

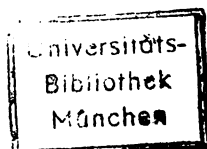
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17. Jahrgang 1969



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LEONHARD LIPKA

Assimilation and Dissimilation as Regulating Factors in English Morphology

1. This paper attempts to show that the distribution of those allomorphs of a number of important grammatical morphemes in English ($\{Z_1, Z_2, Z_3, D_1, D_2\}$), which are phonologically conditioned, can be reduced to only two basic principles: assimilation and dissimilation. The allomorphs /iz/ and /id/ are chosen after sibilants and alveolar stops respectively, precisely because the other two pairs of allomorphs /z, s/ and /d, t/ are themselves sibilants and alveolar stops, and such clusters do not occur in English. The choice between the remaining allomorphs which follow non-sibilants and non-alveolar stops is regulated simply by assimilation: the voiced variants /z/ and /d/ appear after voiced sounds, the voiceless allomorphs /s/ and /t/ after voiceless sounds. Thus, if a sound of the same kind — either sibilant or alveolar stop — precedes the respective morpheme, we have dissimilation, otherwise, we have assimilation of voice.

2.1. With H. A. Gleason we assume that there are basically two types of allomorphs: those which are *phonologically conditioned* and those whose "selection is determined by the specific morpheme or morphemes forming the contexts"¹ which can therefore be termed *morphologically conditioned*. We shall exemplify the implications of this distinction and the notions tied up with it by describing the allomorphs of the English plural morpheme, usually symbolized by $\{Z_1\}$.²

2.2. The singular being an unmarked category, English nouns form their plural by adding an allomorph of $\{Z_1\}$. The vast majority use an allomorph which is selected by the nature of the preceding phoneme:

/iz/ is found after sibilants (*fishes, roses, boxes*),

/z/ after voiced non-sibilants (*boys, stones*), and

/s/ after voiceless non-sibilants (*cats, cups*).

Such nouns form an open class,³ i. e. new words in the English language join this class, and add one of the three allomorphs mentioned, according to their phonic shape. This procedure for marking the plural in the noun is inherent in the system of the English language. However, it is not the only method employed.

2.3.1. The nouns which do not form the plural in the way just described can be regarded as a virtually closed class, i. e. their number is restricted, and they can be listed.⁴ They belong to the 'norm'⁵ of the English language which is, in this respect, the non-systematic level, only explainable historically, but not under a synchronic, functional aspect. Only a diachronic approach can account for the difference between *box* / *boxes* and *ox* / *oxen*. Four main groups of nouns can be distinguished:⁶

1) /z, iz/ is attached, but there is an additional change in the stem, more precisely, the final voiceless consonant becomes voiced. There are three sub-groups: /f/ → /v/ as in *calves*, *knives*, *wolves*; /θ/ → /ð/ as in *paths*, *mouths*, *oaths*, and (only in one example) /s/ → /z/ in *houses*.

The present-day situation goes back to an earlier stage of the language where intervocalic voicing took place, which is only another term for assimilation of voice between vowels.

2) /ən/ is attached, either accompanied by a change in the stem as in *children*, *brethren* or without, as in *oxen*.

3) nothing is attached, but the plural is nevertheless clearly marked by a change in the stem. Such a change can be represented systematically by introducing the concept of *replacive* which has to be regarded as a further allomorph of the plural morpheme. Gleason says: "the difference of syllable nucleus functions . . . like the suffix. We may consider such a difference in phonemes (they are not restricted to nuclei; consider *send* : *sent*) as a special type of morphemic element called a *replacive*" (p. 74). Within the group of nouns which form the plural by means of a replacive, it seems advisable to establish two subclasses according to whether we have formation on a native basis or on a foreign basis.⁷

a) on a native basis the plural can be formed with the replacives /i ←(u)/ as in *geese*, *teeth*, *feet*, /ai ←(au)/ as in *mice*, *lice*, /e ←(æ)/ as in *men* and others. *Pence* and *dice* would also be best included here.⁸ This subclass is completely closed.

b) on a foreign basis, a number of stem final replacives are used, such as /i ←(əs)/ or /ai ←(əs)/ as in *stimuli*, *cacti*, /ə/ ←(əm)/ as in *desiderata*, *dicta*, *data*, /ə/ ←(ən)/ as in *criteria*, *phenomena* and some other replacives.⁹ With nouns of this subclass, much idiolectal and stylistic variation exists,¹⁰ which accounts for the fact that the class is not as clearly definable as are all the other classes of nouns forming the plural with morphologically conditioned allomorphs of {Z₁}. Another reason why these nouns do not constitute a closed class is the productivity of the pattern *nucleus/nuclei* in scientific and technical language, where newly coined words form the plural on a neo-Latin basis.

4) there is no morphological difference between plural and singular, in other words, the plural is not marked by an overt morpheme, as with all the other nouns. For systematic reasons it is practical to introduce the concept of

zero (\emptyset) in such cases which is of course another allomorph of $\{Z_1\}$. This does not exclude the possibility that the category of plural be marked syntactically when the word is not used in isolation. Thus there is normally no ambiguity when words like *sheep*, *grouse*, *Chinese*, *Swiss* are embedded in larger syntactic units or in a situational context. This class is fairly small and a practically closed one.

2.3.2. With all the English nouns treated under 2.3.1. the choice of the respective allomorph of $\{Z_1\}$ is not dictated by the phonological shape of the singular. The selection of the allomorph is therefore morphologically conditioned. Historical reasons can be given for particular instances of such irregular forms. Generally speaking, the nouns in this class represent the remainder of older or foreign systems of plural-formation which are no longer productive in the English language.

