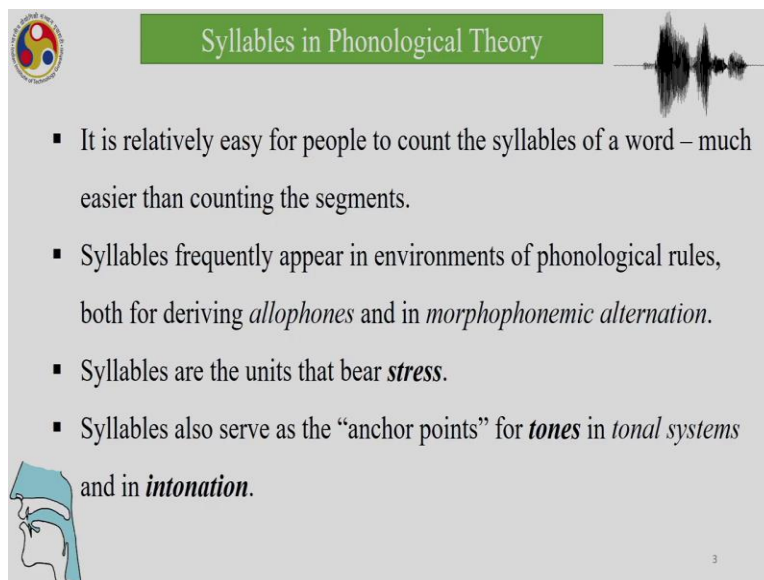**Phonetics and Phonology: A Broad Overview**
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Lecture 23
Syllables

Welcome to this NPTEL MOOC course. And this course is on phonetics and phonology, a broad overview. We have had a lot of lectures on phonetics and phonology, in many of those we assumed certain knowledge about syllables.

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So, in this unit, we will talk about syllables in greater detail. So, while we assumed knowledge of syllables, it is because it is relatively easy for people to count the syllables of a word in a language that they speak. So much easier than counting the segments sometimes. So, the vowel is not very easy to determine but the syllable is easier to count.

So, syllables frequently appear in environments of phonological rules, both for deriving allophones and in morphophonemic alternation and syllables are also the units that bear stress and they are the ones which are counted for rhythm and accent and other purposes. So, for all prosody purposes syllables are counted. So, syllables also serve as the anchor points for tones in tonal systems and intonation. So, as we just said, in prosody, syllables are quite vital in the analysis.

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So, in the International Phonetic Alphabet, syllables are shown by separating them with a boundary symbol, especially a period, like the one that you see here, as in ka.nek.tiv, three syllables. And there are other notations for syllables like this symbol, so the sigma symbol is also used for syllables. And another approach avoids boundary symbols and assumes in the syllables of phonological constituents. The notation is tree structure and the syllable constituents are labelled with, as we just said, with the Greek sigma for syllable.

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And this is how we see the representation in a tree structure. So, the word connective that you just saw, if it is just a consonant and a vowel, it is a one branching node to the left and then the vowel. And then if there are two consonants flanking the vowel on both sides, then we have two nodes towards both sides the consonant, therefore the two consonants. And similarly again for the last syllable tiv. And a more concise notation uses brackets and notated with, just the sigma. So like this showing a syllable division or like this where the syllable division is shown outside the syllable.

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So, the onset of a syllable is a consonant or sequence of consonants at the beginning of a syllable. And the coda is a consonant or sequence of consonants at the end of a syllable. And the nucleus is the vowel or diphthong found at the syllables core and functioning as its sonority peak. So, three important structural points of a syllable, they are the onset, the coda and most important of all, the nucleus.

So, these are supposed to constitute the structure of a syllable. And the nucleus also constitutes so called sonority peak. Recall our sonority hierarchy that we saw in the feature lecture, where we saw that depending on the features there is certain hierarchy, there is a kind where we have the vowels which are the most sonorous and vowels liquids glides, nasals and then on one side we have the obstruents, which are minus sonorant and then we have the plus sonorants which are

the vowels liquids, glides and also nasals. And these are supposed to be plus sonorant. So, obstruents are minus sonorant and these are plus sonorants.

So, recall your class your lecture on sonorants. So, vowels, liquids, glides, nasals, where the vowels are the ones which are the most sonorous. And as a result, often the nucleus is almost always occupied by a vowel, which is the one which is the segment with the highest sonority peak. So, it is obligatory for a syllable to have a nucleus, very common to lack a coda in languages and less common to lack an onset.

So, that is more or less how you would see syllables in languages. A syllable would always have a nucleus and an onset most of the time. But across languages, to lack a coda is more common. So, the linguistic pressure, the pressure in a language is to avoid a coda but to have an onset, to have a nucleus always and if possible have an onset, but do the most to avoid a coda. So, in general, that is what we see in languages.

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Of course there are very many languages which have coda, it is not as if there is a complete ban on codas, codas do occur. But there are often constraints which would come in the way of having a coda, rather the final consonant of a syllable would become often an onset by various processes like epenthesis, syncope, et cetera.

So, we will see those processes shortly in some data that we have. And before that we will let us again talk about how we see syllabification in different languages. Syllabification is how syllabification can be done or is it predictable? Is it unpredictable? What are the components which drive syllabification in a language?

So, deriving syllabification must be language specific. And every language has its own principles of syllabification, Spanish; four, kwa.tro and Ilokano four, kwat.ro. This is from borrowing, but it seems Spanish syllabifies as kwa and tro; whereas Ilokano would like to have this final consonant as a coda.

