**Saussurian Biolinguistics? Bouchard’s Offline Brain Systems and Sign Theory of Language**

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Abstract

This article examines Bouchard’s (e.g. 2010, 2013, 2015) discussion of the nature of language as ‘Saussurian Biolinguistics’. A fundamental assumption of Bouchard, that of the existence of the Saussurian sign as a psychologically real entity in language, is disputed and an alternative understanding of the semiotic function of language is stressed. The consequences of Bouchard’s adoption of double interface signs for the relation of language to thought are also discussed and it is argued that such an approach leads inexorably to a form of linguistic relativity, and that positing a language independent ‘mentalese’ resolves this problem. The proposed model of language evolution, in which Bouchard is sceptical of protolanguage, is challenged, as are his claims regarding the properties of the language faculty. Bouchard presents a theory of the cognitive underpinning of language, ‘Offline Brain Systems’, which is inadequate in accounting for the unique properties of human cognition. Instead, a more insightful and explanatorily comprehensive theory is presented here: *dual-processing* and the *Representational Hypothesis*.

Key words: Saussurian sign; language evolution; dual-processing; Representational hypothesis

1. Introduction

On the 100th anniversary of the publication of *The Course,* Saussure’s place in contemporary linguistics seems at the same time to be both implicitly assumed and yet largely unacknowledged. A brief examination of a number of introductory (first year undergraduate) linguistics textbooks suggests that they generally include some emphasis on the notion of *arbitrariness* but often there is no reference to Saussure himself nor the semiotic nature of language. This practice is evident in both formal and functional approaches to the study of language. For example, in the former of these, a leading figure such as Chomsky assumes that lexical items are characterised by a ‘ “double-interface” property [which] is one way to express the traditional description of language as sound with a meaning, traceable at least back to Aristotle’ (Chomsky, 1995:2). This characterisation looks distinctly similar to the Saussurian *sign*. A few pages later Chomsky claims discussion of such features as *arbitrariness* to be orthogonal to the principle goals of linguistic inquiry and declares his intention to ‘put these matters aside, along with many others that appear to be of limited relevance to the computational properties of language’ (ibid.: 8). On other occasions, Chomsky is quite dismissive of the contribution of Saussure, reportedly maintaining that the content of the Course is insufficient to warrant being taught (Maher et al., 1996).

From a functional perspective, such as Cognitive Linguistics, Saussure’s contribution is again assumed but rarely explicitly examined as Evans and Green explain:

‘This (symbolic) thesis holds that linguistic units are form-meaning pairings. This idea is not new in linguistics: indeed, it has its roots in the influential work of the Swiss linguist Ferdinand de Saussure (1857-1913) and is widely accepted by linguists of all theoretical persuasions’ (2006: 214)

Later in the same volume they go on to say that ‘while there are important differences between the Saussurian model and the cognitive model, the cognitive model adopts the idea of the Saussurian symbol’ (Evans & Green, ibid.: 476). Similar claims are made in respect to other usage based writers, such as those in the framework of Cognitive Grammar in which the linguistic sign is stated to be ‘comparable to the “symbolic unit” in Langacker’s theory as the central object of enquiry’ (Taylor, 2007: 579). This point is echoed by Nerlich and Clarke who make the claim that ‘it is indisputable that at least some cognitive linguists, like Langacker, share with Saussure a concern with the linguistic sign even when this term is not explicitly used’ (2007: 598)[[1]](#footnote-1). It is then surprising and welcome to encounter a theory of language such as that outlined in Bouchard (2010, 2013, 2015) in which the explicit analysis of Saussure is central.

Bouchard aims to provide a unified, comprehensive account of how language appeared in our species or one of its precursors. Actually the author’s goal is even more ambitious than this, aspiring to provide not just an explanation for the origin and evolution of language but also a detailed account of a novel theory of the nature of language: *Saussurian Biolinguistics*. His account involves ‘a very simple idea. Language is a system that links concepts and percepts’ (2013: 61). In essence this is the Sign Theory of Language (STL), in which the only components are signifiers which represent a particular signified. Bouchard introduces his distinction between unit signs (U-signs) which correspond to words and morphemes, and combinatorial signs (C-signs) which include the conventions in any language for juxtaposition, grammatical marking and imposition of suprasegmentals on U-signs (see discussion in section 5 below).

In the next section I deal with the nature and evolution of the cognitive processes that underpin Bouchard’s interpretation of language: the *Human-specific adaptive suite*, central to which are *Offline Brain Systems*. In section 3 I will then examine his analysis and development of the work of Saussure including a discussion of some fundamental problems in the notion of the Saussurian sign and how effectively Bouchard deals with them. Section 4 then considers the relationship between language and thought in his theory, with particular reference to the problems of linguistic relativity. Section 5 looks at Bouchard’s notions of U-signs and C-signs in more detail before considering the role of protolanguage in his evolutionary scenario.. Section 6 examines the application of the STL in relation to linguistic phenomena, and I make some final comments in a short conclusion.

For Bouchard ‘the most important reason’ (2013: 5) for the task he undertakes is that a convincing evolutionary narrative can act as a constraint on any viable theory of language. Of course different aspects of language may have very different evolutionary scenarios, a distinction highlighted by Hauser et al. (2002), Hauser et al. (2007) and others. Precisely which aspects of language Bouchard is concerned with, that which constitutes the *Biolinguistics*, are discussed in detail in the next sections.

In approaching the subject, Bouchard sets himself two questions which address respectively the ‘origin’ and ‘nature’ of language. The first asks how and why language emerged in humans and not in any other species. Bouchard makes the, admittedly bold, claim this has remained a puzzle because

‘[i]n order to determine how language has emerged in our species, we must have an approximately correct theory of what language is…this is what is missing in all the approaches [to language evolution]’ (2013: 60)

This is what he seeks to discover in the answer to his second question: how and why did language evolve with the properties that we observe rather than some other set of properties? In particular , there are two properties that need to be explained: Saussurian signs and type-recursion. The origins of these are traced to an inventory of 11 cognitive, neurological, psychological and behavioural traits that are claimed to be uniquely human: the *Human-specific Adaptive Suite*. The most important of these are *Offline Brain Systems* (OBS), part of which are credited as the foundational system for the creation of concepts and the central feature of *Saussurian Biolinguistics* and it is to this which I now turn.

2. Offline Brain Systems (OBS)

The first issue to be addressed in a discussion of the evolution of a posited uniquely human OBS is its place in relation to cognitive processes in other animal species, especially primates i.e. zoosemiotics (Sebeok e.g. 1972). This ‘continuity problem’ is acknowledged but there is no sustained application of the ‘comparative method’ involving an examination of relevant aspects of the vast research available on animal cognition. In particular Bouchard eschews all scenarios for the appearance of language based on theoretical functionalities:

‘Language did not emerge because there was environmental pressure for better communication or thought organization (though it brought leverage for both). It is not a system with a function of communication that emerged, nor with the function of organizing thought. It is a system of signs that emerged because two very different substances met in the brain via their representations by a new neurological system which itself evolved for totally independent reasons’ (2013: 106).

 So if, as he claims, communication and ‘organization of thought’ are merely epiphenomena of OBS, how and why did OBS arise, and what are its characteristics?

