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"Preverbs and Complex Predicates:

Dimensions of Wordhood"

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Preverbs and Complex Predicates: Dimensions of Wordhood

Farrell Ackerman (UCSD) and Phil Lesourd (UCSD)

There are a number of points of view from which words can be defined... One can attempt to characterize words as phonological units; as the irreducible terminal elements of syntactic structure; as the domain of principles regulating the appearance of morphological material; as the basic elements of the lexicon... In many (perhaps even most) cases, these various lines on what a word is converge on the same units; but unfortunately they do not always coincide, and this fact is responsible for a great deal of controversy. - Anderson (1992:17)

1. Introduction

Many languages contain complex predicates of the schematic sort illustrated below:

A. [PV-V] B. [PV V]

These predicates consist of a verbal stem (V) and some other constitutive piece, i.e. a preverb (PV), where the PV is bound to the V as in A. or where the PV and V are juxtaposed and separable under certain syntactic and/or discourse conditions as in B; whereas A. represents a *synthetic expression*, B. represents an *analytic or phrasal expression*.

Craig and Hale (1988) argue for the theoretical importance of the type of predicate in A. which contains a so-called 'relational' PV encoding the semantics often associated with postpositions or oblique case markers. On the basis of evidence from Winnebago, Rama, Nadeb and Navajo they propose the following diachronic development for the PV element in these compositions:

postposition ---> proclitic ---> preverb

Roughly, on their account, the head of a postpositional phrase goes through a stage in which it functions as a proclitic and then as a bound morpheme. Though in principle they permit more transitional stages than the two, i.e. clitic and bound morpheme, which they posit, they assume that the final stage of this development yields a morphophonologically integrated or synthetic wordform.

From a synchronic perspective, Craig and Hale adapt certain assumptions concerning the syntactic (adposition) incorporation proposal of Baker (1989) to account for various properties of compositions with incorporated PVs: they tentatively suggest that "the theory of government might be the system of grammar most directly relevant to an adequate explanation of the observed typology of relational preverb constructions." (p.342) On Craig and Hale's

account, even though government arguably constrains head movement there is still no explanation for what might motivate movement in the first place.

Hale and Craig's view develops the hypothesis offered in Wier (1986) for Nadeb. Roughly, Wier proposes that a postposition initially forms a phonological unit with certain verbal stems without attendant semantic or grammatical function changes and then begins to appear with a larger number of verbs associated with a changed semantics and consequences for clausal complement relations. On Wier's account phonology appears to antecede any semantic or grammatical function effects associated with the interaction between a PV and a V: she provides no explanation for why a postposition would migrate to the head of the clause.

In sum, Craig and Hale attempt to explain the appearance of PV V compositions in terms of syntactic movement whereas Wier appeals to phonology.

We argue, in contrast, that the theoretical notion *functional wordhood* (as developed in parallel in Ackerman and Webelhuth (to appear) and T. Mohanan (1990, in press)¹ is necessary for an optimal account of the phrasal PV V constructions: the dissection of complex predicates into different dimensions of wordhood provides the appropriate resources to address the multifaceted nature of phrasal predicates including their striking parallelisms with synthetically expressed complex predicates. On our account the treatment of elements as a lexical unit, i.e. functional word, antecedes and may motivate the treatment of this unit as acquiring certain phonological and morphological properties. That is, two syntactically independent entities are perceived as constituting a single argument taking predicate, i.e. a type of functional word: this explains the tendency for such entities to begin displaying phonological and morphological properties that both distinguish them from simple syntactic phrases and make them resemble (complex) synthetic wordforms.

In this paper we present PV and V complex predicates from Fox (representative of Algonquian) and Hungarian (representative of Ugric) that parallel many of the phenomena cited by Craig and Hale (1988) but where, crucially, the PVs are neither clitics nor bound morphemes. We begin by introducing the data from Fox and Hungarian in order to contextualize the *analytic paradox* presented by these constructions. We then focus on two aspects of PV V compositions: (1) evidence for their status as lexical compositions and (2) evidence illustrating that these lexical units though often functioning as morphologically complex whole consist of syntactically independent words. We utilize data such as these in support of a particular solution to the alleged *analytic paradox*: throughout we focus on the data relevant for an analysis in terms of multiple interactive domains of wordhood. We defer the particulars of our proposal to another forum. (cf. Lesourd and Ackerman (1992)). Our goals in the present forum are quite modest: we want to bring into focus the nature of the problem presented by so-called *phrasal predicates* and then examine aspects of these constructions that suggest a solution to this problem in terms of different dimensions of wordhood.

2. An Analytic Paradox

2.1 Evidence for separability of PV: Inflecting pieces of discontinuous predicates

Consider the following examples of phrasal predicates from Fox (Algonquian) and Hungarian (Ugric). (1a) illustrates that inflectional markers (underlined) surround the pieces of a complex predicate even when such pieces are discontinuous, while (1b) shows that inflectional markers similarly surround a simplex verbal stem. In addition, it can be seen that a verbal complement (OBJ), 'your daughter', has been interposed between the boldfaced PV and V. Given arguments against the incorporation of this complement presented in Dahlstrom (1987), the PV and V appear discontinuous in constituent structure.

(1a) nepye:ci keta:nesa **wa:pama:pena**
Iperson-come your daughter look at Iplural-3
 WE HAVE COME TO LOOK AT YOUR DAUGHTER

(1b) newa:pama:pena
Iperson-look at-Iplural-3
 WE LOOK AT HER

(2a) illustrates that an incorporated pronoun, i.e. (underlined and boldfaced) has been suffixed to the PV. This pronoun satisfies the oblique argument requirement of the complex predicate *bele=szeret* 'fall in love with' derived from the simple transitive predicate *szeret* 'love'. (2b) shows that the PV and incorporated pronoun can be postposed (not necessarily contiguously) to the V.

(2a) a fiú **belé-m=szeretett**
the boy PV-1sg-loved
 THE BOY FELL IN LOVE WITH ME.

(2b) a fiú nem szeretett **belé-m**
the boy not loved-3sg PV-1sg
 THE BOY DID NOT FALL IN LOVE WITH ME.

There is an abiding assumption among several traditional grammarians as well as many generativists that the syntactic separability of the pieces of such combinations as the Hungarian complex predicate in (2b) disqualify them from inclusion into the class of so-called *lexically composed compositions*. For example, after noting the syntactic separability of Hungarian PVs such as *bele* 'into' in example (2), Samuel Brassai (1887) derides the popular view of contemporary linguists that such constructions represent single lexical entities, namely, complex predicates. He compares the syntactic behavior of these putative verbal compounds with incontestible nominal compounds and asks rhetorically whether,

Perhaps it is possible to separate portions of compounds in the following manner:

* a so tedd az asztalra **tartót** < sotartó N 'saltshaker'
 the salt place the table-SUBL shaker
 'place the saltshaker on the table!'

