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CONTENTS

Issue Seventeen

<http://www.phil.muni.cz/linguistica/art/issues/issue-017.pdf>

James Dickins

Construction of a linguistic theory from first principles and confrontation with crucial data

<http://www.phil.muni.cz/linguistica/art/dickins/dic-004.pdf>

previously unpublished

James Chamwada Kigamwa

Salient factors in the acquisition and maintenance of heritage languages among US-born children of African immigrants

<http://www.phil.muni.cz/linguistica/art/kigamwa/kig-001.pdf>

previously unpublished

Feras Saeed

On Move and Agree: Evidence for in-situ agreement

<http://www.phil.muni.cz/linguistica/art/saeed/sae-001.pdf>

previously unpublished

CONSTRUCTION OF A LINGUISTIC THEORY FROM FIRST PRINCIPLES AND CONFRONTATION WITH CRUCIAL DATA^{1[*]}

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Abstract: This paper develops a ‘signum ontology’, i.e. a model for coherently linking the signum (cf. sign) as an abstract entity ultimately to speech phenomena. It begins by analysing basic aspects of language: physical, meaningful and ‘word’ (i.e. in terms of word-identity), abstract and concrete (sections 2–5, 7), within a semiotic framework (Section 6). The resulting relationships between phonological, grammatical and abstract semantic entities (Section 8) allow for the incorporation of allomorph and alloseme into the model (Section 9).

Having established core features of the model, I go back to the periphery, showing how maximally primitive notions (unascribed phonetic image correlate, and unascribed semantic image correlate / referent) provide a basis for coherently linking language reality (speech phenomena) to the abstractions of the model (Section 10), via a small number of serially applied basic principles, crucial among which is a set-forming criterion (Section 11). I show how the extra-linguistic models of general semantics and general phonetics (sections 12 and 13) link to the linguistic models of phonology and delology, and ultimately to the signum (sections 14–17), and the instantiational correlate of the signum, the lexonete (utterance) (Section 19).

I provide a complete model of the signum ontology (sections 20–21), showing that its overall structure requires two notions, the allomorphon and allosemon, which have no obvious correlate in standard linguistic theorising, but demonstrating also that they are essential for coherent analysis of two phenomena which are widely recognised in linguistics: incomplete neutralization and imperfect synonymy (sections 22–23). I demonstrate the integration of the signum ontology with the other component of the overall theory (extended axiomatic functionalism), the system ontology (Section 24). Finally, I attempt to show that the small number of basic principles used for establishing the signum ontology model in this paper can, in fact, be further reduced (Section 25).

Keywords: axiomatic functionalism, linguistic sign, signum, linguistic theory, ontology, member, set, Peircean first

1. Introduction

In this paper, I will progressively construct a linguistic theory (or, more accurately, one component of a two-component linguistic theory; see Section 24) by doing a number of things:

¹ I thank Barry Heselwood for making very useful comments on an earlier draft of this paper.

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

1. I will first (Section 2) identify a reasonable set of basic aims for a linguistic theory (allowing that different linguistic theories may legitimately have different aims, and that the aims which I identify are, potentially, one set of reasonable aims amongst other possible reasonable aims).
2. At subsequent stages in the argument, I will, wherever possible, start with the simplest possible linguistic model (theory) given previous argumentation. I will only abandon this model when it is shown to be inadequate to the task of analysing language, replacing this with a minimally more complex model which is shown to be able to deal with problems previously raised. The development of the model thus proceeds progressively: at each stage a minimally more complex model replaces a less complex model whose inadequacy in specific respects has just been demonstrated.
3. Sometimes I will demonstrate the inadequacy of an existing version of the model (theory) by consideration of general issues such as the nature of reality, or degrees of abstraction. I will then provide a more complex model which overcomes the identified inadequacies.
4. On other occasions, I will demonstrate the inadequacy of an existing version of the model (theory) by confrontation with crucial real-language data, showing that the existing version of the model cannot adequately treat this data. I will then provide a more complex model which is able to deal with the identified data.
5. Sometimes, I will reverse the process in 4. Thus, I will first present a more complex version of the model than previously provided, and subsequently illustrate this with data which are intended to provide a practical illustration of how this more complex version of the model is able to deal with data that less complex previously presented versions could not.

2. Basic aims and principles of a linguistic theory

I start from the position that the basic aim of a linguistic theory should be to provide analyses (descriptions) of the data which are coherent (i.e. statements within the analyses do not contradict one another), adequate to account properly for the data, and simple (i.e. avoiding unnecessary complications). The analyses should also, in order to qualify as scientific, be potentially refutable (i.e. it should be possible to say what kind of data would disprove the analyses, even though such data are not, by definition, forthcoming at the time of the analyses (cf. Dickins 1998: 37; Mulder 1989: 7, 55–65). This may seem a rather modest aim for a linguistic theory, particularly in comparison with the aims of the two dominant approaches to contemporary linguistics: what I will here term ‘nativist generativism’ and ‘social-functionalism’.

Generativism involves the production of generative grammars, a generative grammar being definable along the lines: ‘a fully explicit finite set of rules that can be applied to generate all those and only those sentences (often, but not necessarily, infinite in number) that are grammatical in a given language’, coupled with an assertion that some set of fundamental characteristics (particularly syntactic features) of all human languages are the same (cf. for example, Carnie 2013). Generative theories are thus universalist; they involve an a priori claim that there are universal features common to all languages, these features being established ‘prior’ to the analysis of individual languages themselves. Thus, if one were to analyse

a language which had never previously been studied using a generative approach/model, the analysis would presuppose that this language has those features which are deemed to be universal by the particular generative approach/model which one was adopting: these features would be 'hard-wired' into the analysis (description). This contrasts with the standpoint taken by axiomatic functionalism, in which no analytical features are presumed (pre-assumed) to be universal. All analyses are language-specific. An analysis of any particular language is, in this sense, *ex nihilo*.

A further typical feature of generativist approaches (though one rejected by a few generativists, e.g. Gazdar, Klein, Pullum and Sag 1985) is that the universality of language which generativism presumes reflects specific genetically-endowed mind/brain structures shared by all human beings, such that young children, in particular, are able to acquire any natural language without in any sense being taught it. This is sometimes known as 'nativism' (e.g. Chomsky 2007). An approach to linguistics which is both generativist and nativist can thus be termed 'nativist generativism'.

There are profound practical problems with nativist generativism. Commenting on Pinker's arguments in favour of nativism, Rose states:

In the computer-speak that Pinker favours, humans possess a 'language acquisition device' or LAD. However, it would appear that if it exists, as with other such proposed modules, it has no particular instantiation within brain structures or biochemistry (Rose 2006: 110).

Even indirect evidence of nativism is weak, e.g. how language acquisition takes place in relation to supposed features of 'universal grammar'. Clark and Lappin note:

In spite of the centrality that Chomsky has accorded to the problem of acquisition, surprisingly little formal or empirical work has been done within the generative tradition to produce an explicit, computationally viable, and psychologically credible account of language acquisition (Clark and Lappin 2011: 214).

There are also more general objections to the testability – and therefore scientificity – of generative grammar and, indeed any universalist approach to linguistics (some of which are discussed in Dickins 1998: 27–34), as well as specifically meta-theoretical issues (discussed, for example, in Mulder and Rastall 2005).

Generativism is sometimes referred to as 'formalism' (e.g. Newmeyer 2010), a usage which is confusing, since it does not clearly differentiate generativism from other formal (i.e. explicit, logically coherent) approaches to linguistic analysis, such as axiomatic functionalism. 'Formalism' in this sense is sometimes also confusingly contrasted with 'functionalism' (Newmeyer 2010) – or what I shall term here 'social-functionalism', to distinguish it from the sense in which 'function' 'functional' and 'functionalism' are used in an axiomatic-functionalist context. ('Function' in axiomatic functionalism is a matter of 'distinctive function', i.e. the appeal to non-arbitrary 'language-internal' set-forming criteria for determining fundamental linguistic identity/existence; cf. Section 15).

Social-functionalism proposes that language structure is determined by social structure. The currently dominant social-functionalist approach to linguistics is systemic-functional linguistics, originally put forward by Michael Halliday. According to Halliday:

The structure of sentences and other units is explained by derivation from their functions – which is doubtless how the structures evolved in the first place. Language is as it is because of the function it has evolved to serve in people’s lives (Halliday 1978: 4).

Systemic-functional linguistics proposes three socially-oriented universal linguistic semantic ‘metafunctions’, which dominate and directly structure ‘lower’ levels of analysis, particularly lexico-grammar: the ideational, the interpersonal, and the textual. The ideational metafunction is “language as ideation. [...] It corresponds roughly to non-systemic terms such as *Darstellung*, representational, [semantic] content, and semantics” (Matthiessen, Kazuhiro, and Lam 2010: 115). The interpersonal metafunction is “language organised as a resource for enacting roles and relations between speaker and addressee as meaning” (Matthiessen, Kazuhiro, and Lam 2010: 126). The textual metafunction is “the enabling metafunction, providing the resources for presenting ideational and interpersonal meanings as a flow of information in text unfolding in its context” (Matthiessen, Kazuhiro, and Lam 2010: 220).

As a universalist theory, systemic-functional linguistics runs up against the same general problems of testability – and therefore scientificity – as does generativism (cf. Dickins 1998: 27–34). More simply, systemic-functional linguistics can be seen to ‘straightjacket’ languages into a set of basic categories (ideational, interpersonal, textual) which they do not, in practice, neatly fit. For a more specific critique along these lines, in relation to theme and rheme, as proposed universal sub-components of the textual metafunction, see Dickins (*in prep.*).

The notion that the currently dominant approaches to linguistics – nativist generativism and social-functionalism – are problematic, partly but not entirely because of their universalist orientation will not be pursued here. I will, however, stress a minimalist view of what a linguistic theory should do (as already set out at the beginning of this section): a linguistic theory should yield analyses which are coherent, adequate to account for the data, and simple, and that in order to qualify as scientific these analyses must be potentially refutable. It is this rather ‘modest’, though I believe realistic, view of the aim of linguistics which is adopted in this paper.

In relation to the basic orientation of linguistic analysis, the most appropriate place to start is by identifying the overall ‘purport’ of language, i.e. its ‘underlying purpose’, since this will determine the orientation of the analytical models which a linguistic theory seeks to establish. The purport of a language can be identified as the conveyance of information (meaning) by conventional means (cf. Mulder and Hervey 2009: Def. 1c; Dickins 2009: Dec. 1c). The ‘vehicle’ for this conveyance of meaning is something physical: in the case of spoken language, vocal sounds, and in the case of written language, marks on a piece of paper or patterns of light and dark on a computer screen.

This gives two basic aspects to language, physical and meaningful, or what I will here call ‘purely physical’ and ‘purely meaningful’ (for reasons to be explained later) as in Figure 1 (next page).

By differentiating between the purely physical and purely meaningful aspects of language, Figure 1 accounts in a very basic manner for the fact that I can make some sounds, representable as [kæt], for example, on a particular occasion, and mean by them a specific feline ‘cat’ (i.e. a particular cat which I am referring to). However, this is all that the model implied by Figure 1 allows us to do.

Figure 1
Basic aspects of language: purely physical and purely meaningful

purely physical aspect	purely meaningful aspect
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Consider now my saying [kæt] on a second occasion and referring to a different cat. If we only had the linguistic model implied by Figure 1, all we could say would be that we have two completely unconnected utterances: two different [kæt]s and two different cats. Indeed under a Figure 1 theory, all we could do would be to list every single utterance which occurred as being different: there would, in an obvious sense, be no analysis of the language in question at all (even assuming we had also succeeded in incorporating into the theory some practical means of assessing what constituted our relevant ‘universe of phenomena’ – our language).

Pre-theoretically (intuitively), what unites all occurrences of [kæt] in English which refer to ‘carnivorous quadruped (*Felis domesticus*)’ (Oxford English Dictionary Online) is three things: 1. That all occurrences of [kæt] in some sense sound the same; 2. That all occurrences of [kæt] referring to *Felis domesticus* in some sense mean the same thing; and 3. That all occurrences of [kæt] involve the same word ‘cat’.

3. Basic aspects of language: physical, meaningful and word

The identification of word alongside sound (purely physical aspect) and referent (purely meaningful aspect) might appear to give us Figure 2.

Figure 2
Basic aspects of language: physical, meaningful and word

purely physical aspect	word	purely meaningful aspect
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4. Basic aspects of language: physical, meaningful and word – abstract and concrete

However, Figure 2 is not adequate to account for the fact that we are not merely concerned with individual occurrences of [kæt] referring to particular instances of *Felis domesticus*. We are also concerned with *all* instances of [kæt] referring to a single notion *Felis domesticus*. That is to say, we are concerned with an abstraction from individual sound-occurrences

[kæt] to an ‘abstract sound’ correlate of these, ‘kæt’ (notatable as /kæt/, and from reference to individual examples of *Felis domesticus* to an abstract meaning correlate of these *Felis domesticus*). Equally, we are concerned not only with individual occurrences of the word ‘cat’, but also the abstract notion of the word ‘cat’ – i.e. the notion that there is one word ‘cat’ in English notwithstanding that we can utter this word an unlimited number of times. These considerations give rise to the view that we need two levels of analysis in our model (theory): a concrete level and an abstract level, covering each of purely physical aspect, word, and purely meaningful aspect, as in Figure 3.

Figure 3

Basic aspects of language: physical, meaningful and word; abstract and concrete

Abstract	abstract purely physical-related aspect	abstract word	abstract purely meaningful-related aspect
Concrete	purely physical aspect	concrete word	purely meaningful aspect

5. Basic aspects of language: physical, meaningful and word – abstract and concrete

Further insights are obtained by analysing the columns according to the following categories: physical-related, and meaningful-related.

According to Figure 4 (next page), language has a purely physical/physical-related aspect and a purely meaningful/meaningful-related aspect (the left-hand and right-hand columns respectively), but it also has an aspect which involves a combination of the physical-related and the meaningful-related, the middle column (covering in Figure 4, ‘abstract word’ and ‘concrete word’).

One obvious way in which Figure 4 is lacking is that language (when viewed pre-theoretically/intuitively) does not consist of individual words. Not only can we say ‘cat’, we can also say ‘pretty cat’, ‘a pretty cat’, ‘that is a pretty cat’, and so on. In each case, we have added something more to ‘cat’. ‘Cat’ itself retains its same word identity – plus the same abstract purely physical-related aspect and the same purely meaningful-related aspect (*Felis domesticus*). Similarly, in ‘pretty cat’, ‘a pretty cat’, and ‘that’s a pretty cat’, ‘pretty’ retains its same word identity, plus the same abstract purely physical-related aspect and the same purely abstract meaningful-related aspect (assuming we mean by ‘pretty’ in each case ‘attractive and pleasing in appearance’: Oxford English Dictionary Online). This analysis can be extended for ‘a’, ‘that’ and ‘is’.

What this illustrates is that language involves not just individual words but combinations of words – at both the concrete and abstract levels (just as we can have individual utterances

of ‘that is a pretty cat’, so we can say that they are all utterances of a single abstraction – a sentence – ‘that is a pretty cat’). We can also go down below the word. Thus, the ‘s’ at the end of ‘cats’ has the same meaning ‘plural’ as the ‘s’ at the end of ‘rats’ – i.e. and we apply the same distinction between abstract (real occurrence) and abstraction to the ultimate units making up words (morphemes) as we do to words (e.g. ‘cat’), phrases (‘a pretty cat’) and sentences (‘that’s a pretty cat’).

Figure 4
Basic aspects of language: physical-related, meaningful-related and word; abstract and concrete

		PHYSICAL-RELATED	∅
		∅	MEANINGFUL-RELATED
Abstract	abstract purely physical- related aspect	abstract word	abstract purely meaningful- related aspect
	Concrete	concrete word	purely meaningful aspect
	purely physical aspect		

We can apply the same principles to the purely physical-related (sound-related) aspects of language as we can to morphemes, words, phrases, etc. Thus, we can contrast the following purely in terms of physical-related (sound-related) aspects:

- /kæt/ ‘cat’
- /kɪt/ ‘kit’
- /kɒt/ ‘cot’
- /pæt/ ‘pat’
- /pɪt/ ‘pit’
- /pɒt/ ‘pot’
- /kæd/ ‘cad’
- /kɪd/ ‘kid’
- /kɒd/ ‘cod’

Here, the different ‘sounds’ (/æ/ vs. /ɪ/ vs. /ɒ/ in ‘cat’, ‘kit’ and ‘cot’; /k/ vs. /p/ in ‘cat’ and ‘pat’; /t/ vs. /d/ in ‘cot’ and ‘cod’, etc.) are, from one perspective, yielding different words. However, the different ‘sounds’ ((/æ/ vs. /ɪ/ vs. /ɒ/; /k/ vs. /p/; /t/ vs. /d/, etc.) are not morphemes, i.e. they do not have both a physical-related and a meaningful-related aspect: we

cannot directly relate the final /t/ element in ‘cat’, ‘kit’, and ‘cot’ to a word-part-identity, as we can the final plural ‘s’ which occurs in ‘cats’ and ‘rats’. Rather /t/ has only a physical-related aspect: it is purely a feature of the left-hand column in Figure 4.

What this tells us is that just as entities in the middle column in Figure 4 (inadequately termed ‘abstract word’ and ‘concrete word’) can be analysed in terms of size (building up from smallest to largest), so entities in the left-hand column (abstract purely physical-related aspect, and purely physical aspect) can be independently analysed in terms of size (building up from smallest to largest). Thus, we have quite distinct analytical *systems* in the left-hand column, and the middle column.

It is a little more difficult to see that the system in the right-hand column (purely meaningful-related aspect, and purely meaningful aspect) in Figure 4 are distinct from those in the middle column. However, the principles are the same. Intuitively, we can recognise this in a number of ways. Firstly, there is the fact that words may have more than one sense – what is traditionally known as polysemy. Thus, in ‘garage’, ‘garage’ might mean either 1. “Building, either private or public, intended for the storage and shelter of motor vehicles while not in use”; or 2. “Commercial establishment that sells petrol, oil, and similar products and freq. also undertakes the repair and servicing of motor vehicles” (definitions from Oxford English Dictionary Online), while, ‘old’ might mean either 1. “Having lived or existed a long time; not young or new”, or “Former; not current; relating to past times, bygone”. Thus, ‘my old garage’ might mean any of four things, given two possibilities for ‘garage’ and two for ‘old’.

The second intuitive way in which it can be seen that there are distinct systems operating in the middle column and the right-hand column in Figure 4 is that words/phrases may mean either individually or only in combination. Thus, in ‘give in’ (= ‘surrender’, etc.), it is not possible to assign individual meanings to ‘give’ and ‘in’: all we can say is that the entire phrase has the meaning ‘surrender’ (etc.), even though in other contexts ‘give’ and ‘in’ have independent meaning. Similarly with idioms, e.g. ‘round the bend’ meaning ‘mad’, we have to treat the entire phrase as a single meaning-unit. However, whether we mean by ‘round the bend’, the idiomatic ‘mad’ or the non-idiomatic ‘beyond the turn/corner’ (etc.), we have intuitively the same complex entity in terms of the middle column (words, etc.).

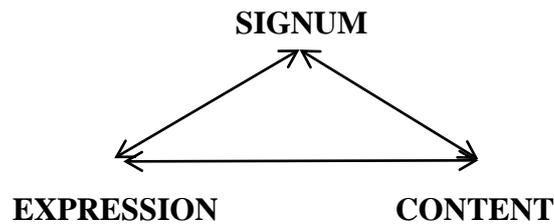
Just as we can think of morphemes combining to make words, words to make phrases, etc. (Figure 4, middle column), so we can think of smaller units of meaning combining (in various ways) to make larger units of meaning. This and the facts of polysemy and size-difference between word (etc.) units and meaning-units (previous two paragraphs) gives us two separate small-to-large systems in the middle column and the right-hand column in Figure 4.

6. Signum, expression and content

It is useful at this point to consider language from a more specifically Saussurean-based semiotic point of view. Saussure regarded language from the perspective of the sign, or what is known in axiomatic functionalism as the signum (for the distinction between ‘sign’ and ‘signum’ in axiomatic functionalism, see: Mulder and Hervey 2009, Def. 2a2). For Saussure,

a sign was a biunity (bi-unity) of what he termed a signifier and a signified – roughly equivalent to what Hjelmslev (1953 / 1943) later termed an expression and a content, respectively. Using the terms ‘signum’, ‘expression’ and ‘content’, we can represent this relationship as in Figure 5.

Figure 5
Signum as biunity of expression and content



In Figure 5, the double-headed arrows express mutual implication: signum implies expression and content, expression implies signum and content, and content implies signum and expression.

Signum is an abstraction. ‘Signum’ is useful as a term, because a signum can be any size, from morpheme through to sentence. It would be tempting to identify an expression with the abstract purely physical-related aspect (Figure 5) and content as the abstract meaningful-related aspect (Figure 5). However, as will be seen later, this cannot be coherently done: the relationship between expression and content and signum needs to be conceived differently from this. For the moment, we may note that the fact that the abstract purely physical-related aspect does not stand in a relationship of mutual implication with the signum is evident from the fact that the entities in the left-hand column in Figure 5 operate as a different system from those in the middle column, as argued above. The same is true of the entities on the right-hand column in Figure 5 (as also argued above) in relation to the entities in the middle column. I will return to the signum and semiotic issues later in this paper.

7. Basic aspects of language – with ‘area of analysis’ terms

Having introduced some ‘entity’ terms for central aspects of the theory, I will now introduce some provisional ‘area of analysis’ terms, in Figure 6 (next page).

The most obvious of these terms are ‘phonetics’ (as the analysis of real sounds) and phonology (as the analysis of abstractions ‘organising’ these sounds). ‘(Level of) utterances’ is fairly self-explanatory, as I think are ‘abstract semantics’ (analysis of abstractions ‘organising’ meanings) and ‘concrete semantics’ (the analysis of real meanings).

‘Grammar’ is also a fairly traditional notion. It is important to note, however, that ‘grammar’ here has to be understood in a very specific sense: hence the usage ‘(connotative) grammar’. This is apparent from the discussion in Section 5 of ‘old garage’ and ‘round the bend’. ‘Old garage’ as a grammatical entity is not a phrase having just one of the four possible senses ascribable to it from the discussion in Section 5 (i.e. 1. ‘Not new building, either private or public, intended for the storage and shelter of motor vehicles while not in use’; 2.