Bouchard maintains that it is not a question of brain size, and the issue is dismissed on the grounds that many animals have larger absolute brain sizes than humans, and some apparently have higher ratios of brain to body mass. However, research shows that this latter group, if it exists at all, is very small and if the more complex allometric calculation of the encephalization quotient (EQ) is used (Jerison, 1973), then humans have by far the largest relative brain size of any animal. Among the mammals, the great apes stand out by virtue of having larger than expected brains, gorillas having an EQ of around 24.7 and chimpanzees 37.5. But the human brain is proportionally, on average, a massive 2.4 times that of chimpanzees (Allen, 2009). As Bouchard notes, large brains are metabolically very expensive organs and, in humans, have resulted in problematic child birth and a subsequently extended period of ontogenetic development of the infant. Given these seriously deleterious effects, then *pace* Bouchard, increased brain size must be the result of one or more selective adaptive pressures, and, as Reader et al. note, ‘brain component volumes are related to functionally relevant cognitive capacities’ (2011: 1024); greater cognitive abilities, including language, appear to be prime candidates and, at the very least, the topic is deserving of more discussion.

What Bouchard does identify as relevant to OBS is brain reorganisation, especially cortical complexity and neuronal density which gives rise to a uniquely human way of ‘apprehending the world’ (2013: 161). He bases much of his foundation here on Hurford’s (esp. 2007) claims for (proto) propositional thought in prelinguistic animals[[2]](#footnote-2). Hurford draws attention to the literature on ‘subitizing’ which is the ability of subjects to accurately report the number of objects in a scene without counting (Hurford, 2003; Dehaene, 2011). This capacity is evolutionarily old and is attested in human infants and also in rhesus macaque monkeys. For the vast majority of subjects the limit for this figure is 4 which is also both the maximum number of moving objects that can be simultaneously visually tracked, and also the maximum stored at any one time in working memory. In visually processing a scene, each object is located and relevant information regarding its situation is channelled through a dorsal pathway in the brain while a separate ventral pathway carries information regarding the content of the object. Focusing on any individual object within the scene involves the same process of ‘where’ information identifying the position of physical features and ‘what’ information concerning the nature of those features. Thus there is no categorical distinction between events, scenes and objects, as Hurford explains, ‘there are only two basic kinds of entitities: (1) objects/events/scenes – all the same kind of thing; and (2) properties’ (2007: 157). With regards to the properties, Hurford argues that prelinguistic animal interpretations of the world are founded not on individual constants but rather on very finely grained bundles of features, or predicates, which may be highly reliable but are nevertheless (ontologically) distinct. He discusses a range of evidence most notably the fact that even primates are easily tricked into giving attention to sensory sources that closely mimic some salient features (such as the cry of an offspring played through a loudspeaker) even though that source may be utterly distinct in terms of other features (such as physical shape). In Hurford’s account an animal processes an event, scene or object as being of a certain type, say a ‘grooming’ event rather than a ‘fighting’ event, consisting of up to 4 participant variables each of which are associated with a bundle of predicate features including physical properties and also the nature of a variable’s participant role, such as ‘Agent’ or ‘Possessor’, if relevant to the interpretation. Hurford maintains that basic prelinguistic predicate argument structure, which gives rise to (proto) propositional content, shared by all animals is founded on this evolutionarily ancient visual system grounded in immediate percepts.

For Bouchard then, at some critical stage, the brain became less driven by such immediate perceptual input, and internal representation came on-stream giving rise to OBS. This, he argues, is a case where ‘quantity produces quality’ (2015: 7). In other words, OBS is a side-effect of a brain composed of more densely packed cortical neurons, the result of some other, unspecified, evolutionary pressure. As a consequence of this innovation he claims that humans are invested with a unique capacity to form and reflect on concepts divorced from an indexical link to their immediate percepts. The coupling of a concept and a sound image is the root of the symbolic Saussurian signs that make up language.

Crucial to the capacity to use language is another facet of the *Human-specific Adaptive Suite* and one of the pleitropic effects of an OBS: an advanced Theory of Mind (ToM). ToM essentially involves the appreciation of other individuals as intentional beings with purposive mental states and independent (and therefore possibly false) belief systems. Without ToM, interlocuters would be unable to make the complex inferences that characterise linguistic communication, and on this basis Bouchard rejects the hypothesis that language evolved first and initiated the evolution of ToM and other cognitive aspects of the suite (a hypothesis he ascribes to Dennett, 1991).

While reflective thought detached from immediate perception is plainly a key attribute of human cognition, I believe Bouchard over emphasises the ‘offline’ aspect at the expense of other properties. Other animals clearly engage in offline processing of some sort. All animals need to have systems for processing core knowledge concerning the situated representation of physical objects, their appearance and disappearance, and their spatial properties and relationships. However, in addition to these, there is now mounting evidence that higher animals also have systems for understanding animate agents in terms of simple, goal-directed actions and have memories of their own episodes of interactions with the environment which can in turn influence future behaviour. Much of the evidence is based on our closest relatives on earth, the great apes, but also, more surprisingly, on studies of corvids. As noted in section 5 below, several researchers now argue for recognition of some form of ToM in chimpanzees, but ravens (Corvus corax) have also been shown to modify their behaviour in the presence of conspecifics such that they will cache food differently depending on whether another closely situated raven is able to observe the sight of the caching or not (Bugnyar & Heinrich, 2005). Furthermore, both corvids and primates demonstrate transitive inference, for example understanding dominance relations of the type that if A>B and B>C then A>C.

However, it is with regards to future planning as well as the processing of memories where the firmest evidence for animal offline processing is to be found. Raby et al. (2007) demonstrated that one member of the corvid family, the western scrub-jay (Aphelocoma californica) cached food differently based on predictions of where they would be hungry the next day and where particular food types would be available. Such planning has also been shown in great apes who selected and transported particular tools (and discarded others) depending on what they anticipated their needs to be up to 14 hours ahead (Mulcahy & Call, 2006). Similar motivations have been attributed to a chimpanzee, Santino, who gathers concrete discs in his pen in a Swedish zoo and stores them for later use as missiles in dominance displays in front of visitors (Osvath, 2009). With regards to the past, research has focused on the ‘what, where and when’ of episodic memories (Tulving, 1983). Here the evidence extends to other animals, for example De Lavilleon et al. (2015) showed how spatial memories in animals are consolidated during sleep (and the researchers were even able to manipulate such memories in mice), while it has also been shown that rodents are able to find their way around mazes based on previous experience (see discussion in Crystal, 2018). However, the clearest indication of episodic-like memory in non-humans is seen is another species of scrub-jays (Aphelocoma coerulescens). Clayton and Dickinson (1998) demonstrated that these corvids have distinct memories of caching dissimilar food items – either nuts or perishable worms – in different place at varying times. Similar results to this experiment were found with great apes who acted differently depending on their memories of where and when they had cached iced juices. Further examples of episodic memories in chimpanzees and bonobos have been reported in relation to variable tool selection based on long-term (up to 3 years) and shorter term (2 week) recall (Martin-Ordas et al., 2013), and ‘anticipatory looking’ in a repeated viewing of videoed events (Kano & Hirata, 2015). It appears that offline processing may be necessary but is not a sufficient condition for modern human cognition.

So if it is not the presence of offline systems alone that accounts for the emergence of uniquely human cognition then we need to look for a more comprehensive and thorough explanation. It has long been established that there are unconscious brain operations that affect our routine perception and thinking. Well known examples include Mariotte’s blind spot, a small area in our wider field of vision that neither eye is able to perceive, yet no-one notices this as our brain ‘invents’ material to occupy this slot. Another case is Helmholtz’s ‘unconscious inference’ in which the brain creates arbitrary explanations for changes to visual stimuli. To account for a wide range of phenomena such as these, Evans and Frankish ( 2009) Evans (2010) and others have emphasised the dual-processing nature of human cognition. Dual-processing theory (DPT), which has recently emerged as a mainstream theory in psychology, maintains that humans have two utterly distinct types of mental processing (sometimes in conflict, vividly seen in ‘alien hand syndrome’ in split brain patients) linked to two separate systems, each arising from different architectures of the mind/brain (for discussion see Eagleman, 2011).

