Merge: the fragmentation of second language acquisition theory, and our blended experience of reality

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Abstract

マイケル・ロング（2007）は、第二言語取得（SLA）の分野におけるいわゆる理論の拡散に反対することで SLA に関する様々な重大な問題を明確にしようとする。ロング氏は、この脅威が、SLA の社会文化的理論の研究分野から出てきていると信じているようだ。しかし、言語学習研究者は自分たちの脆弱な理論を批判から守るべきという彼の仮説は全く説得力がない。それどころかロング氏ははからずも、SLA がより厳密な審査を受けなければならないという非常に強力な証拠を提供している。理論的な焦点が狭すぎると、研究が真の進歩を達成できないことは言うまでもない。確かに、理論的言語学研究を見ても、言語学習研究者はより広い視点を持つべきであるという結論を避けることは不可能だ。言語学習研究は、人間が身体的かつ無意識のうちに日々の世界で経験する現実に焦点を当てる必要がある。特に、抽象的な研究方法は、文化や物理的経験に根ざした具体的な世界との接触を失う危険に直面することになる。

Michael Long (2007) seeks to make clear certain severe problems afflicting Second Language Acquisition (SLA) studies, railing against the so-called proliferation of theory in the field. He perceives this threat as coming from the sociocultural wing of SLA. However, his hypothesis that researchers on language learning studies should protect vulnerable theories from criticism, is totally unconvincing. In fact, Long unwittingly provides very strong evidence that SLA must undergo a more rigorous review. It goes without saying that research cannot achieve true progress if its theoretical focus is too narrow. Even evidence from theoretical linguistics makes it clear that language learning studies require a broader frame of reference. Studies of language learning need to focus on the reality that humans experience physically and unconsciously in their daily world. In particular, abstract research methods confront us with the risk of losing contact with the concrete world that is rooted in culture and physical experience.
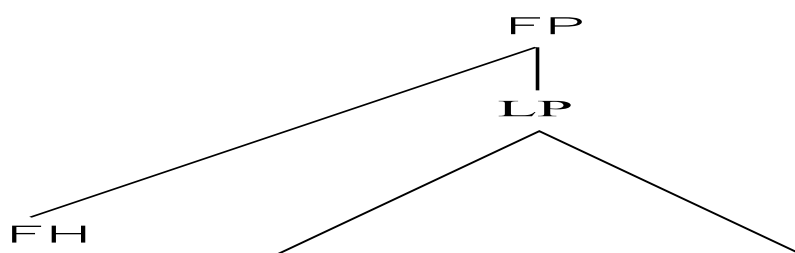
Introduction

Long (2007) acknowledges the importance of theory in the field of SLA as a means of bringing "order out of chaos" (p. 22), but recommends reference to a radically restricted set of prescribed, and at the time of writing, mainstream theories, which may be characterized as Generative Grammar and "Black Box" Input-Output SLA. I argue here that, on the contrary, chaos will inevitably result from such a narrow theoretical focus, as research is likely to become increasingly detached from common sense and the everyday reality of teaching and learning. As SLA has been insulated from the need to satisfy such basic standards, there has been a failure to challenge entrenched patterns of thinking, both in SLA and more broadly in the field of theoretical linguistics and its applications to language learning. It will be shown that any attempt to explain linguistic phenomena in terms of too narrow a frame of reference results in confusion

and failure to resolve even the most unchallenging of puzzles. In fact, a reappraisal of language learning in line with sociocultural factors is urgently required to arrive at straightforward explanations for observable phenomena in SLA. It may be, indeed, that SLA no longer serves a useful purpose, will inevitably fail to emerge from the shadows of Chomskyan linguistics, and needs to be replaced with a more dynamic theory of cross-cultural communication more in tune with the needs and goals of language learners and users rather than teachers and researchers. In line with this, I suggest that theoretical linguistics itself, and even highly mathematical models of language, are likely to move towards a more culturally and bodily experienced model of cognitive experience.

