Semantocentric Minimalist Grammar

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It is common to interpret minimalist "syntax" as "generative," since it yields "instructions" for the C-I systems, and "semantics" as "interpretive," but that view is basically incompatible with Chomsky's internalist approach, where the syntax of meaning is as generative as that of form. This work discusses this usually overlooked matter, evaluates its meta-theoretical implications, and sketches a semantocentric interpretation of MG as, not only strictly faithful to internalism, but more realistic from a processing viewpoint, easier to reconcile with cognitive and functionalist alternatives to MG, and closer to common sense. Although the paper is deliberately programmatic, it offers concise but explicit alternative views of all major components of MG, in particular: a reduction of semantic entities and relations to types and predicate-argument structure, an explicit statement on lexical selection, a careful inventory of lexical information, a more natural concept of (un)interpretability, a theory of structure-building as Satisfaction that is superior to Merge and explains c-command, a more efficient unification-based theory of "displacement" as category-split that avoids type clashes, a principle of Transparency that nicely explains binary branching, and a re-evaluation of the role of Economy throughout, with potential consequences for semantics, lexical access, structure-building, displacement, phonological structure, ellipsis, and anaphora.

KEY WORDS: internalism, minimalism, syntactocentrism, semantics, structure-building, displacement, lexical item, transparency, binary-branching, economy.

1. Issues and pseudo-issues

Minimalist Grammar (MG, hereafter) assumes that I-Language generates mind-internal representations that the conceptual-intentional systems (C-I, hereafter) "interpret." The "generative" role is, therefore, *prima facie* attributed to I-Language, particularly to its Computational Component (CHL, hereafter), not to the C-I systems, whose participation is *a posteriori* and merely "interpretive," although what they contribute is a substantial part of the lay view of "meaning." Nevertheless, it is I-Language, its Lexicon and its CHL, particularly "narrow syntax," that generates the "legible" objects that the C-I systems derive interpretations from. The output of I-Language, optimal syntactic derivations (SD's, hereafter), each a convergent pair (P, L) can, thus, be considered "linguistic," internal to I-Language, but the C-I interpretations are external, fully engage the speakers' belief systems and their encyclopaedic knowledge of the world, and properly belong to the domain of the theory of "language use" (alias, the "theory of performance"), a topic that Chomsky has always considered scientifically intractable. Under this view, "meaning" is not inherent to I-Language but the result of external "interpretation" of otherwise

unknown I-Language internal objects (SEM objects) which, for all we know, might be just about anything, in practice arbitrary "pointers" to C-I objects, and "semantics" is (part of) a theory of language use outside the core of Chomsky's research program, or even beyond scientifically feasible linguistics.

This is how critics have interpreted the Chomskyan programme, with its apparent relative silence on matters semantic, and it has to be conceded that this interpretation, although questionable (see *infra*), is supported by the terminology used by Chomskyan linguists in discussion of the roles of "autonomous" syntax and the "interpretive" semantic component. The consequence is that Chomsky's approach, and particularly his division of labour between syntax and semantics, and the attention paid to each, have seemed outrageously untenable to most linguists. After all, the traditional view since Plato, and what our common sense tells us, is that Language is simply a vehicle for the configuration and expression of Thought. To that extent, the generation of linguistic expressions cannot but start in the Thought systems with the emergence of an intention to say something about an object of thought in focus (see Levelt 1989). The linguistic process cannot start with a random choice of lexical items (LI's, hereafter), and cannot possibly consist of a blind autonomous bottom-up computation that only by accident succeeds in producing a coherent output, being aborted or computed but thrown away as illegible or useless most of the time (hence the principle "compute until convergence"), as assumed in MG in its classical formulation in Chomsky (1995).

Certainly, although our linguistic mechanism breaks down sometimes (e.g. "tip of the tongue" and "garden path" phenomena, "slips of the tongue," in general), performance-attributable errors aside, it is remarkably successful and efficient, on the whole. Thus, the idea that I-Language computes randomly selected LI's "autonomously," bottom up, and largely in vain at that, is simply unacceptable to common sense. On the contrary, observed linguistic behaviour suggests that lexical selection is strongly constrained, if not fully determined, by what the speaker "wants to say," and that the computational process is meaning-oriented from the start, top-down, rather than bottom-up, and closely monitored throughout, if only on account of the fact that speakers can correct their own "mistakes." Thus, MG is perceived as wrong if not perverse, and has lost credibility with many linguists, psychologists, cognitive scientists, and philosophers of language.

To directly capture the expressive function that I-Language obviously performs, grammatical architecture must be either "semantocentric," as in Generative Semantics, Levelt (1989), and the "functionalist" models (e.g. Functional Grammar, Systemic FG), or "parallelistic," like Montague's (1974) rule-to-rule Categorial Grammar, Tagmemics, HPSG, Construction Grammar, Jackendoff's (1997) Representational Modularity, or, indeed, certain versions of MG like the "radical derivational" one in Epstein et al. (1998) or recent work on derivation "by phase" in Chomsky (1999, 2001, 2005), in which, although access to the Lexicon is still presented as a one-stage operation at the start of SD's, Spell Out/Transfer is available throughout, P and L no longer exist as "levels" of representation, and what seems involved is just parallelistic phonetic-syntactic-semantic computation *à la* Montague. In all such semantocentric and parallelistic architectures, what the speaker means realistically starts the expressive process, and the Lexicon and the Syntax simply do the rest, although the nature of initial representations is obscure, particularly in what concerns the Lexical Arrays of MG. Apparently, it is only Chomsky's traditional "autonomous syntax" hypothesis that has everything perversely upside down;

hence, opponents claim, his view of the role of syntax and semantics in the grammar is wrong and must be abandoned.

However, whether Chomsky's view of "semantics" amounts to the process of interpretation of LF representations by the C-I systems is itself questionable, and to the extent it is questioned a radical reappraisal of the issues is in order. The terminology in use (e.g. "legibility" at the interface, "interpretation" by the C-I systems) certainly suggests that the semantic relation holds of L and C-I interpretations, with unspecified modules of C-I supplying the "semantic component," but, at bottom, that construal is incompatible with Chomsky's internalism and with his frequent statements to the effect that what other people prefer to call "semantics" is just "syntax," or the outer reaches of syntax (see for example Chomsky 2000b: 174; 2002: 158).

