

# L U D Language Under Discussion

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## Editorial: Let the discussion begin

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The first issue of *Language Under Discussion* is now out, and with it, our journal has now been officially launched. *Language Under Discussion* is an open-access, peer-reviewed journal devoted to promoting open-minded debate on central questions in the study of language, from all relevant disciplinary and theoretical perspectives. Moreover, we seek to provoke a kind of discussion that is rarely seen on the pages of academic publications nowadays—a discussion that moves its participants outside their theoretical comfort zones, into a space where familiar assumptions can be questioned and fundamental questions can be raised. Our journal seeks, unapologetically, to promote scholarly discussion of the “big” questions about language—such questions as: What kind of a thing is language? What is the nature of linguistic meaning? How to best conceptualize structure and regularity in human languages? What is the role language plays in culture and how do cultural phenomena reflect on language? What are the roles of cognition and communication in language?

To be sure, the journal’s pages are not reserved solely for pure theoretical discussions. After all, theoretical discussions are only truly valuable when grounded in empirical research, but then too, specialized and applied studies are at their best when they are informed by a vision or model of language in general and reflect back on it, and it is this kind of reflection, in all forms, that *Language Under Discussion* is hosting on its pages.

In addition to high-quality regular submissions that correspond to the journal’s mission, outlined above, *Language Under Discussion* will occasionally publish invited papers, in which scholars of notice from different fields and theoretical approaches discuss the implications their work has for our understanding of language as such. The journal will not have a fixed schedule, but we do aim for publishing at least three or four (and no more than twelve) issues a year.

What makes this journal unique is not only its integration of data and theory but also its before-and-after peer review and its means of encouraging debate on its pages. As with any peer-reviewed journal, articles are reviewed prior to publication. *Language Under Discussion* also provides opportunities for public peer review of articles after publication, thus integrating both discussion and review. The post-publication peer review can take the simple form of web-

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page comments, but on top of that, authors are encouraged to add more substantial comments in the form of discussion notes. These notes will be peer-reviewed and published in the same issue with the article to which they respond. A year after the original publication of the issue, the author(s) of the focus paper will be invited to pen a response to the published discussion notes, after which the issue will be closed to further changes (but still open to comments on the web).

The editors of *Language Under Discussion* invite your feedback as this journal sets off on its way. Let us know what scholars you would like to see write invited articles. Inform us about what would be most helpful to you as readers, scholars, or educators. Contact us with any other queries and comments you may have regarding the journal. Sign up to be a reviewer and join the discussion also before articles are published.

Finally, we encourage you to join the Language Under Discussion Society ([ludsociety.org](http://ludsociety.org)), which publishes *Language Under Discussion* and shall hold annual online conferences on themes that allow language scholars of all kinds to come together to discuss their work. Selected papers and round-table discussions from these conferences will also be published in the journal. The society will also be organizing occasional online symposia around papers published in the journal, where the authors of published articles will present their work and other scholars will be given the opportunity to respond.

With this first issue of *Language Under Discussion*, we are setting out on a way that—we believe—will truly benefit scholarship, connect and mutually fertilize different perspectives on language, and, over time, contribute to an advance in our understanding of it. Let the discussion begin!

## Small Model Languages as Tools for Reflection

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**Abstract.** The paper presents a way of investigating verbal communication and examining assumptions about it independently of particular approaches to linguistic analysis through the development of imaginary language systems using very limited models (small model languages), identifying limitations, and finding ways to extend them. The imaginary systems are compared to real verbal phenomena to highlight communicational principles and to show where questions arise. They can be pedagogical tools. A simple model is introduced as an example and ways of extending it are considered along with the questions that are raised in the process. Consideration is given to a model of empirical testing and the assumptions behind it. Some links to existing views are made along with tentative connections to cognate disciplines.

**Keywords:** language models, imaginary systems, empirical testing, assumptions, limitations, real data

### 1 Basic Idea

Languages are not only vastly complicated but, furthermore, linguistic phenomena can be approached from a variety of points of view to arrive at constructs of different sorts. As Saussure pointed out long ago, “[b]ien loin que l’objet précède le point de vue, on dirait que c’est le point de vue qui crée l’objet” (1972: 23).<sup>1</sup> In order to describe languages then, parts of languages (such as phonological or syntactic systems), or verbal interactions, one needs a “theory for

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<sup>1</sup> “Far from the object (of study) preceding one’s point of view, one would rather say the point of view creates the object” [trans. PR]. One might note that the implication that languages and their components are the linguist’s constructs conflicts with Saussure’s claims to be defining “des choses et non des mots” (“things and not words” [PR], p. 31) and that language is an identifiable reality (“empreintes déposés dans chaque cerveau” (“imprints formed in each brain” [PR] p. 38)).



description”, i.e. a principled way of establishing constructs (or “point of view”), which can account for selected sets of observables in a coherent and empirically valid way (cf. Mulder, 1975: 87–104). The term “description” should not be viewed restrictively—any description must have an explanatory function in relation to the selected phenomena of whatever sort. However, any theory for description will involve a wide range of assumptions about the nature of the observables—i.e. which aspects of speech events to model and the relevant selection of phenomena, and methods. Such theories will be “arbitrary but appropriate”, as Hjelmslev (1953: 24–5) maintained. We might assume, for example, that “communication”—the transmission of information—is the fundamental characteristic to be considered, but that assumption too requires further investigation and definition. Alternative perspectives on speech, viewing speech as “expression” or as aesthetic or social phenomena, bring other assumptions and methods. For the purposes of this investigation, a communicational perspective will be assumed.

It might be best to investigate our assumptions in a relatively independent way, i.e. in a way which is not related to any particular theory for description. This might be done by setting up small-scale, imaginary communication systems as models with the aim of questioning our assumptions about what must go into verbal communication systems, the requirements on them, their limitations, and the decisions that must be made in setting them up. One can then compare the limited, imaginary systems with observed linguistic phenomena to determine additional perspectives and complexities that models need to address (although one should note immediately that “observed linguistic phenomena” are not as straightforward as the expression may indicate). That is, we might devise small-scale systems which can be used to create a virtual world of potential messages, and examine its interpretation (if any) in real-world communication. By limiting the scale of such systems, we can control variables better and make assumptions more transparent. We can call such imaginary systems “small model languages” (SMLs) and ask:

- What properties should such a small-scale system have?
- What can small-scale systems do?
- Do real languages have the same properties? If not, what changes are needed in the model?
- What assumptions are we making?
- What capacities are implied for speakers?
- How can SMLs be extended?

SMLs are thought experiments. It is important to note that SMLs should be explicit and independent of particular linguistic models. It is not the intention here to apply, or critique, any particular approach to linguistics, but rather to suggest a way of reflecting on assumptions. This process leads to the discussion of fundamental questions. Of course, other thinkers have arrived at similar proposals or ideas from different starting points. The use of SMLs can support other approaches in such cases, or suggest areas for questioning in others. It will not be possible to point out all of the connections between the outcomes of the simple SMLs presented below and existing proposals, although some links will be made.

One of the uses of SMLs is to be a teaching tool, although the notion of a “model” (below) can be applied in any linguistic approach. Since any approach can be translated into a self-contained set—a set of entities with their relations defined in it—all linguistic approaches include models. Sometimes, models are used more explicitly in linguistic analysis. Early discussions of

linguistic models are found in the work of Revzin (1966) and Mulder (1968). Approaches with significant emphasis on epistemology have developed ideas of modelling explicitly. One such approach is Mulder's "axiomatic functionalism", e.g. Mulder (1989 and 1998), and Hervey (1980), Dickins (1998). Explicit applications of modelling principles are found in, for example, Hervey (1978), Rastall (1993), Dickins (2007), and Bičan (2013) in phonological analysis, and Lieb (1968) used the concepts of modelling to develop semiotic theory. Weigand (2010) has adopted modelling principles in the analysis of dialogue. Here we are concerned with the use of imaginary models as ways of exploring ideas about verbal communication. I am not aware of any similar approach, although tagmemicists have long used imaginary language data as a way of practising the application of their descriptive approach (e.g. Pike, 1971, or Elson and Pickett, 1974). Martinet (e.g. 1975) occasionally contrasted real linguistic phenomena with imaginary structures and Wittgenstein (1953) used imaginary communication systems to investigate ideas about certain aspects of verbal behaviour. As should be obvious, the purpose here is not to practise a particular descriptive approach, but to investigate assumptions.

## 2 What do we mean by "model"?

There is an important area of logic called "model theory" (see, e.g., Bridge, 1972 or Schreider, 1975). Its main application is to be a "theory of interpretations" for mathematical or logico-mathematical ideas (*Stanford Encyclopedia of Philosophy, online*). According to the *Stanford Encyclopedia*, "model theory is the study of the interpretation of any language, formal or natural, by means of set-theoretic structures" (section 1). The notion of model in linguistics is only partially similar to that in model theory and it should be distinguished also from the "universal modelling language" used for software development. The SML approach only draws on basic ideas from model theory. The purpose here is not to investigate logical relations, natural language semantics, or to view linguistic phenomena in logical terms, but to apply a model-based approach to the exploration of assumptions about communication. Although models in linguistics only partially coincide with the model theoretician's notion of a model (see below), any set of related constructs can be viewed as a "model" in the sense adopted below, so a model-based approach is common to all linguistic analysis, whether modelling is implicit or explicit. Having a logical approach to describing languages emphatically does not imply the view that languages or language systems are logical or "logics", or the view that the investigation of languages should be undertaken via an exploration of a logical calculus. A model (or self-contained set, or relational system) is a tool and is, in its simplest form, a pair, consisting of a set of names of entities and the names of relations between those entities. We can express this as follows with the set  $\{x, y, z, \dots\}$  and the relations  $R^1$  to  $R^n$ .

$$\text{Model} = \langle \{x, y, z, \dots\}; R^1, \dots, R^n \rangle$$

Now, as the *Stanford Encyclopedia* makes clear, the notion of a model can be interpreted in different ways. As the authors point out (section 5),

To *model* a phenomenon is to construct a formal theory that describes and explains it. In a closely related sense, you *model* a system or structure that you plan to build by writing a description of it. These are very different senses of "model" from that in model theory; the

“model” of the phenomenon or the system is not a structure, but a theory, often in formal language.

They go on to point out that the distinctions become blurred in the case of scientific theories (and here we may include linguistic theories) because theories are closely connected to, and shade into, the means of interpreting them. In linguistics, the normal sense of “model” is just such an intermediate case. A linguistic theory for description and explanation is normally a way of modelling phenomena with a system of entities and relations. A theory consists of statements, but a linguistic theory embodies, and is used to develop, structures which can be interpreted in terms of real-world verbal events. For example, the theoretical statement that all languages are “doubly articulated” leads through definitions to models including phonemes contracting phonotactic relations to provide the phonological forms of grammatical units which contract syntactic relations. In particular descriptions, the phonological and grammatical structures conforming to the theory are then matched with speech phenomena.

The interpretation of the model is real-world entities and events, and the aim is to account for real-world phenomena using the entities and relations in the model. So, some rules are needed for developing expressions derived from the model (formation rules), and ways are needed to connect the class of expressions from the model to real-world phenomena (interpretation rules). Such rules are expressed informally below for the purposes of the approach, but more formal statements can be developed. Clearly, you can have models of any phenomena—the rotation of the earth, chemical reactions, numbers, etc. In this case, we are concerned with modelling speech signals and verbal interactions whose purpose is the transmission of information. “Information” is here left undefined, but is not restricted to the representation of factual information. It includes the information derived from speech acts about the disposition of the speaker, and the speaker’s orientation to the interlocutor, and the situational and textual context of speaking. The example below is largely restricted to grammatical modelling, but the approach is not intended to be restrictive. Indeed, the foregoing comments imply that speech can be viewed (and modelled) from a variety of different perspectives, and that speech events are complex totalities in social contexts.

### 3 Models in hypothetico-deductive testing and some questions arising

An important function of models (among others) is to provide explicit means of empirical testing. It is reasonable to say that most approaches to linguistics are broadly “hypothetico-deductive”, and this has been the case since (at least) the 1960s<sup>2</sup>. A key role for modelling in a hypothetico-deductive approach is empirical testing. That process can also be seen in terms of a model, and a model of hypothetico-deductive testing can serve as an example of how models can be used to test assumptions.

