

SOME ALLOPHONES CAN BE IMPORTANT

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I

Phonetics deals with "overt speech-behavior". Phonemics deals with "categories" of speech-behavior in language.¹ Not all forms of speech-behavior occur in all languages. Some occur in certain languages but not in others. Within each language some different speech acts are used contrastively to differentiate meaning; these differences are phonemic or distinctive. Some differences between speech acts do not differentiate meanings; these differences are phonetic or allophonic, that is, non-distinctive.

The inventory of phonemes in every language is exhaustive. Phonetic differences, on the other hand, are inexhaustive. Between the level of phonetic difference and that of phonemic difference, there is that of allophonic difference. Phonetic differences account for all the different speech acts in a language. For example, the different amounts of friction in /s/ as in the word *cease*. Allophonic differences account for the types of phonetic differences of a designated phoneme according to the environments in which they occur. For example, the different varieties of stops of each of the three voiceless stops in English. The voiceless stops can occur with aspiration as in *pill*, *till*, and *kill*. They may occur unaspirated or with minimal aspiration² as in *spill*, *still*, and *skill*. They may occur aspirated, unaspirated, or unreleased as in *lip*, *lit*, and *lick*. All these differences are phonetic. But the aspirated, unaspirated, and unreleased stops in *pill*, *spill*, and *lip* are assigned to /p/. They are allophones of /p/. The aspirated, unaspirated, and unreleased stops in *till*, *still*, and *lit* are assigned to /t/. They are allophones of /t/. The aspirated, unaspirated, and unre-

¹Martin Joos, "Description of Language Design," *The Journal of the Acoustical Society of America*, XX (1950), p. 704.

²Hereafter "unaspirated" will be used to mean "unaspirated or with minimal aspiration".

leased stops in *kill*, *skill*, and *lick* are assigned to /k/. They are allophones of /k/. Phonetic differences make allophones.

In a theoretical analysis of the phonology of a given language, the linguist aims at exhausting the distinctive features and arriving at a limited number of phonemes of that language. And the distinctive features of phonemes are arrived at after the distributions of the allophones are studied. In the teaching of a foreign language, a comparison between the phonemic systems of both languages is essential. The purpose is to discover the phonemes that occur in the foreign language which do not occur in the native language. Such phonemes are generally accepted as the biggest learning load for the students and similarly the heaviest teaching problem for the instructor. But there are also structurally contrastive relations among the allophones of the two languages and between allophones of one language and phonemes of the other. Such relations must not be ignored either.

II

Some observations about teaching allophones: They do not differentiate meaning. Yet the comparison of allophones in the native language with the allophones of the language to be learned can be as important in its way as the comparison of phonemic charts.³ Such a comparison of allophones and allophonic systems leads to the basic thesis of this article: some allophones can be important.

Allophones can be important for more reasons than one:

1. Allophones in the native language can occur as separate phonemes in the foreign language and must therefore be separated.

2. They may occur in the native language but not in the foreign language and therefore must be carefully eliminated.

3. Similar phonetic types in the native language and in the foreign language may be distributed differently and therefore the patterns of distribution must be understood and then practiced.

4. Allophones in the foreign language which do not occur in the native language must be learned as a new type of phonetic behavior.

³Yao Shen, "Phonemic Charts Alone Are Not Enough," *Language Learning*, V (1955), pp. 122-128. Read the pages of this article in the following order: 122, 124, 125, 126, 123, 127, and 128.

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5. Those allophones used to signal two different sets of phonemes in a certain position in the foreign language but only one set of similar phonemes, or neither set, in a similar position in the native language, must be drilled.

Eight various and different types of relation are given in this article to demonstrate that allophones must be taught. Each will be designated as Type... , and the presentation of each begins with a formula to show allophonic and phonemic relations. An example follows the formula to illustrate it. The description of the type ends that specific section. In each formula and its description, capital letters within () represent various languages. Symbols within [] represent various allophones. Symbols within / / represent various phonemes. Various allophones of a phoneme are represented by / [... ~ ... ~ ...]/. V means vowel. C means consonant. Throughout the article, ~ means "is in non-distinctive and complementary distribution with". ≠ means "is in distinctive contrast with".

Type 1. (A) / [y ~ z] /
(B) / [y] / ≠ [z] /

The languages used to illustrate type 1 are Mandarin Chinese and English. The specific example is [w] and [v] occurring in word initial position.

