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Linearizing the control relation: A typology

1 Introduction*

The Copy Theory of Movement (CTM) (Chomsky 1993, 1995) requires that a moved element be fully represented at each step in its movement chain. Since only one copy in a chain is usually pronounced, this has necessitated adding theories of Selective Copy Pronunciation (SCP) to Universal Grammar. Such theories permit chains to be linearized in more than one way, allowing, for example, non-highest copies to be pronounced (Pesetsky 1998; Fox and Nissenbaum 1999; Bobaljik 2002; Nunes 2004; and others). In this paper, we restrict attention to a single domain of investigation, namely, Obligatory Control, in which there is variation in the pronunciation of copies cross-linguistically. We adopt the Movement Theory of Control (MTC) (Hornstein 1999, 2000; Boeckx, Hornstein and Nunes 2010) and show that a complete typology as expected given a SCP theory is seen: one may pronounce a higher copy, a lower copy, either copy, or both copies.

The rest of the article is organized as follows. Section 2 gives a brief overview of the evolution of the theory of movement within the Principles and Parameters framework, focusing on its latest adaptation as the CTM and how it gives rise to SCP. Section 3 introduces the MTC, providing a brief presentation of the theoretical assumptions it is based on. In section 4, we present the control typology. Given the CTM and SCP, the expectation is that a control construction could pronounce the higher copy (forward control), the lower copy (backward control), either the higher or the lower copy (alternating control), or both copies (copy control). We discuss the first three types of control in section 5, using evidence from English, Greek, and Japanese, respectively. In section 6, we present and analyze a case of copy control in Assamese. Section 7 is a conclusion with a discussion of cross-linguistic variation.

We use the following abbreviations in glossing: 3—3rd person, ABS—absolute, ACC—accusative, CL—classifier, CNP—conjunctive participle, CNPP—conjunctive participle clause, GEN—genitive, NEG—negative, NOM—nominative, PRS—present, SJV—subjunctive, SG/PL—number.

2 Movement

Movement of a constituent from one syntactic position to another has been a defining characteristic of Chomskyan syntax from its beginnings (e.g. Chomsky 1965, 1973). The purpose of movement was, and still is, to allow an element to be in two places at once – to satisfy various syntactic, semantic, phonological, or lexical requirements at multiple places in a structure. Chomsky (1973) introduced traces as a device to mark the launching position of a moved constituent. A trace was an empty category, a phonologically null element, that was coindexed with the moved element. It inherited various interpretive properties from the antecedent via this coindexation. Traces were empirically motivated (Chomsky 1977a, 1977b) and, at the same time, their lack of phonetic content accounted for the observation that movement leaves nothing phonologically substantive behind.

Chomsky (1993) rejected traces for both theoretical and empirical reasons. On the theoretical front, they violated his Inclusiveness Condition (Chomsky 1995: 228), which required that no new objects be introduced by the syntactic computational system and that syntactic representations only be built from lexical items. Traces violate Inclusiveness because they are introduced during the derivation following movement and do not originate in the lexicon. Eliminating traces thus simplified the syntactic ontology. Instead of traces, Chomsky (1993) returned to ideas originally put forth in Chomsky (1973) and contended that traces were actually copies of the moved element – the so-called Copy Theory of Movement (CTM). Under the CTM, movement constructions such as Subject-to-Subject Raising in (1a) and *wh*-movement in (2a) receive the partial analyses in (1b) and (2b), respectively, in which copies of the moved element are bracketed.

(1) a. *Sandy seems to like winter.*
     b. *[Sandy] seems [Sandy] to like winter.*
(2) a. *Who will you call?*
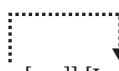   b. *[Who] will you call [who]?*

This theoretical simplification also came with claimed empirical benefits (Chomsky 1993; Nunes 2004; Hornstein, Nuñes, and Grohmann 2005; Corver and Nunes 2007; Bošković and Nunes 2007, and others). Evidence for the CTM came from phenomena in which traces seemed to have internal structure. The CTM also helped to make sense of scattered analyses where traces seemed to have phonetic content, contrary to expectations (e.g. McDaniel 1986).

The theoretical simplification and empirical gains resulting from the CTM come at a cost however. The representations in (1b) and (2b) are not the

pronounced forms of the sentences. The lower copies are transparently not pronounced. Thus the CTM must be supplemented by an operation that determines which of multiple copies are pronounced. Universal Grammar requires a supplemental theory of what we call Selective Copy Pronunciation (SCP). Such a theory must provide principled ways to determine which copies may, must, or must not be pronounced. A number of researchers have risen to this challenge (Brody 1995; Pesetsky 1998; Fox and Nissenbaum 1999; Bobaljik 1995, 2002; Nunes 2004). We adopt the version of SCP in the work of Jairo Nunes for concreteness.

Nunes (2004) reformulates the CTM as the Copy-plus-Merge Theory of Movement. According to this theory, movement consists of four independent operations: (i) Copy, (ii) Merge, (iii) Form Chain, and (iv) Chain Reduction. The two operations Copy and Merge are similar to Chomsky's (1993, 1995). Chain formation is an independent operation which dictates that two element that are non-distinct form a chain if they are in a c-command relationship. Two elements are non-distinct if they are copies of the same token(s) in the numeration (Chomsky 1995: 227; Nunes 2004: 22–23). Feature checking does not render two non-distinct elements distinct; they remain non-distinct even if they come to differ in their features.

One consequence of having Form Chain as an independent step is that movement does not have to target a c-commanding position. This means that movement between two unconnected syntactic objects, or *sideward movement*, is possible. For example, α in (3a) may copy out of the syntactic object L and merge in the unconnected syntactic object M. Subsequently, L and M undergo merge in (3b), and the two copies of α form a chain, (3c). Note that if L is an adjunct, it becomes an island after merging with M.

(3)   a.   [L α . . .] → COPY α → MERGE α → [M α [. . .]]
      b.   [M [M α [. . .]] [L α . . .]]
      c.   [M [M α [. . .]] [L α . . .]]

The operations Copy, Merge, and Form Chain all take place in the syntax. The last operation, Chain Reduction, on the other hand, is an operation that takes place at Phonological Form (PF). According to Nunes, if two non-distinct copies form a chain, one of them has to be deleted in order for the structure to be mapped into a linear order in accordance with Kayne's (1994) Linear Correspondence Axiom (LCA) in (4). The LCA dictates that at PF an element cannot asymmetrically c-command and be asymmetrically c-commanded by the same element in a structure. At the same time, an element cannot follow and precede itself. See Kayne (1994) and Nunes (2004) for details.

(4) *Linear Correspondence Axiom* (Kayne 1994: 33)
     Let X, Y be nonterminals and x, y terminals such that X dominates x and Y
     dominates y. Then if X asymmetrically c-commands Y, x precedes y.

Therefore, in (3c) above, one of the two copies of α has to be deleted for the
purpose of linearization. The choice of which copy to delete is determined by
economy. Unchecked features on a syntactic object are formal features that need
to be deleted at PF because they are not interpretable there. The deletion of these
formal features is carried out by the operation Formal Feature (FF)-Elimination.
Chain Reduction operates to minimize the number of necessary applications of
FF-Elimination. For example, assuming that the lower copy in the chain {α . . . α}
in (3c) has more (unchecked) features to be deleted by FF-Elimination, it will be
targeted by Chain Reduction (see Nunes 2004: 30–33 for details).

   With nothing else said, the system favors the deletion of lower copies because
they will have more unchecked features–feature checking takes place as an
element moves up the tree. This is not the only option however. If neither copy
has more unchecked features than another, then the system predicts free varia-
tion over the choice of which copy to delete. Alternatively, if there is an indepen-
dent well-formedness requirement that precludes the pronunciation of a higher
copy, a lower copy may then surface. Nunes (2004: 33–38) discusses several such
cases and we exploit these options below.

   We can summarize the system with the following two principles:

(5) *Chain Reduction Principles*
     a. Only one copy can be pronounced.
     b. Pronounce the copy with the fewest unchecked features, provided no
         other grammatical principle is violated.

