

ON THE EXTRAPOLATION OF PHONOLOGICAL FORMS

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The problem formulated

We shall start with the assumption that the role of a *phonological system* is to provide – by economical and systematic constructional means – *forms* for the expressions of signs in a *grammatical system*, with which it ‘interlocks’ (Mulder and Hervey 1975). It seems fairly obvious from this, that a phonological system is autonomous in producing a certain output of *forms*, which, if the grammatical system needs them, *may* be utilized as the phonological forms of allomorphs of signs (Mulder and Hervey 1972). There is, however, no reason to suppose that the output of this autonomous, form-producing system, is restricted to those forms which actually *are* utilized by the grammatical system as forms of allomorphs. That is to say, the phonological forms figuring in the phonological system *may, but do not have to*, figure also as phonological forms of allomorphs in the grammatical system. What this means – and this is a fairly standard view in linguistics, except, perhaps, in the way it is formulated here – is that there is a *discrepancy* between the ‘output’ of phonological forms from the phonological system and the ‘input’ of phonological forms to the grammatical system. Schematically, the situation is as follows:

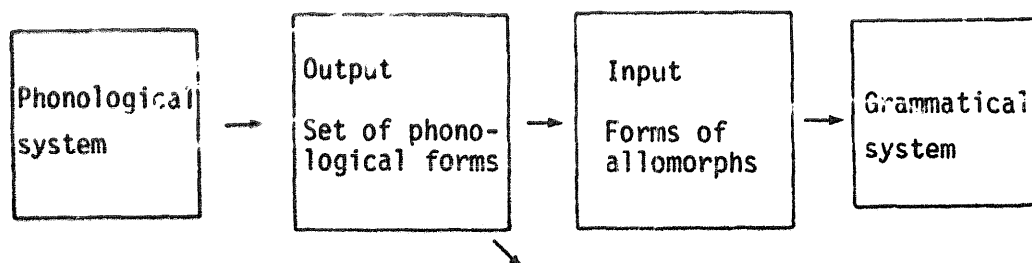


Fig. 1.

As it is indicated in the diagram, some of the phonological forms autonomously ‘generated’ by the phonological system are, actually, ‘lost’ to the grammatical system, in that the grammatical system makes no use of them. At best, then, a part of the phonological system is constituted by a set of ‘potential’ – rather than actual – forms of allomorphs.

Now let us look at the problem from another direction. What does it mean to say that a particular phonological form is ‘attested’ for a given language?

In the approach underlying the whole of the present discussion – that of Axiomatic Functionalist linguistics – every entity in a description has the status of a ‘model’, and, as such, derives its empirical value from its *applicability* to “‘isolatable’ sections of speech” (Mulder 1968). The validity of a ‘model’ within a linguistic description – or rather, its *non-vacuity* – hinges, then, on there *being* ‘isolatable’ sections of speech (within the range of speech-phenomena selected for description) to which that model can be applied. Phonological forms – entities in phonological systems – have the status of descriptive ‘models’ and must, therefore, be applicable to certain ‘isolatable’ sections of speech. This, in general terms, is what it means for phonological forms to be ‘attested’ – that certain aspects and features of the speech flow (in the relevant field of speech phenomena chosen for description) should be capable of being picked out as *realizations* of these phonological forms.

We may ask in what form speech events present themselves as data for the isolation of features to which various descriptive models may apply. The answer, in general terms, will be that the describer of a language is interested only in speech-events embodying messages – he is not usually concerned with occurrences of ‘pure’ sound, nor in partial, abortive attempts at conveying messages.

In Mulder’s theory the model ‘sentence’ – defined as “signum such that it is a self-contained vehicle for conveying messages” – provides the model that applies most directly to entire speech events. Every spatio-temporally concrete speech-event is, in its entirety, a realization of at least one ‘sentence’.¹ Attested data, therefore, are registered as properties of speech-events that are fully-fledged realizations of ‘sentences’. In this primary form, speech-data are ‘idealized’ objects to which a model

¹ A speech-event may be a realization of more than one ‘sentence’ in two different ways. It may correspond to a set of successive, juxtaposed ‘sentences’; or it may, especially in the case of ‘puns’, correspond simultaneously to two or more ‘homonymous sentences’.

uniting the aspects of ‘expression and content’ applies globally; that is to say, these objects are isomorphic with ‘sentences’, and ‘sentences’ are – a type of *signum* (Mulder and Hervey 1971, 1972) – fusions of ‘expression’ and ‘content’. Properties of ‘form’ and ‘meaning’ are, in the data, not separated and isolated from one another.

Therefore, what speech-events *attest*, in the first place, is the non-vacuity of certain *signa* – since it is only *signa* (actually *signa* that are ‘sentences’) that can apply to them, until by further abstractions ‘pure form’ is isolated from what initially presents itself as a fusion of ‘form-meaning’ properties. Phonological features (i.e. features of ‘pure’ functional form) are, in sentences, only indirectly manifested by the forms of expression of *signa*. That is to say, it is the occurrence of certain features as realizations of the forms of expressions of *signa* that attests those ‘isolatable’ sections of speech to which phonological forms (as models) apply.

From the foregoing it would appear that only those phonological forms are *attested* (i.e. non-vacuous in a given description) which apply to features identified as corresponding to the forms of expressions of *signa*. If this were really the case, all phonological forms would have to be attested *as the forms of expressions* (more precisely, of allomorphs) *of signa*, and any putative phonological forms that are not utilized *directly as such* would have to be considered vacuous.

This apparent denial of the descriptive validity of purely phonological entities – a denial resulting from the apparent equation of the set of phonological forms with the set of forms of allomorphs of *signa* – requires immediate qualification. A phonological form can be regarded as attested if it is ‘part’ of (not necessarily the whole of) the form of an allomorph of a *signum*. For example, a speech-event, phonetically noted as [kʰʌmhiə] (with a certain appropriate intonation, and conveying an appropriate message), attests *not only* a phonological form /kʰmhi/ as a form of an allomorph of the ‘sentence’ (*signum*) ‘Come here!’, a phonological form /kʰmhi/ as a form of an allomorph of the ‘syntagm’ (*signum*) ‘come here’: a phonological form /kʰm/ as a form of an allomorph of the ‘word’ (*signum*) ‘come’, and a phonological form /hi/ as a form of an allomorph of the ‘word’ (*signum*) ‘here’ – but *also* the phonological forms /k/, /r/, /m/ as functional components of the attested form /kʰm/, and the phonological forms /h/, /i/, /r/ as functional components of the attested form /hi/; as well as the phonological forms (i.e. distinctive features) /dorsal/, /occlusive/, /unvoiced/ as functional components of the attested form /k/, the

phonological forms /semi-vocalic/, /neutral/ as functional components of the attested form /r/,² etc.

