

Chains and Phono-Logical Form

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1. Introduction¹

This paper provides empirical and conceptual motivations for a research program concerning the nature of the phonological and semantic interfaces with the syntactic component. The analysis we present here represents only a first step in this program. What we hope the reader will take away from this paper is not a detailed analysis of the phenomena we discuss, but rather a sense of the character that any such analysis must have. The central observation of the paper is that NP-movement, control and anaphor-binding all represent the same phenomenon (cf. Hornstein 1997, to appear). From this observation we argue that NP-t, PRO, and anaphor are allomorphs conditioned by properties of the chains that they occur in.² We show that the choice of allomorph has semantic consequences, indicating that the semantic component has access to morphophonological representations. To account for this fact, we will argue that there is a single level of representation, *Phono-Logical Form*, which provides the input to both the morphophonology and the semantics. This approach represents a reification of the level of S-structure in grammatical theory by collapsing the functions of PF and LF into a single level. We believe that this type of theory embodies the most minimal of all Minimalist-style theories predicated on the assumption that the syntactic component must, at the very least, provide an input representation for the Articulatory-Motor System (PF) and an input representation for the Conceptual Intentional System (LF) (Chomsky 1993; 1995). The simplest instantiation of this assumption is that these two levels of representation are the same.

The argument proceeds from the question of the explanatory power of chains in linguistic theory. We follow the standard assumption that chains are a consequence of movement and then ask whether other syntactic relations

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² The approach is reminiscent of the functional determination hypothesis of Bouchard 1982, Chomsky 1982 and Safir 1985 among others.

also involve chains.³ Rizzi 1986 and Reinhart and Reuland 1993 (among others) argue that anaphora is also a chain relation. Lidz 1997 claims that this conclusion is necessary in a theory in which chains are the only interpretable objects. If a chain is the only legitimate LF object (Chomsky 1993), then we are led to the question of what object of the interpretive component a chain corresponds to. The simplest position is that a chain corresponds to a semantic entity. Turning this around, if every semantic entity corresponds to a single syntactic object, then anaphora, NP-movement and control all *must* involve a chain relation because it is in precisely these cases that we find more than one NP position corresponding to a single semantic entity. These can be unified as chain relations,⁴ giving us a one to one relationship between syntactic objects (chains) and semantic objects (entities).^{5, 6}

Conceptual considerations aside, there are good syntactic reasons to think that NP-movement, control and anaphora all involve the same syntactic relation. These are reviewed in sections Reasons to Unify NP-Movement, Control and Anaphor Binding through Anaphor Binding. In section How to Build and Pronounce a Chain we provide an algorithm for building and pronouncing chains, explaining the allomorphy of anaphor, NP-t and PRO. Finally, section Reasons to Distinguish NP-t, Anaphor and PRO provides evidence against the total unification of anaphor, NP-t and PRO demonstrating semantic differences between them. We further show that these differ-

³ This assumption is not beyond scrutiny and has been questioned by Hornstein (1997), who argues that chains can be eliminated from grammatical theory altogether, their effects reduced to derivational constraints. We do not find Hornstein's arguments convincing by themselves and give evidence in support of the existence of chains below.

⁴ We stand uncommitted on the question of whether the chains in anaphora and control structures are also the consequence of movement, though the analysis of Lidz 1998 is suggestive of a generate and filter approach to chains whereby chains can be formed between any two NPs in the syntax but only those that are referentially unique are legitimate inputs to the semantics. see also Section Alternative 1: Generate and Filter.

⁵ We restrict attention here to chains involving Nouns. Chains of other syntactic categories will have the appropriate semantic content. That is, verb-chains will be interpreted as eventualities and so forth.

⁶ Assertions of identity, like "Clark Kent is Superman," involve two semantic objects, even though both of these correspond to the same individual in the world. That is, this sentence is an assertion that the entity in the model that we call Clark Kent is realized in the world by the same guy as the entity in the model that we call Superman.

ences do not derive from any single syntactic, semantic or phonological property but from the interaction of semantic and phonological properties with the syntactic representation. The theory which best explains these interactions is one in which chains are simultaneously visible to both morpho-phonology and to semantics and in which chains, pronunciations and meanings must meet certain correspondence conditions defined at the interface between the syntax and these other components.