An important consequence of the CTM in conjunction with a theory of SCP, such
as Nunes', is that it is not uniformly the highest link in a chain that is pronounced,
as was the case with trace theory. Nunes' theory allows for a range of options: the
higher copy will be pronounced, the lower copy will be pronounced, or either copy
can be pronounced. Under restricted circumstances which we develop in section 6,
the system even allows for both copies to be pronounced (Nunes 2004: 38–50;
Kandybowicz 2008). In the next sections, we explore one movement construction
and suggest that these four options are realized in a single domain.

3 The Movement Theory of Control

Ever since its inception in the early 1990s, the Minimalist Program (Chomsky
1995), with its emphasis on economy of representation and economy of derivation,

has prompted a wave of reductionism with respect to earlier work in the Principles and Parameters framework. One radical attempt along these lines occurs in Hornstein (2001), which suggests that all construal (binding, anaphora, etc.) can be reduced to movement.

In the domain of Obligatory Control, Hornstein (1999, 2003) proposes that control construal is also the result of movement, and he puts forth the Movement Theory of Control (MTC). He argues that sentences like (6a) and (6b) have the derivations in (7a) and (7b). *Tom* starts out in the subordinate clause before it moves to the matrix clause. Both copies are available for interpretation at LF, but only the higher copy is pronounced at PF.

(6) a. *[Tom$_i$ managed [$\Delta_{i/*k}$ to win the race]]*
     b. *[Tom$_i$ escaped [after $\Delta_{i/*k}$ kissing Mary]]*

(7) a. *[Tom managed [~~Tom~~ to win the race]]*
     b. *[Tom escaped [after ~~Tom~~ kissing Mary]]*

Hornstein's original picture of the Movement Theory of Control (Hornstein 2003: 22) consisted of the following theoretical machinery: θ-roles are features and a DP "receives" a θ-role by checking a θ-feature of a verb that it merges with. A DP can "receive" more than one θ-role; that is, there is no upper bound on the number of θ-features that a DP can have. Furthermore, movement is Greedy, where Greed is understood as Enlightened Self Interest (Lasnik 1995): an element moves to check a feature of its own or a feature of the target. Combining the various assumptions, movement can be driven by the checking of a verb's θ-role feature.[1]

For the purposes of this paper, we make certain modifications and additions to this implementation of the MTC. We follow Landau (2007) and those before him in making a distinction between selection and agreement. Agreement is feature checking and is implemented using Chomsky's (2000, 2001) *Agree*, a relation of c-command between a probe and a goal. The probe and goal share a feature [F] and at least one instance of the feature is uninterpretable, represented as [uF]. Agree results in feature valuation and then checking of the uninterpretable feature(s). *Selection*, in contrast, is a local relation that does not result in feature checking. Well-known examples of selection include c(onstituent)-selection of a verb for a PP complement, [__ PP] or s(emantic)-selection for an animate argument [__ [+animate]]. Selectional features are not checked under Agree. There

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1 Hornstein's version of the MTC has been challenged on numerous grounds. See Culicover and Jackendoff (2001), Jackendoff and Culicover (2003), Landau (2003), and Boeckx and Hornstein (2003, 2004) for discussion.

is only one instance of a selectional feature, on a head. Selectional features are evaluated for satisfaction at the interfaces. Thus, selectional features are satisfied while agreement features are checked (Landau 2007). Selection is more local than agreement and a head can only select for its complement or specifier. The two configurations can be reduced to sisterhood if it is assumed that selectional features percolate within a projection from the head to non-minimal projections or if non-minimal projections are non-distinct from the heads from which they project.

In contrast to Hornstein's assumptions, we take θ-role assignment to be a species of selection, not agreement. θ-role assignment consists of an XP being the complement/specifier of the θ-role assigning head that has a selectional feature [__ θ]. This change is meant to capture the observation that θ-roles never seem to be assigned non-locally as would be expected under Agree (Landau 2003). They are always assigned by a head to its complement or specifier. We assume that both syntactic selection and agreement can drive movement and are subject to Greed. Our assumptions are summarized in (8).

(8) a. Case/agreement features are checked under Agree.
     b. Selectional features are satisfied under sisterhood (spec-head or head-complement).
     c. θ-roles are "assigned" under selection.
     d. A DP "receives" a θ-role by satisfying a selectional θ-role feature of a verb that it is the sister of.
     e. A DP can satisfy more than one selectional θ-role feature. There is no limit on the number of θ-role features that a DP can satisfy.
     f. Movement is Greedy.
     g. Greed is understood as Enlightened Self Interest (Lasnik 1995), whereby an elment moves to check/satisfy a feature of its own or a feature of the target.
     h. Movement can be driven by agreement or selection.

A separate development in the study of control structures has been the conclusion that the lower argument in the control chain (i.e. PRO in other Principles and Parameters analyses) can be in a Case position in some languages (Sigurðsson 1991, 2008; Terzi 1997; Moore and Perlmutter 2000; Tóth 2000; Cecchetto and Oniga 2004; Landau 2004, 2006, 2009; Bobaljik and Landau 2009). For this conclusion to be compatible with the MTC, Multiple Case Checking (MCC) must be possible. The moving DP checks Case in the embedded clause and then again in the matrix clause. A chain must be able to have more than one Case position (Bejar and Massam 1999; Merchant 2006). We thus adopt the assumptions in (9).

(9) a. A-movement out of one case position into another case position
         is possible.
     b. Multiple case checking is possible.

Multiple case checking is clearly a rather radical departure from traditional Principles and Parameters Case Theory, which required that a chain have exactly one Case position for visibility. (9) violates that. Although space considerations preclude us from discussing the implications of this theoretical move, such discussions are clearly desirable. The existence of multiple case checking phenomena cross-linguistically hopefully serves as a place holder for this discussion (Massam 1985; Belletti 1988; McCreight 1988; Harbert 1989; Yoon 1996, 2004; Bejar and Massam 1999; Miller 2002; Sigurðsson 2004; Woolford 2006; Merchant 2006). We will assume that Case feature checking occurs sequentially, with one Case feature value overwriting a previous one (see also Boeckx, Hornstein, and Nunes 2010: 157–158). A DP constituent will not have more than one structural case feature value under this conception, although a chain may. The morphology realizes the case feature on the copy that is pronounced. The fact that it is typically the last Case checked that is realized in MCC phenomena suggests that a revaluation approach is at least viable.

4 The typology

SCP combined with the MTC predicts an interesting typology of Obligatory Control constructions. Consider the control schematic [DP . . . [DP . . .]] under the MTC, where the two DPs – controller and controllee in traditional terms – are copies related by movement.[2] The expectation given the conclusions from section 2 is that a control construction could pronounce the higher copy, the lower copy, either copy freely, or both copies, yielding the typology in (10)

(10) a. forward control: the higher copy is pronounced
      b. backward control: the lower copy is pronounced
      c. alternating control: either the higher or lower copy is pronounced (free
          variation between forward and backward control)
      d. copy control: both copies are pronounced

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2 For illustrative purposes, we will assume that control chains consist of only two members. In the case of subject control, these are the two subjects, as in (7) above.

Using an English derivation in (11), this corresponds to the structures in (12). We suggest that this typology is realized.

(11) *[Tom managed [Tom to win]]*

(12) a. *forward control*
          Tom managed [~~Tom~~ to win]
      b. *backward control*
          ~~Tom~~ managed [Tom to win]
      c. *alternating control*
          Tom managed [~~Tom~~ to win],
          or
          ~~Tom~~ managed [Tom to win]
      d. *copy control*
          Tom managed [Tom to win]

Cases of forward control abound and for many years this was widely thought to be the only pattern. Languages with forward control include English and other Germanic languages, and the Romance languages.

Backward control is relatively rare but has been claimed for several languages including Japanese (Kuroda 1965; Harada 1973; Fujii 2006), Brazilian Portuguese (Farrell 1995), and Tsez and Bezhta (Nakh-Dagestanian) (Polinsky 2000; Polinsky and Potsdam 2002).