Phonological, morphological, and syntactic analyses are the most obvious examples and typically contain a finite presentation of hypothesised units and the relations they contract, which give an account of the functional elements and relations in communication. These may be, for example, syntactic or morphological structures and the lexical elements entering them, or they may be phonemes and their phonotactic relations, or distinctive features and their

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<sup>2</sup> Saussure’s *Mémoire* (1879) is hypothetico-deductive *avant la lettre* and Hjelmslev’s Glossematics is deductive in the Euclidean sense of “deduction”.

constructional relations. These “underlying structures” can be thought of as “deep structures” or as the most all-embracing models in an analysis. They are related by rules of formation to a potentially infinite class of specific, or predicted, structures—models for individual utterances. This may be thought of as *similar to* the “consequence class” of the model (Popper, 1975: 47 ff; 301 ff)—i.e. the set of specific structures implied by the underlying structure and the ways of deriving the specific models. For some, the two classes are related by generative and transformational rules, while—for others—the process is one of the application of simple logic or Cartesian multiplication and functions selecting allophones or allomorphs (realisational forms, generally). In either case, we have a model which can be presented in outline, as follows:

< {*underlying structures*}, {*predicted, specific structures*}: *Relations of formation*>

Clearly, this is a model containing a complex of many other models. In other areas of linguistics (sociolinguistics, for example), one can imagine a similar arrangement, albeit with different specific characteristics.

The output of a hypothetico-deductive approach—the set of predicted, specific structures—is compared with a set of utterances which are either observed or accepted as observable (often with a certain amount of idealisation of the data). Frequently, comparison of observables is involved, as in commutation or permutation, or the analysis of expression differences. Clearly, observables are not “raw data”, which—in turn—raises questions about our assumptions about “data” and the extent to which they are also constructs. In fact, linguists are rarely concerned with individual utterances; they are concerned with classes of utterances accepted as the same in given respects. The real-world utterances or potential utterances can be thought of as a class of potential falsifiers in Popper’s terms (above). A model of empirical testing can then be the class of predicted structures, the class of real-world utterances, and a relation of correspondence, such that for each predicted structure there is at least one real-world utterance which corresponds to it in relevant respects, i.e. those defined within the model, and for each utterance there is at least one corresponding predicted structure. There should be no predicted structures which do not correspond to an observable utterance or *vice versa*. Any discrepancy would constitute a refutation calling at least for some amendment in the model. (The expression “at least one” allows for structural homonymy and realisational variation.) The term “correspondence” is intended as a relatively neutral term, and is used with some reluctance. In using the term “correspondence” in the context of empirical testing, I do not wish to suggest that linguistics is, or should be, committed to a uniquely correspondence theory of truth (for a discussion of this point, see Rastall, 2011), or to suggest that “correspondence” is a simple matter of matching. However, thus, we get the testing model:

< {*predicted structures*}, {*real-world utterances*}: *relations of correspondence*>

One should bear in mind that Popper’s consequence class (and similar notions in other forms of hypothetico-deductivism) is a class of *statements*, which are either true or false. The output



of a *model* is a further class of models which may or may not “correspond” to observables in relevant respects<sup>3</sup>.

This model of testing contains a number of assumptions and raises numerous questions. The most obvious are the nature of the relation of correspondence, the role of theory in the selection of relevant data, and the tests on it. One cannot simply assume that real-world data have the properties of the model (one must perform tests on them), and the idea that models describe real-world speech data *in relevant respects* suggests that the relation cannot be one of absolute isomorphism. This supports the views of many scholars who advocate the integration of different perspectives in linguistic analysis (see below). However, one could also question the definition of the proposed “underlying” elements and relations, and how they are arrived at. One’s constructs are “theory-laden”.

Since the data are also constructs, one cannot assume a simple one-for-one identity. The empirical correspondence of predicted structures and real-world data in selected respects is clearly a *necessary* condition of the validity of the model (*if* the model is valid, *then* there is correspondence of predicted structures to real-world data and no non-correspondence). It is not a *sufficient* condition of the validity of the model. That is, there are other (notably theoretical) conditions involved and we must allow for the possibility that more than one model may account for the same set of observables (which, of course, happens). A pure instrumentalism, which refuses to define underlying entities or to accept their theory-laden nature, appears to be inadequate from this point of view. The latter question, however, raises a further question. Do the underlying structure and the processes linking it to predicted structures themselves correspond to any real-world entity? Here there is a clear division among scholars between those who attribute models and operations to speakers’ cognitive processes (recently reasserted by Chomsky, 2013) and those who see models as having an explanatory function only in relation to observable *speech* data (such as Mulder, 1989 and 1998). Clearly, those who attribute models and processes to speakers’ brains or minds need more justification than the achievement of the necessary condition of correspondence with utterances<sup>4</sup>. Connected to this question is the need for an ontological framework connecting more “abstract” units and relations to more concrete models and to classes of real-world speech events. One such framework is that of Mulder (1989) and Mulder and Hervey (2009 online). The entire issue is connected to the question of the degree of “ontological commitment” of linguists to the existence of classes.

Finally in this regard, the model of testing presupposes that any complex utterance must be accounted for by a complex predicted structure which is a function of the underlying structure and formation processes. In the cases of fixed expressions of various sorts—adjacency pairs, expressions of emotion (e.g. *what a nuisance!*), contextually fixed expressions (e.g. the checkout assistant’s *do you need help with packing?* or the dentist’s *open wide*), or proverbs (*waste not, want not* with a fossilised grammatical structure *not* in current English)—it is quite reasonable to doubt that assumption, i.e. one might see verbal activity as the appropriate use (and combination) of verbal “chunks” of varying degrees of complexity. While the complexity can be

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<sup>3</sup> This raises the question of whether, and in what sense, linguistic theories are “true”, as opposed to “valid” in their own terms for the phenomena they address.

<sup>4</sup> Saussure spoke of language existing in the collectivity (1972: 38). This might be interpreted as an alternative view in which language is seen as a construct containing the communicational properties defining a speech community and in relation to which speakers form a sense of linguistic identity.

described, it would not necessarily be attributed in all details to the speaker or to every utterance.

This is not the place to go further into those questions. The key point here is that the adoption of a reflective attitude to models quickly leads to fundamental questions. SMLs achieve similar ends and we focus on them now, although we should note that the same range of questions applies to SMLs insofar as they are confronted with real-world data.

#### **4 Some Limitations on SMLs**

It is important to note the limitations on SMLs. SMLs are limited communication *systems*. The term “language” is highly polysemous. Here it must be understood in the way that “language system” can be used to refer to a construct for the understanding of selected communicational aspects of speech in a given community. The limited nature of SMLs is entirely intentional and means that *any SML can deal only with a restricted set of functions*. They do not have “universal purport”, but only restricted capacities for modelling message formation. The term “language” here may be regarded as to some extent “metaphorical” just as the use of the word “language” in model theory (above) or describing logical calculi or architectural styles as “languages” is clearly metaphorical<sup>5</sup>.

It is important to set up SMLs with selected communication functions in mind. In that way, they can help us to see some of the semiotic reasons for the nature of speech signals. Equally important is to compare our imaginary models with what we know of real languages. As noted above, all linguistics is concerned with modelling. What is suggested here is that imaginary SMLs for restricted functions can allow reflection on assumptions. For that reason, SMLs can have a pedagogical purpose. Students can be invited to develop SMLs for restricted functions, explore their capacities and limitations, compare with real phenomena, and question the assumptions that go into the construction of SMLs. This process can raise further research questions.

#### **5 Requirements**

We have seen in outline the necessary components of SMLs. Notably, for our example,<sup>6</sup> we need distinct names for referring to the non-linguistic world (signs) and to be able to combine signs into complex signs. We need to know how the signs and complexes can be represented as groups and how each group is interpreted as a particular message in a virtual world of communication acts. In this we assume real-world messages modelled by signs would have to be distinguished, i.e. the signs in the system would have to be formally and semantically distinct—“functional” in the sense of “separately relevant” or “pertinent”. This is just another version of the fundamental communication principle that communication is impossible without some differentiation in the signal and, hence, that in any system minimally a sign must be distinguished from its absence (Shannon and Weaver, 1949: 9ff, and Mulder and Hervey, 1972: 13). Here we are concerned mainly with the formal properties of speech signals, but it should be remembered that speech messages are another way of looking at signals from a semantic (and/or pragmatic) point of view and that semantic models of messages are intrinsically linked to models of signals.

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<sup>5</sup> “Language” is here the linguist’s representation of it. This raises the question of whether language or a language is just a construct created by the linguist, or indeed a “myth”, as argued by Harris (1982).

<sup>6</sup> Obviously, a phonological or sociolinguistic SML would have other requirements.

However, we are using “sign” here without close definition as any form-meaning unit, simple or complex. Clearly, analysis in terms of “signs” is itself an assumption, and the definition of “sign” as well as the possibility of modelling without signs also need further investigation. In fact, signs are also modelled, so including signs in SMLs introduces the important principle that all components of models are themselves models.

As noted above, SMLs have to be goal-oriented, so we would have to specify the communicational functions they address. For communicative interaction, an SML would have to be dynamic.

In mapping sign combinations to the real world, we need to consider, especially, the sequencing of signs. Ultimately, we should be able to create models for social cooperation. Of course, all of these requirements can themselves be seen as assumptions about the communication process.

## 6 Components of the Models

We have said we need a set of signs fulfilling specific functions. In animal communication, there might be a set of signals for alarm, courtship, aggression, submission, bonding, etc. The signals involved are not necessarily in the sound medium and are not necessarily discrete or sequenced. They may involve multiple media—e.g. acoustic as well as visual channels simultaneously. Human communication signals are also typically multi-modal, but the most prominent and distinctive human modality is verbal communication in the sound medium—a subset of communication acts in the sound medium, normally simultaneous with other ways of exploiting the sound medium (to display attitude or emotion, for example) and other media (e.g. visible gesture). Verbal communication and its modelling are thus selections from the totality of speech communication behaviour and part of our assumptions. Human languages are generally realised by sound, although they can be realised by other means such as signing or in writing. This raises the question of why the sound medium has been exploited by humans as a key evolutionary strategy, and the question takes the student into the pros and cons of the sound medium and its effects on verbal signalling.

It is natural to assume that linguistic signs must be discrete units *and not relative points on a cline*. A given sign is expected to be either *x* or *not-x* but with no overlap. It is part of our general experience that a sign is either *dock* or *dog*, *rat* or *rabbit* with no intermediary sign. In terms of *sign identity*, this is a reasonable assumption in line with the fundamentals of communication laid out by Shannon and Weaver, although we must note that there can be overlap between signs in phonological form (as when /z/ realizes both *have* and *be* in English)<sup>7</sup> and there can be overlap in the semantic range of different signs (“paronymy” in Hervey’s terminology—Mulder and Hervey, 2009, online). For example, *teaching* and *instruction* overlap in meaning. Overlaps are, of course, not clines. Adherents of Cognitive Grammar, however, regard the semantic, pragmatic, and cognitive processes of language as continuous and non-discrete (e.g. Langacker, 2008). This can be considered an alternative position (and perhaps related to a different stage in the communication process), although they too must make connections with discrete entities. In the case of paratactic features, such as intonation, signs may be non-discrete in the sense that pitch changes exist on a cline, correlated with degrees of

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<sup>7</sup> Not the allomorph “/z/” which would imply sign identity through its meaning.

emotion or attitude. That is also the case with various features of animal communication. We also assume in this connection that the members of sets are in an *either/or* (but not both) relation (exclusive disjunction).

The assumption that signs combine in sequences is also based on our experience and involves a *both/and* relation, but simultaneous signs exist in verbal, visual, and non-human communication. All signals must take place in the dimension of time, but there may, or may not, be a sequence of identifiable component parts. In languages, we assume sequencing for combinations of signs, although simultaneous non-discrete features (stress, intonation, rhythm) must at some point be allowed for in our models.

In other words, we assume discrete and sequential units for the purpose of developing our SML and we have asked what those assumptions tell us. There is, of course, nothing to prevent the development of SMLs with alternative assumptions.

A number of other questions arise also at this point.

## 7 Questions

Which simultaneous features are there in natural languages? Why are they of limited use?

Why, and in what sense, are non-discrete features relatively “marginal”?

The “linear” sequence is a temporal sequence. What constraints does the temporal sequence bring?

In languages, there are expressive utterances—*oh, well!, woops, ouch!, whoopee* but more complex expressions of emotion or attitude, representation, or address require more than unanalysable reaction signals. Expressive utterances of that type appear to be on the margin of languages—not integrated into complexes—and very restricted. One can ask why that should be so and how the human communication strategy developed in this way.