In our modified view, then, the set of *attested* phonological forms extends to all those phonological forms which are manifested by their appearance as self-contained entities in the forms of allomorphs of *signa* – whether they constitute the whole of, or are functional components of, the forms of these allomorphs. In other words, not every *attested* phonological form is required to be utilized *as* the form of an allomorph of a *signum* in the grammatical system – some attested forms may be utilized as *functional components* in the forms of allomorphs of *signa*.

On the other hand, if the output of the phonological system is restricted to *attested* phonological forms – those actually utilized in grammar – then the *autonomy* of the phonological system is weakened, and the concomitant *discrepancy* between phonological output and grammatical input (see fig. 1) is liquidated. The result will be a phonological description that suffers all the disadvantages of a strictly corpus-based approach – i.e. the limitation of data to a narrowly selected, finite sample. This would necessitate the incorporation of ‘gaps’ in, for instance, phonological distribution, each time a paradigm is missing certain members that *happen not to be utilized* in grammar.³ Thus, instead of giving validity, in a description of the phonological system of English, to the generalization that

“between two consonant phonemes, all vowels and semi-vowels commute with one another in nuclear position”, e.g.

/pit/ attested in ‘pit’	/put/ attested in ‘put’
/pet/ attested in ‘pet’	/prt/ attested in ‘putt’
/pat/ attested in ‘pat’	/pot/ attested in ‘pot’

it would become necessary to withdraw, or at least qualify, this statement, in view of ‘gaps’ found, say, in the paradigm /b–t/

/bit/ attested in ‘bit’	*/but/ there is no signum in English with the form /but/
/bet/ attested in ‘bet’	
/bat/ attested in ‘bat’	/brt/ attested in ‘but’
	/bot/ attested in ‘bott’ (a kind of parasite)

² For details concerning the phonological description of English I have based myself, throughout, on the proposals put forward by Mulder (Mulder 1968; Mulder and Hurren 1968).

³ For an earlier treatment of the problem of ‘accidental gaps’, reference may be made to the work of Uhlenbeck (1949, 1966).

and of even further “gaps” found, say, in the paradigm /v-t/

*/vit/ there is no signum in English with the form /vit/

/ve:/ attested in ‘vet’

/vat/ attested in ‘vat’

*/vut/ there is no signum in English with the form /vut/

*/vrt/ there is no signum in English with the form /vrt/

*/vot/ there is no signum in English with the form /vot/.

It would be preferable to say that the ‘gaps’ in the above paradigms do not constitute counter-examples to the generalization (that any vowel, or semivowel of English may occur nuclearly between two consonants), but that they are the result of a discrepancy whereby certain phonological forms simply *do not happen* to be used as forms of allomorphs of *signa*. There is, however, as far as the *attestation* of phonological forms is concerned, no sufficient justification for this – albeit desirable – attitude.

It may be possible, in terms of our example above, to argue that, in some sense, /vit/ is attested as ‘part’ of the phonological form of ‘vitriol’. But in order to argue for this type of *attestation*, certain processes of *extrapolation*⁴ will be necessary.

In order to support the view that /vit/ *as a unit* (as opposed to simply the separate phonemes /v/, /i/ and /t/), is attested *in* the form of the word ‘vitriol’, a *calculus* is required for showing that – in some sense – /vit/ is a ‘constituent’ of the phonological form /vitri:l/. The argument for this must take the form of a demonstration that the phonological form /vitri:l/ is ‘composed of’ phonologically self-contained ‘groups’ – i.e. phonotagms – and that /vit/ is one of these, standing in *juxtaposition* with at least one other (self-contained) phonotagm to make up the phonological form /vitri:l/.⁵

In anticipation of the development of certain principles of extrapolation, we may note that there are two possibilities which would justify extrapolating the phonotagm /vit/ as being attested by ‘part’ of a form of an allomorph of ‘vitriol’:

⁴ ‘Extrapolation’ for ‘The calculation from known terms of a series of other terms which lie outside the range of known terms’.

⁵ In terms of phonological theory in Axiomatic Functionalist linguistics, there are constructional relations between distinctive components of phonemes, and between phonemes as functional components of phonotagms – but not *between* phonotagms, since these manifest the ultimate complexes (distributional units, see Mulder 1968, 1977) of the constructional part of phonology. Thus, phonotagms cannot be said to be constituents in construction with one another, though they may be *juxtaposed* in forms of allomorphs of *signa*.

(a) if /vitɾɪrl/ were shown to be a juxtaposition of /vit/ and /ɾɪrl/ as two disjunct phonotagms;

(b) if /vitɾɪrl/ were shown to be a juxtaposition of /vit/ and /tɾɪrl/ as two contiguous phonotagms.⁶

As far as actual attestation is concerned, the phonological form /ɾɪrl/ can, by itself, constitute the whole of a form of an allomorph of the word 'real', and is in that instance *attested* as a self-contained phonotagm. This piece of evidence, while not in itself conclusive, lends support to the view that /vitɾɪrl/ might be regarded as the juxtaposition of /vit/ and /ɾɪrl/. If we add to this the fact that neither */vi/, nor */vitr/ are actually attested as forms of allomorphs of *signa* – and the fact that there are two phonological nuclei in /vitɾɪrl/, indicative of there being *two* juxtaposed phonotagms – we have fairly strong justification for the view that /vit/ is one of these phonotagms. To say that we have justification for such a view is to say that we have extrapolated /vit/ as a phonotagm *attested* in the form of 'vitriol'.

The method of extrapolation roughly sketched out for the attestation of /vit/ will perhaps not answer in the cases of */vut/, or */vot/ which may not be found as self-contained 'groups' within attested forms. In a sense, then, their 'phonological well-formedness' is a possibility more remote than that of /vit/. Since, however, extrapolation is in any case necessary for unravelling phonological forms attested by 'parts' of the forms of allomorphs of *signa*, it would be rather short-sighted to stop at this point, and not to use further calculus for deciding in the case of such forms as /vut/, /vrt/ and /vot/ whether they should be counted as valid *potential* phonotagms. Should the results of the calculus be positive, this will, of course, still not make /vut/, /vrt/ or /vot/ into attested phonological forms, but it will class them as belonging to that subset of the set of phonological forms which is 'generated' by the phonological system without being utilised by the grammatical system.

I propose to call

(a) forms directly manifested in their entirety by the forms of allomorphs of *signa*: *directly attested forms* (e.g. /pit/, /bit/, /vitɾɪrl/, etc.);

(b) forms manifested by 'parts' of the forms of allomorphs of *signa*: *indirectly attested forms* (these may be *functional components* of attested forms, e.g. phonemes such as /p/, /t/, /i/ etc., distinctive features such as

⁶ The contiguity of juxtaposed phonotagms, involving 'functional amalgamation' whereby certain elements belong as much to one as to the other of two juxtaposed phonotagms is discussed in Mulder 1968: 48, 178–179 and Mulder and Hurren 1968.

