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I

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email: linguistica@phil.muni.cz

editor: Aleš Bičan (bican@phil.muni.cz)

READINGS IN AXIOMATIC FUNCTIONALISM I

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prepared by: Aleš Bičan (bican@phil.muni.cz)

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FOREWORD

Aleš Bičan

In this issue of *Linguistica* ONLINE I am happy to introduce the readers to a linguistic approach known under the name *Axiomatic Functionalism*. It is a functionalist and structuralist approach to linguistics, though it extends over to semiotics as a whole. The approach was originally set forth by Jan W. F. Mulder in his doctoral dissertation *Sets and Relations in Phonology*, published in 1968 in Oxford, England. It was further developed by Mulder in association with the now late Sándor G. J. Hervey at the University of St. Andrews, Scotland. The approach is closely related to functionalism around the French linguist André Martinet and has even some affinities to functionalism of the Linguistic School of Prague, especially to the theories of its classical pre-World War II era. It is for that reason the present issue of *Linguistica* ONLINE is hoped to be useful and interesting to many linguists. Not only from the comparative point of view but also because Axiomatic Functionalism has a lot to offer as an example of a scientific theory.

* * *

The first paper in this issue is the editor's own article on Axiomatic Functionalism called "Signum-theory in Axiomatic Functionalism" and serves as an introduction to the approach. It was originally a review of *Ontological Questions in Linguistics* by Jan W. F. Mulder and Paul Rastall but on advice of a fellow linguist it became an introduction to Axiomatic Functionalism with special attention to one aspect of the approach, the theory of sign. It also discusses Martinetian double articulation and explains why Axiomatic Functionalism does not agree with the traditional interpretation of this principle.

The rest of the papers were written by Barry Heselwood of the University of Leeds, English, or by Paul Rastall of the University of Portsmouth, England. It is very pleasing these two scholars submitted their original articles to *Linguistica* ONLINE.

Barry Heselwood's first, previously unpublished article "Simultaneous phonemes in English" discusses one aspect of the phonotactics of English, namely the problem of word-initial clusters. It has been often remarked that the sequence of the particular phonemes of these clusters is fixed and generally not permutable. The article discusses this fact in connection with the theory of phonology in Axiomatic Functionalism and proposes a solution according which the non-permutable clusters are to be regarded as simultaneous bundles called *phonthemes*. It further explores this notion and applies it to the phonic data of English.

The first article by Paul Rastall "Linguistic units and *-en* verbs in English" has not also been previously published. It touches upon the grammatical theory of Axiomatic Functionalism and explains the nature of linguistic units and distinctions between them, in particu-

lar between morphological and syntactical complexes. The theoretical framework is applied on a class of verbs in English called *-en* verbs. Rastall argues that the class is actually very diverse, ranging from genuine morphological complexes where the *-en* element is clearly a suffix, to so-called pseudo-composites where the *-en* element cannot be identified as a separate morphological entity. As such the article offers several alternative analyses different to the traditional ones.

The last three articles may be a little bit technical and theoretical in nature but they offer several interesting insights. They all discuss two notions of the theory of Axiomatic Functionalism introduced by Jan W. F. Mulder: the distinction between “diverse determination” and “parallel determination”. This distinction is mostly applicable in grammar where it aims to account for the syntactical difference between the immediate constituents in constructions like “the blue vase” (parallel determination) vs. “John likes Mary” (diverse determination).

In “A methodological argument against Mulder’s parallel vs diverse determination distinction” (originally published in *La Linguistique* 31 (1995)) Heselwood argues against the distinction and explains why “parallel determination” and “diverse determination” cannot be maintained as valid concepts in Axiomatic Functionalism. His claims were later countered in “Mulder’s parallel and diverse determination distinction, A reply to Heselwood” by Rastall, originally published in *La Linguistique* 33 (1997) and now reprinted in *Linguistica* ONLINE. Heselwood in turn wrote a further response and submitted it to *La Linguistique*. However, for one reason and another, the response has never been published and it is now for the first time that it is published here as “Parallel and diverse determination revisited: A reply to Rastall”.

As a whole the three articles are a nice example of how a scholarly discussion should look like. One should never take anything as a given and should be able to question it. Both Heselwood and Rastall explore various aspects of Mulder’s distinction and arrive at different conclusions, and though apparently not in absolute agreement they show the strength of Axiomatic Functionalism: the intrinsic ability to test its consistency, adequacy and simplicity and its openness to be improved by logical thinking. Few linguistic approaches can, alas, honestly claim the same.

SIGNUM-THEORY IN AXIOMATIC FUNCTIONALISM^[*] (in margine *Ontological Questions in Linguistics* by Jan W. F. Mulder and Paul Rastall)

Aleš Bičan

Abstract. As a marginal note to the book *Ontological Question in Linguistics* by Jan W. F. Mulder and Paul Rastall the article aims to introduce the readers to Axiomatic Functionalism, a linguistic approach originally developed by Jan W. F. Mulder in association with Sándor G. J. Hervey. It briefly sketches its historical and theoretical background and its affinities with functionalism of the Prague School and functionalism of André Martinet. As a way of comparison it gives a brief exposition of the axiomatic-functionalist theory of sign and touches upon the principle of double articulation. Axiomatic Functionalism does not agree with an interpretation of the principle according which language is articulated to entities (signs/monemes) having both a content and an expression the latter of which is in turn articulated to entities (formulae/phonemes) having only the formal aspect. Mulder regards this as a mixture of ontologically different entities and proposes a distinction between a sign (a grammatical entity) and a phonological form of the sign (a phonological entity).

0. The following paper wants to introduce readers to the theory of sign as advanced by a linguistic approach called Axiomatic Functionalism. It rose up from a review of a recent book *Ontological Questions in Linguistics* by Jan W. F. Mulder and Paul Rastall (published by LINCOM Europa in 2005). However, since Axiomatic Functionalism is not much known in the Czech lands, the original review gradually changed to an introduction to this approach, in particular to one of its basic components: ontology or signum-theory.

1. The book *Ontological Questions in Linguistics* is a joint work by Jan W. F. Mulder and Paul Rastall, two linguists whose names are little known in the Czech Republic, though at least the name of Jan Mulder is well established in the context of European linguistics. He is Emeritus Professor of Linguistics at the University of St. Andrews, Scotland, UK. Paul Rastall, who studied under Mulder's guidance at University of St. Andrews, is Principal Lecturer in Linguistics at the University of Portsmouth, UK. Both work within the linguistic approach called Axiomatic Functionalism (henceforth AF). Naturally, there are other proponents of AF; to name the most important: the late Sándor G. J. Hervey, Michael A. L. Lamb, James Dickins and Barry Heselwood (the last three operate with an extended version of AF, see Dickins 1998).

[*] A revised version of Bičan, Aleš. 2007. "Signum-theory in Axiomatic Functionalism (in margine *Ontological Questions in Linguistics* by Jan W. F. Mulder and Paul Rastall)". *Sborník prací filozofické fakulty brněnské univerzity A* 55.5-18. [Editor's note]

The originator of AF is, however, Jan W. F. Mulder. He has been developing AF since 1960s in close cooperation with Sándor G. J. Hervey (for the beginnings of AF see Mulder 1998). It is a type of functional linguistics and therefore an approach that should be of interest to Czech linguists, though it is rather a branch that is more related to French functionalism of André Martinet than to functionalism of the Prague School. Martinet had a great impact on Mulder, so that AF is often regarded as a formalized branch of Martinetian functionalism (cf. Akamatsu 2001), but there are many considerable differences and disagreements between these two functional linguistic schools. On the other hand, they are closely related as to the basic tenets, the most important of which is the principle of functional relevance. They also share the common background: both Martinet and Mulder were presidents of *Société Internationale de Linguistique Fonctionnelle* (SILF; Mulder is now Honorary President of SILF, which was Martinet, too, until the time of his death in 1999). This society is also connected to the renewed Prague Linguistic Circle, as can be witnessed from a joint colloquium held in Prague in 1991. In 2003 another colloquium of SILF took place in České Budějovice.

In spite of being treated here as a linguistic approach, AF is in fact better described as a paradigm in semiotics (cf. Hervey 1994). First of all, it is not a purely linguistic approach, but a semiotic one. It is not limited to treatment of natural languages only but is, at least in principle, designed to account for different semiotic systems. On the other hand, AF is mostly focused on core-linguistic theory and description and so will it be presented here except for one illustrating semiotic example. This brings us to the second point, which can be quoted from Hervey (1994: 1338): “the approach claims a unique position with respect to the philosophy of science, in particular to theory-building and the evaluation of theories and descriptions”.

Another person to have had a great impact on AF was the philosopher Karl Popper. The approach adopts Popper’s view on theories which, in order to be properly scientific, should be hypothetico-deductive. As such, AF explicitly rejects all forms of speculativism, operationalism and inductivism in linguistics. In AF the hypothetico-deductivism of Popper is enriched by a distinction between theories and descriptions. Such a distinction is not usually recognized in natural sciences, because there is usually one world to describe but in linguistics this is a necessary dichotomy, as there are hundreds of different worlds, i.e. languages, that can be described by one particular theory. Now, under the hypothetico-deductivism of AF, it is theories which should be deductive, but not hypothetical, while it is in descriptions where we launch hypotheses that (as Popper says) should be in principle refutable.

The core of the theory of AF is formed by six axioms (therefore *axiomatic* functionalism) which are basic—arbitrary but appropriate—propositions the whole theory rests on. They are given below (taken from Mulder 1989). As AF is a semiotic approach, the terminology in the axioms is generally semiotic, though in natural languages terms like *cenotactic*, *cenological*, *cenetic*, *plerological* could be replaced by *phonotactic*, *phonological*, *phonetic* and *grammatical*, respectively.

Axiom A: All features in semiotic sets are functional.

This axiom sets the scope of the theory: it deals with only those features that are relevant to the purport of semiotic systems, which is communication.

Axiom B: *Semiotic systems contain simple, and may contain complex ordered, and/or complex unordered signa and figurae.*

This axiom establishes two basic systems, phonology and grammar, for dealing, respectively, with figurae (semiotic entities which have only form) and signa (semiotic entities with both form and information-value). Also, it sets an important dichotomy: ordering vs. simultaneity, the latter being lack of ordering. Semiotic entities may be either ordered (e.g. phonemes, words) or unordered (e.g. distinctive features, monemes).

Axiom C: *Cenological entities may have para-cenotactic features and plerological entities may have para-syntactic features.*

Roughly speaking, this is an axiom of suprasegmental or prosodic or para-tactic features. In AF this includes accent, juncture, tones (para-phonotactic features) and intonation (para-syntactic features).

Axiom D: *All semiotic systems contain sentences, constituted by a base and para-syntactic features.*

This axiom sets the sentential level as a level distinct from the syntactic one.

Axiom E: *There may be a many-to-one relation between cenetic form and figura (allophony), and between cenological form and signum (allomorphy), and vice versa (homophony and homonymy respectively).*

This could be called an axiom of realization: it states that both figurae and signa may have formal variants (allophones and allomorphs respectively) and that there may be formal coincidence between variants of different figurae (i.e. homophony) or signa (homonymy).

Axiom F: *Signa may be realized an unlimited number of times (in actual communication), each resulting utterance denoting a denotatum which may belong to a potentially infinite denotation class.*

The axiom introduces semantics dealing with the denotational aspect of signa. Let it be noted that AF explicitly operates with denotation rather than connotation of signa, through the treatment of the latter was suggested by Hervey (Hervey 1971, see also Dickins 1998: 310ff.), who was also the one to put forth the theory of axiomatic semantics (see Hervey 1979) based on the Axiom F.

The axioms are interpreted by a network of accompanying definitions. These together form the so-called Postulates for Axiomatic Functionalism (to be found in Mulder 1989: 435-57 and Mulder & Hervey 1980: 40-63).

It is no coincidence that I have described the axioms as basic propositions that are arbitrary but appropriate. The reader of Louis Hjelmslev's *Prolegomena to a Theory of Language* may find the phrase familiar. The basic meta-theoretical assumptions of glossematics are in many respects relevant to AF. Both the glossematians and axiomatic functionalists hold that a linguistic theory should be arbitrary, which means it could be different if necessary, but it must be appropriate to its purpose. Another common feature is insistence on deductiveness: in the case of AF it is that everything in the theory should be derived from the axioms (and/or accompanying definitions) in a strictly deductive and logical way. The third common feature to mention is the denial of any existential postulate for the linguistic theory, a point discussed in detail in *Ontological Questions in Linguistics*.

2. The mentioned book deals with problems connected with the nature of linguistic objects. Mulder and Rastall argue for a reduced ontological commitment in linguistics. It is a view strongly opposed to many prevailing contemporary ones. One of the ontological questions that is discussed in the book is the ontological status of speech events and their connection or correspondence to reality.

In the authors' view there should be a distinction between what we observe (in linguistics these are speech events), the tools by which we can account for the observations (a theory), and finally the actual accounting for (a description). The aim of a linguistic theory, by establishment of certain entities and their classes, is to provide adequate tools for allowing us to account for speech events, but the theory cannot make any claim about the outer existence of the entities it has established. It operates with constructs only!

For instance, a linguistic theory can set up the notion *phoneme*. In a description we can speak about a phoneme /t/ in Czech but this is only an explanatory construct by which we account for certain speech phenomena. We cannot claim that the entity /t/ *per se* exists and/or is real outside the description. We cannot even claim it is once and for all the phoneme of Czech, because once again the interpretation of the Czech phonological system is dependent on the governing theory. This may strike as strange to many linguists at the first sight. However, we should remember that we have established the entity /t/ only on the ground of a certain theory: it is the theory that creates the entity, NOT that it is discovered by the theory!

Incidentally, it is the basic point of my paper "Phoneme and Alternations: Different Views" (Bičan 2006) which tries to show that the same piece of data, sc. the sound [t] in Czech [let] can be phonemically interpreted in at least three different ways according to three different phonological theories: 1. as a phoneme /t/, 2. as a phoneme /t/ if it realizes the word *let* "flight" or as /d/ if it realizes the word *led* "ice", or 3. as an archiphoneme /T/ being distinct from both /t/ and /d/ in the theory. See Figure 1.

speech event	approach 1	approach 2	approach 3
[let]	/let/ (for both <i>let</i> "flight" and <i>led</i> "ice")	/let/ (for <i>let</i> "flight") /led/ (for <i>led</i> "ice")	/leT/ (for both <i>let</i> and <i>led</i>)

Fig. 1: Interpretations of [let]

We see that the same speech event can be phonologically represented in three different ways. There is therefore no a priori linguistic reality of the speech event [let] that is to be discovered by a linguist. Its interpretation is wholly dependent on the theory through which it is created. Something similar is true for a color picture: a person who is color-blind will perceive and describe it differently than the one without the defect of seeing. Let me also quote de Saussure (2006, going back to the beginning of 20th century):

Let us remember in fact that *the object* in linguistics does not exist to start with, is not predetermined in its own right. Hence to speak of an object, *to name* an object, is nothing more than to invoke a particular point of view, A. (8)

What is more, even the sounds [l], [ɛ] and [t] in Czech [let] are nothing but constructs. It is merely a way by which, in phonetics, we account for specific speech phenomena by means of a phonetic theory. It is a common mistake to assume that sounds are the real things, real events, and phonemes are certain abstract and generalized models of the sounds. Even the sounds are abstract and generalized models, because actual pronunciations at any given time and space are directly inaccessible. They are immediately gone and can never be repeated; they exist only in passing. For example, it is generally assumed that the sound [ɛ] in Czech [let] is the same as [ɛ] in e.g. Czech [sen] but if we pronounce these two words (*let* “flight” and *sen* “dream”) and compare their spectrograms (which are models, too!), we will see that they are not identical; however, there are certain characteristics common to them from which we can *generalize* the sound-type [ɛ] that is in turn nothing but an abstraction.

3. Before moving to the discussion of signum-theory in AF, I will sketch the overall structure of the theory of AF and of another of its components: *systemology*.

The theory of AF—by which I mean the tool for description of languages—has three basic components or sub-theories: *systemology*, *semantics*, and *signum-theory*. Mulder (1989: 70) likens it to a stool with three legs where the seat of the stool can be seen as being the all-pervading point of view of the theory, the functional principle. The most important leg of the theory is nevertheless the signum-theory because it sets the ontological nature of linguistic objects.