While the answers to some of these questions are inevitably speculative, and it is not the purpose of this paper to provide answers, but rather to explore assumptions and the questions they raise, the exploration of SMLs may provide perspectives for research.

## 8 A simple case

Given the above assumptions and noting the issues that arise with model-formation for verbal phenomena, we could move on to a simple model. For example, we could imagine a communication system *whose purpose is to convey what exists in the world of experience*. We could proceed, as follows, by setting up:

- A sign asserting existence—an “actualiser”— $E$
- A set of names of identifiable parts of reality— $\{river, house, fish, \dots\} = \{s\}$
- = the pair of sets  $\langle E, \{s\} \rangle$

And, with a relation of combination for signs,  $R$ , we arrive at a model as defined above.

$\langle E, \{s\}: R \rangle$

We introduce the formation rule: any one  $s$  may combine with  $E$  to form a well-formed sequence.

We get the set of combinations:

$$\{Es^1, s^1E, \dots, Es^n, s^nE\}$$

(in words this might be Exists river, river Exists, Exists house, house Exists,...)

This is a set of unordered pairs in which  $Es^i = s^iE$ . To model a real set of utterances one would need ways of forming correspondences between model signs and real-world utterances.

This system is clearly limited. We cannot “say” anything else in this “language”. We have not allowed for identification of location, negation of existence, possibility, questions, etc. There is no communicational exchange here. There is one-way communication only. Nevertheless, we can learn even from this SML. It has implications for the communicational capacity of its users. Any user would have to be able to identify component signs and associate signs in sequences. That implies the holding of signs in short-term memory for their ultimate synthesis into a complex sign. That complex sign would have to be compared with the world of experience. It goes qualitatively well beyond expressive cries. Another way of looking at this might be to say the following:

The SML can be interpreted by mapping rules which state:

- $E$  tells the hearer to search for an entity in the real-world
- A name,  $s$ , tells the hearer the type of entity to search for, i.e. a denotable in the identified category.
- The relation of combination,  $R$ , tells the hearer to associate the named entity with the search.

Such mapping rules are meta-linguistic with respect to the SML. They act as models of communicators’ behavioural activity in relating a potential to a reality. They too make further assumptions—such as the ability to identify real-world denotables—and involve the limitation of real-world reference—and hence questions about the nature of non-real world reference.

The above SML has other lessons for us.

We can see that our SML is inefficient because of the large number of alternative equivalent expressions. There are sequences, but the sequences are not exploited for any communicational purpose. Every message can be conveyed in two equivalent ways. In this simple case, the inefficiency is of little significance, but as sign groups grow more complex, say with 3 or 4 signs in a sequence, then the number of variants increases exponentially. Where there might be 6 or 24 variants with the possibility of a different sign,  $s$ , appearing at any point in the sequence, the potential for communication losses would be great and the advantage of fixing the sequence to enhance predictability and interpretation would increase correspondingly. Alternatively, a difference in sequence could be correlated to a differentiation of message, as in Old Slavonic, where  $S-V$  structures emphasised the subject role whereas  $V-S$  structures emphasised the prominent information of the verb (Khaburgaev, 1974: 367).

However, as noted above, the idea of a sequence of signs is an assumption.  $E$  could be expressed in different ways. For example,  $E$  might be expressed by a simultaneous intonation pattern (as in the rise-fall pattern of Malay *hujan!* or the English falling intonation equivalent, *rain!*), or there might be a different tone for each  $s$  based on a formal indication of  $E$ . One might distinguish naming an entity with  $s$  from the assertion of the existence of  $s$  in the environment by, say, reversing the form of the sign, *revir* as opposed to *river*.

In real languages, however, we normally find an actualiser and a naming sign in a sequence (*There is/are, Es gibt, Il y a, (Arabic) fii, (Chinese) you<sup>3</sup>, etc.*). This strategy is clearly dominant,

although it requires the “effort” of identifying different signs, associating them, memorising and synthesising them into a complex message. This increase in syntagmatic “effort” is rewarded by the potential for naming larger numbers of real-world entities with distinct signs. It is likely that the use of simultaneous and non-discrete signals would be less efficient in that respect and might be less manageable from the point of view of maintaining large numbers of distinct signs<sup>8</sup>. Certainly, animal communication involving sound with clines of loudness or degrees of repetition is communicationally limited to relatively small numbers of expressive and address functions, and only rarely fulfils the function of representing a presence in the environment. Sequencing signs appears to be a significant communicational advantage and to be connected to the feature of “displacement” (identified by Hockett, 1958)—the ability to communicate about, and in particular represent, states of affairs not in the immediate environment (in space or time) or connected to immediate emotional responses or interactional needs. One might speculate that this strategy of sequencing signs was a key step in human communicational development allowing multiple perspectives on the world of *communicanda*.

### 9 Ways to extend the model

There are several ways to extend the model to “say” more things. They include: negation of existence, forming questions, adjusting the assertion of existence to allow for types of existence (permanent, temporary, possible, etc.), indicating location, expressing judgements, making suggestions, giving instructions, relating two real-world entities, etc. Let us look at how the model can develop to allow for some of these possibilities and the assumptions and effects of doing so.

### 10 Negation

If we wish to allow for the possibility of denying the existence or presence of an entity in the real-world environment, we need to introduce some sign,  $N$  = negation. Employing symbols as before, there are at least two possibilities for extending the model,  $A$  and  $B$ .

$$A = \langle E, N, \{s\}: R \rangle$$

$$B = \langle \{E, N\}, \{s\}: R \rangle$$

While apparently similar,  $A$  and  $B$  have different characteristics. Possibility  $A$  increases the sequence length and the number of alternatives— $ENs$ ,  $NEs$ ,  $sEN$ ,  $EsN$ , etc.—it is more analytic/transparent

It also introduces a second relation of combination— $Es R N$  (in words, *exist tree – not*) or  $N R E R s$  (*not – exist tree*)—either way some sequencing of the combinations would arise. We exclude  $Ns R E$  (*not tree – exist*). *If included, we would introduce a different set of messages and functional ordering. When the relation of combination is used twice, we raise the possibility that a difference in communication may be conveyed by the ordering of the combinations (bracketing)*. Obviously, our formation rules will have to be extended to allow the double use of  $R$ . Also, however, it is clear that  $N$  may occur or not occur. We have introduced a “facultative” possibility into the model.

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<sup>8</sup> Phonological economy also plays a role here, of course.

*B* is simpler. It introduces a negation element as a commutant (i.e. *E* and *N* are in exclusive disjunction in the same set)—*Es*, *Ns*, *sE*, *sN*, etc. It is more “opaque”/ synthetic.

In both approaches (and in the original model), there is a contrast between the closed inventory  $\{E, N\}$  and the open inventory,  $\{s\}$ .

### 11 What do real languages do—*A* or *B*?

Languages are normally more like *A*. Occasionally, we find *B*-like structures, as in some simple expressions in Russian—*est' d'en'g'i*, *n'et d'en'eK* (“there is money” / “there is no money”), although Russian has other structures (*n'e javl'ajetsə*, *n'e sušestvujet*) of the *A* type.

I.e the more common case is (again) the analytic possibility which involves:

- more effort in terms of complexity
- an additional rule for combination
- a restriction on realisational sequence

One could suggest the following reasons for this apparently more complex choice.

- Restriction on sequence allows more predictability with a reference point in the utterance clarifying its function, i.e. *E* from a closed inventory establishes the function of the whole utterance and so *s* defines its syntactic function relative to *E*. (Here we have grammatical dependency with the closed inventory item in a fixed position acting as a signal of the structure being used. The facultative *N* can be introduced as an additional combination. Again, the occurrence and function of *N* would be dependent on either *E* or *Es*, but the dependency of *N* as an optional feature relates to its commutation with its own absence (“zero”), whereas the dependency of *s* relates to the variability in the *s* position compared with the relative fixity of *E* as a reference point in the sequence. We have introduced the need for “zero” in some sets.)
- In *A*, communicational clarity is bought at the expense of greater effort in articulation and memory (in accumulating the signal) as well as cognition in associating and synthesising its parts, but combinatory patterns reduce the effort by structuring the experience in a predictable way.
- The possibility is raised of creating alternative messages by varying the sequence (e.g. *not-tree exists* as opposed to *tree – not exists*). Extending the sequence increases the virtual world of messages, if this possibility is included in the model.
- In real languages, other functions may involve similar strategies—that is, “structural pressure” may lead to some regularisation by analogy (but see below).

But we must note the following:

- Rules of sequence and rules of combination are different
- Two combinatory patterns are possible.

So we add the rules:

For assertion, rule as above (combine *E* with any one *s*)

For negation—for any assertion structure, optionally combine the assertion with *N*. (i.e. for simplicity we choose not to exploit differences in combination at this point).

Sequence—in assertion *E* precedes *s* and in negation *E* precedes *s* which precedes *N*—*EsN*.

In fact, negation could be in the first, second, or third positions. It is an empirical matter to determine which is generally found in real languages and which model is appropriate for any

particular language. Similarly, we could negate  $E$  and then add  $s$ . Our imaginary models can proceed in different directions. By trying out each one, we find their limitations and degree of correspondence with real language phenomena. I.e. we need to determine which pattern is found in real languages and what communicational differences come with different possibilities.

In the current model, the only relation is that for the combination of signs. A second relation of dependency could be introduced,  $R^d$ . Such a relation would model the organisation of combinations, e.g. that  $s$  functions in relation to, and is to be associated with,  $E$  or that  $N$  functions in relation to, and is to be associated with,  $Es$ . Dependency relations give a different perspective on complex signs. From the point of view of the organisation of the complex group, the occurrence of  $E$  can be interpreted as an instruction to anticipate some  $s$ , and the occurrence of  $N$  to presuppose (look for)  $Es$ , as reference points. Similarly, the relation,  $R^{sequence}$ , could be included in the model, rather than as a formation rule. (For simplicity, we will not include those different relations and perspectives on signals, and leave sequence to formation rules, although in real language descriptions they would be included.)

## 12 The question function

Suppose now that we build a question function into our model. This is not just a matter of introducing a question sign,  $Q$ , into the model. We move from a model with a single function of *asserting* existence or non-existence in the real world to *enquiry* about existence or non-existence. The introduction of this function implies that two-way (cooperative) interaction can take place and so we will need means to reply to questions and ways of modelling interactions (“interaction rules”). Receivers of signals must recognise that the presence of the question sign is intended to elicit a response and they must have relevant ways of making a verbal response (as opposed to non-verbal interactions also found in animal communication). For example,  $Q$  could be taken as directing the receiver to inspect the world of experience and to affirm or dis-affirm the existence of  $s$  in it. One way of doing that (verbally) would be to use the existing model to assert or negate. The model would now be as follows (with [...] for facultative signs, and symbols as before):

$$\langle E, [N], [Q], \{s\}: R \rangle$$

And we need to amend the rules for combination and sequence. At least three ways of forming  $Q$  are conceivable according to the above considerations: i.e.

Place  $Q$  in sequential relation to  $Es$ ,  $EsN$ , e.g.  $EsQ$ ,  $EsNQ$ —where  $Q$  is a discrete sign like *ma* in Chinese or *-kah* in Malay. Its position in the sequence may be final, as in those languages, but could be elsewhere, as with *est-ce-que* as the first sign in a French sequence or the particle, *l'i*, in Russian, which tends to be second in the sequence.

Or exploit sequence difference with  $sE$ ,  $SeN$  for assertions, and  $Es$ ,  $EsN$  for questions (for example, tree exists [not]? vs. exists tree [not]? As in German *Er geht/Geht er?*)

Or use a non-discrete feature— $Es \searrow$  (assertion with falling intonation) vs.  $Es \nearrow$  (question with rising intonation)—i.e. discrete and non-discrete can be combined, as in numerous languages.

Clearly, all three possibilities occur in real languages. However, we might note that the same should be true of negation, but in real languages intonation and sequence inversion are not



likely to be used for negation. This difference in the models raises the question why there should be such a difference between negation and question formation, which both involve closed inventories. A possible route to the answer may lie in the difference in function, where variation in pitch in the signal can be an attempt to elicit a response, which is central to the question function.

Using the above interaction rule, replies might be: *Es*, *EsN*.