The inability of the pieces of nominal compounds to separate was offered as an argument against assuming that they could have the same lexical status as entities whose pieces were separable.

Similar intuitions concerning the relation between complex predicates and morphology have informed much work within the generative tradition. Consider the following representative formulation of the so-called *Lexical Integrity Hypothesis*:²

(Strong) Lexical Integrity Hypothesis

Syntactic rules can neither analyze nor alter word structure

The effects of lexical integrity were argued to follow from certain assumptions concerning morphology. For example, the interaction between Bracket Erasure and the Opacity Condition as advanced by Mohanan (1982/1986) yields wordforms that should function as syntactic atoms:

Bracket Erasure

Erase the internal brackets at the end of each cycle.

Opacity Condition

The internal structure (of words) at one stratum is invisible to the processes at another.

The existence of phrasal predicates is clearly at variance with the expectations of Lexical Integrity. In fact, Nash (1982) describing separable PV V compositions in Walpiri refers to this problem as an *Analytic Paradox*. The question is how to resolve this paradox. A popular move among syntacticians is to employ such data to demonstrate the incorrectness of the LIH and, by implication, the view of grammar which it subserves, namely, Lexicalism. The remedy recommended is to subsume morphology within the syntactic component: either to argue that it is in some manner a principled variant of syntax (most recently Lieber (1992)) or that it is a "module parallel to Case theory and Binding theory" (Baker (1988)).

There is, however, an alternative tack: this is to re-evaluate the relation between morphology and the lexical information associated with wordforms. On this hypothesis ostensible counterexamples reveal an indefensible covert assumption embodied in standard interpretations concerning the relation between lexicalism and lexical integrity. We will refer to this assumption as the *Hypothesis of Morphological Lexicalism*:

All predicate forming operations, whether conceived syntactically in terms of head-movement (i.e. Baker (1989) or lexically (i.e. DiSciullo and Williams (1987) or Bresnan (1982), yield complex morphological objects, i.e. morpho-phonologically integrated (i.e. synthetic) wordforms.

The fundamental effect of this assumption is that predicate formation is identified with morphological wordforms. One way of resolving Nash's analytic paradox is to suggest that this hypothesis posits an erroneous identification of lexical properties with particular, namely, *synthetic* morphological encodings. It is

possibly the case that discrepancies of the observed sort argue less for the identification of morphology with syntax (or, for a reduction of morphology to syntax), than to further decomposing the notion *word* into more dimensions than the familiar division into morphological and phonological wordhood. In particular, we posit that the observed discrepancies indicate a mismatch between *functional* wordhood and its expression in morphology and constituent structure.

In the remainder of this paper we provide further evidence against the Hypothesis of Morphological Lexicalism and for the view that predicate formation operations are independent of formal expression. This evidence argues against the identification of an information theoretic composition operation with a particular surface expression, i.e. synthetic expression. We turn now to arguments for the lexical status of PV V compositions, and then we will examine some of the encoding or formal properties of these constructions.

2. Arguments for Lexical status

...either it [P(reverb)]occupies initial position, separated from the V ("tmesis") or else immediately precedes V, still written as a separate word. In subordinate clauses we have already in the Rig Veda the "univerbation" of juxtaposed P and V, which becomes the rule later for the principle clause as well with the elimination of tmesis. **This illustrates that P and V even in tmesis are constituents of a single semantic "word"**. -Watkins 1964: 1037

In this section we demonstrate that despite their separability from their verbal stems under certain syntactic conditions, the relevant PVs are often correlative with properties standardly identified as *lexical effects* when they combine with verbal stems. According to standard lexicalist criteria for determining the 'lexical provenance' of constructions, i.e. *valence change, case government change, meaning change, grammatical function assignment alterations*, the composition of separable preverbs with verbal stems represents, in some dimension, the same type of entity as complex predicates consisting of an inseparable preverb (prefix) and verbal stem in languages such as Serbo-Croatian.³ Given length constraints we focus here only on meaning changes and case government, meaning changes and valence, and lexical aspect. The lexical effects examined here are evident in the predicate formation operations which obtain in languages where complex predicates consist of a prefix (i.e. a bound morpheme) and a V and/or a separable PV and a V. This can be illustrated by a comparison between Serbo-Croatian and Hungarian.

In Serbo-Croatian, as can be seen, the simple predicate in (3a) means 'scream' and governs an OBL argument expressed by a prepositional phrase and can also govern a DAT marked complement correlative with a different meaning. In contrast, the complex predicate in (3b) displays a different lexical semantics and case government pattern: it cannot co-occur with a PP complement. (We will ignore grammatical function values throughout this paper.)

- (3a) *majka viknula je na dete /detetu*
mother screamed 3sg at child-ACC child-DAT
 THE MOTHER SCREAMED AT THE CHILD/TO THE CHILD
- (3b) *majka podviknula je * na dete / detetu*
mother PV-scold 3sg at child-ACC child-DAT
 THE MOTHER SCOLDED THE CHILD

In Hungarian, the simple predicate in (4a) means 'shout' and governs the DAT case for its complement, while the complex predicate formed with the separable PV *ra* displays a different lexical semantics and case government pattern than the simple predicate in (4a).

- (4a) *az anya kiáltott a gyerekeknek / * a gyerekek*
the mother shouted child-DAT child-SUBL
 THE MOTHER SHOUTED TO THE CHILD
- (4b) *az anya rá=kiáltott * a gyerekeknek / a gyerekek*
the mother PV-shouted the child-DAT the child-SUBL
 THE MOTHER SHOUTED AT THE CHILD

Complex predicates in these languages differ in a single relevant respect: whether their PVs are (in)separable. That is, there is a morphological condition that requires that PVs function as affixes in Serbo-Croatian, but are juxtaposed in Hungarian. This cross-linguistic difference will be shown to have parallel intralanguage differences analyzable in terms of *paradigmatic relations* below.⁴

2.1 Meaning Change and Case Government

Roughly speaking the presence of a PV in Hungarian alters the aspectual value of a predicate by making it perfective, whatever additional ways in which a PV might modulate the meaning of the verbal stem. The presence of a PV can restrict the general directionality of motional predicates. This is illustrated below where the Greek letters are intended to represent the arguments of the predicate interpreted in terms of Dowty's proto-roles, while the line connecting these arguments to grammatical function names are intended to suggest the mapping principles responsible for these alignments. Whereas the simple motion predicate *dob* 'throw' can co-occur with any type of goal complement in (5a.), the complex predicate in (5b.) *be dob* 'throw into a contained space' restricts the complements to be expressed by either case-markers or postpositions whose feature complex is subsumed by the features associated with LOC in the case specification for the predicate. Finally, the complex predicate *bele dob* 'throw into a narrowly contained space' in (5c.) requires that its OBL complement be exclusively encoded by a single case-marker.⁵