2. Reasons to Unify NP-Movement, Control and Anaphor Binding

The following 10 paradigms illustrate that anaphor binding, control and NP-movement are possible into the same domains (cf. Bouchard 1982, Hornstein to appear, Lebeaux 1984-85). In (1) we see that these relations are possible from the subject into the object of a matrix clause:⁷

- 1) a. **John** was seen **e**
 b. **John** saw **himself**
 c. **John** dressed **PRO**

In contrast, these relations are not possible from the object into the subject of a matrix clause:

- 2) a. * **e** was seen **John**
 b. * **himself** saw **John**
 c. * **PRO** dressed **John**

All three relations are possible into the subject of an infinitival clause:

- 3) a. **John** is expected **e** to lose the race
 b. **John** expects **himself** to lose the race
 c. **John** expects **PRO** to lose the race

They are not possible, however, into the subject of a tensed clause:

- 4) a. * **John** was expected (that) **e** would lose the race
 b. * **John** expected (that) **himself** would lose the race
 c. * **John** expected (that) **PRO** would lose the race

⁷ We follow Hornstein (to appear) in the claim that so-called inherently reflexive verbs have a PRO object.

These relations are impossible across an expletive subject of an infinitival clause.⁸

- 5) a. * **John** was expected it to be likely **e** to lose the race
- b. * **John** expected it to be likely **himself** to/will lose the race
- c. * **John** expected it to try **PRO** to lose the race

An antecedent is always required for NP-t, anaphor and PRO:

- 6) a. * was seen **e**
- b. * **himself** shaved
- c. * It was expected **PRO** to shave himself

In general, the antecedent for NP-t, anaphor and PRO must be the closest possible antecedent:⁹

- 7) a. * **John** was expected Mary to be likely **e** to lose the race
- b. * **John** expected Mary to believe **himself** to be losing the race
- c. * **John** expected Mary to try **PRO** to lose the race

In all three relations, the antecedent must c-command the anteceded:

- 8) a. * **John's** campaign is expected **e** to lose the race

⁸ We follow Williams 1980 in distinguishing Obligatory Control from Non-obligatory Control. The generalizations in this paper are meant to capture only Obligatory Control. Hence cases of Super-Equi do not constitute a counter-example because Super-Equi is a case of Non-obligatory Control, as can be seen in (ii):

- (i) **Roger** thinks that it will be easy [**PRO** to protect **himself**]
- (ii) Roger thinks that it is easy [**PRO** to protect **yourself**]

Space prevents us from discussing Non-obligatory Control, but we note that, like binding into picture-NPs, this process behaves more like pronominalization than NP-movement with respect to the paradigms listed above. cf. Bouchard 1982.

⁹ Two potential counterexamples to this generalization are (i) subject control and (ii) binding in double-object constructions:

- (i) John promised Mary PRO to leave
- (ii) John told Mary about himself/herself

Whether these are actual counterexamples depends on the precise definition of “closest potential antecedent” and on the structure of these sentences. Analysis of these cases would take us too far from the main point of this paper, though it should be noted that the NP object in both examples could be construed as a dative and hence invisible to the relation in question, much as the prepositional object of *seems* does not block raising in English.

- b. * **John's** campaign expects **himself** to lose the race
- c. * **John's** campaign expected **PRO** to lose the race

Split antecedents are impossible with all of these relations:

- 9) a. * **John** was expected **Mary** to be likely **e** to lose the race
- b. * **John** described **Mary** to **themselves**
- c. * **John** persuaded **Mary** **PRO** to describe themselves/each other

Under VP-ellipsis, only sloppy identity is possible in all three cases. That is, (10a) cannot mean something like “John was expected to lose the race and Bill was expected John to lose the race too.”¹⁰ Similarly, (10b) cannot mean that John expected himself to lose and that Bill also expected him to lose; and, (10c) cannot mean that John expected to leave and Bill also expected him to leave.

- 10) a. **John** was expected **e** to lose the race and Bill was too
- b. **John** expected **himself** to lose the race and Bill did too
- c. **John** expected **PRO** to leave and Bill did too

These distributional similarities suggest that A-movement, control and anaphora should be unified as involving the same relation. Failure to unify these relations is failure to explain a clear pattern of facts. The minimal differences between these relations are stated in Table 1.