‘Former building, either private or public, intended for the storage and shelter of motor vehicles while not in use’; 3. ‘Not new commercial establishment that sells petrol, oil, and similar products [...]’; and 4. ‘Former commercial establishment that sells petrol, oil, and similar products [...]’). Rather as a grammatical entity, ‘old garage’ subsumes all these four possible senses (as well as other senses of ‘old’ and ‘garage’ not considered here).

Figure 6
Basic aspects of language – with ‘area of analysis’ terms

Abstract	phonology	(connotative) grammar	abstract semantics
Concrete	phonetics	(level of) utterances	concrete semantics

Similarly with non-idiom—idiom pairs, ‘round the bend’ as a grammatical entity is not a phrase having just one of the senses ascribable to it – the non-idiomatic ‘beyond the turn/corner’ (etc.), or the idiomatic ‘mad’. Rather as a grammatical entity, ‘round the bend’ subsumes both these possible senses (as well as other senses of ‘round’ and ‘bend’ not considered here).

The notion of ‘grammatical entity’ also goes beyond word class. Thus, ‘garage’ is the same grammatical entity, regardless of whether it is a noun, as in i. ‘Building, either private or public, intended for the storage and shelter of motor vehicles while not in use’; or ii. ‘Commercial establishment that sells petrol, oil, and similar products [...]’, or whether it is a verb, as in iii. ‘To place (a motor vehicle) in a garage for storage [...]’ (definitions from Oxford English Dictionary Online). For further discussion of ‘connotative grammar’ see Dickins (2009, section heading: *The scope of extended axiomatic functionalism compared to that of standard axiomatic functionalism*).

8. Relationship between phonological, grammatical and abstract semantic entities

I want to turn now to the relationship between phonological entities (entities in phonology) and grammatical entities (entities in (connotative) grammar) on the one hand, and that between abstract semantic entities and grammatical entities on the other. Consider the following:

1. The word – i.e. (connotative) grammatical entity² – ‘garage’ can be pronounced as either /'gæɾɑ:z/ or /'gæɾɪdʒ/ in British English. I will assume, for the moment, that

² ‘Word’ is not, in fact, a technical term in extended axiomatic functionalism. I will, however, use the term ‘word’ in this paper as a synonym for a certain, albeit ill-defined, kind of (connotative) grammatical entity / signum.

/'gærɑ:ʒ/ and /'gærɪdʒ/ are two different phonological entities (and try to demonstrate this in Section 14). Thus one (connotative) grammatical entity can correspond to two phonological entities.

2. The word (grammatical entity) 'garage' might mean either i. 'Building, either private or public, intended for the storage and shelter of motor vehicles while not in use'; or ii. 'Commercial establishment that sells petrol, oil, and similar products and frequently also undertakes the repair and servicing of motor vehicles', or even iii. (as a verb) 'To place (a motor vehicle) in a garage for storage [...]' (definitions from Oxford English Dictionary Online). I will assume, for the moment, that 'Building, either private or public, intended for the storage and shelter of motor vehicles while not in use' and 'Commercial establishment that sells petrol, oil, and similar products [...]' are two different abstract semantic entities (and try to demonstrate this in Section 17). Thus, one (connotative) grammatical entity can correspond to two abstract semantic entities.
3. The phonological entity /bɪn/ in English can correspond to two words (grammatical entities) 'been' (the past participle of the verb '[to] be') and the word 'bin' (meaning 'receptacle' etc.)
4. The abstract semantic entity (meaning, sense), representable as CH₂O (using standard chemical formula notation) in English can correspond to two words (grammatical entities) 'methanal' and 'formaldehyde'. Thus, one abstract entity can correspond to two grammatical entities (words, in this case).

Starting with 1. above, a grammatical entity (e.g. word) can be understood as a set of phonological entities (phonological forms), each of which is conceived as standing in a relation to ('belongs to') that grammatical entity (e.g. word). A phonological entity (phonological form) conceived as standing in a relation to a grammatical entity can be termed an allomorph. 'Allomorph' is a traditional term for a phonologically distinct variant of a word (i.e. an abstract word; Figure 4); in extended axiomatic functionalism, the notion 'allomorph' is extended to cover a phonologically distinct variant of any grammatical entity, not just a word. A grammatical entity can be regarded as a set of utterances (Figure 6). More obviously, perhaps, an abstract word (as a grammatical entity) can be considered as a set of concrete words (i.e. words actually uttered – or better, as models for these words actually uttered). A word, as a grammatical entity, can also, however, be regarded as a set of allomorphs (as argued in the previous paragraphs). Allomorph, however, is more abstract than concrete word (i.e. a model for something actually uttered). Thus, while the word 'garage' has two allomorphs, with phonological forms notatable as /'gærɑ:ʒ/ or /'gærɪdʒ/ in British English, it has a potentially unlimited number of concrete words – i.e. 'garage' can be uttered (realised, or more precisely, instantiated) a potentially unlimited number of times.

Moving on to 2. above, just as a grammatical entity (e.g. word) can be understood as a set of phonological forms, each of which is conceived as standing in a relation to ('belongs to') that grammatical entity (e.g. word), so a grammatical entity (e.g. word) can be understood as a set of abstract semantic entities, each of which is conceived as standing in a relation to ('belongs to') that grammatical entity. An abstract semantic entity conceived as standing in a relation to a grammatical entity can be termed an alloeme.

As noted above, a grammatical entity can be regarded as a set of utterances (Figure 6). Thus, an abstract word (as a grammatical entity) can be considered as a set of concrete words

(i.e. words actually uttered – or better, as models for these words actually uttered). A word, as a grammatical entity, can also, however, be regarded as a set of alloemes (as argued in the previous paragraphs). Alloeme, however, is more abstract than concrete word (i.e. a model for something actually uttered). Thus, the word ‘garage’ has a small number of alloemes (senses) of which three were given above: i. ‘Building, either private or public, intended for the storage and shelter of motor vehicles while not in use’; ii. ‘Commercial establishment that sells petrol, oil, and similar products [...]’; and iii. ‘To place (a motor vehicle) in a garage for storage [...]’. By contrast, ‘garage’ has a potentially unlimited number of concrete words – i.e. ‘garage’ can be uttered (realised, or more precisely, instantiated) a potentially unlimited number of times.

This model not only allows for allomorphy (one grammatical entity, more than one phonological form) and alloemy (polysemy) (one grammatical entity, more than one abstract semantic entity: what I shall later term ‘delogical form’ / ‘denotation’), but also for the converse of these: homomorphy: one phonological form corresponding to more than one grammatical entity; and homosemy: one abstract semantic entity corresponding to more than one grammatical entity. An example of homomorphy (see also above) is /bm/ as related to the two signa (grammatical entities) 1. ‘receptacle’; and 2. past participle of the verb ‘to be’ (this latter probably being best analysed as a complex signum / grammatical entity). /bm/ = ‘receptacle’ and /bm/ = past participle of verb ‘to be’ are homomorphs. An example of homosemy (see also above) is the abstract semantic entity (meaning, sense), CH₂O (as a chemical formula) as related to the signa (grammatical entities / words) ‘methanal’ and ‘formaldehyde’. Thus, one abstract entity can correspond to two grammatical entities (words, in this case). ‘Methanal’ and ‘formaldehyde’ (both having the sense also expressible by CH₂O) are homosemes – or, to use a more traditional linguistic term, they are synonyms.

9. Model of linguistics, incorporating allomorph and alloeme

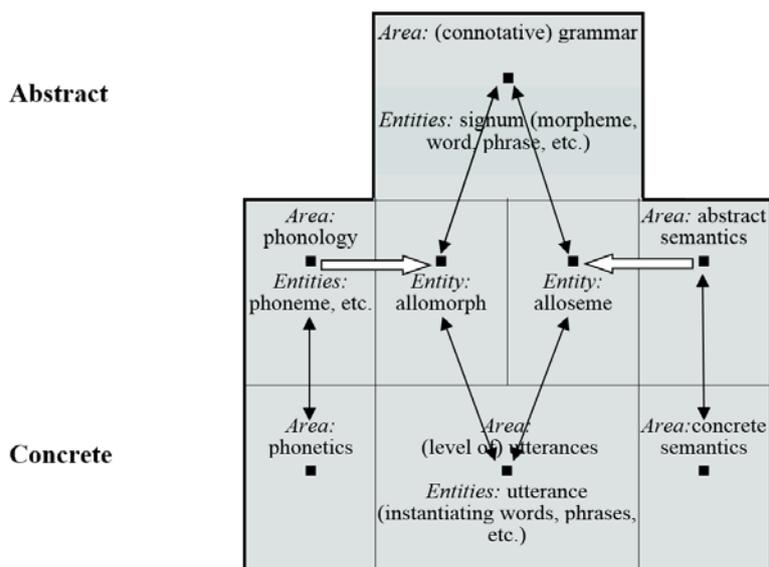
We can visualise diagrammatically, the relationship of member-to-set³ vertically (as has, in fact, been done implicitly in previous diagrams, as in Figure 7 (next page).

Figure 7 does a number of things. Firstly, it differentiates between area of analysis (abbreviated to ‘area’ in Figure 7) and entity/entities within that area (e.g. between (connotative) grammar as an area of analysis, and morpheme as an entity within that area of analysis). Secondly, it uses the vertical dimension more specifically than previous figures to represent member-to-set relationships – with the level of the set higher up than that of its member entities. Thus a signum (grammatical entity) is a set of allomorphs, and also a set of alloemes. An allomorph, however, is also a set of utterances (instantiating that allomorph), while an alloeme is a set of utterances (instantiating that alloeme). At a further remove, of course, a signum is also a set of utterances (instantiating that signum), while an alloeme is a set of utterances (instantiating that signum). A third thing which Figure 7 does is give a sense to the

³ Like many writers, Mulder uses the terms ‘set’ and ‘class’ interchangeably (as synonyms). In mathematics and set theory, however, ‘class’ is sometimes used to mean ‘a collection of sets (or sometimes other mathematical objects) that can be unambiguously defined by a property that all its members share’ (cf. <http://www.encyclopediaofmath.org/index.php/Class>). In order to avoid confusion, I will use the term ‘set’ throughout this paper.

horizontal dimension on the diagram, which can be termed *bringing into a relationship with*. Thus, an allomorph is a phonological entity (phoneme, or normally a string of phonemes), brought into a relationship with a signum (grammatical entity), an example of an allomorph being the phonological entity /bn/ brought into a relationship with the signum (grammatical entity) ‘bin’ having the sense (or one sense among many) ‘receptacle’ (etc.).

Figure 7
Model of linguistics, incorporating allomorph and alloseme



Similarly, an alloseme is an abstract semantic entity brought into a relationship with a signum (grammatical entity), an example of an alloseme being the abstract semantic entity CH₂O brought into a relationship with the signum (grammatical entity / word) ‘methanal’.

Two types of arrows are used in Figure 7. The first of these \Rightarrow signifies ‘bringing into a relationship’ or more specifically, the bringing of ‘form’ across from one ‘analytical column’ to another – or what is more technically known as ‘transformation’. This ‘arrow of transformation’ thus indicates that an allomorph involves bringing phonological form into a relationship with a grammatical identity (entity), while an alloseme involves bringing a ‘form’ in abstract semantics into a relationship with a grammatical identity (entity).

The second arrow in Figure 7 \leftrightarrow is (as noted in Section 6) an arrow of ‘mutual implication’. This indicates that the entities in the areas of analysis connected by this arrow all imply one another logically. Signa, for example, imply utterances and vice versa: one cannot have a signum (as an abstraction) without utterances (or at least potential utterances) which realise it, and one cannot have utterances (using ‘utterance’ in the technical sense developed in this paper) without having a signum, or signa, which they realise.

10. Primitive notions: unascribed phonetic image correlate, and unascribed semantic image correlate (referent)

In order to consider the entities at the edge of the theory – phonetics and phonology on the left, and concrete semantics on the right – and how these fit into the overall theory more

closely, I will now turn to the two most ‘primitive’ notions of relevance to the theory: *unascribed phonetic image correlate*, and *unascribed semantic image correlate* or referent.

Consider the difference between pointing at a tree and saying ‘tree’. In both cases, we can be said to have referred to a tree – in both cases this tree is the referent. In pointing at a tree, however, I have merely identified (picked out) something. I have not ascribed this something to any category. By contrast, in saying ‘tree’, I have ascribed this referent to the category of trees. I could also, however, have ascribed the same referent to a narrower (hyponymous) category; thus, instead of saying ‘tree’, I could have said ‘oak’ (let us take it that the tree in question is an oak). Or I could have ascribed it to a narrower set still. Thus, I could have said ‘sessile oak’ (let us take it that the tree in question is a sessile oak). Or I could have ascribed it to a wider (hyperonymous/superordinate) category. Alternatively, again, I could have ascribed it to an overlapping category. Thus, I might have said ‘hazard’ (let us assume that the tree in question is a hazard, because it is rotten, and in danger of falling down onto a busy road; ‘tree’ and ‘hazard’ overlap, because some but not all trees are hazards, and some but not all hazards are trees). The above discussion of ‘ascription’ serves as a starting point. It fails, however, to adequately make the distinction between the use of an arbitrary set-forming criterion and a non-arbitrary set-forming criterion – the former yields a phonetic image (Section 13) or a semantic image / denotable (Section 12), while the latter yields – via the prior establishment of phonetic image and semantic image / denotable – a phonete (Section 14) or a delete/denotatum (Section 16).

A referent then is an irreducibly basic meanable entity without this entity being ascribed to a category. Or, rather, since we are necessarily modelling everything – even the most basic ‘things’ – when we are doing linguistics, a referent is an irreducibly basic model for a ‘unascribed’ meanable entity. ‘Meanable entity’ must be understood to cover not only objects (whether physical or abstract), but also qualities (e.g. “blue”), processes (e.g. “walk”), and relations (e.g. “on”) (see Hervey 1979: 28-31; also Mulder and Rastall 2005). A referent is a model for a ‘propertiless meanable entity’; all that it involves is its mere existence. ‘Referent’ would appear to be very similar to a Peircean ‘first’ – and may, indeed, be exactly the same as a Peircean ‘first’ (cf. Gorrée, 2009).

11. Primitive notions and set-forming criteria

When we conceptualise a referent (in any way), we ascribe it to – or bring it into a relationship with – a set, or better, with what we may call a *set-forming criterion* (Mulder 1989: 157 refers to this as a ‘class-forming criterion’). A ‘set-forming criterion’ can be defined as ‘the intension of the class [set] in question’ (Mulder 1989: 157), i.e. it is the conceptualisation by which the referent in question is ascribed to a particular set. ‘Set-forming criterion’ will be considered in more detail in Section 25. In this section, I will consider how the notion ‘set-forming criterion’ operates in practice.

Let us symbolise referent as β , let us symbolise the set-forming criterion as a , and let us symbolise ‘bring[ing] into a relationship with’ as R . A referent brought into a relationship with a set-forming criterion can, on this basis, be symbolised as βRa . We can refer to this ‘referent brought into a relationship with a set-forming criterion’ or this ‘ascribed referent’ as a semantic image. Semantic image can also be represented as j . Thus $j = \beta Ra$.

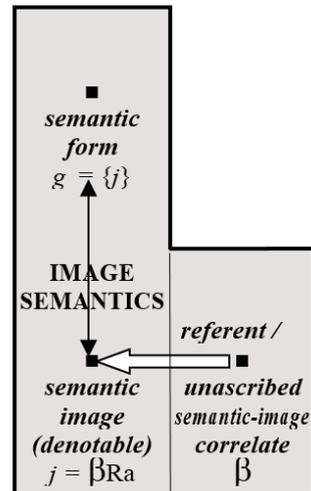
While referent provides a model for a ‘propertiless meanable entity’, semantic image provides a model for a ‘propertied’ meanable entity, i.e. it is a meanable entity which is ascribed to (belongs to) a category of meaningful entities. Thus, while a referent (in a particular case) is a model for a tree without being ascribed to the category of tree (or any other category), a semantic image (in a particular case) is a model for a tree which is ascribed to the category of trees.

Because a semantic image is a referent ascribed to a particular category, all the semantic images belonging to the same category can be grouped together (as a set) to provide a generalised semantic model of all semantic images which are regarded as the same (by virtue of having the same ascription) except for their real-world individuality (specificity). This set of semantic images can be termed a semantic form. Semantic form is defined as $\{\beta\}Ra$ – i.e. a set of semantic images, each being brought into a relationship with the same set-defining criterion. Semantic form can also be symbolised as g . Thus semantic form can be defined as $\{\beta\}Ra$, or as $\{j\}$. Semantic form thus provides a general model for ‘tree’, for example, as a meanable notion.

12. General semantics

An alternative term for referent is unascribed semantic-image correlate. We can term the area of enquiry encompassing referent (or unascribed semantic-image correlate), semantic image and semantic form general semantics, and we can represent general semantics as in Figure 8.

Figure 8
General semantics



As will be seen subsequently (Section 16), general semantics provides models which are used for semantic analysis – and in particular, for connecting semantic abstractions to the real world.

13. General phonetics

On the non-semantic side of linguistics, we can produce corresponding models for ‘general phonetics’, which are used in particular for connecting phonological abstractions to the real world. Here we can start with the notion of an unscribed phonetic-image correlate, which we can symbolise as α . Just as a referent (unscribed semantic-image correlate) is a ‘propertyless’ model for a meanable entity, so an unscribed phonetic-image correlate is a ‘propertyless’ model for an individual real-world speech sound (uttered at a particular time and place). All that an unscribed phonetic-image correlate does is to identify this speech sound as existing. (Barry Heselwood has used the term ‘(auditory) perceptual-object’ for what I term here an unscribed phonetic-image correlate; cf. Heselwood 2013: 204.)

We can, however, ascribe an unscribed phonetic-image correlate to a particular category, to produce a phonetic image, which we can symbolise as i . Just as we can symbolise this category in relation to referent (unscribed semantic-image correlate) as a , so we can use this same a in relation to unscribed phonetic-image correlate, and we can also use R to symbolise ‘bringing into a relationship with’ as we did with referent (unscribed semantic-image correlate). Accordingly, phonetic image can be defined as $i = \alpha Ra$.

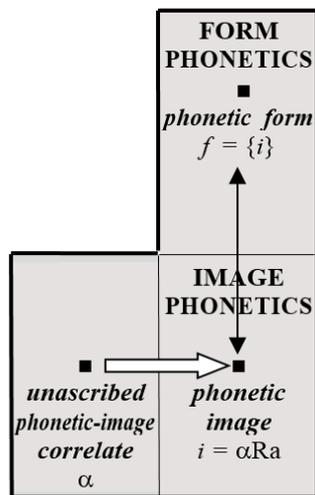
Just as a single referent (unscribed semantic-image correlate) can be categorised in terms of different semantic images (e.g. ‘tree’, ‘oak’, ‘sessile oak’, ‘thing’, ‘hazard’), so can a single unscribed phonetic-image correlate be categorised in terms of different phonetic images. Thus, given an appropriate unscribed phonetic-image correlate, we could categorise this as $[p]$, where $[p]$ is taken to mean any kind of ‘p’ sound (including unaspirated, aspirated, etc.). Alternatively (assuming this is also correct, or appropriate), we could categorise the same unscribed phonetic-image correlate as $[p^h]$, i.e. an aspirated ‘p’, i.e. as a member of a smaller category, properly included within $[p]$. We could, again, ascribe it to a larger category, encompassing ‘p’ sounds, such as $[consonant]$ (where $[consonant]$ designates ‘consonant’; all ‘p’s are also consonants). Or we could ascribe this same unscribed phonetic-image correlate to a category which overlaps with $[p]$, e.g. $[aspirated]$ (some ‘p’s are aspirated, while others are not). This parallels the different ways in which a referent (unscribed semantic-image correlate) can also be variously categorised.

Just as semantic image can be symbolised as j , and defined as $j = \beta Ra$, so phonetic image can be symbolised as i , and defined as $i = \alpha Ra$ (where a is the set-forming criterion). Phonetic image provides a ‘propertyless’ model for an individual speech-sound, occurring at a particular time and place, and thus gives us a basic model which we can use to describe the phonetic data.

Just as we can generalise from semantic image to the entire set of semantic images which are deemed identical apart from their time-space individuality (specificity), giving a semantic form, so we can generalise from phonetic image to the entire set of phonetic images which are deemed identical apart from their time-space individuality (specificity). This gives us a phonetic form. Just as semantic form can be symbolised as g and defined as $g = \{\beta\}Ra$, so phonetic form can be symbolised as f , and defined as $\{\alpha\}Ra$, or as $\{i\}$. Semantic form provides the basic general model which allows us to describe speech sounds not simply as individual occurrences, but as more abstract generalised notions – e.g. the speech sound $[p^h]$, as a general notion, rather than simply a speech sound $[p^h]$ which was uttered in a particular place at a particular time.

We can term the area of enquiry encompassing unascribed phonetic-image correlate, phonetic image and phonetic form *general phonetics*, and we can represent general phonetics as in Figure 9.

Figure 9
General phonetics



Just like the relationship between an entity in phonology (e.g. a phoneme) and an allomorph (Section 9), or that between an entity in abstract semantics and an alloeme (Section 9), the relationship between an unascribed phonetic-image correlate and a phonetic image involves 'transformation' (the 'carrying across' of 'form'), as does the relationship between an unascribed semantic-image correlate /reference and a semantic image /denotable, as indicated by the 'arrows of transformation' (\Leftrightarrow) in figures 8 and 9. Just as the 'vertically related' entities imply one another in Figure 7, so semantic image / denotable and semantic form in Figure 8, and phonetic image and phonetic form in Figure 9 imply one another (\Leftrightarrow).