Languages potentially exhibiting alternating control currently include Ancient Greek (Haug 2011), Korean (Monahan 2003, but see Kwon, Monahan, and Polinsky 2010), Kabardian (Minor 2005), Malagasy (Potsdam 2009), Romanian and Greek (Alboiu 2007; Alexiadou et al. 2010), Mizo (Sino-Tibetan) (Subbarao 2003), Telugu (Dravidian) (Haddad 2007), and Omani Arabic (Al-Balushi 2008).

Copy control is rarest of all, having been defended only for complement control in San Quiaviní Zapotec (Oto-Manguean) (Lee 2003; Boeckx, Hornstein, and Nunes 2007) and adjunct control in Telugu (Haddad 2009).

In the next two sections we show how Nunes' theory of SCP when augmented with plausible auxiliary assumptions allows the typology. We also highlight a case of copy control, adjunct control in Assamese, and show how it too might be allowed. Although the MTC has been challenged for various empirical and theoretical reasons, in conjunction with a theory of SCP, it plausibly succeeds in unifying the analyses of the constructions in (12), an interesting and non-trivial result.
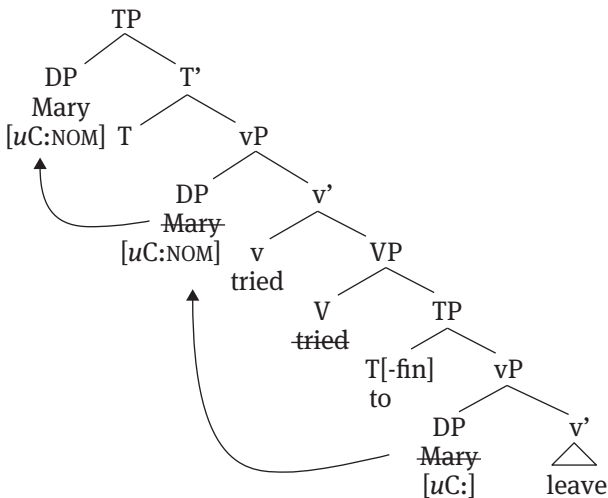
5 Deriving the typology

5.1 Forward control

The canonical control case cross-linguistically is that a language will allow only forward control. We use English to illustrate the analysis of forward control under the MTC and Nunes' theory.

An English subject control sentence as in (13a) has the structural analysis in (13b).

(13) a. *Mary tried to leave.*

b.

The derivation proceeds as follows, building from the bottom up. The DP *Mary* initially merges in the embedded clause Spec,v where it receives the external θ-role of the embedded verb *leave*. More accurately, by (8b-d), it satisfies the external θ-role selectional feature of *leave* in a spec-head configuration, as shown. At this point, it has an unvalued, uninterpretable Case feature, represented as [*u*C:]. Various heads are introduced into the structure until the matrix v. At this point, *Mary* moves to the matrix Spec,v. In this position it satisfies a second θ-role feature, the external θ-role feature of *try* as allowed by (8e). The movement is driven by the selectional θ-role feature, (8f-h). Finite T° is then introduced and it checks the Case feature of the DP in Spec,v under Agree, (8a). Finally *Mary* moves to the matrix Spec,I where it satisfies the EPP.

Our view of the EPP is that it is a PF constraint, following Landau (2007). It is a requirement that Spec,T contain phonological material at PF. Landau argues

that it is implemented as a species of selection, p(honological)-selection, not agreement. T° p-selects for phonological material represented as the feature [P], [__ [P]]. P-selection is subject to the same configurational requirement of sister-hood, (8b), and cannot be satisfied by Agree. It can however drive movement in the syntax, in keeping with Enlightened Self Interest, (8f-h). More accurately then, *Mary* in (13b) moves to Spec,T where it satisfies the p-selectional feature of T°. The fact that the EPP is a PF constraint means that the satisfaction of the [P] selectional requirement is not evaluated until PF.[3]

We assume that infinitival Spec,T does not have any relevant features that enter into a checking relation with the DP. It is also not an EPP position (Baltin 1995; Manzini and Roussou 2000; Castillo, Drury, and Grohmann 1999; Epstein and Seely 2006; Landau 2007). As a result, the subject in the above derivation does not stop in Spec,T of the infinitive. Little hinges on this assumption however and the subject could stop in Spec,T of the infinitive as long as Case is not checked there.

The final piece of the derivation of (13a) is Chain Reduction. It applies at PF to delete all but the highest copy of *Mary*, as shown using strikethrough in (13b). This result follows directly from the Chain Reduction Principles in (5) and the PF nature of the EPP. Two copies have the fewest unchecked features (i.e. none), the copy in Spec,T and the copy in the matrix Spec,v. Pronunciation of either one of these could thus satisfy the Chain Reduction principles in (5). The highest one must be pronounced however in order for the p-selectional feature of T° to also be satisfied. Because the EPP is a PF constraint, we assume that the satisfaction of [P] is evaluated at PF after Chain Reduction. If the Spec,T copy is deleted, the p-selectional feature of T° would not be satisfied (the EPP would be violated). Thus, (13a) is the only legitimate outcome.

5.2 Alternating control

Forward control in English results because of the unavailability of Case in the infinitive and a phonological version of the EPP that is satisfied by movement to Spec,T. This results in the highest position in the chain being privileged for pronunciation. If a language had different Case characteristics in the embedded clause and another way to satisfy the EPP, a different pattern might result. In such a case, the Chain Reduction principles could not decide between copies in terms

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3 This is not the same system as in Landau (2007). A crucial difference is that Landau argues that the EPP on its own can never trigger movement. It is always parasitic upon the checking of some independent feature. We thank Idan Landau for clarification and discussion of his system.

of the number of unchecked features as all would be equally "good". Since only one copy can be pronounced, it is predicted that the subject may occur in either the matrix clause or the embedded clause subject position.

This scenario yields an alternation between forward and backward subject control, which has been documented in several languages mentioned above. We illustrate this case with Greek. The example in (14a) is from Alexiadou et al. (2010) with the control verb 'learn'.[4] The subject may appear in the matrix clause or in the embedded clause. The derivation, which we explain below, is as in (14b) with English words substituted.

(14) a. *(O Janis)*   *emathe*   *(o Janis)*   *[na*   *pezi*   *(o Janis)*   *kithra]*
John.NOM   learn.3SG   John   SJV   play.3SG   John   guitar
'John learned to play the guitar.'

<div align="right">(Alexiadou et al. 2010: 18)</div>
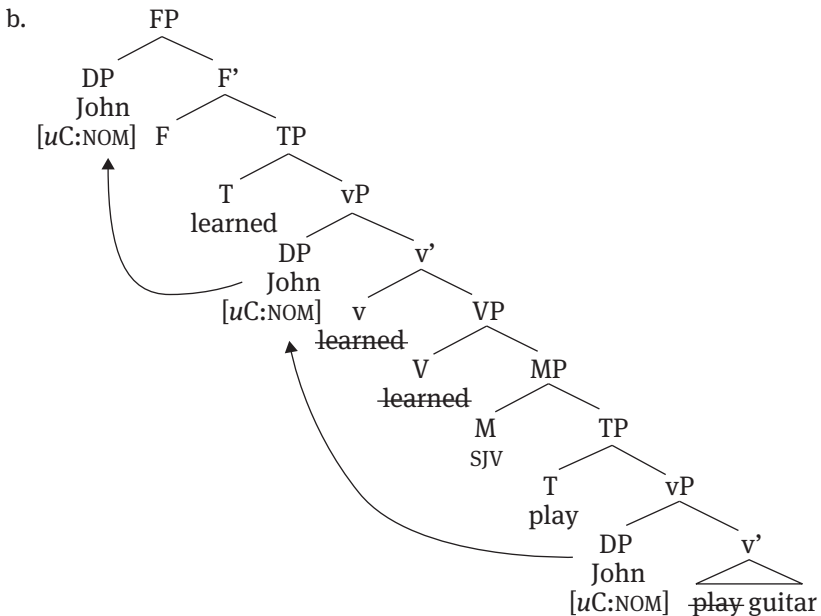
b.