The evolutionary rationale for positing DPT is that the metabolic cost of the brain is at its highest, consuming up to 25% of nutrients despite constituting only 2% of body mass, when engaged in reflective, conscious thinking (Leonard et al., 2007). The greater the load we can leave to an automated, unconscious brain, the lower the energy cost incurred; conversely, the conscious system is able to intervene and avoid costly actions based on harmful intuitions (Sloman, 1996). In DPT it is emphasised that humans share an ancient, unconscious processing system, which is termed System 1, with other animals, but have a unique, evolutionarily recent conscious System 2 as outlined in figure 1. Although people generally assume that System 2 is in operation at all times, in fact a great deal of human behaviour is actually under control of system 1, as Eagleman observes, ‘[o]ur brains run mostly on autopilot, and the conscious mind has little access to the giant and mysterious factory that runs below it’ (2011: 5)[[3]](#footnote-3).

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| --- | --- |
| **System 1** | **System 2** |
| Evolutionarily oldUnconscious, preconsciousShared with animalsImplicit knowledgeAutomaticFastParallelHigh capacityIntuitiveContextualisedPragmaticAssociativeIndependent of general intelligence | Evolutionarily recentConsciousUniquely (distinctly) humanExplicit knowledgeControlledSlowSequentialLow capacityReflectiveAbstractLogicalRule-basedLinked to general intelligence |

*figure 1* from Frankish and Evans (2009) p.15

The implications that DPT has for the evolution of language are considered in relation to Bouchard’s Sign Theory of Language (STL) in the next section.

3. The Saussurian sign

As I have already noted, Bouchard takes the hypothesis that language is constituted by arrangements of Saussurian signs to be incontrovertible. His is an orthodox interpretation of Saussure (leaving aside the attribution of the foundations of ‘*biolinguistics*’) whereby the core property of language is a linguistic sign understood as ‘involving two elements – a meaning/signifié and a percept/signifiant – and a link between the two’ (2013: 68). The constituted sign is characterised by the arbitrary (i.e. unmotivated) nature of the link and the mental abstractness of both elements. Bouchard is consistent in his use of these terms and his claim is that the syntagmatic and paradigmatic relationships between signs constitutes language (I will employ the terms *signifier* and *signified* as in the 1959 edition translated by Wade Baskin). He defends Saussure against criticism that his model of syntax is too simplistic, and claims that it has the same rule governed creativity as, for example, models of language in the tradition of Chomskyan Generative Grammar.

What I find most troubling here is the explanation of the relationship of the signifier and signified and it may be fruitful to begin with a clarification of the notion of signs in Saussure. For Saussure this relationship is defined as ‘semiological’, whereby one element – the signifier – stands for/signifies another element – the signified (I consider this in more detail below). Indeed, Saussure is of course credited with the coining of the term ‘semiology’, and his legacy today is far stronger in cultural studies and related fields founded on principals of semiology/semiotics than is overtly the case in linguistics (though see section 1 Introduction for a discussion of the implicit legacy). However, in addition to the semiotic relationship (which is asymmetric), there also exists between the signifier and signified, a symmetric, mereological (part-part) relationship in constituting the third entity, the sign. Essentially signs are linguistic units that are composed of two arbitrarily linked elements, both of which are mental: an acoustic image (signifier) and a conceptual construct (signified). However, Saussure is unambiguous in his insistence that this does not involve some system of nomenclature whereby either of the elements have any existence prior to the establishment of their union. Rather, it is the case that the ‘value’ of the sign is determined solely by its position within a structure; that is, by its difference from all other signs, as Saussure makes clear, ‘whether we take the signification [signified] or the signal [signifier], the language includes neither ideas nor sounds existing prior to the linguistic system, but only conceptual and phonetic differences arising out of that system’ (1916/72: 166/118). The latter of these differences is straight forward, signifiers such as the phonological properties of words are social conventions and no string of phonemes existed, as a word, prior to its incorporation as a meaningful unit in a language. It is far less clear that concepts are in any way similar.

As part of Saussurain signs, the signifier and signified cannot be separated, as Saussure puts it ‘[j]ust as it is impossible to take a pair of scissors and cut one side of paper without at the same time cutting the other, so it is impossible in a language to isolate sound from thought or thought from sound’ (*ibid*.: 157/111). In this framework, signs, as linguistic units, although composed of mental sound images and concepts, are real/concrete, psychological entities that people have (mental) access to. Conversely, in Saussurian terms, the signifier and signified, are not real, independent objects; they are abstractions created by linguists and neither has any autonomous existence outside of their relationship in the sign. In other words, if individuals have no mental access to non-linguistic concepts i.e. to the pure abstractions, then there are no such things. As Joseph claims ‘the signifier and signified, conceived in isolation from one another, are not part of the language, *indeed are nothing at all*’ (2004: 65, emphasis added). While I take it is as uncontroversial to state that concepts without phonetic labels are not part of a language, it is far more contentious, and in need of substantiation, to claim that there is no conceptual existence outside of language. To take an example used by Joseph, the signifier ‘cattle’ has been linked to a diachronically shifting set of concepts. That is, its ‘value’, and thus its position within the structure, has changed from a wide term denoting all property belonging to an individual, through to just livestock and finally in its modern form referring only to bovine animals. Joseph, like most interpreters of Saussure (e.g. Culler, 1976; Bouissac, 2010) take the term ‘value’ (as part of ‘langue’) to consist of a number of ‘meanings’ which are ways in which a particular sign is used on any occasion (as part of ‘parole’). So, to use one of Saussure’s own examples, the speaker of French is required to employ the term ‘mouton’, as the only sign in French to indicate the concepts (or aspects of a single concept) that are represented by the English ‘mutton’ and ‘sheep’; precisely which of these two concepts (or aspects thereof) the French speaker is referring to (presuming the distinction to be relevant) becomes clear in the context of the act of ‘parole’. But how are such indivuated ‘meanings’ supposed to come about? The French ‘mouton’ is able to evoke two different meanings/concepts but, in Saussurian terms, these concepts only exist as part of language. It seems that, at best, Saussure has little to say about the nature and origin of concepts. Even Joseph, who is a very sympathetic commentator, notes that ‘[w]hat is dissatisfying in Saussure’s discussion of value is that he is so insistent on its difference from meaning that he never gets to grips with their complex relationship’ (*ibid*.: 67).

Despite Saussure’s reputation as a founder of semiotics/semiology, there is actually little explicit discussion of the nature of semiotics in the Course. This is most likely due to the general acceptance of the notion of signs, both natural (such as symptoms of diseases) and non-natural (such as maritime signals as well as language) and the long tradition of meditation on the nature of signs from Aristotle onwards (for an overview see Clarke, 1987). However there is no doubt that, in addition to the mereological aspect discussed above, Saussure also understands the relationship between the signifier and signified to be ‘a semiological phenomenon’ (1916/72: 112/77). In a similar vein, the semiotic function is also not stressed by Bouchard and there is only a rather vague, indication of the author’s interpretation of this relationship. For example, he refers to ‘the linking of the two parts of a sign – the meaning is attributed to the form and vice versa’ (2013: 213). However, exactly how the term ‘meaning’ is being employed here is not clear and it seems to correspond more closely to Saussure’s ‘value’. Bouchard states elsewhere that ‘[w]ithout a perceptual form associated with it, a concept is just a concept: it only becomes a meaning – a linguistic element – when it is linked with a perceptual form’ (2013: 240, emphasis added). But surely concepts do not become ‘meanings’? Or become anything else for that matter. Rather, I take ‘signify’ to be pretty much synonymous with ‘mean’ and consequently I understand the percept to mean the concept, when used ostensively on a particular occasion, i.e. for the two to stand in a semiotic relationship.