- (5a) *a fiú dobta a labdát a fal felé/a tóba*
the boy threw-3sg/DEF the ball-ACC the wall toward/the lake-IN
 THE BOY THREW THE BALL TOWARD THE WALL./INTO THE LAKE

(6a.) *hat* V 'influence,
 exert an influence' < α , β >
 | |
 SUBJ OBL \emptyset
 OBL \emptyset _{case} = SUBL

(6b.) *meg hat* V 'move, touch' < α , β >
 | |
 SUBJ OBJ

The differences in valence for the the preceding predicates is reflected in their inflectional behaviors: whereas the transitive predicate *meg hat* 'touch, move' in (7a.) can host the definite conjugation which is required with definite ACC OBJs, the intransitive two-place predicate *hat* 'influence' in (7b.) cannot.

(7a.) *meg hat-ja* vs. (7b.) * *hat-ja*
PV move-3sg/DEF *influence-3sg/DEF*
 S/HE MOVED HER/HIM

2.3 Aspect

The PVs of Fox are semantically heterogeneous. Several are relational in the sense of Craig and Hale while others have an adverbial force, introduce modal notions, or are valence changing. Like Hungarian, Fox also has PVs which function as aspectual markers. Consider the following predicate provided by Dahlstrom (1987): the glosses are radically simplified to improve intelligibility.

(8) *ke ki:si-* =koci -a:ya:cimohc*enepena*
PERF enclitic tell-to 1p-2/IND
 WE HAVE FINISHED EXPLAINING TO YOU

The PV *ki:si* in (8) contributes aspectual properties to the predicate, as did the Hungarian PV *meg*. In addition, it serves as host for both a prefixed inflectional marker (indicated by italics) and a 2nd position enclitic particle which is interposed between the PV and the verbal stem.⁶ We can see from this example that Fox contains clitics distinct from both bound morphemes (exemplified by the prefixal and suffixal inflectional markers) and PVs.

The domain of wordhood relevant for the lexical unithood of the complex predicates examined in this section is *functional wordhood*. These functional (i.e. lexical) words, of course, receive formal (morphological and phrase structural) encoding. We examine certain aspects of this encoding in the next section.

3. Formal expression: Morphological Complexity and Syntactic Independence

Having presented a small sample of the evidence in favor of treating PV V compositions as lexical units (or *functional words*), we turn to the way in which these units are formally expressed. We begin with certain morphological

properties associated with these entities and then turn to their expression in constituent structure.

3.1 Subcategorization and Derivation

PVs exhibit the sort of distributional constraints ordinarily associated with bound morphemes: they must co-occur with certain categories even though unlike bound morphemes they need not be contiguous to such categories. The evidence from Hungarian and Fox differs with respect to such subcategorizational constraints: whereas Hungarian PVs can only appear with Vs or in deverbal derivatives, Fox PVs are more promiscuous. Fox has preverbs, prenouns and preparticles - many of the same PVs appearing on different categories as long as they are semantically compatible. However, even given this distributional difference it can still be demonstrated that PV-V compositions serve as input to derivational operations in both languages. This can be shown by focusing on aspectual or adverbial PVs which only co-occur with Vs. We first illustrate derivation involving adverbial and negative PVs in Fox, then turn to derivation involving PVs in Hungarian.

In (9a) the adverbial PV 'well' co-occurs with a V to yield a predicate which means 'he lives well'. This phrasal predicate is input to a nominalization operation which yields the nominal 'good life' in (9b). Fox, unlike Hungarian, permits the co-occurrence of PVs. (9c) illustrates that nominalization can take as input a sequence of PVs and a V: in (9c) this yields the nominal 'failure to live well.'

(9a) *menwɪ pema:tesɪwa*
well-PV live.3s
 HE LIVES WELL

(9b) *menwɪ pema:tesɪwɛnt*
well-PV live-NOM-inanimate singular
 GOOD LIFE

(9c) *pwa:ni menwɪ pema:tesɪwa*
neg-PV well-PV live-NOM-inanimate singular
 FAILURE TO LIVE WELL

In Hungarian we find the following types of derivation based on the complex predicate *meg old* 'solve' presented in (10):

(10a) *a kutató meg oldotta ezt a bonyolult feladatot*
the researcher PV solved this-ACC the complex task
 THE RESEARCHER SOLVED THIS COMPLEX TASK

The suffixation of *ás* to *meg old* produces the nominal *meg oldás* 'solution'. Several adjectival forms can be derived from this complex base: *meg oldható* 'solvable', *meg oldhatatlan* 'unsolvable', *meg oldando* 'necessary to solve' among others:

(10b) megold-**ás** N 'solution'

(10c) megold-**ható** A 'solveable', megold-**hatatlan** A 'unsolveable', megold-**andó** A 'necessary to solve'

3.2 Syntactic Accessibility to Pieces of Morphological Compositions

We have seen above that there are standard lexical effects associated with the presence of PVs and that PV V combinations can participate in derivational operations. Despite these behaviors, however, Hungarian evinces what might be called stem gapping: for PV V combinations consisting of a directional PV and a motional V the verbal stem can be ellipsed in chained clauses.

(11a) **azután** nyugodt léptekkel **ki sétáltam** a folyosóra
then calm steps-INSTR PV walked hall-SUBL
 THEN I WALKED OUT INTO THE HALL

(11b) **el** \emptyset a hátsó lépcsőhöz
PV the back stair-ALL
 OVER TO THE BACK STAIRS

(11c) **föl** \emptyset a hatodik emeletre
PV the sixth floor-SUBL
 UP TO THE SIXTH FLOOR

(11d) **be** \emptyset a fogadó terembe
PV the receiving room-IN
 INTO THE RECEPTION ROOM

(11e) **át** \emptyset a becsukott franciaajtón
PV the closed french door-SUP
 THROUGH THE CLOSED FRENCH DOOR.

In (11b-e) the verbal stem *sétál* 'walk' has been ellipsed. What remains in each clause is the PV and the case government demanded the complex predicate. It should perhaps be noted that unlike the English gloss the Hungarian construction cannot be analyzed as the coordination of prepositional phrases: Hungarian has only postpositions.

Another phenomenon in which pieces of morphological compositions appear to be accessible to syntactic operations is yes/no questions. A standard way of responding affirmatively in yes/no questions is to repeat the predicate: with simple verbs this entails repeating the categorial verb, while, as indicated in (12a) and (12b) the convention is to repeat only the PV in PV V compositions. The PV stands for the complex predicate as a whole.

