Representations and Responsibilities

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Smith, Neil. 2003. **Representations and Responsibilities.** *Korean Journal of English Language and Linguistics* 3-4, 527-545. I look at the respective responsibilities of different components of the language faculty in the description of two radically different kinds of linguistic phenomenon. The first is the production/perception mismatch in the child's acquisition of the phonology of its first language. There is strong evidence that the child's lexical representations are the same as the adult's, but I argue that the child's own pronunciations, have *no* linguistic status and are best treated as the product of a neural network. The second is the nature of compositionality, where I argue that compositionality in Natural Language is derivative from that in the Language of Thought. With this assumption and using evidence from quantification in 'backward control' structures, I argue that chain theory is intrinsically inimical to a simple view of the legibility relation between LF and LoT.

Key Words: levels of representation, acquisition of phonology, neural network, compositionality, (backward) control, language of thought, legibility

It is by now a commonplace[1)] that, given some 'linguistic' fact, there is need to provide evidence for whether it should be treated by the grammar or by some extra-grammatical system the parser, production mechanisms, pragmatics, etc. If the grammar is responsible, there is a further decision as to which component(s) – phonology, morphology, syntax or semantics should be invoked. (See Smith & Cormack, 2002). For instance, the semantics may be simplified by complicating the syntax, as in the clausal analysis of intensional transitives (see den Dikken et al, 1997); the syntax may be simplified by appealing to phonology, as in the treatment of focus (e.g. Szendroi, 1999); the

[1]See for instance the April 2003 GLOW programme on "The Division of Labour".

syntax of resultatives can be simplified by appealing to pragmatics (cf. Cormack & Smith, 1999:266).

If Chomsky's speculation in the epigraph is correct, a number of other conclusions follow; specifically that "the only linguistically significant levels are the interface levels" and that "relations that enter into CHL[2]) either (i) are imposed by legibility conditions or (ii) fall out in some natural way from the computational process" (Chomsky, 2000:113). In this paper I want to provide evidence of two different kinds for this minimalist position: one from language acquisition, relating to PF, one from compositionality, relating to LF. In each case I propose that apparent properties of the language faculty are in fact properties of systems external to the language faculty. In the case of the language acquisition example the facts fall out from the computational process (in a perhaps extended sense of that notion); in the case of compositionality the facts fall out from properties of a (Fodorian) Language of Thought.

Consider first a traditional problem presented by the mismatch between the child's production and perception of words in its first language. It is well known that little children mispronounce the words of the language they are exposed to, so that a two-year-old learning English might produce 'duck' as [gʌk], 'blue' as [bu:], and 'banana' as [ba:nə]. It is equally clear that the relation between the adult and child forms is systematic and predictable: given that the child pronounces 'feet' as [wi:t], 'finger' as [wiŋə], and 'fire' as [wæ:], it is no surprise to discover that he pronounces 'fork' as [wo:k]. In other words, the child's production is rule-governed. There is also good evidence that such mispronunciations are not an accurate reflection of the child's perceptual abilities, and that the child's lexical representations are in most respects equivalent to the adult surface forms (see e.g. Smith, 1973).

That perception is in advance of production is obvious from a range of phenomena: for instance, the child can successfully

[2]That is the 'Computation for Human Language'.

discriminate minimal pairs where it can pronounce neither of the forms concerned. At a stage when he pronounced both 'mouth' and 'mouse' as [maut], my son Amahl consistently identified pictures of mouths and mice correctly. More strikingly, as a result of the kind of regular rules just alluded to, he pronounced 'puddle' as [pʌgəl], but 'puzzle' as [pʌdəl], so the reason for the mispronunciation of 'puddle' couldn't be his inability to say it.

How to explain these asymmetries is controversial, and a variety of suggestions have appeared in the literature (for a review, see Smith, 2003). My own contribution, long ago, was to argue (Smith, 1973) for the existence and psychological reality of an ordered set of 'realisation rules' that took the adult surface form as input and gave the child's pronunciation as output. A typical example of such a derivation is provided by the sequence in (1), converting 'squat' to [gop]:

(1) a. /skwot/ becomes |skwop|
(harmonising a coronal consonant to a preceding labialised sequence /kw/)
b. |skwop| becomes |kwop|
(deleting pre-consonantal /s/)
c. |kwop| becomes |kop|
(deleting post-consonantal sonorants)
d. |kop| becomes [gop]
(neutralising the voicing distinction between /k/ and /g/).