In Mandarin Chinese, [w] in word initial position may vary with [v]. For example: [wən] and [vən] are heard from the same speaker. Either production—whether the upper teeth touch the lower lip or not—has the same referential meaning. When either sequence of sounds given here is produced with the first tone, it means *to review*; with the second tone, it means *to smell*; with the third tone, it means *steady*; with the fourth tone, it means *to ask*. [w] and [v] are phonetically different, but native speakers of Mandarin react to them as the same. [w] and [v] in Mandarin Chinese are allophonically different.

In English, [w] and [v] must be kept separate. /w/ *wine* is not /v/ *vine*. /w/ and /v/ are different, and native speakers of English react to them as different. They are phonemically different. Failure to distinguish the two will cause lexical confusion.

A Mandarin speaker who has not been trained to be aware of the free variation in his native language automatically brings this freedom into English. In language, there is a tyranny of

categories.⁴ And this freedom of varying between [w] and [v] in Mandarin is not permitted in English.

Mandarin /w [w ~ v]/
 English /w [w]/ ≠ /v [v]/

Unless the native speaker of Mandarin Chinese is aware of the free variation in his native language, he will not be able to produce satisfactory English.

Type 1 can be described as follows: Allophones of a phoneme /[y~z]/ in the native language (A) can occur as two separate phonemes /[y]/ ≠ /[z]/ in the foreign language (B). Native speakers must be made aware of the free variation in their own language before satisfactory production of the foreign language can be called for. The example for type 1 is /[w~v]/ in Mandarin Chinese and /[w]/ ≠ /[v]/ in English.

Type 2. (A) /[y ~ z]/
 (B) /[y]/
 (C) /[z]/

The three languages taken up here to illustrate type 2 are Mandarin Chinese, Thai, and German. The specific example is again [w] and [v] occurring in word initial position.

In Mandarin Chinese, as we described above, [w] and [v] in initial position are allophonically different /[w~v]/.

In Thai, /w/ occurs in initial position. /v/ does not occur.⁵ The Mandarin speaker is accustomed to producing [w] and [v] freely.

Mandarin /w [w ~ v]/
 Thai /w [w]/

When he learns to speak Thai, he must be first made aware of the fact that there are two different sounds in his native language, although it makes no difference which one he produces. But if he is to speak Thai properly, he must learn to select only the [w] and not the [v] for production. Otherwise, he is not speaking Thai.

In Standard German, /v/ occurs in initial position. /w/ does not occur. When the Mandarin speaker learns to speak German, again he is not free to vary between [w] and [v].

Mandarin /w [w ~ v]/
 German /v [v]/

⁴Joos, *op. cit.*, p. 703.

⁵The informant is Sirabharana Manasandana.

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As in the case of learning Thai, he must make a selection. But what is selected is different. Instead of consciously selecting [w] and eliminating [v] as for producing Thai, he must consciously eliminate [w] and select [v] for producing German. Otherwise, he does not speak German.

Type 2 can be described as follows: Two allophones of a phoneme /[y~z]/ may vary freely in the native language (A) whereas only one of them occurs as a phoneme /[y]/ or /[z]/ in the foreign language (B) or (C). Native speakers must also be made aware of the allophonic difference so that practices can center on the selected phonetic type. The example for type 2 is /[w~v]/ in Mandarin, /[w]/ in Thai, and /[v]/ in German in initial position.

The relationship of [w] and [v] as allophones and phonemes in initial position among Mandarin, English, Thai, and German is as follows:

Mandarin	/w [w	~	v]/
English	/w [w]/	≠	/v [v]/
Thai	/w [w]/		
German	/v [v]/		

Type 3. (A)	/z-[z]/	(B)	/z-[y]/
	/zC-[zC]/		/zC-[yC]/
			/Cz-[Cz]/

There is a similar /p/ in Tagalog and in English. /p/ occurs as a voiceless bilabial stop in both languages. However, in initial position, in Tagalog, whether it occurs singly or as the first member of a cluster, it is unaspirated or with minimal aspiration.⁶ It does not occur as the second member of a cluster.⁷ In English, when it occurs singly⁸ or as the first member of a cluster, it is aspirated. When it occurs as the second member of a cluster, it is unaspirated or with minimal aspiration.

Tagalog		English	
[p]	pipino	[p ^h]	pay
[p]1	plano	[p ^h]1	play
[p]r	prano	[p ^h]r	pray

⁶See footnote 2 above.

⁷The examples in Tagalog given in this section of the article are from Aurora L. Asinas and Rosalina A. Morales.

⁸G. L. Trager and H. L. Smith, jr., *An Outline of English Structure* (Norman, Oklahoma, 1951), p. 29.