Indeed, granted an internalist philosophy, the "semantic" relation must hold of I-Language-internal entities, i.e. under minimalist assumptions, primarily PHON and SEM (leaving aside syntactic features like tense or number in nouns that happen to also be interpretable) (see Chomsky 2000b: 124–25, 150, 174). Under that construal, the pre-theoretical terms "meaning" and "semantics" simply correspond to SEM and I-Language, respectively, since SEM-PHON correspondences presuppose the Lexicon plus syntax in the broadest sense, including all aspects of computation, i.e. "narrow" syntax, but also Morphology and even PF. If so, it no longer makes sense to say that Chomsky's semantics is "interpretive" and *a posteriori*, as it is absurd and unfair to say that Chomskyan linguistics has nothing to say about semantics, a favourite accusation of Chomsky's functionalist opponents. On the contrary, "meaning" is as "generative" as anything else in I-Language, and it arises partly in the Lexicon and partly in the syntax, as a result of structure-building operations. The only "interpretive" component(s) are in C-I, but that aspect of human Language belongs to the "theory of language use," the broader "semiotic" theory of "performance" presupposed since Chomsky's earliest TGG, but considered ever since hopelessly beyond reach (see Chomsky 2000b: 72; 2002: 159; 2005: 4 for recent statements on the matter). Internalist semantics, on the contrary, the systematic correspondence between PHON and SEM, is firmly within I-Language, and is as generative of linguistic SD's as anything in it.

The only issue that might, in principle, separate Chomsky's approach from "semanto-centric" ones like GS, FG, SFG, etc., then, is what specific information I-Language computes, but whether a difference exists even in that respect is debatable, for the minimalist answer is that I-Language must compute at least (ultimately meaningful) SEM entities, (ultimately audible) PHON entities, and, possibly "formal" (i.e. syntactic) properties that do not surface at any of the interfaces but nevertheless play a role in the computational process. Of course, SEM items have never been fully listed, but what has on and off been considered relevant includes type (or category), *qualia*-structure and s-selection, argument structure, thematic and event structure, quantification, binding, control, reference, and information structure (topic/comment, focus/presupposition, old/new, etc.). The minimalist treatment of such aspects has not always been consistent (see González Escribano 2005b for details and criticism), but at least such aspects figure in everybody's pre-theoretical view of what human Language must compute to establish sound-meaning correspondences (i.e. to support "semantics"), and, *pace* functionalist enthusiasts, there is no question that Chomsky and his followers have made crucial contributions to the development of explicit and elegant theories of such aspects of the form-meaning correspondence.

In this light, then, there is no deep difference between the respective role of syntax and semantics in MG and those in semantocentric or parallelistic approaches, as there is no deep difference between Chomsky's internalist semantics and "cognitive" semantics, or even between internalist semantics and earlier linguistic semantics of the Saussurean varieties developed by Lyons, Coseriu, etc. All linguistic semantics has been the study of a plane of immanent linguistic "content" and its correspondences with linguistic "form," and that crucially involves syntax in the broad sense. The only really deep difference is that between internalist and externalist semantics, for the latter can indeed be said to play a merely "interpretive" role and correspondingly allows for a strictly "formal" view of Language. As matters have turned out, that divide also roughly separates linguistic from philosophical semantics, since externalist views (realist, conceptualist, nominalist, or pragmatist) have predominated among philosophers of language from Plato to the present, if isolated figures like Humboldt are left aside. Linguists, on the other hand, with a few exceptions (e.g. Bloomfield), are mostly in the same internalist boat as far as semantics is concerned, although the extent to which semantic matters have been a priority in their respective agendas varies greatly.

The ultimate purpose of this programmatic paper, however, is not to call attention to such meta-theoretical misinterpretations and oversimplifications as to who is doing/has done/can do what in the field, but, assuming and re-interpreting in strictly internalist terms Chomsky's overall approach, to examine where the minimalist programme may be flawed and sketch the outlines (nothing else may be attempted in a paper this size) of a more realistic alternative.

Any explicit internalist model of grammar must minimally specify what linguistic properties are computed and how they are computed, and define how I-Language interacts with neighbouring systems, particularly the C-I systems. The first task is largely that of explicitly characterizing the computationally relevant information of LI's in the speakers' mental Lexicon, an issue on which minimalist statements are somewhat unsystematic (see González Escribano 2005b). As to the second task, Chomsky's (2005: 11) current view is that all structure-building is accomplished via recursive application of non-tampering, unstructured, n-ary Merge, a set-building operation, to impenetrable lexical atoms, but, for reasons fully explained in González Escribano (2005b), unstructured Merge is a dubious candidate and must be replaced with a definitely tampering, unification-based operation of Satisfaction that penetrates linguistic objects in search of uninterpretable features, satisfies them, and builds not just unstructured sets, which are perfectly irrelevant to I-Language, but organic functional wholes. Finally, as to the third issue, MG continues to interpret the "autonomy of syntax" as meaning not only that I-Language is a self-regulated module, itself a moot point, but, furthermore, that it is CHL that literally builds and sends autonomously generated messages ("instructions") to the C-I systems.

It is this radically syntactocentric view of standard minimalism that will be the underlying focus of discussion in this paper, and the approach defended here differs substantially from the standard view, for it might be described as semantocentric, and yet radically internalist. Of course the "autonomy" hypothesis is fully consistent with internalism, even if the internalist viewpoint tends to get lost sight of in current MG discussion of syntax and semantics, but the idea that it is I-Language that generates instructions to the interfacing systems entails much more than internalism: it comes very close to the unacceptable hypothesis that Thought just IS (silent) Language.