/labial/, /occlusive/, /unvoiced/ etc.; or they may be *juxtaposed* ‘groups’ such as /vit/ in our example above); and

(c) forms which, although they are unattested, are nonetheless regarded as phonologically ‘well-formed’: *potential forms*.

This essentially tripartite view of phonological forms has the effect of giving an exact sense to the postulated discrepancy between phonological output and the input of phonological forms into the grammatical system (see fig. 1), by identifying the set of discrepant forms with the set of *potential forms*.

At the same time, the *onus* of identifying *potential forms*, as well as that of identifying *a subset of indirectly attested forms*, must fall on certain explicit principles of extrapolation (by calculus) – and not on a vain search for direct attestation bound to result in the exclusion of many ‘phonologically well-formed’ forms, nor on purely informal, intuitive judgements of ‘phonological well-formedness’.⁷ Fig. 2 sums up our position with regard to the set of phonological forms.

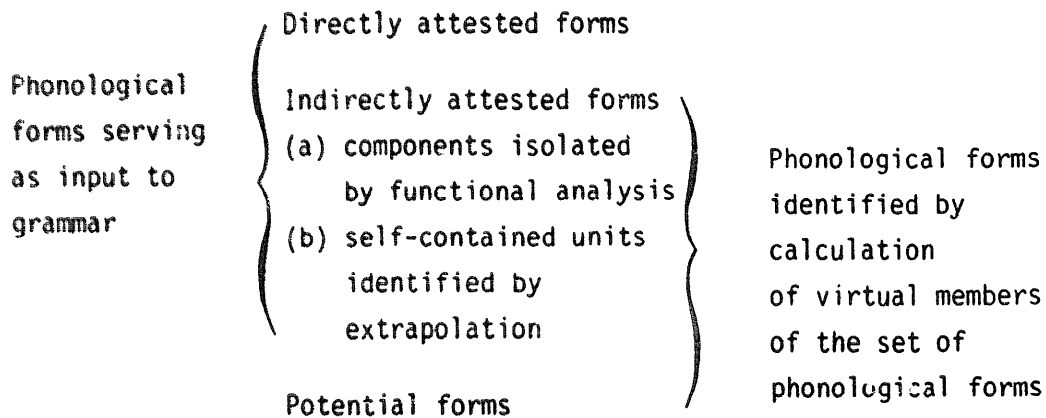


Fig. 2. Phonological forms.

We have arrived at a stage in the discussion where we can give a succinct formulation of the task that will constitute the remainder of this article. What we are seeking to establish is a principled method for the calculation of certain *indirectly attested* phonological forms, and of *potential* phonological forms, in such a way as to capture (as nearly as possible) the *total*

⁷ I do not intend to enter into a debate as to whether such intuitions ‘exist’. No doubt, speakers of English would, informally, and on the basis of their ‘sentiment linguistique’, agree that the unattested form /klant/ is ‘phonologically well-formed’ in a way in which the equally unattested form /kslanr/ is not. No doubt, also, there is a wide range of ‘intermediate’ forms concerning which intuitive judgements of ‘well-formedness’ are not clearcut. What extrapolation is intended to provide is a way of by-passing the use of purely intuitive judgements of ‘well-formedness’.

set of entities belonging to specific phonological systems. If the proposals that follow do not, perhaps, provide an exhaustive solution to the problem posed, they should, at least, take us a fair way towards such a solution.

General principles of extrapolation

- (I) Extrapolation should be used only for the calculation of *phonotagms* (whether indirectly attested or potential).

In justifying this principle, we must, first of all, concentrate our attention on that part of phonology which deals with discrete and disjunct phonological entities. In other words, we must set ‘para-phonotactics’ aside as a separate, though complementary, compartment dealing with non-discrete aspects of phonological form (Mulder 1977). Excluding ‘para-phonotactics’, then, the aims of phonological description are

to establish those discrete and disjunct phonological entities of a language which have a potentially distinctive value with regard to communicative function; to examine the constitution of phonotagms and of phonemes, these being the only potentially complex phonological forms; and

to set out the constructional relations distinctive features may contract with one another in forming phonemes, as well as the constructional relations phonemes may contract with one another in forming phonotagms (i.e. the distribution of phonemes).

Distinctive function with regard to communication ensures the identity of *directly attested phonotagms*. As for phonemes, these are identified as functional components (arrived at by commutation, which is the principle of functional analysis) of phonotagms. Likewise, distinctive features are identified as functional components (also arrived at by commutation) of phonemes. Thus, all phonemes and all distinctive features may be said to belong to that subset of indirectly attested forms whose members are components identified by functional analysis (see fig. 2).

Functional analysis by commutation – being a basic theoretical principle in ‘functional linguistics’ – is superior in status and in rigour to any form of extrapolation. Thus, wherever functional analysis is potentially applicable – and this is the case for identifying all phonemes and all distinctive features – it would be wholly inappropriate to resort to extrapolation. On the other hand, since phonotagms are *a priori* not components

to be identified by functional analysis, and their distinctive function is only fully assured when they are *directly attested* as the forms of allomorphs of *signa*, it follows that the residue of indirectly attested and potential phonotagms can only be identified by extrapolation (or not at all).

That is to say, extrapolation is *appropriate* to calculating phonotagms because it supplements commutation at a point where commutation is, in any case, inapplicable – rather than supplanting commutation at a point where it could (and, therefore, should) be used.

It will also be *sufficient* to use extrapolation for only the establishment of phonotagms – not of phonemes, or of distinctive features – because, once phonotagms have been extrapolated, the superior principle of functional analysis (commutation) can be used again for establishing the components of these phonotagms (i.e. phonemes), and for establishing the components of these components (i.e. distinctive features).

(II) Extrapolation of phonotagms should look to the evidence of dependencies manifested by *directly attested* forms.

The total set of phonotagms is to be regarded as an extended set in which virtual members have been added to actual attested members. Thus the validity of this principle hinges, in fact, on the definition of ‘extrapolation’ as such. The very meaning of the term *extrapolation* – i.e. ‘the calculation *from known terms of a series* of other terms which lie outside the range of known terms’ – indicates that the sole rational basis for this operation can only lie in what is ‘known’ (*ex hypothesi*) about attested forms. There *is* only the evidence of directly attested members of the set of phonotagms that could possibly justify the further listing of virtual members, and their addition to the set of ‘known terms’.

Thus, the real questions are *how* to make valid use of the evidence of attested forms in calculating virtual members of the set of phonotagms, and *how* to limit the use of such evidence so as to impose a discipline on extrapolation. It is these questions which are enlarged upon in the following sub-principles (and in the subsequent calculi).