In real languages and where the response is in the same modality<sup>9</sup>, however, what we commonly find is either the actualiser alone or *yes/no* responses as in English (or both). In Malay, for example, the question *ada gula?* (“Is there (any) sugar?”) can have the responses *ada* (“there is”) or *tiada* (“there isn’t”). To allow for such possibilities, not only would we have to amend our model but also we need to account for the communicational properties of the responses. The use of the actualiser alone implies that the repetition of *s* is redundant and presupposed in short-term memory, and we presuppose the notion of “communicational focus”, which is here on affirmation or dis-affirmation. It would also be an example of reduction of effort in the signal by the omission of a “known” item. The *yes/no* response takes the process even further by introducing signs of affirmation or dis-affirmation formally unconnected to the original *Q* form at the expense of additional, but distinctive, signs. That is, the “reduced” responses appear to decrease communicational “effort” and redundancy, and to introduce distinctive signs for the response function, but to increase the demand on short-term memory. In both cases, the exchange involves the first speaker using an address function to elicit information and the second speaker using a representational function to satisfy the questioner’s need. One might imagine an interaction model in which we find:

$$\langle \{Q \text{ signs}\}, \{\text{affirmation signs}\}, \{\text{dis-affirmation signs}\}: R^{\text{response}} \rangle$$

That is the set of all signs from the extended model containing *Q* above, the set of all signs asserting existence from the model, the set of all signs denying existence from the model, and a relation of response.

We can then specify the rules that:

- If a *Q* sign is addressed to the receiver, then the receiver responds cooperatively and
- For every *Q* sign, there is an *affirmation sign* and a *dis-affirmation sign*, where  $s^i$  in the *Q* sign is the same as  $s^i$  in the assertion or denial of existence and
- The receiver selects the relevant affirmation or dis-affirmation sign on the basis of direct real-world experience.

The *affirmation* and *dis-affirmation signs* could have alternatives, in which affirmation follows the same rules but substitutes either *E* or *N* or *yes/no* responses. In English, both response patterns are available, e.g. *yes/there is*, *No/there isn’t*. This possibility raises the question of the factors determining the selection.

Our extensions to the model have introduced numerous additional considerations, not least the way in which models can be connected, e.g. by allowing the extension of one model to be a set in another, and the social functions of utterances. The model—at this point—excludes a refusal to reply, a change of subject, or a way of expressing an inability to answer (such as *I don’t know*). The limitations of the model and the choices we face in developing it have revealed

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<sup>9</sup> Nodding, head-shaking, shoulder-shrugging etc. are also possible visual responses.

various issues in our understanding of the communication process. Furthermore, we can see how models can be adapted in comparison with observed phenomena. It can be seen that communicational models imply social interaction, and thus lead on to issues in such fields as sociolinguistics and conversation analysis (see below). For example, where a selection is made from alternative responses, a model of the disposing and inhibiting factors is required.

### 13 Asserting and questioning location

The assertion or denial of location (of the sort *exists tree here*, *exists river not there*, etc.) involves similar considerations to those for adding other functions, except that in the case of locations we have another open inventory of signs. Initially, we will deal only with simple signs of location.

e.g.

<[Locations], {s}, E, [N], [Q]: R>

(Locations: {here, there, front, behind, above.....})

So, following the above rules, we would be able to form:

{EsL, LEs, EsLN, EsLQ, EsLNQ, etc.}

In this model, the set of *location signs* have different possible positions—a possibility which might be exploited for communicational purposes, although we have not done so here. *Location signs* and the set {s} do not overlap and generally in real languages we might expect the set of location signs to be formally identifiable and distinct in form from other signs. Their function is thus distinct in any complex. However, various signs in the set {s} could indicate location. One would then expect that their location function would be differentiated from their naming function. It is typical of *s*-type signs that in reality they serve multiple syntactic and semantic functions and hence their functions are defined relative to signs with a fixed function. Normally, for the distinction in question, that is achieved through a morphological feature (e.g. locative case) or some location indicator such as a preposition. One might speculate that such features arise to differentiate naming and location functions. At any rate, it is commonly found that location signs with no other functions are often not marked by any sign of location function (*here*, *there*, *below*, *above*, etc.), whereas signs with multiple functions are so marked—in *London*, *below ground*, etc. Martinet (e.g. 1975) speaks of “autonomous monemes” in the former cases. Where signs can only refer to location (or time) and have distinctive forms (a class of forms not used as forms for other signs) and/or fixed relative positions in the sequence (as in Chinese), further indications of function seem to be redundant. In some languages, of course, that may not be the case.

A further possibility is that location signs could commute with *E* –*here tree*, *there tree not*, etc. In that case, in the model we would have {{Locations}, E} as well as the above. More importantly, we can see that in real languages negation can combine with members of different sets; *exists tree here – not* vs. *exists tree – not here*. Our rules of combination would have to be amended to allow different optional combinations of negation to address this possibility, which greatly increases the communicational potential of the model. The model thus far only deals with static location and not direction to a location, which would require another extension and

raise questions about the communicational means for distinguishing location and direction. Further interactional rules are needed for responses to location questions to link the entity named by  $s^i$  to the location named by  $l^j$  and to affirm or dis-affirm as before.

#### 14 Judgements

The set of judgement signs,  $J$ , (e.g. *good, fast, high*, etc.), like the set of locations and negation, might appear in the model in different ways and in different combinations. For example:

$\langle \{J\}, \{s\}, E, N, Q: R \rangle$  and/or

$\langle \{J\}, \{s\}, \{j\}, E, N, Q: R \rangle$

To allow:

$EsJ$ : *exists tree – good*

$sJ$ : *tree – good*

$EsJN$ : *exists tree – good – not*

$EsNJ$ : *exists tree – not good*

$SNJ$ : *tree not good*

Suitable combination rules would be needed and, with increasing group size, it is clear that further sequence rules would be needed also. Increasing complexity in those areas is the price of increasing communicational possibilities. Clearly, further interaction rules are conceivable here for agreement and disagreement. If  $\{L\}$  were included as an option to  $\{s\}$ , we could form signs of the sort  $LJ$ ,  $LJN$  (*here good, there far not*, etc.), but  $\{L\}$  would have a different function and the model would need relevant amendments.

#### 15 Making suggestions and giving instructions

As a final example, let us look at the functions of making suggestions and giving instructions which require differences in our model.

It should be obvious that these two functions involve quite different communicational purposes from the ones we have considered around the assertion of existence, so  $E$  is not involved here, and nor are the *Judgement signs*. While  $N$  and *Location signs* will still be needed,  $Q$  will not<sup>10</sup>, but interactional rules for assent and dissent will be needed. For some suggestions and instructions  $\{s\}$  will also be required. That is, for suggestions, we will need a suggestion sign,  $S$  (such as *let's* in English or *pust'*, *davajt'e* or the enclitic *-t'e* in Russian, although other means are conceivable such as inversion or a distinctive intonation pattern), a set of signs for actions,  $\{actions\}$  (such as *go, drink, run*, etc.), and the combination relation.

$\langle S, \{actions\}, [N], [Q]: R \rangle$

With rules similar to those above and sequencing  $S$  before  $a$ , we get a set of signs  $\{Sa^1, \dots, Sa^n, Sa^iN, Sa^iQ, Sa^iNQ\}$ . (*let's go, let's drink, let's drink not, let's drink Q, let's drink not Q*, etc.)

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<sup>10</sup> Of course, a suggestion might take a question form, as in English *Shall we dance?* with non-correspondence of form and function.

If {s} is included in the model, *i.e. if we build in an overlap with the model for assertion of existence*, and sequence the combinations so that an *s* may combine with an action in the sequence *Sa*, then we allow for such signs as *Sas* (“let’s drink water”). This, of course, introduces a different grammatical relation for the members of {s} to enter. A further optional combination is with *Locations signs*.

In this model, we have to allow again for the possibility of “bracketing” (or, better “grouping”<sup>11</sup>), *i.e.* that some signs are more closely connected in the group than others and that some signs are optional. Here *S* may combine with *a* and *a* with *s*, but not *S* with *s*<sup>12</sup>. As before, there may be various sequences and means to achieve communicational effects, and we must compare with real language phenomena. (It would be interesting to consider the treatment of affirmation/dis-affirmation, agreement/disagreement, assent/refusal in different languages to determine the distinctions in the interaction rules. As is well known, in English for example, *yes* and *no* indicate agreement and the selection depends on the modality of the initial assertion, whereas the same signs can indicate affirmation and dis-affirmation respectively with different rules in “closed” questions—a feature which frequently confuses learners.)

We thus arrive at:

$\langle S, \{actions\}, [N], [Q], [\{Locations\}], [\{s\}]; R \rangle$

Where:

*S* combines with any *a*;

Any *Sa* combines with either *N* or *Q* or both;

An *a* may combine with an *s* and

Any group may combine with a *Location sign*.

For instructions, an instruction sign, *I*, is needed instead of *S*. As before, the form of such a sign may be discrete, non-discrete or a feature of sequence.

$\langle I, \{actions\}, [N], [Q], [\{Locations\}], [\{s\}]; R \rangle$

## 16 Concluding remarks

The purpose of this exploration was to reveal the assumptions behind our descriptive modelling of languages and the potentialities of models by working with small-scale models, and gradually increasing their complexity and functions. As increasing complexity has been introduced, so the communicational possibilities and the concomitant complexities have increased. No doubt, many possibilities have not been covered in this initial exploration, but we have seen the sorts of decisions that need to be made in making models, and have compared imaginary models with real linguistic phenomena. As a result it has been possible to connect our investigation to principles of communication, particularly in relation to questions of sequence and reference points in groups, and to identify questions about why particular communication strategies are found rather than other logically possible ones (and thus to contrast with animal

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<sup>11</sup> As Mulder (1989) argued, bracketing in syntax tends to be associated with analytical “cutting”, but we might think more usefully in terms of how signs group together to form constructions.

<sup>12</sup> At least in this model. In English, we can have a suggestion sign such as *how about* in *how about a coffee*.

communication). The models we have developed have allowed us to see different types of relation in combination, dependency, and sequence as well as the role of facultative signs and the ordering of combinations. We have thus been led to consider implications for communication capacities on the part of speakers and hearers, and move towards strategies for interaction.

SMLs are deliberately very restricted. The questions we have raised have, of course, been addressed from different points of view by other scholars operating with models in different fields. In particular, we have touched on areas of sociolinguistics and discourse which have been extensively discussed in the last twenty years. The modelling of interactions may be connected to issues in conversation. To repeat, the purpose here is to offer a way of analysing assumptions and not to discuss particular models. Where SMLs coincide with current thinking, they offer a degree of support. For example, in sociolinguistics, Mahmoudian (2009) has pointed out that the correlation of a linguistic system with a “speech community”, whose communicational features the linguistic system purports to represent, faces the problem of the sheer (social) diversity of verbal behaviour in the “community” and the variety of systems in operation. In British English, for example, the standard variety has /h/ in initial, prevocalic position for a large number of lexical items, but in some other varieties there is no /h/. Since one can hardly speak of discrete “communities”, at least two variant systems must be in operation<sup>13</sup>. Furthermore, it is quite normal for speakers of the “non-/h/” variety to pronounce [h] in the relevant positions when speaking formally, with self-conscious “correctness”, or in using relatively technical expressions (or when addressing those who habitually pronounce /h/). Speakers of the “/h/” variety do not always pronounce [h] and vary in which words have an initial /h/. The same diversity is true of a range of other British English phonological features too (such as the presence or absence of epenthetic /j/ in such words as *new*, *consume*, or *suit*, for example). Variation of this sort is not restricted to phonology and Mahmoudian calls for a multi-level approach to linguistic description to present a more realistic view allowing for sociolinguistic diversity and determining factors.

In discourse analysis too, multi-level approaches have been called for (e.g. by Delmas, 2012, in relation to media and political discourse). In the use of proverbs (mentioned above), for example, it is clear that multiple perspectives are similarly needed to provide understanding. For example, the Malay (and also Peribahasa Indonesia) proverb *gajah sama gajah berjuang, pelanduk mati di tengah-tengah* (literally, “elephant with elephant fight, mouse deer dead in (the) middle”) has a standard grammatical structure with standard lexical units, but grammar and lexis do not fully account for the expression. It is obvious that the literal meaning (glossed as “when two elephants fight, the mouse deer gets killed in the middle”) is of less importance than the metaphorical interpretation “when two powerful opponents fight, weaker people may suffer if they get involved” and the clear implication “keep clear of disputes between powerful opponents”. There is also a strong association of this proverb with the politics of non-alignment of Indonesia and Malaysia, where it is used to explain the policy of non-alignment and was used extensively in the context of the confrontation between the USA and the former Soviet Union. Furthermore in a related context, recently, Weigand (2010) has advocated an approach to dialogue involving the integration of multiple perspectives and communicational modalities

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<sup>13</sup> But, actually, a whole range of overlapping varieties.

with an explicit probabilistic model, which aims to account for the relatively unpredictable ways in which dialogue may develop according to a wide range of potential motivating factors.