This paper is an attempt to reconcile internalist linguistics and the "autonomy of syntax" hypothesis while claiming that the really "generative" engine is C-I, which conceives imminent "messages" in "preverbal" terms. Linguistic autonomy is not in question, though, because such preverbal constructs can be expressed only to the extent they match independent I-Language objects with an intrinsic "meaning" and "form" encoded, respectively, in their SEM and PHON properties and their configurations. Thus, the primary goal of internalist linguistics, in this as in Chomsky's version, is to characterize the I-Language world, i.e. its primitive and derived PHON and SEM entities and the way they combine with each other, and, against widely held, but ill informed, opinion of many of Chomsky's opponents, that goal immediately entails doing traditional semantics, syntax, lexicology, morphology, phonology, phonetics, and even discourse structure or pragmatics, although, in a short programmatic paper like this, only a selective sketch of the respects in which the present model differs from the standard one will be attempted, i.e. mainly the nature of SEM representations and their interaction with the lexicon and the syntax, the internal structure of lexical items, the properties of structure-building, the nature of displacement, and a few general comments on how Economy affects lexical selection, structure-building, and the SEM and PHON representations.

Whether such a characterization is called "syntax" or "semantics" is largely a matter of taste, as Chomsky has often observed, but "grammar" might be a preferable term. It is grammar that establishes the semantic connection between PHON and SEM. Of course, full "meanings" (in the externalist sense) eventually arise only under further constraints and operations of the C-I systems, but how the externalist world relates to the world of I-Language is not a strictly linguistic concern as Linguistics is understood here.

2. Semantocentric Minimalist Grammar

2.1. I-Language and its interfaces

This paper claims that I-Language and its interactions with the conceptually necessary neighbouring modules can be represented as in (1).

(1) C-I : CIR <S> [SEM - LEXICON - SYNTAX - TRANSFER - PF - PHON] <P> A-P

In cases of language production, the process starts with the C-I systems generating an appropriate preverbal C-I representation (CIR, hereafter). C-I in (1), thus, plays a role similar to that of Levelt's Conceptualizer (see Levelt 1989: 9, 70ff). At C-I, the speaker is considering what to say and "executive control" is needed (see Levelt 1989: 20), for the speaker surely can monitor the conception process, consciously or not, and retrace his steps if necessary, so there must be a C-I "buffer," a "working area" where provisional conceptual output may be considered and finally adopted or replaced with something else until eventually a satisfactory CIR results. However, as Levelt (1989: 24) observes, processing is likely to be "incremental" ("cascaded," "parallel" are also in use in the literature), so a CIR need not be completely constituted by the time the interface systems <S> start mapping parts of it into a SEM representation.

Model (1) differs from Levelt's in one important respect, though: whereas Levelt (1989: 105–106), following Jackendoff (1983), identifies C-I objects with "semantic representations," (1) directly claims, according to its underlying internalist philosophy, that CIR's are *not* semantic structures (see section 2.2. *infra*). Contrary to Levelt's, CIR's do not have any language-particular features (recall: they are "pre-verbal") and cannot even be expected to be fully expressible in particular I-Languages. In other words, the mechanisms <S> mediating between C-I and the SEM interface in (1) do "what they can," but the speaker may have to struggle with his I-Language to find some way to express (something similar to) what he intends, and may fail, a situation which is empirically detectable (false starts, anacolutha, afterthoughts). In other words, it is assumed that Full Interpretation (FI, hereafter) holds asymmetrically, in the direction SEM > C-I, but not viceversa: by assumption, Thought is richer than I-Language.

According to (1), the next stages in derivation are (a) access to the Lexicon in search of suitable lexical matches of SEM specifications, pied-piping of LI's into derivations and activation of specific LI's (section 2.3), (b) structure-building guided by the need to satisfy uninterpretable features of LI's (section 2.4), a process which may include "displacement" (section 2.5), and (c) transfer of PHON information to the PF component, with further specification, adaptation and optimization of the phonetic output (section 2.6). Finally, PHON, again asymmetrically, satisfies FI and is mechanically converted by appropriate transducers at the A-P interface (<P> in figure 1) into a pronounceable/readable expression.

Obviously, in language reception, the process starts at the other end, with an auditory/visual signal being partly analysed by the <P> transducers at the A-P interface as a PHON representation of I-Language (partly, since, as stated, FI does not hold in the direction A-P > PHON). Elements of PHON, then, call the Lexicon in search of appropriate matches and the LI's involved are identified and pied-piped into the working area; then syntax operating "backwards" analyses the internal structure of the expression and reveals its SEM elements, and these are mechanically assembled into a SEM representation, which is finally converted by the <S> systems at the C-I side into a CIR which the C-I systems may interpret and use.

In such a model, the real "generative" job is "conception," done by the C-I systems, which, subject to semiconscious monitoring and feedback, assemble CIR's partly expressible in linguistic terms. The rest is largely mechanical, and therefore automatic. SEM structure remains an internal interface mediating between the C-I systems and CHL, just as standard LF, and, correspondingly, the sound-related output PHON is, in its turn, an I-Language-internal interface fully convertible by <P> into a narrow phonetic representation that can be interpreted by the articulatory/perceptual mechanisms. Thus, I-Language is surely "autonomous," since it has its own internalist "vocabulary" (SEM, PHON) and is subject to its own computational principles (Economy, Transparency, Satisfaction, see *infra*) but does in no sense function "independently of" or "before" C-I. C-I, through a CIR, yields a SEM representation which interacts with the Lexicon and directly determines what LI's enter a SD, and, since lexical information is what triggers structure-building, C-I, through SEM, also ultimately guides the computations of CHL throughout. In this respect, then, the present model might be called "semantocentric," although "syntax" in the broad sense still plays the key role in linguistic structure-building and of course does the crucial mediating job between meaning and sound.

All this is practically common sense. Assuming an internalist position and a compromise with the thought-expressing function of I-Language, it is difficult to imagine how things might be otherwise at this level of abstraction. Unsurprisingly, much of the overall structure of MG remains, virtually all except the linear disposition of components inherited from the T model. According to (1), on the contrary, the entry point to the linguistic production process is exactly at the opposite end, so in language production I-Language can no longer be said to generate "instructions" for the C-I systems, but it certainly can in cases of reception, and PHON does still behave as a set of instructions for the A-P systems even in cases of production.