Systemology then deals with internal deployment of linguistic objects, that is, the ways they are used in the system, covering mainly classical phonology and grammar. Semantics—which is an autonomous sub-theory of AF, not an extension of grammar—deals with external deployment of linguistic object, that is, with regard to the purpose of denoting things. Axiomatic semantics (for which see Hervey 1979) will not be discussed here, though.

Systemology is mostly set by Axiom B (see above) which introduces *figurae* and *signa* as semiotic entities, and ordering relations among them. This means that systemology deals with systems of both unordered and ordered semiotic entities with only form (*figurae*) and with systems of both unordered and ordered semiotic entities with form and information-value (*signa* or *signs*). The systems are as follows: for phonology: phonematics (distinctive features and phonemes as their unordered bundles) and phonotactics (phonemes and phonotagms as their ordered bundles); for grammar: morphology (morphemes and words as their unordered bundles) and syntax (words and syntagms as their ordered bundles). In addition to these, AF recognizes two para-tactic levels: para-phonotactic level (covering features such as juncture, accent or tones) and para-syntactic level (covering intonation and including the sentential level, cf. Axiom D). Figure 2 (adapted from Mulder 1989: 113-7) presents the structure of systemology and possible types of analyses of complex entities to less complex and ultimately to simple entities.

A few examples from Czech can be given for easier understanding. As regards grammar: On the sentential level (in para-syntax) the sentence *Horník kopal ve skále*. “A miner was digging in a bedrock.” is analyzed to the base (syntagm) HORNÍK KOPAL VE SKÁLE and the accompanying intonation. In syntax the mentioned syntagm, which is a predicative syntagm, is analyzed to the nucleus (predicate) KOPAL “was digging” and a subordinate word

HORNÍK “a miner” and a subordinate prepositional syntagm VE SKÁLE “in a bedrock”. In morphology the word HORNÍK “miner” is analyzed to an unordered bundle of monemes HOR “mountain” and NÍK “agentive suffix” (unordered because there is no functional difference in the order of the monemes).

SYSTEMOLOGY					
phonology			grammar		
<i>phonematics</i>	<i>phonotactics</i>	<i>para-phonotactics</i>	<i>morphology</i>	<i>syntax</i>	<i>para-syntax or sentential level</i>
types of analyses:					
phonemes > distinctive features	phonotagms > phonemes	complex para- phonotagms > simple para- phonotagms > bases + para- phonotactic features	words > monemes	syntagms > words	sentences > clauses > bases + para- syntactic features

Fig. 2: Systemology of AF

We now move to phonology: In para-phonotactics the para-phonotagm */#ve#Skāle#* is analyzed to the phonotactic base */ve skāle/* and para-phonotactic features accent (underlining) and juncture (#). In phonotactics the phonotagm */Skāle/* is analyzed to a bundle of phonemes */S/* (which an archiphoneme), */k/*, */ā/*, */l/* and */e/*. Finally, in phonematics a phoneme like */v/* is analyzed to an unordered bundle of distinctive features ‘labial’, ‘constrictive’ and ‘voiced’ (again, there is no functional ordering).

As a final word let me note that the above presentation of systemology is necessarily simplified but I hope to present a detailed exposition in a future paper.

4. It was suggested at the beginning of this paper that, despite being related to and inspired by, AF is in certain respects different to functionalism of André Martinet. Mulder discusses the differences in several works of his, but it is also in the recent book *Ontological Questions in Linguistics* where this issue is addressed. He tries here to set his position with the respect to Martinetian (“realist”) functionalism and also to de Saussurean tradition. The point I want to discuss here is the theory of double articulation.

Mulder explicitly rejects the not uncommon interpretation of double articulation maintaining that language is articulated to entities (signs, monemes) that are unions of a semantic content (*signifié*) and a vocal form (*signifiant*) which is in turn articulated into a succession of entities with form only (figurae, phonemes). In Martinet’s own words (1990, section 1.14):

l’expérience humaine s’analyse [...] en unités douées d’un contenu sémantique et d’une expression vocale, les monèmes; cette expression vocale s’articule à son tour en unités distinctives et successives, les phonèmes [...]

In *Ontological Questions in Linguistics* Mulder argues that this is a category-switching and an ontological mistake, because on the one hand the *signifiant* is viewed as a part of sign and therefore implies the *signifié* (for a sign to be a sign it must have both *signifié* and *signifiant*!), on the other hand the *signifiant* is viewed as wholly independent of the *signifié* as it can be analyzed into a series of meaningless phonemes. Now, if it is the same *signifiant*, where did the content, i.e. its implied *signifié*, get lost?

In AF this controversy is evaded by postulating three ontologically different entities: *expression of a sign*, *allomorph of a sign* and *phonological form of the allomorph*. It is then the phonological form that can be divided to phonemes. Expression is the *signifiant* aspect of the sign and implies content, i.e. *signifié*; it is a class of its allomorphs (variants) each of which having a phonological form but the phonological form cannot be equated with the sign itself or its expression!

This leads us to the structure of signum-theory in AF. It is given in Figure 3 (taken from Mulder & Rastall 2005: 141). The theory is also called *ontology* and the name is not without motivation, because if, as already mentioned above, systemology (phonology and grammar) deals with the systematic structure of linguistic objects and semantics with the ways linguistic objects denote things in “real” world, the purpose of ontology or signum-theory is to set the very nature of these linguistic objects and/or notions and their relative status. Both systemology and semantics presuppose ontology and, as Mulder notes (1989: 74), every science implicitly or explicitly needs an ontology.

Let it be also noted that AF makes a distinction between the terms *signum* and *sign*, the latter being a type of signum. Signum (see Mulder 1989: 437) is defined as a semiotic entity with both form and information-value whereas sign is a signum with wholly conventional information-value. The other type of signum is a symbol whose information-value is not wholly conventionally fixed. However, for our purposes here the difference between signum and sign is immaterial and the terms may be regarded as synonymous.

level of <i>phonetic entities</i>	level of <i>phonological entities</i>	level of <i>grammatical entities</i> (level of <i>Sign</i>)
<i>i</i> (image)	iRd (phonon)	$(iRd)Rd$ (utterance)
$f=\{i\}$ (phonetic form)	fRd (allophone)	$(fRd)Rd$ (allomorphon)
	$p=\{f^{i..n}Rd\}$ (phonological form)	pRd (allomorph)
		$S=\{p^{i..n}Rd\}$ (sign)

Fig. 3: Ontology of AF

In the scheme the parentheses $\{ \}$ and the superscript $i..n$ stand for “a class of”; Rd stands for “having and in capacity of having” d , which is distinctive function (either in phonology or grammar). The most primitive notion here is that of image (symbolized i) from which other notions are derived by applying and re-applying the two mentioned relations, i.e. the relation “a class of” and the relation “having and in capacity of having a distinctive function”.

IMAGE is defined as “a model for the unique form of a singular realization of a phonetic feature” (Mulder 1989: 455); it is simply a model for a single occurrence of a speech-sound. A class of impressionistically similar images is PHONETIC FORM (*f*). If we return to my earlier example with Czech [ɛ], we can say that the phonetic form [ɛ] as a sound-type is a class of impressionistically similar [ɛ] sounds that can be recorded in different pronunciations.

Though included in the table, both image and phonetic form do not belong to signum-theory proper but to a phonetic science, that is, they are provided by a phonetic theory independent of a given linguistic theory. It is the distinctive function that, as it were, creates full-fledged linguistic entities. So if a certain phonetic form (i.e. sound-type) is endowed with a phonologically distinctive function in a given language, we speak of ALLOPHONE. A class of allophones (i.e. phonetic forms with the same distinctive function) is PHONOLOGICAL FORM. There are two points that should be noted here.

First, in AF the class of allophones is not a phoneme but a phonological form. Phoneme is an entity of systemology and does not belong to signum-theory. In other words, it is an entity of a different theory but this does not mean there need not be correspondences between entities of different theories (just as ‘a colorless, odorless liquid with a specific gravity of 1’ as an entity of physics corresponds to H₂O as an entity of chemistry; example taken from Hervey 1972: 361). Phoneme as an entity of systemology (defined there as an unordered bundle of distinctive features) corresponds to phonological form as an entity of signum-theory, where it is defined a class of allophones. Although we can still speak of allophones of a phoneme as a convenient shortening of ‘allophones of the phonological form corresponding to a phoneme’, we should not forget that the difference between phoneme and phonological form is important, because it does away with the logical controversy when the phoneme is, in certain treatments, defined both as a bundle of distinctive features and as a class of allophones. If the phoneme is a bundle (i.e. a set) of distinctive features, it cannot, at the same time, be a class (a set) of allophones each of which containing the same bundle (set) of distinctive features, since all are grouped under the same phoneme! A set of, say, four baskets each of which containing six apples is not the same as a class of six apples as members common to the four baskets!

The second point to mention in connection with phonological form and allophone is the fact that in AF the use of these notions is broader than in other approaches and is not limited to correspond to phonemes only. This is to say that images as well as the corresponding phonetic forms can be models for any speech event, not necessary only for what is in phonetics known as a singular sound. Consequently, allophones and phonological forms are not bound to correspond to phonemes only but also to larger and more complex phonological entities. These are called PHONOTAGMS in AF (just as complex entities in grammar are called syntagms). We can have a phonotagm /sklenka/ in Czech corresponding to the phonological form which is a class of allophones [sklenka] and [skleŋka] (i.e. realized once with an alveolar nasal, once with a velar one).

The last phonological entity of signum-theory is so-called PHONON. It is a particular image with a phonologically distinctive function. According to Mulder (1989: 304), it is a logical rather than a practical concept and I will not discuss it here for that reason (though some examples are suggested in Figures 6 and 7 below). The same is true of the notion of ALLOMORPHON (allophonon with a distinctive function in grammar).

We can now turn to the level of grammatical entities, the most crucial of which, for this discussion, is the notion of ALLOMORPH. It is defined as a phonological form endowed with a grammatically distinctive function, and as such it falls within the domain of grammatical entities. A class of allomorphs (i.e. phonological forms with the same distinctive function) is EXPRESSION of a sign. The reader might have noticed that in the table the class of allomorphs is identified as sign itself, not as its expression. Properly speaking, SIGN is a conjunction of expression and content but since they both imply sign and one another, just as they are both implied by sign, there is in fact mutual equivalence and we can view sign from the angle of its expression (or from the angle of its content if the need be). That is to say, we can identify a sign with its expression because the expression necessarily implies the content of the sign and *vice versa*! We can then define sign as a class of allomorphs, though it is rather a class of expression-allomorphs.

Now to give an example: in Czech the sign-as-expression PES “dog” is a class of at least two allomorphs ‘/pes/’ and ‘/ps/’ (cf. *pes* “a dog”, *psi* “dogs” with *kos* “a blackbird” and *kosi* “blackbirds”). The phonological forms of the allomorphs—not the allomorphs themselves!—correspond to bundles of phonemes /p/, /e/, /s/ (for *pes*) and /p/, /s/ (for *psi*), respectively.

We can now return to the controversial interpretation of the double articulation theory alluded to above which claims that expression of sign is articulated to phonemes. In AF the controversy is forestalled by introducing several ontologically different entities: 1. sign as a conjunction of expression and content, 2. expression of sign (or the sign viewed as its expression) which is a class of allomorphs and which at the same time implies content, 3. allomorph as a class of phonological forms with the same grammatically distinctive function, and 4. phonological form that can be said to be analyzed to phonemes. What is therefore “articulated”, sc. analyzed to phonemes is a phonological form, not an allomorph or expression. The latter are grammatical entities and hence should be analyzed at the level of sign, not at the level of figura.

There is another entity of signum-theory that has not been mentioned yet: that of UTTERANCE. To put it crudely, utterance is a *parole* correlate of sign, which is a *langue* entity. It belongs to speech, because it is a model for the unique form of a singular realization of sign. In more formal way: it is an image with a phonologically distinctive function and a grammatically distinctive function (i.e. $(iRd)Rd$). In Czech [sen] (as a model for what was pronounced at a certain instance of time and space) is an utterance if it is recognized as being both phonologically distinctive (a realization of a phonological form corresponding to a phonotagm /sen/) and grammatically distinctive (a realization of the sign SEN “dream”).

To illustrate better the structure of signum-theory and the difference between phonological form and allomorph, I will now give a semiotic example. It should be remembered that AF is a semiotic approach, though in this paper it is discussed from the point of linguistics.

Suppose we doodle on a piece of paper. Every such a doodle is an image. We notice that some of the doodles resemble each other and we group them under one general type of doodle; this is a parallel of phonetic form. Now if we recognize that the doodle-type is important for drawing—and now we have moved from doodling to drawing, which parallels phonetics versus phonology—, we can assign it with distinctive function in the universe of drawing, because it is distinct from other distinctive doodle-types such as curve, circle or

square. This is a parallel of allophone; we can call it *straight line*. Now, naturally, we will notice that the straight line can have different lengths but it is still a straight line. We can group all the variants (allophones) under one class of straight lines; this would correspond to phonological form. There are obviously other types of distinctive doodle-types in drawing and all these can be combined to more complex drawings. We can, for instance, have two straight lines of certain length crossed. But it is still a piece of drawing (a phonological form).

We will now move from the universe of drawing to the world where different drawings are assigned with information-values. In other words: where drawings are distinctive, because they carry certain information-values distinct from other information-values. We have move from drawing (phonology), where we dealt with mere *figurae*, to symbols and/or signs (grammar). To return to our example with two crossed straight lines: we can assign this drawing with a distinctive information-value “Christianity”. The two crossed lines have become a symbol for Christianity as opposed to other symbols for other religions, and we call it a *Cross*. The Cross is now a parallel of allomorph. And once again we can notice there are different types of Cross, drawn differently from two crossed straight lines (cf. Fig. 4 below), all of which are nevertheless symbols for Christianity. We group these variants to a class of Crosses, and by doing so we have arrived at the level of sign as a class of allomorphs. Finally, the notion utterance corresponds to any instance of two crossed straight-line-like doodles that are recognized as symbols of Christianity.

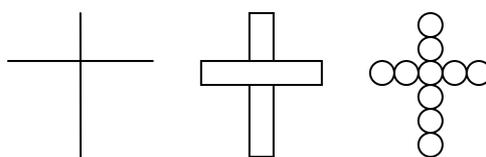


Fig. 4: Different types of Christian Cross

With this semiotic example we can approach the problem of double articulation from a different angle. We have Cross which is a symbol of Christianity. It is a sign and as a sign it has two aspects: the value “Christianity” (*signifié*) and the way it is expressed (*signifiant*). We agree that there are different types of Cross (its allomorphs), each of which being a symbol for Christianity. Every allomorph (variant) of Cross is an instance of the sign Cross. If we followed the common interpretation of double articulation, we should say that the expression of Cross (say, of the first Cross in Fig. 4) can be articulated into smaller entities which have only form (phonemes). In the case of the first Cross of the Fig. 4 it would be two straight lines. However, there is an obvious lapse in reasoning: Cross as a symbol for Christianity is not the same thing as two crossed lines, because it has, in addition, the value of “symbol of Christianity” that cannot be simply done away with. Obviously, two crossed lines is something fundamentally different from a Cross as a symbol of Christianity! To put it other way: we cannot claim that two crossed lines (or other similar objects) are always and ever symbols for Christianity. The same is true for signs and their phonological forms in linguistics: they are fundamentally—we should say ontologically—different entities.