(II)(1) Each indirectly attested phonotagm should be extrapolated by calculating the self-contained phonotagms whose juxtaposition constitutes the form of an allomorph of a *signum*.

Some *signa*, as we have seen, have allomorphs with forms that coincide in extension with single (by definition: self-contained) phonotagms.

Other *signa* have allomorphs whose forms are constituted by the juxtaposition of two or more mutually independent phonotagms. In the case of such *signa*, establishing a calculus for the isolation of juxtaposed phonotagms leads to the extrapolation of *indirectly attested* phonotagms (see the definition of indirectly attested form above).

- (II)(2) Every distributional possibility⁸ attributed to an extrapolated phonotagm must be supported either
- (a) by an identical property evidenced in directly attested forms, or
 - (b) by a *regular analogy* evidenced in directly attested forms, provided that the attribution of that property is *not ruled out* as inadmissible by *regular* distributional restrictions evidenced in the set of directly attested forms.

The strongest form of evidence – one whose use is not hedged about – comes directly through forms that are directly attested. Attributing a certain distributional possibility to an extrapolated phonotagm – and maintaining that a phonotagm with such a property may be ‘well-formed’ – is, obviously, most strongly supported when there is at least one directly attested phonotagm that manifests that self-same property. In such a case it is clear that extrapolation is not ‘inventing’ new properties that are not already established as relevant to the set of directly attested forms. As much as possible, extrapolation seeks to limit itself to non-attested combinations of attested distributional possibilities.

Thus, for instance, one of the distributional possibilities manifested within a putative phonotagm /vit/ (in English) is the dependency

/i ← t/⁹

which is a dependency found manifested in a large number of directly attested phonotagms (/bit/, /pit/, /sit/, /hit/ etc.) including, most convincing of all, a phonotagm entirely constituted by this dependency directly attested by the *signum* ‘it’.

⁸ By ‘distributional possibility’ is meant here any aspect of the total arrangement of phonemes within a distributional unit (Mulder 1968, 1977), including the ‘self-containedness’ of the resulting phonotagm.

⁹ Both here and throughout, arrows will be used to indicate ‘functional dependency’ (Mulder 1977).

Every phonotagm that is not directly attested must have in it at least one distributional possibility – at least one set of dependencies – that is ‘invented’ rather than found evidenced in the set of directly attested forms. For the attribution of such a possibility to ‘well-formed’ phonotagms we have to use a weaker form of evidence that, nevertheless, constitutes evidence based on dependencies manifested by directly attested forms. For this it is proposed that extrapolation should make use of the *regular* attestation of *analogous* distributional properties, but that it should further restrict the use of such analogies to dependencies that are not ruled out by conflicting *regularities* manifested by the set of directly attested forms. That is to say, an unattested distributional possibility is attributed to an extrapolated phonotagm, in the first place, only if the attribution of this property is, in some way, suggested as a possibility by analogy with certain distributional regularities. In the second place, extrapolation is allowed to follow through only if the analogy is not found to be invalid. It will be found invalid when its application leads to the positing of a distributional possibility that is actually ruled out by a regular distributional restriction.

In further application of the conditions under which unattested forms are regarded as ‘well-formed’, it is to be noted that the alternatives in the case of a putative (non-attested) form are either

- (a) that such a form is not ‘well-formed’, or
- (b) that the form in question constitutes an ‘accidental gap’.

One would, clearly, only speak of an ‘accidental gap’ where analogy with some attested regularity permits the calculation of a certain ‘unrealized potential’. Thus, for instance, the reason why one can seriously contemplate the possible ‘well-formedness’ of /vit/, is because it constitutes an ‘accidental gap’ in various analogic and regular patterns.

/bit/	/bet/	/bat/	/pat/	/bat/	/vat/
/pit/	/pet/	/pat/	/pet/	/bet/	/vet/
/fit/	?	/fat/	/pot/	/bot/	?
/vit/?	/vet/	/vat/	/pit/	/bit/	/vit/?
			/put/	?	?
			/prt/	/brt/	?

that is to say, because it can be given status as an analogic ‘creation’ from regularities that emerge out of directly attested cases.

On the other hand, if out of the very non-occurrence of certain forms

within analogic patterns there emerges a *regular* pattern of counter-examples (as opposed to isolated ‘gaps’) then we are dealing with a case where certain distributional possibilities are *ruled out* as regularly inadmissible, i.e. with forms that are not ‘well-formed’, not with ‘accidental gaps’. So, if it were found that the non-occurrence of /vit/ is by analogy with a regular restriction on a set (of which /vit/ is a member), rather than being attributable to the imperfect operation of a regular analogic pattern (of which /vit/ is a member), then we should conclude that /vit/ is not ‘well-formed’.

Having established certain general principles, then, it remains to propose methods of calculus (in accordance with these principles) for the extrapolation of phonotagms. In what follows I shall develop certain calculi of extrapolation, and give illustrations of their application.

Methodology of extrapolation

Calculus A

Basis:

The form of an allomorph of a *signum* contains as many juxtaposed phonotagms as there are mutually distributionally independent, internally self-contained, sub-chains within that form.

This statement may be regarded as a theorem of Axiomatic Functionalist theory, following as it does from the definition of ‘phonotagm’ as a unit within which only mutual dependencies of constituents hold, and which does not depend distributionally, either as a whole or in part, on any element outside of itself (Mulder 19(8), 1977).

The decision as to how many mutually independent sub-chains a given form contains is made by considering, as far as possible, the evidence of directly attested dependencies, and, beyond this, by working on the basis of regular analogies manifested in the set of directly attested forms. Unless, that is, there is a strong reason – in the form of a conflicting regularity – to believe that the analogy on which a certain step in the calculus is based is suspect, extrapolation should be allowed to proceed (cf. Principle (II)(2)).

Criterion 1

Each mutually independent sub-chain of a form must contain its own nuclear element(s).

Once again, this statement follows theoretically from the definition of 'phonotagm'. The identity element of any phonotagm, being the element on which all other (peripheral) elements (if any) depend, is its nucleus. There can simply, and by definition, not be a phonotagm that does not contain a nuclear element.¹⁰

Consequently, a form will not contain two or more juxtaposed phonotagms *unless* there are at least two possible candidates for nuclear status in that form.

The decision as to what elements may constitute potential nuclei is made, as far as possible, by the evidence of what elements actually constitute nuclear elements of attested phonotagms.

Criterion 2

Each mutually independent sub-chain should contain only dependencies that may be considered 'well-formed'.