Apart from directionality, (1) differs from standard MG in important but *prima facie* less obvious details discussed below (e.g. the rich information assumed to be computationally relevant, the "invasive" nature of the structure-building operation, the nature of "displacement"), and entails certain revisions of core minimalist assumptions. FI, for example, must hold asymmetrically (only inside > out) at both interfaces, since there is no reason to expect an optimal fit between C-I and I-Language, just as a lot of linguistic noise cannot be turned into a PHON representation at all (trivially, in the case of foreign languages). More generally, Chomsky's view of the core of I-Language (the Lexicon and narrow syntax, excluding morphology and PF) as a perfect computational mechanism that happens to be "spoiled" by the need to interact with neighbouring systems is not assumed here. The reason is that it does not make sense if, after all, I-Language developed as it did in order to interact with other systems of a human brain. According to Chomsky, if it were not for the "imperfect" nature of A-P and C-I, I-Language would be unique, exempt from Saussurean arbitrariness, parameters, whimsical morphology, strong features, and overt movement, or even all movement ... optimal. Yet, that kind of reasoning easily leads into absurdity, for we might as well say that, if it were not for the fact that I-Language must represent infinite thoughts, it would need neither a Lexicon (with all its "imperfections") nor a CHL, or that if it need not use LI's, it could also dispense with CHL, or that it would be maximally economic if it could stay completely at rest, computing nothing, etc.

Without reaching such extremes, a paradoxical enough consequence of Chomsky's economy metric in what concerns overt vs. covert movement is that a language system is more perfect the less overt movement it has. However, *ceteris paribus*, this means that an I-language is more economic the more its LF differs from its PF, and this conclusion is problematic at best from the point of view of language processing/acquisition, for, after all, LF (roughly, SEM, here) has to be recovered by the hearer or learner from the evidence provided by PHON. Hence, covert movement being, by definition, unobservable at PHON should be particularly troublesome and uneconomic from the point of view of language use and acquisition. The natural assumption would rather seem to be the opposite: the more transparently SEM is reflected in PHON, the less computation is required and the more easily explicable efficient language processing and acquisition becomes. Hence, the concept of Economy underlying the semantocentric model of (1) crucially involves a principle of Transparency similar to, but stronger than the "rule-to-rule" strategy of Montague Grammar, that crucially forces structure to be "functional" in the sense of encoding all and only relations relevant at SEM (see section 2.4).

2.2. Semantic structure

Whatever in CIR's is linguistically expressible granted the resources of the speaker's I-Language is mapped by the interface transducers <S> into "semantic" representations (SEM's hereafter). SEM's, contrary to CIR's, are exclusively constituted by resources internal to specific I-Languages. At SEM, on the other hand, the system is already working automatically, i.e. SEM elements will be selecting and combining with each other as determined by their internalist principles. There may well be another "buffer" or "working area," but speakers do not seem able to access it with feedback, "executive control" is no longer needed, and automatic parallel processing is possible at this and subsequent stages of SD.

At the SEM interface, the major types of entities are individuals and events (the basic ontological types), and their respective properties (including relations and higher order properties), i.e. properties of individuals (e.g. thematic roles, identification, reference), properties of sets (e.g. modification, quantification), and properties of states of affairs and events, including speech events (tense, aspect, adverbials, etc.), all of them as defined in the internalist I-Language world. The matter has not been systematically investigated, but much of Saussurean and cognitive semantics (e.g. Lakoff and Johnson 1980, and subsequent work) is relevant, and the task is clear enough in principle: what must be analysed is not "reality" (scientific or folk-theoretic), but what I-Languages really name and the properties of the entities they hypostatise, and the place to start is the Lexicon. As Chomsky (2000b: 39–40) notes, the entities that *book, house, window, door, London*, etc. name are surely "strange" if judged by the ontological standards that science and common sense have fixed, but (polysemy, aside) perfectly orthodox L-World entities, and, in principle, the same can be said of the ontologically strange (e.g. metaphorical) substances, properties, roles, and events that cognitive and, in general, linguistic semanticists are interested in. It is such internalist entities, not concepts, that figure in SEM representations.

As to relevant SEM relations, they traditionally include argument-structure (i.e. "thematic" relations between heads and their arguments), modification (relations between heads and their modifiers), quantification (relations between quantifiers and quantified sets), co-reference (binding, control), tense, polarity, coordination, information structure (i.e. predication, topicalization, focusing), and various illocutionary relational properties of utterances (e.g. "force" in the strict Fregean sense, modality, evidentiality, speaker attitude, etc.; see Bouchard 1995; Rizzi 1997; Cinque 1999; Haegeman and Guéron 1999; Ernst 2002).

However, in practice, SEM relations in need of syntactic encoding reduce to *one* type, i.e. nth-order predicate-argument relations. This may seem a sweeping generalization but, under the rich type system presupposed here, it is not: thematic relations, modification, and quantification all reduce to subtypes of a single relation between nth-order predicates and their respective arguments (see González Escribano 2004a, b); co-reference, although structure-dependent (since it rests on c-command), always acts as a "free rider," in the sense that no syntactic construction is ever triggered in order to satisfy it, and may be ignored here; tense-relations reduce to argument structure if events are considered as arguments of the function encoded by the functional head Tense; polarity and coordination are standardly treated as monadic and dyadic propositional functions, respectively, in logic textbooks; subject, topic and focus, the key aspects of information

structure, are also considered specifiers of the respective functional heads I, Top and Foc (see Rizzi 1997 on the structure of the "left periphery") and will be considered arguments here; finally, modality, evidentiality, and strict Fregean "force" (declarative, interrogative, imperative, etc.) reduce to predicate-argument structure if the (extended) propositional content is an argument (a complement) of the various functional heads of the CP system, a standard view (see Bouchard 1995; Cinque 1999; Haegeman and Guéron 1999).

2.3. The Lexicon

Elements in SEM, of course, are either directly SEM attributes of LI's or call the Lexicon in search of appropriate SEM matches. Assuming the latter as more plausible, lexical selection is implemented in a two-step process: (1) L-Match, the unification between a set of specifications at the SEM interface and a partially homomorphic SEM set in a LI item in the Lexicon, followed by (2) L-Copy, copying of the relevant LI in the system's working area. On the whole, this corresponds to the standard MG operation Select, but there are major differences: (a) L-Match is driven by C-I instructions in CIR as represented at SEM; (b) L-Match and L-Copy apply gradually (i.e. there is no one-step access to the Lexicon, hence no Numeration/Lexical Array stage in computations); and (c) what is L-copied is the *unification* between the specifications at SEM and lexical specifications, hence SEM might directly supply features not present in the Lexicon. Whether it does largely depends on executional matters concerning such issues as the source of thematic roles, information structure, prosody, and inflectional morphology (e.g. case, number, tense, etc.), which will not be discussed here (see González Escribano 2005b for details).