2.4. We have treated in some detail the morphologically conditioned allomorphs of $\{Z_1\}$, because we wanted to demonstrate that such allomorphs of whatever morpheme can be formalized systematically, and only occur with a restricted (and in most cases clearly definable) class of words. The systems they go back to are not productive. For both reasons they are therefore no objection against considering the phonologically conditioned allomorphs as the central part in the structure of the English language. We shall consequently confine ourselves to these allomorphs when discussing the morphemes $\{Z_2, Z_3, D_1, D_2\}$.

3.1. We shall now consider the principal grammatical morphemes of English just referred to, and their relation to each other, which amounts to giving an outline of English morphology. The morpheme $\{i\eta\}$ will only be mentioned in passing, as there are no phonological processes involved, and it also differs in several respects from $\{Z_1, Z_2, Z_3, D_1, D_2\}$. Free grammatical morphemes will also not be treated. In the following discussion two terms which have already been employed occasionally will be of considerable importance, viz. *marked form* vs. *unmarked form*.¹¹

3.2.1. The morpheme $\{Z_2\}$ serves to indicate the genitive case which is therefore the marked form in contradistinction to the remaining unmarked form which can be called the common case. There are three phonologically conditioned allomorphs:

/iz/ after sibilants (*Rose's*, *Mr. Lewis's*)

/z/ after voiced non-sibilants (*boy's*, *stone's*, *men's*)

/s/ after voiceless non-sibilants (*cat's*, *Jack's*).

The distribution is the same¹² as with the allomorphs of $\{Z_1\}$, treated under 2.2., i. e. the two morphemes are homonymous. Graphemic conventions (the use of the apostrophe) usually hide this fact. There are, however, a few deviations which can be described as morphologically conditioned variants, viz. \emptyset is found after $\{Z_1\}$ instead of /iz/ (except for morphologically conditioned allomorphs of $\{Z_1\}$, as in *men's*, *women's*, *children's*) and occasionally after proper names

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ending in sibilants (*James*'). This is certainly due to phonological reasons, though it is not quite clear why the method of dissimilation is only used inconsistently in some cases /dʒeimziz/ or /dʒeimz/ and not at all in others: *boys*' */boiziz/.

3.2.2. The morpheme {Z₃} serves to indicate the third person singular of the present of the verb, while all the other forms of the present are unmarked. It is homonymous¹³ with the two morphemes used to mark special forms of the English noun. Consequently, the distribution of the three phonologically conditioned allomorphs is the same. We find:

- /iz/ after sibilants (he *fishes*, *dozes*)
- /z/ after voiced non-sibilants (he *stones*, *sees*)
- /s/ after voiceless non-sibilants (he *cuts*, *helps*).

There are no morphologically conditioned allomorphs of {Z₃}, but three verbs (*does*, *has*, *says*) have special allomorphs of the stem /d_Λ-, hæ-, se-/. However, this does not affect phonological conditioning, as both allomorphs of the stem in all three verbs have voiced non-sibilants before adding the allomorph /z/. It might be argued that a zero-allomorph exists in auxiliary verbs. We prefer not to follow this line of argument, and regard this class as a highly specialized closed subclass of verbs.¹⁴ But we do not go as far as Gleason (p. 104) in treating them as an altogether separate class of *verbal auxiliaries*, only associated with verbs.

3.2.3. The morpheme {D₁} serves to indicate past tense in the English verb. In the past, all forms of the verb are so marked, but person and number remain unmarked categories throughout. Again we find three phonologically conditioned allomorphs:¹⁵

- /id/ after alveolar stops (*ended*, *rested*)
- /d/ after voiced non-alveolar stops (*stoned*, *tried*, *managed*)
- /t/ after voiceless non-alveolar stops (*fished*, *helped*).

These allomorphs occur in all regular English verbs which constitute an open class. Besides, there are a number of morphologically conditioned allomorphs¹⁶ — notably replacives of various kinds,¹⁷ but also \emptyset — with irregular (strong) verbs which form a closed class.

3.2.4. The morpheme {D₂} serves to indicate the past participle in English. This difference in the 'signifié' from {D₁} must induce us to consider it as a separate morpheme, though in most cases the two morphemes are homonymous. The criterion Gleason uses that "the two forms... in a few verbs... are different, and so must be considered as two morphemes" (p. 101) is not sufficient. With phonologically conditioned allomorphs the distribution and the examples are exactly the same as those given for {D₁} in 3.2.3. There are three types of morphologically conditioned allomorphs: replacives (*sung*), \emptyset (*cut*), and most conspicuously /ən/ (*taken*) which accounts for the use of the symbol *-en* in transformational notations. As in most languages, the verb *to be* has a number of irregular suppletive forms¹⁸ whose preservation is, of course, due to its extremely high frequency. The use of a zero-allomorph of {D₁} and {D₂} with some verbs ending in an alveolar stop (*cut*, *hit*, *put*) is again certainly tied up with phonolog-

ical reasons, and exactly parallels the zero-allomorph of $\{Z_2\}$ found after $\{Z_1\}$ (*boys'*) discussed in 3.2.1. Nothing would have prevented the use of dissimilation (**cutted*). All four cases of zero-allomorphs with $\{Z_1, Z_2, D_1, D_2\}$ can be interpreted as instances of complete assimilation of the following sibilant or alveolar stop, comparable to *illegal, irrelevant* discussed in 7.1.¹⁹ \emptyset would then be the result of assimilation.