(12a) **át dolgoztad** azt a fejezetet?
PV work-2sing/DEF that-ACC the chapter-ACC
 DID YOU RE-WORK THAT CHAPTER?

- (12b) **át** Ø
 PV
 I DID.

Unlike in stem gapping where there were semantic constraints on the nature of participating predicates, the convention for responding to yes/no questions with the PV applies to all PV V compositions.

3.3 Separability as Conditioned by Morphological Considerations

Having suggested that PV V compositions are lexical units with a morphological status and that the pieces of such compositions are accessible to syntactic operations, we conclude this review of the data with three examples of how purely morphological factors determine the separability of PV and V in both Hungarian and Fox. We demonstrate here what Goddard (1990) has referred to as the need to preserve evident *paradigmatic relations* between wordforms. Consider two phenomena from Fox presented in Goddard (1990a) and (1990b): stem allomorphy and PV bumping.

First we present a phenomenon of *stem allomorphy*. In example (13b) the aspectual marker functions as a prefix, while in (14b) the same aspectual marker functions as a syntactically separate PV.

- (13a) wɛ:senɪ -wa
 eat 3sg
 S/HE EATS

- (13b) **ki:s-isenye:** -wa
 finish/pfx-derivational suffix 3sg
 S/HE HAS FINISHED EATING

- (14a) meno -wa
 drink 3sg
 S/HE DRINKS

- (14b) ki:si meno -wa
 finish/PV drink 3sg
 S/HE HAS FINISHED DRINKING

Whether the exponent of the aspectual notion of completiveness surfaces as a bound morpheme as in (13b) or a syntactically independent PV as in (14b) appears to be a function of idiosyncratic morphological information. In particular, if a V stem has a corresponding *derivational suffix* form (such as the boldfaced element in (13b)), then the aspectual marker is prefixed to the *derivational suffix*. If, however, a V stem does not have a corresponding *derivational suffix* (as indicated by the formal identity of 'drink' in (13a) and (13b)), then the aspectual marker surfaces as a PV. There is obviously a paradigmatic relation between aspectually unmarked Vs (the contrast between the (a) and (b) sentences in (13) and (14)) and their perfective counterparts: (13b) and (14b) differ solely with

respect to the boundness or separability of the aspectual marker and this appears to be morphologically conditioned. It is worth noting that there is an additional notion of paradigmaticity at play here as well: there are paradigmatic relations between the class of all aspectually marked predicates. This class consists of both synthetic and analytic or phrasal expressions of predicates.

Goddard mentions a second phenomenon where idiosyncratic morphological constraints yield paradigmatically related entities with either synthetic or analytic expression. He refers to this as *PV bumping*:

(15a) pem- ose:wa
along/pfx walk-3sg
S/HE WALKS ALONG

(15b) pemi we:p- ose:wa
along/PV begin/pfx walk-3sg
S./HE STARTS WALKING ALONG

In (15a) the so-called *initial pem* 'along' is prefixed to the V, while in (15b) it is displaced or bumped by the aspectual *we:p-* 'begin' and functions as a PV. Goddard suggests plausibly that there is a paradigmatic relation between 'walk along' and 'start to walk along': he observes that even though *we:pi* 'start' exists as a PV in all attested cases where 'along' and 'start' co-occur, *pemi* 'along' surfaces as a PV and *we:p-* 'start' as a prefix. That is, there appears to be a sequencing constraint such that *pem(i)* 'along' must precede *wep(i)* 'start'. This, of course, creates a mismatch between formal expression and the paradigmatic relation which obtains between the two forms: given that 'walk along' should be related to 'start to walk along', i.e. that *wep(i)* 'start' has scope over the complex verb 'walk along', it might be expected that we could get the form listed as (16):

(16) * we:pi pem- ose:wa
begin/PV along/pfx walk-3sg
S./HE STARTS WALKING ALONG

However, according to Goddard this does not correspond to any attested form. The phenomenon on PV bumping, then, represents an instance where certain morpheme sequencing constraints determine (in)separability.

Finally, we look at some examples from Hungarian where morphological properties of a deverbal derivative are determinative for the (in)separable status of PVs. In (10b) and (10c) we witnessed PVs in deverbal derivatives. It turns out that the PV is separable from certain derived stems when the deverbal derivative functions as the PREDICATE of the clause. Consider the contrast between (17a) containing the derived adjective *meg oldható* 'solvable' and (17b) containing the derived adjective *meg oldhatatlan* 'unsolvable'.⁷

(17a) ez a feladat oldható meg
this the task solvable PV
IT'S THIS TASK THAT'S SOLVABLE

- (17b) *ez a feladat* oldhatatlan **meg**
this the task solvable-not able PV
 IT'S THIS TASK THAT'S UNSOLVABLE
- (17c) *ez a feladat* **meg**oldhatatlan
this the task PV-solvable-not able
 IT'S THIS TASK THAT'S UNSOLVABLE

Given that italics indicates focus and that focused elements cause the PV to be dislodged from its position immediately before the V, we can see that focusing postpones the PV in adjectives formed from *-ható* 'able' in (17a), but does not occur in adjectives derived by means of *hatatlan* 'un V able'. As in the Fox cases above, the (in)separability of PVs depends on morphological properties associated with their stems, i.e. what formatives are employed in a given derivation. Irrespective of (in)separability, however, both forms are adjectives with a shared base, namely, PV V.

In conclusion, this section has shown that PV (in)separability appears to be morphologically conditioned. That is, there something about the morphological expression of these functional words that determines (in)separability. These language internal contrasts are, of course, reminiscent of the cross-linguistic contrasts cited previously for Serbo-Croatian and Hungarian: PV V compositions in these two languages exhibit many of the same "lexical effects", but differ with respect to morphological conditions on (in)separability.

4. Conclusions

In the previous two sections we have adduced evidence for the claim that PV V compositions are lexical units whose pieces evince syntactic independence despite the demonstrable status of PVs as quasi "derivational" elements and the status of PV V as an occasional complex morphological unit. In particular we have argued that:

- (1) PVs in Fox and Hungarian are neither clitics nor bound affixes, they are syntactically independent words.
- (2) PV V compositions in Fox and Hungarian are lexical units.
- (3) PV V compositions in Fox and Hungarian are sometimes complex morphological units.
- (4) Conditions on (in)separability are morphological and independent of the lexical status of PV V compositions.