Before walking through the derivation, we indicate ways in which we assume that Greek differs from English. First, Alexiadou and Anagnostopoulou (1998) argue that the EPP in Greek is satisfied by movement of the verb to T°. We implement this as a [P] feature on T° that is satisfied by V°-to-T° when V° adjoins to and becomes the sister of T°. The choice between satisfying the EPP with an X° (Greek) or an XP (English) is parametric (Alexiadou and Anagnostopoulou 1998). As in English, finite T° has a nominative Case feature which it can check against a DP under Agree. Nominative Case is available in both indicative and subjunctive clauses (Philippaki-Warburton and Catsimali 1999; Alexiadou and Anagnostopoulou 1998, 2001; Spyropoulos 2007).

Second, given that the EPP is satisfied by verb movement, there is no need for the subject to move to Spec,T. In fact, Alexiadou and Anagnostopoulou (1998) and Alexiadou (1999) among others argue that Spec,T is not used and pre-verbal subjects in Greek are in an A' position, which we show as FP. In this position the subject receives a topic interpretation. Alexiadou (2000) identifies FP as TopicP. The canonical A-position for subjects is the post-verbal Spec,v. Nominative Case on a DP in Spec,v can be checked from T° via Agree once T° is introduced into the structure.

Third, Greek has no infinitival clauses, only finite subjunctive complement clauses. They are Mood phrases (MP) whose head is the subjunctive marker *na* (Philippaki-Warburton and Veloudis 1984; Philippaki-Warburton 1993; Rivero 1994; Terzi 1997, among others). MoodP dominates TP in an exploded Infl structure, as shown. *Na* is the only indicator that the clause is subjunctive. The verb itself is morphologically indistinguishable from the indicative. Thus, the characteristics of T°/TP in subjunctive complements do not differ from indicative clause T° in terms of its features. As described above, it checks nominative Case, has a [P] feature satisfied by V°-to-T°, and has an unfilled specifier.

The derivation shown proceeds as follows: The subject *John* starts in the embedded Spec,v where it satisfies the external θ-role feature of the embedded verb. Various heads of the embedded clause are then merged into the structure. First, T° is introduced. T° checks the nominative case feature of the DP and the verb moves to T° to satisfy the EPP. M°, the matrix verb, and the matrix v° are then introduced.[5] *John* moves to Spec,v to satisfy the external θ-role feature of the control verb *learn*. Following Alboiu (2007), MoodP is not a phase and thus is transparent for A-movement. Once T° is introduced, the DP's Case feature is revalued as nominative, although this is not morphologically visible. Such

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5 We assume that M° has no features to check. The subject that precedes *na* in (14) is not in Spec,M but the matrix Spec,v. An anonymous reviewer points out however that Spec,M can be filled by the subject in non-control complements.

revaluation is permitted by our adoption of multiple case checking from section 3. The verb moves to T° to satisfy the EPP. Lastly, the DP moves to the pre-verbal topic position, Spec,F, which is an optional A'-movement.

The availability of Case checking in both the embedded and matrix clauses means that all the copies of the subject have their Case feature valued, as shown in the derivation in (14b). Since the EPP is satisfied by verb movement, it is irrelevant to the decision about chain reduction of the DP chain. Consequently, Chain Reduction at PF allows any one of the copies to be pronounced. Without further specification, the choice is underdetermined. Each option in fact corresponds to one of the parenthesized subjects in (14a).

Alternating control – free variation between forward and backward control – arises when Chain Reduction allows either of two (or more) copies in the movement chain to be pronounced. One copy is in the embedded clause and one copy is in the matrix clause.

5.3 Backward control

A necessary condition for alternating control is the availability of Case checking in the control complement clause. If this is possible, one might expect that backward control will always entail forward control because the DP will take its valued Case feature and move up the tree. In actuality, some few languages permit only backward control: Tsez subject control (Polinsky and Potsdam 2002) and Japanese *assist*-constructions (Fujii 2006). Nunes' system that was put in place in section 2 already provides the means to achieve backward control and to force a lower copy to be pronounced. It is a consequence of the second Chain Reduction principle, repeated in (15), which allows the best copy to be deleted if it violates some independent grammatical principle.

(15)   *Chain Reduction Principles*
    a.   only one copy can be pronounced
    b.   pronounce the copy with the fewest unchecked features, provided no other grammatical principle is violated

We will illustrate with the Japanese case. An example of Japanese backward object control with the *assist*-construction is given in (16a), from Fujii (2006: 21–22). (16b) shows that forward control with the matrix object pronounced is unacceptable.

(16)   a.   *isya-ga*　　　$\Delta_{i,*k}$　　*[kanzya-ga*　　*aruk-u-no]-o*　　*tetudta*
          doctor-NOM　　　　　　patient-NOM　　walk-PRS-C]-ACC　　assisted
          'The doctor assisted the patient to walk.'

b. ??*isya-ga*   *kanzya-o*$_i$ [Δ$_i$ *aruk-u-no]-o*   *tetudta*
   doctor-NOM   patient-ACC   walk-PRS-C]-ACC   assisted

The principle that is violated by the forward control example in (16b) in which
the higher copy is pronounced is the Double-*o* Constraint against clausemate
accusative-marked NPs in Japanese (Kuroda 1965; Harada 1973; Shibatani 1978;
Poser 1981, 2002; Hiraiwa 2010)

(17)   *Double-*o* Constraint* (Harada 1973: 55)
        A derivation is marked as ill-formed if it terminates in a surface structure
        which contains two occurrences of NPs marked with -*o,* both of which are
        dominated by the VP node

In (16b), both the theme object and the complement clause are case-marked with
-*o.* The Double-*o* Constraint is a general prohibition in Japanese, not specific to
control structures. Fujii (2006) provides a discussion of its relevance to backward
control and Hiraiwa 2010 provides a Minimalist analysis. The Double-*o* Constraint
is not violated by pronouncing the lower copy in (16a). The structural analysis is
as in (18), based on Fujii (2006).

(18)
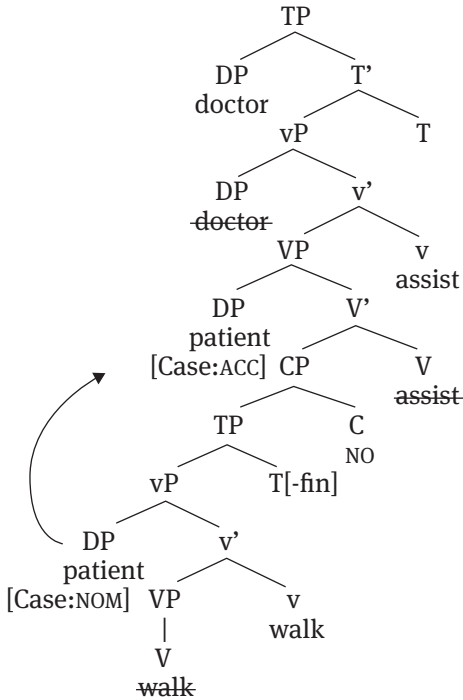
We assume that Japanese is a head-final language, with specifiers on the left. It has largely the same EPP and Case properties as English. In the derivation, the DP starts as the external argument of the embedded verb, where it satisfies the external θ-role feature. Embedded T° then enters the structure. Although the embedded verb is morphologically marked for present tense, this marker cannot alternate with the past tense morpheme. Fujii (2006: chapter 2) argues, following Saito (1985), Ura (1992) and others, that this is an indication that T° is non-finite in these control contexts – an assumption that we also adopt. Nevertheless it is able to check nominative Case.[6] As in English, non-finite T° has no EPP feature and the DP does not move to Spec,T. The embedded clause is completed as a CP headed by *no* and the matrix clause is then built, starting with the merger of the matrix control verb *assist*. The DP moves to the matrix Spec,V position and satisfies the internal θ-role feature of the matrix verb. The CP is not a phase and does not prevent this movement (see Fujii 2006: 67–69, 188 for discussion). Once matrix v° is introduced, the DP's Case feature is valued and checked as accusative by v° under Agree. The remainder of the clause is then built.