4.1. If we try to sum up this short survey of English morphology, we observe that there is an obvious difference between the forms of the noun and those of the verb. The morphology of the verb is far more complex, while there is not much variety in nominal forms.

4.2. Apart from the unmarked base form, the noun has only two marked categories: plural and genitive. The phonologically conditioned allomorphs of $\{Z_1\}$ and $\{Z_2\}$ are exactly alike, i. e. the respective forms are homonymous. Only a small percentage of forms do not fit into this system, as they make use of morphologically conditioned allomorphs. Such nouns constitute a closed class.

4.3. The English verb, on the contrary, has a much wider range of different forms. In addition to a sibilant morpheme $\{Z_3\}$, a number of others can be affixed, viz. $\{D_1, D_2, \text{in}\}$. We can illustrate the situation with the help of a matrix:²⁰

The <i>regular</i> English verb has						
only 4 forms:	call,	calls,	called,	—,	calling	
The <i>irregular</i> verb has no more						
than 5 forms:	sing,	sings,	sang,	sung,	singing	
	take,	takes,	took,	taken,	taking	
	hit,	hits,	—,	—,	hitting	
The verb <i>to be</i> has 8 forms:	be,	am,	is,	was,	been,	being
			are,	were		
			$\{Z_3\}$	$\{D_1\}$	$\{D_2\}$	$\{\text{in}\}$

Morphemes which mark certain verb forms need not necessarily be affixes that are tacked onto the verb. The same function can be achieved with the help of free grammatical morphemes like *to* which marks the infinitive in English. As pointed out recently by Strang²¹ the model most appropriate to describe the English verb system would be a radial one, with the unmarked term in the centre, surrounded by increasingly marked forms.

5.1. We shall now proceed to attempt an explanation of the descriptive presentation given above, concerning the principal facts of English morphology. We have stressed throughout the importance of phonological considerations, and have repeatedly hinted at possible influences. A comparison of $\{Z_1, Z_2, Z_3\}$ on the one hand, and $\{D_1, D_2\}$ on the other, will offer a solution to the distribution of the phonologically conditioned allomorphs. Though a purely mechanical explanation is contradicted by the situation discussed in 3.2.4. and 3.2.1., the guiding principle seems rather obvious in our opinion.²²

5.2. It is evident that the conditioning factor for the group of homonymous morphemes $\{Z_1, Z_2, Z_3\}$ is the question of the presence of sibilants, and also that the three phonologically conditioned allomorphs all contain sibilants themselves. We can therefore call them *sibilant-morphemes*. On the other hand, the decisive criterion for the distribution of the variants of $\{D_1, D_2\}$ is obviously the presence or absence of alveolar stops, and the three allomorphs /id, d, t/ all contain such stops. The group can therefore be termed *alveolar-stop-morphemes*. When a sibilant-morpheme is attached to a stem not ending in a sibilant, the choice between the voiced /z/ or voiceless /s/ allomorph is simply regulated by the nature of the preceding phoneme. If it is voiced, the following allomorph becomes voiced, if it is voiceless, the allomorph too becomes voiceless. This is simply a description of progressive assimilation. Exactly the same holds for the selection of /d/ or /t/ in the case of $\{D_1, D_2\}$, when there is no alveolar stop preceding. Again, progressive assimilation is the regulating factor. The situation is completely changed when a sibilant or an alveolar stop directly precedes the respective morpheme. If /z/ or /s/ and /d/ or /t/ were attached to the stem, two phonemes of the same kind would clash which would yield phoneme clusters not existing in English. To prevent this, a vowel /i/ is inserted which amounts to saying that we have dissimilation in these cases. After the vowel /i/, the voiced variant of the sibilant morpheme is selected. With the phonologically conditioned allomorphs of the five morphemes in question, the process invariably works in the way described. The kind of lexical morphemes involved, more precisely the word-class they belong to, is utterly irrelevant for the functioning of this process. It cuts across the otherwise fundamental distinction between nouns and verbs,²³ and $\{Z_1, Z_2\}$ behave exactly like $\{Z_3\}$. This is probably the reason, why the governing principle should have escaped the attention of scholars, as they traditionally treat noun phrases and verb phrases under different headings. Moreover, $\{D_1, D_2\}$ also behave like the phonetically very dissimilar sibilant-morphemes.

5.3. Assimilation and dissimilation have to be considered as regulating factors in English morphology, which explains the system of the language, but we are far from assuming a purely mechanistic attitude. Such an approach would already encounter considerable difficulties in explaining why we find progressive assimilation in one case, but regressive assimilation in another. We have pointed out in 3.2.4. and 3.2.1. that dissimilation is not at work in some cases where we might have expected it. As mentioned in 3.2.2., $\{Z_3\}$ is not found in auxiliary verbs. Thus, person and number are not marked in the present, as it usually is not throughout the past of all verbs. Ambiguities however, do not normally arise through this fact, or are discarded by other markers in larger syntactic units.

6.1. The description of the functioning of assimilation and dissimilation in English morphology has to be supplemented by a furthergoing interpretation.²⁴ On a higher level of abstraction, not all three allomorphs /iz, z, s/ and /id, d, t/

are equally phonologically conditioned. If we take into account what Hockett (p. 282) calls "the phonemic habits of the language" — which is nothing else but the inherent phonemic system of English, or the laws for the clustering and patterning of sounds valid in this particular language — then we have to attribute a special status to allomorphs following vowels, and certain consonants.