These conclusions support the notion of complex predicates as representing an *analytic paradox*. The hypothesis that the domain of lexical rules must include entities that are neither morphophonologically integrated nor syntactically atomic, i.e. that there is something amiss in the usual identification of lexical rules (roughly speaking, an information theoretic notion) with lexical integrity (roughly representing expression or form), has been central to the analysis of Hungarian complex predicates presented in Ackerman (1987), Hindi

complex predicates presented in T. Mohanan (1990) and Japanese complex predicates in Matsumoto (1992). These works all suggest, in one way or another, that some notion of lexicality is implicated in data such as these. Indeed, the independence of lexical information from surface expression has been argued for independently by Booij (1990) in his analysis of Dutch complex predicates with separable PVs. He suggests that operations on Lexical Conceptual Structure are responsible for the lexical effects associated with phrasal verbs. On his account, as on ours, the phrasal verbs are creatures of the lexicon, though they sometimes violate our expectations concerning the interaction between morphological form and constituent structure behavior.

We propose that linguistic theory must recognize the construct *functional word* (or its' analogue), as an object in the dimension of information where predicate formation occurs. When lexicalism is construed in terms of interacting dimensions of wordhood and *morphological lexicalism* is abandoned, the *analytic paradox* identified by Nash begins to dissolve.

Finally, the postulation of a semantic dimension of wordhood offers the prospect of explaining the similar patterns of diachronic development often noted for complex predicates: independent units are initially construed as constituting tight semantic units irrespective of surface contiguity and this motivates their subsequent morphological and phonological coalescence.

NOTES

¹ Cf. Zwicky (1990) for a similar proposal.

² This formulation reflects the so-called *strong version* of this hypothesis according to which both derivation and inflection operate in the lexicon to produce fully formed words which appear in constituent structure.

³ In fact, Serbo-Croatian and Hungarian evince the same diachronic development of complex predicates – a former head of a dependent constituent is attracted to the head of the clause.

⁴ For the time being it is sufficient to note that Germanic languages exhibit differences in terms of e.g. separable vs. inseparable preverbs.

⁵ We make the following assumptions concerning the relations between lexical arguments and function assignments: the relation can be mediated along the lines proposed in Fillmore (1977) and Dowty (1991) where arguments are analyzed as feature bundles.

⁶ It should be recalled that we have seen earlier that PV can be separated from the verbal stem by a word boundary (cf. example (1a.) for evidence that arguments can be interposed between the PV and the V.

⁷ The point illustrated here could be made as easily by demonstrating that the comparative form of *megoldható*, namely, *megoldhatóbb* behaves just like derivatives with the suffix *-hatatlan*. In particular, as shown in the text, the PV is not separable with the *-hatatlan*.

References

- Ackerman, F. (1987) *Miscreant Morphemes: Phrasal Predicates in Ugric*. Dissertation, UC Berkeley.
- Ackerman, F. & Webelhuth G. (to appear) *Wordhood and Syntax: A Theory of Complex Predicates*. Center for the Study of Language and Information, Stanford University.
- Anderson, S. (1992) *A-Morphous Morphology*. Cambridge University Press.
- Bach, E. (1979) Control in Montague Grammar. *LI* 10.4.
- Baker, M. (1989) *Incorporation: A theory of grammatical function changes*. University of Chicago Press.
- Baker, M. (1988) Morphology and syntax: an interlocking independence. In M. Everaert et. al. eds. *Morphology and Modularity*. Foris.
- Booij, G. (1990) Separable complex verbs in Dutch. *Yearbook of Morphology* 3.
- Brassai, S. (1887) Word order and accent. *Akadémiai Ert.* XII. [In Hungarian]
- Bresnan, J. (1982) "The Passive in Lexical Theory." In J. Bresnan (Ed.) *The Mental Representation of Grammatical Relations*. Cambridge: MIT Press. 3-86.
- Craig, C. & Hale, K. (1988) Relational preverbs in some languages of the Americas. *Language* 64.2.
- Dahlstrom, A. (1987) Discontinuous constituents in Fox. In P. Kroeber et.al. eds. *Native American Languages and Grammatical Typology*. IULC.
- DiSciullo, and Williams, E. (1987) *On the Definition of Word*. MIT Press.
- Dowty, D. (1979) *Word Meaning and Montague Grammar*. Kluwer.
- Goddard, I. (1990a) Primary and secondary stem derivation in Algonquian. *IJAL* 56.4.
- Goddard, I. (1990b) Paradigmatic relationships. *BLS 16: Special Supplementary Volume*.
- Hoeksema, J. (1991) Complex predicates and liberation in Dutch and English. *Linguistics and Philosophy* 14.
- Lesourd, P. & Ackerman, F. (1992) *Lexicalism and Preverbs*. ms.

- Lieber, R. (1992) *Deconstructing Morphology*. University of Chicago Press.
- Matsumoto, Y. (1992) *On the wordhood of complex predicates in Japanese*. Dissertation, Stanford University.
- Mohanan, K. P. (1986) *Lexical Phonology*. Kluwer.
- Mohanan, T. (to appear) Wordhood and lexicality: Noun incorporation in Hindi. *NLLT*.
- Mohanan, T. (1990) *Arguments in Hindi*. Dissertation, Stanford University.
- Simpson, J. (1990) *Walpiri Morpho-Syntax: A Lexicalist Approach*. Kluwer.
- Watkins, C. (1964) Preliminaries to the reconstruction of Indo-European sentence structure. In Lunt, H. ed. *Proceedings of the Ninth International Conference of Linguists*. Mouton.
- Wier, E. M. H. (1986) Footprints of yesterday's syntax. *Lingua* 68.
- Webelhuth G. and Ackerman, F. (1992) Complex predicates and wordhood: Passive predicates in German. presented at CLS.
- Zwicky, A. (1990) Syntactic words and morphological words, simple and composite. *Yearbook of Morphology* 3. .

Multiple Dependencies and Centre-Embedding

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1 Introduction

The goal of this paper is to make somewhat more precise the nature of memory constraints in the parser. The processing difficulties of centre-embedding constructions have often been attributed to limited memory resources in the parser. As more articulated parsing models are proposed, accounts based on references to ever more vague memory limitations become ever less explanatory. We explore a particular parsing model which uses a set of stacks to build dependencies of various types. We then sketch a proposal which links the ill-formedness of centre-embedding constructions with limitations in these dependency stacks.

2 Background

First, some definitions are in order. Following Chomsky (1965) we say that “the phrases A and B form a nested construction if A falls totally within B, with some nonnull element to its left within B and some nonnull element to its right within B.” [p. 12] We also say that “the phrase A is self-embedded in B if A is nested in B, and furthermore, A is a phrase of the same type as B.” [p. 12] In this paper, we use the terms self-embedding and centre-embedding interchangeably.

Chomsky and Miller (1963) attribute the processing difficulty of centre-embedding constructions to memory limitations of the parser. The argument is that with structures which are centre-embedded, the memory load on the parser increases beyond its memory capacity. Each new level of embedding obliges the parser to start construction of a new phrase. Because the phrases nest within each other, construction of a new phrase must be started before the current one is completed. Each partially constructed phrase must be kept in some form of working memory. Processing difficulties become evident when the capacity of this working memory is exceeded.