Economy affects lexical selection in that only minimal L-Matches are aimed at and, correspondingly, only the minimum possible information is L-Copied from the Lexicon into a SD. If a choice arises, the LI with the smallest number of attributes will be preferred (e.g. an empty category or a pronoun or pro-form, in general, over a full noun if the SEM context allows it).

As in GPSG, HPSG, LFG and virtually all current formalized grammars, a lexical item LI is a matrix of [A (LI): v] pairs, where A is conceived of as a function that applies to LI and yields a unique value from a specified range which may include the empty set. An [A (LI): v] pair whose value is the empty set, though, is uninterpretable to CHL, and, if occurring within a SD, must quickly be assigned a non-null value or the SD aborts. Otherwise, as in HPSG, the values may be atomic categories or complex attribute-value matrices. By way of illustration, (2) on the following page represents a possible lexical entry for the double object variant of *give*. No attempt has been made to avoid redundancy by deriving certain kinds of lexical information from others (e.g. S-type from categorial information, C-selection and Case from thematic information, etc.), because it is assumed that such reductions leave residues (see Chomsky and Lasnik 1993: 30–33, and Chomsky 1995: 235–41 for discussion). Information has been grouped by broad traditional "levels," i.e. PHO(nological), SEM(antic), SYN(tactic), and MOR(phological), as in HPSG; the acronyms should be transparent.

PHO is deliberately schematic in (2), as nothing will be said here about metrical structure, syllable structure, or segment-internal articulation. The inherent "meaning" of [GIVE] is also non-committally expressed through both an (extensional) DEN(otation) attribute (valued [[give]] in (2)) and an (intensional) DEF(inition), but the value of the

latter is a conventional formula, similar to many in the literature, but used simply for illustration purposes here. The complex E(vent)-STR(ucture) of [GIVE] is, on the contrary, carefully indicated (Accomplishment dominating Achievement, dominating State), as well as the PRED(icate)-ARG(ument)-STR(ucture) (PAS) of each of the events,

(2)   [GIVE$_1$]
       PHO: BASE: /giv/; PST: /geiv/; PRT: /givn/
       SEM: DEN: [[give]]
            DEF: cause <x, <y to become <y given z>>>
            S-TYPE: Event
            E-STR: [E1$_{CAU}$ [E2$_{INCH}$ [E3$_{STA}$]]]
            PAS (E1): P1$_{CAU}$ < $\underline{1}$, [E2]>; PAS (E2): P2$_{INCH}$ < $\underline{2}$, [E3]>; PAS (E3): P3$_{STA}$ < $\underline{2}$, 3 >
            1 R(P1): Acc; 1 R(P2): Ach; 1 R(P3): Sta; 1 R(1): Ag; 1 R(2): Rec; 1 R(3): Th
            S-SEL (1): Animate; SEL(2): Animate; SEL(3): Physical
            AG: 0; REC: 0; TH: 0
       SYN: CAT: V
            C-SEL(1): CAT: NP, CASE: Nom; C-SEL (2): CAT: NP, CASE: Dat;
            C-SEL(3): CAT: NP, CASE: Acc
       MOR: M-TYP: Stem
            M-STR: ROOT: give; Aff: Tense; TENSE: 0
            DER: -ER: giver
                -ING: giving
                -T: gift

and the thematic role (1 R) of both predicates and their arguments (conventional labels are used for the thematic roles, but nothing hinges on their choice). Tentative (and defeasible) S-selection specifications are also added, as well as syntactic category and C-selection (including typical Case values for each of the selected arguments). Finally, for the sake of completeness, (2) shows MOR(phological) information including M-Type (with values ranging over word, stem, root, affix, and phrase), abbreviated M-Structure (ROOT+ AFFIX, the head status of the latter and its selection specifications not indicated), and obvious derivation possibilities for [GIVE] through integration as a complement of the affixes *–er, -ing,* and *–t*. Obviously, only the information that plays a role in structure-building will be discussed at all here, but see González Escribano 2005b for further detail.

2.4. Uninterpretability, satisfaction through unification, and structure-building

Once LI's are L-copied, they can be "activated" and their unsatisfied features must be "satisfied," which triggers broad syntactic processing (essentially unification) and visible structure-building (morphology, syntax). Activation and Satisfaction might happen serially (i.e. to one LI at a time, the CR "locus" of Collins 2001), or, more plausibly, in parallel, at least in cases of modification (see González Escribano 2004a, b for details), but, if some parallel syntactic computation is possible, severe limitations are to be expected, since the same mechanism must now simultaneously attend to all such active computational *loci*.

Crucial to the structure-building process is the fact that, as stored in the Lexicon, a LI inherently contains two classes of attributes: (a) interpretable ones like PHON(ology), CAT(egory), S(emantic)-TYPE, DEN(otation), DEF(inition), and, if it is relational, EVENT-STR(ucture), PRED-ARG STR(ucture), and C-SEL(ection); and (b) uninterpret-

able attributes with values to be fixed in specific SD contexts (e.g. THETA-ROLE, REF(erent), CASE, or NUMBER, in the case of nominals, and, in the case of all relational LI's, thematic attributes like [AG: o] whose values must be fixed within specific SD's. In the case of a verb like *give* it selects an Agent, a Recipient, and a Theme, but, of course, no particular individuals can be cited in its LI as the values of such attributes; thus, within the SEM matrix of GIVE will be the uninterpretable attributes [AG: o], [REC: o], [TH: o]. When GIVE is L-copied into a SD and activated, unless such attributes are properly valued, they will remain uninterpretable to CHL and the SD will abort (see González Escribano 2005b for details).