6.2.1. Vowels do not necessarily require a following phoneme to become voiced (e. g. *boys* /z/ vs. *voice* /s/), and so nothing in the phonemic system of English would prevent the choice of the voiceless variant of {Z₁, Z₂, D₁, D₂} instead of the voiced one. The selection of the voiced variants /z/ and /d/ (also in /iz/ and /id/) is thus not conditioned by purely phonological factors, but is partly morphologically conditioned. However, English morphology is characterized by the fact that the choice of the voiced variant, as described in 2.2. and throughout 3. is automatic and regular. Assimilation according to the manner of articulation is therefore a guiding principle in English morphology, and has to be regarded as a regulating factor, especially since in the case of allomorphs following vowels, another possibility would exist on the higher plane of the inherent phonemic laws of English. The situation just described also accounts for pairs like *wife's* /wɪvɪz/. The sibilant following the fricative is assimilated accordingly.

6.2.2. What has been said about vowels also holds for some voiced consonants in final position. According to the phonemic system of English, combinations of 'voiced consonant + voiceless consonant' are certainly possible in final position, and such clusters commonly occur (e. g. /mp, lp, nt, lt, lk, mf, lf, ns, ls/).²⁵ However, all clusters of this kind contain either a nasal or a liquid, which both have strong syllabic character, and can function as syllable nuclei. This characteristic feature brings them into close neighbourhood with vowels, which explains the similar phonological behaviour. There seems to be one exception, where no nasal or liquid is involved in the sequence 'voiced consonant + voiceless consonant', viz. the final cluster /dθ/, as in *width, breadth, thousands*). This is, however, an altogether different case, as /θ/ is a derivative lexical morpheme²⁶ (cf. 7.3.1.), and consequently a morpheme boundary between /d/ and /θ/ exists. The other consonant clusters, mentioned above, are found in monomorphemic words. The situation is completely changed, when a grammatical morpheme is attached to a stem ending in a voiced consonant. Then, assimilation regularly and automatically takes place — exactly as when a vowel precedes, as discussed in 6.2.1. — and /z/ or /d/ is added, although in the inherent phonemic system of English the voiceless allomorph would also be possible.

6.2.3. The reverse of the sequence discussed in 6.2.2., viz. the final cluster 'voiceless consonant + voiced consonant' is also possible in English. Again, such cases are restricted to combinations which contain a nasal or a liquid, as in *hasten, fasten, reckon, whistle, hustle, tackle, trample* (and with some American speakers also with the liquid /r/, as in *tanker, hatter*), where the nasals and liquids always clearly have syllabic quality, and thus strongly resemble vowels. This vowel-like quality, which was also evident in what has been said in 6.2.2.,

puts the cluster 'nasal/liquid + voiceless consonant', as well as the reverse, on the same plane with sequences containing a vowel, as discussed in 6.2.1. In all those cases, the choice between voiceless or voiced consonants is in principle open, on the level of the phonemic system of English. However, on the level of morphology, when a grammatical morpheme is attached, assimilation is always at work. The choice of the voiceless allomorphs /s, t/ after voiceless consonants is thus again not conditioned by purely phonological factors, but basically regulated by the habits of English morphology.

6.3. The situation is fundamentally different when it comes to some other final consonant clusters. Here, the distribution of phonemes in the English language does not permit certain sequences which may well occur in other languages.²⁷ The phonemically impossible sequences in question are 'sibilant + sibilant' and 'alveolar stop + alveolar stop'. These consonant clusters are contrary to the phonemic pattern of English. If a combination of two morphemes would yield such an arrangement of phonemes, the language has recourse to the procedure of dissimilation which is always compulsory. A clash of two such phonemes of the same kind, which is impossible in the phonemic system of the English language, is thereby avoided. Dissimilation is therefore inherently phonologically conditioned, even on the highest level of abstraction, and is deeply rooted in the language, which does not mean that the phonemic system itself were not liable to change, or has not been subjected to change in the history of the language. All this explains why /iz/ has to be selected after sibilants, when an overt allomorph of {Z₁, Z₂, Z₃} is attached to a stem, and we do not have Ø.²⁸ Exactly the same holds for /id/ found after alveolar stops, when an allomorph of {D₁, D₂} is added. Dissimilation with {Z₁, Z₂, Z₃, D₁, D₂} is thus inherently tied up with the nature of the respective homonymous morphemes — either sibilant or alveolar stop — and is firmly rooted in the phonemic system of English.

7.1. A short look at regressive assimilation, as it occurs with lexical morphemes, may perhaps not seem out of place here. Gleason (p. 83) gives the examples *intemperate*, *imperfect*, *incalitrant* with the prefix *in-* as base form (which is also etymologically the base) for the assimilated allomorphs /im/ and /inj/. We can add some more examples to give a complete list of phonologically conditioned allomorphs of this morpheme: /in/ as in *independent*, *intolerant*, /im/ as in *impossible*, *impersonal*, /inj/ as in *incapable*, *incorrect*, /il/ as in *illegal*,²⁹ *illogical*, /ir/ as in *irrelevant*,²⁹ *irreverent*. If we want to follow Gleason in regarding /in/ as the base of the lexical morpheme, we must bear in mind that it is itself an assimilated form, containing an alveolar sound, like the following /d/ or /t/. This time³⁰ it really does not matter which of the allomorphs is taken as the base, as they are principally all on an equal footing, i. e. they are all purely phonologically conditioned, by the working of assimilation.