	# of theta-roles	# of Cases
NP ... anaphor	2	2
NP ... PRO	2	1
NP ... t	1	1

Table 1¹¹

¹⁰ Howard Lasnik notes that we can't tell much from paraphrases which violate the theta-criterion, although in this case it seems as though the impossibility of creating the paraphrase that would give the strict reading is precisely the evidence we need to show that this reading is blocked.

¹¹ The missing cell in Table 1 is one with two cases but only one theta role. We might think this is the relation characterized by expletive replacement (also argued to be a case of chain-formation (Chomsky 1981; Safir 1985); however, there are good reasons to believe this to be the wrong analysis. First, such chains are odd in having the less referential expression of the pair as the head of the chain (cf. fn. 17). Second, Tortora 1997 argues that *there* is an argument and thus should not be in a chain with its antecedent. We will follow Tortora and argue

The above observations suggest that NP-t, anaphor and PRO are allomorphs since they form a minimal set with definable conditions as to when each pronunciation will be used. The tail of a two-membered chain will be pronounced as an anaphor if the chain has two case-positions and as an empty category if the chain has only one case position. NP-t and PRO are further distinguished by whether the chain has two theta-roles or one.

It is important to observe that what differs between NP-t, anaphor and PRO is not statability in terms of properties of these elements by themselves. Anaphor is distinguished from NP-t and PRO by having case; but, there is no distinction between NP-t and PRO statable only in terms of the category itself. In GB, the distinction was in terms of government, but government has since been eliminated (Chomsky 1993). Rather, the differences between NP-t and PRO are determined by properties of the antecedent. The antecedent of NP-t is in a non-theta position while the antecedent of PRO is in a theta-position. So, in order to unify the three elements, we need to consider the chains that they are a part of, as in Table 1. The best analysis of these facts will involve calculations over local chain properties only wherein the computational system can consider only two adjacent links at a time. We will assume this to be the case without argument.

If we don't treat NP-t, PRO and anaphor as alternative pronunciations of a particular chain-position, then we fail to capture the fact that their distributions are so similar. That is, if control and/or anaphora do not involve a chain, then we fail to capture the similarities to NP-movement observed above.

3. Control

3.1. Control as NP-Movement

Standard accounts of control are inadequate because they fail to explain the observed similarity to NP-movement. Better accounts were blocked for two reasons. First, it was observed as early as Rosenbaum 1970 that control and raising had different properties and hence it was a virtue for a theory to distinguish them. We will see below, however, that the standard differences between raising and control reduce to thematic differences. Second, prejudices due to the theta-criterion and the projection principle made it impossible to

instead that the missing cell represents an impossibility, perhaps due to something akin to Chomsky's (1981) visibility condition requiring that a case-marked NP bear a theta-role.

unify raising and control, as illustrated here:

- 11) [e tried [John to leave]] $\Rightarrow$ [John tried [e to leave]]

If the matrix subject position in (11) is not a theta-position, then the theta-criterion is violated since *try* has a subject theta-role to assign. If the matrix subject position in (11) is a theta-position, then the projection principle is violated since *John* would only have the relevant theta-role at S-structure and not at D-structure. Thus, there is no raising analysis of control under standard assumptions. Without the theta-criterion and projection principle, however, the movement is licit, assuming that an element can receive a theta-role via movement.

Standard differences between raising and control are still easily accounted for. In the case of expletive subjects, control is blocked because the expletive cannot bear the theta-role required by the control verb. Whether or not the expletive bears a theta-role in the general case, it cannot bear the agentive theta-role assigned by verbs like *try* for lexical reasons. These elements are simply not compatible with an agentive theta-role and so raising into a position in which such a role is assigned is not possible:

- 12) a. there seems e to be a man in the garden
b. *there tries PRO to be a man in the garden

A similar argument can be made regarding the idiom chunk evidence against treating control as raising. For reasons of thematic interpretation, the subject NP in a control structure cannot both be interpreted idiomatically, as required by the base position, and non-idiomatically, as required by the surface position:

- 13) a. the cat seems e to be out of the bag
b. *the cat tried PRO to be out of the bag

Other standard arguments (such as the argument from the interpretation of embedded passives) can also be handled by thematic principles in a raising theory of control.

3.2. Control as Chain Formation Without Movement

The previous section showed that a raising analysis of control is possible without losing the explanation of the core differences between what is traditionally called raising and what is traditionally called control (cf. Hornstein to appear). However, a movement analysis of control is unnecessary if we

assume that chains exist independent of movement. In a theory where chains can be generated freely, we can maintain the prohibition on raising into a theta position. Control and raising are unified in this approach as involving chains. The differences between PRO and NP-t are thematic in nature. PRO is the caseless tail of a two-theta chain; NP-t is the caseless tail of a one-theta chain.