The point is not trivial and the confusion arises, I believe, from a fundamental problem in the notion of the Saussurian sign when used as a psychologically real phenomenon, as is the case here. Positing signs as psychologically real entities gives rise to a number of fundamental problems. Firstly, why is it even necessary to advance the existence of signs in the Saussurian sense? Burton-Roberts and Poole (2006) argue that this is a conceptually unnecessary complexity. They propose a development of the idea of the sign as put forward by C. S. Peirce (e.g. 1873) in which the signifier is the sign and together with the signified are the only two possible relata in the semiotic relationship . For example, in interpreting the English word ‘bed’ the most parsimonious account is that the phonetic label (signifier) /bed/ leads straight to the mental concept (signified) [BED]. There is no role for a third object, a ‘sign’, to play here. Devitt emphasises the thesis that ‘representations are not to be multiplied beyond necessity’ (2006: 50) attributing it to Pylyshyn and, borrowing from Occam, terms it ‘Pylyshyn’s Razor’. The only justification for advancing the idea of the sign is Saussure’s firm commitment to the necessity of language for thought: ‘thought is like a swirling cloud, where no shape is intrinsically determinate. No ideas are established in advance, and nothing is distinct, before the introduction of linguistic structure’ (1916/72: 155/111). Bouchard at times seems to fully adopt this notion of the relationship of language and thought, though this is not always clear and I look at this in more detail in the following section. But even on Saussure’s terms, there are further problems with the sign.

We can illustrate the two aspects of the Saussurian sign as in figure 2:

 Sign

semiotic

Signifier Signified

mereological

(Sound Image) (Concept)

*figure 2:* The Saussurian Sign

Yet this mereological relationship is not coherent when utilized in the psychological domain, and Peirce stresses that it is in the nature of signs/signifiers that they are different entities to that which they represent: it is a ‘condition that a Sign must be other than its object’ (1910: 230). The point is effectively made by Burton-Roberts and Poole’s (2006) reference to the painting *La Trahison des Images* in which Magritte shows that a representation of a pipe is not a pipe, and shares none of its properties other than a physical resemblance *qua* an iconic sign. A further objection to linguistic signs in the Saussurian sense is that they are composed of a sound image (something with phonological properties) and a signified with conceptual properties. Burton-Roberts and Poole argue that these are ‘sortally distinct…, things whose respective properties are incommensurable’ (ibid.: 569, small caps in original). In particular, concepts are structured hierarchically in thoughts; a train of thoughts may have temporal properties but a single proposition does not. Conversely, spoken language must be linear with one phone preceding another. This is highlighted in Saussure’s second principle: ‘[t]he linguistic signal [signifier], being auditory in nature, has a temporal aspect, and hence certain temporal characteristics’ (1916/72: 103/69). However if it is recognised that the signifier has linear (temporal) properties by virtue of being an acoustic image, and as, in Saussurian terms, the signifier and signified cannot be separated, then it surely follows that the latter must also have temporal properties. In addressing this enigma Joseph notes that:

‘we would be obliged to say that the signified of *fourmi* ‘ant’ is twice as ‘long’ as the signified of *chat* ‘cat’ just because the signifiers have two syllables and one respectively. Obviously it makes no sense at all to speak of the ‘length’ of a signified in this way’ (2004: 71) This problem of sortall differences has been inherited in the framework of generative grammar which in the Minimalist Program (MP) attempts to resolve the matter by splitting linguistic derivations into two sets of properties prior to their interpretations by the relevant cognitive system. As Bouchard appears to have begun his academic career in the framework of Chomskyan syntax, his PhD thesis at MIT being concerned with the content of empty categories (1982), generative grammar is in many ways the starting point from which he constructs his own model of language. In particular he shares the goal of simplicity and the minimal necessity of the satisfaction of interface conditions, as in the MP, in an account of how language works. Bouchard states that his thesis ‘has in common with Hasuer et al. (2002) the claim that the linking of the sensorimotor (SM) interface and the conceptual-intentional (CI) interface is the key factor in the emergence of language’ (2013: 152)[[4]](#footnote-4). But the disparity between the phonological and the conceptual is recognised in the MP (the model[[5]](#footnote-5) clearly central to Hauser, Chomsky & Fitch) in the principle of Full Interpretation and the operation Spell Out at which the properties of the derivation interpretable by the SM system and those interpretable by the CI system are split, precisely on the grounds that neither system is able to interpret properties belonging to the other.

 Bouchard is very aware of this sortall difference, that the linguistic signifier and signified are from domains of very different natures – physical/perceptual and psychological/conceptual. Thus the relationship between them is necessarily ‘arbitrary because the nature of the sounds that our phonatory articulators produce and the nature of the concepts that our conceptual system constructs are so different that they cannot entertain a meaningful, logical, or iconic relation’ (2015: 4). His task, he believes, is to account for how these utterly different elements are able to ‘to meet in our brains to form linguistic [Saussurian] signs’ (2015: 8). How this meeting is possible is, for Bouchard, the ‘great leap’ in human evolution and was enabled through the emergence of the OBS, a major component of the *Human-specific Adaptive Suite*. In the next section I will consider in more detail precisely how Saussurian signs are conceived by Bouchard and what implications this has for the relationship between language and thought.

4. Language and Thought

The role of language in the mental processing of thought is ambiguous in the Chomskyan framework. As mentioned above, from a purely evolutionary perspective, Chomsky suggests that language emerged initially as entirely internal, an I-language, interfacing only with the CI system. Only later, once the trait had spread through a large enough group of conspecifics, was there any advantage to externalisation (for communication), which came through an interface with the sensori-motor articulatory-perceptual (SM/AP) system. His current thinking on the relationship of language and thought is less clear and he seems reluctant to commit to a particular position. For example, in the introduction to the 20th anniversary edition of *The Minimalist Program*, Chomsky indicates that he is open to the claim that I-language (the instantiation in any one individual of Universal Grammar, UG) is the only mode of human thought, that the interpretation of syntactically derived expressions at the CI interface ‘yield[s] a “language of thought” (LOT), perhaps the only such LOT’ (2015: ix). Other writers, in the same tradition (including linguists, philosophers and psychologists who may disagree fiercely on other aspects of language) take a more robust stance on the issue, insisting that language is the vehicle of thought (e.g. Bickerton, 2009; Hinzen, 2006, 2007; Hinzen and Sheehan, 2013), independent of externalized linguistic form. Bouchard rightly rejects such radical internalism as ‘a case of linguistic relativity’ (2013: 43). He also objects on the grounds that the STL entails material, that is the signifier, drawn ultimately from a domain other than the mental. Furthermore, other species, while lacking language, are capable of thought. Bouchard’s position is, however, not entirely coherent. On the one hand, he stresses the pre-linguistic nature of human cognition. Categorization, the basis of conceptualisation, is presumed to be biologically determined, which seems right. But then he invokes the Saussurian notion that ‘a particular language can partition the conceptual substance in countless possible ways to delimit its *lexical* meanings’ (162/3, emphasis added), which is fine if we are considering a socio-cultural system (*Langue*) in which any particular language may allocate one, two or more words for a particular denotation (a classic example being the way in which colours are represented in different languages). However, if Bouchard is referring to the break-up of the conceptual domain by means of psychologically real signs, and only in this way can concepts come into existence then this seems to be an obvious case of Whorfian linguistic relativity. It is not clear which of the two positions Bouchard adheres to, and it is worth quoting at length the outline of his stance:

‘the meaning of a word depends on the system of which it is part, on the point of view of the community of individuals. [Saussure] therefore adopts a fully internal language, with no pre-existing part of it. This is true biolinguistics, since *all aspects of language exist only in the brains of these individuals, not with a meaning component absolute and pre-existent to language*.’ (2013: 51, emphasis added.)