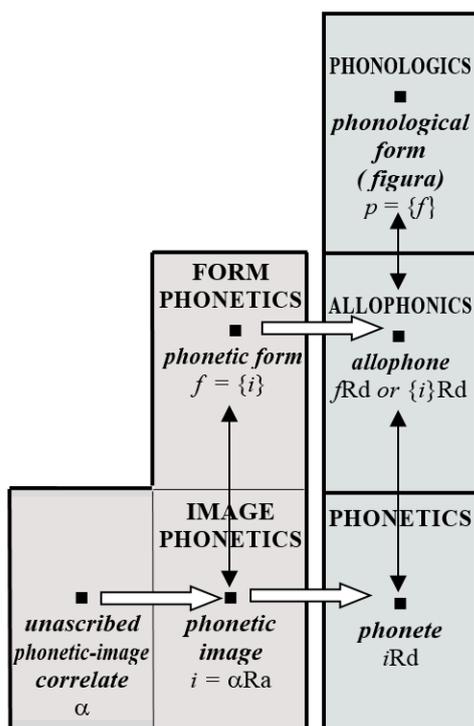
It might be asked why we should provide models of such basicness (primitiveness) as unascribed phonetic-image correlate and unascribed semantic-image correlate (referent). This question is partly answered in practice in Section 14 (in relation to unascribed phonetic-image correlate) and Section 16 (in relation to unascribed semantic-image correlate / referent; for this latter, cf. in particular the example in Section 16 'The surgeon is the goal-keeper'). There is, however, a more fundamental reason. In constructing any model or theory – in this case a theory of linguistics – we should aim to be maximally transparent at all points. This implies building notions up incrementally, starting from the most basic possible notions. In the case of the current theory, unascribed phonetic-image correlate and unascribed semantic-image correlate (referent) are the most basic possible notions, from which all other notions are coherently developed.

14. Relationship between general phonetics and phonology

We can now move on to think in more detail about the relationship between (general) phonetics and phonology. Consider Figure 10 (next page).

The right-hand column in Figure 10 can be compared to Figure 7, which distinguishes in its left-hand column between phonetics and phonology. ‘Phonologies’ in Figure 10 can be equated with ‘phonology’ in Figure 7, and ‘phonological form’ / ‘figura’ in Figure 10 can be equated with ‘phoneme, etc.’ in Figure 7 (the reason for the differences in terminology will be explained later; Section 24). The vertical entities in Figure 10 are all related by mutual implication, while the horizontal ones are related by transformation.

Figure 10



I want now to consider what constitutes a phonological entity, i.e. phonological form (roughly) in Figure 10. A traditional view – and I believe the most coherent view – of what constitutes a phonological entity is that it is an entity which can make a difference to grammatical identity (cf. Figure 7) – i.e. a difference to the identity of a signum / grammatical entity (morpheme, word, phrase, etc.). Thus, the distinction between /ɪ/ and /i/ is a phonological one in English. /ɪ/ and /i/ are different phonemes (for current purposes, I will assume that the distinction between /ɪ/ and /i/ in English is simply one of two contrasting phonemes), because they can be shown to make a difference to grammatical identity, e.g. in distinguishing between ‘sin’ and ‘seen’ (notwithstanding that they don’t always make a grammatical identity difference; cf. ‘bin’ and ‘been’, Section 9). Similarly, in the case of ‘garage’ in British English (cf. Section 18), we can show that /'gæɾɑ:ʒ/ and /'gæɾɪdʒ/ are in fact phonologically different, i.e. that /ɑ:/ and /ɪ/ are phonologically different, because the ‘ɑ:’ vs. ‘ɪ’ distinction elsewhere makes a difference to signum (word) identity, e.g. in ‘Raj’ vs. ‘ridge’, or ‘part’ vs. ‘pit’.

15. Grammatical difference and phonological identity

There are two issues which arise here. The first is how we know what are different grammatical entities (in this case, how do we know, for instance, that ‘sin’ and ‘scene’ are different grammatical entities); I will consider this in Section 18. The second issue which arises is more specifically relevant at this point is: why should it be the case that an ability to make a difference to grammatical identity should demonstrate phonological identity?

The answer to this goes to the heart of functionalist thinking – as the term ‘functional’, or ‘functionalist’ is understood in axiomatic functionalism. The basic theoretical statement of extended axiomatic functionalism (also of Mulder and Hervey’s ‘standard axiomatic functionalism’) is Axiom A: *All features in semiotic sets are functional* (Dickins 2009; also Mulder and Hervey 2009). This is then defined by the first definition, Def. 1a: ‘*Functional*’ for ‘*separately relevant to the purport of the whole of which it is a part*’ (Dickins 2009; also Mulder and Hervey 2009). We also need to think of languages as not only being systems (systematic), but as consisting of interrelated (interlocking) systems. At the apex of this system in the signum ontology is the signum (signa being grammatical entities, in the case of natural language); all the other systemic entities – in phonology (Figure 7, Figure 10) and (abstract) semantics (Figure 7) – are ultimately dependent on signa. If a putative entity in phonology or (abstract) semantics does not make a difference somewhere in the overall system in terms of signum identity (grammatical identity), this putative phonological or (abstract) semantic entity is not in fact an entity at all.

Accordingly, if a sound difference – e.g. the difference in English between light ‘l’ (occurring in onset position in the syllable) and dark ‘l’ (occurring in coda position in the syllable) – never makes a difference to grammatical identity (e.g. word identity) anywhere in the system of English, this sound difference is not a phonological difference – i.e. we do not have two phonological entities (phonemes, in this case), but merely one, with ‘variants’ (i.e. allophones, to be discussed below).

Another way of dealing with this issue is to see what the alternative would be. We will, accordingly, consider what the results would be if we were to allow sound differences which do not somewhere in the overall system (e.g. of English) make a difference to signum identity (grammatical identity) to be regarded as instances of phonological differences. I will take again the example of light ‘l’ and dark ‘l’ in English.

It might be thought that this would result in a strictly limited addition to the phoneme inventory of English: instead of having one /l/ phoneme English (realised as dark ‘l’ or light ‘l’ according to its position, in the onset or the coda of the syllable), we would have two ‘l’ phonemes: /l/ (realised as dark ‘l’, occurring in coda position), and /l/ (realised as light ‘l’, occurring in onset position). This conclusion, however, is wrong; and to understand why it is wrong, it is useful to return to Figure 10.

Figure 10 introduces a notion not found in earlier comparable figures – and particularly Figure 7: that of the allophone. As discussed earlier, to arrive at phonetic image *i*, from unascribed phonetic-image correlate α , one needs to bring unascribed phonetic-image correlate into a relationship R with a set-forming criterion *a*. Thus $i = \alpha Ra$ (figures 9 and 10). A phonetic image is just a model for a speech sound (uttered at a particular time and place). It does not bear any relationship to a phonological entity. Thus, if I utter the sound [p^h] at 11.43 am on June 25, 2014 in room 4.05 in the Michael Sadler Building, University of Leeds,

England, and I simply note this as a specific, individual speech sound, this – or rather the model for this – is a phonetic image.

If, however, I categorise this individual speech sound [p^h] as being a realisation of the phonological entity (phoneme) /p/ in English (e.g. occurring in the word ‘pit’), this is no longer just a phonetic image, but what is termed in extended axiomatic functionalism a phonete.

Like a phonetic image, a phonete still has time-space individuality (specificity), but it also has something more – the bringing into a relationship with a phonological identity (in the case of [p^h] discussed immediately above, this phonological identity is the English phoneme /p/). Just as a phonetic image is defined as $i = \alpha Ra$ (unascribed phonetic-image correlate brought into a relationship R with a set-forming criterion a), so a phonete is defined as a phonetic image i (or αRa) brought into a relationship R with a phonological entity/identity (in the case English /p/, this is a phoneme) – phonological entity/identity being symbolised as d. Thus, a phonete is defined as iRd .

It was argued above that one can have sets of phonetic images which are identical except for their time-space individuality (specificity): these are phonetic forms (Figure 9), phonetic form being symbolised as f and defined as $f = \{i\}$. One can, correspondingly, have sets of phonetes which are identical except for their time-space individuality (specificity). These sets of phonetes are allophones. As a set of phonetes, an allophone can be defined as $\{i\}Rd$ (i being a phonetic image and iRd being the formula for a phonete, as already noted). Allophone can also, equivalently, be considered as a phonetic form f , brought into a relationship with a phonological entity/identity, i.e. as fRd .

Figure 10 thus introduces a further level which is missing in Figure 7 – the level of allophonics, which stands between that of phonetics (used technically in extended axiomatic functionalism to mean the level of phonetes) and that of phonology – or what is technically termed phonologics in extended axiomatic functionalism, for reasons which will be explained in Section 24.

We can now return to an issue raised earlier in this section: why sound differences which do not anywhere in the overall system (e.g. of English) make a difference to signum identity (grammatical identity) cannot coherently be regarded as instances of phonological differences. The example given earlier was that of light ‘l’ and dark ‘l’ in English. I noted that it might be concluded that this would result in a strictly limited addition to the phoneme inventory of English: instead of having one /l/ phoneme English (realised as dark ‘l’ or light ‘l’ according to its position, in the onset or the coda of the syllable), we would have two ‘l’ phonemes: /l/ (realised as dark ‘l’, occurring in coda position), and /l/ (realised as light ‘l’, occurring in onset position). I will here consider in more detail why this conclusion is wrong.

The problem with this analysis is that it is based on the false premise that English intrinsically only has two ‘l’ sounds – dark ‘l’ [ɫ], and light ‘l’ [l]. In fact, as seen, we can categorise sounds in numerous – in fact innumerable – ways. An example given earlier was that of an English sound, which we might categorise as [p] (taken to be indeterminately aspirated or unaspirated) or [p^h], or *consonant*] or even [*aspirated*]. We can similarly say, if we like, that English has one ‘l’ sound (indeterminately dark or light), or two ‘l’ sounds, dark ‘l’ [ɫ], and light ‘l’ [l]. However, we might also say that English has more ‘l’ sounds than this – vastly more if we like – on the basis, for example, of degree of darkness. Thus, the final ‘l’ of ‘pill’, ‘pall’ and ‘pull’ is in all cases dark. However, the ‘l’ of ‘pall’ is darker than that of ‘pill’,

and the 'l' of 'pull' is darker than that of 'pall' (as Janet Watson has pointed out to me). The three 'l's could thus be recognised as three distinct phonetic images – and thus by extension three distinct allophones in English – under a fairly delicate phonetic analysis. Detailed phonetic research suggests that there is no reason to regard dark [ɫ] and light [l] as categorially distinct phonetic entities in English, the general darkness or lightness of the 'l' varying non-discretely and predictably as a factor of its specific phonetic environment (Sproat and Fujimura 1993; cf. also Dickins 1998: 422).

The analysis of phonetic images – and, thus, by extension phonetic forms, phonemes and allophones – is thus ultimately 'arbitrary', using the term 'arbitrary' in the specifically Saussurean sense, i.e. that it could (and can) be done differently (Saussure [1916] 1983: 67-68). This is not to claim that phonetic analysis is random: it has to be not only accurate (within reasonable tolerances), but also appropriate to the task in hand. Thus, if we are interested in capturing fine phonetic differences, we have to employ a phonetic analysis which recognises a large number of different categories.

The crucial notion in phonetic analysis is what I earlier termed the 'set-forming criterion', notated as *a* in extended axiomatic functionalism. In establishing phonetic images (also, by extension, phonetic forms, phonemes and allophones), this set-forming criterion, *a*, is 'arbitrary'.

There is, however, another set-forming criterion, *d*, which is used for establishing phonemes, allophones, and phonological entities (phonemes), etc. This set-forming criterion is non-arbitrary, since it employs a consistent principle, which has already been discussed: namely, that a putative phonological entity (phoneme, etc.) really is a phonological entity if and only if it 'yields' a signum (grammatical) difference somewhere in the overall system of the language. This principle allows us to say that the difference between dark 'l' and light 'l' in English is not phonological (no English grammatical entities – words, etc. – are distinguished by this difference), but that the difference between 'p' and 'b' is phonological in English (many English grammatical entities – words, etc. – are distinguished by this difference, e.g. 'bin' and 'pin').

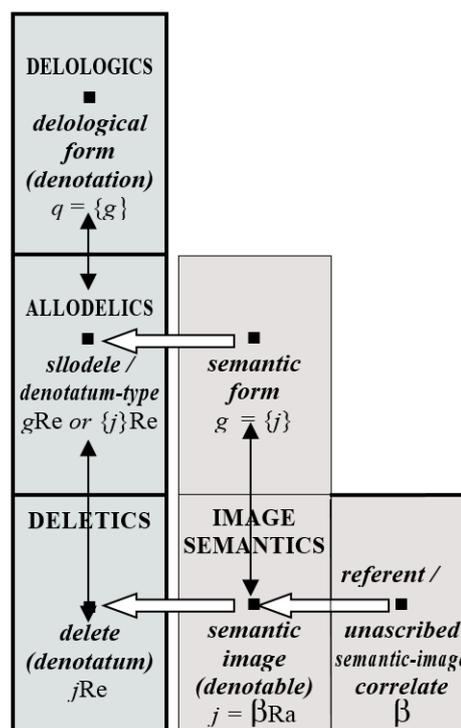
It should be noted that it is the *potential* for a sound difference to make a difference to grammatical identity (signum identity) which is the criterion for phonological difference. This does not necessarily mean that such a sound difference will make a difference in every case. Phonological differences do not make a difference to grammatical identity (signum identity) in the case of allomorphs, such as /'gæɾɑ:z/ and /'gæɾɪdʒ/ in British English (Section 9), involving the phonological difference /ɑ:/ vs. /ɪ/. The second point is that sound differences which 'express' phonological identity do not in practice occur at all possible points in a language.

Fundamental linguistic identity in extended axiomatic functionalism relies on the deployment of a non-arbitrary set-forming criterion – whether in phonology, grammar (signum-level), or (abstract) semantics – a criterion known technically as *distinctive function*. Distinctive function is striking because it gives rise to the minimum number of entities needed to describe a system: only entities which are needed are established as existing. Thus, we do not need more than one /l/ phoneme to describe the phonological system of English, but we do need both a /p/ and a /b/. The employment of distinctive function as a set-forming criterion is thus intended to allow for the simplest possible analysis of the given language.

16. Relationship between general semantics and delology

Having considered general phonetics (covering the entities unascribed phonetic-image correlate, phonetic image, and phonetic form) as well as phonologics/phonology (covering the entities phonological entity/form, allophone and phonete) in Figure 10, I turn now to the corresponding notions in relation to semantics, as represented in Figure 11.

Figure 11



The left-hand column in Figure 11 can be compared to Figure 7, which distinguishes in its right-hand column between abstract semantics and concrete semantics. ‘Delogics’ in Figure 11 can be equated with ‘abstract semantics’ in Figure 7, while ‘deletics’ (Figure 11) can be equated with ‘concrete semantics’ (Figure 7). The vertical entities in Figure 11 are all related by mutual implication, while the horizontal ones are related by transformation.

Just as a phonete is a phonetic image i brought into a relationship R with a phonological distinctive function d – i.e. iRd (Figure 10), so a delete/denotatum is a semantic image / denotable j brought into a relationship R with a delogical distinctive function e , i.e. jRe (Figure 11). Delete/denotatum thus provides a model for an individual unascribed semantic-image correlate / referent β , which is both ascribed to a general category a , and considered as a realisation (in fact an individual instantiation) of a delogical form / denotation (i.e. an ‘abstract semantic’ entity), i.e. further ascribed to a semantic distinctive function category e .

To give a practical example, we can think of an unascribed semantic-image correlate / referent (a ‘propertiless’ model for an entity in the ‘world’), i.e. a β , that we can (reasonably) ascribe to the category, i.e. R , of ‘civil engineer’, i.e. an a . We thus have a semantic image / denotable, i.e. a j , ‘civil engineer’. We can, however, further relate this semantic image / denotable to the meaningful aspect of something said, for example the delogical (‘abstract

semantic’) entity ‘engineer’ (= ‘person who makes engines, structures, or systems’: Oxford English Dictionary Online), giving a delete, i.e. jRe , ‘civil engineer’ instantiating the delogical form / denotation ‘engineer’.

We can then generalise away from an individual instance of ‘civil engineer’, a delete/denotatum instantiating the delogical form / denotation ‘engineer’, to give an allodele/denotatum-type ‘civil engineer’ (paralleling allophone, in Figure 10). Thus, we can, for the sake of argument, conceive of there being three types of engineer ‘civil engineer’, ‘electrical engineer’, and ‘chemical engineer’. Just as [h] and [ɪ] can be analysed as allophones of the phoneme /h/ in English, so [*civil engineer*], [*electrical engineer*] and [*chemical engineer*] can be analysed as allodeles/denotatum-types of the delogical form / denotation /*engineer*/ in English. (I have used square brackets to mark allodeles/denotatum-types, paralleling the use of square brackets to mark allophones, and slant brackets to mark delogical forms / denotations (thus /*engineer*/) paralleling the use of slant brackets to mark phonological forms/entities.)

Just as an allophone can be defined as a set of phonetic images, i.e. $\{i\}$, phonetic image being i , so an allodele/denotatum-type can be defined as a set of semantic images / denotables, $\{j\}$, semantic image / denotable being j . Alternatively, just as an allophone can also be defined as a phonetic form f , brought into a relationship R with a phonological set-forming criterion d, i.e. allophone can be defined as fRd , so allodele/denotatum type can be defined as a semantic form g , brought into a relationship with a delogical (‘abstract semantic’) set-defining criterion e, i.e. allodele/denotatum-type can be defined as gRe .

It is useful here to consider why the *referent+ascription* model (*unascribed semantic-image correlate+set-forming-criterion* model) is particularly useful in describing ‘meanable entities’. Consider the following:

- (1) The surgeon is the goalkeeper.

In 1 (which might be said in the context of a discussion of the members of a hospital-staff football team), the referent (unascribed semantic-image correlate) of both ‘surgeon’ and ‘goalkeeper’ is the same – i.e. these two words refer to the same ‘entity’. This ‘entity’ might be correctly referred to in any number of other ways: ‘man’, ‘employee’, ‘father’, ‘drunkard’, ‘genius’ (assuming these all to be reasonable). ‘Surgeon’ and ‘goalkeeper’ in ‘The surgeon is the goalkeeper’ do not therefore mean different (have different meanings) on the basis of their referents / unascribed semantic-image correlates (or rather single referent / unascribed semantic-image correlate). Rather, they mean different because they ascribe the ‘entity’ in question to different types, i.e. sets: in the first case to the set of surgeons, and in the second to the set of goalkeepers. For more detailed discussion of the notions referent / unascribed semantic-image correlate and ascription, see Dickins (1998: 105–117 – though the notions, as discussed there, are less well integrated into the overall model of extended axiomatic functionalism than they are in this article). The *referent+ascription* model thus separates out two quite distinct aspects of meaning: what is referred to, and the way in which it is being referred to.

Just as a phonological entity, i.e. phonological form (roughly), p in Figure 10 is a set of allophones, i.e. $p=\{f\}Rd$, so an ‘abstract semantic’ entity – or what is termed in Figure 11 a ‘delogical form’ / ‘denotation’ – q is a set of allodeles/denotatum-types, i.e. $q=\{g\}Re$.

Thus, taking the delogical form / denotation /*engineer*/ as an example, we might deem this to have three allodeles/denotatum-types [*civil engineer*], [*electrical engineer*] and [*chemical engineer*]. The number of allodeles/denotatum-types a delogical form / denotation is deemed to have is a function of the number of categories, *a*, which we establish for semantic images and, by extension, semantic forms – just as the number of allophones a phonological form/entity is deemed to have is a function of the number of categories *a* we establish for phonetic images and, by extension, phonetic forms (as discussed above). The decision about how many categories to establish for phonetic/semantic images and, by extension, phonetic/semantic forms is ultimately arbitrary (though it needs also to be appropriate to the degree of precision which we need, or want, for our analysis).

17. Grammatical difference and delogical identity

I argued above (Section 15) that the criterion of existence for a phonological entity (phoneme, etc.) is whether somewhere in the system it reflects a difference in signum/grammatical identity. It might appear that the same criterion can be adopted for establishing delogical/denotational identity. Unfortunately, this is not the case.

Thus, it might appear that if the meaning-distinction between ‘civil engineer’, ‘electrical engineer’ and ‘chemical engineer’ somewhere in the system makes a difference to signum/grammatical identity, then the word (signum) ‘engineer’ (= ‘person who makes engines, structures, or systems’: Oxford English Dictionary Online) corresponds to three distinct delogical/denotational forms/entities ‘civil engineer’, ‘electrical engineer’ and ‘chemical engineer’, i.e. there are three separate, contrasting senses (delogical/denotative forms/entities) involved in relation to ‘engineer’. That this is not the case seems evident from the fact that in describing a person as an ‘engineer’, we may be simultaneously saying that he/she is both a civil and an electrical engineer (or a civil and a chemical engineer, or a civil and an electrical and a chemical engineer, etc.) without any of the semantic manipulation (simultaneous double-meaning) involved in what is known as *zeugma*. (For more discussion of this issue, see Dickins 2014b; Section 4). That is to say, ‘engineer’ (= ‘person who makes engines, structures, or systems’) involves only one sense (delogical form / denotation).

This difference between phonology and delogology in relation to signum/grammatical identity goes back to a fundamental difference between sound (or equivalent written marks in writing, etc.) and meaning. Sounds (or equivalents in writing) are immediate in relation to language: speech, in an obvious sense, consists directly of sounds. Meaning (i.e. what is meant), by contrast, is ‘mediate’: in an obvious sense it is not part of language, but something which language ‘points to’.

Consider the following example, of speech sounds: 1. [p] i.e., in this context, any kind of ‘p’ whether aspirated or unaspirated; 2. [p^h] i.e. aspirated ‘p’; and 3. [p[̄]] i.e. unaspirated [p]. The set of all examples of [p] (i.e. ‘p’, whether aspirated or not) properly includes the set of all examples of [p^h] (aspirated ‘p’) and the set of all examples of [p[̄]] (unaspirated ‘p’). It is – normally at least – impossible, for practical reasons of the ‘immediacy’ of phonetic realisations for a language to have a phoneme whose realisations exactly properly include those

of two other phonemes where these occur in the same contexts.⁴ In this light, consider the relevant practical consequences of positing a phoneme /b/ in English whose realisations exactly covered (properly included) the realisations of both /b/ and /p/. Take now the case of a phonetic image [p], which we wished to analyse in relation to phonological identity – i.e. as a phoneme. We would never know whether a [p] was in fact the realisation of the putative phoneme /b/ or the phoneme /p/. Both analyses would seem to be equally valid.

Of course, the fundamental problem with this example is that the phoneme /b/ should never have been posited in the first place. It is unnecessary for the description of English – and should not therefore be proposed on the grounds of making our analysis of English more complex than it needs to be. However, this example also illustrates another general point: that ‘super-phonemes’ of the putative English /b/ type both introduce an unnecessary analytical complication, and are impossible to operate with coherently.⁵

⁴ Cf. however, the archiphoneme (e.g. Dickins 2007: 14–15; Dickins 2009, Def. 7a⁴), which ‘corresponds’ to two (or more) more basic phonemes, but does not occur in the same contexts as these phonemes; an archiphoneme may have realisations which exactly properly include its two ‘constituent’ phonemes.