At PF, only one copy can be pronounced. The accusative copy must be deleted because it violates the Double-*o* Constraint. This leaves the lower copy as more economical and the structure surfaces as (16a).

In summary, backward control requires all the mechanisms that permit alternating control plus an additional language-specific restriction that prevents higher copies from being pronounced.

6 Copy control: Assamese adjunct control

The fourth pattern in the typology is copy control. As indicated above, it has only been claimed for San Quiavini Zapotec (Oto-Manguean) (Lee 2003; Boeckx, Hornstein, and Nunes 2007) and Telugu (Haddad 2009). In this section we present a case of copy control in the Indo-Aryan language Assamese. We also provide the analytical details within Nunes' framework. The additional grammatical mechanisms that must be present in the language suggest why the phenomenon is so uncommon.

Assamese, also known as Asamiya, is an Indo-Aryan language. Typologically, it is a subject pro-drop, head-final, SOV language (Goswami 1982; Goswami and

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6 Fujii (2006: 91) proposes, with Saito (1985) and Ura (1992), that nominative Case on the embedded subject is actually either inherent case or default case. We ignore this detail in what follows.

Tamuli 2003). That is, sentence (19) is grammatical with an overt subject or with *pro*. This said, it is important to note that, unlike in other pro-drop languages (e.g., Spanish), in Assamese overt subjects and pro are in free variation.

(19) *xi*/pro   *Prɒxad-ɒk*   *e-khɒn*   *kitap*   *dil-e*
        he-NOM/pro   Proxad-ACC   one-CL   book   gave-3
        'He gave Proxad a book.'

Assamese is a nominative-accusative language (but see Amritavalli and Sarma 2002). The subject may be structural-case marked (nominative or absolutive) or inherent case-marked (genitive) (Goswami 1982; Nath 2003; Goswami and Tamuli 2003). Nominative subjects occur with unergative and transitive predicates, (20). Absolutive subjects occur with unaccusative predicates, (21), while genitive subjects occur with experiential or psychological predicates, (22).

(20) *Ram-e*   *nasil-e*   /   *khotha-tu*   *xunil-e*
       Ram-NOM   danced-3   /   news-CL   heard-3
       'Ram danced / heard the news.'

(21) *Prɒxad*   *mɔril*
       Proxad.ABS   died
       'Proxad died.'

(22) *Ram-ɒr*   *khɒŋ*   *uthil*
       Ram-GEN   anger   raised
       'Ram got angry.'

Assamese has a special type of adverbial clauses that is typical of the Indian subcontinent. They are known as conjunctive participle (CNP) clauses. They are non-finite adjuncts with no overt complementizer, and the CNP verb shows no inflection for tense or agreement (Masica 2005). In Assamese, CNP verbs take a single form, presented in (23a). A CNP clause may depict an event that is anterior to or simultaneous with that of the finite clause, (23b). The relation between the two clauses may also be causal, (23c) (see Jansen 2004 for a similar observation).

(23)   a.   Verb Stem + -*i*; e.g., *thak-i* 'keeping, having kept'
       b.   *[Ram-e*   *[kam-to*   *kɔr-i]*   *saĥ*   *khal-e]*
           [Ram-NOM   [job-CL   do-CNP]   tea   ate-3]
           'Ram did the job while having tea.' OR
           'Having done the job, Ram had tea.'

    c. *[Ram-ʋr   [khotha-to   xun-i]   ananda   lagil]*
       [Ram-GEN   [news-CL   hear-CNP]   happiness   happened
       'Having heard the news, Ram felt happy.'

CNP clauses are special in that sentences that involve such adjuncts are instances of adjunct control in which the matrix and the CNP subjects are obligatorily coreferential. Normally, the matrix subject is pronounced, determining the referential properties of the subordinate CNP subject. In this case, the control relation is identified as forward control. However, under the right conditions, the two subjects may be pronounced while still being obligatorily coreferential. In this case, the control relation is identified as copy control. Section 6.1 introduces the relevant control structures. Section 6.2 provides a derivation of forward and copy control as movement.

6.1 Data

Assamese adjunct control structures involve two subjects, one in the matrix clause and one in the CNP clause. The former is usually overt, determining the identity of the latter that is usually non-overt. Sentences (24)–(27) are examples.[7] Note that the CNP and matrix subjects may be case-marked differently or the same. For example, in (24) the matrix subject is nominative, while the CNP subject would be genitive. In (26) and (27), on the other hand, the CNP subject would take on the same case as that of the matrix subject.

(24) *[Ram-e$_i$ [Δ$_{i/*k}$ khʋŋ   uthi]*
       [Ram-NOM   [Δ.GEN   anger   raise-CNP]
       mor   ghʋr-to   bhaŋil-e]
       my   house-C   destroyed-3]
       'Having got angry, Ram destroyed my house.'

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7 Exceptions to adjunct control do exist. These, however, seem to be limited to natural/ weather conditions and disasters, (i). For a possible syntactic analysis of similar structures, see (Haddad 2007: 239–285).

(i) *[[e-ta   ghʋr-ʋt zui lag-i]   bohut   manuĥ   mori]*
    [[one-CL   house-LOC fire.ABS happen-CNP]   many   people.ABS died]
    'A house having burnt, many people died.'

(25) *[boss-tu-r$_i$*   *[Δ$_{i/*k}$*   *kukur-tu*   *ɦeru-i]*   *dukh*   *lagil]*
[boss-CL-GEN   [Δ.NOM   dog-CL   lose-CNP]   sad   felt]
'Having lost his dog, the boss felt sad.'

(26) *[boss-tu-e$_i$*   *[Δ$_{i/*k}$*   *lottery*[8]   *jik-i]*
[boss-CL-NOM   [Δ.NOM   lottery   win-CNP]
notun   *gɦɒr*   *kinil-e]*
new   house   bought-3]
'Having won the lottery, the boss bought a new house.'

(27) *[Ram-ɒr$_i$*   *[Δ$_{i/*k}$*   *e-ta*   *bɦal*   *buddɦi*   *khel-i]*
[Ram-GEN   [Δ.GEN   one-CL   good   idea   play-CNP]
bɦa   *lagil]*
good   felt]
'Having got a nice idea, Ram felt good.'

Disjoint subjects in sentences (24) through (27) are disallowed. More specifically, Assamese adjunct control meets the criteria of Obligatory Control. Following standard assumptions (Williams 1980; Hornstein 1999; Jackendoff and Culicover 2003), this means that the CNP subject has to be coreferential with the matrix subject. It cannot be coreferential with any other NP in the sentence (e.g., the possessor of the matrix subject or a non-local NP), and it cannot take a split antecedent (e.g., the matrix subject *plus* another NP in the sentence). For example, observe the sentences in (28). In (28a) the reference for the CNP subject coincides with the possessor of the matrix subject, while in (28b) the possessor of the CNP subject and the matrix subject are coreferential. The sentences are ungrammatical under the intended reading. Note that sentence (28a) would be grammatical under the reading that the wife won the lottery.

(28) a. *[tar$_i$*   *gɦoiniyek-ɒr*   *[Δ$_i$*   *lottery*   *jik-i]*
[his   wife-GEN   [Δ.NOM   lottery   win-CNP]
phurti   *lagil]*
exhilaration   felt]
'He won the lottery, and his wife felt very happy.'

b. *[Ram-e*   *[tar*   *gɦɒr -ot*   *zui*   *lag-i]*
Ram-nom   [his   house-LOC   fire   happen-CNP]
police-aloi   *phone*   *koril-e*
police-DAT   phone   did-3]
'His house having burnt, Ram called the police.'

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8 Words, like 'lottery', that are borrowed from English are presented in English spelling.

Similarly, in (29), the reference for the CNP subject can only corefer with the closest subject *Ram*. The CNP subject cannot be coreferential with the non-local matrix subject *Prɒxad*. Further, the CNP subject cannot take a split antecedent, which in this case would be *Ram* and *Prɒxad*.