Various people were unhappy with the apparently baroque complexity of this suggestion, and I agree that it may seem counter-intuitive, but I am unhappy with all the current alternative solutions. These include the claim that the child has two grammars (Hayes, in press), or two lexicons (Menn & Matthei, 1992); that it has to unlearn innate constraints (Stampe, 1969); that its lexical representations are seriously underspecified (Ingram, 1974); that it is indulging in constraint re-ranking of the kind exploited in Optimality

Theory (Gnanadesikan, 1995; Smolensky, 1996; Tesar & Smolensky, 2000); and so on. In particular, I am not persuaded by either of the Optimality-theoretic claims that: "what differs between 'production' and 'comprehension' is only *which structures compete*; structures that share the same underlying form in the former case, structures that share the same surface form in the latter case" (Smolensky, 1996:722-723.); or that " grammars are parallel optimisations over structural descriptions containing both input and surface forms" (ibid. 729-730), with the corollary that: "if grammars are sets of parametrised inviolable constraints, it is difficult to see how, with a single grammar, children could display one set of parameter settings in their productions, while correctly processing adult forms requiring different settings" (ibid. 730).

What is common to all these positions is the assumption that the child's inputs and outputs define levels of representation which are comparable in status. For instance, Hayes (in press, p.30) suggests that children construct a production phonology that maps adult surface forms onto their own, simpler, output representations; and Menn & Matthei claim (1992:243) that both input and output forms are 'stored', tacitly ascribing psychological reality to them and the rules or processes that produce them. I have a different suggestion: the child's output forms are simply not 'represented' at all, and the realisation rules have no psychological status. The immediate gain of such a suggestion is that it rids the language faculty of one complete level of representation, redirecting the responsibility for the generalisations which that level putatively captured to properties of the sensori-motor (performance) systems.

In fact, there are two separate issues involved: the status of the output forms and whether they define a level of representation, and the status of the realisation rules which have those forms as output. Given the knowledge explicit in the child's lexical representations, I take it that both of these must be in some sense independent of competence. The only psychologically real entities for the child are the

adult forms that constitute its lexical representations; its own pronunciations are then the result of the operation of a (connectionist) neural network which yields the appropriate outputs. But these outputs do not define a level of representation: for the child, 'duck' is represented only as /dʌk/; its own pronunciation [gʌk] has no status. The diachronic development of the child's production is then a function of biological maturation, giving rise to the apparently increasing complication of the phonological system.

Suppose it is possible to construct an appropriate network (my connectionist friends could do it in their sleep), are there problems with the suggestion? The putative existence of 'production schemata', 'templates' or 'idiosyncratic strategies' might suggest that the child is manipulating the output forms, but I don't think this is true: no further process or rule of the phonology ever needs to refer to such entities, so they have no formal status, and their properties should fall out automatically from the connectionist architecture.

A more serious problem arises if the child can monitor its own production, suggesting that this output is psychologically real. In essence, this amounts to the question of whether you can 'metarepresent' a non-representation. Consider an example. When he was $2\frac{1}{2}$ years old I had the conversation in (2) with Amahl, as I was puzzled by his ability to pronounce the nasal in 'hand', but apparently not that in 'jump' (Smith, 1973:10):

(2) Me: Say 'jump'
A: [dʌp]
Me: No, 'jump'
A: [dʌp]
Me:No, 'jummmp'
A: Only Daddy can say [dʌp]

It is clear that his final [dʌp] is intended to represent the adult form 'jump'. But equally it looks as if he is referring indirectly to his own

pronunciation, as otherwise the remark makes no sense. But referring to his own output is precisely what he ought not to be able to do if it is really not represented and has no status. Fortunately, there is a way out: any processing model must contain a response buffer in which there is an 'echo' of the preceding few seconds exchange, and it is this, rather than any encoded representation which is used to monitor one's own output. Such echoic monitoring could also account for whatever 'repairs' take place in child language and, despite Clark's (2003:144) remark that such self-corrections appear from age one onwards, I suspect that they do not appear systematically until the age of three or so: after the majority of childhood mispronunciations have disappeared. The conclusion we have reached is that we can simplify the child's phonology by the elimination of one level of representation.