⁵ There is, however, one type of situation where a ‘super-phoneme’ analysis might be not only be possible but unavoidable. Let us start with a real situation which occurs in American English. In most dialects of American English, /d/ and /t/ are normally both realised intervocally with a medial flap (or *median tap* in the IPA system) [ɾ]. Thus pairs like ‘ladder’ and ‘latter’ are typically pronounced identically. In careful speech, however, the former will have a [d] and the latter a [t] (as noted in Port and O’Dell 1985: 465; cf. discussion in Dickins 2007: 15–16). The phonological distinction between /d/ and /t/ in this intervocalic context in English is demonstrated by the fact that there are realisations (pronunciations) of ‘ladder’ (those with an intervocalic [d]) which cannot also be realisations of ‘latter’, and realisations (pronunciations) of ‘latter’ (those with an intervocalic [t]) which cannot also be realisations of ‘ladder’. Where there is a medial [ɾ], this may be a realisation of either /d/ or /t/.

Consider now, however, a situation in which there was a third American English word (in addition to ‘ladder’ and ‘latter’). We can represent this third imaginary word graphically as ‘ladder’ (and assign it a sense, if we like, e.g. ‘baby vampire bat’). Let us imagine that the phonological entity represented by ‘dd’ in the middle of this word can be realised as either [d], [t] or [ɾ]. We might initially try to analyse ‘ladder’ as having two allomorphs (i.e. two variant phonological forms; Section 9), one with an intervocalic /d/ and the other with an intervocalic /t/. This analysis would, however, fall down when we came to consider realisations of ‘ladder’ having intervocalic [ɾ] (which would, in fact, be the great majority of its realisations given the dominance of [ɾ] as the realisation of both intervocalic /d/ and intervocalic /t/). Where the phonological entity ‘d’ in ‘ladder’ was realised as [ɾ], it would be impossible to say whether the phoneme which it realised was /d/ or /t/ – whether we deemed the phoneme in question to be /d/ or /t/ would be entirely arbitrary.

Arbitrary analyses are unacceptable in a scientific approach (which extended axiomatic functionalism seeks to be) and are therefore to be eliminated if at all possible (where they cannot be eliminated, this shows that the overall approach, i.e. theory, is not scientific in these respects). Accordingly, we need another, non-arbitrary, analysis. This can be achieved by analysing the ‘d’ in ‘ladder’ as a single super-phoneme, which subsumes both /d/ and /t/. Thus, if for the sake of argument, we analyse /d/ as comprising the distinctive features (also known as phonids in extended axiomatic functionalism) /alveolar, stop, lenis/, and /t/ as comprising the distinctive features /alveolar, stop, fortis/, we can analyse ‘d’ as a third phoneme /d̄/ comprising only the distinctive features /alveolar, stop/ and having the realisations (allophones) [d], [t] and [ɾ] – i.e. the full range of realisations of intervocalic /d/ and /t/. This ‘super-phoneme’ would be like an archiphoneme (cf. Dickins 2007: 14–15, for a discussion of the archiphoneme in extended axiomatic functionalism) in that it involves ‘annulment’ of an opposition (in the case of the /d̄/ in ‘ladder’, ‘annulment’ of the opposition ‘fortis’ vs. ‘lenis’). However, the ‘super-phoneme’ would also be different from an archiphoneme in that the archiphoneme only occurs in contexts where the two (or more) basic phonemes which ‘constitute’ it do not occur, whereas the

The ‘mediacy’ of semantics, by contrast, means that the same principles do not apply. Take the example of ‘sibling’, ‘brother’ and ‘sister’ (in the basic ‘family-relation’ senses in all cases). Let us take it that the delogical form / denotation of ‘sibling’ exactly properly includes those of both ‘brother’ and ‘sister’. By analogy with the situation in phonology and its realisations, this would lead us to say that ‘sibling’ corresponds to (has) two contrasting senses – i.e. relates to two delogical forms / denotations: 1. ‘brother’; and 2. ‘sister’. This, however, is not right: ‘sibling’ does not correspond to two contrasting senses. Rather it corresponds to a single sense, covering the full range of both ‘brother’ and ‘sister’. Thus in delology, unlike in phonology, there are cases (in fact many cases) in which one delogical form/entity / denotation properly includes another.

This leads to a more fundamental question. If the criterion of ‘making a difference to signum / grammatical identity somewhere in the system’ which applies to phonology does not apply to delology, how do we determine in delology what are separate delogical entities / denotations? The easiest way to approach this question is to consider a single word (as a signum / grammatical entity) in relation to putatively distinct delogical forms / denotations. Our starting point is the same as in phonology (cf. the discussion of English dark ‘l’ and light ‘l’ as putatively different phonemes, above): that we do not establish entities unless we need them, on the basis that the fewer entities we establish, the simpler our analysis, simpler analyses being preferred in all cases (all other things being equal) to more complex ones. This principle also operates, of course, in establishing signa / grammatical entities.

The most basic criterion for establishing (i.e. being required to establish) delogical difference is contrastivity in the same context. To take a practical example, consider the word / signum ‘do’ in English. As discussed in Dickins (1998: 221–222), ‘do’ in ‘I want to do my hair’ can be used to mean, among other things, ‘I want to wash my hair’, or ‘I want to dry my hair’, or ‘I want to comb my hair’. Does this mean that ‘do’ corresponds to (has) three distinct delogical forms / denotations? The answer is ‘no’, for the principle reason that there is no contrastivity between the meanings of ‘do’ – ‘wash’, ‘dry’ and ‘comb’. This is clear from the fact that ‘I want to do my hair’ could mean simultaneously, ‘I want to wash and dry my hair’, ‘I want to wash, dry, and comb my hair’, or any other combination involving these three. It could equally cover many other things, and combinations of other things.

By contrast the signum (word) ‘garage’ in the meanings 1. “Building, either private or public, intended for the storage and shelter of motor vehicles while not in use”; and 2. “Commercial establishment that sells petrol, oil, and similar [...]”, does seem to illustrate contrastivity in the same – or at least a very close – context. Thus, an utterance such as “The council banned him from using his garage as a garage”, i.e. *the council banned him from using his building [...] intended for the storage and shelter of motor vehicles while not in use as a commercial establishment that sells petrol, oil, and similar products* seems a reasonable utterance in a way that “I did [i.e. combed] my hair, but I didn’t do [i.e. wash] it” does not. Thus, it seems reasonable to say that the senses of garage 1. “Building, either private or public, intended for the storage and shelter of motor vehicles while not in use”; and 2. “Commercial establishment that sells petrol, oil, and similar products [...]” are alloemes (cf. Section 8).

‘superphoneme’ would occur in the same context in which the two (or more) basic phonemes which ‘constitute’ it also occur.

Whether or not ‘superphonemes’ in fact occur in natural language is a matter for empirical investigation. The point being made here is that logically they could occur.

The question of what constitute different senses (delogical forms / denotations) is, in fact, notoriously tricky. Cruse (1986: 58–72) is particularly good on the issue. I have tried to address some of the more involved problems from an extended axiomatic-functionalist perspective in Dickins (1998: 198–225).

18. Determining signum identity and difference

As has been seen (Section 9), extended axiomatic-functionalism allows for both allomorphy (one signum / grammatical entity, more than one phonological form) and allosemy (polysemy) (one signum / grammatical entity, more than one delogical form / denotation). Thus, ‘garage’ in British has the allomorphs /gæɾɑ:ʒ/ and /'gæɾɪdʒ/, and the allosemes (amongst others): 1. “Building, either private or public, intended for the storage and shelter of motor vehicles while not in use”; and 2. “Commercial establishment that sells petrol, oil, and similar products and freq. also undertakes the repair and servicing of motor vehicles”. As the example of ‘garage’ illustrates a single signum (in this case, word) may have both allomorphs and allosemes.

Conversely, identity of phonological form or delogical form /denotation is not a guarantor of shared signum identity. Thus (as discussed in Section 9), /bɪn/ = ‘receptacle’ and /bi:n/ = past participle of verb ‘to be’ two different signa (they are homomorphs), while the abstract semantic entity (meaning, sense), CH₂O (as a chemical formula) realises the signa (grammatical entities) ‘methanal’ and ‘formaldehyde’; ‘methanal’ and ‘formaldehyde’ are homosemes.

Allomorphy, allosemy (polysemy), homomorphy and homosemy are all intuitively sensible notions: not only do speakers regard ‘garage’ as one word regardless of how it is pronounced or what it means. They also regard ‘bin’ and ‘been’ as different words even when they are both pronounced /bɪn/, and ‘methanal’ and ‘formaldehyde’ as different words, even though they both share the same sense.

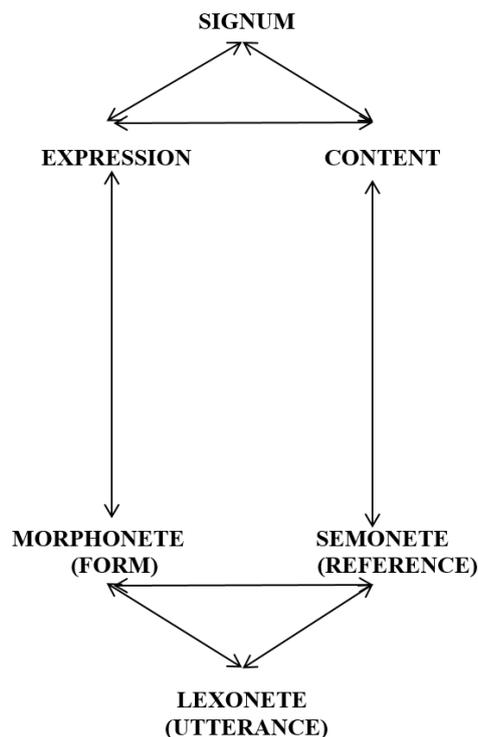
Analytical problems occur, however, in drawing the boundary between allosemy (polysemy) and homomorphy on the one hand, and between allomorphy and homosemy, particularly where there is phonological or delogical (denotational) identity between two forms. Consider the following case of phonological identity. How can we be sure whether *crane*, and the associated meanings (1) large long-necked, long-legged wading bird of the family Gruidae, and (2) a device for lifting and moving heavy objects (definitions from Collins English Dictionary) involves two senses of one word (signum), i.e. allosemy (polysemy), or two distinct words (signa) which have the same phonological form (homomorphy)? Similarly, when there are two phonologically distinct – but similar – forms sharing an identical sense (delogical form /denotation) how can we be sure whether we have a single signum (allomorphy), or two signa (homosemy)? I will not pursue these issues here. I have, however, discussed them at length in Dickins (1998: 195–198, 247–151, and elsewhere), where I argue that: 1. Allowing allomorphy and allosemy (polysemy) – also homomorphy and homosemy – introduces a non-scientific element into extended axiomatic functionalism; 2. However, not to accept them would yield a theory which was not only grossly counter-intuitive in respect of language-users’ views of language, but would also run counter to the ‘everyday metalanguage’ which we use to describe language, and which is therefore, also, something

which a complete linguistic analysis would need to account for (Dickins 1998: 197). Accordingly, while eliminating allomorphy and allosemy (polysemy) – also homomorphy and homosemy – would apparently render the theory more scientific, this would be at an unacceptable cost in terms of its overall adequacy in allowing for acceptable descriptions of languages.

19. Lexonete (utterance) as biunity of morphonete (form) and semonete (reference)

In Figure 5, I presented a signum as a biunity of expression and content, while in Figure 6 and Figure 7, I presented the notion of utterance. Paralleling the signum, an utterance (in this technical sense) – also termed in extended axiomatic-functionalism a lexonete – can be presented as a biunity of a morphonete (also termed a *form*) and a semonete (also termed a *reference*), as in Figure 12.

Figure 12
Signum as biunity of expression and content, and lexonete (utterance) as biunity of morphonete and semonete



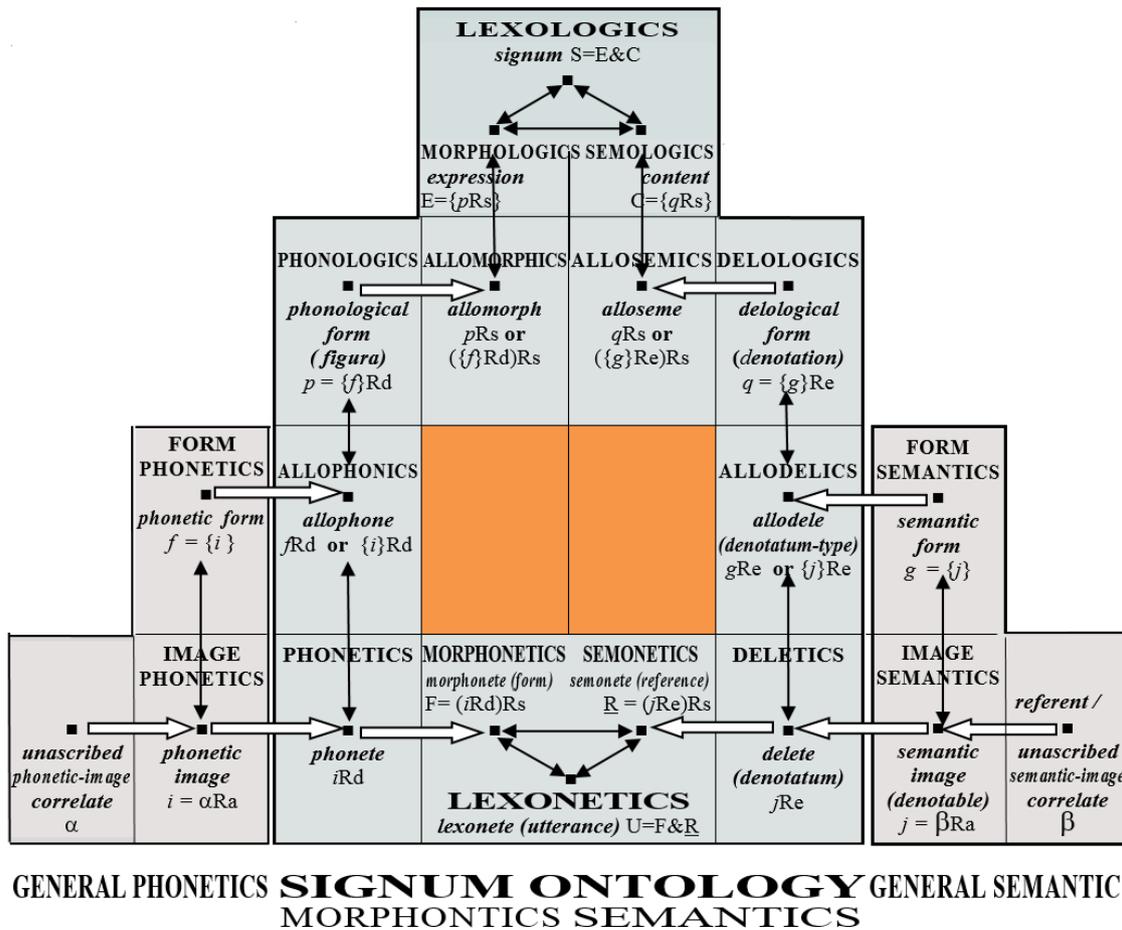
As in previous diagrams, the double-headed arrows indicate mutual implication. Thus not only do morphonete/form and expression imply one another, as do semonete/reference and content (and in fact lexonete/utterance and signum, though this is not shown on the figure), but so do all the entities in the lexonete/utterance–morphonete/form–semonete/reference triangle, and all the entities in the signum-expression-content triangle. I will discuss in more

detail in the next section the notions lexonete (utterance), morphonete (form), and semonete (utterance).

20. Towards a complete signum ontology

Consider Figure 13. It is largely a combination of figures which have been previously presented in this paper. Thus general phonetics was presented in Figure 9 and general semantics in Figure 8. The cells covering the areas of enquiry of phonologics, allophonics and phonetics are added to general phonetics in Figure 10, and the cells covering the areas of enquiry of delogics, allodelics and deletics are added to general semantics in Figure 11. The cell covering signum, expression and content is presented in Figure 5, and the cell covering lexonete (utterance), morphonete (form), and semonete (reference) is added in Figure 12. Cells covering allomorph and alloseme are presented in a simplified 'precursor' version of the theory in Figure 7.

Figure 13
Virtually complete signum ontology



Here, I will look in more detail at the notions found in the central cells of Figure 13, i.e. giving the area(s) of enquiry first identified in each cell first, followed by the names of no-

tions relating to these areas of enquiry in brackets: (i) lexologies, morphologies and semologies (signum, expression, content), (ii) allomorphics (allomorph), (iii) allosemics (alloseme), and (iv) lexonetics, morphonetics and semonetics (lexonete/utterance, morphonete/form and semonete/reference).

I shall begin with a consideration of allomorph and alloseme. These have already been discussed in outline in Section 8. An example of allomorphs given there was the two phonologically different forms (realisations) in British English of the word (signum) ‘garage’, /'gæɹɑ:ʒ/ and /'gæɹɪdʒ/. It was seen in Section 15 that the ‘change’ from a phonetic form to an allophone (also from a phonetic image to a phonete) is achieved, through *transformation*, by bringing allophone into a relationship with the phonological set-forming criterion, or what is more technically known as phonological distinctive function.

Similarly, the ‘change’ from a phonological form to an allomorph is achieved also, through transformation, by the bringing of the phonological form into a relationship with a set-forming distinctive function. But in this case, the distinctive function is grammatical (i.e. that of the signum). Phonological form is symbolised as p or as $\{f\}Rd$, bringing-into-a-relationship-with (transformation) as R , and grammatical distinctive function as s . An allomorph is accordingly defined as pRs , or as $(\{f\}Rd)Rs$.

Turning now to the alloseme, an example of allosemes given first in Section 5, was the two senses of ‘garage’: 1. “Building, either private or public, intended for the storage and shelter of motor vehicles while not in use”; and 2. “Commercial establishment that sells petrol, oil, and similar products [...]”. As was seen in Section 16, the ‘change’ from a semantic form to an allodele / denotatum-type (also from a semantic image /denotable to a delete / denotatum) is achieved by bringing allodele / denotatum-type into a relationship with the delological set-forming criterion (transformation), or what is more technically known as delological distinctive function.

Similarly, the ‘change’ from a delological form /denotation to an alloseme is achieved also by the bringing of the delological form /denotation into a relationship with a set-forming distinctive function (transformation). But in this case, the distinctive function is grammatical (i.e. that of the signum). Delological form /denotation is symbolised as q or as $\{g\}Re$, bringing-into-a-relationship with (transformation) as R , and grammatical distinctive function as s . An alloseme is accordingly defined as qRs , or as $(\{g\}Re)Rs$.

Having considered allomorph and alloseme, we can look ‘upwards’ to signum / grammatical entity, expression and content in Figure 13, and ‘downwards’ to lexonete/utterance, morphonete/form and semonete/reference. Just as a phonological form/entity is a set of allophones, and a delological form /denotation is a set of allodeles/denotatum-types, so an expression is a set of allomorphs, and a content is a set of allosemes. Expression is symbolised as E and defined as $\{p\}Rs$ (i.e. $E=\{p\}Rs$), while content is symbolised as C and defined as $\{q\}Rs$ (i.e. $C=\{q\}Rs$). Thus the expression of the signum $\{garage\}$ in British English is a set consisting of its two allomorphs /'gæɹɑ:ʒ/ and /'gæɹɪdʒ/. Similarly the content of the signum ‘garage’ in British English is the set of all its allosemes, two which are “Building, either private or public, intended for the storage and shelter of motor vehicles while not in use”; and “Commercial establishment that sells petrol, oil, and similar products [...]”. As already noted (Section 6), signum / grammatical entity, S , is a biunity of expression and content, i.e. $S=E\&C$.

Looking ‘downwards’ now to lexonete/utterance, morphonete/form and semonete/reference in Figure 13, a morphonete/form, symbolised F , can be defined as a phonete iRd brought into a relationship R with a grammatical distinctive function s . Thus: $F=(iRd)Rs$. Semonete/reference, symbolised \underline{R} , can be defined as a delete/denotatum jRe brought into a relationship R with a grammatical distinctive function s . Thus: $\underline{R}=(jRe)Rs$. Morphonete/form thus incorporates both phonological and grammatical distinctive function into its definition, while semonete/reference incorporates both delogical and grammatical distinctive function into its definition.⁶

21. Complete signum ontology

Figure 13 has two empty cells in the middle of the diagram, marked in orange. Figure 14 (next page) fills these two cells in, to provide a complete visual representation of what is known as the signum ontology in extended axiomatic functionalism.

The two additional notions introduced in Figure 13 are allomorphon and allosemon/reference-type. I will discuss these in Section 22 and Section 23 immediately below.