7.2. There is also a morphologically conditioned allomorph /ʌn/ of the morpheme discussed in 7.1., or perhaps we can regard the choice between /ʌn/ and

the phonologically conditioned selection between /in, im, iŋ, il, ir/ as being morphologically conditioned. Thus we find *uncertainty* but *incertitude*, *unable* but *inability* (both are vocalic, though one is a diphthong, the other a vowel). Compared to the grammatical morphemes {Z₁, Z₂, Z₃, D₁, D₂} described above, there is one important difference in the distribution of the allomorphs of the lexical morpheme just under discussion: we have to take into account the criterion of productivity, as always in word-formation. With the grammatical morphemes mentioned, the choice between the phonologically conditioned allomorphs was always found to be a living pattern. Nouns and verbs connected with morphologically conditioned allomorphs, however, were found to form a closed class. Here we see a different situation altogether. The phonologically conditioned allomorphs are no longer really productive, but *un-* is a living pattern, though there are certain restrictions³¹. *In-* forms combinations only on a foreign basis (Latin and French). Some linguists do not approve of calling morphologically conditioned variants like *un-* or *-en* (in *oxen* or *taken*) allomorphs, as they are not sufficiently similar in phonic shape to the other variants, but prefer to call them 'alternants'. This, however, is partly a simple matter of terminology, though it also entails considerable disadvantages for systematization.

7.3.1. There is another interesting phenomenon which shows that grammatical morphemes differ from lexical ones in the phonological behaviour of their environment.³² When a lexical morpheme like /i/ is attached to a stem like *long*, no changes in either morpheme are involved, and we get /loŋi/. In other words, the morpheme boundary is maintained, as it is with separate morphemes. However, when a grammatical morpheme like *-er* (either /ə/ or /ər/) — used to mark a degree of comparison — is attached, the phoneme /g/ is inserted resulting in [loŋgə] or [loŋgər]. Thus, the morpheme boundary is not maintained, and the whole combination behaves like a monomorphemic word, e. g. *finger* [fiŋgə] or [fiŋgər]. A homonymous, but lexical, morpheme *-er* — which derives agent nouns from verbs — on the contrary, clearly shows the morpheme boundary; so we have *singer* [siŋə] or [siŋər].

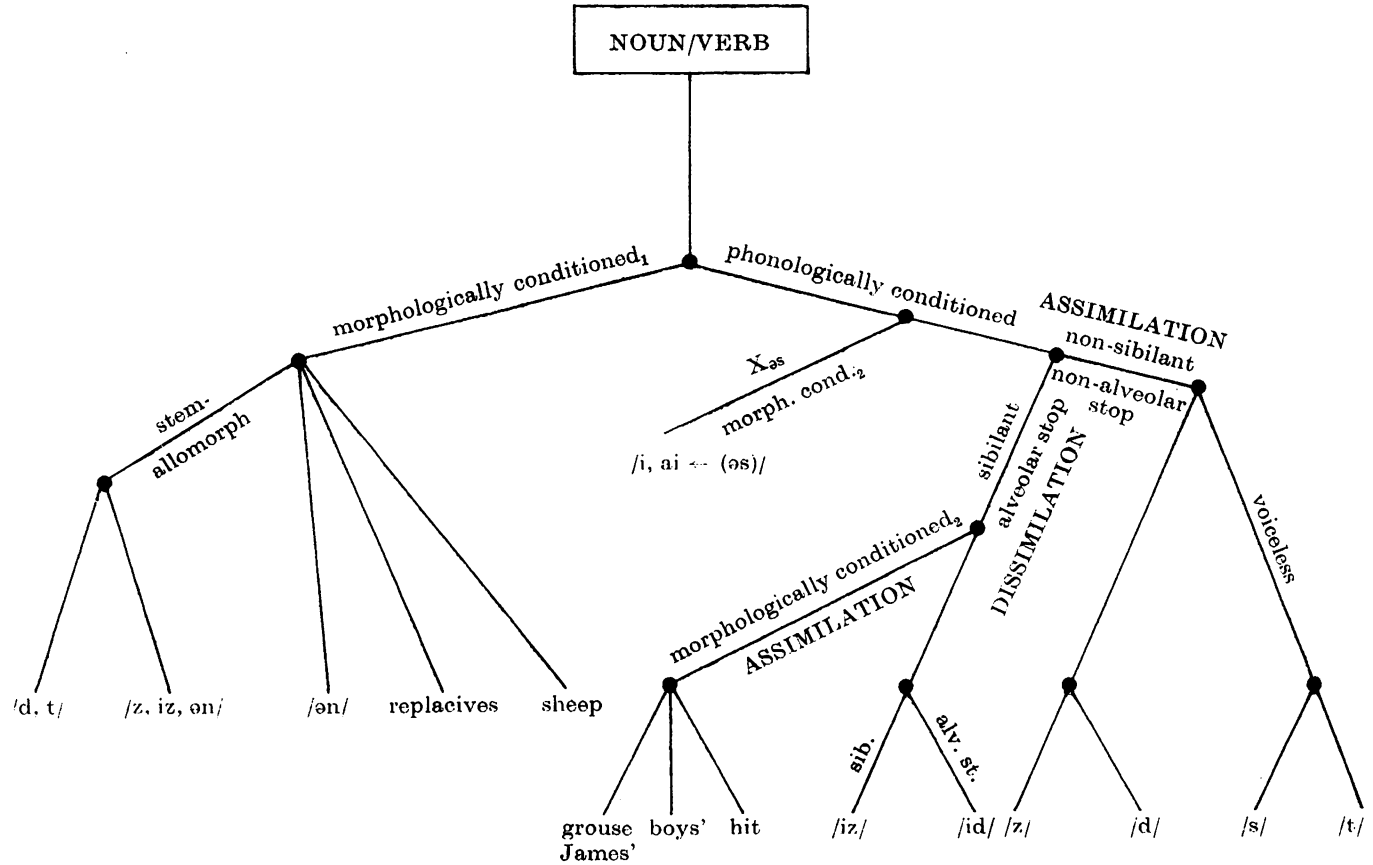
7.3.2. The situation described in 7.3.1. cannot be accounted for by either assimilation or dissimilation. In fact, there is no phonological conditioning at all, but rather a very special case of a morphologically conditioned selection between concomitant phonological features. Neither of the two morphemes in question (base or affix) is affected. The case of the two homonymous morphemes *-er* — which only differ in the point that one is grammatical, the other lexical — seems to demonstrate this very conclusively.