Minimal trees and blind faith

The illustration offered in Long's (2007) polemic against "theory proliferation" relates to the nature of the properties of the innate linguistic endowment, Universal Grammar (UG), that has until fairly recently been widely assumed to, first of all, exist and also be available to the adult second language (L2) learner. Historically, it has been assumed that features of tense and agreement, for example, that allow the projection of phrasal structure, may be characterized as functional (as opposed to lexical) and that the innate ability to access these functional projections effortlessly either degenerates to some extent or is lost entirely, in adult learners. Under this kind of account, it is hypothesized that some abstract feature value is necessary to successfully project a phrase. For example, a tense (T Feature) is required to project a Tense Phrase (TP) or an agreement feature (Agr Feature) is needed to project an Agr Phrase (Agr P), and so on. (One might also note in passing that these abstract features may be specified in certain ways, for example, strong/weak.)

1. A functional feature's phrasal projection

FP
LP
FH

As we can see from 1 above, some functional feature head, FH, associated with a lexical verb feature, may be required in an adequate sentential phrasal structure. The functional feature F may be T or Agr or any other functional category one imagines to be playing a part in our grammar. LP is intended to represent a lexical feature projection, for example a verb phrase.

Certain SLA researchers (Eubank, 1996; Vainikka & Young-Scholten, 1996) hypothesize that these functional features may not be initially accessible (in other words, in the very early stages of learning a second language, where knowledge of the second language is superficial) for L2 learners. The fact that beginners fail to produce the full range of tense and agreement patterns, for example, may be taken as evidence that UG access to the functional features is not available to L2 learners. This is the so-called Minimal Trees hypothesis: the minimal lexical projection/phrase (LP in 1) may be accessed by beginner L2 learners, but the maximal functional projection/phrase (FP in 1) may not.

First notice that this hypothesis breaks down unless we believe implicitly that human beings are born with UG "hard-wired" into their brains, and that the functional features play the part suggested. If human beings are really born with information regarding these functional features, we might expect them to be able to learn foreign languages with less effort and even in the earliest stages once the language faculty (LF) has been activated by the appropriate linguistic input.

The hypothesis is entirely redundant unless one believes in UG in the first place. Beginner learners of foreign languages obviously struggle with tense and agreement because they have only just started learning the foreign language: because they are beginners! Any other expectations require considerable motivation. It may be interesting to think about how L2 learners piece together syntactic knowledge of the language being studied. However, it goes without saying that this process must be based on analysis of L2 input (presumably as the learner, either consciously or subconsciously, becomes aware of similarities and differences between L1 and L2) because the L2 learner obviously knows very little about L2 at the beginner stage. We do not need to worry about why learners do not seem to have any awareness of information that we expect to come packaged in UG *unless* we expect UG to exist in the first place. If learners did show greater awareness of these L2 features despite never having studied the language before, that would, of course, be remarkable and might well offer support for UG. However, no one has offered evidence of this sort and it is extremely unlikely that anyone ever will.

To be fair, other UG proponents, such as Schwartz and Sprouse (1996) and Lardiere (1998), have quite correctly pointed out that the mere fact that beginners make grammatical errors does not necessarily imply the total absence of underlying syntactic knowledge. It could just mean that they are beginners. These researchers claim that there is no real reason to doubt that the full range of grammatical knowledge is available to the beginner L2 learner. This is called the Full Transfer/Full Access hypothesis. In support of this, Lardiere points out that mature (so-called fossilized or final state) Chinese learners of English often have full control of English grammar (and might be expected to communicate perfectly well in the foreign language) apart from the failure to manifest features connected with agreement and tense. Such evidence, however, does not support the UG hypothesis, first because we do expect L2 learners to eventually develop a full range of grammatical ability and, second, because we would predict failure to project sentential structure in the absence of functional features.

While it is true that there is no conclusive evidence to support the Minimal Trees hypothesis, this constitutes fairly strong evidence against the need for functional (as opposed to lexical) features in the projection of phrasal structure. However, although the evidence falls out strongly against UG, Long (2007) makes no reference to competing linguistic theories in his discussion. The disagreement mentioned is a purely theory-internal issue, one that reaches no clear conclusion, is not motivated by anything unexpected given normal everyday commonsense assumptions, and actually provides evidence against UG theory. Even so, the theory is never seriously doubted by anyone involved in the disagreement. To offer a hopefully helpful metaphor, this would be like a researcher in paranormal activity who goes to a big house to investigate reports of a ghost that haunts the house, fails to find any evidence and then writes a paper about the reasons the evidence is not manifest without ever considering the possibility that there is in fact no ghost.

The discussion entirely fails to advance our understanding of either theoretical linguistics or language learning but participants on both sides of the argument never seem to doubt the main theoretical claims under discussion.

