi: "maid servant", dzəuRi: "rope"
 - bhəuRi: "hawking, vending" ts^həuRi: "girl"
- Find examples of **phoneme** and **allophones** in your mother tongue.

Can also do a paper with sounds in your mother tongue look at this thing now here we find that one row you know the tap occurs even at the end of the word but that retro flexural you know written with capital R occurs only in the middle of the word.

And only before only before evolving the what, I am trying to do is try to give you a window on phonology that these are the things we look at we look at features and we will look at context please write in phonology we look at only two things what are those two things, context and region we look at context and we look at features which features change or remain in which context are the predictable you write rules your computer generates those words etcetera and you know you are doing phonology.

I will stop what I have tried to tell you is that we are able to recognize variants because all variants are not significant and all variants have patterns okay. some variants may be meaning changing yet they have certain patterns some variants are not meaning changing they are meaning retaining yet they have patterns okay, what we will look at are two things number one changes in features and number two contexts where these feature changes occur.

If we look at these two things we can predict we can write rules about them we will look at some of these features in the next class okay thank you thanks have a good evening please.

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