7.3.3. A clear case of dissimilation, on the other hand, is to be found in the choice between the two allomorphs of a free grammatical morpheme, preceding a lexical morpheme, viz. the selection between the two variants of the article *a* and *an* which is determined by the nature of the following phoneme. Before vowels, a nasal is inserted.

8. In conclusion, we should like to make it clear that the concepts of assimilation and dissimilation, as used throughout this article, are not to be understood in a historical sense. They rather have to be accepted as basically synchronic terms, in the way of dynamic processes, comparable to generative grammar. 'Generate' in contemporary linguistics has nothing to do with 'produce something' as a historical event, but signifies that a finite synchronic system of rules can bring forth the infinite variety of utterances in a natural language. To establish the historical priority of particular forms which then assimilate other forms, or are themselves assimilated, may be a very rewarding subject for diachronic linguistics. We were not, however, concerned with this question in our discussion of English morphology. It is an altogether different problem: exactly as in word-formation, where it is fully legitimate to point out that the verb *to peddle* is historically derived from the earlier attested noun *pedlar*, but where, synchronically speaking, a *pedlar* is 'someone who peddles', i. e. the noun is derived from the verb. With the grammatical morphemes discussed, only the phonologically conditioned allomorphs are productive, whereas the nouns and verbs with morphologically conditioned variants constitute closed classes. As we have seen in 7.2. this is not necessarily the case with lexical morphemes.

9.1. A synoptical diagram³³ may perhaps contribute to throw light upon the process of selecting the appropriate allomorphs. The first conditioning factor is the choice between morphologically (1) and phonologically conditioned (2) allomorphs. In the first case, further branching off is exclusively dictated by the specific lexical morphemes, and can therefore not be predicted. In the second case, a decision according to the presence of either sibilants and alveolar stops or non-sibilants and non-alveolar stops has to be made. This factor is automatically connected with the respective processes involved, either dissimilation or assimilation. Finally, the manner of assimilation is regulated by the factor: voiced or voiceless.

9.2. Two groups of allomorphs which are primarily phonologically conditioned (or can at least be so explained) are also morphologically conditioned, but on a higher level. We have therefore marked this by the subscript₂, to distinguish them from the morphologically conditioned₁ group, and have derived them from the right hand side of the diagram. X_{as} is the open class of technical nouns, forming the plural on a neo-Latin basis, which is restricted to stem ending in /əs/. The second group consists of verbs and nouns (also personal names) ending in a sibilant or alveolar stop, either in the stem (*hit*, *grouse*, *James*') or after an affixed allomorph of {Z₁} (*boys*'). They all have a zero-allomorph which can be assumed to be the result of complete assimilation. We might also simply include them under the heading *sheep*. We would not, then, be taking into consideration the phonological influences which definitely exist. The symbols at the bottom of the diagram indicate the morphemes with which the respective allomorphs are found.



{D_{1,2}} {Z_{1,2,3}D₂} {Z₁D₂} {Z₁D_{1,2}} {Z₁} {Z_{1,2}} {Z₂} {D_{1,2}} {Z₁} {Z_{1,2,3}} {D_{1,2}} {Z_{1,2,3}} {D_{1,2}} {Z_{1,2,3}} {D_{1,2}}

10. The morphological and phonological conditions existing in English morphology, and the various processes involved, may also be formulated by means of the following morphophonemic rules:³⁴

- (1) $X + \text{gmor} \rightarrow X + \begin{Bmatrix} \text{Al}_m \\ \text{Al}_{ph} \end{Bmatrix}$
- (2) $X + \text{Al}_m \rightarrow \begin{Bmatrix} \text{Stem}_{alv} + \begin{Bmatrix} /d/ \\ /t/ \end{Bmatrix} \\ \text{Stem}_{al} + \begin{Bmatrix} /z/ \\ /ɪz/ \\ /ən/ \end{Bmatrix} \\ X + \begin{Bmatrix} \text{Rep} \\ \emptyset \end{Bmatrix} \end{Bmatrix}$ said, sold
felt, kept
calves, men's, does, says
houses
children, hidden
oxen, taken
feet, sang, sung
sheep
- (3) $X + \text{Al}_{ph} \rightarrow \begin{Bmatrix} X_{\text{as}} \\ X_n \end{Bmatrix} + \text{Al}_{ph}$
- (4) $X_{\text{as}} + \text{Al}_{ph} \rightarrow X_{\text{as}} + /i, ai \leftarrow (\text{əs})/$ nuclei, stimuli
- (5) $X_n + \text{Al}_{ph} \rightarrow \begin{Bmatrix} X_1 \\ X_2 \end{Bmatrix} + \text{Al}_{ph}$
- (6) $X_1 + \text{Al}_{ph} \rightarrow \begin{Bmatrix} \begin{Bmatrix} X_{\text{sib1}} \\ X_{\text{sib2}} \\ X_{\text{alv1}} \end{Bmatrix} + \emptyset \\ X_{\text{sib/alv}} + \text{Al}_{ph} \end{Bmatrix}$ grouse, Swiss, James'
boys', kings'
cut, hit
- (7) $X_{\text{sib/alv}} + \text{Al}_{ph} \rightarrow \begin{Bmatrix} X_{\text{sib}} + /iz/ \\ X_{\text{alv}} + /id/ \end{Bmatrix}$ boxes, fishes, Rose's, dozens
ended, rested
- (8) $X_2 + \text{Al}_{ph} \rightarrow \begin{Bmatrix} X_{\text{voiced}} \\ X_{\text{voiceless}} \end{Bmatrix} + \text{Al}_{ph}$
- (9) $X_{\text{voiced}} + \text{Al}_{ph} \rightarrow X_{\text{voiced}} + \begin{Bmatrix} /z/ \\ /d/ \end{Bmatrix}$ boys, stone's, sees
stoned, tried, managed
- (10) $X_{\text{voiceless}} + \text{Al}_{ph} \rightarrow X_{\text{voiceless}} + \begin{Bmatrix} /s/ \\ /t/ \end{Bmatrix}$ cats, Jack's, helps
fished, helped