SMLs suggest (in agreement with thinkers such as Mahmoudian, Delmas, Weigand, and others) that real-world verbal behaviour can (and must) be modelled from different perspectives and that a formal communicational model captures only one aspect of a complex phenomenon, not the totality of verbal behaviour. Different aspects need integration. Such a view is consistent with the neuro-scientific views that there is no single “language centre” in the brain, and that human verbal behaviour involves the coordination and integration of multiple complex brain functions (among many references, see e.g. Arbib, 2007, *online*, on the modular integration of brain functions in language).

A significant feature of our models is that they contain signs from both closed and open inventories. Signs in closed inventories may be limited to just one as in *E*, *N*, *Q*, or *S*, although real languages may offer alternative means of addressing the same functions or alternatives in the set—different negation signs (e.g. *not* vs. *never* in English, *ne...pas*, *ne...jamais*, *ne...plus* etc. in French) or alternative ways of making suggestions (*Let's* or *Shall we...?*). However that may be, the contrast of signs from closed and open inventories (emphasised by Martinet in many publications) is important for the sequence in a signal as signs from limited inventories act as reference points which are diagnostic of the signal structure. They also allow the development of one type of dependency. Where signs are facultative, there is another type of dependency involving commutation with zero rather than variability of function as opposed to fixed function. This is similar to the distinction drawn by Mulder and Hervey (2009, *online*) between “functional dependency” (the determination of syntactic function in relation to a nuclear unit) and “occurrence dependency” (concerned with the contextual relations of presence or absence of units in a structure). We have seen that facultative signs may also contract relations with more than one other sign, and hence the question of the scope of combinatory relations becomes important, and this in turn raises the issue of bracketing, its signalling, and a classification of combination relations. In real languages, of course, this possibility is not limited to facultative signs of the sorts we have considered. The issues around sequential combination and complexity are clearly important in arriving at understanding of verbal capacity in humans and its role in evolutionary development, as well as (speculatively) the evolutionary development of verbal communication through exploitation of communicative potentials.

Another outcome is that different linguistic functions can be addressed with different but overlapping models. Different models can have different rules of formation and interpretation. Functions involving communicational interaction require “interaction models” beyond models for the creation of a world of messages. The idea that models for different functions *overlap* presents a different view of the integration of linguistic systems from some current thinking. On the “overlap view”, languages are more like organic accretions of different communication systems for different functions which exploit common sets and relations. This possibility raises the question of whether different means might be used for same or similar messages in different functions. While that implies some inefficiency in the overall system, such features could be seen as evidence for the “accretion” view. Examples might be the different forms of pronouns in Indo-European languages or the different roots of the verb “to be” in those languages. In Malay, negation is signalled by *tiada* as opposed to *ada* in actualiser structures (*tiada gula* “there is no sugar” vs. *ada gula* “there is sugar”); *tak/tidak* in predications; *bukan* in equative sentences;

or *jangan* in imperatives. (*Sahaya tak pergi* (“I’m not going”), *Sahaya bukan orang askar* (“I am not a soldier”), *Jangan pergi* (“Don’t go”). In English, the verbs *say*, *tell*, and *speak* are used for different functions, partially overlapping with *dire* and *parler* in French or *sagen* and *sprechen* in German, whereas the aspectual pair *govor’it’/skazat’* (clearly from different roots) can be used to cover all the possibilities in Russian. Similar diversity is found in some number systems, e.g. Russian *raz*, *od’in*, *p’ervyj* (“one” (in counting), “one” (in naming a number), “first”) or Japanese *ichi*, *ni*, (“one”, “two”) etc. in counting but *hitotsu*, *futatsu*, etc. in specifying an amount.

Naturally, we have not considered all the possible communicational functions. In particular, we have not looked at the representation of states of affairs involving a relation between two or more entities in experience, such as *John sees Mary* through naming relations and two or more signs naming participants in such relations, although it should be clear how such modelling would proceed and that there would be overlaps between the names of relations (*see*, *like*, etc.) and the set of action names in suggestions and instructions as well as the set of naming signs in existence structures and the names of participants in two-place relations.

If we take the view that functional models overlap, then members of the set of (perceptual object) naming signs {s} will occur in multiple contexts—not least with two possible relations to signs naming actions (functioning as “subject” and “object”). The relations contracted by members of {s} do not lead to a strict partition of the set—say, into those which perform a subject and those which perform an object function, or into those which can and those which cannot be in construction with a location sign—but members of {s} will enter some relations more frequently than others, and thus *associations* of agency, instrumentality, or location may develop for signs such as *man*, *hammer*, and *river*, and hence the metaphorical quality of signs used in other contexts (*my hammer does a good job*, *the river washes the shore*, etc.). The need to mark the function of a member of {s} in different contexts raises the question of how that is achieved. Martinet’s (1975) discussion of the different communicational perspectives in subject and ergative languages is significant in this respect. In other words, comparison of the set of predicted specific models with actual verbal behaviour raises further aspects of communication for integration.

SMLs further have implications for our understanding of human communicational capacities. For instance, the modelling of interaction or the communication of two-place relations implies further communicational capacities on the part of speakers, which are important for understanding human development, such as identifying connecting or causal relations between two or more identified components in the environment. The accretion view of overlapping communicational functions raises the question of its consistency with models of language acquisition and learning.

SMLs do not replace existing models based on particular linguistic approaches. They may lead on to particular proposals, support them, or challenge them. The purpose here was not to consider every possibility, but to explain an approach and how it might aid understanding through the analysis of assumptions in the modelling process, and thereby raise questions.

The particular SML used above as an example of the method is not intended as a theory of language. When linguistic models are proposed, they are intended either to present a framework of ideas about language (theory of language), to present a method for the analysis of verbal phenomena (theory for description), or to give an account of a particular class of observables

(description of the phonology, grammar, etc. of a particular speech community). Such models state outcomes of thinking, which can—of course—be questioned from numerous perspectives. However, SMLs are developed specifically to identify our assumptions and limitations prior to actual modelling. They are, therefore, not in competition with existing models, but are—so to speak—precursors of actual models. As we have seen, our SML has raised numerous questions of epistemology, ontology, and method. It has allowed us to connect linguistic ideas to approaches in connected fields. For example, it has also allowed us to identify a range of semiotic issues—in particular the relation of models to signals and signalling behaviour, and hence to the mental capacities implied by semiotic behaviour.

There are, however, no cognitive claims for our SML. In fact, the approach here raises the question of what evidence would be necessary to make a cognitive claim, i.e. attribute a linguistic model to actual cognitive processes. Such evidence would have to go beyond meeting the necessary condition of modelling observable speech behaviour, and include identifiable physical processes in the brain and correlate them with experimental data. It would also have to take into account the theoretical presuppositions of linguistic analysis. However, our SML can be used hypothetically. That is, if we adopt our SML, then there are *implications* for human communicational capacities (for example, relating to prioritisation and short-term memory and interactional behaviour). The accumulation of small-scale functions in SMLs suggests a view of language with multiple accreted and overlapping systems, where such systems connect to non-verbal communicative behaviours through the integration of multiple constructs from different perspectives. Such ideas can be tested for consistency. The approach further implies the understanding of language with thinking in neighbouring disciplines.

The SML, as it stands, is limited to communication about perceived reality. That raises questions about how our conception of semiosis (to use Sebeok's (1986) useful term) must be adapted to handle communication about our "many-sorted universe" (Popper, 1975: 37)—including our sense of "reality" beyond sensory perception. It also raises the important question of the motivation to speak. Our model allows for expressions of the form *EsL*, such as *there's a car outside*. *A posteriori* we know the speaker in such a case wishes to draw the attention of a hearer to the existence of a certain type of perceptual reality in a certain location, but we do not know what motivates the speaker to speak, to speak about that particular circumstance, or how that particular expression is selected from those possible (e.g. *what's that car doing there?*). This suggests that our ideas about verbal communication and its disposing factors need to be seen in the wider context of our construction of the world and actions in it, and also implies agreement with Quine's monistic view that, "knowledge, mind, and meaning are part of the same world that they have to do with, and they are to be studied in the same empirical spirit that animates natural science" (2003: 142)<sup>14</sup>.

Our SML was constructed in a way which was intended to be inherently reasonable and reasonably representative of linguistic thinking. Other approaches are not in any way precluded—others can set up different SMLs and analyse their assumptions (I hope they do!), but our model has allowed us to place linguistic ideas in relation to a range of philosophical,

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<sup>14</sup> This does not imply agreement with all of Quine's views on language, but—in my opinion—there is a strong tendency for linguists to imply, or slip into the discourse of, an extreme dualism—rejected by most philosophers and scientists—in which speakers "use language", i.e. in which language is hypostatized and divorced from the speaker's mind which "uses" it.



semiotic, and psychological issues. In doing so, the approach underlines the nature of all linguistic models as *constructs for the understanding*.

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### **About the author**

Paul Rastall holds a PhD in Linguistics from St. Andrews University and is the author of 4 sole-authored books and numerous articles in various international publications, the co-author of one book, and co-editor of two others. He was a principal lecturer at the University of Portsmouth and later a Visiting Fellow at City University of Hong Kong Community College. He has taught in UK, Sudan, Sweden, Brunei, Japan, and Hong Kong and been a visiting professor in China, Algeria, and Czech Republic. His main research interests are in the foundations of functional linguistics and the philosophical questions facing linguistics, and his main language interests are English, French, and Russian.

## Language as Semiosis—A Short Reflection on Paul Rastall’s article

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Models are constructs for understanding; linguistic models are constructs for the understanding of language. Since language is a hugely multifaceted phenomenon, philosopher-linguist Paul Rastall’s (2013) suggestive games with his minimal Models suggest “a view of language with multiple accreted and overlapping systems” (p. 21). Each of these systems could be studied through a (set of) small model(s) foregrounding its specific functions. The motivation for setting up a small model does not spring from a total model of language issued by a school in theoretical linguistics, but rather from a philosophical or semiotic interest in a range of functions that language can reasonably be assumed to have, and which different languages would then manage in their own differing ways.

This approach has the advantage of being pluralistic and open-minded; in a situation where linguistics still has to struggle with its mutually exclusive and conflicting schools, Rastall’s suggestion offers at least an attractive philosophical therapy for frustrated scholars in the agonistic field of language studies. But if the multiple systems “overlap”, the minimalistic strategy does not necessarily lead to a relativistic chaos; the systems involved may well turn out to feed into each other in a certain describable order.

If these systems are forms of *semiosis*, in the sense that they functionally relate expressions to contents, or signifiers to signifieds, or bodily engaging *forms* to mental entities, or *meanings*, then certain connections between the systems could be *semiotic*: either as (paradigmatic) relations between semioses competing for a function, or as (syntagmatic) relations between semioses that uphold structural interdependencies.