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Tagalog		English	
[p]y	piyáno	[p ^h]y	puny
[p]w	puwéde	[p ^h]w	Pueblo
		s[p]	spin
		s[p] 1	split
		s[p]r	spread
		s[p]y	spew

Tagalog speakers must learn to produce the aspirated allophone in English. Unaspirated /p/ occurring singly or as the first member of a cluster in initial position is not English.

Type 3 can be described as follows: An allophone [z] of a phoneme /z-/ in the native language (A) can occur as one of two allophones /[y~z]/ of a similar phoneme /z-/ in the foreign language (B) when the two allophones of this similar phoneme in the foreign language have a rigid distribution. Native speakers must learn to produce the allophone that does not occur in their language. The example for type 3 is the similar /p/ in Tagalog and in English in initial position.

Type 4. (A) /-z [z]/ (B) /-z [x~y~z]/

We shall again take the similar /p/ in Tagalog and in English. In final position, the Tagalog /p/ is unreleased.⁹ The English /p/ is "sometimes aspirated, sometimes unaspirated, sometimes unreleased".¹⁰ It should suffice if the Tagalog speaker produces the unreleased allophone, since it is one of the three free allophones in English. But English speakers are not divided into aspirated /p/ speakers, unaspirated /p/ speakers, and unreleased /p/ speakers. All three allophones occur in the same speaker,¹¹ although with stylistic difference. The Tagalog speaker has to be prepared to perceive all three phonetic types as "free variants" of the same phoneme. And in order to be able to produce satisfactorily, he must be able to perceive first.

Type 4 can be described as follows: An allophone [z] of a phoneme /-z/ in the native language (A) is one of three free allophones /[x~y~z]/ of a similar phoneme /-z/ in the

⁹The informant is Adelaide Paterno.

¹⁰Bernard Bloch and George L. Trager, *An Outline of Linguistic Analysis* (Baltimore, 1942), p. 42; Trager and Smith, *op. cit.*, p. 31.

¹¹Bloch and Trager, *op. cit.*, p. 42.

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foreign language (B). The two other allophones [x] and [y] in the foreign language, however, still are desirable acquisitions. The example for type 4 is the similar /p/ in Tagalog and in English in final position.

Type 5. (A) / [x ~ y] / ≠ / [z] /
 (B) / [x] / ≠ / [y ~ z] /

The example for type 5 is the bilabial stops in English and in Mandarin Chinese. We shall consider their occurrence initially before vowels and medially between vowels.

In English bilabial stops, voicing is usually regarded as phonemic; aspiration is allophonic. There are two phonemic bilabial stops: one voiced; one voiceless. The voiced stop has an unaspirated allophone in word initial and medial intervocalic positions, and an unaspirated allophone and an unreleased one in word final position. The voiceless stop has an aspirated allophone in initial position; an aspirated allophone and an unaspirated one in medial intervocalic position; an aspirated allophone, an unaspirated one, and an unreleased one in final position.

In Mandarin bilabial stops, aspiration is phonemic; voicing is allophonic. There are two phonemic voiceless bilabial stops: one aspirated; one unaspirated. In initial position, both types of stops occur. In medial intervocalic position, the unaspirated stop has a voiced allophone, and the aspirated one does not. In final position, no stop occurs.

The present interest is the relationship between the phonemes and allophones of the bilabial stops in English and in Mandarin Chinese in two-syllable words that do not have consonant clusters and that do not end with a stop.

In English, the aspirated allophone of the voiceless bilabial stop occurs before the stressed vowel and the unaspirated allophone occurs before the unstressed or weak vowel.¹² The voiced bilabial unaspirated allophone occurs before both the stressed vowel and the unstressed or weak vowel. For example:

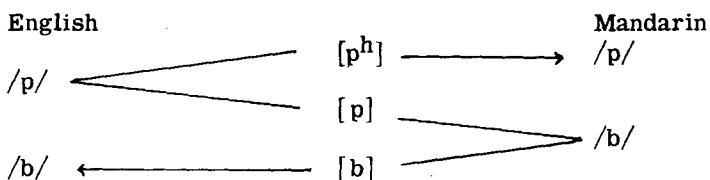
[p ^h] u'p on	[b] o'bey
[p ^h] 'p a p e r	[b] 'b a b y
[p] 'o p a l	[b] 'o b o e
[p] 'p a p e r	[b] 'b a b y

¹²Trager and Smith, *op. cit.*, p. 29 and p. 32.