5. Now, instead of giving a verbal summary of the present paper, I have chosen to give three tables (Figures 5-7) that offer an overview of signum-theory in Axiomatic Functionalism. The overview is accompanied by several linguistic examples and brief commentaries. The semiotic example with Cross is included, too.

entity	example	notation	comment
<i>image (i)</i>	[a] ₁ , [a] ₂ , [a] ₃ ... [a] _n [jε] ₁ , [jε] ₂ , [jε] ₃ ... [jε] _n 	<i>i</i>	models for instances of speech-events [a], [jε], and for instances of doodles
<i>phonetic form (f)</i>	[a], [jε] 	{ <i>i</i> }	classes of impressionistically similar speech-events [a], [jε], and of similar doodles (in bold), i.e. sound-types and doodle-types

Figure 5: Level of phonetic entities

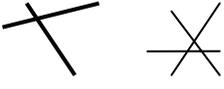
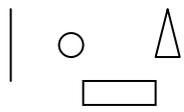
entity	example	notation	comment
<i>phonon</i>	[a] ₁ Rd ¹ , [a] ₂ Rd ¹ , [a] _n Rd ¹ as distinct from [ε] ₁ Rd ² , [ε] ₂ Rd ² 	<i>iRd</i>	images that are found distinctive in phonology, and doodles distinctive in drawings
<i>allophone</i>	[a]Rd ¹ as distinct from [ε]Rd ² 	<i>fRd</i>	a sound as a realization of a phoneme as distinct from realizations of different phonemes, and a drawing (straight line) as different from other drawings (circles)
<i>phonological form (p)</i>	{[a]Rd ¹ , [a]Rd ¹ , [ã]Rd ¹ } 	{ <i>f</i> ^{..n} Rd}	possible allophones of a phoneme /a/ in Czech (front, back, and slightly nasalized), and variants of a drawing style “straight line”

Fig. 6: Level of phonological entities

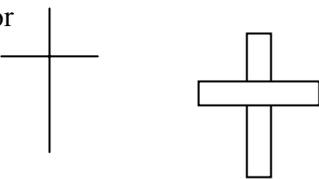
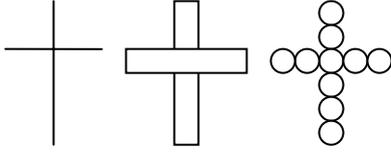
entity	example	notation	comment
<i>utterance</i>	$[\text{j}\epsilon]_1\text{Rd}$ 	$(i\text{Rd})\text{Rd}$	a singular realization of the sign BÝT “to be” in Czech, and a singular occurrence of a doodled Cross as a symbol of Christianity
<i>allomorphon</i>	$[\text{j}\epsilon]\text{Rd}$ 	$(f\text{Rd})\text{Rd}$	a generalized class of singular realizations of the sign BÝT, and of singular occurrences of doodled Crosses
<i>allomorph</i>	$/\text{j}\epsilon/\text{Rd}$ or $/\text{jsem}/\text{Rd}$ or 	$p\text{Rd}$	allomorph ‘/jε/’ and allomorph ‘/jsem/’ of the sign BÝT, and two types of Cross as symbols for Christianity
<i>sign (S)</i> <i>(sign-as-expression)</i>	$\{\text{j}\epsilon/\text{Rd}, \text{jsem}/\text{Rd}, \text{j}\text{si}/\text{Rd}, \text{j}\text{sou}/\text{Rd}\}$ 	$\{p^{1..n}\text{Rd}\}$	sign BÝT “to be” (with allomorphs <i>je</i> “is”, <i>jsem</i> “am”, <i>jsi</i> “(you) are”), and Cross as a symbol of Christianity (with different variants)

Fig. 7: Level of grammatical entities

The tables are hoped to sufficiently illustrate and summarize the structure of the signum-theory of AF. In certain points the presentation had to be simplified due to the lack of notations and space (I could not discuss here the notions of allophony and allomorphy, both elegantly presented in AF, because it operates with set-theoretical relations). The signum-theory is discussed in the book *Ontological Question in Linguistics* by Mulder and Rastall, which was the original inspiration for this paper. An excellent but rather unavailable exposition of signum-theory is found in Shimizu and Lamb’s “Axiomatic functionalism: Mulder’s theory of the linguistic sign” (1985, see references). Another clear and useful summary can be found in Dickins 1998: 46-53. Of course, the most recommended presentation of signum-theory is the one by its originator, Jan W. F. Mulder, which is to be found in several of his works, notably in *Foundations of Axiomatic Linguistics* (Mulder 1989). The present paper has been my own interpretation of the theory and I am solely responsible for any inconsistencies and errors.

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SIMULTANEOUS PHONEMES IN ENGLISH^[*]

Barry Heselwood

Abstract. The sequence of phonemes in English initial clusters, it has often been remarked, is structurally fixed. Fixed sequences can have configurative but not oppositional value. It is argued within an axiomatic-functionalist framework that the constituent phonemes are functionally simultaneous and occupy a single phonotactic position in a phonotagm. A simultaneous bundle of phonemes is called a 'phonotheme'. The members of a phonotheme determine the nucleus of the phonotagm collectively, in parallel. Phonothemes contrast with ordered (non-simultaneous) permutable sequences in which a non-phonemic schwa vowel interposes, e.g. /sp̩-/, /sp-/, /ps-/ in respectively *sport*, *support*, *perceive* (Southern Standard British English, or 'RP'). The schwa allows diverse determination of the nucleus by the phonemes it separates. Commutation of phonemes within these phonothemes is shown to follow the same pattern as commutation of distinctive features within phonemes, that is to say commutation classes are made up of phonemes that cannot co-occur in a simultaneous bundle.

1. Introduction

In the heyday of Prague functionalism one of its leading figures, Josef Vachek, declared that 'there can, and do, exist simultaneous phonological units but there cannot occur simultaneous phonemes' (Vachek, 1936/1976: 18), an assertion repeated by Haugen (1957/1972: 337), and this seems to have been the position of functionalists ever since. Simultaneity has been an implicit property not of phonemes but of distinctive/relevant features since the concept of distinctive features began to emerge in Prague School writings (see discussion of these terms in Akamatsu, 1988: 81ff). Jakobson, in an encyclopedia article in 1932, defined the phoneme as 'a set of concurrent sound properties' (Jakobson, 1932/1971: 231) and Trubetzkoy used terms such as 'phonologisch relevante Eigenschaften' and 'Vorstellungselemente' which Martinet has interpreted as 'caractéristiques phoniques distinctives qui se réalisent simultanément' (Martinet, 1955: 67, fn.8). Vachek himself defines the phoneme as a bundle of distinctive feature which he describes as simultaneous (Vachek, 1966: 62). The phrase 'simultaneous bundle of distinctive features' occurs in Mulder's definition of the phoneme in his presentations of the theory of axiomatic functionalism (Mulder, 1968: 26; 1989: 214). Mulder's use of the term 'simultaneous' is, however, squarely phonological in the functional sense, whereas Vachek, Haugen and Martinet were using the term in a more phonetic sense to describe events taking place at the same time in the vocal tract with the purpose of realising a given phonological unit such as a phoneme.

[*] Previously unpublished. Peer-reviewed before publication. [Editor's note]

In this paper, which develops and revises previous treatments of the topic in Heselwood (1987; 1992), I use an axiomatic-functionalist framework to argue that there can and do occur simultaneous phonemes in English, that they are what have traditionally been called initial consonant clusters, e.g. *pr-*, *bl-*, *st-*, *skr-* etc. Following Michael Lamb's original coining of the term in the early 1980s, and its definition in Dickins (1998: 142-3; see also 379 Axiom B definition 9a^{0c}), a simultaneous bundle of phonemes is called a *phonotheme*. I then consider whether the phonemes of a phonotheme determine the phonotagm nucleus separately or collectively, relating this question to the distinction drawn by Mulder, and reformulated in Heselwood (2008), between parallel and diverse determination.

The notion of simultaneity is applied to English initial clusters in a recent phonotactic analysis of the role of the schwa vowel in English (Heselwood, 2007), inspired by, though not presented explicitly within, the axiomatic-functionalist framework. In that article, the term 'simultaneous cluster' is used in place of 'phonotheme'.

2. Simultaneity

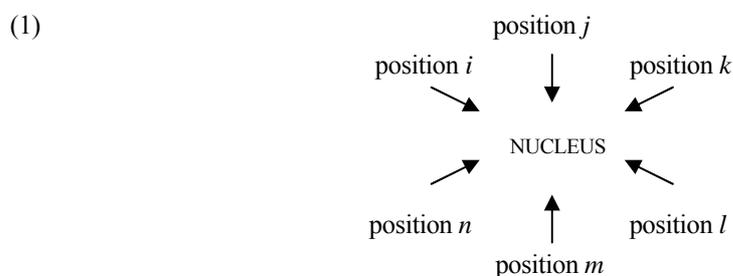
Mulder provides a precise functionally-oriented criterion of simultaneity regarding the occurrence of phonological units: for two or more units to be simultaneous it must be the case that no syntagmatic relations can be established between them (Mulder, 1968: 30-31). Syntagmatic relations are established by refuting a hypothesis of simultaneity (Mulder, 1989: 210), that is to say, in phonology by demonstrating that the sequential order of the units in question is functional. For example, the hypothesis that /l/ and /k/ have a relationship of simultaneity in e.g. *bulk* is refuted because the sequential order /-lk/ can be shown to be functional: changing the order to /-kl/ gives us the phonological form of *buckle*, a different word; the two permuted sequences therefore correlate with two different distinctive functions in English grammar (see Heselwood, 2007, 163-6 for an approach to English phonotactics in which schwa-syllables and syllabic consonants are incorporated into the same distributional frame as a preceding or following full vowel). By contrast, the hypothesis that the distinctive features "labial" and "nasal" have a relationship of simultaneity in e.g. *mist* remains unrefuted unless and until we can find English forms that are differentiated by the order in which these units occur.

The particular focus in this paper is on initial clusters in English such as /pr, bl, skr (or /sKr/ in an archiphonemic analysis), sm/ etc., which do not occur in any other permutations. Rather than view the lack of permutations as an accidental gap in the phonotactics of English, it should be seen as a structural fact preventing refutation of a hypothesis of simultaneity.

3. The phonotagm

It appears to have been generally assumed by functionalists that phonemes are like links in a chain extending through the syntagmatic dimension of phonological structure with, on the whole, little thought given to whether the functional status of the relationships between successive links might or might not always be the same in the description of a given language. More attention has been given over the years to paradigmatic relations in phonology than to syntagmatic ones although Mulder has done much to restore the balance with his notion of the

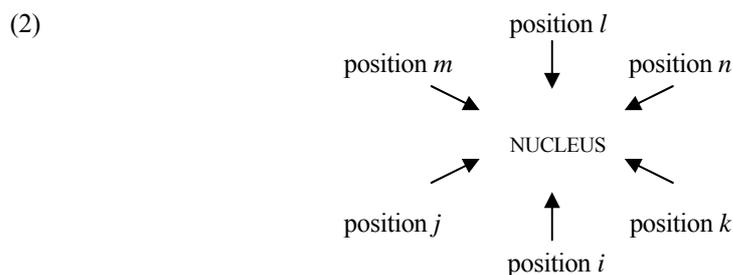
phonotagm, also called by him ‘distributional unit’ – defined as ‘a self-contained bundle of positions’ (Mulder, 1989: 444 Axiom B definition 9a), a domain in which syntagmatic relations of a limited number of different theoretically-defined kinds can be set up between the positions that comprise it and, by virtue of their assignment to those positions, between phonemes. Dickins (1998: 63) explains that Mulder establishes ‘ordering relations’ not between the phonemes in a phonotagm, nor even between the positions of the phonotagm, but between a phoneme and a position. For Mulder, it is an ordered relation because the phoneme stands in the position but the position does not stand in the phoneme (Mulder, 1968: 118). The positions comprising a phonotagm consequently have no ordering relations vis-à-vis one another and are therefore unordered, or simultaneous (Mulder, 1969: 118). In phonotactics, it is the relationship between a peripheral position and the nucleus which is important, not the relationship between one peripheral position and other peripheral positions. The simultaneity of phonotagm positions means we can represent peripheral positions as being arranged around a nucleus, with each position having a different relationship to the nucleus and a different label to identify it, but being equally close to it, as in (1):



Arrow represents relationship of determination: $a \rightarrow b$ means a determines b .

Relations of simultaneity and non-simultaneity between phonological elements can thus be distinguished by whether they are ordered with, respectively, the same position or different positions. How the positions are arranged in a representation such as (1) is unimportant as long as each position is unambiguously identifiable; the representation in (2) below is therefore functionally equivalent to (1).

However, Mulder names positions according to their sequence in realization, those containing phonemes realized before the nucleus being called ‘explosive’, those containing phonemes realized after the nucleus ‘implosive’ (Mulder, 1987: 36; 1989: 229; 1994: 50). There is then a certain tension, even contradiction, between regarding phonotagm positions as simultaneous on the one hand, and formalizing realizational sequencing into a linearly-represented model where one makes a division between pre- and post-nuclear positions. Mulder (1987: 36) in fact talks about some positions being



further from the nucleus than others, and refers to phonotagms as a ‘chain of positions’ and as ‘ordered successions of phonemes’ (Mulder, 1987: 35-6). It is difficult to reconcile this with simultaneity and it is beyond the scope of this paper to attempt to do so, but it should be remembered that description in functionalist linguistics is based on observation and if observation tells us that possibilities for occurrence are structurally different before and after the nucleus, then our description should take account of it. Indeed, how can we assign phonemes to positions without observing where they occur in realization?

That combinatorial possibilities are different in pre-nuclear and post-nuclear positions in English is uncontroversial (see e.g. Fudge, 1969; Cruttenden, 2001: 240-43; Heselwood, 2007: 166). They are thus distinct domains for indirect tactic relations, that is, tactic relations between non-nuclear constituents. If this were not the case, the general statement that /l/ clusters with /t/ and /d/ after a nucleus but not before it, e.g. *pelt*, *petal*, *field*, *fiddle*, but not */tl-/, */dl-/ or */lt-/, */ld-/, would hardly count as worth a mention whereas, in the absence of refuting examples, it is an important constraint on the combination of these phonemes in English and shows that the kind of indirect tactic relations they may contract with each other depends on phonotactic context. Similarly the permutability of /s/ and /p/ (or of one with the archiphoneme of the other) after a nucleus but not before it is a significant fact about our description of English, e.g. *lisp-lips* but only *spill*, not **ps-*; it is, furthermore, an important language-specific phonotactic fact about English which is not shared by, for example, analogous phenomena in Greek – e.g. *spiti* ‘house’ and *psomi* ‘bread’.

To take an example provided by Mulder, the phonological form of *scramble* requires, according to his analysis, a phonotagm with at least seven positions set out linearly as in Table 1 (Mulder, 1989: 231-2; /K/ and /N/ are archiphonemes).

Table 1: Mulder’s phonotactic analysis of *scramble*.

pre-explosive	1st explosive	2nd explosive	nuclear	1st implosive	2nd implosive	3rd implosive
s	K	r	a	N	b	l

Assigning the three pre-nuclear phonemes to separate positions means that one has to be able to refute a hypothesis of simultaneity by demonstrating that the sequential order /sKr-/ is functional and that to assign all the phonemes to the same peripheral position would not be justified, but no examples of phonological forms have been adduced that show this to be the case in English. Mulder counters this point by saying that, in relation to the /sTr-/ in e.g. *strength*, ‘Admittedly there is no permutability in explosive position, but this is irrelevant, as one has to consider the whole of the phonotagm, not some part, in assessing ordering relations’ (Mulder, 1989: 296), a stipulation which is, it must be said, consistent with the simultaneity of positions in a phonotagm. Yet a few pages later he advances the case for assigning the \overline{tj} in e.g. *chair* to a single position – that is, he regards it as what he terms a ‘semi-cluster’, saying that ‘within that position it acts in the absence of permutability (there is no /jT/ in explosive position) as a simultaneous bundle’ (Mulder, 1989: 299-300). If one has to consider the whole of the phonotagm then examples such as *witch-wished* ought to be sufficient to refute a hypothe-

sis of simultaneity in the case of *chair*.¹ To be fair, Mulder appeals to the further criterion of expandability, pointing out that ‘in the case of prenuclear /tʃ-/ , there can be no phoneme preceding it, nor following it explosively. As there are two phonemes which occupy a place equivalent to three positions, we can under those circumstances not assign any of the two phonemes to a specific position. All there is left is to regard /tʃ/ as a whole as standing in a position equivalent to those three positions, i.e. an archiposition’ (Mulder, 1989: 299). However, this criterion, as well as the criterion of permutability, would mean that e.g. /θr-/ (as in *three, throw*) is equally a semi-cluster, and it is far from clear why he does not represent /sm-/ (as in *small*) as a semi-cluster (Mulder, 1989: 231): it is neither permutable nor expandable (see fn. 2 below).

Mulder’s analysis of *twelfth* further conflicts with the criterion of attested occurrence elsewhere in the phonotagm. The phoneme /t/ is assigned to an archiposition (Mulder, 1989: 231) on the grounds that /sTu-/ (i.e. [stw-]) is not found in English. True, but the permutation /-usT/ is found in implosive positions in e.g. *oust, soused*. While /sTu-/ is treated by Mulder as a structural impossibility in English, the non-occurrence of explosive /tSr-/ , /kSr-/ etc. he seems to see as accidental.