4. Anaphor Binding

The similarity between NP-t and anaphor was observed as early as Chomsky 1973 but was captured in later frameworks only by stipulating that NP-t was an anaphor. The relation between the antecedent and these elements, however, was unified only as a case of binding and not as chain-formation. If there is a chain in NP-movement and not in anaphor binding, then we fail to capture the similarity other than by stipulation. On the other hand, if there is a chain involved NP-movement and anaphor binding, then the category *anaphor* can be eliminated entirely.¹² On this conception, there is no binding theory independent of chain theory.

In standard accounts, NP-movement forms a chain between the antecedent and the trace so that the NP can be associated with a theta-position. Further, NP-t is an anaphor and hence must be locally A-bound. An overt anaphor must also be locally A-bound, though it does not form a chain with its antecedent. Thus, chain-formation and binding are independent, and redundant in the case of NP-movement. However, if the local A-binding property can be reduced to the chain-formation property, then the redundancy can be eliminated. Hence, local A-binding should be incorporated into the definition of chain. That is, rather than stipulating that NP-t is an anaphor, we say that anaphora is a chain relation and the redundancy is eliminated.¹³ We propose

¹² There is an alternative whereby there are no chains and NP-t is an anaphor. This also eliminates the redundancy but requires that theta-roles are features. Without that stipulation, there would be no way to get the moved an NP assigned the correct theta-role. We will not pursue this possibility here.

¹³ Howard Lasnik points out that the resulting theory resembles that of Chomsky 1973 quite closely. In that theory, both NP-movement and anaphor binding were viewed derivationally and hence were subject to the same conditions on rule application. The anaphor discussed in that work was *each other* and not *himself* and was related to its antecedent by a rule of *each-movement*. Given the claim of the current work that an anaphor is the spell-out of the tail of a chain with two theta- and case-positions, The distributional unity of reflexive pronouns and recipro-

that an anaphor is like an NP-t with case.¹⁴ That is, an anaphor is the spell-out of the tail of a chain containing two theta-positions and two case-positions.

So far we have presented the following points. NP-movement, local anaphora and obligatory control are the same phenomenon. We have hinted at two possible hypotheses to account for this unity. The first of these allows raising into a θ -position and so NP-t, anaphor and PRO are unified under movement theory. PRO is simply NP-t when the antecedent is in a θ -position. Anaphor is NP-t with case. The second hypothesis does not allow raising into a θ -position and so chains are formed freely, analogous to the theory of free indexation. NP-t, anaphor and PRO are unified under chain theory. On this view there will be a chain pronunciation algorithm which states that a chain with 2 θ -roles and 2 Cases has an anaphor at its tail; a chain with 2 θ -roles and 1 Case has PRO at its tail; a chain with 1 θ -role and 1 Case has an NP-t at its tail. In the next sections, we flesh out these alternatives.

5. How to Build and Pronounce a Chain

5.1. Alternative 1: Generate and Filter

The first alternative we will consider is one in which chains are generated freely. On this approach, any two NPs in a syntactic representation may be connected by a chain. However, these chains are filtered by an interface principle requiring a one-to-one correspondence between semantic entities and syntactic chains:

- 14) *Syntactic Uniqueness Principle (SUP):*
one semantic entity corresponds to one syntactic chain.

A syntactic representation is interpretable provided that the SUP is satisfied.

cals leads us to the conclusion that reciprocals are also the spell-out of the tail of such a chain and that the late phonological choice between reflexive and reciprocal is driven by semantic considerations. This conclusion provides further evidence for the view that PF and LF are the same level of representation (cf. section Reasons to Distinguish NP-t, Anaphor and PRO). Distributional differences between reciprocals and reflexives (cf. Lebeaux 1983) must then follow from other principles.

¹⁴ Compare Bouchard's Principle of Lexicalization (Bouchard 1982, p. 41) which entails that an empty category will be pronounced if it has case.

Chains can be formed either by movement as in (15a) or by “base-generation” as in (15b–c).