(29) *[Prɒxad-e$_k$ kol-e   [ze   Ram-e$_i$ [Δ$_{i/*k/*i+k}$*
      [Proxad-NOM   said-3   [that   Ram-NOM   [Δ.GEN

      xɒmɒi   na-thak-i]   bʰat   na-khal-e]]
      time   NEG-keep-CNP] rice   NEG-ate-3]]

      'Proxad said that Ram, having no time, didn't eat rice.'
      *'Proxad said that Proxad having no time, Ram didn't eat rice.'
      *'Proxad said that Ram and Proxad having no time, Ram didn't eat rice.'

In addition to forward control, Assamese also licenses copy control into CNP clauses. Copy control structures involve two obligatorily coreferential and pronounced subjects, as the sentences in (30) illustrate. Note that the matrix subject may be pronounced as an exact copy of the CNP subject, modulo morphological realization of the Case feature.

(30) a. *[[Ram-ɒr$_i$ khɒŋ   uth-i   Ram-e*
          [[Ram-GEN   anger   raise-CNP]   Ram-NOM

          mor   gʰɒr- to   bʰaŋil- e]
          my   house-CL   destroyed-3]

          'Ram having got angry, Ram destroyed my house.'

      b. *[[Ram-ɒr$_i$ bʰagɔr   lag- i]   etiya*
          [[Ram-GEN   exhaustion feel-CNP]   now

          Ram   xui   thakil]
          Ram.ABS   sleep   kept]

          'Ram having felt exhausted, Ram now fell asleep.'

In addition, the matrix subject may be realized as a pronoun or an epithet, (31).[9]

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9 The name copy control implies that the two subjects should be exact copies of the same token; for examples, two identical copies of *Ram*. We see in (31) that the matrix subject may be realized as a pronoun or an epithet. We do not address this issue here; see Haddad (2007: 182–194) for a detailed analysis. However, a brief explanation is appropriate. Let us consider copy control structures as instances of resumption derived via movement, as in Aoun, Choueiri and Hornstein 2001 and Boeckx 2003. Analyzing similar cases of resumption in Lebanese Arabic, Aoun, Choueiri and Hornstein (2001) hold that a resumptive element (pronoun or epithet) starts

(31) a. *[[Ram-ɒr*ᵢ   *khɒŋ*   *uth-i]*   *xi*ᵢ*/gadha-tu-e*ᵢ
[[Ram-GEN   anger   raise-CNP]   he/donkey-CL

mor   *ghɒr-to*   *bhaŋil-e]*
my   house-CL   destroyed-3]

'Ram having got angry, he/the donkey destroyed my house.'

b. *[[Ram-ɒr*ᵢ   *bhagɔr*   *lag-i]*   *etiya*
[[Ram-GEN   exhaustion   feel-CNP]   now

*xi*ᵢ*/besera-tu*ᵢ   *xui*   *thakil]*
he/poor guy-CL   sleep   kept]

'Ram having felt exhausted, he/the poor guy now fell asleep.'

Copy control obtains under three conditions: (i) the CNP clause has to be sentence-initial; (ii) the CNP subject has to be an R-expression (non-pronominal); and (iii) the CNP subject is preferably an experiencer, which is usually Case-marked genitive. However, see Haddad (2007: 59–61, 89–90) for examples that contain nominative experiencers.

    Conditions (i) and (ii) are consistently obeyed. If either condition is violated, the result is ungrammaticality. For example, in (32) the CNP clause is sentence-internal, while in (33) the CNP subject is a pronoun. Both sentences are unacceptable.

(32) **[xi*ᵢ*/Ram-e*   *[tar*ⱼ*/Ram-ɒr*ᵢ   *khɒŋ*   *uth-i]*
[he/Ram-NOM   [he/Ram-GEN   anger   raise-CNP]

mor   *ghɒr-to*   *bhaŋil-e]*
my   house-CL   destroyed-3]

'Having got angry, Ram destroyed my house.'

(33) **[[tar*ᵢ   *xɒmɒi*   *na-thak-i]*   *xi*ᵢ*/Ram-e*
[[he.GEN   time   NEG-keep-CNP]   he/Ram-NOM

bhat-o   *na-khal-e]*
rice-even   NEG-ate-3]

'Him having no time, he/Ram didn't even eat rice.'

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out as an appositive adjoined to a DP. Later in the derivation, the DP moves, and the resumptive element is stranded. Haddad (2007) holds that copy control is derived in a similar fashion. Unlike Aoun et al., however, he argues that this kind of resumption does not involve stranding. Rather, the pronoun/epithet moves along with the DP to which it is adjoined. At PF, the realization of copies (r-expression vs. pronoun/epithet) is determined by language-specific constraints; for example, lack of cataphoricity in Assamese dictates that a pronoun may not linearly precede an r-expression, which is one reason why the CNP subject may not be a pronominal.

Concerning condition (iii), if the CNP subject is not an experiencer, judgments pertaining to copy control become inconsistent. Out of four consultants, two considered instances of copy control like (34) and (35) below acceptable, while two considered them unacceptable. Notice that the CNP clause is sentence initial and the CNP subject is an R-expression. Apparently, the only reason why the sentences are considered unacceptable by two of the consultants is because the CNP predicate is not an experiential predicate.[10]

(34) ok/*[[Ram-e kam-tu kɔr-i]   xi   gusi   gɔl]
      [[Ram-NOM   work-CL do-CNP]   he.ABS   away   went]
      'Having done the work, Ram left.'

(35) ok/*[[Ram-e kukur-tu ɦeru-i]   tar   dukh   lagil]
       [[Ram-NOM   dog-CL   lose-CNP] he.GEN   sad   felt]
      'Having lost his dog, Ram felt sad.'

Assamese copy control, like its forward counterpart, meets the criteria of Obligatory Control. That is, the references for the CNP and matrix subjects have to coincide. As sentences (36) and (37) illustrate, if the CNP subject is coreferential with another local or non-local NP, or if it takes a split antecedent, the result is ungrammaticality.

(36) *[[Ram-ʋr$_i$ khʋŋ   uth-i]   tar$_i$ ɡhoiniyak
      [[Ram-GEN   anger   raise-CNP]   his   wife.ABS
      gusi   gɔl]
      away   went-3]
      'Ram got angry, and his wife left.'

(37) [Prʋxad-e   kol-e   [ze   [Ram-ʋr/*Prʋxad-ʋr/* Ram   aru
      [Proxad-NOM   said-3   [that   [Ram-GEN/Proxad-GEN/Ram   and
      Prʋxad-ʋr   xʋmʋi   na- thak-i]   Ram-e   bɦat
      Proxad-GEN   time   NEG-keep-CNP] Ram-NOM   rice
      na-khal-e]]
      NEG-ate-3]]
      'Proxad said that Ram didn't have time and didn't eat rice.'

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10 One explanation is that CNP clauses in Assamese do not license structural case. This is why only experiencers, which receive inherent case, are phonologically realized. Speakers who allow nominative subjects to be pronounced in CNP clauses may be resorting to default case.

*'Proxad said that Proxad didn't have time and Ram didn't eat rice.'
*'Proxad said that Ram and Proxad didn't have time and Ram didn't eat rice.'

Now we turn to the analysis of Assamese adjunct control.

6.2 Control as movement

Building on Hornstein (1999, 2003) and Nunes (2004) and the theoretical machinery in section 3, we analyze Assamese adjunct control as movement – more specifically, sideward movement. In section 6.2.1, we present a derivation of forward control structures. In section 6.2.2, we extend the analysis to copy control.