In accordance with the general principle (II)(2) (see above), the evidence for internal cohesion of sub-chains should come, as far as possible, from actually attested dependencies. Failing this, it should come from analogic patterns, on the assumption that, if chains with analogous dependencies can occur as internally coherent constructions, then the sub-chain in question may, by analogy, also be regarded as internally coherent. The limitation on the use of such analogies consists in allowing them to affect extrapolation unless there is reason to suspect that – owing to a conflicting restriction of a regular nature – they are not distributionally valid analogies.

Where a form cannot be consistently and adequately dealt with by analogy with directly attested cases, that form constitutes a *counter-example* to the adequacy of the description. In such a case, however, we are no longer dealing with extrapolation – whose mainstay is analogy between directly attested forms and other forms – but rather with *refutation* of descriptive hypotheses.

Criterion 3

The distribution of each complete, self-contained sub-chain should be independent of every other sub-chain.

Once again (in accordance with Principle (II)(2)) the evidence for such independence should come, as much as possible, from the attested

¹⁰ It is possible, as Mulder (1968) points out for the nuclear position to be filled by a 'zero' element, but, in that case, the functional 'zero' in question still constitutes a nuclear element.

independence of phonotagms. However, the very fact that we need to use extrapolation in connection with a particular phonotagm means that phonotagm represents a phonological configuration *not directly attested* as independent. Consequently, when it comes to deciding the potentially independent status of the phonotagm in question, it is only the regular evidence of *analogous* phonotagm that can be made use of. If there is reason to believe, however, that certain directly attested phonotagms are not justifiably regarded as analogous with the sub-chains in question, this should prevent extrapolation from proceeding.

If there are indications with regard to the set of directly attested forms, that given types of sub-chain *cannot* be regarded as fully independent (for their function and their occurrence) on factors outside of them, then these sub-chains should not be extrapolated as indirectly attested phonotagms. If, however, there is no justification for suspecting that the independence of a given subchain is illusory, then that sub-chain may constitute one of several juxtaposed phonotagms within the form of an allomorph of a *signum*. Unless there are, in the form of an allomorph of a *signum*, at least two sub-chains validly regarded as self-contained, that form constitutes a single phonotagm.¹¹

Example A (a)

The form of the *signum* ‘comforters’ (phonetically most commonly realized as [kʰʌmfətəz]) (can only be regarded as the juxtaposition of several phonotagms (rather than as a single phonotagm) on the assumption that it contains two or more candidates for nuclear status. While the stressed vowel is clearly a candidate for being regarded as the realization of a nuclear phoneme /r/ (witness the directly attested phonotagms: /trn/ ‘ton’, /frn/ ‘fun’, etc.), the fact that in directly attested phonotagms of English we never find nuclear /r/ realized as an unstressed [ə], suggests that there may be a regular distributional restriction that would militate against the assumption that the form in question contains more than one candidate for nuclear status.

¹¹ It may well be the case that a form previously tentatively regarded as a juxtaposition of several phonotagms turns out to be a single phonotagm that cannot be consistently and adequately described by analogy with other directly attested phonotagms. In that case, the failure of the operation of extrapolation will have led to the identification of a counter-example that refutes the adequacy of the previous description of directly attested phonotagms, and to the necessity of devising a consistent and adequate structural description that accommodates the newly found phonotagm, alongside with other directly attested phonotagms.

If we, nevertheless, continue to make this assumption – on the basis that /r/ has in general a *potential* to constitute the nuclear element of a phonotagm (by analogy with /trn/, /frn/ etc.) – then we find *three* potential nuclei in the form in question, as indicated by italics:

/krNFrtz/.

On this assumption, and by the further evidence of such dependencies as

/k → r ← p/ ‘cup’, /f → r ← n/ ‘fun’, /t → r ← n/ ‘ton’
 /d → r ← N ← P/ ‘dump’, /p → r ← t/ ‘putt’, /b → r ← z/ ‘buzz’
 /n → i ← N ← F/ ‘nymph’, etc.

we come to the provisional conclusion that */krNFrtz/* may be a juxtaposition – by “functional amalgamation” (Mulder 1968; Mulder and Hurren 1968) – of the non-disjunct phonotagms

/k r N F
 f r t
 t r z/.

However, if we now apply criterion (3), we find that, in English, the distributional independence of unstressed ‘syllables’ (Mulder 1968: 177–181) is, itself, highly suspect. Independent directly attested phonotagms with nuclear /r/ are realized by stressed ‘syllables’.¹² In other words, the occurrence of the sub-chains /frt/ and /trz/ as independent phonotagms within */krNFrtz/* can only be maintained on the basis of their analogy with phonotagms that are realized as stressed ‘syllables’. This analogy does not, however, appear to be justified – since there is a

¹² One should not be misled by the forms of the signs ‘the’ and ‘a’ into thinking that they manifest /ðr/ and /r/ as *independent unstressed syllables*. The fact is that *as signs* ‘the’ and ‘a’ are, themselves, *bound constituents* within nominal syntagms, dependent for their occurrence on their being part of a nominal syntagm. Thus, it is more suitable to regard /ðr/ and /r/, when realized as unstressed syllables, as realizations of phonological forms dependent on – and part of – the phonotagms that are the forms of signs immediately succeeding ‘the’ and ‘a’, in particular nominal syntagms. Thus, for instance, /ðr/ and /buk/ constitute one phonotagm /ðrbuk/, as attested in the syntagm ‘the book’ in which the occurrence of ‘the’ is *bound* to that of ‘book’. Also, in the case of ‘the one book’, /ðr/ and /uan/ constitute one phonotagm /ðruan/. In this way we do not have to reject the generalization (hypothesis) that “in English, unstressed syllables are *bound syllables* which cannot figure alone in phonotagms”.

significant and notable distributional difference between stressed ‘syllables’ that may regularly be accounted for as self-contained attested phonotagms, and unstressed ‘syllables’ that are regularly dependent for their occurrence on stressed ‘syllables’. That is to say, there is reason to believe that a putative distributional analogy between stressed and unstressed ‘syllables’ is a false analogy. Since there is only this putative analogy which might justify the decision to regard /fɹt/ and /tɹz/ as independent sub-chains within /krNFɹtɹz/, and since this analogy appears to be a false one, we are forced to abandon the position that /krNFɹtɹz/ is a juxtaposition of several phonotagms. Extrapolation of indirectly attested phonotagms fails in this case – instead we are left with the conclusion that ‘comforters’ directly attests a *single* phonotagm: /krNFɹtɹz/.

Example A (b)

The form of the signum ‘contrast’ (noun) – phonetically most commonly realized, in my experience of Southern Standard English, as [khəntɹɔ:st] – can only be regarded as the juxtaposition of several phonotagms (rather than as a single phonotag:n) on condition that it contains two or more candidates for nuclear status.