A typical example of a centre-embedding construction in English is a sentence with nested object relative clauses, as shown in (1a). The extreme deviance of this example is to be contrasted with (1b), which involves relativization from subject position. Subject relatives in English are not centre-embedding, and display no deviance whatsoever.

- (1) a. * I saw the rat that the cat that the dog that the man beat chased caught.
 b. I saw the man that beat the dog that chased the cat that caught the rat.

Chinese phrase structure differs from that of English. It turns out that nested subject relatives form centre-embedding structures while nested object relatives do not. As would be expected, object relatives are fine, while subject relatives are strongly deviant.

- (2) a. Wo kanjian-le nage ren da si de nage gou zhui de nage mao zhao zhu
 I see ASP that man beat REL that dog chase REL that cat catch
 de nage laoshu.
 REL that rat
I saw the rat that the cat that the dog that the man beat chased caught.
 b. * Wo kanjian-le da si-le zhui-le zhua zhu-le nage laoshu de nage mao
 I see ASP beat ASP chase ASP catch ASP that rat REL that cat
 de nage guo de nage ren.
 REL that dog REL than man
I saw the man that beat the dog that chased the cat that caught the rat.

Relative clauses are not the only constructions which form centre-embedding structures in English. Indeed, various other constructions may also be self-embedded: we believe the following to be a complete list for English.

(3) *Sentential Subjects*

That that that Bill slept with Mary amused Fred upset Gloria.

(4) *Result Clauses*

I'm worried enough that he's so fond of hanging out with people who are so violent that they rob drug stores that he'll end up in trouble with the police that I think I should talk to his parents.

(5) *Nested Comparatives*

The average middle-class voter is more likely to vote for a politician who is less well-known to an electorate which is less tolerant of corruption than it used to be than for a prominent public figure than the average working-class voter.

(6) *Conditionals*

If it were true that if Bill had claimed that if Chomsky had voted republican, then Bush would become an anarchist, then you would have punched him out, then I think you're over-reacting a bit.

(7) *Disjunction*

Either it seems to me that either you suspect that either Bill is a fool or I am or one of us has been duped or I just don't understand what's going on here.

Formal language theory typically thinks of grammars used either as decision machines or as enumerators. Decision machines take as input a string over some vocabulary, and either accepts or rejects it as a member of the language specified by the grammar. Enumerators produce a list of all the strings in the language, one at a time.

Chomsky and Miller (1963) hold that for linguistic purposes a grammar must do more than simply the enumerate strings in a language. It must also associate with each string a structural description, which describes the internal structure of the sentence.

Viewed as a decision machine, a grammar must also do more than simply accept or reject strings as members of the language. There seems to be a whole range of grammaticality judgements that people assign to strings in the natural language. Hence, a good model of human language processing must account for these graded judgements. It is thought that performance factors are responsible for these gradient judgements (whereas competence constraints result in clearer grammatical versus ungrammatical verdicts).

Chomsky and Miller also noted that no purely grammatical constraint can rule out the centre-embedding cases. For example, no limit on the number of rule applications will work, as rules can be mixed. Thus, the following case is just as bad as the earlier ones.

- (8) That the average middle-class voter is more likely to vote for a politician who is either worried enough about air pollution to take the bus or greedy enough to steal than an honest hard-working farmer is amusing.

The question which must then be asked is what is wrong with Chomsky and Miller's original explanation? Simply saying that it is vague or imprecise is not good enough, since surely it can be given a more focused interpretation with respect to a specific parsing mechanism. However, many phrase structure fragments must be kept in memory during an ordinary parse, with no concomitant increase in processing difficulty. Furthermore, their approach does not yield gradient judgements. Thus, there is no explanation as to why the following sentences are not as severely deviant as the examples seen above (especially given judicious phrasing).

- (9) The man in the house in the city near Boston with a big garden with tons of money is running for mayor.

- (10) I'm telling you that I already said that noone was here last week yesterday for the record.

3 Previous Approaches

Gazdar (1985) investigates the use of indexed grammars to describe centre-embedding constructions. Indexed grammars lie between context free and context sensitive grammars in the Chomsky hierarchy. They can be characterized as context free grammars augmented by a stack, the use of which is restricted to the types of grammar rules shown:

- (11) a. $A[...] \rightarrow W[...]$
 b. $A[...] \rightarrow B[i, ...]$
 c. $A[i, ...] \rightarrow W[...]$

In these rules, A and B are nonterminals of the grammar, while W is a string of terminals and nonterminals. $[...]$ represents a stack of indices. Rule (a) states that the nonterminal A can be rewritten as the string W , with the stack which A carried distributed to all the nonterminals in W . Rule (b) states that A can be rewritten as B , while an index i is pushed onto the top of the stack. Finally, rule (c) states that the topmost element of the stack can be removed when A is rewritten as W (with the resulting stack distributed to all the nonterminals in W).

Gazdar recognizes, as Chomsky and Miller do, that a grammar must not only produce a set of acceptable strings, but must also associate an appropriate syntactic structure with each of them. He notes that certain string sets which look as though they are centre-embedding given the surface string can be generated as either left-linear or right-linear structures using indexed grammars. This approach is problematic, however, in that the structure associated with these strings is *not* appropriate — the assigned structures have the wrong constituent structure (as determined by various syntactic tests). Moreover, it does not explain why some centre-embedding structures are ungrammatical, while others are more or less acceptable.

Joshi (1990) considers patterns of dependencies which occur in German and Dutch. Dutch allows cross-serial dependencies, while German has nested ones. Joshi shows that using a parsing model called an embedded push down automata (which is equivalent to the tree adjoining grammars), both the Dutch and the German dependency patterns can be generated. As with Gazdar's approach, the problem is that no provision is made for ruling out the Chinese and English cases which are bad. However, it is clear that simple centre-embedding alone cannot be responsible for the ill-formedness of these examples.

Culy (1990) in fact proposes that more than simple centre-embedding is at the root of processing difficulties. He contends that centre-embedding in

itself is not terribly problematic, but results only in mild degradation. Instead, centre-embedding in combination with the appearance of identical consecutive lexical categories is claimed to result in serious deviance. This is formulated as the Consecutive/Embedding Constraint [p. 211]:

(12) *Consecutive/Embedding Constraint (CEC)*

If α is a center embedding category and β is a lexical category, then structures of the form $[_\alpha \dots [\dots \beta] [_\alpha \beta \dots] \dots]$ and $[_\alpha \dots \beta] [\beta \dots] \dots]$ are highly disfavoured.