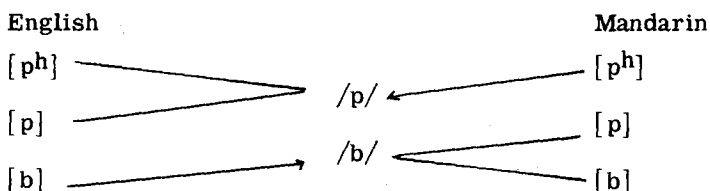
In Mandarin, the bilabial aspirated stop occurs before a stressed vowel or an unstressed vowel when either vowel is in any of the four tones, or intervocalically before an unstressed vowel in the neutral tone. The bilabial unaspirated stop occurs before a stressed vowel or an unstressed vowel when either vowel is in any of the four tones. But intervocalically before an unstressed vowel in the neutral tone, it is voiced.¹³ For example:

[p ^h] pǔ 'piàn 'universal'	[p] bāu 'bāu 'wrap newspaper'
[p ^h] pǐ páur 'fur gown'	[p] 'báu bù 'thin cloth'
[p ^h] pǔ 'piàn 'universal'	[p] bāu 'bāu 'wrap newspaper'
[p ^h] 'pǐ páur 'fur gown'	[p] 'báu bù 'thin cloth'
[p ^h] 'puó p _o 'grandma'	[b] 'buō b _o 'a kind of cake' ¹⁴

The allophonic distribution of the bilabial stops in English and in Mandarin can be given as follows:



We can also arrange them in the following way:



Type 5 can be described as follows: Two allophones /[x-y]/ in language (A) can correspond to two separate phonemes /[x]/ ≠ /[y]/ in language (B). Two allophones /[y-z]/ of one of the two separate phonemes in language (B) can correspond to two separate phonemes /[y]/ ≠ /[z]/ in language (A). In other words, the similar phonetic type [y] must be assigned to two different phonemes in two different languages. The distributions of such allophones should be learned. The

¹³Y. R. Chao, *Mandarin Primer* (Cambridge, 1948), p. 28.

¹⁴Y. R. Chao and L. S. Yang, *Concise Dictionary of Spoken Chinese* (Cambridge, 1947), p. 241.

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example for type 5 is the bilabial stops occurring singly in two-syllable words that do not end with a stop, in English and in Mandarin Chinese.

Type 6. (A) $/[v \sim w \sim x \sim y \sim z]/$
 (B) $/[v]/ \neq /[w]/$
 (C) $/[v]/ \neq /[w]/ \neq /[x]/$

The three languages taken up here to illustrate type 6 are Mandarin Chinese, English, and French.

There are five allophones of the high-vowel $/i/$ in Mandarin Chinese. They are: the high-front unrounded $[i]$, the high-back rounded $[u]$, the high-front rounded $[ü]$, the apical $[z]$, and the apical fricative $[ʒ]$. The high-front unrounded and high-back rounded allophones occur as two separate phonemes in English; $[ü]$, $[z]$, and $[ʒ]$ do not occur. An English speaker learning to control Mandarin must acquire the habit of producing $[ü]$, $[z]$, and $[ʒ]$, and he must be able to control all three.

In French, the high-front unrounded, the high-back rounded, and the high-front rounded allophones in Mandarin occur as three separate phonemes; $[z]$ and $[ʒ]$ do not occur. A French speaker learning Mandarin thus needs to control $[z]$ and $[ʒ]$ only. In order to produce the high-vowel in Mandarin, the English speaker must learn to control three allophones and the French speaker must learn to control two. Without being able to control these allophones, neither the English speaker nor the French speaker speaks Mandarin.

Type 6 can be described as follows: Allophones of a phoneme $\sqrt{[x \sim y \sim z]/}$ or $[y \sim z]/$ in the foreign language (A) which do not occur in the native language (B) or (C) must be taught. The example for type 6 is the high-vowel in Mandarin for English or French speakers.

Type 7. (A) $/VC_1 [yC_1]/$ (B) $/VC_1 [yC_1]/$
 $/VC_2 [zC_2]/$

The two languages taken up here are English and German. The specific example is the allophonic length of the English vowel.

There are three similar voiceless stops and three similar voiced stops in English and in German.

In English, in word final position, the lengthening of the vowel is automatic when the vowel is followed by a voiced consonant. Conversely, when the consonant is voiceless, the vowel is shorter. In these cases, vowel length in English is allophonic. The examples used here are:

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cup	[k ^h əp]	cub	[k ^h ə·b]
but	[bət]	bud	[bə·d]
duck	[dək]	dug	[də·g]

In German, both the voiceless and voiced stops occur in initial position. In final position, only the voiceless set occurs. Thus *cup* and *cub*, *but* and *bud*, and *duck* and *dug* are often produced alike by a German learner of English.

In English, pre-pausal "voiced" obstruents have a voiceless final portion; but they are signalled as "voiced" by the allophonic length of the preceding vowel.