3.1. *Configurative function*

A hypothesis of simultaneity is not refuted for /sKr-/ , /sTr-/ , /tu-/ or, in fact, for any initial cluster in English. The distribution of classes of phonemes across the three pre-nuclear positions Mulder sets up (see Table 2 below for examples) is entirely predictable. Pre-explosive position can only take /s/ , and any pre-nuclear occurrence of /s/ will be in this position – we could even call it the /s/-position. Oral sonorants (semi-vowels and liquids) occurring within the phonotagm and before the nucleus will always be in the 2nd explosive position, and this position can only contain oral sonorant phonemes – we could call it the oral sonorant position (there is the marginal exception of /li-/ in e.g. *lure* which many English speakers report as feeling ‘odd’). Equally predictable are the occupants of the 1st explosive position: these are the obstruents other than /s/.² Where we have such absolute bidirectional predictability there can be no semiotic value and the sequential order of the phonemes in these clusters is therefore not a semiotic feature. Given a phoneme from any of these categories – /s/ , obstruent, oral sonorant – its sequential position in an explosive combination of phonemes is structurally predetermined. Semiotic redundancy does not of course mean communicative irrelevance, as Jakobson was concerned to point out (Jakobson & Waugh, 1987: 39-41).

From a listener’s point of view the onset of the phonological form of a word must play an important rôle in word-recognition (Cutler, 1989) and a high degree of redundancy would certainly make the task easier insofar as it restricts the set of possible realizational forms that the listener could have heard. Instead of being a semiotic feature, the sequential order of the pho-

¹ It may be, however, that Mulder would analyze the final /t/ in *wished* as an instance of what he calls a ‘morpheme’ (Mulder, 1989: 228-33; see also Mulder, 1987: 37) or, later, an ‘accidental phonological appendix’ (Mulder, 1994: 51) in which case it would lie outside the basic distributional unit. I have argued against this analysis elsewhere (Heselwood, 1997: 98-9).

² The nasals /m/ and /n/ can cluster with /s/ and with /i/ , but never at the same time, e.g. *smooth, snooze, muse, news*, but not */smi-/ (except for the one lexical item *smew*) or */sni-/ . In a Mulderian analysis, nasals after /s/ occupy the archiposition deriving from the suspension of contrast between 1st and 2nd explosive.

nemes in these clusters is, then, what Jakobson calls a *configurative* feature (Jakobson & Waugh, 1987: 41-3).

Table 2: Examples of English prenuclear phonemes distributed over the three positions set up by Mulder (1989: 231).

PRE-EXPLOSIVE (/s/-slot)	1ST EXPLOSIVE (obstruent slot)	2ND EXPLOSIVE (oral sonorant slot)	EXAMPLE
s	P	l	split
s	P	i	spume
s	T	r	string
s	K	u	square
s		l	slit
s			sit
s		u	swear
	p	l	ply
	p		pie
s	P		spy
	b	l	blue
	b		buy
	t	u	twin
	t		tin
	d	r	drew
	d		do
	k	i	queue
	g	l	glue
	f	l	flew
	v	i	view
	θ	r	through
		r	rot
		l	lot
		u	what
		i	yacht

3.2. Potential for functional ordering³

Being unable to refute a hypothesis of simultaneity for any prenuclear clusters in English means we must provisionally regard the phonemes of the cluster as a simultaneous bundle occupying just one position in the phonotagm, i.e. the three positions of Table 2 can be collapsed into a single prenuclear position. There is a clear analogy here between the distinctive feature constituents of a phoneme and the constituent phonemes of a phonotheme, and the

³ For the distinction between functional ordering and realizational sequencing, see Mulder & Hervey, 1975.

analogy is entirely a valid one in that in both cases a hypothesis of simultaneity has not been refuted. The difference, however, is that in the case of the distinctive features of a phoneme the hypothesis has not been refuted in *any* phonological context whereas in the case of the phonemes of a phonotheme considered separately there will be at least one context where a hypothesis of simultaneity has been refuted. So, for example, the feature “labial” has a relation of simultaneity (symmetrical relation) with at least one other distinctive feature in *all* its contexts of occurrence, e.g. in the contexts “nasal” (/m/), “voiced, occlusive” (/b/), “unvoiced, fricative” (/f/) etc. and is therefore unorderable under all conditions of occurrence. But if we take any member of any of the clusters in Table 2 we can show it has a non-simultaneous (asymmetrical) relation with at least one other non-nuclear phoneme in at least one phonotactic context. Taking /s/ to illustrate this, it must be the case that its relation with /t/ (an indirect tactive relation via the nucleus) is different in e.g. *kits* and *kissed* because either /s/ or /t/ or both must be in a different phonotactic position. Table 3 shows three of the possible ways of accounting for this syntagmatic difference.

In version A of Table 3 /t/ is in a different position in the two forms; in B /s/ is in a different position; and in C they are both in different positions. Whichever version we adopt, and there are of course other possible ones, the relation between /s/ and /t/ cannot be said to be the same in *kits* and *kissed*. That is to say, at least one of them can determine the nucleus from more than one position. It is therefore demonstrably *not* the case that /s/ is unorderable under all conditions of occurrence. We can summarise by saying that distinctive features are phonological units which do not have the potential for functional ordering and therefore always occur in simultaneous bundles (although we have to allow bundles that comprise a single feature), while phonemes are phonological units that do have this potential, but which, contrary to Vachek’s declaration, may also occur in simultaneous bundles; in the latter case, functional ordering with respect to other members of the bundle is suspended. It is to be noted that this is not the same as the suspension of contrast between positions which gives rise to an archiposition. A simultaneous bundle of phonemes occupies a single primitive position in the phonotagm, not a position contextually derived from two or more primitive positions.

Table 3: Three ways of accounting for the syntagmatic difference between *kits* (/kits/) and *kissed* (/kist/). The indexing of positions here is arbitrary and intended only to accommodate these examples.

	explosive	nucleus	1st implosive	2nd implosive	3rd implosive
A. kits	k	i	t	s	
kissed	k	i		s	t
B. kits	k	i		t	s
kissed	k	i	s	t	
C. kits	k	i	t	s	
kissed	k	i	s	t	

3.3. *Clusters as single units*

There is nothing essentially new about attempting to describe certain clusters as distributionally unitary. Firth, the founder of the British ‘Prosodic Analysis’ school of linguistics, suggested that initial *spr-*, *str-*, etc. might best be seen as single elements (Firth, 1936: 543) but he did not examine the implications of this. One of Firth’s followers took up the suggestion pointing out that in English ‘the constituents of the initial consonant cluster of a word are severely limited in their mutual relations’ (Hill, 1966: 211) and we may interpret his statement that e.g. *spl-* be regarded as a ‘shape’ rather than a ‘sequence’ as an appreciation of the absence of functional ordering. However, his description of this ‘shape’ as a ‘sigmatized lateralized unvoiced bilabial plosive’ denies phonotactic autonomy to the three constituents and leads to the conclusion that they are phonologically quite different from the singletons /s/, /p/ and /l/. This is of course to be expected in a polysystemic approach such as the Firthian school’s, but Hill’s description of *spl-* does seem arbitrary: why not ‘labially occluded lateralized apical fricative’, or ‘hissed labially occluded lateral’, for example?

A similar analysis is offered by Fujimura & Lovins (1978) who present these clusters as simultaneous bundles of features rather than sequences of individual segments. In a later paper Fujimura (1988) describes the cluster *sp-* as an unordered set of the features {stop, spirant, labial}, implying again that a clustered /s/ is a different entity from an unclustered /s/. Furthermore, as with Mulder’s semi-cluster, these analyses necessitate bundling incompatible features together into one set, and therefore compromising paradigmatic oppositions.

There have also been suggestions that some clusters are neither single units nor sequences of units. Akhmanova (1971: 44), for example, theorises that ‘In the “phoneme – cluster” hierarchy [tʃ] and [dʒ] stand midway between *p, t, k, b, d, g*, etc. and *pr, tr, kr, br, dr, gr*, etc.’ Anderson & Ewen (1987: 265) describe clusters such as *st-* as complex segments along with affricates and propose setting up ‘a gradient between segment and sequence on which complex segments occupy an intermediate position’. Similar thinking is behind Devine’s (1971) plea for recognition of the syntagmatic ambiguity of these clusters.

A fundamental incoherence attends these proposals, however, insofar as they challenge us to conceive of an element that at one and the same time does and does not contrast with itself (or neither does nor does not) on the syntagmatic axis. Either there is one distributional prime, or more than one: there can be no halfway house here.

The notion of the *phontheme*, presented below, acknowledges the non-refutation of hypotheses of simultaneity regarding English initial clusters and at the same time avoids the problems identified in these previous attempts to account for their limited combinatorial possibilities. That is to say, the integrity of paradigmatic oppositions and syntagmatic contrasts is preserved when these clusters are modelled by the phontheme.

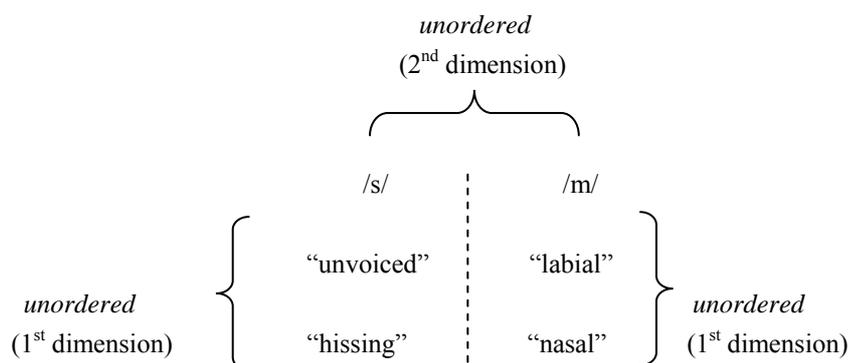
3.4. *The phontheme*

As has been demonstrated, a hypothesis of simultaneity can be refuted for phonemes in post-nuclear positions but not for those occurring in the pre-nuclear part of the phonotagm in what have traditionally been called initial clusters in English. The members of these clusters can therefore be assigned to a single phonotactic position (Heselwood, 2007: 166-7), meaning that we have a simultaneous bundle of phonemes, or, put another way, a simultaneous bundle of

simultaneous bundles (Heselwood, 1987: 80-81). It is useful to think of it as simultaneity in two dimensions, the first being the simultaneity that obtains between the constituent distinctive features of a phoneme, the second being the simultaneity between the constituent phonemes of the cluster. Following a suggestion made originally by Michael Lamb (personal communication), the term *phonotheme* will be used for a simultaneous bundle of two or more phonemes (Dickins, 1998: 142-3; 379); following Mulder's convention for representing semi-clusters, phonothemes will be transcribed with a ligature. In terms of set theory, a phonotheme is an unordered set of unordered sets as diagrammed in (3) for the phonotheme $\sqrt{sm-}$; although unordered, the sets are nevertheless discrete and thus avoid the unwelcome consequence of having incompatible features in the same set.

The unorderedness of the distinctive feature constituents of a phoneme means that it is of no matter whether we state the content of /m/ as the unordered set {"labial, nasal"} or as {"nasal, labial"} – they are equivalent expressions. By the same token it is of no matter whether we state the content of the phonotheme $\sqrt{sm-}$ as the unordered set {/s/, /m/} or {/m/, /s/}. By convention, however, distinctive features are stated in the order 'glottal feature, place-of-articulation feature, manner-of-articulation feature', e.g. /b/ as

(3) Simultaneity in two dimensions in an initial cluster. The unordered sets {"hissing", "unvoiced"} and {"labial", "nasal"} form one dimension, and the unordered set {/s/, /m/} forms the other. Note that the two sets of distinctive features remain discrete sets.



"voiced, labial, occlusive", so by convention we can state the phonemes of a phonotheme in their order of realization. But the fact that {/m/, /s/} is equivalent to {/s/, /m/} in this context leads to a problem in the traditional functionalist postulation of an archiphoneme in e.g. *spill*, *still*, *skill* (Trubetzkoy, 1969: 79-80; Davidsen-Neilsen, 1978: 183; Akamatsu, 1988: 189; Mulder, 1989: 238). These initial clusters are phonothemes, so the /s/ and the occlusive are in a relation of simultaneity and it becomes unclear how to argue that one of them provides the context of neutralization for the other: if {/P/, /s/} is equivalent to {/s/, /P/}, how then can /s/ be the context for the neutralization of the /p/:/b/ opposition any more than the occlusive can be said to be the context for neutralization of the /s/:/z/ opposition? The choice of which is the context for which is arbitrary. There are four logically possible phonothemes of the form {(/s/ or /z/), (/p/ or /b/)} but the principle of simplicity in linguistic description means we need assume that only one actually occurs and we cannot determine which one it is in a non-arbitrary manner. If we wish to avoid arbitrariness we have no option but to say that both these oppositions have been suspended and that the *sp-* phonotheme should be represented as {/S/, /P/}.

The context for neutralizations of this kind is the co-occurrence of certain distinctive features in the same phonotactic position; in this example, co-occurrence of “hissing” and “occlusive”. In other words, where “hissing” and “occlusive” occur together in a relation of simultaneity the “voiced”：“unvoiced” opposition is suspended in the position in question. In fact it seems that wherever “hissing” occurs in two-dimensional simultaneity in English there is suspension of the “voiced”：“unvoiced” opposition. This has a phonemic analogue in English where there is no “voiced”：“unvoiced” opposition among phonemes containing the feature “nasal”, for example.

3.4.1. *Determination*

We need to consider at this point the relations between a phonotheme and the nucleus of a phonotagm. A phonotheme in a peripheral position will necessarily involve subordinate direct tactic relations with the nucleus (Mulder, 1989: 445, Axiom B definition 11a). The important question is whether each member of the phonotheme has its own subordinate tactic relation with the nucleus, or whether there is just the one relation such that the phonotheme as a whole determines the nucleus. The difference can be represented as in (4) using the phonotheme /pr/ as an example.

- (4) a) Separate determination of the nucleus by the members of a phonotheme.
 b) Collective determination of the nucleus by the members of a phonotheme.



Determination of the nucleus of a phonotagm, or any construction, can only happen from a non-nuclear (peripheral) position within the same construction. It would be incoherent to claim otherwise if we accept that a phonotagm is ‘self-contained’ (Mulder, 1989: 444 Axiom B definition 9a; Dickins, 1998: 377-8 Axiom B definition 9a). Occupancy of a peripheral position is a necessary and sufficient condition for a phoneme to determine a nucleus, it is what makes such determination possible. When a single phoneme occupies a peripheral position, e.g. /p/ in *pen*, it is the totality of what is in the position that determines the nuclear /e/. That is to say, the constituent distinctive features of /p/ – “unvoiced, labial, occlusive” – determine it collectively, not separately. We can think of a peripheral position as a single channel connecting to the nucleus through which the contents of that position relate to the nucleus, i.e. establish a direct tactic relation with it. The same conclusion must perforce be reached in the case of the constituent phonemes of a phonotheme: a phonotheme is ‘a single determining entity’ (Heselwood, 1992: 132) as represented in (4b). Wherever there is more than one element in a peripheral position – two or more distinctive features, or two or more simultaneous phonemes – each element of course contributes to the determination of the nucleus – if it did not, it would not be ‘separately relevant to the purport of the whole of which it is a part’ (Mulder, 1989: 436 Axiom A definition 1a; see also Dickins, 1998: 356-7): it would not have distinctive function and so would not in fact *be* a distinctive feature or phoneme. Taking my reformulation of Mulder’s distinction between parallel and diverse determination (Mulder, 1989: 174-5) presented in Heselwood (2008), we can say that, because there is no attested permutation of the members of a pho-

nothème, and no possibility of permutation of distinctive features, there is parallel determination. Where there is permutation, there is diverse determination. This point is returned to later in section 4.

A phonothème is a member of a position class, or paradigm, and meets the definition of a paradigmème (Mulder, 1989: 445 Axiom B definition 10a; Dickins, 1998: 382 Axiom B definition 10a). As a single determining entity, it forms, in relation with its peripheral position, a single syntagmème⁴ (see the definitions of syntagmème in Mulder, 1980: 48 Axiom B definition 10; 1989: 445 Axiom B definition 10; and in Dickins, 1998: 381-2 Axiom B definition 10) as represented in (5).

(5) The members of a phonothème represented as a single syntagmème.

$$\left. \begin{array}{l} p \\ r \end{array} \right\} \mathbf{R} e^i \quad \text{or} \quad (\overline{pr}, e^i)$$

e^i denotes a particular explosive position in a phonotagm

\mathbf{R} denotes the relation between a phonème and the position it occupies

Bracketed expression shows the phonothème and its position as an ordered pair (Mulder, 1980: 48 Axiom B definition 10).