- 15) a. John was expected e to leave $\langle \text{John}, e \rangle = \text{JOHN}$
 b. John expected himself to leave $\langle \text{John}, \text{himself} \rangle = \text{JOHN}$
 c. John expected PRO to leave $\langle \text{John}, \text{PRO} \rangle = \text{JOHN}$

Chains formed between referentially distinct NPs will be blocked by the SUP:

- 16) John expected Bill to leave $\langle \text{John}, \text{Bill} \rangle \neq \text{JOHN}$
 $\langle \text{John}, \text{Bill} \rangle \neq \text{BILL}$
 Therefore: $*\langle \text{John}, \text{Bill} \rangle$

Given the SUP, we must also block chains that are formed across syntactic domains that are too large, as in pronominalization structures or superraising constructions:

- 17) a. John expected Bill to see him $\langle \text{John}, \text{him} \rangle = \text{JOHN}$
 b. John was expected it to be likely e to win the race
 $\langle \text{John}, e \rangle = \text{JOHN}$

These structures satisfy the SUP but are not licit chains. We therefore need an additional locality requirement on chains. Only sequences which meet the locality requirement are licit chains:

- 18) $C = (a_1, \dots, a_n)$ is a chain iff C is the maximal sequence such that for all j, $1 \leq j < n$, the link from a_j to a_{j+1} obeys the Minimal Link Condition¹⁵

Now, given the definition of chain in (18) and the well-formedness condition on chains in (14) we need an algorithm for pronouncing the elements of the chain. This is given in (19):

19) *Chain Pronunciation Algorithm:*

Given α and β , successive links in an A-chain, β in a theta-position:

$\beta_{[+case]} = \text{anaphor}$

$\beta_{[-case]} = [e]$ (where $[e]$ is NP-t or PRO)

5.2. Alternative 2: Dramatis Personae

An alternative approach places a semantic restriction on the numeration.

¹⁵ The precise formulation of the Minimal Link Condition is beyond the scope of this paper. We assume something like the definition of Chomsky (1995).

Here, every entity in the semantic representation will correspond to one and only one element in the numeration, in accordance with the principle in (20):

20) *Unique Lexical Access Principle:*

each semantic entity corresponds to exactly one lexical item in the numeration.

On this view, syntactic chains are formed for syntactic reasons alone. NP-movement is driven by syntactic properties like case, in the standard fashion. Anaphor binding, on this view, also involves movement. Here the movement is driven by the need to identify a theta-role since the NP is assigned case in its base position.¹⁶ Control structures involve movement both to identify a theta-role and to get case. Independent principles determine how the chain is pronounced, i.e., whether the tail is an empty category or an anaphor. These principles roughly follow the approach of Nunes 1995.

Nunes 1995 argues that deletion of the base position in a movement structure is required to satisfy the Linear Correspondence Axiom (Kayne 1995). If you didn't delete one position, you couldn't linearize the structure. Thus, NP movement leads to deletion of the base position, as in (21):

- 21) a. {John, was, expected, to, leave} numeration
 b. [was expected [John to leave]]
 c. [John was expected [John to leave]] movement is copying;
 driven by Case
 d. [John was expected [e to leave]] delete base-copy

If the base position of a chain is a case-marked NP, a problem arises when this position is targeted for deletion. Because this position has case, it must be morphologically realized. Thus, a case-marked NP targeted for deletion must be replaced (rather than deleted) in order to meet the linearization conditions. Since an anaphor is the least specified NP (both morphologically and semantically) that can be used as a replacement, it is used as the replacement item, as indicated in the derivation (22a–d). If the base position in the structure (22c) is not a case position, then the NP in this position is deleted, i.e., pronounced as $\emptyset$, as illustrated in (22e).

- 22) a. {John, expected, to leave} numeration
 b. [expected [John to leave]]
 c. [John expected [John to leave]] movement driven by θ

¹⁶ Note that this theory will require an assignment theory of case as opposed to a checking theory.