Even more startlingly, Long (2007) takes this inconclusive and entirely unmotivated argument between opposing camps in the UG domain as desirably scientific! He goes so far as to contrast these theories favorably with comparable ones in the sociocultural domain (Schumann, 1978, 1986; Gardner, 1985, 1988) because UG theories focus on abstract cognitive and linguistic variables. In other words, this kind of narrow focus (on cognitive and linguistic variables gleaned from one theoretical domain) is assumed to be sufficient, even though there is serious reason to doubt that these variables really exist and absolutely no good reason at all to believe that they do. This is compounded by the fact that Long demonstrates a complete lack of awareness that there are linguistic theories that do not employ functional categories to generate syntactic structure (Boas & Sag 2012; Pollard & Sag 1994). Furthermore, he was writing at a time when it was already clear that Chomsky (2005:10) *himself* was expressing profound doubts about UG, at least understood in its strong sense of a modularized innate endowment delivering a system of grammatical principles (0'Grady, 2008).

This is somewhat disturbing because the resolution of this puzzle would seem to be rather straightforward with reference to a different set of theoretical issues. The absence of tense and agreement among mature Chinese learners of English may initially be a matter of transfer from L1. As Chinese lacks tense and agreement inflection, mastery of these variations may pose a challenge to Chinese learners of English. This situation may also make it more difficult for Chinese learners to subsequently notice related phenomena in the target language. Even after these phenomena have been noticed, learners might not regard them as a problem given that they are perfectly well able to understand what is said to them and make themselves understood in the foreign language. This lack of motivation to align with native speaker prescriptivism, therefore, reduces to a matter of identity and can probably be better explained with reference to theories from the sociocultural domain related to cross-cultural communication. However, that is precisely the conclusion that Long does not wish to reach. Long's conclusion, rather astonishingly, is that the "scientific" UG-centered research is desirable but the "unscientific" sociocultural approach, situated in ordinary reality, should be banned. This is clearly mistaken and, I will argue, evidence from theoretical linguistics also supports a broader, cultural experience-based approach to language learning studies.

Universal Grammar: giving up the ghost

As has been seen, Long's (2007) argument is based on a disagreement between two groups of generative grammarians belonging to the Universal Grammar camp (UG). UG, of course, offers an attractively integrated account of language related conundrums in that knowledge of language is regarded as a biological endowment. If infants are born with knowledge of grammatical categories and principles wired into a specific module in their brains, we may explain why children acquire language, apparently effortlessly, from an early age. If we assume that access to these inborn capacities becomes somehow degraded after a certain age, we can also offer explanations regarding why second language acquisition is relatively more

challenging, particularly for adult learners. It must also be acknowledged that it is true that the imposition of a narrow theoretical focus delivers order to a potentially messy and chaotic situation.

However, this may come at great cost. Long (2007) shows very little awareness that the UG-based program has run into serious criticism during the short period of its relative dominance. For one thing, we cannot really assume that children acquire L1 without effort. Certainly, our ability to learn languages seems to drop off as we get older, but children engage in as many as 10,000 hours of speaking practice by the time they are six years old (Anderson, 1995) and we are not justified in rejecting the possibility that languages are learned in ways that are fundamentally the same as those relating to other abilities. Tomasello (2003: 3-7), for example, argues that UG principles are too abstract (for example, the functional categories mentioned above), divorced from practical reality (for example, the cultural factors involved in considering the Chinese speakers of English mentioned above), and do not consider a wide range of non-linguistic cognitive abilities at the disposal of human beings (to be discussed below). As broad parallelism between cognitive abilities that clearly play a part in the natural world is ignored, the idiosyncratic, faculty-specific nature of UG inevitably contrasts radically with the rest of cognitive science.