22. Nature and practical use of allomorphon

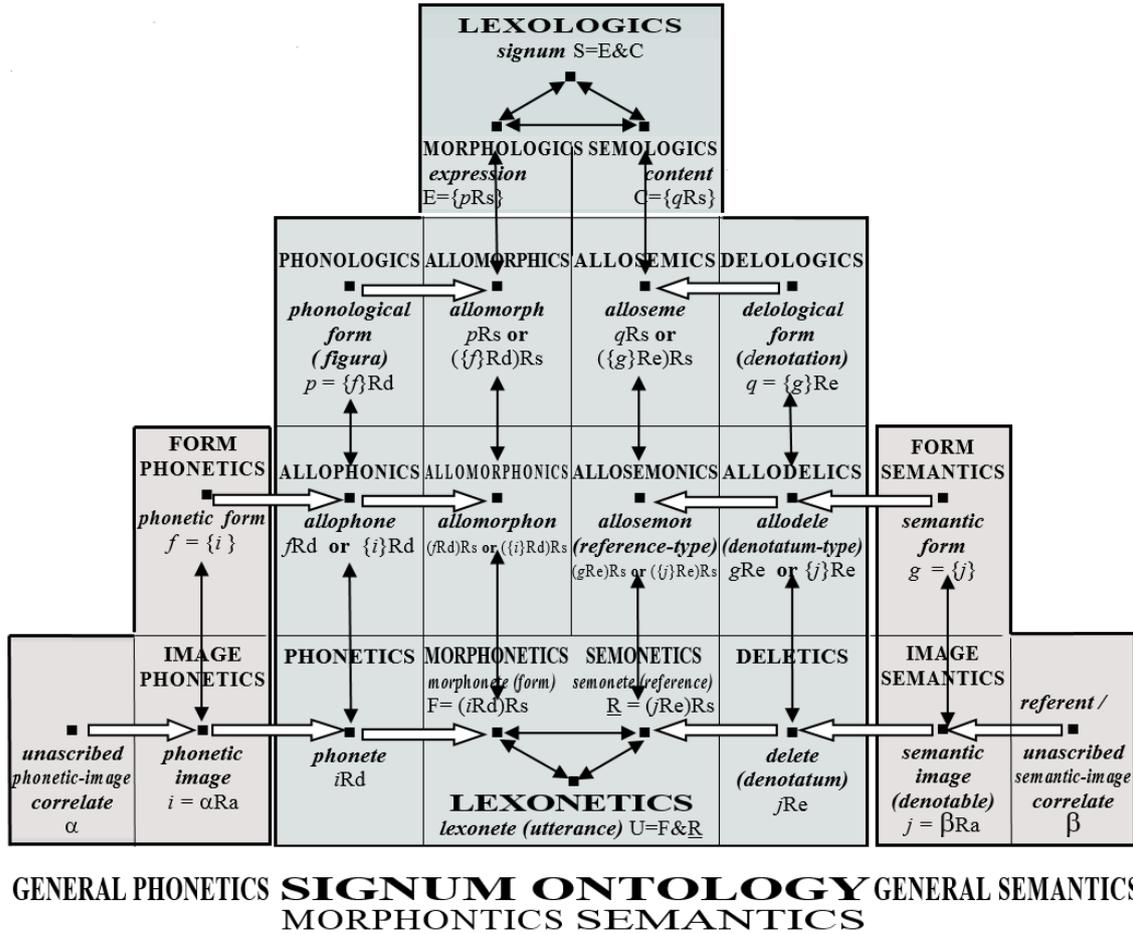
The allomorphon is a set of morphonetes/forms, a morphonete/form being F or $(iRd)Rs$ and an allomorphon therefore being $(\{i\}Rd)Rs$. An allomorphon is equally an allophone fRd , brought into a relationship (R) with a grammatical distinctive function (s); i.e. an allomorphon is equally $(fRd)Rs$. An allomorphon is a set of all those morphonetes/forms which are deemed identical except for their time-space individuality (specificity); i.e. not only do they have the same phonological distinctive function (d) and grammatical/signum distinctive function (s) (as set-forming criteria), but they are also ascribed to the same general-phonetic set-forming criterion (a) (i in the formula for allomorphon, $i = \alpha Ra$, involving ascription to a set-forming criterion a). The allomorphon thus makes simultaneous appeal to (i) a general-phonetic set-forming criterion a , (ii) a phonological set-forming criterion d , and (iii) a grammatical set-forming criterion s .

For a consideration of the practical significance of the allomorphon for linguistic analysis, we can consider what is sometimes termed ‘incomplete neutralisation’ (the following argument is adapted from Dickins 1998: 90–98, which also discusses numerous related examples). Incomplete neutralisation is exemplified by pairs in German such as (i) *Rad* ‘wheel,

⁶ Two other complex notions which can be derived from more basic notions in the theory are what are termed in extended axiomatic functionalism ‘morphete’ and ‘semete’ (Dickins 1998: 131, 132; Dickins 2009: Def. F1b^{1a0}, Def. F1b^{2a0}). A morphete is a ‘[phonetic] image [...] in its capacity of having the particular distinctive function [...] appropriate to a particular signum [...]’ (Dickins 2009, Def. F1b^{1a0}), i.e. it is a phonetic image brought directly in relation to the set-forming criterion of a particular signum. Morphete is defined as iRs . When Hervey talks about a ‘form’ he means roughly what I have here termed a ‘morphete’ (cf. Mulder and Hervey 2009, Def. F1b1a), but when Mulder uses the term ‘form’ he typically means what I have here termed a morphonete. A semete is a ‘semantic image [...] in its capacity of having the particular distinctive function appropriate to a particular signum’ (Dickins 2009, Def. F1b^{2a0}), i.e. it is a semantic image / denotable brought directly in relation to the set-forming criterion of a particular signum. Semete is defined as jRs .

bicycle’ and *Rat* ‘advice’; (ii) *Bund* ‘association, group’, and *bunt* ‘colourful’; and (iii) *seid* ‘[you] (familiar pl.) are’ and *seit* ‘since’. Traditionally there is said to be no opposition between final ‘d’ and final ‘t’ in forms like this in German; the voiced/voiceless opposition is said to be neutralised and the resulting entity is described as an archiphoneme (cf. Dickins 2009, Def. 7a4b; Mulder and Hervey 2009: 441, Def. 7a4b).

Figure 14
Signum ontology



Phonological neutralisation in axiomatic functionalism involves there being in a given context no extensional phonetic difference in the (phonetic) realisations of two putatively distinct forms. Thus, *Rad* and *Rat* involve neutralisation of the /d/~t/ opposition if and only if (i) every realisation of *Rad* can also be a realisation of *Rat*, and (ii) every realisation of *Rat* can also be a realisation of *Rad*. The view that there is no extensional difference in the realisations of *Rad/Rat* and the other similar pairs investigated in terms of incomplete neutralisation is borne out by careful analyses of the data (e.g. Port and Crawford 1989). However, it is the case that:

Pairs like *Bund* “association, group” and *bunt* “colourful” have long been said to be homophonous ..., yet the words tend to retain a small difference in certain phonetic parameters (Port and Crawford 1989: 258; underlining mine).

If this is correct, and all we are dealing with in cases of incomplete neutralisation is a tendency for the one form to be pronounced in one way, and the other form in the other way, the phenomenon does not in axiomatic-functionalist terms involve phonological difference between the two members of the pair. That is to say, this is a case of neutralisation, despite superficial evidence to the contrary.

Taking this analysis to be correct, the relevant allomorphs of *Bund* and *bunt* in the case of incomplete neutralisation are homomorphs (i.e. they share the same phonological form); therefore we only have one phonological form here to talk about. This means that we cannot investigate incomplete neutralisational phenomena purely in terms of allophones and representative sets of the phonemes which are the members of these allophones, as might initially be thought. At the same time we cannot simply investigate these phenomena purely in terms of the signa (words) involved. If we were to do this, we would introduce consideration of all realisations of *Bund* and *bunt*, *Rad* and *Rat*, etc. In the case of *Rad*, for instance, these would include the dative singular form *Rade*; this is unambiguously differentiated from all realisations of *Rat* (which has a dative singular form *Rate*). This would mean that we were not investigating the same range of phenomena we were originally interested in, and we would correspondingly achieve results which were irrelevant to the original area of investigation.

What is needed is a means of controlling the range of phenomena in phonological terms, and thus ultimately in general phonetic terms, and at the same time differentiating cases such as *Rad* and *Rat* in terms of their signum (word) identity. That is to say, we need simultaneously to identify the phenomena in question phonetically, phonologically and grammatically. As already discussed in this section, this is what the notions morphonete/form, allomorphon, and allomorph do. In particular, the notions form and allomorphon provide coherent models for the investigation of the relative frequencies of different individual phonetic realisations of phonologically identical realisations of *Rad* and *Rat*. By looking at representative samples of data we are able to determine the relative sizes of the different ‘morphonete-sets’ / ‘form-sets’ which make up the allomorphons in question.

The following provides a simple illustration of the kind of procedure which I have in mind. In order to simplify the presentation, I will take an imaginary example, but one which is analogous to *Rad/Rat* for illustration. Let us suppose a language which has two signa (words), which we may call *Signum-A* and *Signum-B*, each signum having an allomorph of one particular phonological form (i.e. the two signa share a homomorph). We may call this phonological form / χ /. Let us assume that we can divide the phonetic range of the allophonic realisations of / χ / into six. That is to say, we have arbitrarily – but let us also assume appropriately (cf. the discussion of ‘arbitrary’ in Section 15) – established six allophones for the entire phonological form / χ / taken as a whole. These allophones by definition correspond to six different phonetic forms, which are themselves arbitrary but also appropriate. Let us call these allophones [χ^1], [χ^2], [χ^3], [χ^4], [χ^5] and [χ^6] (the corresponding phonetic forms we might symbolise as] χ^1 [,] χ^2 [,] χ^3 [,] χ^4 [,] χ^5 [and] χ^6 [). Let us now assume we have a sample of fifty individual realisations each (perhaps artificially elicited in a phonetics laboratory) of the signa *Signum-A* and *Signum-B*. Each one of these realisations, considered simultaneously both as a realisation of a signum and as a realisation of a phonological form, will be a morphonete/form (an instance of a particular allomorphon), which will have a phonete (an instance of a particular allophone) – which will itself have a phonetic image (an instance of a particular phonetic form). The form of each utterance of *Signum-A* and *Signum-B* can

thus be simply related to a particular allophone of the phonological form / χ /. Let us suppose that of the fifty utterances of *Signum-A*, 17 relate to the allophone [χ^1] (i.e. they have the phonete which instantiates the allophone [χ^1]), 6 relate to the allophone [χ^2], 7 relate to the allophone [χ^3], 8 relate to the allophone [χ^4], 4 relate to the allophone [χ^5], and 8 relate to the allophone [χ^6]. Let us also suppose that of the fifty utterances of *Signum-B*, 7 relate to the allophone [χ^1], 7 relate to the allophone [χ^2], 4 relate to the allophone [χ^3], 12 relate to the allophone [χ^4], 14 relate to the allophone [χ^5], and 6 relate to the allophone [χ^6]. This situation can be tabulated as in Figure 15.

Given the results which are presented here, one could reasonably claim that *Signum-A* has a *canonical allomorphon* (cf. Dickins 1998: 255; i.e. a ‘focal’ allomorphon) which has the allophone (or allophonic form) [χ^1]; 17 out of 50 utterances of *Signum-A* have a form which has a phonete which instantiates the allophone [χ^1]. *Signum-B*, on the other hand, has a canonical allomorphon which has the allophone (or allophonic form) [χ^5]; 14 out of 50 utterances of *Signum-B* have a form which has a phonete which instantiates the allophone [χ^5].

Figure 15
Descriptive procedure for the analysis of incomplete neutralisation

Allophone of phonotagm / α /	Number of utterances of <i>Signum-A</i> and <i>Signum-B</i> relating to (‘having’) particular allophone (from total of 50 each)
[χ^1]	<i>Signum-A</i> = 17 utterances <i>Signum-B</i> = 7 utterances
[χ^2]	<i>Signum-A</i> = 6 utterances <i>Signum-B</i> = 7 utterances
[χ^3]	<i>Signum-A</i> = 7 utterances <i>Signum-B</i> = 4 utterances
[χ^4]	<i>Signum-A</i> = 8 utterances <i>Signum-B</i> = 12 utterances
[χ^5]	<i>Signum-A</i> = 4 utterances <i>Signum-B</i> = 14 utterances
[χ^6]	<i>Signum-A</i> = 8 utterances <i>Signum-B</i> = 6 utterances

Given the ultimately arbitrary nature of phonetic analyses, this would not be the only way in which one could divide the phonetic continuum. It would be possible to establish many more than six phonetic forms for the relevant phonetic range, and therefore many more than six potential allophones and allomorphons (cf. the discussion of dark and light ‘l’; Section 15). It would also be possible to set up secondary (also tertiary, etc.) foci; for *Signum-B* the realisation [χ^4] with 12 utterances might be considered a secondary canonical (focal) realisation (for further discussion of this issue, see Dickins 1998: 97).

23. Nature and practical use of allosemon/reference-type

Having considered the nature and practical use of the allomorphon in Section 22 above, I turn now to the nature and practical use of the allosemon/reference-type. The allosemon/reference-type is a set of semonetes/references, a semonete/reference being \underline{R} or $(jRe)Rs$ and an allosemon/reference-type therefore being $(\{j\}Re)Rs$. An allosemon/reference-type is equally an allodele/denotatum-type jRe , brought into a relationship (R) with a grammatical distinctive function (s); i.e. an allosemon/reference-type is equally $(jRe)Rs$. An allosemon/reference-type is a set of all those semonetes/references which are deemed identical except for their time-space individuality (specificity); i.e. not only do they have same delogical distinctive function (e) and grammatical/signum distinctive function (s) (as set-forming criteria), but they are also ascribed to the same general-semantic set-forming criterion (a) (j in the formula for allosemon/reference-type, $j = \beta Ra$, involving ascription to a set-forming criterion a). The allosemon thus makes simultaneous appeal to a general-semantic set-forming criterion a, a delogical set-forming criterion e, and a grammatical set-forming criterion s.

For a brief consideration of the practical significance of the allosemon/reference-type for linguistic analysis, we can consider what is sometimes termed ‘imperfect synonymy’ (the following argument is adapted from Dickins 1998: 117-125, which also discusses a number of related examples; cf. also Dickins 2014b). As will be seen, imperfect synonymy is the semantic (‘content-side’) analogue of the morphontic (‘expression-side’) phenomenon of incomplete neutralisation (Section 22). Consider the following

[...] the two verbs *vernielen* and *vernietigen* “to destroy, bring to nought” in nineteenth-century Dutch [...] appear to have referred to exactly the same range of situations and exhibited identical selection restrictions, even in the writings of one and the same author. Were these two words, then, “perfect synonyms”? Geeraerts [1988] argues they were not. Differences emerged when the frequencies of different senses were compared, *vernietigen* being used predominantly in an abstract sense, while *vernielen* referred predominantly to an act of physical destruction. Remarks in contemporary handbooks of good usage also pointed to a difference in the conceptual centres of the two words (Taylor 1989: 56).

In this light, consider the following, both of which can be translated into English as ‘The conflict destroyed the village’:

- (2) *De strijd heeft het dorp vernield.*
- (3) *De strijd heeft het dorp vernietigd.*

Example 2 with a form of *vernielen* would tend to mean that the village was physically destroyed, while example 3 with a form of *vernietigen* would tend to mean that the village was destroyed as a community. Thus, if 3 were taken by a reader in a given instance to mean that the village was destroyed as a community, the writer might object that this was not what he/she meant. It might even be the case that the utterance was true under the “physical destruction” interpretation (as, let us say, intended by the writer), but untrue under the “destruction as a community” interpretation (as misinterpreted by the reader).

Under an extended axiomatic-functionalist approach, there is a perfect parallel between incomplete neutralization (e.g. *Rad* and *Rat*; Section 22) and imperfect synonymy. *Vernielen* and *vernietigen* (in the appropriate allosemes/‘senses’) correspond to a single delogical form/denotation (there is no difference in the range of the semantic images/denotables to which they can refer). At the same time *vernieten* has a tendency to mean not merely to destroy but to destroy physically, while *vernietigen* tends to mean not merely to destroy, but to destroy in an abstract sense. Since we have only a single delogical form/denotation we cannot investigate differences in tendencies to mean purely in ‘sub-denotational’ terms - i.e. in terms of deletes/denotata and allodeles/denotatum-types. This parallels the way in which we cannot investigate differences in pronunciation tendencies between *Rad* and *Rat* purely in ‘sub-phonological’ terms – i.e. in terms of allophones and phonetes. Rather, we need both the analysis of *vernieten* and *vernietigen* as different signa (words) plus the analysis of their correspondence to a single delogical form/denotation, just as we need the analysis of *Rad* and *Rat* as different signa (words) plus the analysis of the ‘correspondence’ of the relevant allomorph in each case to a single phonological form. That is to say, just as the notions morphonete/form and allomorphon allow us to investigate the differing ‘tendencies to sound’ of *Rad* and *Rat*, so the notions semonete/reference and allosemon/reference-type allow us to investigate the differing ‘tendencies to mean’ of *vernieten* and *vernietigen*.

Vernieten and *vernietigen* in nineteenth century written Dutch seem clear examples of synonyms, as defined by extended axiomatic functionalism, i.e. two signa (words) which have the same /delogical form/denotation (cf. Dickins 2009, Def. 28 formal definition of synonym). However, they are not ‘perfect synonyms’, in the sense that this term is used by Taylor, since they have differing ‘focal reference-types’ – or what can be referred to in an extended axiomatic-functionalist context as differing *canonical allosemes* (cf. Dickins 1998: 256).

In semantics (the ‘content side’ of the signum) the notions delete/denotatum, allodele/denotatum-type, and delogical form/denotation allow us to investigate denotational aspects of meaning; the notions semonete/reference and allosemon/reference-type, on the other hand, allow us to investigate at least some aspects of what are traditionally called connotational aspects of meaning. Correspondingly, in morphontics (the ‘expression side’ of the signum) the notions phonological form, allophone, and phonete allow us to investigate what Michael Lamb (personal communication) has proposed be called *figurational* aspects of “sounding” (to borrow a Hallidayan term) – i.e. the way realisations of signa are pronounced in a general sense. That is to say these notions allow us to investigate the organisation and realisations of *figurae* (= phonological forms; cf. Section 14); the notions allomorph, allomorphon and morphonete/form, on the other hand, allow us to investigate what Lamb has proposed be called *configurational* aspects of ‘sounding’.

24. Signum ontology and system ontology

As noted in Section 1, extended axiomatic functionalism has two components: the signum ontology, which has been the focus of this paper, and the system ontology. Figure 16 (next page) presents a view which I have put forward in Dickins (2009) of the relationship between these two components.

late and unscribed semantic-image correlate (referent) progressively to different set-forming criteria – a, d, e, and s (together with the more direct use of the notion of sets), the system ontology makes use solely of the linguistic set-forming criteria – d, e, and s.

Figure 17
Extended axiomatic functionalism: linguistics (signum ontology and revised system ontology)

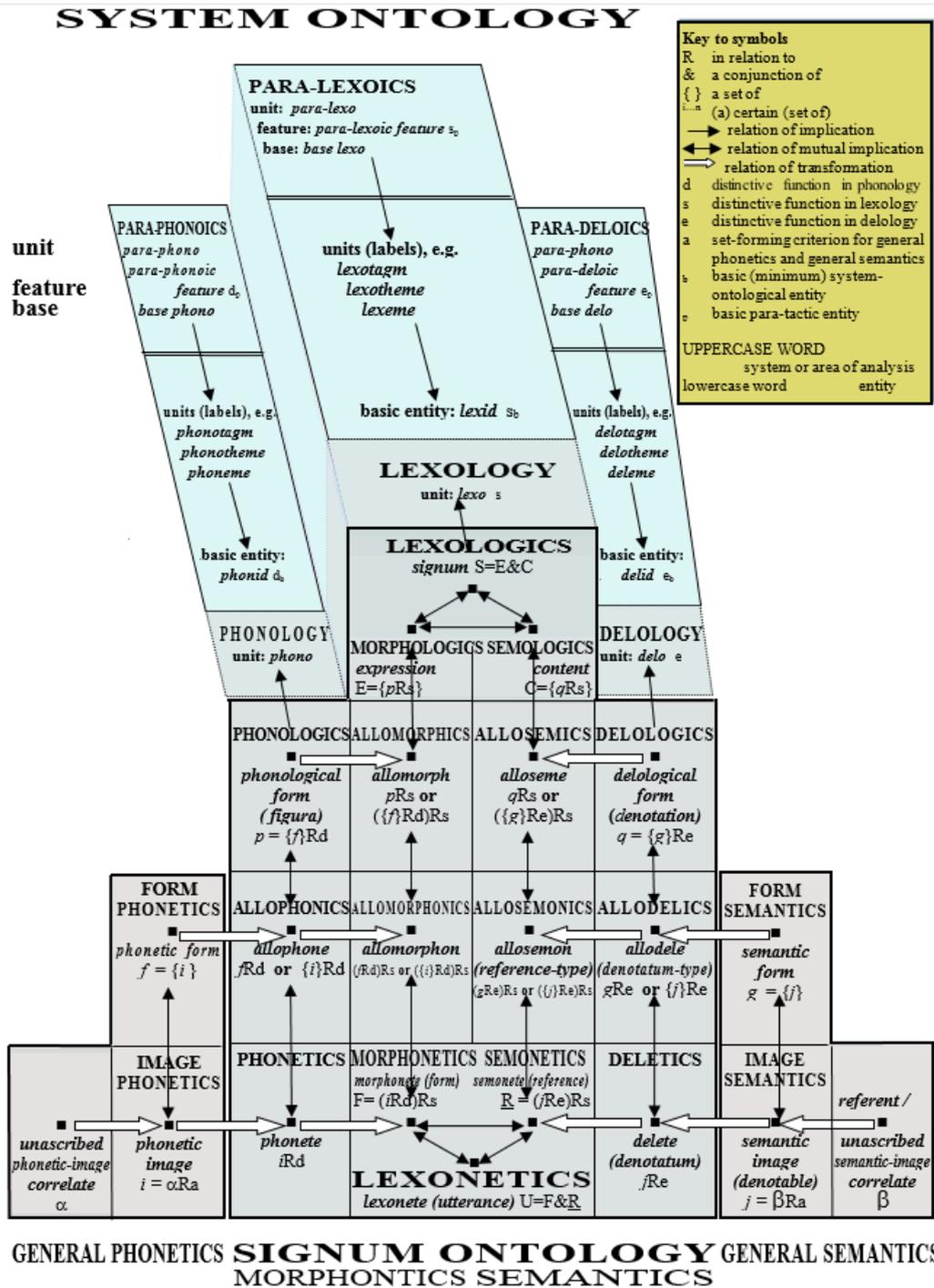


Figure 16 makes plain why terms like ‘phonologics’, ‘lexologics’ and ‘delologics’ are used in the signum ontology (cf. Section 14). These are terms in the signum ontology, corresponding respectively to ‘phonology’, ‘lexology’ and ‘delology’ in the system ontology. Within the signum ontology the suffix *-ics* is used for all ‘areas of analysis’ (‘image phonetics’, ‘form phonetics’, ‘phonetics’, ‘allophonics’, ‘phonologics’, etc.). The terms ‘phonological form’ (also ‘figura’) and ‘delological form’ are used for entities in the signum ontology. ‘Phonological entity’ (also ‘phono’) and ‘delological entity’ (also ‘delo’) are correspondingly used for entities in the signum ontology. ‘Signum’ is used in the signum ontology, while ‘lexo’ is the most appropriate term for entities in the system ontology.

I have elsewhere (Dickins 2014a) proposed that the version of system ontology given in Figure 16 is both unnecessarily complex, and logically not really sustainable. In its place, I propose a system ontology of the kind represented in Figure 17 (previous page; see Dickins 2014a for further discussion).