Let us turn now to the other 'end' of the language faculty – the Conceptual-Intentional interface – and look at the nature of compositionality. No-one seriously disagrees that natural languages have a compositional semantics, but it is not self-evident where this uncontroversial property resides: as part of the language faculty, as derived from other components of cognition or as a joint function of the two. If it inheres in the language faculty, there remains the question of which level(s) of representation it is characterised at 'deep structure', 'surface structure', 'LF', or some further 'semantic' level. For instance, in an introductory discussion of scope ambiguities of the kind in (3):

(3) Most students have read two books by Chomsky

de Swart (1998:99ff.) suggests several different ways of dealing compositionally with them, including quantifier raising (cf. May, 1985), quantifying-in (cf. Montague, 1974), and quantifier storage (cf. Cooper, 1983; Pollard & Sag, 1994). The first of these (quantifier-raising) is purely 'syntactic' and 'interpretive', relating

surface structure to LF, both levels within the narrow syntax[3]). The second (quantifying-in) and third (quantifier-storage) posit independently generated syntactic and semantic representations which are produced in parallel – on a rule-to-rule basis – to capture the relation between syntax and semantics. The two differ in that quantifying-in has multiple syntactic representations, whereas quantifier-storage makes do with a single syntactic representation for ambiguous sentences, allocating the responsibility for resolving the ambiguity to (a more complex) semantics: to 'meaning', as Cooper (1983:13-14) rather vaguely put it. Two points are worth noting: first, the semantic structures involved are immediately truth-evaluable and therefore presumably outside the narrow syntax; second, a single representation for an ambiguous sentence is by definition unsuited to inference. Most important in the current context is that quantifier raising deals with (one aspect of) compositionality purely syntactically, quantifier storage deals with it purely semantically, and quantifying-in involves both.

I wish to argue that the source of compositionality is indeed outside the syntax proper ('FLN'[4]) in the sense of Hauser et al, 2002), but that a traditional notion of world-oriented semantics is the wrong place to relocate it. Rather one should take the locus of compositionality to be in the Language of Thought (in the sense of Fodor, 1975): that is, outside the language faculty *stricto sensu* but inside the head. With this assumption one can take a small step towards elucidating the relation between Natural Language and the Language of Thought (LoT) and simultaneously constrain the kind of linguistic analysis it is plausible to motivate. The evidence will come from the study of quantification, and will draw on recent work with Annabel Cormack[5])

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[3]The minimalist position that 'surface structure' is not a level of representation doesn't alter the 'syntactic' nature of the operation.

[4]The 'Faculty of Language in the Narrow sense'.

[5]I am grateful to Annabel Cormack for much help and advice. She is not to be blamed for what I have done with it.

on so-called 'backward control' (Cormack & Smith, 2002, submitted).

The Language of Thought must have a compositional semantics in order to support valid inference. We assume that LF is translated into LoT with the intervention of pragmatics. If the translation is as simple as possible, a necessary assumption for acquisition, then LF will derivatively acquire a compositional semantics from LoT.

We further assume, we hope uncontroversially, that analyses should be as general as possible: in particular, an analysis devised to account for ordinary (referential) noun phrases (NP, DP or whatever) should generalise to quantified noun phrases. Given these assumptions, we argue that Hornstein's (1999) use of Copy Theory is incompatible with a simple view of the relation between LF and LoT and, more generally, that all the variants of chain theory proposed in Chomsky (1995) to (2001) are intrinsically inimical to such a direct relation. The position entails a distinction between LF (a representation at the C-I interface[6]) in the usual Chomskyan sense) and LoTF (a representation in the language of thought). It also suggests a distinction between $\text{Competence}_{\text{NL}}$ and $\text{Competence}_{\text{LoT}}$, reflecting the difference between our knowledge of English or Korean, and our knowledge of the Language of Thought in Fodor's sense. That is, for well-known reasons, the NL and the LoT are not identical: NL contains items which encode processing instructions rather than conceptual meanings, such as pronouns (which have to be allocated referents or antecedents), and gradable adjectives such as *big* (which may need a comparison class to be introduced and fixed), and LoT can deploy resources, such as images, which are alien to NL. Given this contrast, there is a natural distinction between $\text{Competence}_{\text{LoT}}$ and $\text{Performance}_{\text{LoT}}$: our knowledge of LoT and our use of that knowledge in particular acts of thinking. That is, the thought processes deployed in (e.g.) problem solving and the 'fixation of belief' are in principle distinct from processes which use natural languages. It is necessary to

[6]This interface is often itself referred to as 'LF', which is thus used with a systematic ambiguity to designate either the representation of a particular sentence, or the level of representation itself.

make this distinction explicit, because of the tendency in some of the literature to run them together. For instance, in discussing "the child's ability to think" and "the roots of thought" Hobson (2002:5, 7, see especially p.105) fails to distinguish the content of thought and the algebra or syntax of thought, which renders that content transparent. (For discussion, see Smith et al, submitted).