- d. [John expected [himself to leave]] if +acc, base-copy = anaphor
- e. [John expected [e to leave]] if -acc, delete base-copy

5.3. Some Implications

We believe that the chain pronunciation analysis outlined above leads to some interesting implications for the theory of movement in general. As an illustration, consider the nature of Strong Crossover violations, standardly treated as violations of Principle C:

- 23) * Who_i did he_i see e_i

Here, a chain must be formed between the position of the pronoun and the position of the *wh*-trace. That is, the structure of a sentence like (23) is really:

- 24) [CP *who* [IP *who* see *who*]]

This structure includes a chain connecting [spec, CP], [spec, IP] and the complement position. The chain between [spec, IP] and the complement position must be pronounced as <who, himself>, given the chain pronunciation principles outlined above. Thus, the element in [spec, IP] (and not the complement) must ultimately be treated as the variable bound by the *wh*-quantifier, leading to the pronunciation in (25):

- 25) who saw himself

The sentence in (23) simply cannot be generated. Strong-crossover structures do not arise because in all cases they can be pronounced as non-crossover structures. Thus, strong-crossover is not properly a syntactic phenomenon, but a morphological one.

We anticipate that similar considerations will be operative in the analysis of weak-crossover, parasitic gaps, improper movement and resumptive pronouns.

6. Reasons to Distinguish NP-t, Anaphor and PRO

Given the conclusion drawn above that the difference between anaphor, NP-t and PRO is simply a difference of allomorphy, i.e., of pronunciation, we would expect that there are no significant semantic differences between these elements. We don't expect the meaning of a formative to change simply because its environment triggers one allomorph over another. However, we

find that empty categories are more closely tied to their antecedents referentially than anaphors are. This point can be seen when we consider the Madame Tussaud examples first discussed by Jackendoff (1992). Jackendoff shows that an anaphor can refer to a representation of its antecedent. In a scenario in which Ringo Starr goes into a wax museum which has a set of statues representing the Beatles and Ringo trips when approaching them, we may say (26) to mean that Ringo fell on the statue that portrays him:

26) Ringo fell on himself

Lidz (1997a) labels this interpretation “Near-reflexive.” Interestingly, an overt anaphors allow Near-reflexive interpretation but empty categories do not.

- 27) a. **Ringo** was expected **e** to be on display at the museum
 b. **Ringo** expected **e** to be on display at the museum
 c. **Ringo** expected **himself** to be on display at the museum

(27c) can have the reading that Real-Ringo expected that Statue-Ringo would be on display. However, such an interpretation is blocked in (27a-b). The gaps in (27a-b) cannot be interpreted as the statue unless the antecedent is also interpreted as the statue.¹⁷

Interestingly, in languages with multiple anaphors, interpretation varies with the form of the anaphor exactly along the lines of the variation between the empty category and the anaphor in English. In Kannada, for example, the morphologically simplex anaphor *tannu* must be completely identical with its antecedent, while the morphologically complex anaphor *tannu-taane* can be interpreted as a Near-reflexive:

- 28) a. **Ringo tann-annu** boolisikoNDa
 Ringo self-ACC shaved-REFL
 'Ringo shaved'
 (=Beatle shaved Beatle; ≠ Beatle shaved Statue)
 b. **Ringo tann-annu-taane** boolisikoNDa
 Ringo self-ACC-self shaved-REFL

¹⁷ Note also that in the cases where statue interpretations are allowed, we cannot interpret the antecedent as the statue and the anaphor as the real guy. An anaphor cannot do a better job of picking out a referent than its antecedent (Jackendoff 1992). We believe it to be a general property of chains that elements in higher positions in the chain are more directly linked to the referent identified by the chain than elements in lower positions. Space precludes elaboration of this point.

'Ringo shaved himself'

(=Beatle shaved Beatle OR Beatle shaved Statue)

Similarly, the affixal anaphor in English has the interpretive properties of an empty category.

29) **Ringo's self**-destruction surprised everyone

We cannot interpret (29) as Real-Ringo's destruction of Statue-Ringo.

A second distinction between empty categories and anaphors in English lies in the set of readings allowed in Comparative Deletion. Strict readings are licensed in comparative deletion structures involving the English anaphor *himself*, but not in comparative deletion structures that involve empty categories.¹⁸

- 30) a. **John** was expected **e** to leave before Bill was
 b. **John** expected **e** to leave before Bill did
 c. **John** expected **himself** to leave before Bill did

(30c) can mean that John expected himself to leave before Bill expected him to leave. (30b), however, cannot mean that John expected to leave before Bill expected him to leave. Similarly, (30a) has only the sloppy reading.