25. Theoretical parsimony and signum ontology

The model presented in Figure 17 (also Figure 16) looks like it involves the following basic notions:

1. α – unanalysed phonetic-image correlate
2. β – unascribed semantic-image correlate / referent
3. d – phonological distinctive function
4. e – delological distinctive function
5. s – grammatical / signum distinction function
6. a – set-forming criterion which is not distinctive function (phonological, grammatical or delological)
7. Member-to-set relationship
8. R – bringing into a relationship with
9. Ordering relation

The only notion which has not been discussed in this paper is that of ordering relation. This is a feature of the system ontology, rather than the signum ontology (for discussion, see Dickins 2014a). In fact, the number of basic notions can be significantly reduced from the nine notions given in the list above. Firstly, there is in reality no difference between unascribed phonetic-image correlate and unascribed semantic-image correlate / referent. This should be clear given that unascribed phonetic-image correlate is just an irreducibly primitive model for a sound-event: such a sound-event could just as easily, however, be something referred to (an unascribed semantic-image correlate / referent) as a feature of ‘form’. (Thus, the IPA as a semiotic system, for example, has as its unascribed semantic-image correlates / referents speech sounds.) Given that this is the case, unascribed phonetic-image correlates are simply a subset of unascribed semantic-image correlates. As noted earlier (Section 9) the latter look like Peircean firsts. We can, accordingly, use the term ‘first’ to refer to both an unascribed phonetic-image correlate and an unascribed semantic-image correlate / referent.

It is also possible to reduce the notions *phonological distinctive function* d, *delogical distinctive function* e, *grammatical / signum distinctive function* s, and *set-forming criterion which is not distinctive function* a. We can start from the fact that all these four notions are set-forming criteria. We can then consider that the theory has two basic aspects – the morphontic (involving ‘formal’ features – from the most abstract to the most concrete) and the semantic (involving ‘meaning’ features – from the most abstract to the most concrete).

We can cross-classify the notions ‘morphontic’ and ‘semantic’ in relation to the notion of a set-forming criterion, as in Figure 18.

Figure 18
Morphontic and semantic in relation to set-forming criterion

	Morphontic	∅
Semantic	s	e
∅	d	a

Figure 18 demonstrates that only 3 notions – semantic, morphontic and set-forming criterion (this last implied but not shown in Figure 18) – are needed to generate the following four notions: (i) *phonological distinctive function* d, which can be analysed as the application of the notion set-forming criterion in relation to morphontics only; (ii) *semantic distinctive function* e, which can be analysed as the application of the notion set-forming criterion in semantics only; (iii) *grammatical / signum distinctive function* s, which can be analysed as the application of the notion set-forming criterion to morphontics and semantics simultaneously (a signum / grammatical entity S, for example, has both a morphontic aspect, its expression E, and a semantic aspect, its content C); and finally (iv) *set-forming criterion which is not distinctive function* a, i.e. set-forming criterion which has neither a morphontic nor a semantic aspect (and is not therefore properly speaking part of the signum ontology).

The notion set-forming criterion also implies the notion set: we therefore regard ‘set’ and ‘set-forming criterion’ as related (if strictly speaking distinct notions). This, then, gives the following revised reduced list of basic notions (of which 2 and 3 are intimately related) for the entire theory (signum ontology plus system ontology):

1. First
2. Set-forming criterion
3. Member-to-set relationship
4. Morphontic
5. Semantic
6. R – bringing into a relationship with
7. Ordering relation

26. Conclusion

In this paper, I have attempted to progressively develop a model for linguistic analysis, leading eventually to the signum ontology of extended axiomatic functionalism, and the presentation of this together with the other component of extended axiomatic functionalism, the system ontology. Making use of a very small number of basic notions which are repeatedly applied, I have developed an ultimately complex signum ontology, which I have tried to show is able to provide insightful and rigorous analyses of central features of language which cannot be adequately treated by less coherently structured models.

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SALIENT FACTORS IN THE ACQUISITION AND MAINTENANCE OF HERITAGE LANGUAGES AMONG US-BORN CHILDREN OF AFRICAN IMMIGRANTS^[*]

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Abstract: This sociolinguistic study reveals some of the tensions surrounding transmission of heritage languages to U.S.-born children of two African immigrant families in the Midwestern region of the United States. Data collected from interviews, focus groups, and observations, indicated that all children had limited proficiency in their heritage languages despite all their parents having native speakers' competence in those languages. Findings suggest that gains made in the acquisition of heritage languages before the preschool years, at home, were lost as soon as children began going to preschool. Older siblings were also found to influence the linguistic environment in the home as they became more proficient in, and increased their use of English, thus reducing the use of heritage languages in the home. Further, the parents' frequent use of heritage languages to obscure meaning from their children during adult conversations was also observed among adults. This study has implications for immigrant parents who would like to see their children learn their heritage languages in the home.

Key words: bilingualism, language shift, heritage language, code-switching, immigration, birth-order, indigenous languages

Interactions with African immigrant families in the U.S. often reveal an interesting linguistic phenomenon that seems to distinguish the parents' and children's language practices. It is easy to quickly observe how adults code-switch and code-mix between English, heritage languages, and African languages, while their children seem to speak predominantly in English and only use short responses, at most, in their heritage languages. Such occurrences have left observers with questions about the future of African languages; and have led some to ask immigrant adults whether their children actually speak African languages. Although the challenges of intergenerational transmission of heritage languages have been documented widely among immigrant communities in different diasporas (Portes & Hao, 1998; Portes & Schauffler, 1994; Hakuta, & D'Andrea, 1992; Krashen, 1982) few studies have focused on African immigrants' language experiences (Obeng, 2009). This study sought to answer the question, what are some of the tensions around the acquisition of heritage languages by U.S.-born children of African immigrants? This study draws its significance in the in-depth interaction between the researcher and a rarely studied theme in the community of African immigrants, heritage language transmission, and in the findings which are drawn from both children and their parents.

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Heritage languages

In the Diasporas, heritage languages are generally viewed against a backdrop of dominant languages, and are, thus, always considered as ‘other’ languages wherever there is a widely used language (Fishman, 2001; Valdés, 2001). Different terms are used to describe heritage languages, some of which are: immigrant languages, minority languages, ethnic languages, community languages, mother tongues, and home languages (Baker & Jones, 1998; Kelleher, 2008). Valdés (2001) notes that in the U.S. context, heritage languages refer to “all non-English languages, including those spoken by Native American peoples” (p. 39). Fishman (2001) places heritage languages into three categories: immigrant, indigenous, and colonial, and defines immigrant heritage languages as those spoken by immigrants who came to the U.S. after it became independent, thus distinguishing them from the indigenous heritage languages spoken by Native Americans. This study adopts the term *heritage languages* to refer to indigenous languages from Africa that are spoken by adult African immigrants in the U.S.

Theoretical framework

In this article, theoretical perspectives on first language acquisition are drawn from wider sociocultural theory (Vygotsky, 1978), interactionist perspectives (Ginsburg & Opper, 1969), and Fishman’s sociolinguistic frameworks on language transmission (Fishman, 1999, 2001). As a cultural artifact, language mediates social practice as well as psychological processes. Sociocultural perspectives foreground both the cultural and social contexts of language learning (Vygotsky, 1978; Zuengler & Cole, 2004), and are predicated on the assumption that language development of children is bound in the collective practices of a cultural group that children belong to. Interaction with more knowledgeable members of society such as parents and other fluent speakers of the heritage languages usually results in acquisition of the first language from their immediate environment, for children (Mitchell & Myles, 2004; Lantolf & Thorne, 2007; Tse, 1998). Fishman (1999; 2001) highlights challenges associated with intergenerational transmission of heritage languages, and notes that effective learning is predicated upon intentional home language use, and also, that the maintenance of heritage languages is heavily dependent upon the a community’s use of the language in different domains. Furthermore, it has been noted that, “if a language is not transmitted in the home, it is not likely to survive another generation” (Clyne, 2003, p. 22). A study conducted among African immigrant families from the Congo living in Sweden revealed that children who migrated after having acquired their immigrant languages at home shift more slowly than those who had not fully acquired the languages or were born abroad (Kasanga, 2008). A similar phenomenon was observed in the case of the two families featured in this study.

Language shift and language choice

Heritage language acquisition and maintenance in the Diasporas is visualized against a backdrop of ‘linguistic competition’ between the immigrant languages and dominant language(s) among immigrant families. Fasold (1987) noted that:

language shift and, the other side of the coin, language maintenance, are really the long-term, collective results of language choice ... when a speech community begins to choose a new language in domains formerly reserved for the old one, it may be a sign that language shift is in progress (p. 213).

Generally, language shift is manifested as more members of a community that speak a minority language adopt a majority language “as their vehicle of communication” (Appel & Muysken, 1987, p. 32) and is characterized by speakers becoming less proficient in their heritage language. The failure by a community to maintain its language and the gradual adoption of another language heralds a language shift (Hoffman, 1991). Changes in language use seem to take place in subtle and covert ways (Gafaranga, 2010), which may not be visible to casual observers and may also be unrecognized by the speakers as well (Kulick, 1992). Baker (2006) argues that language shift happens based on deliberate decisions by language users, and that the shift may also reflect economic, political, cultural and technological changes that a society may be going through. It represents a gradual displacement of a language by another language, usually in cases where a difference exists in the prestige level of the two languages (Hornberger & King, 1997).

Regarding changes in habitual language use, it has been suggested that it generally takes an immigrant community three generations to attain a complete shift from an immigrant language to a dominant one (Fishman, 1991; Portes & Shauffler, 1994; Portes & Hao, 1998). Further, second generation children have been found to use English more than their heritage languages, and that parents who speak the same heritage languages are likely to uphold linguistic preservation more than those who speak different languages (Portes & Hao, 1998). The study also found that it is easier to retain foreign languages that have the same grammatical structures as the dominant language; therefore, immigrants who speak languages such as Spanish that share linguistic roots and some grammatical structures with English stand a better chance becoming more proficient in English than English learners of other foreign languages including heritage languages from Africa.

Speakers of multiple languages often have inherent ability to choose the language they wish to use in different communicative events. Such choices are not haphazard, but are guided by overall linguistic cost-benefit analysis, and various factors that are not limited to linguistic ability, but also include considerations of the contexts of where conversations take place (Tuominen, 1999; Piller, 2002). The choice and appropriation of a preferred language for home use by a family, otherwise referred to as private language planning or family language planning (Schwartz, 2010; Pillar, 2001; Curdt-Christiansen, 2009) is influenced by factors such as, linguistic ability, personal identity, and perceived social value of a language. Generally, language loyalty is compromised when parents view a language as a ‘handicap’ to their children’s advancement and education (Saville-Troike, 1989, p. 205). The choices that lead to code switching, whether deliberate or not, will influence heritage language acquisition for their children as they have a bearing on both the attitudes and access to the heritage language for the children (Kigamwa, 2014).

Method and analysis of data

The study employed the use of individual interviews, focus groups, and observations to collect data from the families. The individual interviews were semi-structured and were conducted on a face-to-face basis with all adults who participated in the study. Focus group data were collected in sessions with three groupings of the participants, namely: parents, children, and families. The children were involved in a joint focus group session where they responded to prompts of semi-structured questions that were provided by the researcher. Likewise the parents in the study were involved in a joint focus group session that was led by the facilitator. A final set of focus groups was conducted with each family during the final debrief session where the researcher met with parents and children in their homes. Additional data were collected through observations during visits with the families and during social gatherings that involved the families interacting with other African families. The researcher took detailed field notes of all observations during the different events that involved the families. All of the interviews and focus groups were recorded using a digital audio recording device and were transferred to a computer. All the recorded data were transcribed and saved as Microsoft Word files that were then transferred to qualitative *data management* software for thematic analyses. The identities of the participants in this study were obscured in line with the institution's research board's requirements.

Individual face-to-face interviews were conducted with every adult who was a part of the study. For each family both parents were interviewed separately; the only grandmother in the study was also interviewed on her own, with the help of a translator. Care was taken to ensure that translations were accurate as an independent speaker of the language checked random selections of the translations for accuracy. Interviewing each adult member of a family on their own was intended to act as a safeguard against possible influences in opinion by spouses, in case there were varied opinions on some of the issues regarding home language policies on heritage languages. The parents' focus group session allowed parents to speak to some of the issues as significant members of their own diaspora communities. Collecting data from adults through individual interviews, focus groups, and observations provided the need triangulation of data across these three data sources.

Children's views were also collected through focus group interviews where the children came together and responded to some open-ended questions regarding their experiences. The views of children were also collected through the family focus groups during the family debrief sessions during which parents and children got to respond to some of the questions. This last set of interviews sought to clarify some of the findings and initial conclusions from the overall study. The three sources of data from children; namely: children focus group, family focus group, and observations, also provided triangulated data. Although the active study was conducted over a period of one year, the researcher had begun to interact with the families much earlier, and observations of language use were taken over a period of at least two years.

This article reports on the experiences of four children born in the U.S. to parents who immigrated from an English-speaking country and French-speaking country in Africa. The children were part of a larger study in which other families participated. The children selected for this article had a lot more in common than the other children, and so the data collected from them was subject to comparison for the purposes of this write up. Some of

the commonalities include: they were all born in the United States of America, and had at least one grandparent living in the U.S. Although only one of the families in this case was living in a grandparent the other family had both grandparents living in the U.S. and more specifically in the Midwest region of the country, and had regular access to them. The grandparents who did not live with the grandchildren would also visit regularly, and the research observed interactions between these children and their grandparents on at least three occasions.

Participants

The children in the study consisted of two boys and two girls between the ages of eight and 12. The boys, Simeon and Steven were 10 and 12 at the time of the study, and were born in the U.S. to parents who speak Ekigusii, a language spoken in Kenya, an English-speaking country in East Africa. At the time of the study, the boys seemed to have a basic level of receptive proficiency in their heritage language, but were low on productive proficiency. They were both fluent speakers of English. Their parents, on the other hand, were proficient speakers of a number of languages, including their heritage language, English and Swahili. Additionally, the father reported that he could speak Spanish and French at an intermediate level. The mother, on the other, had proficiency in some dialects of Luhya, a language that is spoken in the western region of Kenya.

The Anglophone family had three daughters: Neema, age nine; Natalie age 12, and a toddler age two at the time of the study. Due to her age, the youngest sibling was not involved in the study. The children were born in the U.S. to parents who had migrated from Rwanda. The girls were basically monolingual English speakers with limited understanding of their heritage language, which was spoken widely by their parents and their grandmother who lived with them. The parents had migrated to the U.S. in the late 1990s, at which point they reported that they had not learned to speak English well. They worked in a busy department store in the Midwest as they went to school. Therefore, at the time of their migration and birth of their first child, they were fluent speakers of their heritage language, Kinyarwanda, and French, which they had learned as a result of going through school at a time when the language of instruction in their country was French. In addition to being fluent in Kinyarwanda and French, the parents could also speak Kirundi, a language that is spoken in Burundi, a country that neighbors Rwanda. The father could also understand Swahili. Both families had lived in the U.S. for close to 15 years at the time of the study and had established their homes in the U.S. being legal permanent residents in a Midwest state.

Findings

Analyses of the collected data yielded a number of themes that were salient to the acquisition and maintenance of heritage languages among the two African immigrant families who participated in the study. This article focuses on three themes that prominently played out in regard to language use in the home and were common to both families. The themes were: birth order, start of preschool and the effects of code-switching by the parents.

Heritage language acquisition gains lost at the start of preschool

A key finding of this study focused on significant changes in language practices and ability that could be traced to the start of school for both families. The transition from home to school seems to mark the beginning of a steady decline in heritage language ability for the older children. This entry into society's mandated socializer; school, brought with it changes in the children's lives as well as in the home of the child going to school for the first time. This is supported by what seems to have been the changing home language environment at the time the older children begun going to school. Although both families acknowledged that their older children had not developed absolute fluency in their heritage languages by the time they started going to school, they noted that the small gains in language acquisition, and the progression towards fluency, that were made while the children were at home seemed to disappear quickly after their children started going to preschool. While these changes were attributed by parents to the start of school, and were associated only with the first-born children and not with their younger siblings. This interruption in the steady progress in the acquisition of heritage languages had implications in changes that would affect the language environment at home. It may be important to note that other peer and social interactions for the children, outside of school, e.g. in church may also have contributed to the change.

In the case of the Anglophone family, the parents noted that at the time their older son began going to daycare, he was literally fluent in their heritage language, Ekigusii. They attributed his language abilities to the fact that he was being raised by his parents and his paternal grandmother who lived with them, at that time, and insisted on the use of their heritage language in all their communication. The practice of sustained use of the heritage language at home seemed to have provided a good language learning environment where their son was mastering how to speak in their heritage language. The family reported that when their son started going to daycare at about age three, he had a problem communicating with his caregivers because he could only speak in his heritage language. The parents reported that the loss of his heritage language ability started at that point and was greatly accelerated when he started going to preschool. The 'interference' in the heritage language development, initial loss of language and eventual shift into English were characterized by code-mixing in the child's conversation as he started going to school. In one incident, the boy's mother noted:

... (when) he went to preschool for the first time ... he didn't know milk. He was calling it mabere! ... He didn't know kales/collards. He was calling them chinyani, [and would say] I don't want chinyani. I want more mabere!

The basic words he could put them there, like the things you should know as a child he was calling them in Kisii.

The mother's use of the word "fine" here is meant to emphasize the fact that the boy was making good progress and could communicate relatively well in their heritage language.

The Francophone family, on the other hand, had similar experiences, in fact theirs could be said to be even more embroidered since the family was speaking only their heritage language before their older child, Natalie, started going to preschool. The mother noted that her daughter "... was okay in Kinyarwanda ... (until) she started school." The mother further

added that she had not lived in the U.S. for long when she had her first child and, at that time, she barely spoke English. Having come from Rwanda, a French speaking country, at that time, the family generally communicated in their heritage language. As the mother recalls, she was enrolled in an Intensive English Program (IEP) as a student. Their home heritage language environment was enriched further as at that time the children's grandmother, a monolingual Kinyarwanda speaker, lived with them. They noted that their home was basically 'saturated' with the use of their heritage language. The family noted that their older child only started learning English when she began going to preschool, citing that "... she did not pick up English when she was little. I spoke in Kinyarwanda because I didn't know English ... so ... she was okay in Kinyarwanda ... (until) she started school." At the time their daughter began going to preschool, she began to quickly learn how to speak English. With her increased usage of English, her parents also seemed to have reduced their use of their heritage language in conversations directed at the child. Their increased usage of English could be attributed to, among other things, the fact that both parents were busy trying to learn English in order to keep up with their new jobs and some of the relationships that they were developing with neighbors and other members of the community, who were basically monolingual English speakers.

These occurrences among the two families are typical of immigrant families facing changes related to the beginning of school, before their children have mastered their heritage languages. The loss of a heritage language when it is replaced by a dominant language has been referred to as subtractive bilingualism (Baker, 2006). Lightbrown and Nida (1999) noted that, generally, in subtractive bilingualism, "children may begin to lose the family language before they have developed an age-appropriate mastery of the new language" (p. 3). Clyne (2003) seemed to also be in agreement that certain changes in lifestyle, such as entry into the workforce, and going to school for children, mark the beginning of a different phase in language development and could, generally, interrupt gains that have been made previously.

Other indicators of this individual and family based language shift starting to take place include children responding in a dominant language to instructions and conversations in their heritage language, signaling their receptive ability in the language and a gradual decline of their communicative ability.

Birth order influence

Language experiences of siblings were found to differ based on their position in the family. In both families, that some of the changes associated with the first child going to school that were introduced into the home created significantly different home language experiences for their younger siblings. The parents in this study reported a significant difference in the preschool experiences of their first and second children. Children who were born after the first born seemed to have come into a home environment that was already altered, or was changing, based on the fact that their older sibling(s) was already learning to speak English. Therefore, the home environment was already embracing an increased use of English in comparison to their heritage languages.

In both cases, the parents' circumstances as they raised their children caused them to use their heritage languages less and use English more in conversations with their children. With the older child speaking more English as a result of going to school, the parents seemed to respond in English more than they did before the children went to school. A second factor in the reduction of the usage of the heritage language seemed to affect the Francophone family, and had to do with the fact that the parents, who were already trying to learn English, were now engaging more in English at the time of the birth of their second child than they had previously when they had no children or when their first child was still young. This adjustment had already created an environment where English was being used a little more than at a comparable time when they were raising their first born.

For the Francophone family, the linguistic environment for the younger child was significantly different because the parents were now able to speak English more proficiently and were using it a little more with their older daughter. This increased use of English may have resulted in a complex situation in that, although both children may be said to be unable to fully understand their heritage language, the older child had developed better receptive skills in the language than the younger child. The case of the Anglophone family seemed related in that they reported that once their second son began to speak English, it influenced his younger siblings as they heard less of the heritage language and more English. These findings are in agreement with research in second language acquisition as cited by Shin (2002), who determined that birth order significantly influenced the language experience of children being raised in bilingual Chinese families.

Older children were, therefore, found to be significant influencers of the linguistic environment in the homes and, by extension, influencers of the linguistic factors that affected how their siblings were socialized into the acquisition of their first language(s). This was confirmed by Neema and Natalie's father who noted "... the older one was speaking English, the younger one followed into her sister's (practice)," thus highlighting the influence of interactionism in influencing the home language environment.

The absence of a deliberately thought out family policy on language use could also be a factor in situations in which the language experiences of older siblings seem to significantly influence those of the younger ones. The parents in this study indicated that they had not discussed what their home language use family policy should be. Many bilingual parents raise their children without ever having agreed on a deliberate family language policy (Yakoubou, 1994; Piller, 2002; Baker, 2006; Kamaungu, 2006; Kigamwa, 2014).

Code-switching among parents

An interesting phenomenon of language choice that was characterized by code switching and code-mixing among parents played out by adults in both families. The children in the study reported that often, and especially when their parents wanted to discuss something in 'privacy', or were unhappy with them, they tended to switch to their heritage language. The children cited specific incidents and circumstances under which parents would code-switch. These occurrences seemed to take place at times when the children were in close proximity to the parents, and because of the environment, they would find it difficult to excuse them-

selves or to ask the children to leave. Such places included in the car when driving, at shopping malls, in public gatherings when accompanied by the children, and during telephone conversations when children were nearby. Such switchings may have heightened the desire of the children to want to learn their heritage languages in order to understand what their parents were saying, as one child reported. The practice elicited other reactions as well, with one child noting that she felt “rejected ...left out when my (her) parents use the language.” Besides the feelings that code-switching elicited in the children, it appears that this practice also had an effect on the acquisition experiences of the children in the study.