The Danish linguist Louis Hjelmslev (1943) proposed a simple principle, or a minimal model, describing intersemiotic relations. A particular semiosis may take another particular semiosis as its signifier (form) or it may take another particular semiosis as its content (meaning). We could call this mechanism a principle of semiotic embedding. Hjelmslev further proposes a somewhat idiolectal terminology for the structural situations resulting from semiotic

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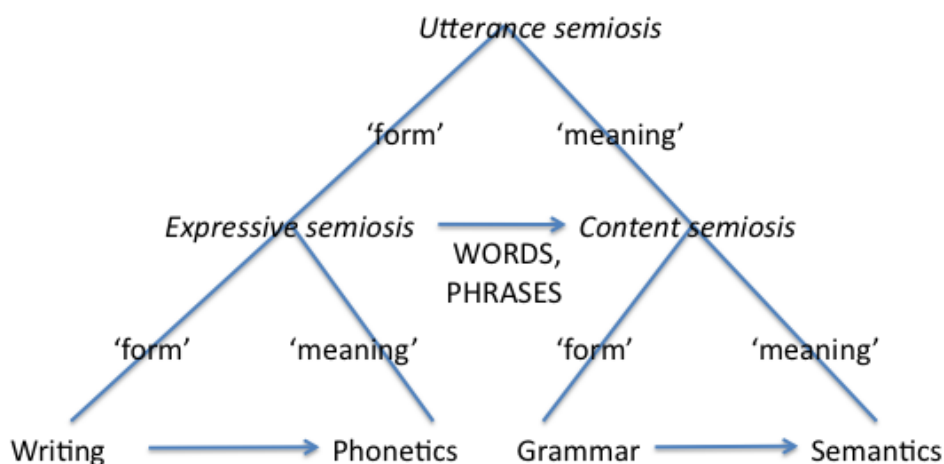
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embedding. He wanted to describe metalanguages, connotational languages, etc. and had specific philosophical reasons to do so. Since he saw language as the only form capable of grasping the properties of the world, linguistics was going to become the philosophical metalanguage of all (object) languages of knowledge. I consider Hjelmslev's claims on this point to be derailed. Instead, I want to find out what language is doing, exactly as Rastall does. Here is my own quasi-minimal model of basic functions in language (Fig. 1).

Table 1. Core functions of language



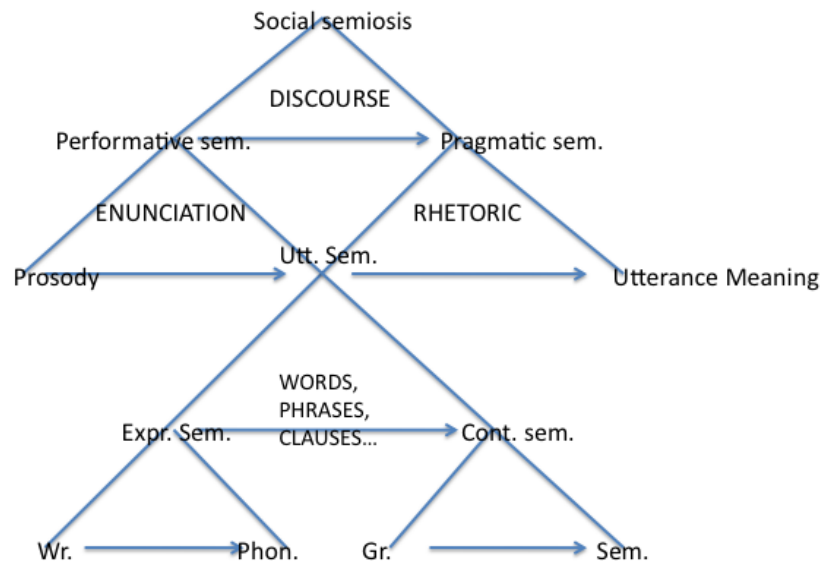
According to this model, writing signifies phonetics, and grammar signifies semantics. Languages that do not have or use writing may instead have elaborate speech gesture systems. Those which do have writing, often have more than one writing system. Grammatical constructions signify meanings but often compete with other (paraphrastic) constructions, and preferences can depend on utterance-related circumstances. Words, phrases, clauses, sentences all have both expressive semiosis and content semiosis. The superordinate semiosis here corresponds to de Saussure's linguistic sign, composed of a conceptual signifier and a conceptual signified. It also corresponds to the form–meaning pairings celebrated in construction grammar. However, each of these semioses can be considered a small model in its own right, they just happen to integrate rather nicely.

Utterance semiosis, as shown in Fig. 1, is not the ultimate and overarching semiotic function, since none of the core structures in the model account for speech acts, performative functions, pragmatic and situational constraints or discourse meaning. We need to expand the core model and add at least three more functions (we ought to add them one by one, as small models, while arguing carefully, but this is just a note in what is hopefully a debate). The functions we need to introduce are those of enunciation, rhetoric, and discourse.

In some traditions, the representation of speaker and hearer is in fact called *enunciation* (from French: *énonciation*, a notion introduced by Benveniste 1966) and accounts for the variable modes of address (assertion, suggestion, request, order, declaration, promise...) and the variations in evidentiality and voice (polyphony, irony, emotional temperature...). The pragmatic function lets the enunciative meaning of the utterance, and the utterance itself, express a situational meaning determined by the social discourse function in which the utterance is inscribed. Finally, the discursive function accounts for the ways in which certain enunciative forms signify particular socio-cultural meaning conditions. The result is now a more

complex architecture of semiotic functions, each of which may even correspond to several Rastall models (Fig. 2):

Figure 1. More functions of language



One might object that this begins to look like a total and global, maximal model again. However, it is still open to further additions and subtractions of all kinds, since social semiotics include ritualizations, iconic settings, musical framings, and complex institutional discourse formations of many kinds. Each node in this semiotic architecture is a locus of competing systems; in this perspective it seems strongly implausible that language as such should be *a system*, or a single coherent and ‘immanent’ structure—as Hjelmslev’s glossematics and many other schools have believed—or that a particular language be such a system or structure. Other researchers, including Bakhtin ([1975] 1981) and Voloshinov ([1929] 1986), have doubted this belief. My main reason for being doubtful is that word classes and syntactic functions cannot be reduced to each other; they are not part of the same sub-system. It may be more accurate to characterize language as consisting of semiotic parts of (a semio-linguistic part of) an open semiotic network that expands in all directions without reaching any known limits; but a network containing local architectures that can be systematically studied one by one through local models that we can call ‘small’ if we wish to follow Rastall’s inspiration. Considering language this way is what linguistics and other semiotic disciplines, including philosophy (of language), *practically* have to do, whatever the theoretical justification they prefer to adduce may be.

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## It's Only a Model: Discussion Note on 'Small Model Languages as Tools for Reflection'

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When a linguistic model is shown to be inadequate, its proponents scramble to update it, or to downplay the significance of the data that doesn't fit. But why should a model's proponents be disappointed that their model is imperfect? The model's inadequacy has offered a valuable insight into the assumptions that underlie the model. Nevertheless, the flawed model is rarely given credit for this contribution. Recognition is instead granted to the next model that comes along to replace it, which will of course have inadequacies of its own.

Rastall's (2013) paper 'Small Model Languages as Tools for Reflection' observes that when linguistic models fall short of an accurate representation of language, this offers a rare opportunity to question assumptions and observe linguistic facts. The only reason a model's proponents might be distressed when a model is proven inadequate is if they harboured the illusion that the model was an accurate representation of language, or even of cognition. As Rastall points out, no model can make this claim. Every model is necessarily an imperfect representation of reality.

Why, then, not build formal models that are designed to fail? Simple, resilient models, such as proposed by Rastall (2013), can fail, offer up insights, be easily repaired, and fail again. Researchers can take credit for the fruit of their models' inadequacies, and either salvage and refine the model, or cast aside the model without regrets and build a new one. There is no reason to cling to a model once it has lost its usefulness. This healthy attitude towards formal models is unfortunately uncommon in linguistics, where—as Rastall observes—modelling is often implicit, linguists are inclined to make grandiose claims for their models, and many researchers confuse the map with the territory.

Most linguists have observed firsthand the value of imperfect models, both in teaching and in research. Despite the flaws of a feature-based model of semantics, I continue to teach my students that in terms of semantic features, a BACHELOR is [+human +male +adult -married]. I

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am always gratified when students protest, “But what about people who don’t identify as either male or female?” or “But doesn’t adulthood begin at different ages in different cultures?” or “Hasn’t the definition of marriage changed over time?” One student observed that even some non-humans, such as unpaired male deer, are termed *bachelors*. No student has yet pointed out that the Pope or Tarzan are [+human +male +adult –married] but fail to fit our understanding of the meaning of *bachelor*, but by the time I mention these examples, most students have already convinced themselves of the inadequacy of the feature-based model. Semantic features cause students to notice polysemy, semantic change, encyclopaedic cultural information in language, and other concepts they haven’t yet been introduced to and otherwise wouldn’t have considered. The introduction of the semantic features model, and the subsequent process of identifying and discussing its inadequacies, also serves as an introduction to more recent models such as frame semantics and prototype theory. Even if the students never encounter semantic features again, the model has served a purpose.

Questioning a model’s adequacy can, of course, also lead to research advances. In 1971, Geis and Zwicky noted that their students tended to interpret conditional sentences biconditionally, though these “novice logician(s)” were “surely wrong” (1971: 562). Students understood the sentence *If John leans out of that window any further, he’ll fall* as meaning that if and only if John leans further out the window, then he will fall. Moreover, students interpreted the consequent (falling) as a causal result of the antecedent (leaning out). This interpretation of an English sentence, by a group that doubtless included native speakers of English, was considered wrong by Geis and Zwicky because it did not match the predictions of their formal logical model. Although students’ intuitions did not lead Geis and Zwicky to question the adequacy of their model, Geis and Zwicky did acknowledge that English conditionals involved inferences of biconditionality and causation. This allowed later researchers, such as Dancygier and Sweetser (2005), to build a new model that recognised that conditionals are interpreted locally, and that the local interpretation of English conditionals is biconditional. In the local scenario in which John is leaning precariously out of a window, *If John leans out of that window any further, he’ll fall* is indeed asserting that if John ceases his foolish behaviour, he won’t fall. The speaker of this sentence is not actively considering other non-local reasons that John might fall, such as an earthquake. Questioning the assumptions of the formal logic model made these observations apparent and paved the way for a new model of English conditionals.

Clearly, the rejection and replacement of models is an essential part of linguistic discovery, both in classroom learning and in research advances. Recognition of the value of temporary models would offer at least three advantages in the field of linguistics. Firstly, the cycle of rejecting and replacing models, with all of its benefits to teaching and research, could be sped up. Currently linguists are reluctant to let go of outdated models, learn from the models’ flaws, and move on. Temporary models can be employed until they fulfil their purpose, and then be discarded, allowing researchers to begin with new models instead of tinkering with models that have little more to offer.

Secondly, temporary models are less likely to become needlessly complex and opaque. Longstanding linguistic models can become increasingly unapproachable to those outside their field. Even a model that is designed to be easy to learn, such as the Natural Semantic Metalanguage (NSM), will almost inevitably become impenetrable to outsiders as it attempts to account for more phenomena. NSM semantic descriptions (‘explications’) avoid technical

vocabulary and use only everyday terms such as *something*, *all* and *good*. Over 40 years, NSM has maintained this limited vocabulary, but has become intricate to the point that explications of single words sometimes last pages, must reference other lengthy previously defined explications (Goddard 2010), and are not transparent to laypersons (Matthewson 2003). Discussions of longstanding models may additionally dissuade outsiders due to their focus on the minutiae of the model itself. If you do not work in NSM, you probably will not attach much importance to whether 54 or 56 different words may be used in explications, for example. Temporary models encourage researchers to keep their models simple and keep their debates relevant.

Thirdly, and most importantly, models that are temporary and purpose-built are less easily conflated with the linguistic or conceptual reality they represent. Linguists who have saturated themselves in a single model for a lifetime sometimes make claims about language and cognition that are incompatible with findings from psychology, anthropology, or even biology. This is because they have forgotten that their model is necessarily flawed, and they insist on its perfection to the point of ignoring evidence that contradicts it.

Given the advantages of temporary linguistic models, why is Rastall so unusual in preferring them? Perhaps linguists become emotionally attached to their models. Perhaps it is easier to publish on, or receive funding for, work involving well-established models accompanied by claims of cognitive reality, rather than purpose-built models with realistic claims. Nevertheless, Rastall's description of "all linguistic models as *constructs for the understanding*" (2013: 22) could hardly be more accurate. An honest recognition of the nature of linguistic models can only lead to a more effective use of models and more rapid progress in the field.

To quote a line from the scene in "Monty Python and the Holy Grail" where characters are enthusing over a distant castle that is obviously a low-budget fake: "It's only a model". Recognising a model for what it is will offer more benefits than interpreting a model as an accurate representation of reality, or even as reality itself.

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## The dark side of the model

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**Abstract.** In his paper “Small Model Languages as Tools for Reflection”, Paul Rastall proposes using deliberately oversimplified and artificial model languages, making no grand claims for absolute truth, as heuristic and didactic tools in linguistic inquiry. While I find this approach both useful and commendable, I argue (echoing similar warnings in Wittgenstein’s late work) that such models can not only expand our horizons in thinking about language, but also limit them.