Whereas in Spanish, the two consonants in between would rather be the onset of the following syllable. And cross linguistically or the linguistic principles which drive these kind of syllabification, they are both okay with this in the sense that, as we just talked about this before, syllable would always want to have a nucleus, which it does, and an onset, which it does. But tries to avoid codas which is clearly seen here, that was, the consonants are now the onset of the following syllable.
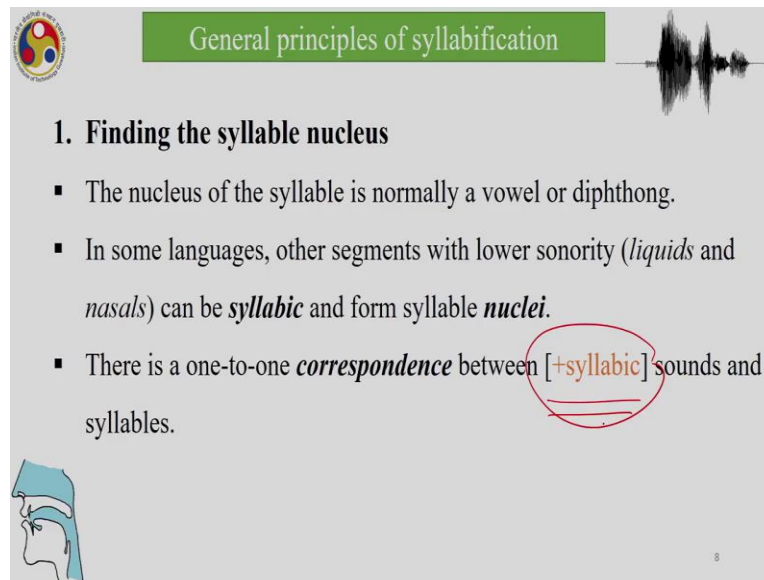
Whereas Ilokano satisfies the universal sort of characteristic among languages to avoid codas to have a nucleus as well as an onset. And this is satisfied in the sense that Ilokano does not syllabify like this. Now, this would go against the syllabification tendencies that we see in languages, this is not seen.

However, this is a possibility because it satisfies what we see cross linguistically a constraint to have onset. So, onset is almost very often preferred in languages so that is satisfied. However, when this language, there seems to be greater tolerance for codas than in Spanish. So, it tolerates a coda but also has an onset. And whereas in Spanish would prefer not to have codas as well at all and have them as onsets are the following syllables.

So, these are the two syllables in Spanish and Ilokano and speakers judgments of the two syllables is like this in Spanish, they would say kwa and tro; in Ilokano they would say kwat and tro. So, this is what we meant when we said that language can choose its own principles of syllabification. It might completely not want to have codas, avoid codas to the extent possible.

If it is possible to make it the onset of the following syllable just make consonant the answer to the following syllable rather than a coda of the previous syllable. But at the same time, there may be also languages which will tolerate some codas may say as long as the following syllable will have an onset, it is okay to tolerate a coda in the preceding syllable.

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Now, having looked at how languages may differ in terms of syllabification, let us now see what constitutes a syllable. We already know nucleus, onset and coda, but how do we find the nucleus onset and coda in a language, we already saw a few examples. Let us, discuss this a bit more to understand how a nucleus may be different in different languages. So, the nucleus of a syllable is normally a vowel or diphthong.

And almost always they are not vowels or diphthongs, but in some languages other segments will lower sonority like liquids and nasals can be syllabic and forms syllable nuclei. And there is a one to one correspondence between plus syllabic sounds and syllables. So, some sounds are plus syllabic, if you recall from your lecture on features that some sounds are plus syllabic, which means they can be the nucleus of a syllable. That is what we mean when we say that some sounds are plus syllabic.

So, every plus syllabic sound is the nucleus of its own syllable and hence we have examples even they are examples from English where a plus syllabic sound is the nucleus of its own syllable.

So, it is plus syllabic in the sense that it is not a vowel, which is almost always nucleus of all syllables but sometimes some segments which are not vowels can also be the nucleus of a syllable.

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Syllabic affiliations of consonants, the main task in syllabification is determining to which syllable the consonants belong. And when a consonant immediately precedes a vowel, it must belong to the same syllable as the vowel. So, we have examples like VCV is syllabified as V, CV not as VC, V. So, this is fine and this is not so good.
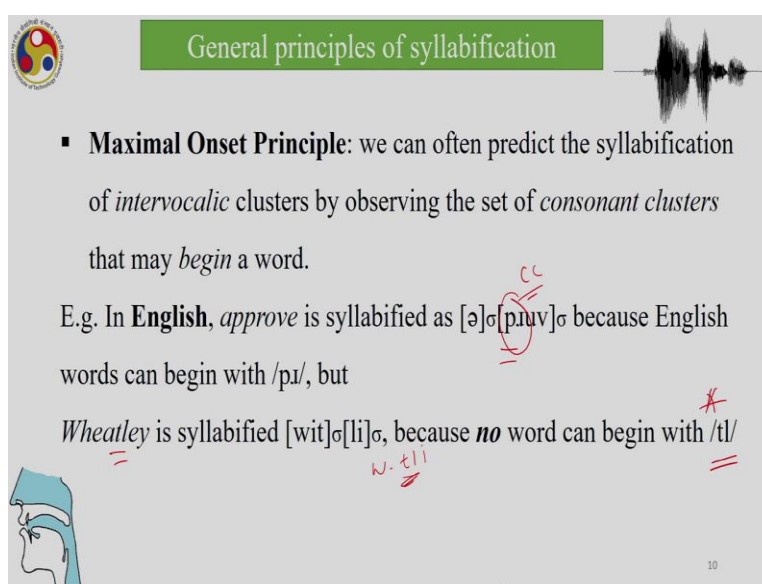
Why is that so? So, when a consonant precedes a vowel it must belong to the same syllable as the vowel. So, there we have this now proceedings relationship here, where the consonant is preceding the vowel and hence it should be in the same syllable as the vowel like this one and unlike this one. So this is not good versus this is considered better.

So, hence that is what you do in syllabification. When you are asked to syllabify your task is to find out that where the consonants belong to, which syllable the consonants belong to, the preceding syllable, following syllable, et cetera. And there are some of these principles are generally are followed that if there is a consonant vowel sequence it is better consonant proceeds the vowel it is better that the consonant is a part of that syllable where the following vowel is the nucleus.

And when we see CV, sometimes we see CV as we saw in the kwa tro example, sometimes here we see CV, where the language can optimally satisfy the need to have a onset and also have a coda in the preceeding syllable. And however, sometimes both the consonants can be the onset of the following syllable.