If the German speaker brings his native habit of producing the voiceless stops in place of the voiced ones without lengthening the vowel, then *cub*, *bud*, and *dug* will sound like *cup*, *but*, and *duck*. Should he substitute the voiceless set for the voiced one but lengthen the vowel, then the English-speaking listener will react to [k^hə·p] [bə·t] [də·k] as *cub*, *bud*, and *dug* instead of *cup*, *but*, and *duck*. While it is important to produce both the voiced and voiceless sets of stops in English, it is equally important if not more important here to produce the lengthened vowel. Often when the voiced stops are preceded by a short vowel

[k^həb] [bəd] [dəg]

the English-speaking listener reacts to the voiced stops as the voiceless ones. Although vowel length in English is only allophonic, it must be acquired for producing satisfactory English.

Type 7 can be described as follows: Allophones /[y~z]/ of a phoneme /V/ can be followed by two different sets of phonemes C₁ and C₂ in the foreign language (A) but one of the allophones [y] is followed by one similar set C₁ in the native language (B). Such allophones should be taught. The example for type 7 is the allophonic vowel length followed by voiceless or voiced stops in English for German speakers.

Type 8. (A) /VC₁ [yC₁]/ (B) /V [y]/
 /VC₂ [zC₂]/

The two languages taken up here are English and Mandarin Chinese. The specific example is again the allophonic length of the English vowel.

There are six stops in English and in Mandarin Chinese. As we have seen in type 7, the English vowel has allophonic length followed by voiceless and voiced consonants. In final position, as we have previously stated, the voiced stop has an

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unaspirated allophone and an unreleased one; the voiceless stop has an aspirated allophone, an unaspirated one, and an unreleased one.

In Mandarin, there are phonemic aspirated and unaspirated stops. But neither occurs in word final position. For example:

English				Mandarin	
<i>cup</i>	/p/	<i>cub</i>	/b/	}	
<i>but</i>	/t/	<i>bud</i>	/d/		No final stops
<i>duck</i>	/k/	<i>dug</i>	/g/		

Proper teaching of English should take up all of the above described allophones of both stops, because all such allophones occur in the same speaker. In Mandarin, stops are always followed by a vowel, since they do not occur in final position. A Mandarin speaker will produce the English voiced unaspirated allophone and the voiceless aspirated and unaspirated allophones with a vowel following them.¹⁵ In order to avoid the undesirable automatic production of the vowel, the unreleased allophones can be selected first so that the vowel following the stops will not be permitted to occur. However, for the listener, it is not easy to hear the difference between the voiced unreleased stop and the voiceless unreleased stop. Furthermore, English voiced consonants in final position as we said before, end with a voiceless portion. Thus, without the proper allophonic difference in vowel lengths, *cup* and *cub*, *but* and *bud*, and *duck* and *dug* would sound very similar. But if the Mandarin speaker lengthens the vowel before either of the unreleased set, the English-speaking listener will react to the set preceded by the lengthened vowel as the voiced set. As with the German speaker, but with a different reason, the allophonic vowel length in English must be taught to the Mandarin-speaking learner.

Type 8 can be described as follows: Allophones / $[y \sim z]$ / of a phoneme /V/ can be followed by two different sets of phonemes C₁ and C₂ in the foreign language (A) but one of the allophones [y] is followed by neither set C₁ or C₂ in the native language (B). Intensive drill on the allophones signalling the different sets must be emphasized. The example for type 8 is the allophonic vowel length followed by voiceless or voiced stops in English for Mandarin Chinese speakers.

A satisfactory theoretical descriptive linguistic analysis of the phonology of any language must not depart from the principle

¹⁵Yao Shen, *The Teaching of English in China* (Taipei, 1955), p. 7.

of "economy". The "smallest number of phonemes" or "the simplest description which accounts adequately and accurately for all the facts is to be preferred".¹⁶ This smallest number of phonemes is arrived at by observing, comparing, and classifying the overt speech-behavior in the language analyzed. The phonetic differences are grouped according to their types and distribution. Allophones are thus established, and finally the phonemes are arrived at.

In applied linguistics, needless to say, a knowledge of the phonemes in both the native language and the foreign language is imperative. Phonemes in the foreign language that do not occur in the native language dare not be overlooked, for they differentiate meaning. But failure to control structurally contrastive relations between the native language and the foreign language can cause confusion. Allophones provide acoustical clues to the recognition of phonemes. By careful utilization, they can constitute an aid to a more satisfactory production of the foreign language.

¹⁶Charles F. Hockett, "A System of Descriptive Phonology," *Language*, 18 (1942), p. 9.