Elsewhere, however, Bouchard talks of Einstein thinking non-verbally and comments that ‘people can verbalize some of their thoughts *afterwards*’ (Ibid.: 209, emphasis added) implying that concepts and conceptual structure are independent of any natural language, as I argue below is the case. Bouchard also posits a species wide tendency for concepts to self-organise in a similar way with a focus on broad category meanings. This, accompanied by an ability to pragmatically infer based on a ToM (all of which are assumed to have co-evolved with language) are what enables communication to occur. Thus there is no direct concept~lexical item isomorphism. Instead, he says, language is characterised by ‘chunking’ in which a range of complex conceptual structures may correspond to a single lexical item. But this does not seem to clarify the matter, indeed it restates the problem of the distinction between ‘value’ and ‘meaning’ discussed in section 3 above, nor does it accord with his apparent belief that concepts themselves are only brought into existence with linguistic structure.

While the link between the signifier and signified are indisputably arbitrary[[6]](#footnote-6) and conventional, concepts themselves have neither of these properties. Bouchard claims that in order to facilitate the creation of linguistic signs there needs to be a process which enables ‘elements of the conceptual and perceptual substances to meet in the brain’ (2010: 43). However, as discussed in the previous section, it is incoherent to posit the existence of any object that is composed of both sound properties and conceptual properties. As Burton-Roberts puts it, ‘take the properties prime and loud. Things of the sort that can be prime (i.e. numbers) are not the sort of thing that can be loud, and conversely. Sortally distinct properties are such that nothing can have both sorts of property’ (2011: 2091). This holds for posited mental substances which are grounded in sortally incompatible properties as is the case with sound images (from physical, acoustic properties) and concepts (with conceptual-intentional properties). This sortall difference between the grounding of the sound image and mental concept is also acknowledged by Joseph who notes that:

‘there must be some particular nature to signifieds, and some particular nature to signifiers, that makes them part of one or the other system in the first place … what makes a value into either a signifier or a signified is something that emanates, or is borrowed…from the material form in which it will find its realization….[the signifier] must borrow time’s key characteristic, linearity, which the signifier possesses even though it is mental’ (2012: 588)

The distinction between the signifier and signified is clearer if we consider other, non-linguistic but still conventional (symbolic) signs. Figure 3 is the sign for the national speed limit in the United Kingdom and I have a mental image of this sign (in this particular example of a semiotic system they are visual) stored in my long-term memory and an awareness of the relation between this sign (or signifier) and its intended meaning (or signified) on a highway, but there is no third entity constituted by these two elements that is residing somewhere in my brain. Similarly, language is a conventional system that I can employ to symbolically *represent*, in this case in acoustic form, conceptual structure.



*figure 3*

Sign for UK national speed limit

Within cognitive science there are many perspectives on human thought that envisage individuals having a conceptual array and a system for structuring concepts independent of language including ‘language of thought’ (Fodor, 1975, 2008), ‘mental symbols, the units of thought’ (Carey, 2011), ‘category detectors’ (Harnard, 2010), ‘folk mechanisms and category three, complex, abstract thought’ (Wyn et al, 2009)[[7]](#footnote-7). In whatever way concepts are defined, I maintain that a purely internal ‘language of thought’ (LoT) or ‘mentalese’ accounts for the systematicity and combinatoriality of thought as well as accounting for the existence of ambiguity in natural language. Indeed, LoT acts as the source of disambiguation. Thus the two interpretations of the sentence ‘everybody loves somebody’ can be resolved by appealing to a LoT in which one of the concepts represented by the noun phrases has scope over the other. To attempt to disambiguate on the basis of linguistic structure alone requires the introduction of notions such as covert raising which do not sit easily in a STL. Furthermore, a uniquely human, universal system of cognitive processing enables members of our species to engage in conscious, reflective thought and have further thoughts about thoughts, the property of a multi-order ToM. In addition, most people have acquired, often very different, conventional systems for representing internal mental structure. There is almost no consideration of LoT in Bouchard’s work and the notion is dismissed, with no discussion, on the grounds of objections from connectionists and problems in perceptual pattern recognition, unfortunately with no source given.

In the next section I examine Bouchards depiction of the origins of language and discuss the possible scenarios for the emergence of its earliest forms and evolution into the modern, complex system.

5. The emergence of (proto)language

As noted in section 1, the STL admits only two elements: U-signs and C-signs. The traditional components of a generative grammar, a lexicon of lexical items with feature specifications and a generative component for merging items into derivational structures are eschewed in favour of these two sign types. U-signs correspond roughly to minimal meaningful units (‘morphemes’ in traditional notation) which may be bound affixes or free (root) words. The ‘syntactic’ operation in STL, which is comprised of R (relation), unites, through juxtaposition, a single ‘unit’ or U-sign (that is both a signifier and signified) and produces a new, compositional (combinatorial) C-sign that is interpretable, as a signifier, by the composition of the two sound images, and as a signified, by the composition of the two concepts. In such a manner (using traditional grammatical categories) a head (e.g. a noun such as ‘book’) may merge with a modifier (such as an adjective ‘red’) to produce a C-sign ‘red book’. Examples of C-signs extend from inflected heads (such as plural nouns) through phrases consisting of combinations of free words U-signs, through to fully propositional clauses and combinations thereof. R itself is considered a C-sign as the nature of juxtaposition results in different interpretations, such that the declarative ‘the book is red’ differs from the interrogative ‘is the book red?’. Other types of R include phonological suprasegmentals such as intonation which can also result in different interpretations, for example a rising intonation on a declarative such as ‘the book is red’ indicates a functional question. Bouchard’s proposals in this respect are not radically different from those of Saussure who noted that ‘ “units” and “grammatical facts” are only different names for different aspects of the same general fact: the operation of linguistic oppositions’ (1916/72: 168/120). Precisely how simple U-signs gave rise to complex C-signs raises the question of the role of protolanguage in Bouchard’s STL.

The existence of an intermediate stage between the complete absence of language in our ancestors and the possession of language in the sense of the endowment currently universally attested in *H. sapiens* (with the exception of severe cognitive impairment) is one of the more widely accepted tenets in language evolution (see Bickerton, 2007). In fact, all theories of language evolution can be classed as in terms of two binary distinctions: those that appeal to a gradual, neo-Darwinian emergence of language (and thus posit the existence of protolanguage), and those that propose a sudden or catastrophic (Bickerton, 2012) appearance of complex language (for discussion see Feeney, 2018). Sudden accounts are founded on the notion of ‘saltation’, such as a genetic macro-mutation which results in profound phylogenetic effects, which is generally decried in biological circles as a ‘hopeful monster’ theory. In language evolution, such explanations generally rely on the abrupt appearance of cognitive innovations such as recursion (Hauser et al., 2002) or ‘double-scope conceptual blending’ (Fauconnier & Turner, 2008). Adherents of sudden accounts attribute to these novel developments powerful productive capacities which are beyond theoretical credence for the majority of language evolutionists. Furthermore, brain imaging techniques point to a distributed processing of language which is at odds with a single mutation story (Bickerton, *ibid*.).