This approach thus offers an explanation of why some centre-embedding structures are relatively acceptable, whereas others are highly deviant. Attributing the ill-formedness of centre-embedding structures to something more than the simple fact that they exhibit a certain tree geometry thus seems promising. Unfortunately, this explanation offers no insight into examples such as those in (4) through (7). These examples do not involve identical consecutive lexical categories, yet they are strongly deviant.

Gibson (1990) considers ways of capturing performance limitations in a parsing mechanism. He assumes that all aspects of processing overload derive from thematic considerations. The Property of Thematic Reception (PTR) and the Property of Thematic Assignment (PTA), paraphrased below, associate a certain processing load with a parse in progress if either an element requiring a θ -role has not yet been assigned that role, or a θ -role cannot be assigned to an element requiring one yet.

(13) *The Property of Thematic Reception*

Associate a short term memory load with each thematic element whose θ -role has not yet been assigned.

(14) *The Property of Thematic Assignment*

Associate a short term memory load with each θ -role which is not assigned.

During the parse of a sentence such as (1a), too many elements have unsatisfied θ requirements, and thus impose an unacceptable processing load on the parser.

At first sight this is an appealing account of processing difficulty, but it is untenable as a general explanation. It predicts that languages such as Japanese, German, and Dutch should be very difficult to parse, since verbs occur at the end of the clause. It also cannot generalize to nonthematic elements, such as adjuncts. Moreover, it does not provide an explanation of the differences between examples such as (1) through (7) on the one hand and (9) and (10) on the other.

4 Proposal

We propose that all of the constructions which result in deviance when nested, as in (1) through (7) above, involve \bar{A} -dependencies, as follows.

- (15) *Relative Clauses*
 $O_i / wh_i \dots e_i$
- (16) *Sentential Subjects*
[that [that Bill left]_j upset Mary t_j]_i amused Fred t_i
- (17) *Result Clauses*
 $so_i \dots that_i$
- (18) *Nested Comparatives*
 $more_i / less_i \dots than O_i$
- (19) *Conditionals*
 $if_i \dots then_i$
- (20) *Disjunction*
 $either_i \dots or_i$

In order to properly ground our proposal, the parsing model adopted must be described. Following Abney (1991), the parser has two main components, a chunker and an attacher. The chunker processes sets of items from the input stream, building phrase-structure fragments which Abney refers to as “chunks”. Chunks are basically phrases headed by functional categories in which the functional selection has been satisfied. For example, upon encountering a determiner in the input, the chunker projects a determiner phrase, and sets out to satisfy the functional selection of a noun phrase by the determiner. The role of the attacher is to connect chunks to each other according to various licensing conditions in order to form a complete parse tree. In this architecture, the attacher deals with larger units than in a standard parser, where all elements of the input are treated uniformly. The attacher uses a buffer and stack mechanism, along the lines of that described in Marcus (1980), to store phrase structure fragments which are waiting to be incorporated into the final parse tree. For more details, see Abney and Cole (1986), Abney (1991), and Alphonse (1992).

In addition to the attacher’s main stack, a set of auxiliary stacks are used to build various types of dependencies. Rizzi (1990) notes that the formation of multiple dependencies of the same type is highly constrained. This constraint is formalized as Relativized Minimality (RM). Following RM, dependencies of different types do not interfere with each other, and thus have different stacks. Multiple dependencies of the same type are not allowed to interfere with each

other. In order to achieve this result, these auxiliary stacks are optimally limited to a single dependency each. It is this memory limitation which we claim is the source of processing difficulty for the parser.

The proposal thus takes shape as follows. The main stack of the attacher is limited, but has a fairly large capacity. The greater number of items stored in it the greater the processing load for the parser. The increase in processing load is quite gradual, however. Simple centre-embedding structures will thus eventually result in processing difficulties, but the effect of multiple embeddings is not drastic. We predict that this is the case not solely for centre-embedding constructions, but for any structure in which a phrase cannot be completed until another phrase is constructed in its entirety. Thus, (9) and (10) are fairly good. Note that these examples also involve attachment ambiguities for the prepositional phrases, which may also contribute to the difficulty in interpreting them.

The auxiliary stacks of the attacher, in contrast to the main stack, are severely limited in their size (in fact, they may be simple stores, rather than stacks). Thus, whenever there are nested dependencies of the same type, we expect processing difficulties to ensue. This explains not only why (3) – (7) are bad, but also why (8) is deviant.

5 Counterargument

Pickering and Barry (1991) follow an approach which argues directly against the one we take here. It is reminiscent of Gibson's proposal, but whereas Gibson relies on the θ -criterion to measure processing difficulty, Pickering and Barry consider the relationship between some phrase and the element which it subcategorizes. Hence, their approach is somewhat more general than Gibson's in this regard.

Numerous psycholinguistic studies have been carried out in order to ascertain the psychological reality of various empty categories (ECs) postulated to exist by Government-Binding theory (see, for example, MacDonald (1989), McElree and Bever (1989), Bever and McElree (1988), Nicol and Swinney (1989), Fodor (1989)). These and other researchers have concluded that there is psycholinguistic evidence to support the existence of ECs. Pickering and Barry disagree, and argue that the results do not necessarily lead to this conclusion. Indeed, they reinterpret the results to support a "filler-verb" relationship, and argue that ECs are in fact *not* psychologically real.

In discussing centre-embedding constructions they consider German subject relative clauses. They consider the following example.

- (21) Der Bauer der das Mädchen das den Jungen küßte schlug ging.
 the farmer who the girl who the boy kissed hit went
The farmer who hit the girl who kissed the boy went.

This example is ill-formed in German, which is unexpected given that the \bar{A} -dependencies are disjoint. The filler-verb dependencies are nested, however, supporting Pickering and Barry's approach. They thus conclude that ECs are not psychologically real, and that an approach such as ours cannot be correct.

We would dispute this conclusion, however. Suppose that the parsing mechanism must wait to postulate the existence of a gap until the verb is encountered and its possible subcategorization frames have been checked. The example above will then force the attacher to keep numerous partially assembled phrases in memory, resulting in at least some deviance. Furthermore, the none of the \bar{A} -dependencies can be resolved until the corresponding verb is encountered. Thus, the capacity of the auxiliary stack will be exceeded, resulting in complete ill-formedness.

Pickering and Barry work within a categorial grammar framework. Thus, there are no fillers as such, since there is no movement taking place. The dependency between a determiner phrase (DP) and the verb must be established whether the DP has (in Government-Binding terms) been moved or not. The DP-verb dependency patterns in English object relative clauses are the same as those in German embedded clauses.