Combining the representations in figures 4 and 5, we can represent the determination of a nucleus by a syntagmème comprising a phonothème and a position as in (6).

(6) Determination of the nucleus by a syntagmème comprising a phonothème and a position.

$$(\overline{pr}, e^i) \longrightarrow \text{nucleus}$$

So far in this section it has been argued that the phonèmes of a phonothème determine the nucleus of the phonotagm in the same way, i.e. in parallel. It remains, however, to say that because phonèmes are by definition (minimum) syntagmatic entities, and all syntagmatic entities in a construction have tactic relations with each other even in the absence of syntagmatic relations (Mulder, 1989: 442 Axiom B definition 7c2; Dickins, 1998: 371 Axiom B definition 7c1), it is theorematic that there are phonotactic relations within a phonothème and that therefore there can be phonotactic relations within a single phonotagm position.

Nearly a century ago, Baudouin de Courtenay (1910/1972: 272) likened the component parts of a phonème to the notes in a musical chord but it is more appropriate to apply the musical chord simile to a phonothème. The distinctive feature components of a phonème are then more like the partials of a single note. That phonothèmes are realized sequentially is analogous to a pianist playing a chord as an arpeggio because he/she cannot reach all the keys at once. Explanation for the realizational sequence is probably to be sought in sonority relations

⁴ This departs from the view in Heselwood (1992: 132) where each phonème in a phonothème is said to be a paradigmème in its own right, and thus to form, with its position, a syntagmème.

and the strong tendency for sonorant sounds to be closer to a vowel and obstruent sounds to be further from it, a point returned to below.

3.4.2. Commutation

There remains the question of the commutation classes within a phonotheme. If the phonemes of a phonotheme are, as this paper is arguing, a simultaneous bundle then we cannot ascertain the commutation classes by positional criteria. For example, we cannot (provisionally) establish the class that /r/ belongs to in e.g. /kɹ/ by noting other phonemes that can follow /k/ in this context precisely because we are saying that /r/ does NOT follow /k/ in any functional sense - it is from a functional point of view simultaneous with it. We can, however, approach it a different way, the same way in fact that we approach the commutation of distinctive features in phonemes.

The distinctive features of a phoneme are by definition simultaneous yet we have no trouble identifying the commutants of a given feature. Only those features that cannot co-occur commute with each other. So for example English /b/ comprises the features “voiced, labial, occlusive”. “Unvoiced” commutes with “voiced” but they cannot co-occur; “voiced” and “labial” co-occur but cannot commute and there are very clear phonetically-grounded reasons why these and other restrictions on co-occurrence and commutation are found. Applying the same criteria to the phonemes of a phonotheme, we can state that the commutants of /r/ in /kɹ/ are those phonemes that cannot co-occur with it in phonothemes. As there are no attested examples of /r/ occurring with /l, i, u/, or of any of these occurring with any of the others, we can set these up as commutants.⁵ In realizations of phonothemes these elements always come last, an observation best accounted for by what Greenberg (1970: 131) has called ‘the law of the voiced syllable center’ and what others have called ‘the sonority principle’ (Laver, 1994: 503-5) or the ‘sonority sequencing generalization’ (Hall, 2006: 6), not by language-specific phonotactic distribution patterns.

Similarly, occlusives do not co-occur in English initial clusters, neither do nasals. Although there is not sufficient space here to examine all the co-occurrence restrictions involved, and thereby to exhaustively identify members of phonothematic commutation classes, it is worth pointing out that /s/ (or its archiphoneme /S/) can occur with almost every phoneme (or, where relevant, its archiphoneme) that clusters initially in English. Of course /s/ does not cluster with /ʃ/, but arguably the latter does not cluster with anything initially in English: phonetic [ʃɹ] in e.g. *shriek*, *shrew*, *shrank*, etc. is best described as the realization of /sɹ/ with anticipatory coarticulation, cf. the realization of /t, d/ in *tree*, *dream* etc.

4. Ordered sequences

Simultaneity cannot be refuted for what have traditionally been called initial clusters in English, and therefore only one phonotactic position need be set up for them. But simultaneity can be refuted for consonants separated in realization by schwa, and these sequences do require

⁵ The /li-/ in *lure* has already been noted as a rare exception. Its marginal status, and the fact that it is felt by many native speakers to be unusual, can be attributed to the co-occurrence of /l/ and /i/ in a phonotheme violating a general restriction. For the history and accent distribution of clusters with /i/ see Wells, 1983: 206-8, 247-8, 330-31.

another phonotactic position. If we compare, for example, *support* and *terrain* with *sport* and *train* respectively, we find the pretonic consonants are reversible around the schwa in the former pair – e.g. *perceive*⁶, *retain*. The phonotactic structure can be accounted for by setting up two explosive positions. If we also consider *light* and *alight*, we can account for them in a similar fashion, i.e. by assigning /l/ to the first explosive position in *light* and to the second in *alight*, analogous to the different phonotactics of /l/ in *plight* and *polite* (see Heselwood, 2007: 169). Table 4 contains examples to compare ordered clusters with simultaneous clusters (phonemes). The occurrence of pretonic schwa in English word-forms is in fact entirely predictable by reference to whether the second explosive position is occupied or not (Heselwood, 2007: 171).

Table 4: Simultaneous and ordered explosive clusters.

	1st explosive	2nd explosive
sport	\widehat{sp}	
support	s	p
perceive	p	s
train	\widehat{tr}	
attrition		\widehat{tr}
terrain	t	r
retain	r	t
plight	\widehat{pl}	
apply		\widehat{pl}
polite	p	l
lapel	l	p
light	l	
alight		l

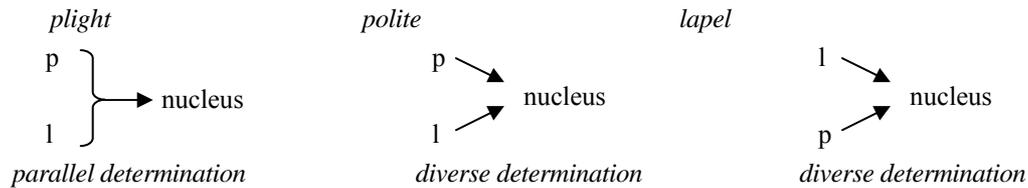
The phonological difference between *support* and *sport*, between *terrain* and *train*, and also *polite* and *plight*, can be represented as a difference in the kind of indirect tactic relation obtaining between the first two consonants. In the first of each pair this relation is asymmetrical (non-simultaneous), in the second it is symmetrical (simultaneous). That is to say, *sport* and *train* each begin with a phonotheme, / \widehat{SP} -/ and / \widehat{tr} -/, while *support* and *terrain* begin with the ordered clusters /sp-/ and /tr-/. Forms such as *the port*, *the rain*, *the light* also contain a bound syllable with schwa⁷ and thus are structurally parallel to *support*, *terrain*, *polite* phonologically speaking.

Returning to the question of parallel and diverse determination raised in section 3.4.1 above, the distinction can be applied to, respectively, simultaneous and ordered clusters as represented in (7):

⁶ I am assuming non-rhotic varieties of English, such as RP, or Southern Standard British English.

⁷ There is a strong case for regarding unstressed *the* etc. as clitics although this has not traditionally been the view of grammarians (see e.g. Huddleston (1976: 45-7)), and the case is even stronger if the schwa is not the realization of a phoneme.

(7) Parallel and diverse determination by simultaneous and ordered clusters.



In *polite* and *lapel*, the /p/ and /l/ determine the nucleus diversely because they meet the two required conditions for diverse determination – 1) they permute, and 2) the different permutations correlate with different distinctive functions (Heselwood, 2008). By contrast, in *plight* they determine the nucleus in parallel because the conditions for diverse determination are not met.

To accommodate the analyses of *support*, *terrain*, *polite* etc. the English phonotagm needs to be set up with at least two explosive positions, and there have to be adequate criteria for assigning phonemes and phonothemes to them. Exploration of these criteria and their implications for the syntagmatic phonological description of English is beyond the scope of this paper, but the issues are addressed to some extent in Heselwood (2007), where sequences that arise from Latinate prefixes such as *ab-*, *ob-*, *sub-*, *ad-*, *acc-*, *succ-* etc. are considered, as are examples that seem to refute the hypothesis of simultaneity of e.g. *sk* in *askance* in light of the *ks* in *accede*, for which a third explosive position is postulated.

5. Conclusion

A hypothesis of simultaneity has not been refuted for any of the consonant clusters traditionally described as initial clusters in English and therefore they are all examples of phonothemes; that is, the constituent phonemes can be described as all occupying the same position in syntagmatic phonological structure. It follows that only one explosive phonotagm position is required to accommodate them; within that position there are tactic relations but not syntagmatic relations. The phonemes in a phonotheme cannot be shown to determine the nucleus of the phonotagm in different ways any more than can the constituent features of a phoneme and therefore there is parallel determination. Commutation classes in phonothemes are set up to contain those phonemes that do not co-occur in a phonotheme. A relationship of simultaneity in a phonotheme means that, in deciding whether or not an opposition is suspended within a phonotheme, we cannot separately identify a position of neutralization and a context of neutralization.

A second explosive position is required to account for the difference between pairs such as *sport-support*, *train-terrain*, *plight-polite* and also *light-alight*, and a third seems to be called for to handle a small number of forms with Latinate prefixes. The question of how to deal in an axiomatic-functionalist framework with catenations of schwa syllables in e.g. *and the support*, *to the train*, *for a light* (where the gradable items occur in their weak forms) from a phonotactic point of view has yet to be properly considered.

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LINGUISTIC UNITS AND *-EN* VERBS IN ENGLISH^[*]

Paul Rastall

Abstract. The paper begins with a consideration of theoretical and methodological issues relating to the identification of linguistic units and, in particular, to the morphology/syntax distinction using a functionalist approach. It further considers the class of *-en* verbs in English from the points of view of their history, grammar and semantics. There is a consideration of their register differences from verbs of similar meaning. It reviews their treatment in earlier grammars, considers some deficiencies of those treatments and suggests some alternative analyses. The paper suggests that the verbs are unusual for English because of their morphological structure and present some linguistically interesting properties, such as the sporadic nature of word formation in English and the contrast with synthetic or syntactic alternative expressions.

Theoretical Preamble

In order to make descriptive statements about any language, we must be clear about the units and relations we are operating with. The definition of units (*phoneme, sign, morpheme, syntactic complex, etc.*) and relations (*is dependent on, is in construction with, etc.*) is a theoretical matter. We cannot define linguistic units from experience of particular languages without circularity, because the identification of particular linguistic units (phonemes in Chinese or syntactic constructions in English) presupposes a method of classification and the definition of theoretical terms such as those above. In morphology, it is tempting to define units purely in terms of the linguistic form of expressions. Such an approach means, however, that homonyms cannot be distinguished, as Mulder and Hervey (1972, 26-7) point out. Thus, if we look only at the question of form, there is a single linguistic unit, *put ... out* and a single unit *relay* in English. However, that will be the same unit in

she put the cat out (placed it outside the house)

she put the fire out (extinguished it)

They are re-laying the carpet (laying it again)

They are relaying the information (transmitting it).

(The hyphen is irrelevant except in writing.)

If we wish to recognise two units with the form *put out* and two with the form *relay*, we must use a **form-meaning** criterion, and we will have units of a different sort, namely signs of the Saussurean type. If we do the latter, then it will be clear that *put out*¹ and *re-lay*¹ are grammatically complex (consisting of two separately meaningful units *put* and *out*

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and *re-* and *lay*, respectively) and *put out*² and *relay*² grammatically simple because the meaning of the whole is, in each case, not a function of the meanings of the assumed parts. The examples show that homonyms may be of different grammatical types (see also Harris, 1973, chapter 3) and that the grammatical relations we recognise in a structure depend on the units we identify in analysis, i.e. in the first case there is a grammatical relation between *put* and *out* and between *re-* and *lay*, and in the second there is none because *put out*² and *relay*² are “pseudo-composites”; they are not genuinely constructions at all, but only have the appearance of being complexes because of their form and, perhaps, a comparison with genuine homonymous complexes. It is commonly the case with phrasal verbs in English that there may be two or more homonymous units, each with a different grammatical status, e.g. *take out*, *take in*, *set down*, *put back*, etc. The same is true of the much less extensively studied *-en* verbs below.

Furthermore, we must ask whether the complex units we recognise are all of the same type. Traditionally, morphological complexes are distinguished from syntactic ones, but the demarcation is normally very unclear. I will take the following approach (see Rastall, 1998, 139 ff.). A sign is morphologically complex, i.e. not functionally ordered, if and only if

- a. it functions as a single unit
- b. it consists of two or more simple signs
- c. there is no possibility of commuting either component sign with a complex sign
- d. there is no possibility of permutation of the component signs and additionally
- e. neither sign separately contracts syntagmatic relations with other signs in a syntagm. (E.g. the morphological complex *dogs* in *I like dogs* is related as a whole to *likes* – no component in the complex *dogs* can be separately bracketed with *dog* or *-s*.)

Otherwise, signs are syntactically ordered. This approach is in line with a long tradition in functionalist linguistics and is explained in Martinet (1975 and 1989) and especially in Mulder and Hervey, 1972, 20-25; 1980, 122-49). “Units” or “linguistic entities”, as indicated above, may be of varying degrees of complexity and may occur at all levels of analysis. They can be defined as “elements or analytical properties of elements” (Mulder, 1980, p. 42). This means that “units” are those constructs which we set up through the processes of analysis to account for aspects of the complex process of speech communication. In functionalism, it is insisted that all units must have *separate* communicational relevance. This corresponds to the communication theorist’s principle that “information implies choice”. Without clarity over the position of a term such as “morphological complex” or “grammatically simple unit” and the corresponding methodology, it is impossible to know what an analysis is saying and what might be a refutation.

Using the principle of relevance, we can distinguish cases in which a unit has two or more separately relevant component units from those cases where this is only apparently so. *Put out*¹ is a syntactic complex using these criteria (because, among other things, *out* can be commuted with complex adverbials such as *in the garden*, *further away*, etc.)

She put the cat in the garden/further away

and *re-lay*¹ is a morphological complex (there is no possibility of commutation with complexes or permutation). It is “unordered”. (That is, there is no possibility of an ordering relation between the component units – unlike in syntax. One should not confuse “order” in

this sense with “sequence”: see Mulder and Hervey, 1980, p. 122 *ff.*) *Put out*¹ and *relay*¹ function as single units because, though clearly internally complex, they commute with simple verbs,

I feed/put out the cat at night.

They clean/re-lay the carpet every year.

However, *put out*² and *relay*² are not complex at all.

-EN Verbs

The English verbs in *-en* form an interesting class because they may be morphologically simple (in the sense adopted here), morphologically complex (meeting the criteria above), or there may be homonymy of morphologically simple and complex signs. Furthermore, there are relations of synonymy of verbs in *-en* with regular syntactic structures. Verbs in *-en* also show typical features of morphological combinations, such as the sporadic nature of their composition. They also show some interesting regularities of register.

In English, the formation of morphological complexes by prefixation or suffixation (word formation by derivation in traditional terms), while clearly not absent, does not constitute a particularly rich system compared with other languages such as Russian or Latin. The formation of morphological complexes can be seen as an intermediate case between a synthesis of meaning in a grammatically unanalysable sign and the analytic expression of meaning by *syntactically* analysable signs (see, for example, Potter, 1950, 10 *ff.*). In English, it can even be noted that some derivational affixes may cross the borderline into syntax (e.g. *up-and-down-ness*, *pea-soup-y*, *etc.* – see Rastall, 1993, 143 *ff.* and 1998, 35 *ff.*). English has, of course, inherited a significant number of signs which contain fossilised forms derived from historical prefixes (perhaps in other languages or earlier forms of English). Such ancient affixes as *be-*, *for-*, *a-*, *re-*, in *believe*, *behind*, *forget*, *forfend*, *again*, *away*, *return*, *reduce*, *etc.* (extensively listed by Nesfield, 1898, p. 378 *ff.* for example) have not been productive for a very long time and cannot be considered as separately meaningful units in the modern language. Such signs as those mentioned are, therefore, synchronically simple. They are “synthetic” in the sense given above. One might compare the syntactically analysable *go back* and *make less* with the grammatically unanalysable (in synchronic terms) *return* and *reduce*^{*1}. There are, of course, some productive affixes. *-ise/-ize* is one in *computerise*, *centralise*, *hybridise*, *etc.* As Quirk *et al.* (1985, 1557) say,

“Only a few verb-forming suffixes occur with any great frequency in English, and only *-ize* is highly productive.”^{*2}

^{*1} “Complexity” here involves the combination of at least two formally different and separately meaningful form-meaning units in a construction. Morphology in this sense must be distinguished from synchronic “allomorphy” (variation in form) and the synchronic vestiges of earlier morphological processes found in “fossils” or “pseudo-composites”, i.e. simple units, whose meaning is **not** a function of the *apparent* parts.