So this one is pretty clear and this one we have options. So, if there are two consonants in between, we have two options. But if we have one consonant in between, we do not seem to have the option, the consonant has to be a part of the syllable where the following vowel is the nucleus.

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And now we come to something important in languages, that is the maximal onset principle. We can often predict the syllabification of intervocalic clusters by observing the set of consonant clusters that may begin a word. Now, we already saw intervocalic clusters in the preceding example.

Now, something called the maximal onset principle may guide some syllabification, some languages where the language may try to have as many consonants in the onset position as possible rather than having the consonants in the coda positions. In English, approve is syllabified as a.pruv, because English words can begin with pr. But Wheatley is syllabified wit.li, because no word can begin with tl.

As a rule of thumb, languages will prefer to have syllabification where the consonant cluster is a legit consonant cluster in that language. And if it is not a legit consonant cluster like tl, which is not possible in English, then the syllabification will prefer to not have, will not prefer this syllabification because tl is an absolutely impossible sequence of consonants in English.

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The maximal onset principle can often predict syllabification languages that is not infallible, that is important to remember it maximises onsets. And in English that is followed to the extent that the legit consonant clusters are the consonant clusters which are possible in English. But if the consonant clusters are not possible then maximum onset principle is not followed. In Ilokano, kwatro is syllabified kwat and ro, even though there are words that can begin with tr, for example tres, as in three.

So, hence, it is not why did Ilokano choose the syllabification, it is not because that tr is not possible, unlike the English example where tl was not possible and hence maximal onset principle was not satisfied. Here maximising the onset is not satisfied even though tr is proper consonant sequence in the language.

The maximum onset principle though is fully not specific enough to be part of a phonological analysis. So, that is issue with the maximum onset principle, it is very useful to show that the languages have this preference for maximising onsets at the cost of not having onsets, not having

codas. But it is not as if that is a constraint that is very strictly observed by languages because language, as we saw from the Ilokano example, the language even though has this cluster, did not satisfy the maximum onset principle. The reason is that a full grammar of a language should say what the word initial onset are.

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And so how do we have a scheme for syllabification? There are three rules that apply, one is assign syllable assignment. Assign syllable nodes to be one to one correspondence with plus syllabic sounds. And onset formation, so one, we assign syllable nodes, so syllable nodes are assigned. Suppose they are CV, CV, CV so we assign syllable nodes such that the nucleus is the V and the onset is the C.

Now, onset formation, join consonants to the following syllable provided the resulting cluster can occur at the beginning of a word. So, as we just said, what do we do, we join consonants to the following syllable and like this is the following vowel and proceeding, there is a proceeding consonant. And as a result, this is one syllable, again this is another syllable.

And so we have the nodes and then we connect the consonants with the onset if there is a following vowel. So, we have to remember that when we have consonant clusters at the beginning, those consonant clusters will have to be legit consonant clusters in the language. For

instance, tl can never be in an onset position in English, because that is never the beginning of a word in English.

So, that is one thing to remember when you are assigning onsets. While assigning onsets, whether the CC, the consonant cluster is a legit consonant cluster, CC has to be one of the concerns apart from node assignment. So, and then two onsets determining the onsets.

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So, finally then we have coda formation. Join any consonants not yet syllabified to the preceding syllable as a coda. So, in English, we can assign a coda when we have those left out consonants which could not make it to the onset. So, your syllable assignment must affiliate a syllable node with a and ae.

So, let us see this contract. The underlying form then syllable nodes, we have two vowels here, we have the syllable assignment, the node assignment to two vowels.

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Then the second step of assigning the onsets; onset, onset, onset. This is done. Then the second step, remaining consonants are solidified by coda formation. Now, what was left behind on n could not make it to the onset position of either syllable or k t could not make it to the onset position of any syllable. Now, these will be your codas. So, the coda, the step of coda formation is the last step and those are the consonants which where are not connected to any node after the nucleus assignment and the onset formation.

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Syllabication is complicated since rules of phonology rearrange the sequence of consonants and vowels through deletion, insertion and other processes. One held view is that rules of syllabification are persistent and that is underlying knowledge representations are syllabified by the syllabification rules at the outset of the derivation.

So, persistent syllabification, it is persistent in the sense that hardly any consonant of vowel material in a word will be left out un-syllabified. And we see that from various processes, phonological processes of insertion, deletion and other processes. So, that is underlying phonological representations are syllabified by the syllabification rules at the outset of the derivation. So, before all our segmental rules apply, we have our syllabification rules. So, whenever a phonological rule applies the syllabification rules reapply if possible.

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So, now we see from some real example, linguistic examples, about how syllabification and phonological derivations, what role does syllables play in phonological derivations. Syncope role deletes the second vowel of a word when it is not adjacent to a consonant cluster or final consonant.

So we have Tonkawa syncope What happens in Tonkawa syncope is that the vowel goes to null, so which means a vowel is deleted in a position, so it deletes the second vowel of a word when it

is not adjacent to a consonant cluster or a final consonant. So, in this position the vowel is deleted.

So, what is it? So, what does it show us? It shows us that if there are the second vowel can be deleted now and it shows us that we have this kind of a syllable in Tonkawa instead of a CV CV CV CV, CV CV CV syllable, Tonkawa now would like to have one vowel deleted so that it has two consonants in that position.

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And let us look at more examples, and here is an example of notoxo-n-o, so he hoes it. So the first step in what we discussed before we have syllable assignment and then we have onset

formation and then finally we have coda formation. So, after onset formation what was left was this material, the coda on the right hand side of the final syllable and that has to be the last step where the coda is formed.

Now, once the form is syllabified, it is submitted to the phonology rules component of the grammar and syncope removes the second vowel. So, now we have this no.to.xo.noh. So we have a CV, CV, CV and CVC. Now, remember, after two CV's this V is going to be deleted. So, now we have syllabification but syncope will now remove the second vowel.

The syllable nodes are now no longer in one to one correspondence. Now, once a vowel is deleted, which is the nucleus of a syllable, then we do not have the syllable node there. Therefore, the persistent rule of syllable assignment is now applicable, once that node goes away syllabification happens again.