The phonological form of the signum ‘contrast’ (noun) is constituted by a chain /kontrarsT/, in which chain both /o/ and /a/ (classified as vowels, i.e. as occurring *only* in nuclear position, by Mulder; see Mulder and Hurren 1968). There is, of course, evidence of a host of attested phonotagms with /o/ or /a/ as nuclear element (e.g. /kot/ ‘cot’, /pot/ ‘pot’, /kosT/ ‘cost’, etc.; /rat/ ‘rat’, /tar/ ‘tar’, /kart/ ‘cart’, etc.).

Consequently, our first step in the calculus allows the identification of two potential nuclei, as indicated by italics

/k o n t r a r s T/.

If we assume the validity of identifying these two nuclear elements, the evidence of attested dependencies in

/k → o ← t/	‘cot’	/k → o ← s ← T/	‘cost’
/f → o ← n ← t/	‘font’	/h → i ← n ← t/	‘hint’
/t → r ← a ← k/	‘track’	/t → r ← a ← p/	‘trap’
/p → a ← r ← s ← T/	‘past’	/m → a ← r ← s ← T/	‘mast’

further allows us to posit, provisionally, that /kontrarsT/ is the juxtaposition – by functional amalgamation – of two non-discrete sub-chains.

/k o n t
t r a r s T/.

If we now apply criterion (3) we find that, in the final analysis, treating /kont/ and /trarsT/ as mutually independent phonotagms hinges on the acceptability of the analogy between /kont/ and such directly attested forms as /font/ 'font', /pond/ 'pond', /konK/ 'conch', etc., and of the analogy between /trarsT/ and such directly attested forms as /treisT/ 'traced', /trrsT/ 'trust', /trarns/ 'trance', /farsT/ 'fast', /blarsT/ 'blast', etc. Insofar as there appears to be no indication that these analogies are, for some specific reason, unjustified or suspect – and, in particular, there is no notable regular distributional restriction that might militate against them – we have no reason to deny their validity. Consequently, we have no reason to deny the mutual independence of the sub-chains /kont/ and /trarsT/, and will conclude that the form of the *signum* 'contrast' (noun) is constituted by the juxtaposition of the two phonotagms /kont/ and /trarsT/. These two phonotagms are thus shown – by extrapolation – to be indirectly attested phonotagms of English.

Calculus B

Basis:

A potential phonotagm may be constituted by a nuclear element with no peripheral attachments, i.e. nuclear elements may occur in 'well-formed' phonotagms without 'bound' dependents.¹³

The validity of this statement is assured by deductive inference in Axiomatic Functionalist theory – it is implied by the very definition of 'nuclear element' that such an element constitutes the 'fulcrum' of a phonotagm (its presence is the minimum requirement for there being a phonotagm at all). At the same time, the definition of 'peripheral element' allows such elements to be, in principle, expendable expansions to nuclei. Thus, the question is not whether nuclear elements may, in principle, constitute complete phonotagms in the absence of peripheral dependents,

¹³ Mulder defines 'bound entity' as "peripheral immediate constituent that does not commute with zero" (Mulder 1977).

but, rather, under what circumstances one should, in practice, recognize such phonotagms as ‘well-formed’, though not directly attested.

Criterion 1

The extrapolation of a potential (non-attested) phonotagm constituted by a nuclear element with no bound dependents requires the evidence of *at least two* directly attested forms in which a nuclear element of *the same distributional type* occurs without bound dependents.

The validity of this criterion hinges on the principle (II)(2) (see above). This principle – by insisting that analogic evidence comes not from isolated cases but from regularities (analogic patterns) – entails that in a calculus of extrapolation ‘one swallow does not make a summer’. Unless a certain potential holds for at least two items, we cannot justifiably call it a regularity. Thus, unless the potential for certain types of nuclear element to occur without dependents holds for at least two attested cases, we cannot call that potential a matter of ‘regularity’ – and, consequently, we cannot use this potential as a basis for extrapolation. Furthermore, unless the attested cases belong to the same distributional type as the potential phonotagm whose extrapolation is in question, then there is no valid basis for extrapolation, since the regular analogy of the attested cases can only affect the potential ‘well-formedness’ of phonotagms of the same type as themselves.

Criterion 2

The evidence of directly attested forms in which nuclear elements occur without bound dependents allows for the extrapolation of a particular phonotagm constituted by a nuclear element alone, only on condition that extrapolation is not ruled out by a regular distributional restriction.

Example B (a)

Let us assume, just for the sake of illustration, that /r/ constitutes a directly attested, independent phonotagm in English,¹⁴ as attested by the form of an allomorph of the *signum* ‘indefinite article’. Given this, the phonotagm /r/ would constitute the *only* attested phonotagm with no bound dependents to the nucleus.

The element /r/, *qua* phoneme, belongs to the distributional type labelled by Mulder ‘semi-vowel’ (Mulder 1968; Mulder and Hurren 1968). Thus,

¹⁴ In footnote 12, I have argued against accepting /r/ as a directly attested, independent phonotagm of English.

in order to extrapolate other potential phonotagms constituted by a nuclear element with no dependents, we should require at least one further directly attested case of a semi-vowel *other* than /r/ constituting a self-contained phonotagm in the absence of bound dependents. Otherwise, we would be using the *isolated* (idiosyncratic) case of /r/ – and not an attested regularity – as a basis for extrapolation. This, we have said, is not a permissible procedure in extrapolation.

Even if there were, in English, attested cases of *two* semi-vowels constituting complete phonotagms when occurring as nuclear elements without dependents, this would establish an analogic pattern affecting only the extrapolation of other phonotagms each constituted by a nuclear *semi-vowel* with no dependents. This would lead to the ‘filling in’ (by extrapolation) of any ‘accidental gaps’ in the pattern

/r/
/i/
/u/

regarding the non-attested member of the set a potential phonotagm, on condition that the other two members are directly attested phonotagms.¹⁵ But the extrapolation of phonotagms /a/, /e/, /o/ (containing full ‘vowels’ as nuclear elements) would not be affected by this – their non-occurrence would still be attributable to a regular distributional restriction applicable to the total set of vowel-phonemes.

Example B (b)

The question of whether, in general, Hungarian phonology permits the recognition of the ‘well-formedness’ of any phonotagm constituted by a nuclear element with no dependents, can be solved by extrapolation.

We start by noting that, in the first place, the entire set of nuclear elements in Hungarian belongs to the same general distributional type. Any element that can, in Hungarian, occur as the nucleus of a phonotagm is an element that can *only* occur in nuclear position; i.e. all such elements would be classified (distributionally) as vowel-phonemes (Mulder 1968).