Against this background of multiple competences and the need for compositionality, consider examples of the type in (4a) from Hornstein (1999:79) with the syntax and semantics as in (4b) and (4c) respectively, as compared to the quantified example in (5), (where 'S-O' is 'Spell-out'):

(4) a. John hopes to leave
b. [$_{IP}$ John [$_{VP}$ John [hopes [$_{IP}$ John to [$_{VP}$ John leave]]]]]
c. John λx [x hopes x leaves]

(5) Every boy tried to win
a. Every boy [T [$_{VP}$ every boy [tried [every boy [to [$_{VP}$ every boy win]]]]] **S-O**
b. Every boy [T [~~every boy~~ [tried [~~every boy~~ [to [~~every boy~~ win]]]]] **PF**
c. *Every boy tried to win* **PF interpretation**
d. Every boy [T [$_{VP}$ ~~every boy~~ [tried [~~every boy~~[to [$_{VP}$ ~~every boy~~ win]]]]] **LF**
e. EVERY BOY λx [PAST [$_{VP}$ [x TRY [to [$_{VP}$ x WIN]]]]] **LF interpretation (LoTF)**

On the standard assumption that we are building the structure from the bottom up, the embedded VP [*every boy win*] in the representations (5b) and (5d) appears to have a proper meaning. Crucially however, this meaning is not one that enters into the meaning of the whole: the meaning of (5) is not equivalent to (6):

(6) Every boy tried (to make it true that) [every boy win]

It follows that, for a compositional semantics of NL, we do not want the noun phrase 'every boy' to obtain the theta role assigned externally by 'win'. Rather, we need to construe the embedded subject in (5) as a variable *before* it is assigned its theta role. That is, the relation between a theta role and the argument that discharges it needs to be made at some level subsequent to movement and chain construal, the level we refer to as LoTF. The crucial issue is then whether the non-compositionality at Spell Out in (5a) matters.

There are two reasons to suppose that it does. First, as argued in Cormack (1989/1998), sub-sentential phrases such as those in (7), each of which by older analyses contained an np-trace or anaphor, are manifestly interpretable in isolation (with meanings resembling those indicated), not just as parts of a larger vP.

(7) a. [trying to win] LoT: λx [PROG [x try [x win]]]
b. [seeming isolated] LoT: λx [PROG [seem [x ISOLATED]]]
c. [pursued by the Furies] LoT: λx [THE-FURIES [PURSUE x]]

Analyses like that offered in (5) can give no interpretation to these phrases in isolation, since there is no argument chain to licence any 'crossed through' item and its subsequent interpretation as a variable. Conversely, an analysis that can give a meaning to such phrases cannot include a copied (or moved) argument in the embedded subject position in (7a or b) or the object position in (7c). It is not sufficient that the VP or vP is sent from Spell-Out to the interfaces at the next higher phase if there is no next phase. The absence of any copy of an argument is consistent with the fact that in the LoTF (5e), the argument EVERY BOY is only ever required once, wholly externally to the lower VP.

Second, all of acquisition, production and parsing will be facilitated if NL representations are compositional and, on minimalist

assumptions, any deviation from compositionality should be viewed with suspicion. Consider the compositionality of the Spell-Out representation and LF from the point of view of the speaker. He has something to say, formulated, let us suppose, in LoT. How is this to be realised at PF for production? If the syntax of Spell-Out is grossly distinct from that of LoT, it is hard to see how the speaker is to proceed. In particular, presupposing that the constituent lexical items of the LoTF have been selected in such a way that they can be translated into items of LF, there seems to be no reason why he should begin the Merge process by constructing the phrase [*every boy win*], as required by the derivation in (5a), as this has nothing to do with the meaning he wants to construct. Consider instead a procedure for deriving the LF and hence the S-O representation in (5) from the LoTF in (5e). In the example given, this procedure would appear to be straightforward; and from such an S-O representation, the PF representation can be derived, leading to articulation. Crucially, this bypasses the stage of the standard derivation which relates the numeration to Spell-Out. This relation gives rise to the further undesirable implication that in such a derivation grammaticality is not guaranteed, as the derivation might not converge if, for instance, the chains exhibited in the putative S-O form were not capable of being licitly generated due to minimality violations. The grammaticality of the putative S-O form could be a consequence of the status of the initial LoT representation, but then the LF would simply be a notational variant of the LoTF. I take it that although the vocabulary of LoT may be affected by NL, its syntax should be universal—hence largely if not entirely unaffected by NL. It follows that well-formedness conditions on LF should simply reflect those of LoT. If this is so, there can be no real sense in which the lower positions in the chain are copies of the argument, and it should be impossible to find data requiring such copies.