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And we have again persistent syllabification, we have a no.to.xo.noh. So now, after removal of the second vowel we have to now syllabify again the remaining consonant which is now left behind after the deletion of the vowel has to be assigned a syllable node, and it becomes a part of the previous syllable.

So, according to persistence syllabification approach, t is a syllable initial segment at the outset of the phonology, but ends up as a syllable final a consonant. So, whereas at one point it was the onset when this vowel is there. Once the vowel is deleted it has no choice but to align itself with

another syllable node which is available there which does not have a coda in the preceding syllable and hence it assumes the position of the coda in the proceeding syllable.

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Like other phonology rules, syllabification rules often respect word boundaries. And onset formation and coda formation are often word bounded. So, something that we have to remember is that respect boundaries, because syllabification happens across words, in words it has to be applicable to words in such a way that it recognises the boundaries.

So, here is an example from German, das ist ein ochs, and das ist ein alter ochs. So, that is an old fox and das ist ein alter ochs. So that an old fox old ox. And then the final consequence of das is ein and alter, all precede vowels. So, as a result, we can see that the word boundaries are respected in the sense, in the phonology at least, of course in speech segmentation that is another matter altogether. In speech in the phonology we have the syllables respect the word boundaries in the sense, what does this mean? That means that these do not become syllables of the following word.

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So, onset formation could affiliate them with syllable nodes attached to these vowels. So, under a word bounded onset formation rule for German, no such affiliation is possible. So, in German the word bounded onset, so onset do not onset the final consonant of one word does not become the syllable of the following word. And those prosodic boundaries are maintained in a language like German.

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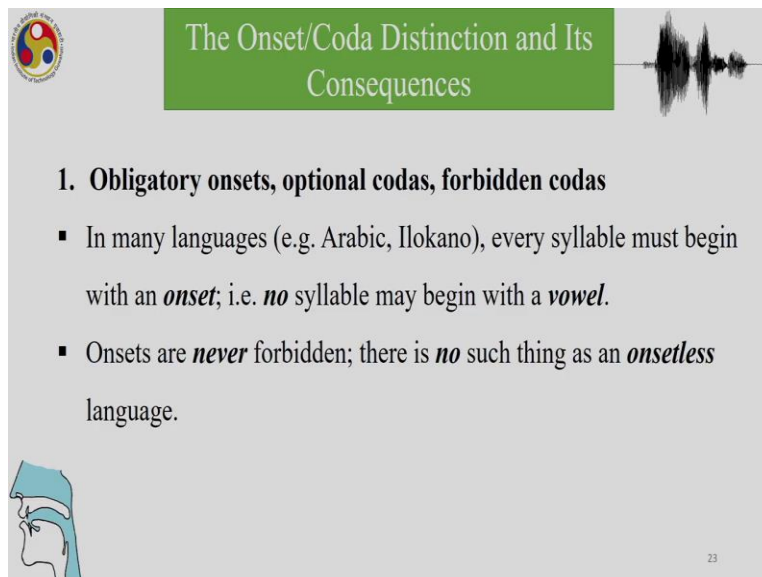
These consonants must undergo coda formation and are syllabified within their own words. So, that is what we see here, that all of these are separate syllables, das ist ein alter ochs. And whether onset formation is word bounded or not is evidently language specific.

And of course, there may be languages where those boundaries are sometimes completely removed and as a result we have instances of languages where those between word boundaries are the syllable boundaries are removed and as a result we have consonants which syllabify with the following word et cetera. And there are examples from languages where we have new words as a result of such kind of syllabification.

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So, obligatory, onset, optional codas and forbidden codas, in many languages example Arabic, Ilokano, every syllable must begin with an onset, that is no syllable may begin with a vowel. Onset are never forbidden, there is no such thing as an onsetless language.

The typology for codas is the opposite, in many languages codas are forbidden. And there are no languages that require every syllable to have a coda. So, the importance of onsets and codas are the relative importance of onsets versus codas is something to understand, is something important that should be understood. In many languages, every syllable must begin with an onset.

So, there are languages which obligatorily prefer onsets and no syllable may begin with a vowel. So, if there is a syllable with a vowel the language will insert a consonant so that it has an onset.

So, there are those languages. But there are no languages, but onsets are never forbidden so no language ever says that delete the consonant so that the onset is not there in the vowel. So, that is an absolute impossibility and there is no such thing as an onsetless language. So, however, there are languages which obligatorily prefer to have onset.

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The reverse applies to codas, in many languages codas are forbidden and there are no languages that require every syllable to have a coda. The only universal syllable present in every language is CV.

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And the preference for syllables to have onsets can be seen in German. As a vowel initial syllables undergo a rule of glottal apprentices in careful speech, they will surface with glottal onset, and that is often seen in languages that epenthesis, as we just discussed, is one of the ways to repair a syllable which does not have an onset. So, one of those preferred consonants is that of a glottal stop. And glottal epenthesis is found often in languages when before a vowel glottal stop is often inserted as the onset of a syllable.

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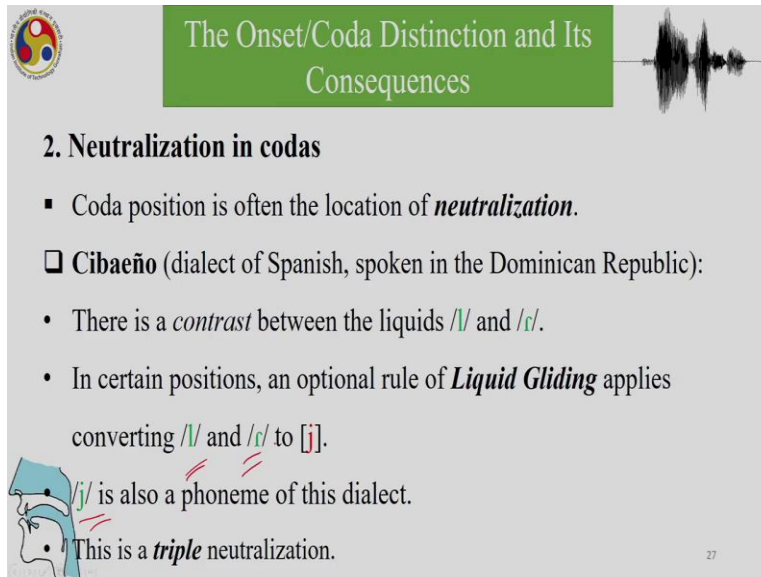
And so now we see the three steps that we first discussed that we take the German example of this, alter ochs. So, we have all these six syllables and we have the syllable assignment onset formation coda formation, first syllable and assignment and then we have onset formation and then we have glottal epenthesis.