The first consideration for the purposes of extrapolation, then, is whether there is sufficient evidence (in the form of directly attested phonotagms) to set up a regular analogic pattern for phonotagms constituted

¹⁵ Factually speaking, of course, not only are there not *two* attested members in the set in question, but there is reason to believe that there is not even *one*.

by single vowel-phonemes and no dependents. If such a regularity can be set up, then it might be appropriate to regard the non-attestation of certain vowels figuring alone in complete phonotagms as *accidental gaps* which extrapolation can fill with potential phonotagms. (This would, of course, still be subject to whether a regularity can be found to account for the ‘gaps’).

The following directly attested forms are found in Hungarian:

- /ő/ (form of the *signum* ‘ő’ ‘he/she’)
- /ó/ (form of the *signum* ‘ó’ ‘old’)
- /a/ (form of the *signum* ‘definite article’)
- /e/ (form of the *signum* ‘e’ ‘this’).

According to our stated principle (II)(2), these four forms are sufficient *prima facie* evidence for setting up a regular pattern among the members of the set of vowel-phonemes. On the basis of the regular analogy created by this putative generalization covering vowel-phonemes we may posit that, in general, Hungarian permits any nuclear element with *zero* dependents to constitute a complete phonotagm. This would give to the unattested forms (marked with an asterisk in the set below) the status of *potential* phonotagms

- | | | | | | | |
|-----|------|------|------|------|------|------|
| /a/ | /o/* | /e/ | /ő/* | /u/* | /i/* | /ü/* |
| /á/ | /ó/ | /é/* | /ö/ | /ú/* | /í/* | /ű/* |

It is, of course, still possible that the regularity attested by /a/, /e/, /ó/ and /ő/ covers only a *subset* of the vowel-phoneme set, and that the counter-evidence of some regular distributional restriction will override the assumption of ‘well-formedness’ for *some* well-defined subset of the forms marked with an asterisk above. The onus falls, however, on being able to find, and generalize, such a distributional restriction in a way consistent with the evidence of directly attested forms.

The suggestion that the regular analogy of phonotagms containing only a nuclear element is restricted to say, the set of ‘long’ vowels is immediately refuted by the directly attested form /ő/. The suggestion that it is a restriction covering the subset /u/, /ú/, /i/, /í/, /ü/, /ű/ hinges on identifying this subset as a well-defined set within the set of vowel phonemes – i.e. on finding phonologically relevant properties that are common to *all and only* the members of this subset. Though this is a point on

which it is not possible to be categorical, I am unable to formulate a regularity that would account for the non-attestation of the phonotagms /u/, /ú/, /i/, /í/, /ü/, /ü/. Consequently, I would suggest that – the principles of extrapolation having been satisfied – one should regard these forms as potential phonotagms.

Calculus C

If a given nuclear element X has, in at least one directly attested case, a certain set of left-hand dependents $a \rightarrow b \rightarrow c$, and, in at least one other directly attested case, a certain set of right-hand dependents $d \rightarrow e \rightarrow f$, then – even if $|a \rightarrow b \rightarrow c \rightarrow X \leftarrow d \leftarrow e \leftarrow f|$ is not directly attested – we may, by extrapolation, posit that such a chain is a ‘well-formed’ phonotagm, *unless* this conflicts with some specific regular restriction detected on the basis of directly attested cases.

The calculus is clearly based on, and in accordance with, Principle (II) (2). Given that, say, $|a \rightarrow b \rightarrow c \rightarrow X \leftarrow y|$ and $|z \rightarrow X \leftarrow d \leftarrow e \leftarrow f|$ are directly attested phonotagms, but $|a \rightarrow b \rightarrow c \rightarrow X \leftarrow d \leftarrow e \leftarrow f|$ is not, the principle leads us to recognizing the following as the only two alternatives:

either: the non-attestation of $|a \rightarrow b \rightarrow c \rightarrow X \leftarrow d \leftarrow e \leftarrow f|$ is ‘accidental’, in that it just so happens that the grammatical system does not utilize this form, in which case $|a \rightarrow b \rightarrow c \rightarrow X \leftarrow d \leftarrow e \leftarrow f|$ is a ‘well-formed’ potential phonotagm;

or: the possibility of there being a phonotagm $|a \rightarrow b \rightarrow c \rightarrow X \leftarrow d \leftarrow e \leftarrow f|$ is ruled out by some explicit phonological *regularity* suggested by the nature of the ‘gaps’ among directly attested cases.

It should be noted in particular that Calculus C makes the assumption that it is *unlikely* (though, of course, not impossible¹⁶) for the occurrence of left-hand dependents to rule out or otherwise affect the possible occurrences of right-hand dependents to the same nucleus, and *vice versa*. Though both left-hand and right-hand dependents in a given phonotagm are governed by the same nucleus, and there are always dependencies *among* left-hand dependents and *among* right-hand dependents of the nucleus, we adopt – for the purposes of extrapolation – the convention that dependencies *between* left-hand and right-hand dependents are a

¹⁶ The onus is placed on finding convincing evidence that this unlikely possibility is realized.

remote possibility. By this convention, we take it that *unless and until* regularities noted on the basis of attested forms force upon us a contrary conclusion, such dependencies do not come into play.

Example C (a)

In English we find the directly attested phonotagms

/sTɹeŋθ/ and
/eitθS/

(witness the *signa* ‘strength’ and ‘eighths’), but no directly attested form

?/sTɹeitθS/.

However, since there is, in English, no evidence that the occurrence of left-hand dependents can, in a *regular* way, affect the occurrence of right-hand dependents, or *vice versa*, we allow extrapolation to proceed, and on the basis of extrapolation, admit /sTɹeitθS/ to the status of potential phonotagm.

Example C (b)

In Kamali Arabic¹⁷ (Hadj-Mohammed 1976) the following *regular* dependency is noted between left-hand and right-hand dependents of the same nucleus:

the occurrence of two left-hand dependents regularly precludes the occurrence of more than one right-hand dependent, and *vice versa*. Consequently, although there are such directly attested phonotagms as

/nmal/ and
/malx/

(witness the *signa* ‘nmal’ ‘to be fed-up with’ and ‘malx’ ‘to cause damage to’), the extrapolation of a phonotagm */nmalx/ is prevented by the fact that this would conflict with an established regular restriction in phonological distribution. This example illustrates the discipline that attested regular restrictions exercise over extrapolation.

¹⁷ I am indebted to Mr. S. Hadj-Mohammed for providing me with this example.

Calculus D

Potential phonotagms may be extrapolated by a successive, step-by-step 'expansion' starting from a valid potential nucleus, provided that *each step* is in accordance with the general principles of extrapolation.

It has already been argued that the nuclear element of a phonotagm provides a suitable 'fulcrum' for extrapolational calculus. Also, it has already been pointed out that extrapolation is blocked where it conflicts with an attested regularity, may proceed where the only counter-evidence is the 'accidental' (irregular) non-attestation of certain forms, but requires the evidence of analogous (directly attested) forms to follow through.