A posited transitional protolanguage, lacking the structural richness of modern, complex languages, is often compared to modern ‘windows’ such as pidgins, the telegraphic stage in child development and the communicative abilities of trained primates (Botha, 2016). There is disagreement over the precise nature of protolanguage, whether it consisted of fully propositional unanalysed chunks that were later fractionated into compositional units (Wray, 1998) or was comprised of compositional, sound~meaning pairings from the outset (Tallerman, 2007). Nevertheless, the notion of protolanguage is ubiquitous in gradual accounts of the emergence of language. Bouchard, however, is at odds with this view. Seizing on the analogy with pidgins, he notes that these are generally developed into a structured creole within a single generation and concludes that a similar time-scale ought to apply to the change from U-signs to C-signs, rendering the consideration of a protolanguage trivial. This is despite the fact that creation of creoles is undertaken by modern *H. sapiens* with a fully developed faculty for language. He also rejects the argument that the emergence of syntactically structured language is correlated with the appearance of symbolic activity and complex tool production, language being neither necessary nor sufficient for either. Instead, he advocates Dubreuil’s (2008) hypothesis that the critical development was a modification to domain general cognitive capacities that resulted in the ability to focus on a representation not just of an object, but the object as a conspecific perceives it (level-2 perspective-taking). Consequently, Bouchard tentatively adopts a position of a very early appearance of fully developed language, predating the gradual appearance of modern behaviours, though frustratingly is reticent about offering even an approximate time-scale .

For Bouchard, the emergence of language is inextricably linked to the materialisation of OBS: ‘uniquely human … representations by new neuronal systems’ (2015: 6). In a return to the continuity hypothesis, Bouchard argues that early hominins who possessed OBS, and were consequently cognitively enhanced, were able to detect the arbitrary but systematic relationship between the sound (and/or gesture) and indexically linked referent in animal call systems of members of their species. Although such calls are largely innate and under the control of the limbic system, hominins endowed with OBS reinterpret them via:

‘a primitive attribution of intention to conspecifics: though the conspecifics do not actually inform the individual intentionally, the ToM of the individual makes him attribute the same mind connections to his conspecifics, not as receivers of the information but as producers who are aware that there is this connection’ (2013: 139)

This is followed by intentional imitation and the formulation of new calls, now under cortical control. Thus a ‘new representational capacity had the side-effect that percepts and concepts could meet through their representations, and this got language started by allowing the formation of signs/words’ (2010:46). In conjunction with these developments there was some reorganisation of brain pathways to enable the production, perception and processing of language. Furthermore, it is claimed, based on work by Dehaene and Cohen (e.g. 2007), that this can be accounted for, in a relatively short period of time, in terms of ‘neuronal recycling’ (2015: 8) operating on the plasticity of the brain. This ‘side effect’ developed rapidly into its current form under the self-organising constraints imposed by hominin/human anatomy and efficiency conditions. Consequently, we recognise a limited number of digital phonemes rather than analogue phones, with the actual range restricted by ease of production and reception. There is little here that is controversial, but both the notion of call continuity and the claim for the early appearance of language are problematic.

With regards to continuity, language involves considerably more than noticing arbitrary sound~meaning pairings. The human ability to acquire an enormous lexicon consisting of phonological and semantic information and also morphological (e.g. irregularities) and syntactic (selectional and subcategorization) features, is surely a prime candidate for gradual evolution. Furthermore, there is a complete lack of semantic compositionality, a crucial feature of language, in any nonhuman call system ( Hurford, 2011). Nevertheless, we are descended from a last common ancestor (LCA) with the two extant members of the *Pan* genus, common chimpanzees and bonobos, who lived some 7.5 mya (Sun et al, 2012) and it is constructive to examine the cognitive and communicative characteristics of our closest living relatives to get an idea of the abilities of the earliest hominins.

We know that chimpanzees have a rich conceptual inventory and effective problem solving abilities including fashioning basic, mode 1 tools, the use of which are common among chimpanzees (e.g. Koops et al, 2015). Claims have also been made for a basic ToM and first order intentionality in chimpanzees (Tomasello, 2008; Schmelz et al, 2011); others have been more sceptical (see Penn et al, 2008). While Great Apes in general have only limited and inflexible vocalisations (Seyfarth and Cheney, 2012), they display far greater flexibility and creativity in gestural communication (Call and Tomasello, 2006). Although there have been mixed results and controversies in captive trained ape programmes (e.g. Terrace, 2005), there has been undoubted success with signs and lexigrams, especially the bonobo Kanzi (Savage-Rumbaugh &Lewin, 1994). Nevertheless, even in the most successful encounters, there is little or no evidence of communication beyond simple requests and demands for immediate gratification (Penn et al, *ibid*.).

The earliest hominins, most likely species from the genera *Ardipithicus* and *Australopithicus*, exhibited little change from contemporary chimpanzees other than bipedalism. The first major stage in the hominin trajectory comprising irrefutable evidence of cognitive capacities beyond the LCA are witnessed in the species *Homo erectus[[8]](#footnote-8)*which appears in the fossil record from 1.9 mya to approximately 150 thousand years ago (kya). In the period of a few hundred thousand years just prior to this, there appears to have been a comparatively large number of changes to genes and genomic regions, particularly in the Human Accelerated Region 1. These influenced brain size but also lateralisation, brain organisation and connectivity (Stringer, 2011; Kamm et al., 2013) and as a result the hominin brain had doubled in size in *H. erectus* to an average of just under 1000cc. As noted previously, this growth is associated with such adverse effects that the increase in brain size must, *pace* Bouchard, be the result of some strong adaptive pressure, most likely enhanced general cognitive capacity. These hominins were the first to migrate out of Africa reaching Georgia by 1.7 mya and occupying three continents shortly after. Around the same time, at least by 1.5 mya, they were also the first species on earth to produce mode 2 type tools, knapping large pieces of rock to create Acheulean hand axes. It is also probable that they made controlled use of fire and cooked food may have provided the additional sustenance to support large brains (Mann, 2012; Wynn, 2012). Yet during *H. erectus*’ long inhabitation of earth there were no further behavioural changes. In particular, researchers (e.g Gonen *et al*., 2011) have noted the intense cultural conservatism of the production techniques applied to Acheulean axes (though see discussion of cultural stasis below).

The developments during the early days of *H. erectus* equate to a standard model of punctuated equilibrium (Gould & Eldredge, 1993). As a complementary theory to the gradualism of neo-Darwinism, the theory of punctuated equilibrium is based on:

‘a novel interpretation for the oldest and most robust of palaeontological observations: the geologically instantaneous origination and subsequent stability (often for millions of years) of paleontological “morphospecies”’ (ibid., 223)

In other words, new species appear in periods of rapid change (adaptive radiations) which are then followed by long intervals of stasis in which there is relative stability of the species.