And as a result, we see that this language is trying to maintain the syllable boundaries between the word boundaries between the difference syllables. So, as long as it is the same word, we have a glottal epenthesis. And if it is a different word, we have glottal epenthesis but if it is same word, of course, we do not have glottal epenthesis.

The Onset/Coda Distinction and Its Consequences

2. Neutralization in codas

- Coda position is often the location of *neutralization*.
- ❑ **Cibaeño** (dialect of Spanish, spoken in the Dominican Republic):
- There is a *contrast* between the liquids /l/ and /ɾ/.
- In certain positions, an optional rule of **Liquid Gliding** applies converting /l/ and /ɾ/ to [j].
- /j/ is also a phoneme of this dialect.
- This is a *triple* neutralization.

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So, neutralisation in codas. Coda position is often the location of neutralisation and we often see that in languages that is, which do not prefer to have codas so much, there the codas are limited, in such languages we will give some examples. Here we have an example of Cibaeno, there is a contrast between the liquids l and r, in certain positions and optional rule of liquid gliding applies converting l to the tab to l and the tab to l to j. And neutralisation in codas, coda position is often, sorry this is a triple neutralisation because the j is also a phoneme of the dialect. And both of these are neutralised to j.

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So, forms with r, we have karta, we have kajta. And so we have these neutralisations for both l and r. In all these cases where liquid gliding implies, the l and r occurs before a consonant or word finally. So, hence, we can see that where does this happen, it happens only in the coda positions.

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To formulate a rule that applies both pre-consequently and finally, and analysis proposed use curly brackets. These are notational devices and denotes the logical notation or so we can see that in Cibaeno, the sonorant, some sonorants, l and r become j in the position where the word

final or in the coda position. And liquids are converted to j if they precede a consonant or are word final.

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The Onset/Coda Distinction and Its Consequences

- Many linguists have expressed the view that curly brackets offer little or no insight into linguistic phenomena.
- For the many cases like **Cibaeño** Liquid Gliding, a widely adopted alternative solution is to suppose that the environment is *syllable-final*.
- ❖ **Cibaeño Liquid Gliding** (syllable-based version)

$$\begin{bmatrix} +\text{sonorant} \\ +\text{consonantal} \\ +\text{continuant} \end{bmatrix} \rightarrow j \, / \, \underline{\hspace{1em}} \,]_\sigma$$

Liquids are converted to [j] *in syllable-final position.*

- Thus, the *neutralization of liquids* occurs in **codas**.

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The Onset/Coda Distinction and Its Consequences

- To formulate a rule that applies both preconsonantally and finally an analysis proposed uses so-called **curly brackets**.
- These are a notational device that denotes the logical notion "**or**"
- ❖ **Cibaeño Liquid Gliding** (with curly brackets)
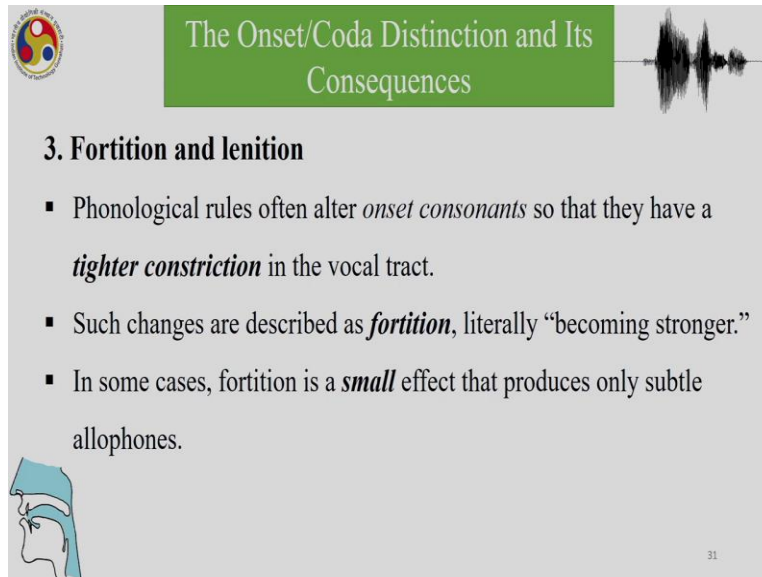
$$\begin{bmatrix} +\text{sonorant} \\ +\text{consonantal} \\ +\text{continuant} \end{bmatrix} \rightarrow j \, / \, \underline{\hspace{1em}} \, \left\{ \begin{matrix} C \\ ]_{\text{word}} \end{matrix} \right\}$$

Liquids are converted to [j] *if they precede a consonant or are word-final.*

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Many linguists have said that curly brackets are not very useful and for many cases like Cibaeno liquid gliding are widely adopted alternative solution is opposed as the environment is syllable final. So, liquids just become j in a syllable final position. Thus, the neutralization of liquids occurs in coda instead of saying that to positions word final and preceding a consonant, it is much simpler to say that that is a coda position.