Observe that, whereas in current minimalist work an uninterpretable feature is a "virus" that must be removed from the SD as soon as possible (see Uriagereka 1998: 207 on "viral" features), as understood here, an uninterpretable feature is simply one that (temporarily) has no (licit) value, but becomes interpretable when it acquires one. Thus, uninterpretable features are in no sense "imperfections," or entities alien to I-Language. On the contrary, they must exist in LI's in the Lexicon (and temporarily in SD's) because their presence is what makes LI's constructible with others. To the extent that linguistic objects can exist underspecified, their uninterpretable features demand Satisfaction through unification with interpretable analogues and must contract relations with other syntactic objects to obtain it. On the contrary, if all attributes of LI's were properly "satisfied" in the Lexicon, by definition, combinations would be unnecessary, hence impossible granted Economy (Last Resort, see *infra*). The presence of uninterpretable features in LI's, in other words, is what makes them computationally "active," and they remain active for as long as they contain such attributes demanding satisfaction. For the sake of concreteness, "uninterpretability" can be defined as in (3) and "satisfaction" as in (4).

(3) UNINTERPRETABILITY: An [A: v] attribute is uninterpretable if v = o or is unlicensed.

(4) SATISFACTION: An [A: v] attribute is satisfied when v is a licit value; an uninterpretable [A: v] attribute gets satisfied when it unifies with a matching interpretable [A: v] pair.

The intuitive content of (3) is straightforward: although underspecified linguistic objects must exist in the Lexicon as "pieces" of future linguistic constructions, CHL cannot "resolve" linguistic objects in actual SD's unless their value is completely specified. When an uninterpretable feature appears in an active LI in a SD, unless it receives a proper value the system must stop computing and the SD aborts. Observe, though, that (3) potentially covers two different cases: (a) unvalued attributes, i.e. [A: v] pairs where v is the empty set, and (b) [A: v] pairs whose value is illicit in specific syntactic contexts (a circumstance that arises only if I-Language can "make mistakes," e.g. select a nominal with the wrong Case, a verb with the wrong tense inflection, etc.; whether it can is an empirical matter, see González Escribano 2005b). In either case, Satisfaction depends on unification, intrinsically a binary relation between satisfier and satisfied, and must take place individually for each of the uninterpretable attributes. When both participants satisfy each other's uninterpretable features, successive unifications take place; for example, a complement satisfies a selection feature of its head, but the head licenses the Case and Theta Role of the complement (see González Escribano 2005b for further detail). It

follows, first, that "labels," understood by Chomsky (2001, 2005) as full LI's, are irrelevant (see González Escribano 2005b for discussion), and, second, that only binary "constructions" will ever occur (see *infra*).

Economy affects structure-building vs. lexical selection as follows: the most economic system will be the one that computes less. Hence, if lexical selection is sufficient to satisfy SEM specifications, no structure-building will occur at all. Structure-building, recall, takes place in order to satisfy uninterpretable features, which, by definition, have no local value and have to be valued *via* unification with valued attributes "elsewhere," which entails search. Thus, their computation is inherently costly, and generally has the character of a Last Resort strategy used when no appropriate LI is available. By default, Economy blocks all structure-building unless it licenses at least an uninterpretable feature of one of the elements involved. It follows (1) that structure-building will never apply blindly to just any two syntactic objects, and therefore "wild" sets will be directly avoided, (2) that the Projection Principle is redundant, for any head whose thematic selection requirements are not satisfied will be uninterpretable to CHL and the SD will abort, and (3) that Locality of Theta Marking (e.g. the XP-Internal Subject Hypothesis) is also redundant, for it will be impossible to skip a selection feature and proceed to build higher structure leaving the head partially unsaturated.

Ignoring parallel computation of two simultaneously active LI's (i.e. predicate composition, see Chomsky 2001: 18), Satisfaction applies until all the uninterpretable attributes of the active LI have been "resolved." Assuming that subcategorization and selection are encoded via one or more such uninterpretable pairs, absence of necessary arguments is immediately excluded, which gets one half of the Projection Principle. At that point, the LI will be "satisfied" in the sense that all information involved in its resolution is available. Of course, a satisfied head, by definition, cannot be further constructed with items interpreted as additional arguments, since by that time no uninterpretable attributes will remain in its [A: v] matrix and, granted Last Resort, no Satisfaction will be legitimately triggered, so excess of arguments is also automatically ruled out, which captures the second half of the Projection Principle. However, nothing in principle prevents a satisfied [A: v] matrix from being constructed as an argument of another LI that needs it (i.e. as a subject of a predicate of a suitable type), and that is what happens with so-called "adjuncts," which are just higher order predicates of NP's and VP's, in core cases (see González Escribano 2004a, b; 2005a for details).

As to its nature, structure-building is what it is because it must minimally satisfy constraints at both SEM and PHON. At SEM, nth-order predicates and their arguments must be locally available with minimum search, i.e. sisters. The PHON interface, on the other hand, requires also only one syntactically supported relation to be represented, i.e. adjacency of the phonologically relevant units (PHON words and phrases, for present purposes, since nothing will be said here about PHON features, segments, syllable and metrical structure, etc.) on the time-dimension. It follows that CHL minimally entails a structure-building operation that yields properly attached nth-order predicate-argument pairs ordered as adjacent elements. Under standard two-dimensional representational conventions, minimal attachment is sisterhood, hence that conceptually necessary operation must yield adjacent sisters. Observe that neither mere adjacency of unattached elements nor mere attachment of non-adjacent elements will do. The former would satisfy PHON (as characterized above; of course not if PHON structure at the word and phrase

level is seriously considered) but not SEM, whereas the latter would attend to the needs of SEM, but not those of PHON. Since Chomsky's unstructured Merge yields just set-membership, but neither sisterhood nor adjacency, it follows that it satisfies neither condition, and is, in principle, an absolute non-starter. That is, of course, unsurprising from an intuitive point of view: sets *qua* sets play no role in CHL computations. Sets cannot have a category, a thematic role, Case, number, etc.; simply, there are no grammatical rules that apply to sets (or members of sets) *qua* such; hence, CHL does not need, and therefore does not build, unstructured sets. What CHL needs, and builds, is functionally integrated nth-order predicate-argument structures (see González Escribano 2005b).

In general, structure-building is subject to the Economy-related TRANSPARENCY PRINCIPLE in (5) (TP, hereafter), similar to, but stronger than Bach's "rule-to-rule hypothesis" and related principles in CG and various Montagovian approaches.

(5) TRANSPARENCY: Structure is built in order to encode SEM relations as PHON requires.