¹ H. A. Gleason, *An Introduction to Descriptive Linguistics*, rev. ed. (New York, etc. 1961), p. 62.

² We here drop the unnecessary hyphen in Gleason's notation $\{-Z_1\}$ — also with other morpheme symbols — which is redundant, as there is no doubt about the place where the morphemes are added.

³ Cf. Barbara M. H. Strang, *Modern English Structure* (London, 1962), p. 77 and pp. 89f.

⁴ Cf. the list in Strang, pp. 87—89.

⁵ The concept of 'norm' (norma) vs. 'system' (sistema) has been introduced by Eugenio Coseriu, "Sistema, norma y habla", in: *Teoría del lenguaje y lingüística general*, pp. 11—113, where the irregular English plural *oxen* is given as an example

- of the 'norm' in the morphological field (p. 76). The clearest evidence is the 'errores de flexion' (p. 76) which are found in children's language. Of course, all morphologically conditioned variants in a language belong here.
- ⁶ Cf. the very similar presentation in Gleason, pp. 98f.
- ⁷ This distinction is even more important and useful in word-formation, where we have to separate clearly between coinings on a native basis, and on a foreign basis. Cf. Hans Marchand, *The Categories and Types of Present-Day English Word-Formation* (Wiesbaden, 1960), pp. 162f., in the following quoted as *Cat.*
- ⁸ Though *dice* might be explained as formed by adding the morphologically conditioned allomorph /s/. Also *pence*, with an additional allomorph of the stem /pen/.
⁹ *Seraphim*, *cherubim* could be said to fall under this heading, but might be described as adding an allomorph /im/ which is the regular plural morpheme for masculine nouns in Hebrew. Cf. W. Gesenius, *Hebräische Grammatik* (o. E. Rödiger), 21. Aufl. (Leipzig, 1872), §§ 87f., 108.
- ¹⁰ Cf. Strang, pp. 88f.
- ¹¹ Cf. Strang, p. 64 and pp. 82f.
- ¹² Cf. Strang, p. 92, and Gleason, p. 100.
- ¹³ Cf. Strang, p. 127. There is still another morpheme, homonymous with {Z₁, Z₂, Z₃}, viz. the phonetically reduced variant of the lexical morpheme *is*. Charles F. Hockett, *A Course in Modern Linguistics* (New York, 1958), p. 279, gives the following examples for the three allomorphs /iz, z, s/: *Rose's going, John's going, Jack's going.*
- ¹⁴ On the grounds of morphological (defective {Z₃}, infinitive, participles; suppletives in the past) and syntactic properties (position and periphrastic uses).
- ¹⁵ Cf. Strang, p. 129, and Gleason, p. 101.
- ¹⁶ See the list in Gleason, pp. 102f.
- ¹⁷ Cf. 2.3.1.
- ¹⁸ Though the form *been* is regular, if compared to the infinitive.
- ¹⁹ We owe this observation to Dr. D. Kastovsky, Tübingen. Although there is no conclusive evidence to prove or disprove this view, we have incorporated it in the synoptical diagram given in 9.
- ²⁰ Cf. Owen Thomas, *Transformational Grammar and the Teacher of English* (New York, etc., 1965), p. 119, who does not, however, give a matrix.
- ²¹ B. Strang in a review of M. Joos, *The English Verb: Forms and Meaning*, and F. R. Palmer, *A Linguistic Study of the English Verb*, in: *Foundations of Language* 3 (1967), pp. 317—321, esp. p. 320.
- ²² It is therefore amazing that nobody should have noticed this situation up to now. Gleason (p. 83) cites only "the two commonest allomorphs of {-D₁}", viz. /d, t/ as instance of assimilation, but remarks, in the case of {Z₁}, that one of the three allomorphs /iz, z, s/ has to be selected as the base form, from which the other two may be explained. Hereby "one is about as convenient as the other" (p. 82). This may be correct in some cases, e. g. the allomorphs /in, im, iŋ/ (cf. 7.1.), though not here, as on a higher level of abstractness, only /iz/ is purely phonologically conditioned, after sibilants (cf. 6.), since both /z/ and /s/ could, in principle, also occur after vowels. In fact, W. Nelson Francis, *The Structure of American English* (New York, 1958) considers /iz/ as "the normal form of the plural suffix {-es}" (p. 213) from which the other two may be deduced, but not for the reason just given. Hockett (p. 282) uses the criteria which have induced us to hold the view presented in 6., but chooses /z/ as the base form (p. 280). He states correctly that "... The base form in automatic alternation is the alternant which appears in those environments in which the phonemic habits of the language do not force the choice. In English, the phonemic shapes /z/, /s/, and /əz/ all occur after a vowel:

seize /sɪz/, *cease* /sɪs/, and *ideas* /ajdɪjəz/ show the three after the vowel /ɪ/. . .” (p. 282). This is exactly the reason why only /ɪz/ is phonologically conditioned, i. e. the choice is forced by the phonemic habits of the language (note that *ideas* does not contain the allomorph /ɪz/). Hockett then goes on to say that “. . . /z/ is replaced by /s/ after voiceless consonants after which /z/ is phonemically impossible . . . It is replaced by /əz/ after six consonants [i. e. the sibilants] after which neither /z/ nor /s/ is phonemically possible . . .” (p. 282). It is, however, the unmarked form of the noun or verb that has to be regarded as the basis of the explanation (which is not the same as the base form) — not an allomorph of the affix — and that determines which allomorph is chosen, either by means of assimilation or dissimilation. Only the *three* allomorphs in conjunction represent the morpheme {D₁} or {Z₁}, and it is this affixed morpheme as a whole which is influenced by the preceding final phoneme of the stem.

- ²³ At another point in the structure of the English language, the barrier between nouns and verbs is also not very high, viz. in an area of word-formation, where verbs are derived from nouns by means of zero-derivation. Cf. H. Marchand, „Die Ableitung desubstantivischer Verben mit Nullmorphem im Englischen, Französischen und Deutschen“, in: *Die Neueren Sprachen* (1964), S. 105—118; and Fritz Preuss, „Konversion oder Zero-Derivation“, in: *Lebende Sprachen* 7 (1962), 8 (1963) and 9 (1964).
- ²⁴ Our attention was drawn to this fact by Dr. D. Kastovsky. Cf. also footnote 22, esp. the remarks by Hockett. We are not here discussing the questions of the influence of morpheme boundaries, and of the different behaviour of grammatical and lexical morphemes. (Note that /s/ after vowels in *voice*, *cease* is found in monomorphemic words.)
- ²⁵ Cf. Strang, pp. 50f. In American English clusters with the liquid /r/ followed by voiceless consonants are common, e. g. in *dark*, *shirk*, *force*, *harsh*, *cart*, *hurt*.
- ²⁶ Actually, we have two homonymous morphemes, which are no longer productive in English. The cluster /dθ/ and the example *thousandths* are given in Strang (pp. 50f.), but many speakers of RP pronounce /tθ/, and *thousandths* only with final /nθs/.
- ²⁷ Cf. the example of the different distribution of variants of /k/ in English, Arabic, Hindi, and Loma given by Gleason (pp. 260ff.).
- ²⁸ As already mentioned in 3.2.4., Ø can be explained as the result of complete assimilation.
- ²⁹ The assimilation in the case of *ir-* and *il-* is complete in British English. We can therefore regard *illegal* and *irrelevant* as having the same allomorph /i/.
- ³⁰ Cf. footnote 22, and also 7.
- ³¹ Cf. H. Marchand, *Cat.*, pp. 119—121, and, by the same author, the review of Karl E. Zimmer, *Affixal negation in English and other languages* (New York, 1964), in: *Language* 42 (1966), pp. 134—142, where it is pointed out that *non-combinations* are essentially different.
- ³² We owe this observation to Prof. H. Marchand who has drawn our attention to the fact. Cf. also *Cat.*, p. 157.
- ³³ The use of the above synoptical diagram, for representing the situation described, was suggested to us by Dr. D. Kastovsky.
- ³⁴ This was suggested to us by Dr. H. E. Brekle, Tübingen. Cf. also the remarks on the distinction between morphology, word-formation, and syntax, and the generative model which attempts to demonstrate this, in L. Lipka, „Kugelsicher — à l'épreuve des balles. Eine Lücke im Wortbildungssystem des Französischen“, in: *Festschrift H. Marchand*, pp. 127—143 (The Hague, 1968), esp. §§ 1.1, 1.2, 1.3. The following symbols are used in the order of their appearance (note that braces { } do

not here signify 'morpheme', but enclose elements which may alternatively be selected): \bar{X} = noun stem or verb stem, $gmor$ = grammatical morpheme, Al_m = morphologically conditioned allomorph, Al_{ph} = phonologically conditioned allomorph, $Stem_{av}$ = stem allomorph of verb, $Stem_{a1}$ = stem allomorph of verb or noun, Rep = replacive, X_{as} = certain noun stems ending in /əs/ spelt *-us*. This class is primarily phonologically conditioned, and open, but also morphologically conditioned on a higher level. X_n = all noun stems not belonging to class X_{as} , and verb stems, X_1 = stems ending in sibilant or alveolar stop, X_2 = stems not ending in sibilant or alveolar stop, X_{sib1} = certain noun stems and names ending in sibilant, X_{sib2} = noun stem + {Z₁}, X_{av1} = certain verb stems ending in alveolar stop, $X_{sib/av}$ = all other noun and verb stems ending in sibilant or alveolar stop, X_{sib} = noun and verb stems ending in sibilant, X_{av} = verb stem ending in alveolar stop. X_{voiced} = stem ending in voiced phoneme, $X_{voiceless}$ = stem ending in voiceless phoneme.