^{*2} This is not the place to discuss compounds, which are outside the scope of this paper, but I have taken the view elsewhere that compounds in English are either syntactic or pseudo-composites and therefore not “morphological” in the sense defined above (see Hervey and Mulder, 1980 and Rastall, 1994, 1998).

Verbs formed with the suffix *-en*, however, are especially interesting in a number of respects. It is unfortunate that modern grammars and reference works have little to say about them.

Verbs in *-en* (once known as verbs with a nasal ending – the reduced vowel represented by [ə] historically simply maintains the syllable) include, for example, *harden*, *soften*, *freshen*, *smarten*, *dampen*, *lighten*, *lengthen*, *hasten*, *gladden*, etc. They are of interest for a number of reasons. Firstly, although the *-en* suffix is clearly not productive and has not been so for a long time, it is still generally a separately meaningful sign in most cases (but not in *listen*, *happen*, *open*, for example). As Sweet (1891, 467) and Jespersen (1965, 350-58) point out, most of the modern verbs in *-en* were first recorded in the Middle English or Early Modern English periods and only a few new formations (which are mainly either non-standard or have not survived) are recorded from the 18th and 19th Centuries, e.g. *loaden*. Secondly, very few verbs in *-en* have fossilised in such a way as to be only apparently complex (additional examples are *glisten*, *listen*, *chasten* (in its usual sense of “punish”)). Thirdly, the existing signs show only sporadic formation with the suffix. That was also noted by Bradley (1904, 130-31). *-En* suffixation is a clear case of the unpredictable and rather inefficient nature of morphological complexity in English. All language systems contain numerous anomalies of detail (see Rastall, 2006) even though there are overall systemic regularities. Fourthly, *-en* verbs show some interesting grammatical and semantic properties by comparison with the purely synthetic or syntactically analytic means of expressing similar meanings. Finally, as Jespersen showed, the *-en* formation seems to have appeared *ex nihilo* as a meaningless alternative and to have become meaningful later through differentiation of function.

History

The view expressed by Sweet (1891, 467) that verbs in *-en* derive from a Scandinavian formative *-na*, and that “*-na* is a Scandinavian suffix forming weak transitive verbs, mostly inchoative, from verb roots and adjectives” is open to objections. As Sweet himself points out, most of the *-en* verbs were formed in the Middle English period, long after the effects of Scandinavian influence. Furthermore, *-en* verbs have always been also transitive and causative, as well as intransitive. It is more likely that the meaningless *-en* suffix inherited into Middle English in various combinations acquired significative functions and became differentiated as the suffix we recognise now. It was attached to adjectives and nouns to create new meaningful complexes *ex nihilo*, as Jespersen (below) pointed out. It should be noted, however, that the forms in *-en* from Old English and Scandinavian were available as material for new formations.

As noted by Jespersen (1933, 76), verbs can be formed from adjectives with the suffix *-en*. That is quite a large class. We can list, for example, – *blacken*, *whiten*, *redde*n, *darken*, *lighten*, *brighten*, *deafen*, *tighten*, *loosen*, *sweeten*, *slacken*, *soften*, *harden*, *weaken*, *broaden*, *roughen*, *shorten*, *widen*, *quicken*, *sharpen*, *flatten*, *toughen*, *stiffen*, *smarten*, *thicken*, *quicken*, *quieten*, *straighten*, *dampen*, *moisten*, *ripen*, *sadden*, *freshen*, *flatten*, *fatten*, *gladden*, *sicken*, *lighten*. It will be noted that all of the adjectives from which the verbs

are formed are of one syllable (noted by Kruisinga, 1935, 176). We do not find, **happyen*, **bitteren* (two syllable adjectives).

Nevertheless, many mono-syllabic adjectives still do not take the *-en* suffix to form verbs. We do not find **colden*, **youngen*, **olden*, **dryen*, **wetten*, **warmen*, **coolen*, **gooden* (? **gedan*), **palen*. Furthermore, although we find, *whiten*, *blacken* and *redde*, we do not find **brownen* and **greenen*. Similarly, there is *deafen*, but not **blinden* and *roughen* but not **smoothen*. The system seems never to have had more than a sporadic efficiency. The gaps are partially explained by Jespersen (1965, 350-58). He points out that, firstly, adjectives ending in nasal consonants, vowels or diphthongs or (historical) /r/ do not form combinations with *-en* (a possible exception is the rare 19th Cent. form *dimmen*, “to make dim”). Secondly, he shows that the verbs in *-en* were originally alternative forms (used especially with further endings) of monosyllabic, causative verbs formed from adjectives. Thus, *whiten* was an alternative to (to) *white*, *shorten* was an alternative to (to) *short*, *open* to *ope* etc. In Gray’s line “Far from the madding crowd’s ignoble strife”, we find the old causative (to) *mad* and not the modern *madden*. Shakespeare uses both *ope* and *open*. Where no simple causative verb existed, no alternative was formed. (The absence of **blinden* cannot be explained that way because of the existence of the causative short verb, (to) *blind*.) Generally, the *-en* form has survived and has subsequently become interpreted as a causative formative, although it was originally meaningless and seems to have spread from other meaningless alternative *-en* forms in nouns, adverbs, adjectives and participles (hence the idea that the meaningful, causative construction is *ex nihilo* even if existing forms were used). The function of *-en* in such cases may have been to give greater prominence to otherwise monosyllabic signs. *-En* verbs are thus a way of analysing an originally synthetically expressed meaning.

Historically, the now homophonous *-en* was similarly an alternative in *maid/maiden*, *oft/often*, etc. and readers will remember that Tom (the Piper’s son) *was beat* after the pig *was eat* (not *beaten*, *eaten*) in the nursery rhyme. Jane Austen sometimes used the past participles *broke*, *forgot*, *spoke* (in *Pride and Prejudice*, e.g. 1969, 66, 173, 201 etc.) rather than the “second” participle, *broken*, *forgotten*, *spoken*, which are now standard, although *broke*, *forgot* and *spoke* are still found as non-standard participles in (northern) British English dialects. (*Broke* has also become differentiated to mean “without any money, impecunious” as a basilectal expression.) The forms with and without *-en* appear to have been in free variance, although dialectal and sociolectal differentiation was setting in by Jane Austen’s time. The forms without *-en* are generally correlated with less formal situations and less respected characters in her novels (see Phillipps, 1970, and Page, 1972). While the *-en* participle must be distinguished from the *-en* verb-forming suffix, the process of differentiation of function is similar in both cases. The *-en* participle *is not separately relevant*, so participles containing it are only apparently complex (as explained above). The same is true of other sporadic occurrences of the form *-en* in *often*, *maiden*, *golden*, etc. Furthermore, the participial *-en* shares only the form of the *-en* verb forming suffix and not its meaning. It, therefore, does not have the same identity. The discussions in Sweet and Jespersen (quoted above) are thus rather misleading on this point (synchronically speaking), although it is likely that all of the *-en* forms are derived from a single historical source.

There are also two verbs formed from the comparative adjective – *lessen*, *worsen*. As Jespersen says, those are the only comparatives not ending in an original /r/. There are also

verbs formed from nouns where no simple verb existed – *strengthen, lengthen, heighten, hasten, hearten*, i.e. there were no verbs (*to*) *strong, long, high, haste, heart* (in the latter two cases, the signs which might have served as a basis do not have suitable corresponding adjectival forms). Those points are noted by Jespersen in the work quoted and by Kruisinga (1935, 176), but not by Quirk *et al.* who say (1985, 1557) only that, “-EN combines with adjectives as in *deafen, sadden, tauten, quicken, ripen, widen, harden*”. Those points are also missed by Bauer (1983, 223) who says only that, “a third suffix deriving verbs is *-en* as in *shorten, whiten, widen*. This suffix is only marginally productive, if at all”.

A few verbs have the prefix *em/en-* alone (*empower, ensure, enfeeble, endear*) or discontinuously with the *-en* suffix in the formation – *embolden, enliven, enlighten*, i.e. *em/en-...-en + adjective*. According to Jespersen, the prefix *em-/en-* is the same form as the suffix *-en* (although there may have been some influence from the Romance *en-* prefix in *encourage, engage, etc.* and those forms should be distinguished from the *en-* in verbs such as *endeavour, endanger* from (*mettre*) *en devoir, en danger*). Whatever their origin, in the above cases, then one can propose allomorphic variants, *en-*, *-en* and *en- ...-en* of the verb-forming *-en* we are discussing.

A few verbs have become fossils (“pseudo-composites”), i.e. originally complex signs which are now simple but which retain evidence of their one-time complexity – *chasten, hasten*, (not really “make chaste” or “make haste” now but “punish” and “hurry”), *liken*, (i.e. “compare”, not “make like”), *deaden* (i.e. “make dull/numb”/“anaesthetise”) and, perhaps, *gladden*. Sweet (1891, 467) pointed out that *awaken* and *fasten* are reinterpretations

“not formed direct from *wake* and *fast*, but the O.E. weak verbs *a:waecian, faestnian* are formed from the nouns *waecen* “watching”, *faesten* “fastness”, “fort”, which are of course derivatives of *waecan* “wake” and *faest* “fast”, “firm””,

a view with which Jespersen concurs.

It is noticeable that some of the verbs formed from adjectives form pairs of antonyms – *soften/harden (stiffen), tighten/loosen (slacken), weaken/toughen, darken/lighten (brighten), weaken/strengthen, shorten, lengthen*. But we do not find – *sweeten/*souren, lessen/*moren, thicken (fatten)/*thinnen, roughen/*smoothen, etc.* This is just another case of the sporadic nature of the formation in *-en*. Some, but not all, of the absences can be explained by Jespersen’s rules, as he himself points out.

Some *-en* verbs have had only a marginal existence or have disappeared altogether, e.g. *ridden, shapen, milden, brisken, dullen*, mentioned by Jespersen and found in the *OED*. One occasionally hears *neaten* nowadays in the sense of “to make neat or tidy”. However, most *-en* verbs contain morphological complexity in the above sense of complex signs whose meaning is a function of the meanings of the component signs.

Syntax

Nearly all verbs in *-en* can be used as main verbs in two syntactic contexts. Jespersen (1933, 358) mentions that they can be used transitively or intransitively and Quirk *et al.* say,

“as well as being causative “to make...”, many of these [verbs] can also be used intransitively, “to become...”: *the news saddened him – His face saddened.*”

To be more precise these verbs can appear as main verbs with an agentive (usually, but not always, animate or instrumental) subject and an obligatory direct object –

They tightened the bolts
He loosened his tie
She quickened her pace
They fattened their animals
We straightened our ties
The sight sickened her
The water softened the mixture, etc.

They can also be verbs in a “middle voice” with a non-agentive (generally, but not always inanimate) subject and no direct object. This intransitive usage is called “inchoative” by Sweet and Jespersen.

The tomatoes ripened
The wind freshened
The pace quickened
She reddened
He was sickening (for something)
He straightened
He frightens (easily)
They quietened (down), etc.

There are some exceptions, especially with fossilised *-en* verbs. One should note that *hasten* occurs without a direct object (intransitively) in *He hastened to the bank, She hastened to get ready*, but not as a “middle voice” verb – **The pace hastened* – and *hearten* also cannot be used in that way **The crowd heartened*.

Meaning

The *-en* verbs show the usual latitude of indeterminacy of meaning shown by all signs (see Rastall, 1997 and 2000, 237 *ff.*). Where verbs derived from adjectives occur with direct objects, they have the following patterns of meaning, where *x* is the direct object and *y* is the adjective –

– **render *x y***

e.g.
They roughened the surface (rendered the surface rough)
He flattened the can (rendered the can flat)
The story saddened me (rendered me sad)

– **render *x y in a greater degree***

e.g.
She darkened the picture (rendered the picture darker)
They weakened the currency (rendered the currency weaker)
They widened the road (rendered the road wider)

This also applies, of course, to verbs from comparatives –

They lessened their demands (rendered their demands less)

The boss worsened the conditions of work (rendered the conditions worse)

– **render x y to the necessary or maximum degree**

The sun ripened the tomatoes (rendered the tomatoes to the correct degree of ripeness)

He sweetened his tea (rendered his tea sufficiently sweet)

The explosion deafened him (rendered him completely deaf)

He tightened the bolt (rendered it as tight as necessary)

A similar latitude of indeterminacy applies to verbs derived from nouns, but, of course, it is the adjective related to the noun which we place in the position marked by y –

He strengthened his position (rendered the position stronger or as strong as necessary)

They lengthened the runway (rendered it longer or as long as necessary).

Where a non-agentive subject is used with a “middle voice” verb and no direct object occurs (intransitive cases), the range of meanings is as follows (for verbs derived from adjectives and nouns)

– **to become y to a higher degree**

The wind freshened (became fresher)

Her eyes widened (became wider)

His pace quickened (became quicker)

(for verbs derived from comparatives)

Conditions worsened (became worse)

– **to become y to the necessary or maximum degree**

The tomatoes ripened (became sufficiently ripe)

His resolve strengthened (became sufficiently strong)

The mixture thickened (became as thick as possible)

The sky blackened (became completely black)

Some verbs in *-en* can form combinations with prefixes (*dishearten*, *unfasten*, *re-moisten*) and with adverbs to form phrasal verbs, often with metaphorical meanings or sometimes pleonastically, *sharpen up*, *dampen down*, *widen out*, *roughen up*, *smarten up*, although it is generally verbs without *-en* which show a stronger tendency to combine with adverbials to form phrasal verbs, *rough out/up*, *black out/up*, *slack off/up*, etc. Certain *-en* verbs, of course, have metaphorical meanings of their own –

They blackened his character

She flattened his argument

He hardened his heart, etc.

The verb, *sicken*, has a latitude of meaning which includes both the predictable meaning – **render x sick** and **become sick** – and the fixed transferred meaning “nauseate”, “revolt”. It is (probably) gradually losing its morphological complexity and becoming predominantly a simple sign (fossil) with the latter meaning. It is an example of the normal process of fossilisation through the development of metaphorical meaning, but is interesting because it is at a stage where we might speak of homonymy between the morphologically complex and the grammatically simple verbs, *sicken*¹ and *sicken*².

The morphologically simple verbs from adjectives which were once synonyms of the verbs in *-en* have tended to disappear or to be differentiated in meaning from the verbs in *-en*. The old causative verbs, *damp*, *deep*, *sharp*, *bright*, for example, have disappeared and *(to) short*, *black*, *slack*, etc. have become differentiated from *shorten*, *blacken* and *slacken*. The simple verbs have sometimes developed specialised, non-transparent meanings (*to short*, *slack*), although in the case of *black/blacken*, it is *blacken* which has the metaphorical meaning.

Final Remarks

It should be quite clear that for every morphologically complex verb in English there is a syntactically complex synonymous expression (*sadden/make sad*, *worsen/make worse*, *strengthen/make stronger*, etc.). Occasionally, there is also a simple sign which synthetically expresses the meaning – *lessen / make less / reduce*, *weaken / make weaker / debilitate*, *lengthen / make longer / elongate*, *frighten / make frightened / terrify/scare*). The grammatically simple verbs are often fossilised signs borrowed from other (especially Romance) languages and are generally, and for that reason, recognised as of a higher, more literary, style. The syntactically analytic expressions belong correspondingly to a more familiar, spoken style. The *-en-* verbs seem to be stylistically intermediate and, occasionally, somewhat technical because of their common contexts of occurrence (e.g. *tighten/loosen*, *lengthen*, *strengthen*, etc.)