TP simply restates the basic fact that the flowchart diagram (1) entails, i.e. that "broad syntax" is just a way to turn SEM representations into PHON representations. Of course (5) says little unless the import of the term "relevant SEM relations" is clarified, but has dramatic consequences once all SEM relations are reduced to predicate-argument structure, as above. Thus, TP immediately yields a nice consequence about an unexpected property of Chomsky's Merge, its binary branching nature (BB, hereafter). Granted TP, BB follows automatically. The reasoning (first deployed in González Escribano 1991: 247) is this: since only predicate-argument relations are encoded, through sisterhood, and two arguments contract no predicate-argument relation to each other, they cannot be attached to each other as sisters. Thus, ternary-branching Head+Arg$_1$+Arg$_2$ configurations (order irrelevant) are automatically excluded. It follows that syntactic heads can have only one argument (of course LI's themselves can be polyadic, like *give* above, but in that case they will unfold into a series of successive projections, e.g. Larsonian "shells," or Chomsky's "multiple specifiers"). If a head had a second argument, it would have to be a second sister, but in that case the two arguments would themselves have to be sisters, and they cannot be sisters, as they are not semantically related; hence they cannot be arguments of the same head at all. Two predicates of different order, on the contrary, can stand in a predicate-argument relation to each other in cases of modification (= predicate composition), and therefore can be sisters (see González Escribano 2004a, b). Yet, multiple modifiers of the same head are also forbidden: two predicates cannot simultaneously be in a predicate argument relation to a third predicate without becoming sisters and contracting a second predicate argument relation with each other, but they cannot contract such a relation, so ternary Head+Mod$_1$+Mod$_2$ configurations (order, again, irrelevant) are also excluded. Thus, TP effectively imposes binary-branching throughout.

The fact that structure-building is triggered by, and occurs under, Satisfaction, rather than under Chomsky's set-forming Merge, also trivially explains the existence and crucial importance of the "mysterious" c-command relation: C-command must be computed in CHL because syntactic objects are hierarchically organized attribute-value matrices and Satisfaction requires access to, and manipulation of, their internal attributes. Of course, c-command is unexpected under Chomsky's set-forming Merge, which entails atomicity

of phrasal objects and rests on Lexical Integrity, but Lexical Integrity is an illusion created by the fact that PF rules must operate on fixed segmental templates of PHON information, and, in fact, holds at no point in standard minimalist SD's: in the Lexicon, LI's are underspecified (i.e. "incomplete"); by the time they enter lexical arrays, they have been modified *via* addition of various contextually determined feature(values); in narrow syntax, LI's exist only as "modified LI's"; and, of course, even modified LI's dissolve beyond Transfer/Spell Out to leave only interpretable PHON/SEM information at the interfaces, or FI violations arise.

2.5. *Displacement*

The minimalist approach defended here also differs from standard MG in what concerns the conception and the fine details of implementation, but not the deep causes, of displacement. As to the latter, it is assumed here that displacement is enforced by the need to satisfy discourse-related properties like information-structure and illocutionary force. For concreteness, displacement exists because certain elements have not only their basic thematic properties (as nth-order predicates or arguments), but additional ones as e.g. subjects, *foci*, or topics, i.e. as arguments of special functional heads like Pr (= Predication), Foc (= Focus), Top (= Topic), or C elsewhere in the structure. In its broad sense, this is a widely shared assumption in MG and beyond, but different implementations are possible.

According to the standard minimalist "copy theory of movement," displacement is internal Merge of a copy of a full category subsequent to feature-agreement between an uninterpretable "probe" feature in the target and an interpretable analogue in the goal, i.e. at bottom, displacement reduces to feature satisfaction, except that the attractor categories are functional rather than lexical (see for example Chomsky 2000a), and the features involved are "strong," or, as Uriagereka (1998: 207) aptly calls them, "viruses" that must be eliminated as soon as possible.

However, that view of "uninterpretability" has no place in the present theory (see González Escribano 2005b). According to (4), an attribute is uninterpretable only if it lacks a proper value; a feature that CHL does not recognize is simply irrelevant. Therefore, under present assumptions, what has to be said is that the core targets of movement (e.g. PrP, FocP, TopP, CP, etc.) cause displacement because they contain unvalued selectional attributes. In particular, PrP, FocP, TopP and relative CP require visible arguments (a subject, a focus, a topic, a *wh*-item, respectively) that are not satisfied unless suitable constituents are attached to them as sisters, in this case specifiers, but comparable reasoning reduces head adjunction to satisfaction of uninterpretable features, e.g. an I (our Pr) head or the +Q attribute of an interrogative Foc selects a suitable finite verb as its sister, so the verb adjoins to a head in that case.

On the other hand, the "copy theory" of movement causes serious implementation difficulties, as well as obstacles to the smooth semantics <> syntax mapping that TP imposes, and cannot be assumed here. Of course, *prima facie* its advantages are obvious, e.g. LF restructuring can be dispensed with, and, whereas under trace theory Inclusiveness is violated, under the "copy theory" it is not. Indeed, if displacement literally involves a copy, set-theoretically speaking there is no objection, for {a, b} and {a, a, b} name the same set-theoretical object. However, leaving aside now the deeper objection (see González Escribano 2005b) that *sets are completely irrelevant* to I-Language, even under Chomsky's

assumptions, the "copy" theory is hard to implement and reconcile with the rest of the grammar.

First, of course, the "copy" in the landing site cannot literally be a copy, for, on being attached to its target, it automatically acquires new properties (e.g. it becomes a specifier of T, Foc, Top, C, etc., gets a licensed nominative Case feature, gets a licensed Subject, Focus, Topic, or +Q feature, etc.). Secondly, multiple copies cause trouble at the interfaces (e.g. semantic type clashes) and must be eliminated, but there seems to be no way to do it cleanly without causing difficulties elsewhere. Note that it does not suffice to claim that the P-features of all but the highest copy are "muted" at PF/P, for the real issues arise at the SEM interface. Roughly, in order to avoid type clashes, unwanted SEM information must correspondingly be removed from all but the lowest copy. That should not be problematic if roles, reference, etc. are attributed to full chains, as assumed, and some link in them (e.g. the lowest) conserves SEM information, but a serious problem arises with precisely the discourse-related SEM features Subject, Topic, and Focus involved in core cases of displacement.