For the parents, code-switching meant to signal that they were discussing something important as well as something they felt the children were not ready to be a part of, an ‘adult issue’. Some of the issues included impending family activities, such as family travel or serious family situations such as the death of a loved one or member of the extended family, or even embarrassing situations that may have been unfolding in the extended family or among friends who the children probably knew. Pavlenko (2004) noted that sometimes bilingual parents code-switched to emphasize certain points or to make the children know that they really meant what they are saying. When this happens, in some cases, the heritage language becomes associated with rebuke and correction. The practice of code-switching seemed to curtail and limit the use of heritage languages in the families. It appeared that the immigrant parents’ use of their heritage languages to obscure meanings during conversations among themselves did not seem to set well with their children, and that the children’s mixed feelings about their parents switching from English to their heritage languages came to be viewed negatively.

Though, as mentioned, some children reported that code-switching by parents seemed to motivate them to want to learn the heritage language, for others it seemed counter-intuitive with the wishes of the parents to have their children learn to speak their heritage languages. Krashen (1982) in his monitor hypothesis theory argued that people learn second languages when they receive a lot of comprehensible input. For the purposes of this article, it may suffice just to note that it appears that although the linguistic environment may have been filled with the heritage languages, the fact that the content was not intended for the children to hear it makes it difficult for the learners to benefit from the ‘input.’

This study determined that, in general, the parents were basically the only ones interacting significantly with the heritage language. During the study, the researcher witnessed numerous occasions of code-switching and code-mixing as the parents conversed among themselves as well as when they spoke to their children. In some cases, it appeared that the switching and mixing were not deliberate, but rather communicative practices which the parents were not intentional about. It may also have signaled a lack of intentionality on the part of parents in approaching their role as language teachers for their children who were entirely dependent on them as the single, and key resource for accessing their heritage languages. Code-switching to obscure conversational meaning was not just limited to children, but seemed to extend to other adults who were not familiar with the languages. In line with what seems to be common African hospitality to visitors, as I would visit the homes repeatedly for interviews and observations, the families served me a beverage, usually tea or juice. In most cases, I was invited to share in the evening meal with the family that I visited. In literally every visit, what would signal to me that the family was organizing or preparing to invite

me to share in their meal would be the switch from English to their heritage language between the adult members of the family. This code switch would sometimes be followed by instructions to children, usually in English or sometimes in short instructions in the heritage language, or a mixture of English and the heritage language.

Shin (2003) argued that code-switching is usually done by choice or as a result of limited competence in a language. In this study, the parents were clearly switching to their heritage languages by choice and, specifically because they wanted to discuss among themselves things that they may not have wanted their children to understand or be aware of. The interviews conducted during the focus groups confirmed this, as the parents acknowledged the practice; as one of the parents noted: “when we want to share secrets, we switch to a language they don’t understand.” The children in the two families also confirmed that the adults tended to change their languages when they wanted to speak about something they were not comfortable with their children knowing. In the case of the Anglophone family, code-switching was mainly from English to Ekigusii and in some cases into Kiswahili, since their children could understand some spoken Ekigusii.

The Francophone parents portrayed the most elaborate use of different languages. Code-switching occurred at two levels: sometimes the parents spoke in Kinyarwanda while at times they chose to use French. In observing the family, I could see that the conversations between the adults were mainly in Kinyarwanda, with limited usage of English. However, the conversations between the parents and children were in English. Although I did not observe the use of French, the parents reported that there were times when they spoke French, which kept the conversations strictly between themselves, because even the children’s grandmother could not understand the language.

Conclusion

This article highlights the effects of school for children who are in the process of acquiring their heritage language, the effects of the influence of older siblings on the younger siblings as they impacted the home environment, and the intentional use of heritage languages by parents to obscure meaning in conversation, among adults, in the presence of children. While the former two factors certainly influence acquisition, it is easy to see how the intentional use of heritage languages by parents would affect language learning by children. Shifting language practices in the home are bound to take place as immigrant families increasing use of the dominant language, while linguistic gains made in the home are bound to be lost or to wane as children’s proficiency in a school language improves when they start going to school. Intentional use of heritage languages in the home remains an important factor for heritage language transmission. The home language environment is also bound to change for immigrants whose use of the dominant language increases with their extended stay in a host country. Faced with the initial challenges of the acquisition of heritage languages, children born in the U.S. may never learn the languages well enough to maintain them. The effects of this kind of usage on language learning are yet to be fully understood, and may need to be investigated further, however we can conclude that code-switching, to obscure meaning in conversations by adults, curtails heritage language acquisition for their children.

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ON MOVE AND AGREE: EVIDENCE FOR IN-SITU AGREEMENT^[*]

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Abstract: The verb in Standard Arabic agrees with its subject in all Φ -features in the SV order; however, in VS order, the verb surfaces with a singular number regardless of the number value on the subject. This paper argues that feature-specification on a designated inflectional head triggers the different agreement asymmetries found in many languages. In this respect, a feature-driven analysis is proposed to account for subject-verb agreement asymmetry and word-order alternation in Standard Arabic and Sana'ani Arabic in terms of Φ -completeness on the inflectional head T. I argue that the head T is considered Φ -complete only when all the uninterpretable features available to that head enter the derivation unvalued and then assigned values in the syntax. Crucially, only Φ -complete T can have EPP feature to trigger subject movement (Chomsky, 2001); however, nominative Case can be assigned to DPs by Φ -incomplete probes in-situ, lending support to the minimalist assumption that divorces movement from formal feature valuation (Chomsky, 2000, 2001, 2005). In addition, the paper provides a comparative study of preverbal DPs in Standard Arabic and Sana'ani Arabic and concludes that while preverbal DPs in Standard Arabic can be subjects or topics, the subject in Sana'ani Arabic is uniformly postverbal and preverbal DPs are usually dislocated topics.

Keywords: agreement, subjects, topics, A-movement, nominative Case, word order, Standard Arabic

1. Introduction

This paper provides a new analysis of agreement morphology on the verb, from a minimalist perspective. For quite some time, Corbett (2006) notes, agreement morphology was used merely as a diagnostic test for other syntactic phenomena. For example, verbal agreement was a diagnostic test for subjecthood which helped in working on subject raising. Later, researchers concluded that agreement is such a poorly understood phenomenon in itself to be used as a diagnostic test for other phenomena. Currently, the recent advancements in linguistic research made it possible to at least understand the richness of the agreement systems in world's languages, making agreement a major topic in the current theories of syntax. Agreement morphology on the verb has been viewed syntactically as uninterpretable features that need to be valued for successful convergence of the derivation; and semantically as redundant information that does not give new information, but instead repeats the same information expressed in the subject. Verbal agreement, Corbett (2006) observes, is seen to be an instance of 'displaced grammatical meaning' or 'information in the wrong place' in the sense that the verb can carry the grammatical meaning relevant to another word, i.e., the

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subject; hence, it is redundant and adds no extra information. However, agreement still stands as a crucial paradigm in natural languages that affects different components of the grammar.

The paper is divided as follows: in the second section, I describe the agreement facts in Standard Arabic in different contexts. In the third section, I propose two conditions that regulate instances of A-movement and nominative Case assignment. In the fourth section, I revisit the phenomenon of subject-verb agreement asymmetry and provide a new feature-driven analysis to account for this asymmetry with nominal DPs as well as the absence of this asymmetry with pronominal DPs. In the last section, I summarise the main findings of the paper.

2. Subject-verb agreement facts in Standard Arabic

In Standard Arabic, partial agreement in person and gender holds between the verb and the subject in VS order as in (1a). Full verbal agreement in VS order yields the ungrammatical sentence in (1b). In SV order, full agreement in person, number, and gender holds between the subject and the verb as in (2a). The sentence in (2b) is ungrammatical since the verb displays partial agreement in SV order. In other words, when the subject is postverbal, the number feature on the subject does not agree with the number feature on the verb and the latter shows a default singular value:

- (1) a. ḥaDar-a T-Tullaab-u n-nadwat-a
attended-3.s.m the-students-nom the-seminar-acc
'The students attended the seminar'
b. *ḥaDar-uu T-Tullaab-u n-nadwat-a
attended-3.p.m the-students-nom the-seminar-acc
'The students attended the seminar'
- (2) a. ?aT-Tullaab-u ḥaDar-uu n-nadwat-a
the-students-nom attended-3.p.m the-seminar-acc
'The students attended the seminar'
b. *?aT-Tullaab-u ḥaDar-a n-nadwat-a
the-students-nom attended-3.s.m the-seminar-acc
'The students attended the seminar'

When the subject is pronominal, it usually gets dropped in the course of computation, since Standard Arabic is a null subject language. Nonetheless, the verb always shows full agreement:

- (3) ḥaDar-uu n-nadwat-a
attended-3.p.m the-seminar-acc
'(They-m) attended the seminar'
- (4) ḥaDar-na n-nadwat-a
attended-3.p.f the-seminar-acc
'(They-f) attended the seminar'

However, when the pronominal subject chooses to surface, it occurs only in a preverbal position with full agreement on the verb:

- (5) a. *ħaDar-uu hum an-nadwat-a
attended-3.p.m they-m the-seminar-acc
'They attended the seminar'
- b. *ħaDar-a hum an-nadwat-a
attended-3.s.m they-m the-seminar-acc
'They attended the seminar'
- c. hum ħaDar-uu n-nadwat-a
they-m attended-3.p.m the-seminar-acc
'They attended the seminar'
- d. *hum ħaDar-a n-nadwat-a
they-m attended-3.s.m the-seminar-acc
'They attended the seminar'

By contrast, many spoken varieties of Arabic (dialectal Arabic, henceforth) do not show any subject-verb agreement asymmetry. The examples from Moroccan Arabic and Lebanese Arabic below are taken from Aoun et al. (1994, p. 196–197):

- (6) a. ragad-uu al-jahaal (Sana'ani Arabic)
slept-3.p.m the-children
'The children slept'
- b. ?al-jahaal ragad-uu
the-children slept-3.p.m
'The children slept'
- (7) a. la-wlaad naʕs-uu (Moroccan Arabic)
the-children slept-3.p
'The children slept'
- b. naas-uu la-wlaad.
slept-3.p the-children
'The children slept'
- (8) a. la-wlaad niim-uu (Lebanese Arabic)
the-children slept-3.p
'The children slept'
- b. niim-uu la-wlaad.
slept-3.p the-children
'The children slept'

In these dialects, the verb always establishes full agreement with its subject, whether the latter is preverbal or postverbal.

3. Conditions on formal feature valuation

In the recent theories of minimalist syntax (Chomsky, 2000, 2001, 2005), it is assumed that features can motivate various syntactic operations: External Merge is motivated by the EPP feature on T as in the case of expletive-insertion, Internal Merge, i.e., Move, is also motivated by the EPP feature on T and Agree is motivated by the need to value formal features.

Under minimalist assumptions, uninterpretable features on a designated head are matched and valued via sending a probe to the nearest DP goal in a c-command local domain. For example, the uninterpretable Φ -features on the head T can be valued against those of the subject DP and then get deleted to enable the derivation to converge; and as a reflex of the operation Agree, the Case of the DP gets assigned. Under this discussion, Φ -features on T and Case on DPs can actually be valued in-situ without appealing to movement.

This leaves us with the task of identifying the mechanism of satisfying the EPP feature. It is argued that heads with EPP feature can have an extra specifier (Chomsky, 2000, p. 102). Spec-vP can host a shifted object in some languages, or act as an intermediate position for wh-movement. Spec-TP serves as a landing site for the subject and spec-CP accommodates the moved wh-phrase.

Chomsky argues that the EPP feature on T is satisfied either by External Merge, as in the case of expletive-insertion, or by Internal Merge which involves the movement of the agreeing DP to spec-TP. In both cases, the head T projects a specifier to host an element.

The inventory of features on the head T is central to our discussion. It is important here to distinguish between the EPP feature and the Φ -features. While the EPP feature is satisfied via merging an element in the specifier of T, Φ -features require valuation by means of matching and then deletion. It is argued that “uninterpretable features, and only these, enter the derivation without values...their values are determined by Agree” (Chomsky, 2001, p. 5). A major assumption in minimalist syntax is that movement is dissociated from formal feature valuation “Note that Case assignment is divorced from movement and reflects standard properties of the probes, indicating that it is a reflex of Agree holding of (probe, goal); the EPP-raising complex is a separate matter” (Chomsky, 2001, p. 17); hence the EPP feature is satisfied differently from Φ -features and Case.

At this point, we need to answer the question: does the head T always have an EPP feature? For SVO languages, e.g., English, Chomsky argues that the head T always has an EPP feature, in finite as well as non-finite contexts. However, in VSO languages, e.g., Standard Arabic, it is clear that the subject can surface postverbally, suggesting that T need not always have an EPP feature. Hence, the task here is to regulate the presence vs. absence of the EPP feature on T or, in other words, to answer the question: what triggers the EPP feature on T? I argue that Φ -completeness of the head T can trigger the EPP feature (Chomsky, 2001). The head T is Φ -complete only when all the uninterpretable features available to that head enter the derivation unvalued and then assigned values in the syntax. To regulate the presence of the EPP feature on the head T in Standard Arabic, I introduce the following condition:

- (9) EPP condition:
Only Φ -complete T can have EPP feature.

Thus, when the head T is Φ -complete, i.e., when the complete set of uninterpretable features available to that head enters the derivation unvalued and then assigned values in the syntax, it can have an EPP feature. It is important to note that the complete set of features should enter the derivation unvalued. Thus, a default value, which does not need to be valued, will render the set of features incomplete. I argue that the condition above can successfully account for A-movement of the subject in Standard Arabic.

Moreover, Chomsky argues that the Case of the agreeing DP, here the nominative Case of the subject, is assigned as a reflex of establishing agreement with T. He assumes that “Case itself is not matched, but deletes under matching of Φ -features” (Chomsky, 2001, p. 6).

It is tempting to consider the stipulation that Φ -completeness can be a prerequisite to trigger the EPP feature and also to assign structural Case. However, cross-linguistic variation in terms of agreement features makes it difficult to adopt such a stipulation. In fact, the stipulation above can be challenged by the facts of formal feature valuation in Standard Arabic. The assumption that only a Φ -complete T can assign nominative Case on the subject can be challenged by the fact that in VS sentences in Standard Arabic, the subject surfaces with a nominative Case which is assigned by a Φ -incomplete probe:

- (10) qaraʔ-a T-Tullaab-u l-qaSiidat-a
 read-3.s.m the-students-nom the-poem-acc
 ‘The students read the poem’

Formal feature valuation in defective domains is not a peculiar phenomenon of Standard Arabic alone. This phenomenon occurs in other languages as well; and interestingly all these languages share one common property: they are all null subject languages. In these languages, nominative Case on the overt subject can be assigned in-situ by a defective (Φ -incomplete) probe that need not match the number feature on the DP:

- (11) katab-a l-ʔawlaad-u d-dars-a (Standard Arabic)
 wrote-3.s the-boys-nom the-lesson-acc
 ‘The boys wrote the lesson’
- (12) chegou as cadeiras (Colloquial Portuguese; Costa, 2001, p. 8)
 arrived-3.s the chairs- nom
 ‘The chairs arrived’
- (13) gwel-odd/*gwel-son y cathod yr aderyn (Welsh; Tallerman, 1998, p. 113)
 saw-3.s/saw-3.p the cats-nom the bird
 ‘The cats saw the bird’

The examples above show that a Φ -incomplete probe can assign structural nominative Case on the subject DP under partial agreement.

Therefore, I assume that Φ -completeness on the head T can be a condition to have EPP feature, but is not a condition to assign nominative Case on the subject. I claim that nominative Case on the subject DP, at least in Standard Arabic, is assigned under agreement, irrespective of the probe’s Φ -completeness. Considering the minimalist assumption that the inflectional head T encodes two paradigms, i.e., agreement and tense, I assume that a Φ -in-

complete probe in Standard Arabic has the ability to value formal features by virtue of agreement. However, in English-type languages, formal feature valuation seems to be instantiated by tense. I introduce a generalization on structural nominative Case assignment in Standard Arabic along the following terms:

(14) Nominative case condition (NCC):

Nominative Case on the subject is assigned under agreement with T irrespective of Φ -completeness.

Therefore, I argue that Φ -completeness is not a condition for assigning nominative Case. Rather, a defective T can assign nominative Case on the subject as a reflex of establishing agreement.

Moreover, I argue that in Standard Arabic the head T will have an EPP feature to trigger the movement of the subject to its specifier only when it is Φ -complete. Therefore, Φ -completeness always triggers the EPP feature in Standard Arabic, consequently the unacceptability of sentences with full subject-verb agreement in VS sentences:

- (15) a. *katab-uu l-ʔawlaad-u d-dars-a
 wrote-3.p.m the-boys-nom the-lesson-acc
 ‘The boys wrote the lesson’
 b. ʔal-ʔawlaad-u katab-uu d-dars-a
 the-boys-nom wrote-3.p.m the-lesson-acc
 ‘The boys wrote the lesson’

Therefore, I assume that Φ -completeness is a necessary and sufficient condition to trigger the EPP feature in Standard Arabic, and subjects must move into a preverbal position when the head T is Φ -complete.

Alternatively, Φ -incomplete heads in Standard Arabic cannot have an EPP feature. However, defective probes can assign nominative Case on the subject. I argue that in this language when the head T lacks the EPP feature, the subject remains in-situ in its internal position in spec-vP, yielding VS order; however, when the head T has an EPP feature, the subject moves from its internal position in spec-vP to spec-TP to satisfy this feature on T, yielding SV order. Thus, a feature-driven analysis to formal feature valuation can successfully account for A-movement and the phenomenon of subject-verb agreement asymmetry in Standard Arabic.

However, the different spoken varieties of Arabic display a uniform pattern of subject-verb agreement. In these dialects, the verb always agrees with a postverbal subject in person, number, and gender. There is no partial subject-verb agreement in VS order in dialectal Arabic. Still, these dialects employ another word order, i.e. SV, with full subject-verb agreement, too. Unlike Standard Arabic, the movement of the postverbal subject to a preverbal position in dialectal Arabic is not triggered by full agreement, since the subject in these dialects can stay in-situ in a postverbal position with full agreement morphology on the verb. Thus, in Standard Arabic, it is obligatory to move the postverbal subject to a preverbal position if there is full agreement, whereas in dialectal Arabic this movement is optional:

- (16) $\text{ʔal-ʔaTfaal-u naam-uu}$ (Standard Arabic)
 the-children-nom slept-3.p.m
 ‘The children slept’
- (17) $*\text{naam-uu l-ʔaTfaal-u}$
 slept-3.p.m the-children-nom
 ‘The children slept’
- (18) $\text{ragad-uu al-jahaal}$ (Sana’ani Arabic)
 slept-3.p.m the-children
 ‘The children slept’
- (19) $\text{ʔal-jahaal ragad-uu}$
 the-children slept-3.p.m
 ‘The children slept’

A possible account would be to assume that these dialects may not have an EPP feature on the head T. The EPP condition argued for earlier states that the EPP feature on the head T is triggered only by Φ -completeness, but it is clear that in dialectal Arabic Φ -completeness does not trigger the EPP feature. Thus, given the assumption that dialects of Arabic may not have an EPP feature on the head T, then, maybe, movement of a postverbal DP to a preverbal position in these dialects is an A-bar movement that is triggered by the optional availability of a head above TP. I take this head to be Topic (Top) and assume that preverbal DPs in dialectal Arabic are topics:

- (20) $[\text{TopDP}_i \text{Top} [\text{TPV}_j + \text{T}(\Phi\text{-complete})[\text{vpt}_i \text{t}_j [\text{VP obj}]]]]$

One of the common properties of topics is definiteness; therefore, a topicalised DP in Standard Arabic as well as dialectal Arabic must be definite. It is to be noticed that in Standard Arabic as well as dialectal Arabic, a postverbal subject can be definite or indefinite. However, while preverbal subjects in Standard Arabic can be definite or indefinite (Fassi Fehri, 1993), a preverbal DP in Sana’ani Arabic must be definite:

- (21) $\text{jaasuus-un ʔaqbal-a ʕalay-naa}$ (Standard Arabic)
 spy-nom appeared-3.s.m on-us
 ‘A spy appeared to us’
- (22) $\text{ʔal-jaasuus-u ʔaqbal-a ʕalay-naa}$
 the-spy-nom appeared-3.s.m on-us
 ‘The spy appeared to us’
- (23) $*\text{jasuus bada ʕalay-naa}$ (Sana’ani Arabic)
 spy appeared-3.s.m on-us
 ‘A spy appeared to us’
- (24) $\text{ʔal-jasuus bada ʕalay-naa}$
 the-spy appeared-3.s.m on-us
 ‘The spy appeared to us’

It is obvious that Φ -completeness is a sufficient condition to have a preverbal definite or indefinite subject in Standard Arabic. However, a preverbal DP in Sana’ani Arabic must be

definite, a common property of topics in this language, suggesting that this DP might be a topic. If the preverbal DP in Sana'ani Arabic is a subject, the ungrammaticality of (23) above is difficult to explain, given the fact that subjects can be indefinite.