Also, the explanation for how such a faculty evolved in one "outrageously lucky individual – Prometheus – who happened to inherit in one fell swoop, a language gene." (Evans 2014: 92) is not entirely plausible, to say the very least. In the Prometheus account (Chomsky & Berwick 2016), a single, random genetic mutation resulted in the miraculous creation of a cognitive ability referred to as "merge." This is presumed to have taken place at some time before human beings appeared outside Africa. Note that it must also be assumed that "merge" was of more general use beyond application to language, or it would have provided no advantage to Prometheus, who would inevitably have been surrounded by non-speaking, pre-modern humans. Therefore, "merge" does not seem to have been a strictly language related capacity, which suggests it is a more general cognitive endowment, which in turn seems to suggest that the attempt to explain human language development in terms of a unique, language-specific endowment unravels. It may, indeed, have become an embarrassment and is in the process of being quietly forgotten about. After all, if "merge" offered an evolutionary advantage in areas other than language, it is not clear why it should be regarded as a narrowly linguistic faculty at all. Also, UG theories appear to be replaceable with alternative, perhaps more plausible explanations, even within the field of SLA (Hawkins 2004, O'Grady 2005) while, as mentioned earlier, it is not clear that even Chomsky himself believes in a strong version of UG anymore (O'Grady, 2008). Therefore, Long's (2007) prescriptions for the future of SLA research clearly take ivory tower research too far.

Dispensing with functional categories: language-specific lexical information

Indeed, the disagreement between UG researchers mentioned above can be dealt with rather simply on the assumption that neither UG nor functional categories exist. Consider 2, an attribute value matrix (AVM) of the sort employed in unification-based theories such as Head-driven Phrase Structure Grammar (HPSG) or Sign-based Construction Grammar (SBCG).

2.. Partial specifications for the Japanese verb *kaku* (write)

$$
\begin{bmatrix}
\text{PHON } <kaku> \\
\text{ARG-STR } <NP_i,\ NP_x> \\
\text{SYN } [\text{VAL } NP[nom]_i,\ NP[acc]_x>] \\
\text{SEM } \begin{bmatrix} \text{FRAMES } < \begin{bmatrix} write\text{-}fr \\ \text{WRITER } i \\ \text{WRITTEN } x \end{bmatrix} > \end{bmatrix}
\end{bmatrix}
$$

Note that we expect lexical information requiring the appropriate case specifications for any candidate subject and complement. No one expects a functional phrase to be projected in accordance with such specifications. We merely expect compatibility between the specifications on the verb and the NPs that satisfy the valence requirements. This is lexical information specific to Japanese and not shared by English speakers, for example.

Now consider 3, partial specifications for the English verb *writes*, indicating the need for an NP that allows appropriate case marking and *carries 3rd Person Singular* agreement specifications in its SEMANTICS (in SBCG, equivalently CONTENT in HPSG) value.

3. Partial specifications for the English verb *writes*

$$
\begin{bmatrix}
word \\
\text{PHON } <writes> \\
\text{ARG-STR } <NP_i,\ NP_x> \\
\text{SYN } [\text{VAL } NP[nom]{:}SEM[3^{rd}\ Sing]_i,\ NP[acc]_x>] \\
\text{SEM } \begin{bmatrix} < \begin{bmatrix} write\text{-}fr \\ \text{WRITER } i \\ \text{WRITTEN } x \end{bmatrix} > \end{bmatrix}
\end{bmatrix}
$$

Given these specifications, the verb *writes* will combine with a subject such as *she*, which carries lexical specifications for SEMANTICS (SEM) as shown below in 4. The NUMBER (NUM) value in SEM is singular so it is compatible with *writes*, but a word such as *they* will not carry the appropriate NUMBER value and will be ruled out, as in 5.

4. AVM for *she*

$$
\begin{bmatrix}
word \\
\text{PHON } <she> \\
\text{SYN } [\text{CAT } \begin{bmatrix} \text{HEAD noun} \\ \text{CASE nom} \end{bmatrix} \\
\text{SEM } \begin{bmatrix} < \begin{bmatrix} ref\text{-}index \\ \text{PER} & 3rd \\ \text{NUM} & sing \\ \text{GEN} & fem \end{bmatrix} > \end{bmatrix}
\end{bmatrix}
$$

Again, we have no need to project an appropriate functional phrase from an Agr Head. We just require that the subject is compatible with the lexical specifications.

5. *They writes the letter.

Therefore, 5 is unacceptable because the subject is 3rd Person Plural, making it incompatible with the verb's specifications.

6. *Him writes the letter.