The problem is this: obviously, no licensed instances of such attributes can be available in the lowest copy, so if all SEM information is eliminated from the unwanted higher ones, the licensed tokens of such attributes will be removed from the SD, which will cause a violation of the principle of Conservation (alias, Recoverability of Deletion). The alternative is to allow licensed tokens of just Subject/Focus/Topic features to arise and survive only in the highest copy, and for that purpose they must be excluded from the general process of deletion of SEM features in all but the lowest copy. That, however, seems inconsistent with the theory of chains and their legibility conditions at the SEM interface, for the result is a strange discontinuous object which, ignoring violations of the Minimal Link Condition, is not properly a set of "copies," but an "original" and one or a few "added" features. Such a solution is *ad hoc* and, of course, technically impossible if CHL is indeed subject to Atomicity and No-tampering. To this must be added the technical problem of assigning a semantic type to "strange" categories consisting exclusively of attributes like [Focus], or [Topic], for that is all the SEM information that will remain in them after everything else has been removed to avoid type clashes.

All this suggests that the "copy theory" should be abandoned and replaced with an operation that naturally allows scattered features of a given (future) category to be grouped if necessary, i.e. unification. Lexical Integrity cannot be maintained anyway, as stated, and displacement must be reinterpreted as feature attraction rather than copy, i.e. it must be assumed that sublexical elements (e.g. PHON features) can move on their own leaving no copy. In other words, a category can be "split" in order to allow different attributes thereof to occupy new structural positions and perform signalling duties for additional (but compatible) functions as Subject of PrP, Focus or Topic (apart from thematic ones like Agent, Theme, etc.).

Thus, e.g. PHON attributes of the subject are attracted to Spec Pr, PHON features of a *wh*-phrase are attracted to Spec Foc or C, etc., while their respective intrinsic SEM attributes remain *in situ* and *new* SEM properties (Subjecthood, Focality, Topicality, etc.) arise under unification with the specifications of the respective target sites. Observe that no copies are made, so they need not be subsequently disposed of either, no type clashes arise, since SEM features are not duplicated, and, crucially, nothing need be added to guarantee the necessary "reunification" of such fragments of categories throughout SD's

and thereby save appropriate form-meaning correspondences, for, under present assumptions, as in HPSG, attributes are functions that take a particular object as their first (domain) argument. Hence, no matter where they occur, the identity of their domain argument will unambiguously establish which chain they belong to.

Displacement remains a marked CHL option in that it entails re-using linguistic material, but otherwise it reduces to satisfaction and unification. The predicates Pr, Foc, Top and C have uninterpretable features that must be valued, therefore they need a visible argument, and an argument must be their sister. Since what makes arguments visible is their PHON content, and the domain argument of PHO will nevertheless call the appropriate chain, if CHL is subject to Economy (read: minimize computation), nothing but PHON information should be displaced from the relevant category, and that is what happens: just PHON features reach Spec Pr, Top, Foc, or C. The "displacement" effect is simply a consequence of the fact that an argument must be a sister of the relevant head, and it cannot be a sister until enough intermediate structure is built.

2.6. Economy, PHON, and PF

A choice of LI's immediately supplies a SD with PHON information that must be incrementally handed (by Transfer, in standard MG) to the PF component as soon as uninterpretable features have been licensed in the respective categories and all necessary syntactic structuring in the "phase" (see Chomsky 1999, 2000a, 2001) has taken place.

For present purposes, as stated, all that PF requires of its input is adjacency, i.e. linear order, which follows from hierarchical structure-building and Kayne's Linear Co-occurrence Axiom (see Kayne 1994 and González Escribano 2004a, 2005a on how LCA can be further exploited to deduce recalcitrant adjacency phenomena). PF computation, then, incrementally yields the enriched interface representation PHON, to which syllable structure, metrical structure, phonological prominence, and further segmental specifications will have been added, but the semantocentric approach of (1) has nothing special to add to standard treatments in this respect, which are assumed here, so just a few final considerations will be made in closing about how PHON is affected by Economy considerations beyond FI, particularly by Transparency, in what concerns ellipsis and anaphoric processes.

The basic intuition is trivial: assuming that PF operations are also computationally expensive and therefore Last Resort, we expect syntactic output matching semantically prominent information to also receive phonological prominence at PHON and be unequivocally mapped to A-P for the hearer to recover, whereas what is relatively redundant in SEM (e.g. current topic) may be phonologically reduced or elided by PF. Although the issues merit careful research and more detailed treatment than can be afforded to them here (see for instance Merchant 2001), this hypothesis offers insight into interesting aspects like anaphora and ellipsis, because a natural hierarchy of syntactic elements as to their degree of intrinsic prominence, and general predictions as to their omissibility or reducibility at PHON follow from the Last Resort nature of structure-building vs. mere lexical selection.

The reason is trivial: granted the need to minimally satisfy SEM, the zero choice Economy-wise is the use of lexical heads, followed, if strictly necessary, by their arguments and adjuncts. If an argument is obligatory, its presence follows from Last Resort and

Conservation and is not particularly informative nor need be prominent at PHON. If it is optional, on the contrary, its presence automatically makes it informationally prominent at SEM and non-omissible at PHON. Modifiers, by their very nature, are always optional in SD's, hence their presence intrinsically makes them potential informational *foci* at SEM and non-omissible at PHON. Thus, lexical heads, the optimal expressive choices, could be characterized as degree 0 in prominence, their obligatory complements as degree 1 (obligatory) or degree 2 (optional), and their modifiers as always degree 2.

Since, granted TP, omissibility or reducibility is a function of the informational content of constituents, such a hierarchy largely predicts the existence and specific properties of PF processes like Gapping, Stripping, Sluicing, as well as lexical selection phenomena like Do(So) Replacement, One-replacement, and other pro-forms earlier in SD's. Observe that in e.g. Gapping, the head verb/noun is necessarily affected, whereas its dependents may not be, and that prominent PHON material remains, whereas everything else goes, in cases of Stripping and Sluicing. As stated, full treatment (out of the question here) is needed, particularly in relation to Merchant's account, but the consequences are intriguing, and point to a close integration among Economy, Transparency and semantocentric grammar. Whether these speculations point in the right direction, only further research will tell, but they look promising, as do other features of the semantocentric approach.

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