**Keywords:** theoretical models, methodology of linguistic inquiry, Ludwig Wittgenstein

Paul Rastall’s paper “Small Model Languages as Tools for Reflection” (Rastall 2013) explores the heuristic potential of deliberately oversimplified and artificial model languages in the study (and teaching) of language. These Small Model Languages (SMLs), as Rastall calls them, can “control variables better and make assumptions more transparent” (Rastall 2013, 2). As Karen Sullivan (2013) stresses in her response, a great advantage of Rastall’s approach is that it avoids committing to the “truth” of the specific model being applied. We are thus free to exploit the valuable insights our models can provide without being forced to defend the inadequacies they inevitably have.

I definitely see the great heuristic value of the sort of model languages Rastall is talking about, and I share Sullivan’s sentiment that Rastall’s paper offers a very healthy approach to linguistic modeling. And yet, I believe there is a lingering danger in using models of languages (small or otherwise), which Rastall neglects to address—a danger that should not preclude us from using models, to be sure, but which we should nevertheless be mindful of when we are using them, especially for heuristic or pedagogical purposes.

The title of Rastall’s paper presents his SMLs as *tools*. Tools are excellent enabling devices. They vastly increase the affordances of our bodies and minds. But tools can also limit the way we see the world around us. As the old adage goes, when all you have is a hammer,

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everything looks like a nail. This restricting power of models (or pictures, to use his own word) was a major concern for Wittgenstein (1958) in his late work, and, as I will try to show in what follows, this concern indeed applies to Rastall's suggestion.<sup>1</sup>

To accomplish this task, one needs to go no further than Rastall's own example model. Moreover, the limitations this model unwittingly imposes on those using it are already evident if we look at the very first stages of its development in the paper (Rastall 2013, 9–11). The description of Rastall's sample SML begins with an imaginary situation in which people are communicating to each other the existence of various objects, without any further information about them. The initial model consists of two types of markers: one marker of existence ("actualizer", obviously modeled on the existential quantifier  $\exists$  in formal logical notation), and an open set of object labels. The existence of an object is communicated by placing the object label and the actualizer next to one another, in any order.

Rastall then notes that "the idea of a sequence of signs is an assumption" (Rastall 2013, 10), and that the actualizer need not be expressed explicitly as a symbol at all. Instead, the existence of an object can be conveyed by modifying the object label itself in some way (e.g., using prosodic marking). This gives him the first chance to conduct a reality check:

In real languages, however, we normally find an actualiser and a naming sign in a sequence (*There is/are, Es gibt, Il y a*, (Arabic) *fii*, (Chinese) *you*<sup>3</sup>, etc.). This strategy is clearly dominant, although it requires the "effort" of identifying different signs, associating them, memorising and synthesising them into a complex message (Rastall 2013, 10–11).

Now, those of us who are used to working with naturally-produced linguistic materials (in corpus studies, or in discourse and conversation analysis) might notice a problem at this stage: Rastall's conclusion that such explicit marking is a "clearly dominant" strategy does not seem to be borne out by the evidence. First, whereas many languages have existence markers, as listed by Rastall, not all do, while languages that do have such explicit markers also typically retain the option of marking existence prosodically or pragmatically. Of course, a full typological study would be necessary to settle the empirical question properly, but at first blush, it appears non-explicit marking is actually the more widespread strategy of the two among the world's languages.

And if we also consider the semantics and pragmatics of communicating existence, this impression receives further reinforcement. It is notable that the English marker *there is* is not really a device for communicating the mere existence of some object. "There is a river", in isolation, is not a complete utterance (where is that river? what about it?) It is also definitely *not* the way English speakers typically report on the existence of objects they can perceive directly. To the contrary, *there is* would be used typically to talk about things one knows about, but does not currently perceive. There are also specific idioms being used for some objects and events (e.g., we say "It's raining", not "There's rain"). Studies of how people actually do talk about the presence of objects in their environment (e.g., Clark and Wilkes-Gibbs 1986) show a much more complex picture than the one Rastall takes for granted in his discussion at this stage.

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<sup>1</sup> As it happens, the "language of the builders" described by Wittgenstein (1958, §2) is a superb example of a small model language in Rastall's sense.

But why am I dwelling for so long on just one contingent problem with one example of an SML in use? Well, the issue is that this sort of misjudgment is not random. Rather, it reflects the blind spots inherent in the model itself. One of the model's assumptions is that objects are designated by stable conventional labels.<sup>2</sup> When comparing the "predictions" of the model with actual linguistic practice, our gaze is then naturally fixed on issues of conventional word order, to the detriment of relevant pragmatic devices, for example.

If I understand Rastall's stance correctly, his reply at this point would be that the SML we are talking about is explicitly designed to explore syntactic relations, and that we can use another SML to model pragmatics. Fair enough. But this requires prior knowledge of which aspects of language to model. Aye, there's the rub. For this prior knowledge has to come from another model of language, whose assumptions are no longer made explicit in the same way the SML's assumptions are.

If our SML is being used for didactic purposes—by a professor in a linguistics class—we can say that in a sense the professor is introducing her students into a scientific paradigm, whereby they are taught to see some things about language and (unintentionally) taught *not* to see other things. If the SML is used heuristically to explore fundamental questions about language as such, the blind spots of the model may turn into the blind spots of a whole theory, keeping us entirely unaware of important aspects of linguistic reality. In Wittgenstein's words:

*A picture held us captive. And we could not get outside it, for it lay in our language and language seemed to repeat it to us inexorably* (Wittgenstein 1958, §115).

To come back to the point from which we started, none of what I wrote here detracts from the value and importance of Rastall's argument. Small artificial models are indeed valuable tools for reflection, all the more so because they are explicitly artificial, divorced from any claim for absolute linguistic truth. It's only that, even in this form, models are still the sort of tools that should be handled with care. Handling SMLs with care means remembering that behind the explicit assumptions of the SML there are always implicit assumptions belonging to a background model—a background model that we should then be especially careful to avoid introducing into the real-world data we are comparing our model to.

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<sup>2</sup> As an aside, I should note this assumption has a long pedigree, going back at least to Aristotle's *Organon* (see especially Barnes 1984, 1:25), which further increases the chance that the assumption in question gets unwittingly sneaked into the conclusions of the whole exercise.

Sullivan, Karen. 2013. "It's Only a Model: Discussion Note on 'Small Model Languages as Tools for Reflection'." *Language Under Discussion* 1 (1): 27–29. <http://ludjournal.org/index.php?journal=LUD&page=article&op=view&path%5B%5D=15>.

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## Small Model Languages and Beyond—A Reply to Comments

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**Abstract.** In response to comments on pedagogical, epistemological, and semiotic issues in the original paper, there is further discussion, some clarification, and further suggestions on refutationism, linguistic data, and “bottom-up” perspectives, especially in relation to micro-level anomalies and the integration of perspectives. Critical reflection and openness to alternative views are emphasised.

**Keywords:** data, refutationism, dogmas, anomalies, ontology

First of all, I would like to thank Karen Sullivan, Per-Aage Brandt, James Dickins, and Sergei Sandler for their perceptive and interesting responses to my paper. While Sullivan (2013) mainly took up the pedagogical and epistemological themes, Brandt (2013) focused more on the semiotic strand of the paper with particular reference to a “bottom-up” approach to human communication. Both agreed that models are constructs for our understanding of complex phenomena. Dickins (2014a) applied the small model approach to develop ideas in his approach and, in his web comments on my article (2014b) focused on the confrontation of models with linguistic data, and expressed concern that we should not impose ideas about the nature of the linguistic data, but have a healthy respect for linguistic diversity. Sandler (2013) considered the SML itself, and pointed out some potential dangers in *any* modelling approach (mine included).

Sullivan’s paper develops the idea that all practitioners in linguistics need to reflect on their assumptions and on the meaning of descriptive solutions. She gives the useful example of semantic feature analysis as a case in point. In fact, the idea of small model languages as tools for reflection came out of pedagogical practice. I have long felt that teaching is too much concerned with learning and applying approaches, and too little concerned with the critical analysis of ideas. Certain approaches—particularly those that lend themselves readily to

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teaching—can become uncritically accepted dogmas, especially when a variety of views is not presented. One should not underestimate the desire for “certainty”. It is pleasing to hear that Sullivan’s students are critical thinkers.

Sullivan’s other example of developments in logical semantics is a clear case of improvements in understanding arising from critical thinking and the refutation of a model. As she suggests, “failure” is good. One of the great attractions of Popperian refutationism (e.g. Popper, 1972) for natural scientists has always been that the process of hypothesis and rigorous testing, with progress resulting from identifying empirical weaknesses in a theory, is that it is a realistic representation of what natural scientists do (e.g. Medawar, 1984; Dawkins, 2013). Linguistics is not a natural science and there are strong reasons for not committing *uncritically* to Popper’s epistemology (Rastall, 2011), but, as Sullivan shows, we need ways of identifying the limits of our models—ways of knowing when we are wrong. One of the interesting things about Sullivan’s example is that the refutation in question did not come solely from a failure to meet the necessary condition of correspondence with observations, but it was also the result of the introduction of different perspectives. This reminds us of the “theory-laden” nature of our constructs. Our phonemes, morphemes, sentences, etc. contain the theory and methods used to identify them (see also Harré, 1976: 25ff on this point). They are not naturally occurring observables. However, it also reminds us that there are multiple perspectives on the same linguistic phenomenon—a point made clearly by Sandler. As discussed in my paper, for example, a grammatical view of interrogatives must be supplemented by an account of their role in interaction and the potential responses to interrogatives, as well as by an account of the aesthetic values of different interrogatives and responses for (broadly) the same central meaning: *Would you like a sandwich? Do you want a sandwich? How about a sandwich? A sandwich? – I would; Yes, please; Yeah...*

It is worth bearing in mind that Popper (1972: 30ff) also warned against the “immunisation” of theories against refutation, i.e. building in components of a theory that prevent refutation. This is an aspect of that excessive commitment to a model—defending it at all costs—that Sullivan refers to. One might think of the stratagems of “level-skipping” and “back-looping” in scale-and-category grammars (and their endless exceptions), which would—in any hard-headed analysis—simply be refutations of the model. One could suggest that unobservable transformations of unobservable “kernel” sentences serve a similar purpose, where particular transformations might be rejected but the theory of relating kernel sentences to “surface structures” is not empirically refutable.

Popper was clearly predominantly concerned with physical sciences. Consequently, the phenomena which constitute “refutation classes” in his two-level hypothetico-deductivism are measurable quantities. One of the ways in which linguistics differs from physical sciences is that its phenomena are qualitatively determined, and are themselves constructs. That should be obvious in the case of the recognition of “words” or other entities in a text. What we classify as a “word” depends on our theory for analysis. Linguistic phenomena are a selection from many possible aspects of speech events and may be *comparisons* of observables (as in commutation or permutation). Phonetic phenomena, such as [h] in English (which is a generalisation of contextually determined “voiceless” vowels), are themselves constructs and they can be considered as entities with communicative roles or as entities with social or

aesthetic value depending on how we choose to look at them. The distribution of [h] in the community and the communicative value of [h] involve different qualitative ways of looking at the phenomena. This raises the question of the nature of evidence from observables in linguistic arguments, and their role in empirical testing.<sup>1</sup>

Small Model Languages are intended to be as independent as possible of particular linguistic theories. Dickins points out that I have been associated with axiomatic functionalism. While axiomatic functionalism is certainly very concerned with its own presuppositions and attempts to make them explicit, the SML approach is not an outcome of axiomatic functionalism and it raises questions for that theory as for others, in particular, questions about the integration of language systems with social functions of communication, and the relation between linguistic systems with no “existence postulate” and real-world communicative behaviour. However, as Dickins (2014b) says, it is important not to have preconceived ideas about how languages express given functions or to presuppose that there is a universal set of messages which are conveyed in all languages. Examples of this Whorfian point include the different perspectives on actions and states in the Russian aspectual system compared with, say, the English verbal system, or the many different ways of addressing the interlocutor in a range of languages. SMLs can be used as thought experiments, as suggested in my original paper, and as Dickins did in his paper on language levels (2014a), but we need to know the limitations of our modelling. This is, of course, why SMLs must be confronted with the diversity of (real) linguistic phenomena (“reality checks”, as Sandler calls them).

One cannot set up any model, however, without making some assumptions. One of the chief purposes of SMLs is to identify those assumptions. One of the assumptions of an SML is that one must specify a communicative function for modelling (such as the assertion of existence or address to an interlocutor)—and this is inevitably to some degree heuristic. Since SMLs are tools for reflection, they invite us to question our ideas about verbal communication, including any initial guesses. As Sullivan suggests, creating awareness of limitations is one of the functions of models.

