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Marek Piotrowski

Nasal assimilation in English - morphological/ phonological/phonetic? - alternative analyses.

Strauss (1979) argues for the abandonment of boundary distinctions in English morphology supporting his argument with an analysis of nasal assimilation. Specifically, he states that in the version of lexicalist syntax it is not necessary to recognize boundaries since the proper interpretation of the lexicalist hypothesis eliminates the need for distinctions among boundaries. Consequently, he postulates that there is only one boundary symbol '+' which is actually nothing more than the concatenation operator on both the morphological and the syntactic level. Therefore, Strauss claims that under the convention of rule ordering in the lexicon, the #/+ distinction is no longer necessary[1]. He illustrates his point with assimilatory processes in English prefixes. The prefixes which undergo both assimilation and degemination (like the negative 'in-') belong to Class I prefixes, and accordingly attach by rules of derivational morphology (DM), while those which do not assimilate (like the negative 'un-') belong to Class II prefixes which attach by rules of compounding. Consider the following examples (after Strauss,1979:416):

(1) in-probable → [im]probable un-predictable →*[ʌm]predictable
in-tolerant → [in]tolerant vs. un-tenable →[ʌn]tenable
in-conclusive →[iŋ]conclusive un-kind →*[ʌŋ]kind

in-numerable, inter-rupt vs. un-natural, mis-spell
n r *n *s

The rules of assimilation and degemination apply, according to Strauss, if the consonants to which the nasals assimilate follow immediately '+' symbol (understood as the concatenation operator), and

are contained in strings which belong to the lexical category or stem. The rules are obviously blocked by the presence of contiguous right and left brackets, which are supplied by compounding rather than by DM. Consider (after Strauss,1979:417):

(2) [in+[[con+[clus]]+ive]] as opposed to [[un]+[kind]]
ŋ ŋ *ŋ

Along much the same lines nasal assimilation is treated in Strauss (1982), whose model of Lexicalist Phonology does not recognize any boundaries at all. The rule of nasal assimilation receives the following formulation (Strauss,1982:172):

(3) $\begin{bmatrix} C \\ +nasal \end{bmatrix} \rightarrow \begin{bmatrix} \alpha anter \\ \beta coron \end{bmatrix} / \_\_ [\begin{bmatrix} -sonor \\ \alpha anter \\ \beta coron \end{bmatrix}$, where [represents the left bracket.

The aim of the present paper is to show the inadequacies of (3) and reveal the difficulties into which Strauss's model of phonology runs with respect to nasal assimilation in English. An attempt will be made to present alternative, competing analyses either by suggesting modifications to Strauss's model, or by trying to seek solutions within different theoretical frameworks. Special attention is paid to the problem of boundaries in English phonology which are considered crucial for the proper interpretation of assimilatory processes, and some problems of theoretical nature are touched upon as well.

(3), except for its morphological/lexical conditioning in the form of the left bracket, is strongly reminiscent of the formulation of the rule of nasal assimilation in Chomsky (1965:176) the criticism of which has been adduced by Gussmann (1978). Similar objections can be raised against (3) (for discussion see Gussmann,1978:140-1). The rule as it stands is incapable of distinguishing between obligatory assimilation (which has traditionally been ascribed to stops) and optional assimilation (for non-strident spirants [f,v,θ,ð]), the latter depending largely on phonostylistic factors (stress, tempo etc.). This optional, phonostylistic assimilation happens to apply not only to the contexts described in (3), but also within morphemes and across occurrences of contiguous right and left brackets (or, in other words across word-internal boundaries) in casual or unguarded speech (see Gussmann,1978:142). It also extends to segments not included in (3), like [r], which is [+sonor] (cf. Gimson,1970:197). Finally, (3) incorrectly brings about the assimilation of nasals to [h], which is

[-sonor,-anter,-coron]. Thus, the rule is in relevant sense both too restrictive and too general. Yet, there are more serious flaws in its formulation which bring about consequencies of more general nature. Consider the following data:

(4)a. negative prefix 'in-';

[in] tolerant	[in] different
[im] possible	[im] balance
[iŋ] curable	[iŋ] glorious

in-navigable [i'nævigəbl]
im-measurable [i'meʒərəbl]
il-legal [i'li:gl]
ir-regular [i'regjulə]

b. verbalizing prefix 'en-';