Similarly, 6 is ruled out because *him* carries accusative case. In other words, the need for compatibility persists whether the relevant feature is found in syntactic or semantic feature structures. We do not expect any requirement to project a functional phrasal structure for the subject to adjoin to. This is sufficient to account for the data discussed by the UG researchers. We do not expect functional structure to provide significant help to beginner learners of L2 because such structure is not blindly assumed to exist and there is absolutely no reason to believe that it does. Regarding mature Chinese learners of English who do not develop such agreement specifications in the lexical information on verbs, we might simply assume that the absence of such features in Chinese contributes to the difficulty of learning how such features work in L2, combined with low motivation to make the effort to learn such features because they do not contribute to meaningful communication. It is also possible that Chinese learners have pride in their identity as Chinese speakers of English and have no desire to conform to standard English. So long as the relevant features are regarded as lexical and not part of some abstract biological endowment, there is absolutely no problem with this formulation. Similarly, syntactically marked finiteness of verbs is separate from semantico-morphological agreement so sensitivity to one but not the other among mature Chinese native speakers of English does not raise any problems. In HPSG and SBCG, for example, finiteness is lexically specified as a feature value in SYNTAX.

Note that the very simple solution to these "problems" resides in first rejecting the notion that the relevant features are part of UG. In fact, they are language-specific lexical features and not expected to be available to total beginner L2 learners. This involves a preparedness to look at linguistic theories outside of the mainstream Chomskyan paradigm. Then one should notice that Chinese speakers may find it difficult to learn how these features work because of the influence of lexical specifications carried by Chinese verbs. This involves looking at the students' L1. Then one should notice that possibly low motivation to learn how these features work may be explicable in terms of the fact that failure to conform to standard forms causes no problems in communication while speakers may be happier with nonconformity. This might well involve looking at theories in the sociocultural domain.

Of course, as a researcher in SLA, Long is determined to avoid all recourse to other theories because this reveals that SLA researchers spend far too much time narrowly fixated on problems that simply do not exist. Furthermore, this kind of research, would seem to involve far too much time spent manipulating abstract variables that also simply do not exist. Long desperately defends such practice because he is concerned that proliferation of theories will lead to the fragmentation of SLA. However, one
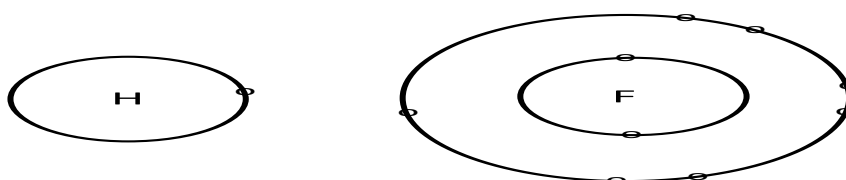
should point out that the situation for this narrow approach to SLA is, perhaps, a lot worse than that. It seems quite likely that allowing non-prescribed theories to shine light on "problems" that preoccupy SLA researchers is likely to lead to the complete collapse of SLA as a field of study.

Is anything universal?

Let us turn now to the status of "merge" in a non-UG, theory of language (henceforth parenthesis will be dropped) that does not rely on an inborn ability to generate functional features that generate abstract syntactic structure. The Merge operation merely states that two objects are taken and combined. Chomsky (2001) assumes that at most two constituents at a time are merged. Therefore, we can say that Merge takes two objects, A and B, and merges them to form a new object G={A,B}.
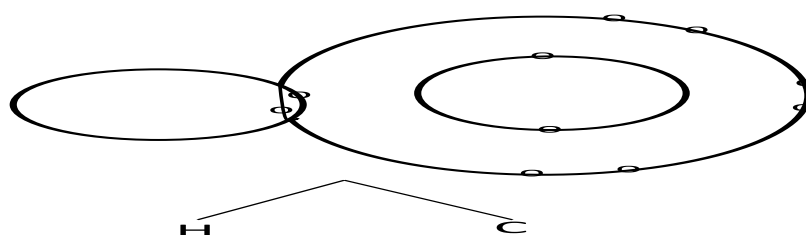
This is perfectly fine, as far as it goes, but we should be aware that we can hardly claim that this is a new or revolutionary idea. Nor is it obvious why we should regard it as an operation exclusive to language. In fact, there are good reasons to think it is certainly not exclusive to language. For example, John Stuart Mill (1930[1843]), pointed out that chemical combination of two substances produces a third substance with properties different from those of either of the two substances separately (p. 243). Mill presents the example of water molecules (H_2O), formed from two hydrogen atoms and one oxygen atom. Of course, the manner in which the atoms combine results in a molecule that behaves very different from either hydrogen or oxygen alone. However, features of individual atoms are certainly inherited in the merged form. A simple binary example of this combinatorial process in nature is hydrogen fluoride (HF). This may be represented as below in 7 and 8:

7. Hydrogen and fluoride in isolation:

When these atoms combine, they behave in predictable ways due to the manner in which they share their electrons, in a covalent bond, a consequence of valence conditions, with both atoms lacking an electron in the outer shell. This is indicated below in 8.
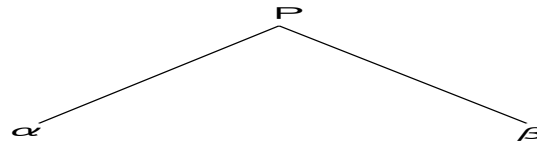
8. Combination of hydrogen and fluoride (HF)

Therefore, without wishing to labor the point, it should be clear that the idea of combining two objects in

certain ways is neither shatteringly revolutionary as a hypothesis nor necessarily confined to human cognitive abilities. One could take an even simpler example from the natural world, that of the Fibonacci sequence, observable as playing a role in an array of natural developmental phenomena. The Fibonacci sequence, which itself has a long history (Devlin, 2012), is a series in which a number is found by adding up the two numbers that precede it.

9. Fibonacci sequence: $P = \alpha + \beta$

One might also point out that blending phenomena are assumed by a rather large number of scholars to be fundamental to cognition (Fauconnier & Turner, 2002; Hofstadter & Sander, 2013; Holyoake & Thagard, 1995; Koestler, 1964; Lakoff, 1987; Lakoff & Johnson, 1980, 1999).

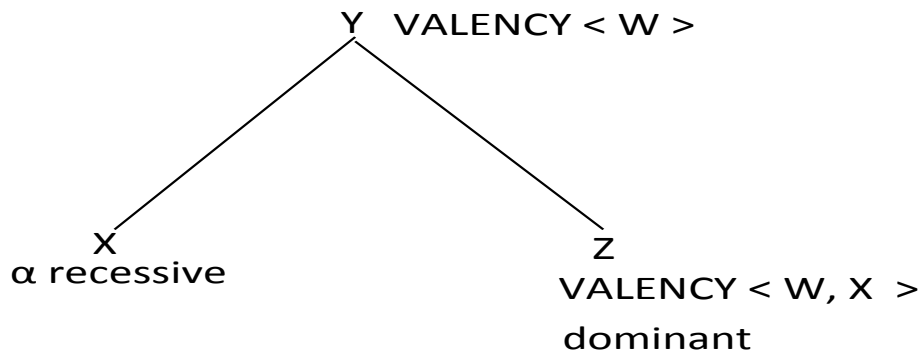**Consequences for linguistics**

Interestingly, if we hypothesize that a patterning such as Merge is fundamental not only to cognition in particular, but also to the natural world in general, it becomes difficult to ignore a number of startling possibilities. First of all, it is extremely difficult to claim that combinatorial processes are unique to Chomskyan Linguistics as generic phrase structure rules are predicated on the notion of constituents combining in certain predictable ways (Goldberg, 1995), while unification-based (e.g. HPSG and SBCG) approaches rely on highly articulated internal structure carried within lexical constituents and contributed to phrases via feature unification.

Fundamentally, we must acknowledge that Merge may be taking place via simple inheritance conditions whereby the internal features of constituents are amalgamated in predictable ways into the newly created structure. In other words, the linguistic phenomenon yielding the combination of lexical items is like the combinatorial process that results in molecules in the chemical world, or new individuals in the biological domain (Waller, 2017). In other words, these are all cases of inheritance. This phenomenon would seem to be most easily observable in the Fibonacci sequence (illustrated in 9 above) such that the merged number inherits structure from the two previous numbers and combines them in a very straightforward manner, by addition. As it would appear that feature inheritance must play a part in Merge, a theory of language that deals with the whole range of linguistic phenomena as a condition on feature inheritance must be preferable on Minimalist grounds.