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And then other processes which apply to syllables are fortition and lenition phonological rules often alter onset consonant so that they have a tighter constriction in the vocal tract. Such changes are described as fortition, fortition means that fricative becomes a stop or so as a result there is a tighter construction in the vocal tract, so becoming stronger. In some cases, fortition is a small effect that produces only subtle allophones.
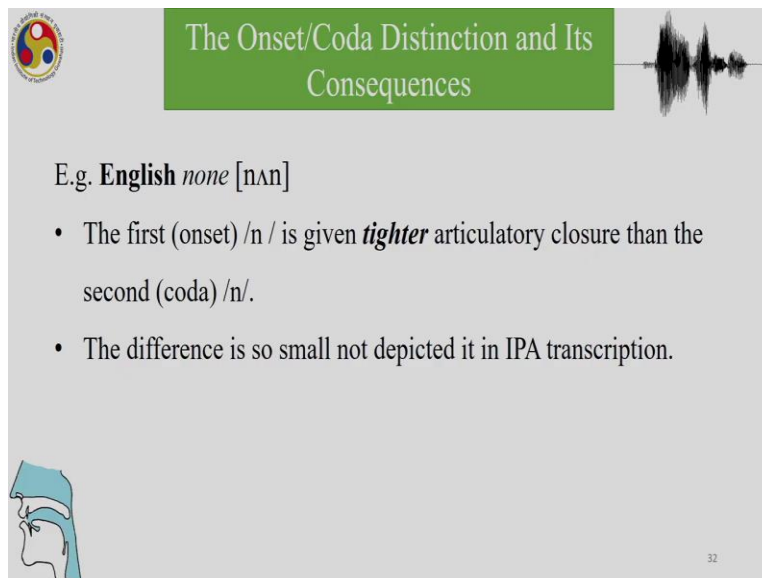
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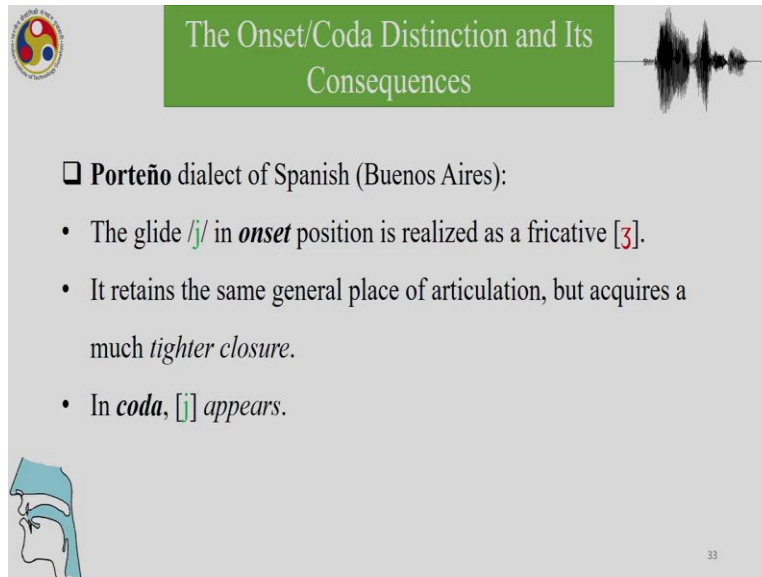
And English, the first onset n is given tighter articulatory closure than the second n in a word like none. The difference is so small, it is not depicted in IPA transcription.
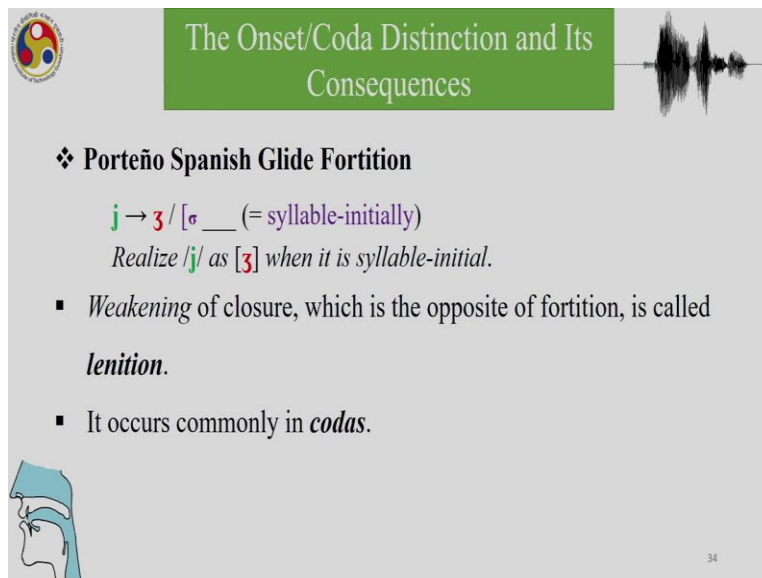
Now, that is the difference between onset and coda. And codas are susceptible to rules of neutralisation, to rules of not fortition but lenition. Whereas onsets are the reverse, onsets are preferred, they are not neutralised or they are strengthening rules rather than lenition rules. So, the glide here in onset position is realised as a fricative j, it retains the same general principle place of articulation that acquires a much tighter closure.

And in coda j appears. So, how do we express the Porteno Spanish glide fortition. We just say that the glide become j in environment where there is preceding syllable position, so syllable
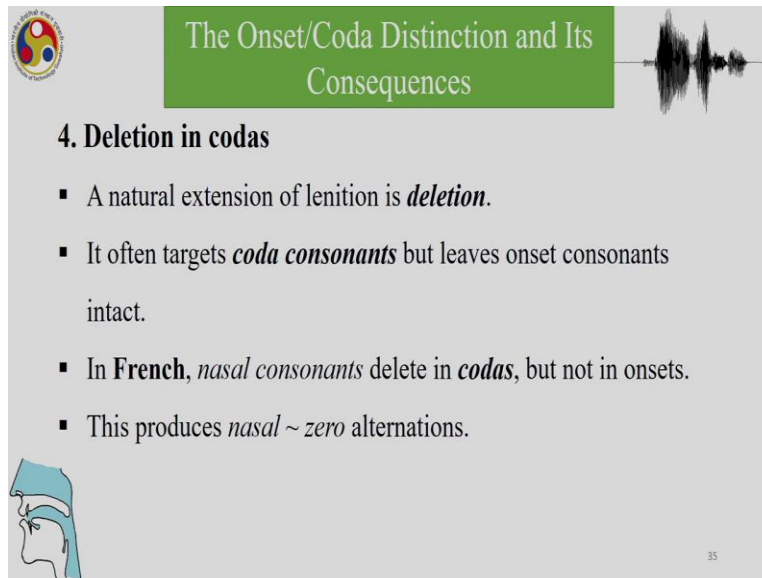
initially y becomes j. So, syllable initially as we just said is a position for fortition, syllable final or coda positions are positions for neutralisation and lenition. Weakening of closure, which is the opposition of fortition, is called a lenition. It occurs commonly in codas and fortition occurs in onsets.