It is highly likely that the cultural transmission of tool making and the needs of groups to adapt quickly to radically new environments in the migratory journeys entailed a greater degree of cooperation than any species of hominid had hitherto exhibited. Indeed, cooperative behaviour is strikingly absent in all Great Apes including chimpanzees[[9]](#footnote-9). This provides ideal conditions for the emergence of intentional communication between conspecifics, building only to a small degree on the basis of extant abilities evident in trained apes. Given the greater flexibility of gestures among Great Apes, the best contender for the earliest protolanguage is one based on pantomiming and iconic gestures. However, the difficulty of processing communication based on iconicity, and the value in having hands free to carry out parallel tasks, would lead to a rapid ‘drift to the arbitrary’ (Tomasello, 2008: 219) and multi-modality until vocalisation came rapidly to dominate (for a wider discussion see Tallerman, 2012b). However, given the subsequent complete stasis in *H. erectus* over more than a million years, the archaeologist Desmond Clark pointed out that if these hominins had language ‘these ancient people were saying the same thing to each other, over and over and over again’ (reported in Stringer, 2011: 125). This is clearly problematic for Bouchard’s claim for an early appearance of complex language. On the one hand, in what way can a language be said to have materialised, as an epiphenomenon, if those that possessed the capacity never utilised it (or there was only ever very partial utilisation)? On the other hand, if there was modern OBS and modern language then why didn’t earlier hominins demonstrate any substantially enhanced cognitive abilities? I consider it more coherent to comprehend the matter from the perspective of dual-processing, and it seems that *H. erectus* lacked the controlled, reflective cognitive productivity that is so characteristic of type 2 processing. They may have been capable of basic communication in a protolanguage but their cognition seems not to have been qualitatively substantially different from that of modern chimpanzees. Certainly, if early members of the genus *Homo* had a ‘proto-language of thought’ (a basic form of system 2 type processing) then they didn’t use it much! It seems more plausible to assume they were, although more cooperative and basic intentional communicators, still essentially system 1 processors.

The period of relative stasis in the hominin clade endured for a period of around a million years until a second episode of punctuated equilibrium with the appearance of *Homo heidelbergensis* a little over 500 kya. There are relatively few models that explicitly address the notion of hominin cultural stasis (e.g. Aoki, 2014; Kolodny *et al*., 2015) but one widely discussed phenomenon is the effect of demographic change on cultural sophistication, such as Henrich’s (2004) account for the loss of tool complexity in early Holocene Tasmania. Although constrained by variables of specific trait distribution and social learning strategies, the basis hypothesis is that larger population sizes result in greater cultural innovations (which in turn can lead to a reciprocal growth in group size), while, conversely, decreasing populations can result in reverses to cultural expansion (Vaesen, 2012). However, there does not appear to be any evidence for suggesting prolonged reduction in group size, nor concomitant cultural reversal, in early *Homo*. An alternative perspective on stasis is Mesoudi (2011) who argues that expanding cultural innovations bring with them a proportional increase in cultural acquisition costs from one generation to another. At some point the resources necessary for acquisition reach such a level that there is insufficient time available for further innovation, resulting in stasis. Mesoudi discusses various cultural transmission strategies that may overcome this and a number of other hypotheses have been posited to account for periods of rapid cultural accumulation including genetically or developmentally induced shifts in body morphology, and environmental variation, either as the result of climatic change or the consequence of population migration (Kolodny, *et al*., *ibid*.). However a final factor discussed by Kolodny *et al*. for motivating a period of adaptive radiations is rapid cognitive change, and this appears to the best candidate in the case of the second dramatic period of hominin evolution. It is certainly the case that following this period of stasis, there was a further 50% increase in brain size, associated with even greater deleterious consequences, and further brain reorganisation until the speciation event of *Homo sapiens* at least 200 kya. It is during this later period, I maintain, that the uniquely human type 2 processing emerged and this great leap in cognition was accompanied by the extension of existing protolanguage into fully complex language distinct from, and symbolically *representing,* internal thought (for further discussion of the Representational Hypothesis see Burton-Roberts, e.g. 2011). Bouchard’s proposal regarding the nature of language in its current form is somewhat different and it is to this that I turn next.

6. Application of The Sign Theory of Language (STL)

As noted earlier, Bouchard’s previous work has largely been in the frameworks of Chomskyan generative grammar. In section 3 I briefly referred to Chomsky’s adherence to an evolutionary scenario in which language initially emerged with only a single interface, that with the CI system. In Chomsky’s current work it is assumed that this primacy of the internal aspect of language manifests itself in the language today. Thus, for example, multiple copies of displaced items are not externalised for reasons of articulatory efficiency even though they remain in Logical Form and are interpreted by the CI system. Bouchard rejects this account noting that, for example, in the noun phrase in (1) (his 11, 2013: 52) gender is expressed three times:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| (1) | la | petite | chatte |  |  |  |  |  | French |
|  | the-fem | small-fem | cat-fem |  |
|  | ‘the small cat’ |

Two redundant expressions of gender would appear to be neither efficient nor necessary for communication. Two directions can be observed in the development of the MP, the framework under which contemporary Chomskyan grammar is executed. On the one hand, there is an approach based on the Strong Minimalist Thesis (e.g. Chosmky, 2004, 2007), which takes ‘unbounded’ merge (including internal merge or move) as the sole operation in the syntactic component, and that deviant derivations are filtered out by the interface conditions. Bouchard, rightly I believe, rejects this approach on the basis of the computational load arising from X! (factorial) number of possible permutations in merging an array of X number of lexical items[[10]](#footnote-10). The alternative position posits a ‘crash-proof’ grammar in which lexical items are specified for a range of syntactic features which determine at which point they may be merged in the derivation (e.g Hornstein et el., 2005; Boeckx, 2010). However, the crash-proof approach is not without its own problems and requires significant complexity in feature specification in the lexicon and numerous associated operations which run the risk of undermining the very ‘minimalism’ of the program. Although Bouchard is closer to this latter stance, he argues that it is semantic, rather than purely syntactic, features that govern the operation merge. He argues that sentences made up of nonsense words can still be parsed based on distribution of lexis and their morphology, as in the poem Jabberwocky. He also highlights the problematic nature of adjuncts which are optional and therefore not obviously part of the feature checking process. However, one respect in which the Bouchard’s model of language differs radically from generative grammar is the claim that language is linear, taken from Saussure’s ‘principle of linearity’. Bouchard’s reasoning is laid out clearly in his explanation that

‘a *signifiant* [signifier] is an overt element of a language, not an element of a theoretical representation of the language. Since a *signifiant* relates to a perceptual form, only a surface position can count as a *signifiant*’ (2013: 72).

The actual design features of the STL is quite simple. It is a development of Saussurian account of language in which the only components are signifiers which represent a particular signified. As noted earlier, the system consists of the juxtaposition, grammatical marking and imposition of suprasegmentals on U-signs (traditionally the domains of syntax and phonology). These combinatorial C-signs include the linear position of their constitutive U-signs as part of the overall signifier/sign. In Bouchard’s account there is no need for Spell Out involving linearization, rather he claims that ‘linear order that functions as a *signifiant* delivers perfectly interpretable information to CS [CI] about the combination of the elements’ (2013: 225). To summarise, his is a radical proposal that linguistics needs to be re-oriented, and ‘[w]e have to realise that words and syntax are made of the same material…and…are subject to the same laws’ (2013: 227), in particular both words and syntax are arbitrary conventions. It is not explicitly stated, but taken to its logical conclusion Bouchard seems to be saying at this point that in fact there is no such thing as linguistic syntax. The central roles are juxtaposition / word order and superimposition / suprasegmentals and these are both concerned with phonetic form which is the domain of phonology (see e.g. Burton-Roberts, 2000). However, as we will see later in this section, Bouchard’s stance on this is not absolutely clear-cut and there is some inconsistency of usage and a clearly stipulated role for hierarchy in semantic interpretation. First, I will consider how a linear grammar relates to one of the more contentious issues in Chomskyan theory: recursion.

Hauser, Chomsky & Fitch (2002) speculated that recursive merge may be the sole operation in a syntactic computation. No definition of recursion was given in their paper and, as Tallerman notes ‘HCF are *not* using ‘recursion’ to mean self-embedding, but rather, to refer to the formation of hierarchical structure generally: the phrase-building capacity’ (2012a: 451, emphasis in original). Bouchard also omits a precise account of what constitutes recursion even though the role of recursion in language is one of the fundamental questions that he seeks to answer. As it is generally understood, recursion has two essential characteristics: one is the embedding of an object of type X in another object of the same type, the other is the premise that the output of an operation becomes the input of a subsequent operation as in the Fibonacci sequence in 2)

2) 1,2,3,5,8,13,21,34 etc.