Now if inheritance is fundamental to language as a natural world phenomenon that we experience both subconsciously and bodily, a radical simplification becomes possible. For example, one interesting possibility would be to follow Mendel and propose that inheritance conditions may be stated in terms of dominant and recessive features. First of all, the Head Feature Principle (HFP) of HPSG (Pollard & Sag, 1994: 399) and SBCG can be explained in terms of the fundamental dominance of verbal constituents. The

Head Feature Principle basically states that the head feature of a phrase (referred to, rather anti-intuitively as the "mother"), shares certain core features with the head ("daughter") constituent in accordance with schema (Pollard & Sag, 1994: 402-403) that are stipulated to license headed phrases. After all, sentences are the end product of language, and sentences are verb phrases that carry an empty VALENCY feature. We might hypothesize, then, that it is the VALENCY feature that confers dominance.
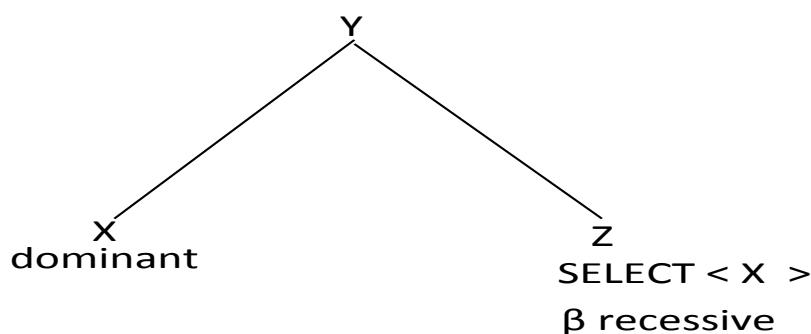
10. The valence-dominant condition for core features

$$Y \quad \text{VALENCY} < W >$$

$$X$$
$$\alpha \text{ recessive}$$

$$Z$$
$$\text{VALENCY} < W, X >$$
$$\text{dominant}$$

In any VALENCY relation, such as in 9 above, the subcategorizing parent is deemed dominant and the subcategorized parent X (cancelled in VALENCY leaving a possibly empty W) is termed α recessive. Therefore, as we hypothesize that VALENCY-bearing Z is the dominant parent for certain features, Y will inherit the core (SYNTAX and SEMANTIC|INDEX) features of Z, and *not* X. One might humbly suggest that this is by no means unintuitive, at least in metaphorical terms, as it proposes that the manner in which a parent couples with another parent determines whether it is dominant or recessive with regard to certain features that are to be passed on.

This condition is sufficient to handle verb-complement or verb-subject constructions as well as nominal-specifier constructions and allows us to dispense with the HFP in a way that makes intuitive sense. However, the situation is reversed for the SELECT (MOD in HPSG) feature, the other means by which constituents combine in unification-based accounts. Adjectives, adverbs, and determiners, that modify other structures in some way, carry these features. I propose here that these modifiers confer, again not unreasonably, dominance to the elements they modify.

11. The select-recessive condition for core features

$$Y$$

$$X$$
$$\text{dominant}$$

$$Z$$
$$\text{SELECT} < X >$$
$$\beta \text{ recessive}$$

In other words, phrases inherit core features from the dominant (SUBCAT bearing) parent while SELECT-bearing parents confer dominance to the partners they SELECT. I make the distinction that

SELECT-bearing constituents will be β recessive. This means that determiners will be both α recessive and β recessive as they in both a valency and select relectionship with their nominal (Pollard & Sag, 1994: 51-54).
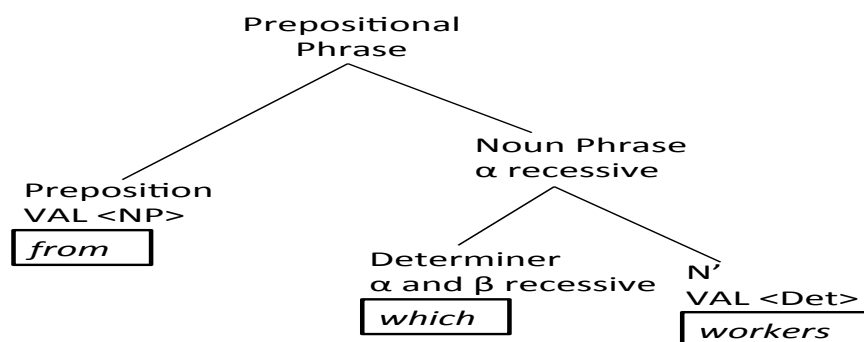
Features involved in Filler-Head structures (trace or SLASH features) are not considered to be core syntactic features and will remain heritable (like non-core SEMANTIC features) from all recessive constituents as well as dominant constituents, allowing syntactic "movement," already traditionally treated as cases of nonlocal inheritance (Pollard & Sag, 1994: 164-165). These inherited features must be cashed out in an appropriate (SLASH-bearing) Filler-Head construction, creating the illusion of movement. Non-core SEMANTIC features (such as FRAMES) will also be freely inherited across all constituents allowing *wh*-expressions, for example, to be interpreted at the appropriate syntactic level.