While Sandler is generally sympathetic to the approach, he reminds us of Wittgenstein’s point that we can be “held captive” by a picture, i.e. that the models we build can blind us to alternative perspectives and other ideas. This point is in line with those of Sullivan and Dickins. We should therefore “handle with care” when using models. That is entirely correct. SMLs are deliberately concerned with very limited functions. The particular SML given as an example does not consider expressions asserting existence in their wider communicational context, and it is focused on the syntax of those expressions—as Sandler says. It is further right to suggest that syntactic issues should not be divorced from pragmatic perspectives (as in the case of interrogatives in my paper). I think it is not unreasonable to say that a lot of linguistics has been too narrowly concerned with phonological and grammatical systems divorced from those wider perspectives, despite frequently expressed calls for the integration of different points of view).

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<sup>1</sup> Another difference was pointed out by Mulder (1975). Whereas hypothetico-deductivism in natural sciences involves a distinction between empirical theories and phenomena, in Linguistics a third “level” of non-empirical constructs is needed (phonemes, grammatical relations, etc.) which can be defined, applied, and tested for consistency but not for empirical validity.

The main function of SMLs is to promote critical reflection and they are deliberately kept simple for the purpose, but they need not be restricted to purely formal issues. Thus, one could envisage models consisting of sets of sentences with textual relations defined in the set (e.g. explaining or signposting), or sets of utterances correlated with sets of social/contextual features (e.g. generational factors or negotiating interactions). This could lead to an analysis of the presuppositions involved.

Sandler's point and the further questions he raises about the wider context of why, when, and where statements about existence are made can be seen as precisely the kind of critical reflection on assumptions and provocation of alternative thinking (and questions) that SMLs are intended to generate.<sup>2</sup> (They also link up with Sullivan's example of refutation in logical semantics arising from a wider set of perspectives.) One might add that the introduction of wider perspectives brings with it the need for analysing the presuppositions of the wider context and the definitions of terms involved. Of course, one must make *some* proposal in order that it can be discussed, and it is a fact about the development of models that, at every point, there are many alternative routes to explore. The important things are to be explicit about one's choices and not to exclude other valid perspectives<sup>3</sup>. The resulting SML is bound to include some things and exclude others, but that is where light can dispel darkness.

Nevertheless, the point is well taken that models should not restrict thinking and that the questioning and conjecturing can never be considered at an end.

The issue of whether existence expressions are predominantly of the actualiser type can—as Sandler says—be left to typological classification, although here again, as is well known, typological results depend heavily on the methodological assumptions behind them; it is easy to end up lumping apples with oranges, where different theories are used for different languages in the typology (different phoneme or morpheme concepts, for example). Whatever the outcome of such a classification, the more interesting questions are about the nature and comparison of the observed communicational solutions, and what they might imply for the understanding of human behaviour.

Brandt's paper presents an interesting way of building up an understanding of complex human semiosis from small-scale functions, which is certainly consistent with my proposal for an "overlap-accretion" view of language. Brandt's model allows for variety and overlap of small-scale communicational means for specific functions. The "accretion" of such structures and the accumulation of wider perspectives on semiosis ultimately builds up a construct which models language as a kind of virtual reality. Productions in the verbal world can be compared with other information—perceptual, logical, remembered—and tested for

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<sup>2</sup> As noted in the original paper, there are other ways of focusing on, or questioning assumptions and, as Sandler says, Wittgenstein certainly offered one of them. In my opinion, Wittgenstein and most other philosophers never really considered that linguistic units and relations were products of analysis and, hence, dependent on the theories and methods used to identify them. They simply assume that they know what the words and syntactic structures of a language are (an exception is Max Black, 1968).

<sup>3</sup> An interesting example might be the many attempts to analyse the sign as a relation—from *voces significant res mediantibus conceptis*, or *aliquid stat pro aliquo* to Ogden and Richards' "symbol stands for referent" (1972: 11) or Mulder and Hervey's "index denotes information" (1972: 56). The Saussurean view that the signifier and signified are not two separate entities connected by a relation (1972: 155ff), but are the same thing from different points of view is a clear example of adopting a different perspective, which at least avoids the problems that arise if "a denotes b" implies there is an *a* and there is a *b* connected by an unclear relation of "denoting".



truth or a range of other factors: social or aesthetic, for example. It can serve as a vehicle or model for a significant part of conscious awareness and our interaction with the environment. Roy Harris' "integrationist" approach (1982), which links verbal to non-verbal communication, is also in this line of thought, as is the conception presented by Hagège (1980) of a hierarchy of functional analyses. A key point for Brandt and Hagège, in line with my paper, is that structures should not be dissociated from social/pragmatic issues. Thus, structures serving the purpose of asking questions or making requests must be seen in the context of interpersonal relations in the situation of verbal interaction.

One of the purposes of my paper was to encourage colleagues and students to question dogmas (see also Rastall 2013). This is inevitably somewhat subversive, as fundamental assumptions are challenged or, at least, one is required to state them. As Brandt suggests, one of the dogmas of linguistics is the idea that language is a system. "La langue est un système qui ne connaît que son ordre propre" (Saussure, 1972: 43)<sup>4</sup>: "la langue est un système rigoureusement agencé, où tout se tient" (Meillet, 1921: 11)<sup>5</sup>. He is right to point out that others have asserted the polysystemic nature of languages (the glossematians, Firth, 1957: 121, Mulder and Hervey, 1975: 2–22). It is certainly true that the establishment of linguistic systems has considerable explanatory power and deters one from atomistic approaches—Hjelmslev (1953: ch. 1) spoke of *disiecta membra* in 19<sup>th</sup> Century comparativism—but the focus on systems also takes attention away from the many anomalies and multiplicity of small-scale systems in languages. One must avoid turning systems into "procrustean beds".

Most versions of "neo-Prague" functionalism, as also Brandt's approach, easily avoid those problems because systems (or structures) are generalisations (macro-structures) which emerge from micro-level functional analysis (Mulder, 1968, Hagège, 1980), or, from the opposite direction, macro-level structures are used to account for micro-level features in explanatory arguments. Thus, anomalies, "marginal" features, or diversity of structure can be accommodated. "Impersonal" structures as in Russian (for example) occur side-by-side with subject-predicate structures. The two types of structure are used for different functions and in different contexts. In a "bottom-up" approach, there is no reason to assume that they arise from a common "underlying" structure or to assume that one must derive from the other. Similarly, there is no reason to see German as either a "case language" or a "subject-predicate" language. "Case" structures serve specific purposes such as "direction" or "location" indication (*ins Haus, im Hause*) or fulfil contrastive roles in signal identification alongside subject-predicate relations for sentence-level functions. The different ways of expressing existence in Russian (mentioned in my paper) or in Arabic (raised by Dickins) invite explanations for the differences of usage in relation to more refined models.

In a "bottom-up" approach, anomalies can be handled from the perspective of the unit rather than the overall structure. For example, the signs in the "article" position in English (i.e. those commuting with *the* and *a*) are mutually exclusive- *the, a, this, that, any, each, my,...* and possessive constructions such as *Fred's*), but *every* is mutually exclusive only with a subset of the signs in this position (non-possessives) and may combine with possessives- *\*the every move*, but *his every move, Fred's every move*). *Every* has its own set of paradigmatic and

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<sup>4</sup> "Language [*langue*, not *langage*] is a system which has only its own arrangement/order" (PR).

<sup>5</sup> "Language [*langue*, not *langage*] is a strictly organised system in which everything is mutually connected/supportive" (PR).

syntagmatic possibilities which are anomalous from the point of view of the overall system. One might note that we can have *all of them*, *some of them*, *each of them*, *any of them*, *none of them*, but not *\*every of them*. Also, from the point of view of the phonological system of English, the phoneme /z/ easily fits in as /voiced, hissing/ with its unvoiced counterpart /s/, and it occupies a pre-vocalic position with no other consonantal combinations (/zip/ etc.) and occurs post-vocalically alone (/geiz/ "gaze") or in combination with nasals (/prizm/, /prizn/ "prism", "prison", etc.). Thus, from a macro-level perspective, one can account for the identity, structure, and distribution of /z/. However, from the perspective of the phoneme (as it were), one can see that:

- a. The number of phonotactic combinations entered by /z/ is very limited (and they can be easily listed, unlike the phoneme /p/ for instance)
- b. The limited occurrence of /z/ in allomorphs means that it has a contrastive function in identifying the limits of meaningful units
- c. /z/ frequently occurs in signs with expressive (or "echoic") connotations (*zap*, *buzz*)
  - Post-vocalically, it is frequently associated with verbs—*gaze*, *daze*, *amaze* (and de-verbal nouns)—and thus helps in the grammatical identification of the unit of which it is a part
- d. And, most significantly of all, /z/ is the exponent of the "genitive 's", 3<sup>rd</sup> person present singular, and plural. It acts as a contrastive feature showing the role and limits of the component of which it is a part. (Ontologically from a top-down point of view, of course, the phoneme /z/ should be distinguished from the allomorph "/z/-plural" whose exponent is the phoneme /z/, but here we are thinking bottom-up of the associations of /z/).

Similar points can be made about other, relatively infrequent phonemes, such as /v/ and /ð/. That is, a bottom-up view of the phoneme and its functions is a very different picture of the role and combinations of the entity than from the point of view of the phoneme table and distributional unit in phonology. In such a view, the phoneme is a node in associations with multiple functions. Similarly from a "bottom-up" perspective, as Twadell (1935) and Mulder (1968, 1978) pointed out, the overall functional identity of a feature is a set of micro-identities. A "macro-phoneme" for Twadell is a generalisation of many micro-phonemes with different identities in fixed contexts. English /r/ in the context of /-ib/ commutes with /f, d, n, dž/, but in the context of /-aŋ/ with /p, b, f, t, g/. To arrive at an identity for /r/ in relation to all phonemes, we need a technique to generalise from all particular functions (as in Mulder, 1968). Mulder's other point (1978) is that even distinctive features are generalisations of non-different functions. Thus, in English, /occlusive/ is opposed to /fricative/ and /nasal/ in the context of /labial/ and /apical/, but not in the context of /velar/, as there are no velar fricatives in standard English- in the overall system /occlusive/ is what he calls a "hyper-feature"- a set of functionally non-different identities.

The view that our models are "constructs for the understanding" is justified from a number of points of view. It starts from the idea that all of our knowledge of the world comes through the medium of our understanding and that we cannot directly know what Kant calls the *Ding an sich*. Even our linguistic phenomena and observables (including comparison of phenomena as in commutation) have some element of theoretical selection and our models,

as noted above, are theory-laden, and hence cannot be assumed to be direct reflections of some supposed reality. The fact that we can have different perspectives on the same phenomena and arrive at different constructs reinforces the argument (different concepts of the morpheme, for example). However, in Householder's deliberately polarised terms (in Joos, 1957), the rejection of "God's truth" linguistics does not imply a wholesale acceptance of "hocus-pocus" linguistics. Clearly, we do want to understand communicational reality, as Brandt says, and so must address the epistemological problem of the relation between models and our experience of verbal communication. Part of this is determining our level of "ontological commitment" (in Quine's (1963) terminology), since most linguistic constructs are classes or classes of classes. Another part of the issue is determining what linguistics can say about cognition and the verbal contribution to conscious awareness. Scepticism that linguistic models can be directly attributed to cognition need not be a problem (as Sullivan indicates), but that does not preclude a more modest collaboration with biological approaches to the understanding of verbal behaviour—for example, in the hypothetical mode, i.e. that if our models can describe some aspect of reality then we may search for some neurological correlate. We must, obviously, ensure that our models are *consistent with* the findings of other sciences (not determined by them). More generally, we need to consider what sort of understanding our models provide, but that in turn implies knowing what we mean by "understanding" and takes us back to that complex linguistic virtual reality that our constructs model. However, as Dickins rightly says (and this was a point made earlier by the glossematians), SMLs (or any other model) are themselves semiotic systems from the point of view of attempting to understand their structure and content. This is an aspect of the truism that we need language to talk about language. More deeply, this "loop of language" (Rastall, 2000: ch.9), or the inability to escape from that virtual reality, is one of the limitations on our understanding. It raises the question of how we relate our verbal "world" to our perceptual world.

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