It is not clear that Bouchard is always using the term in the same way and he briefly discusses phonology as being the ‘simple concatenation-recursion of phonemes’ (2015: 10) by which I think he means just concatenation i.e. linear form. This is in contrast to what he terms syntactic ‘type-recursion’ which adheres to the first of the two characteristics referred to above. In order for objects of the same type to be embedded inside each other, he reasons that these objects must be labelled and this labelling is grounded in their conceptual properties: ‘[t]ype recursion is a side effect of the combinatorial properties of the substances of signs, interacting with a general cognitive principle of property attribution’ (2013: 177). Nevertheless, regardless of the exact nature of recursion, the result of recursively embedding objects is hierarchical structure, and, in fact, Bouchard claims that hierarchical structure is pervasive in domain general cognition and is exapted for deployment in language. He appears to be advocating a role for both recursive hierarchical structure and linear order in semantic interpretation though how exactly this manifests itself and how the division of labour between linearity and hierarchy is organised is not clear.

One further issue which arises is the notion of defective signs, where either the signifier or the signified are missing. As Bouchard notes, in the STL, both of these cases are very problematic: ‘[s]igns are not objects with two parts, one of which could be missing: signs are relations between a concept and a percept, and a relation without one of its elements is not a relation’ (2013: 275). In other words, everything which has phonetic form is a signifier and all signifiers have phonetic form. However, it is generally recognised that languages have items in which there is no signified, such as the expletives in (3) to (5)[[11]](#footnote-11)

(3) it is raining

(4) there are creatures that can fly

(5) it is likely that Sean will win the prize

and the optional complementizer in (6)

(6) she knew (that) he was on holiday

On the other hand, there are also constructions in which there is no signifier, such as the subjects of embedded non-finite clauses as in (7) and (8)[[12]](#footnote-12)

(7) Marie hopes to get the job.

(8) the film is too awful to watch

and in pro-drop languages such as Spanish

(9) hablan por mucho tiempo

 talk-3rd-plu-pres for much time

 ‘they talk for a long time’

The first of these cases, expletives, are treated as either encoding a locative role or as constructions that establishes the existence of a NP in the shared mental space of the interlocutors. Yet the discussion fails to address the problem of an absent signified. His analysis of sentences with missing signifiers is not so explicit. However, in a discussion of long distance dependencies, it is illuminating that his commitment to a STL results in his assertion that:

‘once we have pronounced The Count in a sentence like (108), we cannot reuse that significant, that physical object: if we want to say something else about the Count, we need a new *signifiant*.

(108) The Count left at five o’clock

We must either utter a new token of the phrase The Count, or introduce new *signifiant* that re-actualizes the information conveyed by The Count, such as the pronouns he and him’ (2013: 302/3)

But this is simply not the case, and there are many linguistic examples where the signified has no overt signifier, such as in (9) above, but also in cases such as in (10) and (11)

(10) The Count left at 5 o’clock and stepped outside, watching the window carefully while ensuring that

no-one one saw. No-one did.

(11) The Count left at 5 o’clock and hoped to catch the early train

The only explanation seems to be that these are accounted for in terms of some form of contextual or pragmatic recovery, but it is never made clear where the boundary is between pragmatics and linguistic structure. Such cases in which half of the relation of the posited sign is missing remain therefore a significant challenge in the STL.

7. Conclusion

As I hope I have made clear, I believe it is well worth engaging with Bouchard’s novel theory of the nature and origins of language and that the enterprise is on the right track and a welcome return to the explicit treatment of semiotics and the notion of *signs*. Where I part from Bouchard most fundamentally is in his adoption of the mereological aspect of the Saussurian sign while at the same time failing to fully address the semiological/semiotic; it is these premises that I believe fatally undermine his *Saussurian Biolinguistics* enterprise. But there is still much that is stimulating and I wish that he would be bolder in his analysis and conclusions. At one point he states that ‘there is no independent level of syntax. Syntax is just a set of combinatorial signs’ (2013: 83), but precisely how he sees the distinction, if any, between the syntactic and the phonological, the hierarchical and the linear, is not explored. Nor is the role of pragmatics in understanding linguistic communication. It is accepted by many linguists that pragmatics is not just a matter of implicature or an optional appendage. It is, in fact, the case that the linguistic ‘meaning’ of the code is (often) too underdetermined to provide the most salient aspect of the intended propositional content and what is encoded instead acts as input into the pragmatic processor. These issues are pivotal in the Representational Hypothesis, which, together with DPT, provide a parsimonious account of the nature of language that satisfies the constraints of a viable evolutionary scenario.

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1. Though Langacker does make a (brief) explicit reference to embracing the spirit of Saussure (1987:11) [↑](#footnote-ref-1)
2. One anonymous reviewer points out that so great is the reliance on Hurford that an alternative title could be ‘Hurfordian Biolinguistics’ [↑](#footnote-ref-2)
3. It is even claimed by some writers that the existence of the conscious mind as such is largely illusory (e.g. Chater, 2018) [↑](#footnote-ref-3)
4. This is strictly incorrect and Chomsky has most recently suggested that language initially emerged with only an interface with the CI system; that with the SM interface being a later addition. [↑](#footnote-ref-4)
5. Adherents of Minimalism often insist that it is a ‘research program’ not a theory of language. However it is a program whose parameters are so rigidly defined that referring to a ‘theory’ or ‘model’ does not, I believe, constitute a great misinterpretation. [↑](#footnote-ref-5)
6. Though see Blasia et al (2016) for an alternative view [↑](#footnote-ref-6)
7. There is considerable variation among the writers referred to here, and others, in how precisely the nature and content of concepts and conceptual structure are perceived. [↑](#footnote-ref-7)
8. There is much disagreement among researchers in Human Evolution regarding the constituents of the hominin clade and the ancestral lineages, including a division between ‘splitters’ who identify a larger number of species, and ‘lumpers’ whose criteria for differentiating species is more demanding. I have tended to follow Stringer (2011) [↑](#footnote-ref-8)
9. Hunting is often claimed as evidence of cooperation in primates. However, as Tomasello *et al*. (2005) argue, chimpanzees are not taking socially determined roles, but rather spatially placing themselves in the most advantageous position they can occupy in order to catch the object of the hunt, and that this is essentially no different from the hunting strategies of great cats and wolves [↑](#footnote-ref-9)
10. The issue is actually somewhat more complex and problematic than this but there is insufficient space to go into detail here. [↑](#footnote-ref-10)
11. An anonymous reviewer of an earlier draft of this paper, while accepting that such expletives have neither sense nor reference, claims that they do have a signified in that ‘they have a function in English as more than pure signifiers [which] cannot be derived from the sounds as such’. I would argue that this is not the case and that their non-interchangeability is an arbitrary feature of the language such that one but not the other is acceptable in a particular construction. It is certainly the case that expletives are purely formal (‘dummy’) items with no semantic function at either the sentential or discourse level, unlike other grammatical words such as articles where the definite ~ indefinite alternation may signify a meaningful contrast within a discourse. The reviewer further contends that the position of expletives ‘is also used to differentiate between declarative and interrogative clauses’. However, variation of canonical declarative word order is a prime example of Bouchard’s *C-signs* and does not at all depend on the signs/signifiers involved. [↑](#footnote-ref-11)
12. one does not have to posit a notion from generative grammar such as ‘empty categories’ to note that the embedded clauses here have a logical subject for which is there is no overt signifier [↑](#footnote-ref-12)