Related to this, consider the matter of feature percolation (Heck, 2009; Kobele, 2005), traditionally problematic for Minimalist accounts. English, for example, manifests a syntactic condition such that a syntactic trigger feature is required in left-positioned, subject or filler, constituents.

12. a. From which workers did you get this information?
    b. The workers [from whom] I received complaints t have all been fired.
    c. ? [The information from *which* workers] did you hand in t to the office?
    d. ?These are [the workers [the information from whom]] we have handed t in to the office.
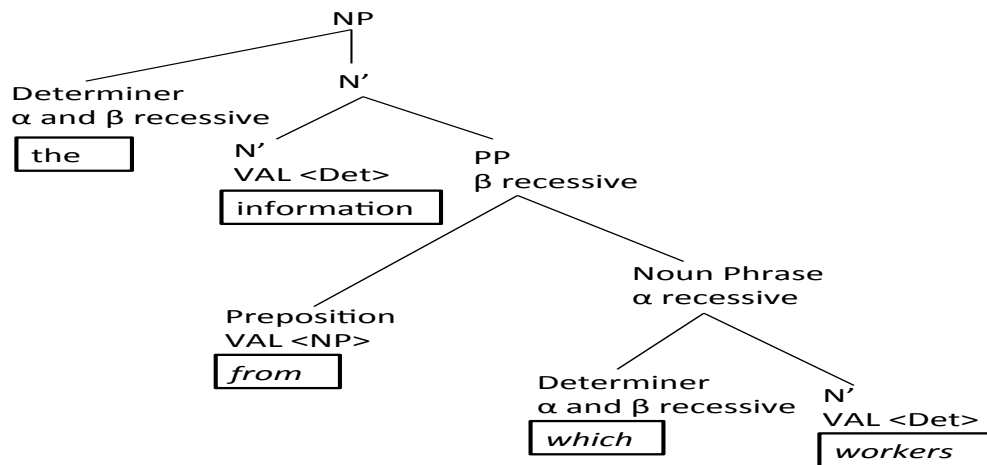
One possible solution is to say that normally α and β recessive constituents are actually dominant for these syntactic features (WH and REL) and make these features available for inheritance. Therefore, we could argue that (otherwise dominant) verbal constituents are not able to contribute or carry these features but determiners and complement noun phrases, for example, can do so.

12. WH and REL dominance constituents that are recessive for core features

Thus, the inability of the prepositional phrase above to pass on syntactic trigger features might be explained in terms of a weak block on inheritance of WH/REL from β recessive PP or the fact that WH/REL will be inherited onto valency dominant N' (like Z in 9 above).

13. Failure of WH and REL to be inherited from dominant N' or β recessive PP

SEMANTIC features will be subject to the same basic conditions, so INDEX will be dominant in headed phrases, but other non-core semantic features will behave like SLASH features and be inherited from all constituents. This means that the main features of the English language may, in a desirably Minimalist manner, be explained entirely in terms of inheritance.

Conclusion

It seems reasonable to suggest that SLA may have invested too heavily in UG-based linguistic theory. As a result, there is a severe danger that its focus has become too narrow to allow meaningful and productive research. There is an urgent need for a reappraisal of the inventory of theories relevant to language learning. It seems reasonably likely that SLA will cease to exist as a major influence in language learning studies, to be replaced by other fields that allow a wider view of the various problems involved. At the same time, it should be acknowledged that there is no evidence for UG and that future research in theoretical linguistics is likely to reveal language as sharing properties in common with not just other forms of cognitive activity but also an array of other phenomena in the natural world. Rather than human beings merely generating abstract mathematical formulae via an isolated module in the brain, human beings actually subconsciously and physically experience language as actual real-world objects possessing hierarchical structure. Recent studies (Chemero, 2011; Johnson, 1987; Lakoff, 1999; Shapiro, 2010) related to the nature of our mysterious experience of language raises the rather fascinating question of to what extent we have an embodied experience of language that is rooted in social activity, not as mathematical abstractions but as real, physically structured objects.

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