In view of the *general* tendency of English to dispense with morphological complexity (while noting the productivity of a limited number of prefixes and suffixes) and to express complex meanings by means of syntactically analysable signs or by incorporating simple signs with a synthetic meaning into a syntactically complex arrangement, the development and preservation of the *-en* verbs is particularly noteworthy. It may be due in part to the integration of the verbs with relatively common adjectives and nouns, and a correspondingly relatively high frequency (particularly in given contexts) and in part to the transparency of the construction. It is interesting that, in this case, English has retained three different grammatical means for similar ends including morphological complexity, which is rather contrary to the general direction of development of the language. One might speculate that the clearly defined semantic content of the genuine sign *-en* has contributed to the survival of the morphological complexes.

Finally, it is disappointing that information on this topic is so scanty in the most recent standard publications, whereas works of an earlier generation (which are probably less frequently consulted nowadays) are significantly more informative and more accurate.

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A METHODOLOGICAL ARGUMENT AGAINST MULDER'S PARALLEL VS DIVERSE DETERMINATION DISTINCTION^[*]

Barry Heselwood

Abstract. It is argued that the distinction between parallel and diverse determination as proposed by Jan Mulder cannot be applied in linguistic description because it relies on knowing the full composition of position classes. Although we may be intuitively satisfied that two position classes do or do not have the same composition, there are no scientifically valid methods that can confirm it. According to Mulder, however, it is necessary to attempt to refute a hypothesis that they do not have the same composition, the attempt being successful if we can show that in fact the two classes are equivalent. What Mulder fails to acknowledge is that it is never possible to show this. If one was to hypothesise the existence of an additional member for one of the classes but not the other, one would run up against the impossibility of refuting an existence postulate. Consequently, it is never possible to refute parallel determination, Mulder's precondition for establishing diverse determination.

In his review of Jan W. F. Mulder's *Foundations of axiomatic linguistics*¹ Paul Rastall² acknowledges Mulder's inestimable contribution to functional linguistics and goes on to discuss some examples of his syntactic analysis. He points out the lack of criteria for deciding between certain alternative analyses, and shows that Mulder's notion of direct tactic relation (i. e. relation between a peripheral and a nuclear element), "qui est à la base de l'analyse syntaxique de Mulder" (p. 145), is neither defined nor made methodologically explicit. A further weakness in Mulder's treatment of tactic relations, and one which has far-reaching methodological implications, and is not mentioned by Rastall, is Mulder's division of direct tactic relations into two types: *i*) parallel (conjunctive) determination, and *ii*) diverse (disjunctive) determination.

The difference concerns the composition of the position classes associated with the peripheral positions. In a 1977 paper³ (published in 1980) Mulder says "Within subordination I distinguish between *diverse determination*, i. e. the case in which two or more peripheral

[*] A slightly revised version of Heselwood, Barry. 1995. "Against Mulder's parallel vs diverse determination distinction". *La Linguistique* 31:1.17-26. A response to this paper written by Paul Rastall was published in *La Linguistique* 33:1.127-9 (1997), reprinted in *Linguistica ONLINE*, <<http://www.phil.muni.cz/linguistica/art/rastall/ras-002.pdf>> (2008). A further response by Heselwood is also published in *Linguistica ONLINE*, <<http://www.phil.muni.cz/linguistica/art/heselwood/hes-003.pdf>> (2008). [Editor's note]

¹ Jan W. F. Mulder, *Foundations of axiomatic linguistics*, Berlin, Mouton de Gruyter, 1989.

² Paul Rastall, "La linguistique fonctionnelle axiomatique", *La Linguistique* 29/1, 1993, p. 135-148.

³ See Jan W. F. Mulder, "On the representation of syntactic structures". Paper presented to the Quatrième Colloque International de Linguistique Fonctionnelle, Oviedo, Spain, 1977; printed in *The strategy of linguistics* by Jan W. F. Mulder and Sándor G. J. Hervey, Edinburgh, 1980, p. 152-160.

constituents can be demonstrated to stand in different positions to the nucleus..., and *parallel determination*, i. e. where this is not the case" (p. 154). And in *Foundations* Mulder says "in cases of parallel determination the position classes of the peripheral constituents are different (though they may have some members in common), whereas in diverse determination they are basically the same" (p. 174-175). The motivation behind the distinction appears to be that if the same set of entities can stand in two or more positions, say *position a* and *position b*, then when a member of the set is in *position a* it must be determining the nucleus of its construction in a different way from how it determines it when it is in *position b* otherwise the two constructions would be variants with the same distinctive function. If, on the other hand, the same set of entities *cannot* stand in both positions then the question of how members of the two sets differentially determine the nucleus does not arise.

To exemplify the two kinds of determination Mulder gives the two syntagms *John likes Mary* and *the blue vase* (*Foundations*, p. 448). In the former any item that commutes with *John* will also commute with *Mary*, and *John* and *Mary* will permute to give a sentence with a different meaning, *Mary likes John*. It is clear that *John* has a different relationship to *like* in the two positions: we can, for the sake of convenience, call them a subject-relation and an object-relation. And what is true for *John* is true for all its commutants and thus for the class of commutants as a whole. Clearly, therefore, subject-relation and object-relation are diverse kinds of relations.

By contrast, in *the blue vase* the two peripheral elements (*the* and *blue*) cannot permute and neither can their commutants. We thus have two different position classes so that *the* and *blue*, and their respective commutants, always determine *vase*, and its commutants, in the same way; that is to say, they can never determine it from the perspective of a different position class. Mulder calls this state of affairs parallel determination. According to Mulder, in phonotactics there is no parallel determination, only diverse determination (*ibid.*, p. 293-294).

The above is, I believe, a faithful interpretation of Mulder's thinking and is certainly consistent with passages, such as the following, where he sets out his position on this:

Typical for diverse determination is that the peripheral items involved are equivalent as to the positions in which they can occur (*Strategy*, p. 155).

Any item that can stand in 'subject' position can also stand in 'object' position, and vice versa, at least in principle (*Foundations*, p. 279).

There is diverse determination if and only if at least two of the classes are the same, and parallel determination only if all classes are different (*ibid.*, p. 295).

In the case of 'diverse' determination, the relation between one of the peripheral entities and the nucleus, and that of at least one other of the peripheral entities and the nucleus, is different. That is, the hypothesis that the relations are not different is refuted. But it can only be refuted if the classes of items that can stand in the two, or more, peripheral positions in question are the same (*ibid.*, p. 279).

Before discussing the methodological implications of the distinction between parallel and diverse determination, we should examine some of the claims Mulder makes in treating of the distinction.

First of all, his claim that "Any item that can stand in 'subject' position can also stand in 'object' position, and vice versa, at least in principle" (*Foundation*, p. 279). Even conced-

ing that he is talking only about English here, this is probably not the case when we consider reflexive constructions, e. g. *he hurt himself*. Mulder does not argue the point and in fact gives the Latin example *ego amo filiam* to show that certain morphologically complex signs may occur in 'object' relation to the verb but not 'subject' relation. If the Latin example is a case of parallel determination then surely so is the English reflexive.

Secondly, his claim that there is no parallel determination in phonotactics does not accord with his assertion that "archi-positions can only obtain, with respect of peripheral positions, in cases of *parallel* determination" (*Strategy*, p. 155; see also *Foundations*, p. 443, Definition 7*h*) when we note that he sets up an archiposition in the phonological form of English *twelfth*, for example (*ibid.*, p. 230-232). Either parallel determination does occur in phonotactics, or archipositions can obtain also where there is diverse determination. Otherwise we have a contradiction, and, as Popper remarked, the acceptance of contradictions leads to the collapse of science⁴.

Thirdly, Mulder seems to suppose that there will always be at least two identical peripheral position classes in the phonotactics of a language (at least those with two or more peripheral positions). If there is any logical reason why this should be so, Mulder doesn't present it; nor is this necessarily the case in English if the notion of the phonotheme, first proposed by Lamb, is accepted as theoretically valid: a first immediate constituent analysis incorporating phonothemes (simultaneous bundles of two or more phonemes) would very likely fail to turn up any two identical position classes⁵ (although, as outlined below, it is actually impossible to establish whether classes are identical or not).

Turning now to the methodological issue, the procedure he advocates for establishing whether a given instance of determination is parallel or diverse is repeatedly emphasized by Mulder. Some further quotes will illustrate this.

In the case of parallel determination, the hypothesis that there is no diversity in determination remains unrefuted, precisely because the position classes are different (*Foundations*, p. 175).

We have parallel determination if it remains unrefuted, and only diverse determination if the hypothesis of parallel determination is refuted by producing two identical peripheral classes (*ibid.*, p. 280).

One has to assume parallel determination until this is refuted (*ibid.*, p. 448, Definition 14*b*; this statement is not contained in Definition 14 *b* of the 1980 version of the Postulates for Axiomatic Functionalism (see *Strategy*, p. 51)).

Doubtless this is motivated by the principle of simplicity, i. e. one hypothesises the simplest of all possible states of affairs⁶, and parallel determination is simpler than diverse determination in that the former requires no further attention — there is nothing else that need be said about it; the latter, on the other hand, requires some further statement about the nature of the diversity, e. g. in terms of 'subjectness' and 'objectness' and suchlike (or,

⁴ See Karl R. Popper, *Conjectures and refutations*, 4th edition, London, 1972.

⁵ A full application of the notion of the phonotheme to the phonotactic description of English is as yet lacking, but see Barry C. Heselwood, "Extended axiomatic-functional phonology", D. Phil. thesis, University of Ulster, 1992, p. 127-134, Barry C. Heselwood, "Simultaneous phonemes in English". *Linguistica* ONLINE, <<http://www.phil.muni.cz/linguistica/art/heselwood/hes-001.pdf>>, 2008.

⁶ See Michael A. L. Lamb, "Free allomorphy or synonymy". Unpublished paper presented to the SILF conference, Montreal, Canada, 1983.

more properly, in terms of those properties for which these are convenient labels). The procedure is thus well-motivated as one would expect it to be. Unfortunately, however, it is an impossible procedure to implement. I shall outline why I believe this to be so. We need to be sure first of all what Mulder regards as a proper hypothesis. Some of his most forceful and insightful statements on the kind of methodology required by a scientific approach to linguistics deal with precisely this. In *Foundations* he presents three conditions that are necessary for a hypothesis to be regarded as a proper hypothesis: it is the third of these that concerns us here.

It should be in principle refutable, i. e. it should not *a priori* be irrefutable. The latter is the actual essence of what is a hypothesis in the Popperian sense. Yet it is the least understood and the most violated (p. 181, original emphasis).

He is quite clear in advocating tighter constraints on what constitutes a valid hypothesis than those imposed by Popper when he says that “A *hypothesis* is in principle refutable only if it contains the negation of notions defined in the theory (except where there are antonymous terms involved...)”⁷. His Popperian colours are clearly displayed when he points out that it is only by refuting a hypothesis that we can arrive at descriptive statements that are, in terms of the theory, deducible as true. As Mulder puts it, “Only refutation leads to exact knowledge” (*ibid.*). Merely corroborating a hypothesis only gives it a stay of execution (perhaps indefinitely) and in no logical way can we derive a theoretically true statement from something that we know in principle may be false. For this reason what Mulder calls ‘positive’ hypotheses can only be corroborated, never refuted: they are *a priori* irrefutable (*ibid.*, p. 120).

‘Parallel’ and ‘diverse’, being antonymous terms in the theory, can legitimately occur in a hypothesis without negation, hypothesising one is equivalent to hypothesising the negation of the other. Thus far nothing prevents us from hypothesising that a given direct tactic relation is a case of parallel determination. At least not until we consider what would actually refute such a hypothesis.

According to Mulder, as we saw above, producing two identical peripheral classes (i.e. two classes with exactly the same members) would refute it, but this is not as simple as it might sound. How do we proceed to show that two classes are identical? By the procedure of hypothesis and refutation we cannot even establish that two classes are equivalent (i. e. have the same cardinality, or number of members), equivalence being a necessary but not sufficient condition for identity of classes. Suppose we have our two position classes, *a* and *b*, the hypothesis we would offer for refutation might be (remembering that only refutation of a hypothesis containing a negated theoretical term can lead to a ‘true’ conclusion, and ‘equivalence’ is a theoretical term in mathematics);

“Class *a* and class *b* are not equivalent.”

To refute this we need to list the members of both classes and compare the lists. If the two lists are identical in number the hypothesis cannot be said to have been refuted, for if both lists contain, let us say, ten items this is no proof against one of the classes actually containing an eleventh member. In the event of someone hypothesising that class *a* does

⁷ See Jan W. F. Mulder, “Simplicity in linguistic description by ‘negativism’”, in Brigitte K. Halford and Herbert Pilch (eds.), *Syntax gesprochener Sprachen*, Tübingen, 1990, p. 119.

indeed have an eleventh member as yet undiscovered we would be in serious difficulties. Mulder quite rightly points out that not finding something in a field of phenomena of infinite extension is no justification for concluding that it isn't there (*Foundations*, p. 182; *Simplicity*, p. 120). We therefore could not refute their hypothesis and would have to concede that time might prove them right. For while we might be intuitively satisfied that we have in fact identified all possible members of a particular position class, e. g. all possible commutants of *the* in *the blue vase*, and even have the full agreement of all our linguist colleagues, we are not at liberty to elevate that satisfaction and agreement to the status of exact knowledge.

Finding an eleventh member of *a* would of course refute the hypothesis that it only had ten members but we can never establish via hypothesis and refutation how many members it does have, nor of course how many class *b* has. It follows from this that, at least insofar as we adopt a negativist hypothetico-deductivism as a methodology of empirical inquiry — and I am not arguing against this — we can never establish, as a piece of exact knowledge, that two classes are or are not equivalent. If we cannot establish equivalence we cannot establish identity. In fact it is impossible to establish the membership of any class for which there are no logical limits. Logical limits would be enforced, for instance, in the class of whole numbers between any two whole numbers, and in various other mathematical sets, but mathematical truths are true by definition, not by refutation of hypotheses (although some philosophers, e. g. John Stuart Mill⁸, have thought otherwise). In linguistic description, however, we cannot enforce logical limits to classes of linguistic entities. What, for example, is the logical limit for the number of phonemes in a given language? Hypothesising thirty can be refuted by finding thirty-one but not by finding only twenty-nine⁹. How then can a hypothesis of a hundred and thirty phonemes in a particular language be refuted? Mulder is well aware that it could not, hence his advocacy of negativism as a corrective to such violations of the principle of simplicity. But what applies to inventories of phonematic classes applies equally to inventories of position classes.

What it all boils down to in essence is the impossibility of refuting an existence postulate, that is to say that if someone asserts the existence of such-and-such an object we cannot refute that assertion by, as it were, observing an instance of its non-existence. Hypothesising an undiscovered member of a class is therefore as *a priori* impossible to refute as hypothesising the survival of the dodo. In other words, we can formulate proper hypotheses to establish whether or not a particular entity *x* belongs to a particular class *a* but not whether *x* exists: such a hypothesis could be corroborated by observation, we might even say proved, but not refuted. It is therefore not a proper hypothesis but a pseudo-hypothesis. This is consistent with the rejection of existence as an attribute by many philosophers, going back at least to Kant¹⁰, insofar as attributes can in principle be investigated by hypothetico-deductive falsificationism whereas existence cannot.

If we can never refute a hypothesis of parallel determination then we never reach the point of establishing diverse determination and the notion of diverse determination thus ceases to have any application in linguistic descriptions. As Mulder reminds us, a linguistic

⁸ See John S. Mill, *A system of logic*, 8th edition, London, 1970, p. 164-172.

⁹ The use of the word 'finding' here is not meant to imply that phonemes, or any other theoretical models, exist in the data; it is used simply for terminological convenience.

¹⁰ See Alfred J. Ayer, *Language, truth and logic*, Harmondsworth, 1971, p. 57-58.

theory for axiomatic functionalists is of value only as a tool (or set of tools, perhaps?), for carrying out scientifically respectable linguistic descriptions (*Foundations*, p. 39). If part of one's descriptive apparatus turns out to be unusable there is no reason to keep it. This critique of the distinction Mulder has drawn between parallel and diverse determination, if its premises are accepted and its reasoning is valid, can only conclude by suggesting that the distinction, and the terms of the distinction, should be abandoned. It is claimed, in fact, that the argument presented above refutes the metahypothesis that a hypothesis of parallel determination (or for that matter a hypothesis of diverse determination, the same objections apply) is a proper hypothesis.