6.2.1 Forward control

Observe the forward control structure (38). We suggest that the sentence has the derivation in (39). In (39a), the CNP clause and the matrix clause form independently, and *Ram* copies out of the CNP clause. In (39b), *Ram* merges in the matrix clause Spec,v. Subsequently, the CNP clause adjoins to the matrix vP, as shown in (39c). Upon adjunction, the CNP clause becomes an island. In (39d), the matrix subject *Ram* moves from Spec,v to Spec,T to satisfy the EPP feature. As the dotted arrows show, the copy of *Ram* in Spec,T c-commands both the copy in the CNP clause and the copy in Spec,v, forming a chain with each. Thus, Form Chain applies. The pronunciation of all the non-distinct copies of *Ram* at PF would induce a violation of the LCA. The reason is that *Ram* would end up preceding and following itself. This is why the PF operation Chain Reduction applies in step (39e). Accordingly, the lower copy in each chain is deleted, allowing the structure to be mapped into a linear order.

(38) *[Ram-e_i   [Δ_i   bhok   lag-i]   bhat   khal-e]*
      [Ram-NOM [Δ-GEN hunger feel-CNP] rice   ate-3]
      'Having felt hungry, Ram ate rice.'

(39) a. i. *[_CNPP **Ram-ʋr** bhok lag-i] → [_NP **Ram**]*
         ii. *[_Matrix vP bhat khal-e]*
      b. *[_Matrix vP **Ram-e** bhat khal-e]*

c. *[_Matrix TP [_vP [_CNPP **Ram-ɒr** bɦok lag-i] [_vP **Ram-e** bɦat khal-e]]]*

d. *[_Matrix TP **Ram-e** [_vP [_CNPP **Ram-ɒr** bɦok lag-i] [_vP **Ram-e** bɦat khal-e]]]*

e. *[_CP [_Matrix TP **Ram-e** [_vP [_CNPP ~~**Ram-ɒr**~~ bɦok lag-i] [_vP ~~**Ram-e**~~ bɦat khal-e]]]]*

If the derivation in (39) is correct, two different outcomes should be possible: (i) the forward control structure in (39e) and (ii) the backward control structure in (40) below. In other words, it should be possible for Chain Reduction to target the matrix copy and spare the CNP copy in the chain {$[_{NP}$ *Ram-e*$]^{MatrixTP}$, $[_{NP}$ *Ram-ɒr*$]^{CNPP}$}; the result would be a backward control structure in which the subordinate subject is pronounced, determining the identity of the unpronounced matrix subject.

(40) *[_Matrix TP **Ram-e**   [_vP [_CNPP   **Ram-ɒr**   bɦok   lag-i]*
      [_Matrix TP **Ram-~~NOM~~**   [_vP [_CNPP   **Ram-**GEN   hunger   feel-CNP]

      *[_vP **Ram-e**   bɦat   khal-e]]]*
      [_vP **Ram-~~NOM~~**   rice   ate-3]]]

The prediction is partly borne out. Grammaticality judgments on backward control structures like (40) are inconsistent. Our Assamese consultants found them degraded and sometimes unacceptable. When given such structures, they usually repaired them by converting them into either forward or copy control structures (see, however, Subbarao (2004), who treats similar structures as acceptable).

We suggest that such backward control structures are avoided because the CNP subject does not check structural case in the CNP clause. This is true even of inherent case-marked subjects. Belletti (1988) and Woolford (2006) among others provide evidence to argue that an inherent case-marked NP may also check structural case. Therefore, when Chain Reduction applies to the chain {$[_{NP}$ *Ram-e*$]^{MatrixTP}$, $[_{NP}$ *Ram-ɒr*$]^{CNPP}$} in (39), the CNP subject is a preferred target because it has a structural case feature that is unchecked. Evidence that this observation is on the right track comes from the fact that backward control structures, although tolerated with an inherent case-marked subject, are consistently judged as unacceptable with a nominative CNP subject, (41). This observation also applies to the data in Subbarao (2004), although the analysis there is different.

(41) *[Δ_i   [Ram-e_i   lottery   jik-i]   phurti   lagil]
     [Δ.GEN   [Ram-NOM   lottery   win-CNP]   exhilaration   felt]
     'Having won the lottery, Ram felt very happy.'

Note that this observation also explains why the CNP subject undergoes movement at all. It seems to move to the matrix predicate in order to satisfy the thematic requirement of the matrix predicate (Hornstein 2003), but also in order to check its own structural case feature. The dual driving force is in keeping with Lasnik's (1995) Enlightened Self Interest. See Haddad (2010) for a different analysis regarding the trigger for movement.

In the following section, we extend the analysis to copy control in Assamese.

6.2.2   Copy control

The preceding section implied that the pronunciation of copies in control structures was regulated at PF. This means that copy control should have the same derivation as forward control. In other words, copy control should be the outcome of PF allowing two copies to be pronounced instead of one. The discussion in this section suggests that this is mostly the case, except for a small twist: the PF decision regarding the pronunciation of copies, although independent from the syntax proper, is prepared for in the syntax. More specifically, copy control obtains only if the CNP clause is base-generated adjoined to the matrix CP.

Observe the copy control structure in (42). It has the derivational history outlined in (43). In (43a), the CNP clause and the matrix clause form independently, and the CNP subject copies out of the CNP clause. In (43b), *Ram* merges in the matrix Spec,v. In (43c), the matrix subject moves from Spec,v to Spec,I to satisfy the EPP feature. Following, the CNP clause merges with the matrix clause at CP, as (43d) demonstrates. The two matrix copies of *Ram* $\{[_{NP}$ *Ram-e*$]^{Matrix\ TP}, [_{NP}$ *Ram-e*$]^{Matrix\ vP}\}$ enter a c-command relationship and form a chain. The CNP copy of *Ram*, on the other hand, does not enter a c-command relation with either of the matrix copies. At PF, Chain Reduction applies for the purpose of Linearization; two copies of *Ram*, $[_{NP}$ *Ram-ɒr*$]^{CNPP}$ and $[_{NP}$ *Ram-e*$]^{Matrix\ TP}$, survive deletion, resulting in copy control.

(42) *[[Ram-ɒr   bhok   lag-i]   Ram-e   bhat   khal-e]*
     [[Ram-GEN   hunger   feel-CNP] Ram-NOM   rice   ate-3]
     'Ram having felt hungry, Ram ate rice.'

(43) a. i. *[_{CNPP} **Ram-ɒr** bɦok lag-i]* → *[_{NP} **Ram**]*
          ii. *[_{Matrix vP} bɦat khal-e]*

   b. *[_{Matrix vP} **Ram-e** bɦat khal-e]*

   c. *[_{CP}[_{Matrix IP} **Ram-e** [_{Matrix vP} **Ram-e** bɦat khal-e]]]*

   d. *[_{CP}[_{CNPP} **Ram-ɒr** bɦok lag-i] [_{CP}[_{Matrix IP} **Ram-e** [_{Matrix vP} **Ram-e** bɦat khal-e]]]]*

The main difference between (43) and the derivational history of forward control structures is the merging site of the CNP clause. In copy control constructions, the CNP clause merges clause-initially at CP. In forward control constructions, it merges clause-internally at vP.

A closer reading of the LCA in (4) above seems to indicate that the derivation in (43) should crash. The LCA indicates that a terminal x precedes a terminal y if the non-terminal X that dominates x c-commands y. In (43d), the non-terminal node of the CNP clause (CNPP) asymmetrically c-commands matrix TP. Therefore, the CNP subject precedes the matrix subject. The two subjects are copies of the same token, which means that two non-distinct element are in a precedence relationship. Unless one of them is deleted, the structure cannot be mapped into a linear order in accordance with the LCA. The problem is that neither copy may be deleted because Chain Reduction only targets chains, and the two copies do not form a chain.

Contrary to the aforementioned observation, however, Assamese does license copy control structures in which two copies escape Chain Reduction and are actually pronounced. According to Nunes (2004: 40), this is an instant of multiple copy spell-out that is possible only if one of the copies hides inside another word, thus, becoming invisible to the LCA. More specifically, if one of the copies adjoins to another head (e.g., the null or overt head of Focus Phrase), both the copy and the head are "morphologically reanalyzed as a single terminal element" or a single "phonological word." In the theory of Distributed Morphology (Halle and Marantz 1993), this process is called Fusion. The LCA cannot see into fused links and, consequently, two copies escape deletion.