The difference between English *himself* and empty categories is mirrored again in the contrast between types of anaphors in Kannada:

- 31) a. Rashmi Siita-ginta cheenage tann-annu rakshisi-koLL-utt-aaLe
 Rashmi Sita-COMP better self-ACC defend-REFL-NPST-3SF
 'Rashmi defended herself better than Sita defended herself'
 '*Rashmi defended herself better than Sita defended her'
 b. Rashmi Siita-ginta cheenage tann-annu-taane rakshisi-koLL-utt-aaLe
 Rashmi Sita-COMP better self-ACC-self defend-REFL-NPST-3SF
 'Rashmi defended herself better than Sita defended herself'
 'Rashmi defended herself better than Sita defended her'

What we have shown to this point is that certain chains differ from each other interpretively in patterned ways. We will say that there are two sets of properties: the Variable Properties (i.e., properties of variables) and the Near-reflexive Properties:

- 32) a. *Variable Properties*: * Near-reflexive interpretation
 * Strict-identity in Comparative Deletion

¹⁸ Note that this is different from VP-ellipsis which allows only sloppy readings for both anaphors and empty categories.

- b. *Near-reflexive Properties*: Near-reflexive interpretation
 Strict-identity in Comparative Deletion

Crucially, the difference in interpretation between the elements with Variable Properties and the elements with Near-reflexive Properties cannot be attributed to a difference in overtiness because the set of elements with Variable Properties includes both overt and covert elements: English empty categories, English affixal reflexive, and Kannada simplex anaphor. The difference can also not be attributed to Case because in Kannada the simplex anaphor is casemarked and has Variable Properties, like English empty category which does not have case. Finally, the differences cannot be attributed to theta-theory because the two kinds of anaphor and PRO are all alike in this respect. That is, the anaphors and PRO are all members of chains with two thematic roles and yet some anaphors have Variable Properties and some have Near-reflexive Properties.

We now find ourselves in the following state of affairs. We have syntactic reasons to think that NP-t, PRO and anaphor should be unified under the chain relation. But, we have semantic reasons to think that the unification is not total. Taking the syntactic evidence that NP-t, PRO and anaphor should be unified as allomorphs leads us to the conclusion that the pronunciation properties of a chain feed its interpretive properties. The form of the tail of the chain provided by the Chain Pronunciation Algorithm (CPA) determines the range of interpretations provided to that chain. In a theory in which PF and LF are distinct, we must wait until PF to apply the CPA. However, doing so makes the Near-reflexive facts mysterious. How can the PF properties of a chain be relevant to interpretation, given that the interpretive component does not have access to PF? If PF and LF were the same level, this problem would not arise.

To make matters even more complicated, we are also led to the conclusion that the interpretive properties of a chain feed its pronunciation properties. Since there is no syntactic difference between simplex and complex anaphors in Kannada with respect to their relationship to an antecedent, the factor determining which to use is the intended interpretation. This may seem in some ways to be a simple matter of lexical choice, like whether an NP is pronounced *cat* or *dog*, since here too the pronunciation properties have interpretive consequences. However, the analogy is not accurate. Whether an NP is *cat* or *dog* has no effect on the syntactic computation; the phonological matrix is atomic as far as the syntax is concerned. Similarly, the choice of anaphor should have no effect on the syntactic computation. But the presence of an anaphor at all is a consequence of the syntactic computation. The

choice of anaphor (a morphophonological choice) does have semantic consequences, however, and indicates that semantics feeds phonology. This case is different from the choice between *cat* and *dog* because it is a *nonlexical* distinction. The syntax tells you that you need a chain with a certain choice of pronunciation and the semantics tells you which pronunciation is best. In the case of *cat* vs. *dog*, syntax is irrelevant; but, in the case of a simplex vs. complex anaphor, syntax gets you to the choice point. Saying that the choice of anaphor is like the choice of *cat* vs. *dog* misses the important generalization that the distinction between anaphors in Kannada is the same as the distinction between overt and covert elements in English. The lexicon is irrelevant in the choice between anaphors and empty categories in English and so must be irrelevant to the choice between anaphors in Kannada. The conclusion is thus that we need PF decisions to be made on the basis of LF representations. It is the interpretation which leads to the morphophonological choice.

In order to account for the fact that the pronunciation properties of a chain have semantic consequences and that the interpretive properties of a chain have phonological consequences, we claim that a chain is simultaneously visible to both morphophonology and semantics. In order for the chain to be available to two extrasyntactic components, we need a grammatical architecture in which there is a single level of representation, *Phono-Logical Form*, which provides the input to both morphophonology and semantics.

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