What is involved in extrapolation by successive 'expansion' can be most conveniently expressed in formulaic terms.

Step 1

Given that a certain element *X* has a nuclear distribution, evidenced by attested forms, the choice of that nuclear element constitutes the first step in the calculus.

Step 2

The second step in the calculus involves asking the following questions:

(a) is there any reason why *y* could not be a direct left-hand dependent of *X*?

(b) is there any reason why *z* could not be a direct right-hand dependent of *X*?

(c) is there any reason why it could not be the case *both* that *y* is a direct left-hand dependent of *X* *and* that *z* is a direct right-hand dependent of *X*, in the same phonotagm?¹⁸

To each of these questions the answer will be one of the following three types:

(i) Yes! there is an attested *regularity* which rules out this possibility.

(ii) No! this would not conflict with any attested regularity, but, at the same time, there isn't sufficient evidence in favour of this possibility, either.

(iii) No! on the contrary, there is *at least* the evidence of two *analogous* phonotagms which suggest that such a possibility might constitute a regularity.

¹⁸ It is important to note that both *y* and *z* may be given the value 0 (zero).

Since we do not wish to allow extrapolation to run riot, we shall adopt the operational convention that the calculus is blocked unless the answer to all three questions is of the third type (type iii). In simple terms, this means: when in doubt, do not extrapolate.

After successful completion of Step 2, there are two alternatives. We may either go on to Step 3 (see below), or we may move on to Step N, which shall be the last step before any succession of steps can be said to have led to the extrapolation of a given potential phonotagm.

Step N

This step involves asking the question as to whether the chain successfully extrapolated up to this point can constitute a complete phonotagm *without further dependents*. Thus, if applied after the successful completion of Step 2, application of Step N would take the form of asking the question:

is there any reason why $/y \rightarrow X \leftarrow z/$ could not constitute a phonotagm without further dependents?

The answer to this question will, again, be one of the same three types listed above (types i–iii), and the extrapolation of a potential phonotagm by this method will only be considered valid, in the final analysis, if the answer to the question posed in Step N is of type iii. As indicated above, one may, instead of moving on to Step N, continue the calculus further by taking Step 3.

Step 3

This step involves asking the following questions:

(a) is there any reason why p could not be a direct left-hand dependent of y in $y \rightarrow X \leftarrow z$?

(b) is there any reason why q could not be a direct right-hand dependent of z in $y \rightarrow X \leftarrow z$?

(c) is there any reason why it could not be the case *both* that p is a direct left-hand dependent of y and that q is a direct right-hand dependent of z , in $y \rightarrow X \leftarrow z$?¹⁹

These questions will be answered in analogous fashion to the questions posed in Step 2, and extrapolation will be blocked under the same conditions (i.e. unless the answer to all three questions is of type iii). Step 3 may be further followed by an analogous Step 4 – until all possible peripheral positions²⁰ to the left and to the right of the nucleus have been exhausted –

¹⁹ Both p and q may have the value 0 (zero).

²⁰ See the notion ‘distributional unit’ in Mulder 1968, 1977.

or, if we wish to terminate the calculus, we may, after the completion of Step 3, move on to Step N.

Example D (a)

Step 1

Selection of a nuclear element /a/ – valid on the basis of the regular nuclear distribution of this phoneme.

Step 2

(a) Is there any reason why /r/ should not be a direct left-hand dependent of /a/?

No! on the contrary, the evidence of such forms as /rat/, /ram/ etc. suggests that such a possibility constitutes a regularity.

(b) Is there any reason why /b/ could not be a direct right-hand dependent of /a/?

No! on the contrary, the evidence of such forms as /rab/, /kab/ etc. suggests that such a possibility constitutes a regularity

(c) Is there any reason why /a/ could not, at the same time, have *both* /r/ as a direct left-hand dependent *and* /b/ as a direct right-hand dependent?

No! on the contrary, the evidence of analogous forms /rob/, /rib/, /rɹb/, as well as /ueb/, /iap/, /rap/ etc.,²¹ suggests that such a possibility constitutes a regularity.

Step N

Is there any reason why /rab/ could not constitute a phonotagm without the addition of further dependents?

No! on the contrary, the evidence of /rob/, /rib/, rɹb/, /ueb/, /rap/, /iap/ etc. suggests that such a possibility constitutes a regularity.

Consequently, we may consider /rab/ to be a potential phonotagm of English.

Step 3

(a) Is there any reason why /t/ could not be a direct left-hand dependent of /r/ in /rab/?

No! on the contrary, the evidence of such forms as /drab/, /krab/, /trap/, /trɹb/ etc. would suggest that such a possibility constitutes a regularity.

²¹ There is also the evidence of /krab/ and /rabl/, if further evidence is required.

(b) Is there any reason why /l/ could not be a direct right-hand dependent of /b/ in /rab/?

No! on the contrary, we have the strongest form of evidence, that of the attested form /rabl/, to manifest such a possibility.

(c) Is there any reason why /rab/ could not have, at the same time, both /t/ as a direct left-hand expansion to /r/ and /l/ as a direct right-hand expansion to /b/?

No! on the contrary, the evidence of /trɹɹbɪ/, /trɹɪpl/, /kripl/ etc. would suggest that such a possibility constitutes a regularity. These same forms would, on application of Step N, provide evidence allowing the extrapolation of /trabl/.

Consequently, we may regard /trabl/ as a potential phonotagm of English.

Example D (b)

Step 1

Selection of a nuclear element /a/ – valid on the basis of the regular nuclear distribution of this phoneme.

Step 2

(a) Is there any reason why /ŋ/ could not be a direct left-hand dependent of /a/?

Yes! on the basis of attested forms we can posit that the non-occurrence of /ŋ/ as a left-hand dependent constitutes a regularity. The extrapolation is blocked at this point, and may not proceed any further.

Example D (c)

Step 1

Selection of a nuclear /i/ – valid on the basis of the regular nuclear distribution of this phoneme.

Step 2

(a) Is there any reason why /ð/ could not be a direct left-hand dependent of /i/?

No! on the contrary, the evidence of such forms as /ðis/, /ðrs/ etc. would suggest that such a possibility constitutes a regularity.

(b) Is there any reason why 0 (zero) could not be a direct (and sole) right-hand dependent of /i/?

No! because the non-occurrence of nuclear elements without right-hand dependents cannot be categorically stated as a regularity based on attested forms (the occurrence of /ðr/ and /r/ as forms of allomorphs of *signa* provides – at this stage – an apparent counter-example).

On the other hand, we do not have the evidence of two or more analogous forms to tip the balance in favour of the possibility of there being a potential phonotagm /ði0/.

Under such circumstances we have adopted the convention of considering extrapolation to be blocked. Therefore, we shall not extrapolate /ði/ as a potential phonotagm.

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