Moreover, preverbal subjects in Standard Arabic differ from preverbal DPs in Sana'ani Arabic in their structural position. Preverbal subjects in Standard Arabic are within the TP domain and pattern like fronted objects (Fassi Fehri, 1993):

- (25) jaasuus-un ʔaqbal-a ʕalay-naa (Standard Arabic)
 spy-nom appeared-3.s.m on-us
 'A spy appeared to us'
- (26) baqart-an shaahad-tu
 cow-acc saw-1.s
 'A cow, I saw'
- (27) dajaajat-an thabaḥ-tu
 hen-acc cut throat-1.s
 'A hen, I cut its throat'

On the other hand, preverbal DPs in Sana'ani Arabic are outside the TP domain, thus the impossibility of fronting an indefinite DP:

- (28) *jasuus bada ʕalay-naa (Sana'ani Arabic)
 spy appeared-3.s.m on-us
 'A spy appeared to us'
- (29) *bagarih ibsar-t
 cow saw-1.s
 'A cow, I saw'
- (30) *bagarih ibsar-t-ha
 cow saw-1.s-it
 'A cow, I saw it'
- (31) *dijaajih thabaḥ-t
 hen cut throat-1.s
 'A hen, I cut its throat'
- (32) *dijaajih thabaḥ-t-ha
 hen cut throat-1.s-it
 'A hen, I cut its throat'

The ungrammaticality of the Sana'ani Arabic examples above can be improved if the indefinite preverbal DPs are replaced with definite DPs, suggesting that these DPs might be topics positioned outside the TP domain:

- (33) ʔal-jasuus bada ʕalay-naa
 the-spy appeared-3.s.m on-us
 'The spy appeared to us'
- (34) ʔal-bagarih ibsar-t-ha
 the-cow saw-1.s-it
 'The cow, I saw it'

- (35) ʔad-dijaajih thabaḥ-t-ha
 the-hen cut throat-1.s-it
 ‘The hen, I cut its throat’

One might wonder if the matter in hand is just about definiteness of preverbal DPs, and that Sana’ani Arabic, for some reasons, does not allow indefinite DPs to surface sentence initially. However, this assumption can be challenged by the ungrammatical sentences below where the preverbal DPs are definite:

- (36) *ʔal-bagarih ibsar-t
 the-cow saw-1.s
 ‘The cow, I saw’
 (37) *ʔad-dijaajih thabaḥ-t
 the-hen cut throat-1.s
 ‘The hen, I cut its throat’

It is clear from the examples above that definiteness is not the only requirement to have a preverbal DP in Sana’ani Arabic. The ungrammaticality of the sentences above arises due to the absence of a pronominal clitic in the original position of the left-dislocated topic. The preverbal DPs in the sentences above might be topics, since topics in these dialects leave a pronominal clitic. However, since the left-dislocated DPs did not leave any pronominal clitic in their original position, the sentences are rendered ungrammatical.

Furthermore, it is argued that sentential negation in Standard Arabic selects a TP in which verbs, preverbal subjects or fronted objects can follow the negation marker (Fassi Fehri, 1993). The examples below show the negation marker *maa* ‘not’ followed by a fronted indefinite object:

- (38) maa dajaajat-an thabaḥ-tu (Standard Arabic)
 not hen-acc cut throat-1.s
 ‘Not a hen I cut its throat’
 (39) maa baqarat-an shaahad-tu
 not cow-acc saw-1.s
 ‘Not a cow I saw’

It is clear from the examples above that the indefinite DPs are fronted to a TP-internal position, and this operation does not trigger a pronominal clitic in the base-position of the fronted DPs, suggesting that the fronted objects that follow the sentential negation marker are not topics. In Standard Arabic, topics cannot follow sentential negation markers:

- (40) *maa d-dajaajat-u thabaḥ-tu-ha
 not the-hen-nom cut throat-1.s-it
 ‘The hen, I did not cut its throat’
 (41) *maa l-baqarat-u shaahad-tu-ha
 not the-cow-nom saw-1.s-it
 ‘The cow, I did not see it’

Unlike Standard Arabic, indefinite DPs cannot follow a negation marker in Sana'ani Arabic. It is to be noticed that it is common in the dialects of Arabic to have double negation markers where negation is indicated, beside the sentence initial negation marker, by the suffix *-sh* on verbs:

- (42) *maa dijaajih thabaḥ-t-sh
not hen cut throat-1.s-neg
'Not a hen I cut its throat'
- (43) *maa bagarih ibsar-t-sh
not cow saw-1.s-neg
'Not a cow I saw'

Given the fact that the fronted DPs in the examples above are not topics, since they are indefinite and have no pronominal clitics in their original position, it is difficult to explain their ungrammaticality. The sentences above can be improved if the indefinite object stays in-situ postverbally or if it is topicalised:

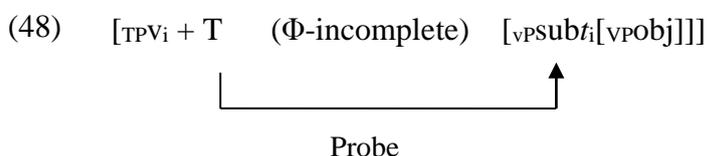
- (44) maa thabaḥ-t-sh dijaajih
not cut throat-1.s-neg hen
'I did not cut a hen's throat'
- (45) maa bsar-t-sh bagarih
not saw-1.s-neg cow
'I did not see a cow'
- (46) ?ad-dijaajih maa thabaḥ-t-ha-sh
the-hen not cut throat-1.s-it-neg
'The hen, I did not cut its throat'
- (47) ?al-bagarih maa bsar-t-ha-sh
the-cow not saw-1.s-it-neg
'The cow, I did not see it'

A comparison between Standard Arabic examples and Sana'ani Arabic examples shows that while Standard Arabic can have a TP-internal indefinite DP following the negation marker, Sana'ani Arabic does not have this option. It seems that Sana'ani Arabic does not have an EPP feature on the head T to create a position to host a preverbal DP within the TP domain. Instead, preverbal DPs in Sana'ani Arabic are topics positioned in a topic phrase above TP.

4. Subject-verb agreement asymmetry in Standard Arabic revisited

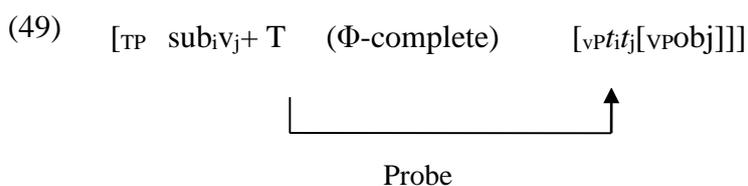
Under minimalist assumptions, I assume that agreement is established by the syntactic operation Agree, which values features at a distance, within a c-command local domain. I argue that agreement in Standard Arabic is established when the head T sends a probe to target the vP-internal subject. The head T in Standard Arabic can have the following inventory of uninterpretable features: i) Φ -features, and ii) the EPP feature. When T is Φ -complete, it must have an EPP feature; however, when T is Φ -incomplete, it cannot have an EPP feature.

On the basis of the arguments mentioned above, I introduce a structural representation for agreement in Standard Arabic, showing how the inventory of uninterpretable features on the head T decides agreement patterns and word-order in this language. I start with the unmarked word-order in Standard Arabic (VS) and show how agreement is established:



In this structure, T is Φ-incomplete, namely the number feature on T comes with a default singular value. The head T sends a probe to the vP-internal subject and the uninterpretable person and gender features on the head T are matched and valued against the interpretable features of the subject, and the nominative Case of the subject is assigned as a reflex of the operation Agree. However, since T is Φ-incomplete, it follows then that it does not have the EPP feature in its inventory; consequently the subject remains in-situ. Thus, we get the VS order with partial agreement showing on the verb, and the subject having a nominative Case as a reflex.

Similarly, I present the following structural representation for the SV clauses:



In this structure, T is Φ-complete and its probe targets the vP-internal subject. The uninterpretable features on T are matched and valued against the interpretable features of the subject, and the nominative Case of the subject is assigned as a reflex of establishing agreement; and since T is Φ-complete, it must then have the EPP feature. As a result, the subject is raised to spec-TP to satisfy the EPP feature on T. Thus, the SV order is derived with full agreement showing on the verb, and the nominative Case of the subject is assigned as a reflex, in a systematic and straightforward way.

4.1 Verbal agreement with nominal subjects

In Standard Arabic, the verb agrees with its subject in all Φ-features when the subject precedes the verb. However, when the subject follows the verb, the latter shows partial agreement with its subject in person and gender features. Partial agreement in VS sentences arises when the number feature on the verb is set to a default singular value, irrespective of the number feature of the subject; be it singular, dual, or plural:

- (50) a. sharib-a l-ʔawlaad-u l-ħaliib-a
 drank-3.s.m the-boys-nom the-milk-acc
 'The boys drank the milk'

- b. *sharib-uu l-ʔawlaad-u l-ħaliib-a
drank-3.p.m the-boys-nom the-milk-acc
'The boys drank the milk'
- c. ʔal-ʔawlaad-u sharib-uu l-ħaliib-a
the-boys-nom drank-3.p.m the-milk-acc
'The boys drank the milk'
- d. *ʔal-ʔawlaad-u sharib-a l-ħaliib-a
the-boys-nom drank-3.s.m the-milk-acc
'The boys drank the milk'
- e. sharib-at il-fatayaat-u l-ħaliib-a
drank-3.s.f the-girls-nom the-milk-acc
'The girls drank the milk'
- f. *sharib-na l-fatayaat-u l-ħaliib-a
drank-3.p.f the-girls-nom the-milk-acc
'The girls drank the milk'
- g. ʔal-fatayaat-u sharib-na l-ħaliib-a
the-girls-nom drank-3.p.f the-milk-acc
'The girls drank the milk'
- h. *ʔal-fatayaat-u sharib-at il-ħaliib-a
the-girls-nom drank-3.s.f the-milk-acc
'The girls drank the milk'

As shown in the examples above, the sentences in (a & e) display partial agreement in VS order. Though the subject is plural, the verb surfaces with a default singular value. However, the examples in (b & f) are ungrammatical, as the verb shows full agreement with the subject in VS order. It is to be noticed that when the subject is a nominal DP and T is Φ -complete, it is obligatory to raise the subject to spec-TP. Absence of full agreement in VS sentences in Standard Arabic strongly supports my claim that Φ -completeness triggers the EPP feature. The ungrammaticality of (b & f) comes from the fact that the Φ -complete head T does have an EPP feature, but after agreement is established between T and the subject, through application of Agree, the EPP feature is not satisfied. The failure to satisfy the EPP feature on T, by means of raising the subject to spec-TP, causes the derivation to crash.

In (c & g), full agreement is established and the EPP feature is satisfied, obtaining SV order. However, the counterpart sentences (d & h) are ungrammatical. In fact, they are ruled out by the EPP condition. A Φ -incomplete head like the one in (d & h) cannot have an EPP feature; consequently spec-TP cannot be generated in the first place. Thus, movement of the subject to spec-TP is ruled out on two grounds: first, since the head T is Φ -incomplete and does not have EPP feature, a specifier cannot be created to serve as a landing site for the moved subject. Second, it is not clear what, if not EPP, triggers movement of the subject, since agreement and Case are valued in-situ, therefore it does not need to move any further. Similarly, in Colloquial Portuguese, it is shown that the verb can have partial agreement with a postverbal subject when the subject is nominal (Costa, 2001, p.8):

- (51) a. chegou as cadeiras (Colloquial Portuguese)
arrived-3.s the chairs-nom
'The chairs arrived'

- b. *as cadeiras chegou
the chairs-nom arrived-3.s
'The chairs arrived'

In fact, the examples above are self-explanatory and conform to the EPP and NCC conditions described in previous sections. Though the head T in (51a) is Φ -incomplete, it establishes partial agreement with its subject and assigns the latter's Case. However, the head T here does not have an EPP feature to trigger the movement of the subject. On the other hand, the sentence in (51b) is ungrammatical because a Φ -incomplete head cannot have an EPP feature in order to create a specifier to host the moved subject.

Interestingly, most of the modern varieties/dialects of Arabic do not exhibit the usual subject-verb agreement asymmetry found in Standard Arabic and usually do not have Case markers on DPs. For example, in Sana'ani Arabic the verb always agrees with the subject, in both word-orders, in all Φ -features:

- (52) ?al-?iyaal riji?u min al-madrasah (Sana'ani Arabic)(SV)
the-boys returned-3.p.m from the-school
'The boys returned from school'
- (53) ?al-?iyaal kasar-uu aT-Tagih
the-boys broke-3.p.m the-window
'The boys broke the window'
- (54) shirib-uu ?al-?iyaal al-?aSiir (VS)
drank-3.p.m the-boys the-juice
'The boys drank the juice'
- (55) ?akal-uu al-?iyaal aS-Sabuu?h
ate-3.p.m the-boys the-breakfast
'The boys had breakfast'
- (56) *harab-a s-sarag min al-?abs
escaped-3.s.m the-thieves from the-prison
'The thieves escaped from prison'
- (57) *ragad-a l-?iyaal mit?axiriin
slept-3.s.m the-boys late
'The boys slept late'

I assume that, in the examples above, the head T sends a probe and values its uninterpretable features against the interpretable features of the nearest DP in its local domain. It can be seen that in Sana'ani Arabic the head T always establishes full agreement, whether the subject is preverbal or postverbal. In this dialect, as well as in other dialects of Arabic, the typical subject-verb agreement asymmetry found in Standard Arabic does not exist. This dialect employs two different word-orders, but always with full subject-verb agreement.

In such contexts, it is difficult to assume that movement of the subject DP from its postverbal position to a sentence-initial position is triggered by the EPP feature on the head T. In this dialect, Φ -completeness does not seem to trigger the EPP feature; consequently, this dialect may not have an EPP feature on T. Therefore, I assume that movement of subject

DPs in Sana’ani Arabic to a preverbal position is an A-bar movement that is triggered when there is a topic head above TP which attracts such DPs to its specifier.

Similarly, in Moroccan Arabic and Lebanese Arabic, the verb agrees fully with the subject in VS and SV orders (Aoun et al., 1994, p. 196–197):

- (58) a. *naʕs la-wlaad. (Moroccan Arabic)
 slept.3.s the-children
 ‘The children slept’
 b. la-wlaad naʕs-uu.
 the-children slept-3.p
 ‘The children slept’
 c. naʕs-uu la-wlaad.
 slept-3.p the-children
 ‘The children slept’
 d. *la-wlaad naʕs.
 the-children slept-3.s
 ‘The children slept’
- (59) a. *niim la-wlaad. (Lebanese Arabic)
 slept-3.s the-children
 ‘The children slept’
 b. la-wlaad niim-uu
 the-children slept-3.p
 ‘The children slept’
 c. niim-uu la-wlaad.
 slept-3.p the-children
 ‘The children slept’
 d. *la-wlaad niim.
 the-children slept-3.s
 ‘The children slept’

The data from Moroccan Arabic and Lebanese Arabic are similar to those in Sana’ani Arabic where one can find full agreement between the verb and the subject in all Φ -features whether the subject is preverbal or postverbal. As argued earlier, when the subject is preverbal, one can assume that this DP got topicalised and raised to a Topic phrase above TP. In VS sentences in dialectal Arabic, the head T is Φ -complete, but it does not have an EPP feature uniformly, therefore formal features are valued in-situ.

Likewise, European Portuguese can have two word-orders: SV and VS. The subject and the verb agree independently of the position of the subject (Costa, 2001, p. 7):

- (60) a. os meninos comeram o bolo (European Portuguese)
 the children ate-3.p the cake
 ‘The children ate the cake’
 b. *os meninos comeu o bolo
 the children ate-3.s the cake
 ‘The children ate the cake’

- c. comeram os meninos o bolo
ate-3.p the children the cake
'The children ate the cake'
- d. *comeu os meninos o bolo
ate-3.s the children the cake
'The children ate the cake'

It is obvious that the verb in European Portuguese establishes full agreement with the subject in both word-orders. The sentence in (60a) is self-explanatory. In (60b), the sentence is ungrammatical because of partial subject-verb agreement which is not an option in this language. In (60c), the head T establishes full agreement with the subject, but the movement of this subject is not triggered due to the absence of the EPP feature.

4.2 Verbal agreement with pronominal subjects

Pronominal subjects are usually dropped in Standard Arabic. However, when they choose to surface, they must precede the verb. In this language, when the subject is pronominal, T is always Φ -complete:

- (61) a. ħaDar-uu l-muʔtamar-a
attended-3.p.m the-conference-acc
'(They-m) attended the conference'
- b. *ħaDar-uu hum al-muʔtamar-a
attended-3.p.m they-m the-conference-acc
'They attended the conference'
- c. hum ħaDar-uu l-muʔtamar-a
they-m attended-3.p.m the-conference-acc
'They attended the conference'
- (62) a. ħaDar-na l-muʔtamar-a
attended-3.p.f the-conference-acc
'(They-f) attended the conference'
- b. *ħaDar-na hunna l-muʔtamar-a
attended-3.p.f they-f the-conference-acc
'They attended the conference'
- c. hunna ħaDar-na l-muʔtamar-a
they-f attended-3.p.f the-conference-acc
'They attended the conference'

Thus, the pronominal subject in Standard Arabic does not follow the verb: "Pronoun subjects in Arabic typically cannot appear postverbally, but are subject to obligatory fronting." (Harbert & Bahloul, 2002, p. 49). Moreover, Fassi Fehri (1993, p. 132) argues that "a pronoun cannot occur as a postverbal subject". However, some linguists assume, incorrectly, that pronominal subjects can occur postverbally, building their assumption on the fact that a pronominal subject in Standard Arabic can appear postverbally in a conjunction phrase:

- (63) *jaaʔ-at hiya wa Omar*
 came-3.s.f she and Omar
 ‘Omar and she came’

In the example above, movement of the preverbal subject is constrained by the Coordinate Structure Constraint (Ross, 1967) and cannot be taken as evidence of the existence of post-verbal pronominal subjects.

Also, Fassi Fehri (1993) argues that the sentence below is ungrammatical when the pronominal subject follows the verb:

- (64) **jiʔ-na hunna*
 came-3.p.f they-f
 ‘They/f came’

Data from Standard Arabic show that whenever there is a pronominal subject, it must be raised higher than the verb. I argue that since the head T is always Φ -complete with pronominal subjects, such subjects cannot follow the verb in Standard Arabic, because the Φ -complete head T always has the EPP feature. The fact that pronominal subjects cannot occur in VS order, coupled with the fact that nominal subjects never agree fully with the verb in VS order, strongly support the EPP condition stated earlier in which I argue that Φ -completeness triggers the EPP feature.

Having a Φ -complete head T with pronominal subjects is required for full interpretation of *pro* cross-linguistically. Standard Arabic is a null subject language in which the pronominal subject of the clause can be dropped optionally. Null subject languages are usually associated with rich morphology which can license the dropped subject:

An influential proposal concerning the conditions on *pro*-drop was put forward by Luigi Rizzi (see Rizzi, 1982, 1986). Rizzi suggested that *pro* is subject to two distinct types of licensing condition: the occurrence of an empty pronoun must be formally licensed, and the content of the empty element must be licensed. Formal licensing restricts the occurrence of *pro* to a particular syntactic position, or particular positions, in a language. According to Rizzi, there is an arbitrary list of heads in a language drawn from the inventory of heads such as C, I, V, P, . . . that license the occurrence of *pro* within their government domain. If *pro* is formally allowed to occur, its content must also be licensed, or recoverable, if it is to be usable. This can be achieved by rich inflection. (Ackema et al., 2006, p. 4–5)

Therefore, I assume that the fact that pronominal subjects in Standard Arabic do not occur in a VS order can be predicted by the assumption that pronominals come always with a Φ -complete head in order to license them, and consequently that head will always have an EPP feature which triggers the movement of the pronominal subject from spec-vP to spec-TP. However, the pronominal subject can be dropped in spec-TP. Thus, the agreement pattern with pronominal subjects can be accounted for by the EPP condition in which I propose that Φ -completeness of the head T triggers the EPP feature, but if T is Φ -incomplete, then there will be no EPP feature on the head T whatsoever.

In Sana’ani Arabic, the verb agrees with its pronominal subject whether that subject occurs preverbally or postverbally. While it is obligatory to raise the pronominal subject to a

preverbal position in Standard Arabic, the pronominal subject can optionally stay in-situ postverbally in Sana’ani Arabic. This empirical fact supports my claim that Sana’ani Arabic does not have EPP feature on the head T. Movement to a preverbal position in Sana’ani Arabic is an A-bar movement that is triggered by a topic phrase above TP:

- (65) a. daxal-uu hum
 entered-3.p.m they-m
 ‘They entered’
 b. *daxal hum
 entered-3.s.m they-m
 ‘They entered’
 c. hum daxal-uu
 they-m entered-3.p.m
 ‘They entered’
 d. *hum daxal
 they-m entered-3.s.m
 ‘They entered’

However, the pronominal subject can be dropped in this language:

- (66) ?akal-uu salteh
 ate-3.p.m salteh
 ‘(They-m) ate salteh’
 (67) ?akal-ayn shfuut
 ate-3.p.f shfuut
 ‘(They-f) ate shfuut’

The head T in this language is always specified for full Φ -features, consequently the absence of the phenomenon of subject-verb agreement asymmetry found in Standard Arabic. The head T in Sana’ani Arabic always establishes full agreement with the subject whether that subject is pronominal or nominal and whether the sentence has an SV or VS order. As argued earlier, this can be accounted for by assuming that this dialect may not have an EPP feature on T. The motivation for raising the subject DP to a preverbal position might be the existence of a Topic phrase above TP which attracts the DP to its specifier.

In European Portuguese, too, there is always full agreement between the verb and the subject if the latter is pronominal. It is argued that “... in preverbal position, nominative pronouns obligatorily agree with the verb...in postverbal position, full agreement is also obligatory” (Costa, 2001, p. 11–12). The following data from European Portuguese show that in both word-orders in this language, the verb agrees in all Φ -features with the pronominal subject (Costa, 2001, p. 12):

- (68) a. eles chegaram. (European Portuguese)
 they arrived.3.p
 ‘They arrived’
 b. *eles chegou.
 they arrived.3.s
 ‘They arrived’

- c. chegaram eles.
arrived.3.p they
'They arrived'
- d. *chegou eles.
arrived.3.s they
'They arrived'

The examples above show that in European Portuguese, as well as in Sana'ani Arabic, when the subject of a clause is pronominal, full agreement is established between the verb and the pronominal subject, regardless of the word-order of that clause. This shows that Φ -completeness does not actually trigger the EPP feature in these languages and maybe such languages do not have an EPP feature on T.

5. Conclusion

In this paper, I argue for a feature-driven analysis for word-order and subject-verb agreement asymmetry in Standard Arabic and Sana'ani Arabic, under the Minimalist framework. The analysis is based on the recent theories of generative syntax (Chomsky, 2000, 2001, 2005) which assume that agreement is established under the application of the syntactic operation Agree, which establishes agreement at a distance. It is argued that preverbal DPs in SV order in Standard Arabic are actually subjects and not topics. Consequently, the alternation in word-order, SV vs. VS, in Standard Arabic is ascribed to the A-movement of the subject from its vP-internal position to spec-TP. This movement is conditioned by the presence of the EPP feature on the head T. Presence vs. absence of the EPP feature is argued to be associated with Φ -completeness and this proposal is stated in the form of a condition I call the 'EPP Condition'. Furthermore, another condition, viz., 'Nominative Case Condition' (NCC) is introduced to regulate nominative Case assignment on subject DPs. Additionally, absence of subject-verb agreement asymmetry in Sana'ani Arabic is ascribed to the fact that in this language the head T lacks the EPP feature. The occurrence of preverbal DPs in this language is argued to be an instance of Topicalisation.

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