[in] title	[in] dear
[im] power	[im] bitter
[iŋ] cage	[iŋ] grave

en-noble [i'noubl]
im-mure [i'mjuə]
[in] liven
[in] rage

c. negative prefix 'un-';

[ʌn] tarnished	[ʌn] deniable
[ʌn] palatable	[ʌn] bearable
[ʌn] kind	[ʌn] guarded
[ʌn] natural	[ʌn] mannerly
[ʌn] lucky	[ʌn] recorded

As can be seen from (4), (3) does not comprise the assimilation of the nasal segment in 'in-', which is considered a Class I prefix, to the following sonorant, nor does it account for the lack of assimilation of 'en-' to liquids, as opposed to its application to nasals. Evidence from (4)a,b,c clearly shows that the three prefixes reveal different degrees of assimilation to the following segments: 'in-' assimilates completely to all sonorants, while 'en-' fails to do so in the case of liquids. On the other hand, both prefixes assimilate in the point of articulation features to the following stops. 'un-' does not assimilate in all contexts. Thus, the two-way distinction assumed by Strauss is insufficient, and a third way of differentiating between prefixes seems to be necessary. This can be attained, if we agree to restore the notion of boundary distinctions. As has been noted by Kenstowicz & Kisseberth (1977), the basic concept underlying the notion of boundaries is the degree of cohesion, defined morphol-

ogically or syntactically, that linguistic forms exhibit. This seems to be the case with nasal assimilation in English: the negative 'in-' is more closely-knit to the stem than 'en-', whereas 'un' exhibits the least degree of cohesion. Now, if we assign the boundaries of different strength to the prefixes in question, the solution seems simple and straightforward. Let us assume that the underlying representations of the prefixes are: /in+/ for the negative 'in-', /en=/ for the verbalizing 'en-', and /un#/ for the negative 'un-', and that the ability of these boundaries to block the application of relevant rules follows from the following diagram:

(5)

BOUNDARIES	+	=	#
assimilation of 'n' to 'l' and 'r'	+	-	-
assimilation in the point of articulation to stops and nasals	+	+	-
degemination	+	+	-

where '+' means that the rule applies across the boundary in question, and '-' that it does not.

In this way we can provide a strictly phonological account of the assimilatory processes without referring to morphological information other than boundaries. The relevant rules will receive the following formulation:

(6)a.

$$\begin{bmatrix} C \\ +\text{nasal} \end{bmatrix} \rightarrow \begin{bmatrix} -\text{nasal} \\ \alpha\text{later} \end{bmatrix} / \_\_ + \begin{bmatrix} +\text{sonor} \\ -\text{nasal} \\ +\text{conson} \\ \alpha\text{later} \end{bmatrix}$$

b.

$$\begin{bmatrix} C \\ +\text{nasal} \end{bmatrix} \rightarrow \begin{bmatrix} \alpha\text{anter} \\ \beta\text{coron} \end{bmatrix} / \_\_ \begin{matrix} + \\ = \end{matrix} \begin{bmatrix} \alpha\text{anter} \\ \beta\text{coron} \\ -\text{del.rel.} \end{bmatrix}$$

c. $C_1 \begin{matrix} + \\ = \end{matrix} C_2 \text{ -- } \emptyset\ C_2$, where $C_1 = C_2$.

One immediate objection to the set of rules in (6) is that although the application of (6)b is meant to be restricted only to obligatory assimilation, it also includes a case of optional assimilation of 'n' to the following velar stop (cf.Chomsky & Halle,1968 and Gussmann,1978). This specific subcase of assimilation is optional across boundaries, but obligatory within morphemes (cf. Chomsky & Halle,1968:419 and Gussmann,1978:141-3). This apparently ruins the validity of our solution unless we revise the formulation of (6)b, It can be done if we assume a more concrete analysis. As has been

mentioned by Gussmann (1978), the rule of 'g'-deletion after the velar nasal is based mainly on distributional facts and not on morphological alternations. Booij (1982) has noted that the only evidence for this rule comes from two forms - longer and stronger[2] which can just as well be listed as exceptions, and consequently, it can be argued that there is no velar nasal assimilation within morphemes and that all morpheme-internal occurrences of the velar nasal are non-derived, underlying /ŋ/ (cf. Hooper,1976). Therefore, the subcase of velar nasal assimilation across morphemes, being optional, can be extracted from the rule and considered a late phonetic phonostylistic rule on a par with the nasal assimilation to spirants. Given the fact that the nasal assimilation applies vacuously to alveolar stops and [n], we are left with only one "true" bilabial assimilation. Therefore, we can reformulate (6)b as:

(7)

$$\begin{bmatrix} C \\ +\text{nasal} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{anter} \\ -\text{coron} \end{bmatrix} / \_\_ \begin{matrix} + \\ = \end{matrix} \begin{bmatrix} +\text{anter} \\ -\text{coron} \\ -\text{del.rel.} \end{bmatrix} .$$

The rule, although simple, has lost its generality value and is intuitively unnatural. Both the slips of the tongue (see Fromkin,1971 and Kenstowicz & Kisseberth,1977:52-3) and dialectal differences (see Gimson,1970:199), as well as distributional facts point to the reality of velar nasal assimilation and 'g'-deletion rule in English. It seems that there is no reasonable way of reconciling the obligatory character of the morpheme internal velar nasal assimilation with its optionality across the formative boundaries except fot setting up two separate rules whose domains would differ[3].

Another serious objection to (6)b,c is the presence of two boundaries ('+' and '=') in their structural descriptions conditioning the application of assimilation, which is totally unnatural and not attested in any other rules for English (see Hyman,1975 for some discussion of this and other related issues). Furthermore, the postulation of '=' boundary for 'en-' is entirely unjustified morphologically/syntactically, the sole reason for its existence being different behaviour of 'en-' with regard to phonological rules. In this way 'en-' constitutes a morphological class in itself, as there are no other prefixes which would share the qualities of 'en-' with respect to assimilation, whereas assigning 'in-' a separate boundary gains support from the fact that there are two more prefixes - 'con-' and 'syn-' which exhibit identical properties as 'in-' (cf. Zwicky,

1973)[4]. Therefore, we can legitimately simplify the rules in question by eliminating the '=' distinction, assigning '+' to 'en-' and marking it as a morphological exception to (6)a. There is some external justification to this decision, as 'en-' behaves like an ambivalent prefix. As has been noticed by Strauss (1982), morphologically 'en-' shares the qualities of both Class I and Class II prefixes. Also phonologically, it exhibits certain idiosyncratic properties. As has already been shown, it assimilates to the following stops, but it does not undergo the complete assimilation to liquids. The case with the nasals is somewhat problematic. There is not much evidence that 'en-' assimilates to these, since the assimilation to [n] applies vacuously and the only proof is that it undergoes degemination. On the other hand evidence for its assimilation to [m] is very hard to come by, as the words like <u>immure</u>, <u>immolate</u>, <u>immerse</u> can be easily disqualified not only on ethymological but also on purely synchronic grounds because nothing motivates them. The only true example in this case is <u>immesh</u> which unfortunately has its unassimilated counterpart <u>enmesh</u>[5]. Thus, we are in a position to postulate a phonological solution which recognizes only two boundaries +/#, and is morphologically conditioned.

Interestingly enough, it is possible to reduce the number of boundaries in the case of nasal assimilation even further, on grounds that are independent of those adduced by Strauss. As Hyman (1975:198) has pointed out, the presende of the morpheme boundary conditioning the application of Velar Softening in English is unjustified and serves as a disguise of the fact that the rule is limited to a specific class of suffixes ('-ity', '-ism', '-ify', etc.). That is, the rule is not a general phonological rule, but a morpholexical one. Therefore, Hyman (1978:459) proposed the following constraint on the use of boundaries (after Booij,1982):

(8) Within the word (##) unit, there can be recognized at most <u>two</u> internal grammatical boundaries. One of these, #, can have phonological consequencies, the other, +, cannot.