Building on Nunes (2004), we suggest that Assamese copy control also involves Fusion. One of the coreferential copies in a copy control structure is morphologically reanalyzed as part of a single terminal. This single terminal is a spelled out domain as in Uriagereka (1999). As a result of this fusion, the copy becomes invisible to linearization, so it escapes deletion. Here are the details.

According to Chomsky (2000, 2001, 2004), when a structure is transferred to the phonological component, it is spelled out phase by phase, whereby a phase is a vP or a CP. This idea is formulated as the Phase Impenetrability Condition,

see (44). This means that a structure undergoes spell-out several times throughout the derivation. Every time a phase is spelled out, which takes place when a new phase head is introduced, its complement is no longer transparent to further syntactic operations.

(44) *Phase Impenetrability Condition* (Chomsky 2001: 11)
      At the phase ZP containing phase HP, the domain of H is not accessible to operations, but only the edge of HP.

Empirical support for this approach comes from Franks and Bošković (2001), and Fox and Pesetsky (2005) among several others. Uriagereka (1999) also argues that Multiple Spell-Out is part of the computational system. He holds that spell-out applies, not only at the end of the derivation, but multiple times throughout the derivation. According to Uriagereka (1999: 256), every time a domain is spelled out, it is converted into a non-phrasal structure that is interpretable, yet inaccessible to further syntactic operations.

Spell-out transfers a phase to the phonological component, and linearization takes place in the phonological component. This means that every time a phase is spelled out, it is also linearized. Subsequently, the spelled-out phase is converted into a single terminal element that is transparent to interpretation but opaque to all syntactic operation. According to Uriagereka, this technically means that a spelled out domain is no longer a phrase structure. That is, once a phrase structure is spelled out and linearized, the elements inside the spelled-out domain go below the word level and thus become invisible to further linearization.

Let us have another look at the derivation of sentence (45) in the light of Multiple Spell-Out. The derivation is delineated in (46). The CNP clause and the matrix clause form independently, (46a), and the CNP subject copies out of the CNP clause. In (46b), *Ram* merges in matrix vP. Following, the matrix subject moves from Spec,v to Spec,T to check the EPP feature, (46c). In (46d), matrix CP is spelled out and linearized. Chain Reduction applies and marks the lower copy of *Ram* for deletion. Subsequently, the spelled-out domain is converted into a single terminal element that is opaque to further syntactic operations, as symbolized by the grey box. Although matrix CP is spelled-out, its edge is still accessible to further computation. This allows the CNP clause to merge with the matrix clause at CP. The whole structure is spelled-out and linearized again. It converges as (46e).

(45) *[[Ram-ʋr   bɦok   lag-i]   Ram-e   bɦat   khal-e]*
      [[Ram-GEN   hunger   feel-CNP] Ram-NOM   rice   ate-3]
      'Ram having felt hungry, Ram ate rice.'

(46) a. i. *[$_{CNPP}$ **Ram-ʋr** bɦok lag-i]* → *[$_{NP}$ **Ram**]*
  ii. *[$_{Matrix vP}$ bɦat khal-e]*

  b. *[$_{Matrix vP}$ **Ram-e** bɦat khal-e]*

  c. *[$_{CP}$[$_{Matrix TP}$ **Ram-e** [$_{Matrix vP}$ **Ram-e** bɦat khal-e]]]*

  d. *[$_{CP}$[$_{Matrix TP}$ **Ram-e** [$_{Matrix vP}$ ~~**Ram-e**~~ bɦat khal-e]]]*

  e. *[$_{CP}$[$_{CNPP}$ **Ram-ʋr** bɦok lag-i]*

  *[$_{CP}$[$_{Matrix TP}$ **Ram-e** [$_{Matrix vP}$ ~~**Ram-e**~~ bɦat khal-e]]]]*

The derivation in (46) does not violate the Linear Correspondence Axiom. Linearization is not able to detect *Ram* in the matrix clause as a copy of the same token as *Ram* in the CNP clause. The reason is that the matrix copy goes below the word level by hiding inside a spelled-out domain, and linearization cannot see below the word level. Consequently, precedence in the sense of Kayne (1994) is not detected and no violation is induced. (Nunes and Uriagereka (2000) also adopt Multiple Spell-Out in order to account for parasitic gaps. The analysis delineated in this section, however, is more in line with Uriagereka's 1999 original formulation. For more details, see Haddad 2009).[11]

7 Conclusions

This paper has suggested that the Movement Theory of Control in conjunction with a theory of Selective Copy Pronunciation like Nunes's (2004) provides a plausible account of the typology of control structures seen in natural language. The existence of the options – forward control, backward control, alternating control, and copy control – supports a syntactic architecture in which the linearization of chains is dissociated from the syntactic derivation which creates those chains.

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11 A word is in order before we conclude. As a reviewer pointed out to us, in Nunes' work, sideward movement is not allowed unless it is repaired by chain formation later in the derivation. Here we should note that Form Chain is obligatory for the purpose of linearization. The lack of Form Chain is a violation only if linearization and the LCA are not satisfied. In other words, if linearization detects two copies of the same token, it dictates that one of them should be deleted. Since deletion – or Chain Reduction – only targets chains, it is mandatory that the two non-distinct copies form a chain. If the two copies are not detected as non-distinct because one of the copies is below the word level in a fused word or in a spelled-out domain, Form Chain becomes no longer a mandatory operation. Therefore, the fact that the two pronounced subjects in Copy Control constructions are not in a c-command relationship and do not form a chain does not pose a problem for this analysis.

Having proposed a plausible theoretical approach to unifying these control constructions, a larger question concerns how to predict which languages will instantiate which option. That is, why is it that Greek has alternating control and English does not, and can we predict what another language will have based on independent characteristics? Space considerations prevent us from fully addressing this issue but we offer some observations. We do not believe that the choice of forward, backward, alternating, or copy control in a language is a simple parametric choice. Rather, it is an interaction of various phenomena that show cross-linguistic variation.

We begin with alternating control. Minimally, such a language requires a means to realize the subject of the complement clause. Traditional Principles and Parameters assumptions implicate Case in the licensing of NPs and much work has acknowledged the availability of Case in control complements of various languages (for example, Icelandic (Sigurðsson 1991, 2008; Bobaljik and Landau 2009), Russian (Moore and Perlmutter 2000; Landau 2009), Hungarian (Tóth 2000), Romanian (Comorovski 1986; Jordan 2009), Welsh (Tallerman 1998), Basque (San Martin 2004), and others in Landau (2006)). Nevertheless, this cannot be sufficient.[12] For example, despite the availability of several subject positions and structural Case in Icelandic control complements, only forward control is possible. We speculate that the tense characteristics of C° and T° in the control clause are relevant (Landau 2004, 2006; Polinsky and Potsdam 2006; Alexiadou et al. 2010), but leave this unexplored.

For subject control, the EPP as implemented above is a further restrictor. There are two ways to satisfy the EPP: XP movement to Spec,T as in English and X° movement to T° as in Greek (Alexiadou and Anagnostopoulou 1998). Requiring a DP to be pronounced in Spec,T of the matrix clause will preclude it being pronounced in the complement clause. In other words, an XP-EPP language should not have alternating subject control, or simple backward control. Alternating subject control is restricted to languages that satisfy the EPP by V°-to-T°, as in Greek. Note that alternating object control should be free from this restriction, if the EPP is not applicable to object positions. To summarize, only forward control will be possible if a language does not license Case in control complement clauses or satisfies the EPP by XP movement.

All of these observations extend to backward control. Backward control arises in a language that in principle allows alternating control but has an additional language-specific restriction that precludes pronouncing the higher copy.

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12 Case is insufficient by itself, if Case is relevant at all. See McFadden (2004), Landau (2006, 2009) and references therein that deny a licensing function to Case.

Finally, we suggest that copy control, like other instances of multiple copy spell out (see Nunes 2004 and works within), only obtains if one of the non-distinct copies derived by movement goes below the word level by becoming a part of a single terminal element or a spelled-out domain. In this way, the copy escapes deletion during Chain Reduction.

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