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Also, codas are subject to deletion, a natural extension of lenition is deletion, often targets coda consonants, but leaves onset consonants intact. In French, nasal consonants delete codas but not in onset, this produces nasal zero alternation. So, nasal consonants are deleted, apart from being, that they can be neutralised, they can be lenitied and they can also be deleted.

So, as we can see in the French example the vowel becomes a nasal in this position, where it is final because of the deletion of the nasal, the vowel becomes nasal. So, we have these French example of bon and bonte and bone where we have a schwa deletion here, but we have t deletion.

So, in this position we have n deletion, so we have bon, and then we have again nasal deletion here so we have bonte or bon, but bon. And similarly, so these are the surface forms of bon, bonte and bone.

Many rules epenthesize vowels, can be analyzed in terms of the syllable structure of the language they occur in. So, vocalic epenthesis often makes it syllabify consonants that otherwise could not be syllabified. So, we have Yawelmani Yokuts, a Penutian language of Northern California. The first row of data gives four partial verb paradigms.

Yawelmani Yokuts is very important language to understand how structure is how couple of different processes are actually trying to achieve a certain type of syllable. So, there are a couple of rules of epenthesizing vocalic epenthesis and syllabification, which would not be easy to understand if we did not have the idea of syllabification in that language.

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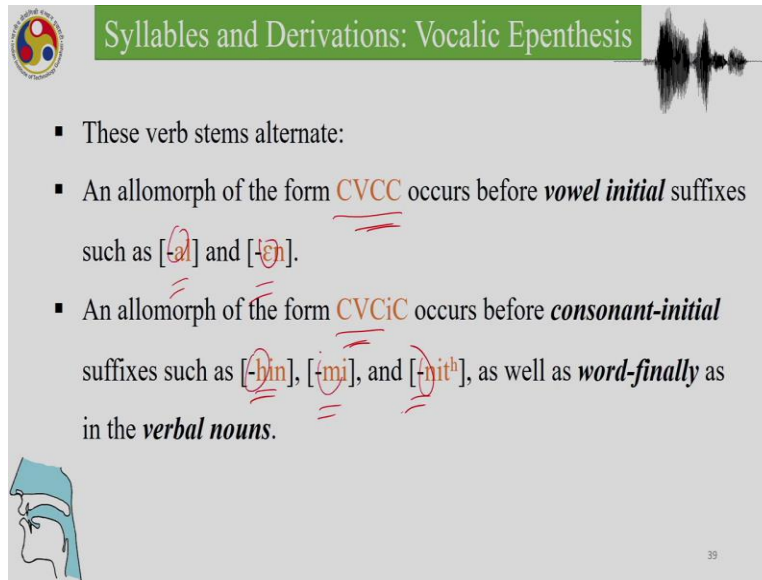
And syllables and derivations vocalic epenthesis. So, these are the examples from Yawelmani Yokuts. And we see that Yawelmani Yokuts have glottal stop and before stop consonant and we have these suffixes al or en or hin or me and nit. And proceeding those we have consonants in all these examples. Now, and similarly we have the nouns where we do not have those suffixes. So, let us see what happens in Yawelmani yokuts in terms of alternation.
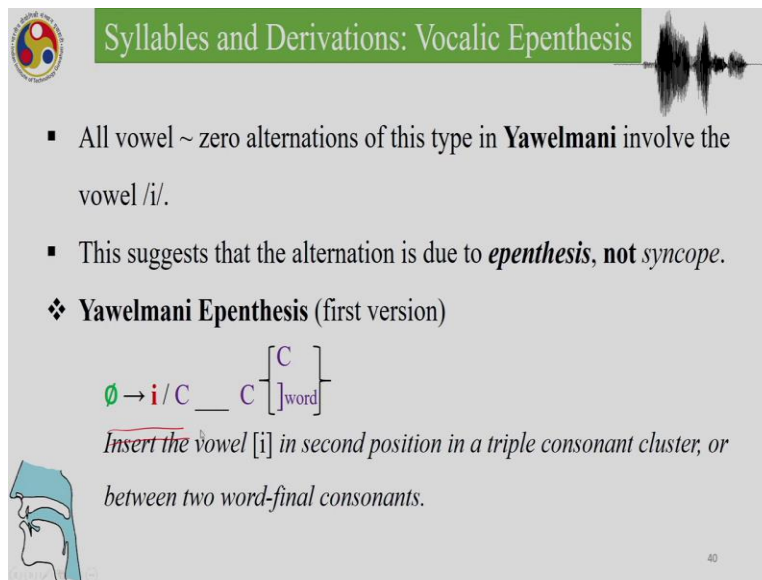
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So, in the last lecture we talked about allomorph, so allomorph are different forms of morphemes and allomorph of the form CVCC occurs before vowel initial suffixes such as al and n. So, we saw the two consonants there in the data just now. An allomorph of the form CVCiC occurs before consonant initials suffixes such as hin, mi or nit. So, what is the difference between these two one is vowel initial the other is consonant initial.

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So, let us see other alternations in Yawelmani Yokuts. All vowels zero alternations of this type involved the vowel i. The suggested alternation is not due to epenthesis not syncope. So, which

means we saw the process of determining whether something is epenthesis or deletion in the last class and we will not go through those processes again. So, suffice it to say that we have to insert a vowel if there are two consonants.