Similar objections against the use of '+' in phonological rules have been put forward by Clayton (1981). It is possible, therefore, to formulate (6)a,b as a morpholexical rule, because it applies only to a strictly limited class of prefixes, and subsequently, to reject the '+' distinction in our description. The rule would still have to

be conditioned to capture the idiosyncracies of 'en-'. Another solution, however, seems to spring up, if we agree to recognize the fact that the degree of productivity of 'in-', 'con-', and 'syn-' in English is very low. For example, new derivatives in English tend to utilize the negative 'un-' and not 'in-' (e.g. <u>un-Polish</u> vs. <u>*in-Polish</u>). We might, therefore, postulate an allomorphy rule which would account for the complete assimilation of 'in-', 'con-' and 'syn-' to sonorants, as opposed to its absence, or irregular application in 'en-'. The assimilation rules would receive the following formulation:

(9)a. $\begin{Bmatrix} \text{in-} \\ \text{con-} \\ \text{syn-} \end{Bmatrix} \rightarrow \begin{Bmatrix} \text{i-} \\ \text{co-} \\ \text{sy-} \end{Bmatrix} / \_\_ \begin{bmatrix} \text{C} \\ \text{+sonor} \end{bmatrix}$,

b. $\{\text{en-}\} \rightarrow \{\text{e-}\} / \_\_ \text{n}$,

c. $\begin{bmatrix} \text{C} \\ \text{+nasal} \end{bmatrix} \rightarrow \begin{bmatrix} \alpha\text{anter} \\ \beta\text{coron} \end{bmatrix} / \_\_ + \begin{bmatrix} \alpha\text{anter} \\ \beta\text{coron} \\ \text{-del.rel.} \end{bmatrix}$, cond.: if α, β = -, then the rule is optional.

It is interesting to note that this solution, which makes use of allomorphy statements and also recognizes the +/# distinction, can be easily incorporated into Strauss's model of phonology by replacing the '+' symbol with the left bracket [. At this point, however, there seems to be not much to weigh in favour of the boundary solution or the lexicalist solution, and in their own terms they seem to be to a large extent equivalent since, as has been noted by Kenstowicz & Kisseberth (1977:108): "In cases where phonological phenomena could be ascribed either to boundaries or to grammatical identity, is there a basis for choosing one solution over the other? Under what conditions do speakers tend to associate the blocking or triggering of a phonological rule with the cohesiveness of elements as opposed to the grammatical categories to which the elements belong?". This is an question to which Strauss has by no means given an answer with his incomplete statement of nasal assimilation in English. His main fault lies probably in his attempt to kill too many birds with one stone. Nasal assimilation in English may be a relatively simple and superficial phenomenon, but its formalization will cause many headaches to anyone and within any theoretical framework. It is utterly fallacious to consider it as a one-step procedure, as it certainly applies on several levels, starting with the minor rule(s) of complete assimilation to sonorants, going through the rule of obligatory

assimilation to the class of stops, the optional allophonic rules for spirants and sonorants, and down to phonostylistic nasal assimilations across words and phrases as well as within morphemes. Therefore it should be treated as a cross-level phenomenon which is deeply rooted in morphology, but which at the same time has a strong phonetic motivation.

FOOTNOTES

1. For an account of the redundance of '=' boundary see Siegel (1974) and Strauss (1979).
2. Booij seems to have ignored the third exception, younger, as well as the superlative forms of these three words.
3. It could be argued that the phenomenon has something to do with the fact that the obligatory assimilation within morphemes may interact with the optional one in the sense that some speakers will undo the effects of the rule working across morphemes under the influence of the morpheme-internal one which allows assimilation only within formatives.
4. Similarly, 'un-' is not the only member of the class. 'non-' as well as prepositional 'in-' and 'on-' behave in an identical fashion.
5. Consider also alternative forms and exceptions in other prefixes: imbardge/inbardge, imbread/inbread, comfort vs. confine.

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STRESZCZENIE

Artykuł o asymilacji nosowej w języku angielskim jest próbą ponownej analizy tego problemu w świetle nowych teorii fonologicznych. Zawiera on krytykę reguły asymilacji nosowej proponowaną w modelu fonologii leksykalistycznej i szuka alternatywnych sposobów opisu tego procesu oraz związanych z nim reguł. Autor postuluje zróżnicowanie typów reguł w zależności od poziomu morfologicznej i fonologicznej abstrakcji. Specjalny nacisk położony jest na status granic morfologicznych w opisie fonologicznym oraz teoretyczne implikacje wynikające ze sposobu potraktowania problemu granic dla formalizacji reguł asymilacji nosowej.