Suppose some NL sentence on a particular reading has an LF representation like that in (8a), where DP_1 and DP_2 are obligatorily

related under identity (e.g. as elements of a chain), so that there is only one element at LF relating to both of them. Suppose that this representation corresponds to the LoTF in (8b), where DP' is the sole meaning associated with the single DP chain in (8a), and that the PF is as in (8c), giving rise to 'Backward Control' (or 'Counter Equi'), i.e. where the c-commanding controller is null and the controllee overt, rather than the other way round as in canonical control:

(8) a. LF:	[DP_1	[$_Y$	DP_2 ...]]
b. LoTF:	[DP′	[λx [.... x	...]]]
c. PF:	[	[....	*DP* ...]]

Because nothing *in the syntax* could stop DP being instantiated as a quantified noun phrase, compositionality would be at risk in relation to the phrase labelled Y in (8a). Interestingly, Polinsky and Potsdam (2002) analyse data from the Caucasian language Tsez, which entails that it has 'Backward Control' structures with precisely the configurations shown in (8). If the discussion of compositionality above is correct, it follows that Tsez structures cannot be analysed as involving either Copy Theory or movement, and an alternative account is necessary. Specifically, in Cormack & Smith (submitted), we defend a solution which is essentially as in (9):

(9) a. LF:	[pro_1	[$_Y$	DP_2]]
b. LoTF:	[DP_2	[$_Y$	DP_2]]
c.. PF:	[-	[...	DP_2]]

Polinsky and Potsdam reject this solution largely on the grounds that syntax cannot guarantee that the null pronominal co-refers with the overt DP. We argue, however, that the required coreference can be obtained via the lexical semantics of the control verb.

To make clear what is involved it is necessary first to outline our account of control, and second to illustrate the kind of meaning

postulate we exploit. Coreference or anaphoric dependency between one phrase and another can be established pragmatically, semantically, or syntactically, or by a mixture of these means. Ordinarily, in such a dependency, one of the two phrases (the anaphor) will be reduced, appearing as a pronoun, *pro*, PRO, or gap, while the other (the antecedent) may be a full noun phrase. At one extreme, the selection of a phrase as antecedent is made on pragmatic grounds (but possibly subject to syntactic restrictions, for example principle C, or c-command for a quantified antecedent). At the other extreme, we have obligatory control as in Principles and Parameters grammars, where for a particular control head, both the antecedent (controller) and anaphor (controllee) are syntactically determined.

Following work in LFG (e.g. Bresnan, 1982; Dalrymple 2001) we argue that it is necessary within Principles and Parameters theory to distinguish two possible kinds of obligatory control, which we call 'Syntactic Control' and 'Semantic Control'. In any control structure, there is a controller, which is an argument of the control head, and a controllee which is associated with the clausal or verb phrase argument of the control head. Consider first canonical control, where the controller c-commands the controllee. In Syntactic Control, the identity of the controllee is determined syntactically, ultimately through the lexical entry of the control head. In a theory postulating PRO, for instance as in Chomsky and Lasnik (1995), the controllee is PRO, where the occurrence of PRO itself is syntactically determined (by the syntactic properties of the non-finite T head selected by the control head). In a 'movement' based version of control, such as that of Hornstein (1999), the controllee is a lower copy, which is also syntactically required by the selection for a non-finite T. In both these theories of syntactic control, the controllee is a subject, and is in a position where it could not have independent, non-anaphoric reference. In Semantic Control, the controllee is in a position where (in non-control sentences) it could have independent reference; it will thus be expressed as a pronoun, perhaps *pro*, anaphorically dependent

on the c-commanding controller. The obligatory controller-controllee relation, and the identity of the controller and controllee can only be determined semantically. We assume that this arises through Meaning Postulates associated with control heads in the LoT. That is, we have an interaction between properties of the LoT and properties of the NL.