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Now, we have the application of the rule here. We have the underlying form phact-al and then we have phact-hin and we have phact. So, these are the underlying forms, but let us see what happens in these two forms. So, now we already see that we have epenthesis applying there and as a result, we had the surface forms of phact-hin and phact-hit but not here when you have phact-al.
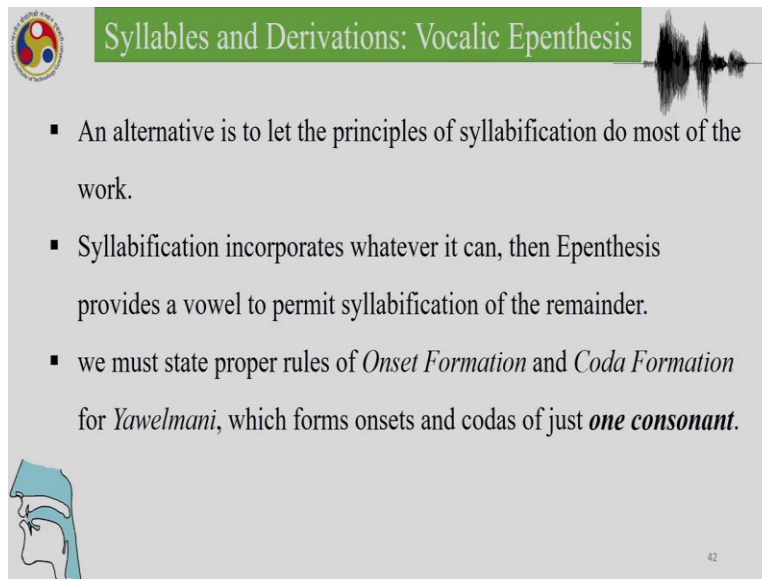
So Yawelmani syllables begin with a single consonant and end with up to one consonant. So, as a result, when we have clusters like this, Yawelmani Yokuts introduces epenthesis. And the underlying representations undergo epenthesis, the ones that could not be syllabified under these limitations.
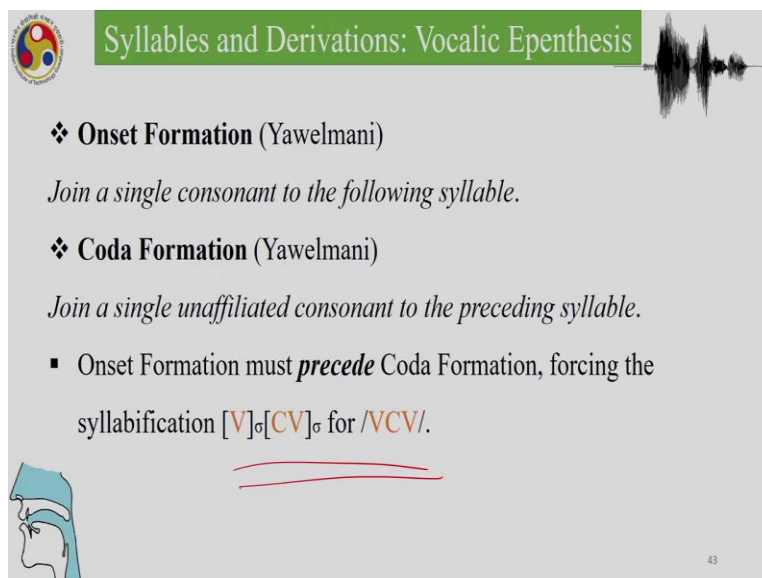
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An alternative is to let the principles of syllabification do most of the work. Syllabification incorporates whatever it can, then epenthesis provides the vowel to permit syllabification of the remainder. We must state proper rules of onset formation and coda formation for Yawelmani, which forms onsets and codas of just one consonant.

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So, onset formation in the Yawelmani, just a single consonant to the following syllable. Coda formation is just join a single and unaffiliated consonant to the preceding syllable. Onset formation must proceed coda formation forcing the syllabification. So, here, so along with

morphophonological in Yawelmani, we understand that the idea of the proper syllables in Yawelmani drives all these types of epenthesis in the language.

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So, we have onset formation with these onsets and then we have coda formation with the remaining consonants. But then there is still something remaining, these parts remaining even after coda formation and that is when we have those syllabification. There are still consonants t in the second and third forms and they are unaffiliated with any syllable, such consonants are, these are the stray consonants now, these are the stray consonants which have to be syllabified.

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Syllables and Derivations: Vocalic Epenthesis

- Suppose that Epenthesis is formulated to *repair* any consonants that are left ***stray*** following the initial application of syllabification.
- The rule that is needed can be expressed as:
- ❖ **Yawelmani Epenthesis** (syllabic version)
  $\emptyset \rightarrow \mathbf{i} \ / \ \underline{\quad} \ C'$
  Insert [**i**] *before a **stray** consonant.*
- C' indicates an ***unsyllabified*** consonant.

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Syllables and Derivations: Vocalic Epenthesis

- Since only two representations include unsyllabified consonants, only they trigger Epenthesis:

$$\sigma \qquad \sigma \qquad \sigma \qquad \text{Epenthesis}$$

$$\underline{\quad} \quad p^h \ a \ \textʔ \ \mathbf{i} \ t^h \ h \ i \ n \qquad p^h \ a \ \textʔ \ \mathbf{i} \ t^h$$

- Since syllabification rules are persistent, they will reapply establishing the normal syllabification on the surface:

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Suppose that epenthesis is formulated to repair any consonants that are left stray following the initial application syllabification that rule can be expressed as so null goes to the vowel i if there is a following consonant. So, insert i before a stray consonant. And i means un-syllabified since consonant. And since only two representations include un-syllabified consonants, only they trigger epenthesis, since syllabification rules are persistent they will reapply establishing the normal syllabification on the surface.

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So, finally we have syllable assignment, we have onset formation, we have coda formation and we have the surface forms where i had to be inserted because the particular kind of coda was not possible the stray consonants had to be adjusted with epenthesis.

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So, the revised version of epenthesis improvement for two reason it unifies a separate environments of the earlier rule in one single environment, that is a stray consonants have to be again re-syllabified. It establishes a connection between syllabification principles and epenthesis.

So, epenthesis in Yawelmani cannot be understood without understanding the syllabification procedure of Yawelmani Yokuts.

So, thank you for your attention. We have finished our lecture on syllables today, which will be helpful in understanding both phonology and phonological alternation as well as morphological alternations. Thank you.