When part of an existing theory is found to be inapplicable for a particular methodological reason, the theoretician must look to other parts of the theory to see whether any of those may also be inapplicable for that same reason. In the point at issue here it is necessary to see whether any other theoretical models or notions in axiomatic functionalism require enumeration of a class or classes as part of the procedure of applying them in descriptions of data. There is one crucial notion in the theory where it seems this may be required, and that is the notion of distinctive function itself, the linchpin, as it were, of the whole theory. Were this to turn out to be inapplicable, the whole theory would fall. It is of some importance, therefore, to examine this question.

Mulder defines distinctive function as “the set of oppositions in which an entity may partake”, giving the example of $a \sim (b \cup c \cup d)$, which states the distinctive function of a , in case the set of oppositions a enters is $(a \sim b, a \sim c, a \sim d)$, and no other”. (*Foundations*, p. 441, Definition, 7a3). It is the “and no other” stipulation that causes the problem because we cannot refute the hypothesis (in fact pseudo-hypothesis) that a is also opposed in the same context to a hitherto unobserved occurrence of e . The exact extent of the set of oppositions into which an entity enters therefore cannot be established, and any statement of that extent will only ever be provisional. This would be fatal if the exact extent of the set had to be established either as a prerequisite for further descriptive procedures, as was the case in deciding between parallel and diverse determination, or for reasons of material adequacy. Fortunately, this is not the case. All we need to know is whether, given any two linguistic objects (identified as such by other relevant procedures, e. g. protocolisation), they have the same distinctive function or not. Mulder's negativist hypothetico-deductivism cannot be faulted for the precision with which it can be applied to yield an exact answer to this kind of question. In fact it is this very methodology that frees us from the obligation to state exactly how many members a particular class has. For example, we are not obliged to refute the hypothesis that English /t/ has four distinctive features, or that English has two lateral approximant phonemes (see Mulder's discussion of the (pseudo-) hypothesis that ‘clear’ and ‘dark’ l are separate phonemes in English (i. e. have different distinctive functions) in *Foundations*, p. 182). These hypotheses are not necessary unless and until we find that we can no longer produce materially adequate descriptions of English speech — that is, descriptions that successfully account for the data of spoken English — on the assumption that /t/ has only three distinctive features (see *Foundations*, p. 222-223), and there is only one lateral approximant phoneme.

For functionalists the value of a linguistic entity derives from the paradigmatic oppositions which it contracts with other entities in a given context; we try to establish as few such oppositions as we can whilst remaining materially adequate, and acknowledge no ob-

ligation to refute any hypothesis that there are more oppositions than we deem necessary (see Lamb, *Allomorphy*, p. 1). In the case of trying to establish parallel determination, however, we are obliged to attempt to refute hypotheses that there are more position class members than we deem necessary — and there are of course an infinite number of hypotheses of this kind — otherwise we cannot enumerate the classes in question in order to attempt a refutation of the hypothesis that the two classes are different. And to be under an obligation to attempt to refute the irrefutable, even just once, is more than an axiomatic functionalist can really bear.

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MULDER'S PARALLEL AND DIVERSE DETERMINATION DISTINCTION, A REPLY TO HESELWOOD^[*]

Paul Rastall

In a recent edition of *La Linguistique* Barry Heselwood (1995/1) discussed Jan Mulder's distinction between parallel and diverse determination. The discussion first described the distinction and then criticised it as "an impossible procedure to implement" (p. 21 [p. 3]). Heselwood's conclusion is that "the distinction and the terms of the distinction should be abandoned" (p. 24 [p. 5]).

I hope to show that Heselwood's criticism is ill-founded and self-contradictory.

Parallel determination occurs when two or more peripheral elements in a construction each contract direct relations with the nucleus in such a way that no communicational difference can be attributed to the relations in question. Thus, in Heselwood's example *the blue vase* the signs *the* and *blue* separately determine *vase* in the relations *the* R^a *vase* and *blue* R^b *vase*. However, it cannot be shown that R^a and R^b are communicationally different. As Heselwood rightly comments "the peripheral elements (*the* and *blue*) cannot permute and neither can their commutants. We thus have two different position classes so that *the* and *blue* and their respective commutants always determine *vase* in the same way..." (p. 18-19 [p. 2]). It should be noted immediately, however, that the position classes arise from the establishment of the commutants in the terminals of the relations in question. The emphasis is first on the relations in syntagms. Thus, the position class "article" is the class of elements which may stand in the domain of the relation R^a above and "noun" is the class of elements which can stand in the counterdomain of that relation. *Blue* is the domain of R^b and *vase* the counterdomain. The position class "adjective" is the class of commutants in the domain of R^b .

In fact, I imagine also that Mulder would prefer to say that the relations are provisionally treated as "not different", rather than "the same". Later evidence may refute the hypothesis that the relations are not communicationally different.

The situation is very different in *John likes Mary* as opposed to *Mary likes John*. As Heselwood explains, "it is clear that *John* has a different relation to *like* in the two positions" (p. 18 [p. 2]), namely the subject and direct object positions. That is, the relation R^x in *John* R^x *likes* is communicationally different from the relation R^y in *likes* R^y *John*.

[*] Previously published as Rastall, Paul. 1997. "Mulder's parallel and diverse determination distinction, A reply to Heselwood". *La Linguistique* 33:1.127-9. Heselwood's original paper to which Rastall refers is re-published in *Linguistica* ONLINE, <<http://www.phil.muni.cz/linguistica/art/heselwood/hes-002.pdf>> (2008); the references in square brackets are to this edition. Heselwood wrote a reply to Rastall's response which is also published in *Linguistica* ONLINE, <<http://www.phil.muni.cz/linguistica/art/heselwood/hes-003.pdf>> (2008). [Editor's note]

Methodologically, what has happened is that the hypothesis that the two relations are not different has been refuted. If that were not the case the communicational difference between the permuted signs in *John likes Mary* and *Mary likes John* would be unexplained and we should have to treat the two syntagms as allomorphs or admit an inadequacy in our explanation (ultimately in the theory). Thus, one distinguishes between two types of determination. That Heselwood seems to accept when he says:

“The motivation behind the distinction appears to be that if the same set of entities can stand in two or more positions, say *position a* and *position b*, then when a member of the set is in *position a*, it must be determining the nucleus of its construction in a different way from how it determines it when it is in *position b*, otherwise the two constructions would be variants with the same distinctive function” (p. 18 [p. 2]).

Furthermore, again as Heselwood rightly observes, the hypothesis of parallel determination, i. e. that two or more peripheral elements are not differently related to their nucleus, is methodologically prior to any hypothesis of diverse determination. If a hypothesis of parallel determination is refuted, then we must be dealing with diverse determination, *Tertium non datur*.

It is true that in parallel determination we are usually confronted with disjunct classes often in a fixed sequence of realisation. In the English noun phrase, generally the article (if any) precedes the numeral (if any) which precedes the adjectival (if any) which precedes the pre-nominal (if any) which precedes the noun followed by the supplement (if any). (There is some variation in the sequential position of the adjectival when complex constructions stand in that position.) The various positions have a demarcative function because the identification of an article, for example, cannot be confused with the identification of a numeral or an adjective and so each gives an orientation in the structure.

In diverse determination, the classes overlap so that communicationally relevant permutation may occur. Functionalists will not need to be told that permutation may not be communicationally relevant and **thus permutation of itself is insufficient to show diverse determination**. *Last week he left* and *he left last week* and *the two other men* and *the other two men* are instances of communicationally irrelevant permutation in English.

Naturally, it cannot be known with certainty either that indefinitely large classes are identical or that they are disjunct. Mulder would never suppose that it could. It is surprising, then, that Heselwood's rejection of the distinction between parallel and diverse determination should relate to the fact that we are dealing with open classes. He argues that the impossibility of determining the equivalence of classes in diverse determination or indeed of the mutual exclusiveness of classes in parallel determination means that the distinction cannot be applied (p. 21-23 [p. 4-6]).

What is central in importance, however, is not the classes involved but the functions of signs in constructions used for the purposes of communication. The classes merely emerge from those communicational functions as generalisations. We must be constantly on the look out for refutations of those generalisations as a single valid refutation is enough to refute a hypothesis of parallel determination. The absence of such a refutation (e.g. for the article, numeral, adjectival and supplement positions in the noun phrase in English) does not show the hypothesis to be irrefutable, but merely that it has not yet been refuted.

That is to say that Mulder works in exactly the opposite direction from the one supposed by Heselwood. He is not concerned with the indefinite listing of the members of classes but with the attempt to refute the hypotheses relating to the communicational functions of the class members. Jan Mulder is, after all, first and foremost a functionalist.

It is a pity that Heselwood has not seen that the formal criteria relating to class membership must be subordinate to the criterion of communicational relevance. Furthermore, it is odd that Heselwood should not see that. After all, he explains clearly the difference between the parallel determination in *the blue vase* and the diverse determination in *John likes Mary*.

The communicational difference between *John likes Mary* and *Mary tikes John* must be seen in its proper perspective. What it shows is that the hypothesis of parallel determination for *John* and *Mary* in relation to the nucleus *likes* IS FALSE. That is, Heselwood has himself shown that a hypothesis of parallel determination can be refuted, contrary to what he claims, and is therefore not, as he claims, "inapplicable" (p. 24 [p. 6]). Indeed, we could ask how the communicational difference in question could be handled if the distinction between parallel and diverse determination were, as Heselwood suggests, "abandoned" (p. 24 [p. 6]). As suggested above, the theory would be inadequate to deal with a clear communicational difference.

The distinction between parallel and diverse determination is well founded and one of the many contributions to functional linguistics which Jan Mulder has made and I was happy to acknowledge in a previous article quoted by Heselwood (Rastall, "La linguistique fonctionnelle axiomatique", *La linguistique*, 1993/1).

PARALLEL AND DIVERSE DETERMINATION REVISITED: A REPLY TO RASTALL^{*)}

Barry Heselwood

Having read Paul Rastall's (1997/2008) reply to my article (Heselwood, 1995/2008) concerning Jan Mulder's parallel and diverse determination distinction, I would like to counter his objections to my criticism of the distinction, and explain why I am not persuaded that my arguments are, as Rastall claims, "ill-founded and self-contradictory" (Rastall, 1997: 127 = 2008: 1). I conclude this reply by agreeing that Rastall may be justified in arguing for retention of the distinction, but not without changing its formulation – in which case it becomes in fact a different distinction. I hope to show that it is on interpretation of how Mulder formulates the distinction that the disagreement between Rastall and myself ultimately hinges.

Rastall appears to agree with my statement that "it is impossible to establish the membership of any class for which there are no logical limits" (Heselwood, 1995: 22 = 2008: 5) when he says that "it cannot be known with certainty either that indefinitely large classes are identical or that they are disjunct" (Rastall, 1997: 128 = 2008: 2). He adds that "Mulder would never suppose that it could" (*ibid.*). If indeed Mulder would never suppose that it could, why has he repeatedly emphasised the importance of the identity of classes as the refuting condition for a hypothesis of parallel determination? More than once in his writings Mulder says that in fact it is the *only* refuting condition. I shall repeat some of the quotes from my original article to substantiate this:

"In the case of "diverse" determination, the relation between one of the peripheral entities and the nucleus, and that of at least one other of the peripheral entities and the nucleus, is different. That is, the hypothesis that the relations are not different is refuted. But *it can only be refuted if the classes of items that can stand in the two, or more, peripheral positions in question are the same*" (Mulder, 1989: 279, my italics).

"There is diverse determination *if and only if* at least two of the classes are the same, and parallel determination *only if all classes are different*" (Mulder, 1989: 295, my italics).

"In the case of parallel determination, the hypothesis that there is no diversity in determination remains unrefuted, *precisely because the position classes are different*" (Mulder, 1989: 175, my italics).

^{*)} This article was originally submitted to *La Linguistique* in 1998 in response to Rastall (1997) but not published. I have updated it slightly and added references to Heselwood (2008) where the reformulation of the parallel versus diverse determination distinction proposed in this paper is applied to an analysis of English initial clusters, and to Dickins (1998) which also discusses the problem. My original paper and Rastall's response were both reprinted in *Linguistica ONLINE*, see references.

“We have parallel determination if it remains unrefuted, and only diverse determination if the hypothesis of parallel determination is refuted *by producing two identical peripheral classes*” (Mulder, 1989: 280, my italics).

These statements are quite clear and consistent with one another, and not at all consistent with Rastall's claim that Mulder would never suppose that the composition of an indefinitely large class can be known. Note that position classes having members in common is not enough for refutation of parallel determination – the position classes must be the same. My whole argument against the distinction as Mulder presents it is based entirely on this point – I have no other objection to the distinction, nor have I expressed any. In my view, Rastall fails to appreciate the importance Mulder has placed on the composition of position classes in his treatment of the distinction between the two kinds of determination. In his discussion of parallel and diverse determination, Dickins (1998: 69-71) is in agreement with me that the distinction as Mulder presents it must be abandoned.

In a move which I think is quite justified, but in no way damaging to my argument, Rastall shifts the focus of the distinction away from the question of identity of classes to the notion of distinctive function. He claims, for instance, that the fact that *John likes Mary* and *Mary likes John* have different distinctive functions refutes a hypothesis of parallel determination. This may be true, but it is not the procedure that Mulder advocates. In order to refute the hypothesis we would, according to my reading of Mulder, have to establish all and only the members of the subject position class and all and only the members of the object position class and show the two classes to be identical.

There are, however, indications here and there in Mulder's writings – but no more than indications – that he may not actually wish to make identity of classes *essential* as a refuting condition for a hypothesis of parallel determination. In my original article I did not address this; I should perhaps have done so. The following two quotes are in this respect at variance with the quotes given above:

“*Typical* for diverse determination is that the peripheral items involved are equivalent as to the positions in which they can occur” (Mulder, 1980: 155, my italics).

“in cases of parallel determination the position classes of the peripheral constituents are different (though they may have some members in common), whereas in diverse determination they are *basically the same*” (Mulder, 1989: 174-175, my italics).

It seems here that it is only *typical*, not criterial, to find identity of classes in cases of diverse determination; this leaves unanswered the question as to what then *is* criterial. And what are we to make of the notion “basically the same”? Is Mulder suggesting that if we judge the classes to be *similar enough* then we can say we have refuted parallel determination? Surely when we talk about “same” or “different” in functional linguistics we cannot have notions like “basically the same” or “similar enough” without introducing an unacceptable arbitrariness. If “basically the same” is not to be construed in this way then it must be interpreted to the effect that the composition of the classes is indeed non-criterial. Although not consistent with those statements that point unequivocally to the criteriality of identity of classes (and therefore contradicted by them), these statements suggest that something else may lie at the heart of the matter, and Rastall is I believe correct in identifying this as distinctive function.

I am happy to concede that the terms parallel and diverse determination can, and perhaps should, be maintained as distinct applicable notions providing the distinction is not made to depend on identity vs. non-identity of peripheral position classes. I think I have in my original article convincingly shown that it is methodologically unsound to make it do so, and in this reply I believe I have clearly shown that Mulder does in fact do so. Dispensing with the criterion of class composition means that the distinction becomes a matter of

- 1) the permutability or otherwise of items in peripheral positions
- 2) the distinctiveness or otherwise of the permutation of such items.

In *the blue vase*, *the* and *blue* cannot permute – at least the hypothesis that they cannot remains unrefuted; this can be called a case of parallel determination. In Rastall's example *the other two men*, *other* and *two* can permute but the two permutations, as he points out, have the same distinctive function; this can also be called a case of parallel determination. In *John likes Mary*, *John* and *Mary* can permute but this time the two permutations do NOT have the same distinctive function; this can be called a case of diverse determination regardless of whether the two position classes have the same set of members.

As a solution to the problem of criteria for distinguishing between the two kinds of determination, this avoids the methodological objection to the criterion of the identity of classes, and allows us to account for the communicational difference between *John likes Mary* and *Mary likes John* in terms of a correlation of the permutation of the peripheral constituent signa with a difference in the distinctive function of the matrix signum.

Reformulating the distinction in these terms is useful for phonological as well as grammatical analysis, and can be applied, for example, to the difference between properties of certain clusters in English and in Greek. In English initial clusters the phonemes are not permutable and are therefore instances of parallel determination; in Greek, however, the initial cluster /sp-/ is permutable – e.g. *spiti* 'house' and *psomi* 'bread' – in which case we have a functionally ordered cluster and diverse determination. In Heselwood (2008) I contend that there can be simultaneous bundles of phonemes, called *phonthemes*, set up to account for clusters that cannot be shown to be functionally ordered, and that the constituent phonemes of a phontheme determine the nucleus of the phonotagm in parallel because they do so from the same phonotactic position.

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