All NL lexical heads select for arguments which can, as a first approximation, be given one of the semantic types <e> (entity) or <t> (proposition, subsuming fact, action, state, etc.). For a Control verb, the first selection is for a proposition and the final one for an entity. That is, the s-selection properties of a control verb permit identities like that in (10), for Control 'begin', BEGIN_c:

(10) $\text{BEGIN}_c \equiv \lambda s\, \lambda x\, (\text{BEGIN}_c.\, s).\, x$
where s has type <t>, x has type <e>, and the item BEGIN_c has type <<t, <e, t>>

In the standard Principles and Parameters version of Control, the subject of the embedded clause is forced to be an anaphor, PRO, so that the external argument of BEGIN_c binds the external <e> role both of BEGIN_c and of the verb of the internal clause. However, this is not necessarily sufficient for the semantic well-formedness of a Control sentence. There are other semantic constraints that must be met if a control sentence is to be well-formed. For example, with *try*, the controller must be capable (in the mind of the speaker), of taking on an agentive role in the embedded clause, as we see from the anomaly of (11) and (12a), and the success of (12b), where an agentive role for the external argument of *be elected* is induced by *get*:

(11) #John tried PRO to be conceived in Peru

(12) a. ?#Tim tried to be elected
b. Tim tried to get (himself) elected

These constraints are expressed in the form of Meaning Postulates, which also function as Inference Rules. We can state the requirement indicated above as a Meaning Postulate on the LoT item TRY. We need a Meaning Postulate something like (13), where by 'agentive', we mean both intentional/volitive and causative:

(13) Meaning Postulate 1:
Where type x = <e> and type s = <t>
$\forall s\ \forall x$ [TRY. s. x => x could plausibly have an agentive role in the event given by s]

The Meaning Postulate associated with the control verb *begin* is stronger than this: what is required is something like (14), where 'the Agent role' is the one carrying the most Agent Proto Role features (Dowty 1991:576).

(14) Meaning Postulate 2:
Where type x = <e> and type s = <t>,
$\forall s\ \forall x$ [BEGIN_C. s. x => x has the Agent role in the event given by s]

The stronger Meaning Postulate explains the unacceptability of sentences like (15) and (16) under the control reading of *begin*:

(15) #John began PRO to fall
(16) #John began PRO to be teased by his classmates

It is important to note that Meaning Postulates like that in (14) are statements in the semantics, not syntax, so they are only possible if the controller is one of the arguments of the control verb. Further, there is no way, in Chomskyan versions of generative grammar, of referring to the syntactic subject of an embedded clausal complement, or to the external selection of a selected VP complement, because the semantics

offers only the possibility of referring to the variable *s*, for the type <t> selection. This entails that the controllee in a controller-controllee Meaning Postulate bear some identifiable role in the propositional complement. As Anderson (2001:78) points out, verbs like EXPECT impose no constraint on the role of the controllee in the embedded clause, so that no Meaning Postulate like those given in (13) and (14) is applicable to EXPECT. The essential point is that if a Meaning Postulate like one of those above is given for some verb, then this alone suffices to establish a (semantic) control relation between the matrix subject and the appropriate role-bearer in the propositional argument. This now solves the problem potentially raised by the analysis of the Tsez data by Polinsky & Potsdam. Instead of the syntactic analysis in (8), where the presence of a quantified noun phrase threatened to subvert an analysis which preserves compositionality, we have an analysis as in (9) in which the relation between DP_1 (i.e. *pro*) and DP_2 is established semantically by the kind of meaning postulate in (14). This analysis correctly precludes the occurrence of a quantified noun phrase at the DP_2 position, because *pro* cannot be interpreted as a bound variable in this configuration (For further refinements, see Cormack & Smith, 2002, submitted).

Let me recapitulate the argument: compositionality is necessary in both LoT and NL. It is clearly undesirable to stipulate it twice, and there is evidence from acquisition, parsing and production that LoT has logical priority. Compositionality is threatened by certain analyses of sentences containing quantified noun phrases, in particular when such noun phrases participate in control structures. An example of such an analysis is provided by Hornstein's copy-theory treatment of control; a treatment which is apparently supported by complex examples of 'backward control' in Polinsky & Potsdam's analysis of Tsez. By providing an alternative treatment of such structures in terms of a contrast between syntactic and semantic control, and by exploiting the power of meaning postulates, we can preserve compositionality and moreover allocate its central properties to the

LoT rather than to narrow syntax.

More generally, I hope to have shown that in each of the cases illustrated it is not only possible but desirable to assign the treatment of a particular vexed phenomenon to aspects of the mind outside the natural language faculty proper, thereby providing support for Chomsky's radical and surprising conjecture in the epigraph.

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