- (22) a. I saw the rat that the cat caught.
 b. * I saw the rat that the cat that the dog chased caught.
 c. * I saw the rat that the cat that the dog that the man beat chased caught.
- (23) a. Peter lies Marie schwimmen.
Peter let Marie swim.
 b. Hans sah Peter Marie schwimmen lassen.
Hans saw Peter let Marie swim.
 c. Ich glaube dasz Hans Peter Marie schwimmen lassen sah.
I believe that Hans saw Peter let Marie swim.
 d. ? Ich glaube dasz Hans Peter Marie Karl schwimmen lassen machen sah.
I believe that Hans saw Peter make Marie let Karl swim.

While the English examples become strongly deviant with the pattern $DP_1 DP_2 V_2 V_1$, the German example with the pattern $DP_1 DP_2 DP_3 DP_4 V_4 V_3 V_2 V_1$ is mildly deviant, and is interpretable with proper intonation. Thus, this example is more like examples (9) and (10) than examples (1) through (7). Pickering and Barry's approach does not seem able to distinguish between these types of examples.

6 Conclusion

The processing difficulties encountered when dealing with so-called centre-embedding constructions seem to be the result more of a combination of reasons rather than a single one. Thus, illicit interactions between \bar{A} -dependencies as well as the need to store several incomplete phrase structure fragments both seem to contribute to the deviance of various constructions. The proposal sketched herein is yet another stab at a difficult problem, one which is not yet fully solved. Pickering and Barry put forth an elegant but not quite comprehensive proposal. Furthermore, we believe that it is not necessary to reject empty categories as such, and while our proposal requires further refinement, it incorporates some of their insights into a Government-Binding approach.

References

- [1] S. Abney. Parsing by chunks. In Robert C. Berwick, Steven P. Abney, and Carol Tenny, editors, *Principle-based Parsing: Computation and Psycholinguistics*. Kluwer Academic Publishers, Dordrecht, The Netherlands, 1991.
- [2] Steven Abney and Jennifer Cole. A government-binding parser. In S. Berman, J.-W. Choe, and McDonough, editors, *Proceedings of NELS 16*, Amherst, Massachusetts, 1986. University of Massachusetts at Amherst.
- [3] C. Alphonse. Towards an explanatory division of competence and performance: A language-independent parsing scheme. Master's thesis, University of British Columbia, 1992.
- [4] Thomas G. Bever and Brian McElree. Empty categories access their antecedents during comprehension. *Linguistic Inquiry*, 19:35-43, 1988.
- [5] N. Chomsky and G. A. Miller. Introduction to the formal analysis of natural languages. In R. D. Luce, R. Bush, and E. Galanter, editors, *Handbook of Mathematical Psychology*, volume II. Wiley, New York, 1963.
- [6] Noam Chomsky. *Aspects of the theory of syntax*. MIT Press, 1965.
- [7] Christopher Culy. *The syntax and semantics of internally headed relative clauses*. PhD thesis, Stanford University, 1990.
- [8] Janet Dean Fodor. Empty categories in sentence processing. *Language and Cognitive Processes*, 4(3/4), 1989.

- [9] Gerald Gazdar. Applicability of indexed grammars to natural language. Technical Report CSLI 85-34, Center for the Study of Language and Information, Stanford, 1985.
- [10] Edward Gibson. Memory limitations and human sentence processing. In *University of Pittsburgh Working Papers in Linguistics*, volume I. University of Pittsburgh, Pittsburgh, PA, 1990.
- [11] Aravind K. Joshi. Processing crossed and nested dependencies: an automation perspective on psycholinguistic results. *Language and Cognitive Processes*, 5(1), 1990.
- [12] Maryellen C. MacDonald. Priming effects from gaps to antecedents. *Language and Cognitive Processes*, 4(1), 1989.
- [13] Mitchell P. Marcus. *A Theory of Syntactic Recognition for Natural Language*. The MIT Press, 1980.
- [14] Brian McElree and Thomas G. Bever. The psychological reality of linguistically defined gaps. *Journal of Psycholinguistic Research*, 18(1), 1989.
- [15] Janet Nicol and David Swinney. The role of structure in coreference assignment during sentence comprehension. *Journal of Psycholinguistic Research*, 18(1). 1989.
- [16] Martin Pickering and Guy Barry. Sentence processing without empty categories. *Language and Cognitive Processes*. 6(3). 1991.
- [17] L. Rizzi. *Relativized Minimality*. Linguistic Inquiry Monographs 16. The MIT Press, 1990.

Theories of subject omission in language acquisition

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1. Introduction

This paper focuses on a specific debate within the field of language development, one that concerns cross-linguistic variation in the usage of sentential subjects. In some languages, such as English and French, subjects are obligatory in tensed clauses; thus (1) is acceptable and (2) is not. In other languages, such as Italian and Spanish, subjects are optional, and both (3) and (4) are acceptable.

(1) I am a good kid

(2) *Am a good kid

(3) Io sono bravo tato

I am good kid

(4) Sono bravo tato

am good kid

This contrast is often explained in terms of parametric variation as to whether or not languages can have a null pronoun in subject position, and thus speakers of languages like Italian possess "pro-drop" (or "null subject") grammars, while speakers of languages like English do not. Linguists have long been concerned with the null subject parameter, and there is an extensive literature examining the structure of subjectless sentences, the precise nature of the null subject, how the potential to omit subjects interacts with other parts of the grammar, and so on (e.g., Chomsky, 1981; Jaeggli and Safir, 1989).

Although the research discussed below is related to these representational issues, it is primarily directed at the developmental question of how children come to understand this property of the adult language. More specifically: Can children's acquisition of the grammatical conditions on subject usage be explained in terms of a parameter-setting mechanism? And if so, what is the initial setting of the parameter -- is it that subjects are obligatory, as in English, or that subjects are optional, as in Italian? The implications of these questions are important, as the null subject parameter has been taken as the paradigm case of how the "principles and parameters theory" (Chomsky, 1988) can explain the acquisition of syntax by children.

Much of the debate over different parametric analyses has focused on sentences like (5) (from Bowerman, 1973), which are often

produced by young children acquiring English. Any adequate theory has to explain the existence of these utterances, which are unacceptable for English-speaking adults, either in terms of some grammatical difference between children and adults or in terms of non-linguistic performance factors.

- (5) Hug Mommy
 Play bed
 Writing book
 See running

The paper is organized as follows. In Section 2, three theories of how children learn whether or not their language has optional subjects are briefly discussed. In Section 3, evidence is presented in support of the first theory, that the initial setting of the null subject parameter is that subjects are obligatory. In Section 4, I respond to some recent criticisms of this view that have been raised by Hyams and Wexler (in press), and Section 5 concludes with a discussion of Valian's (1990) concerns about the psychological plausibility of a parameter-setting model of syntax acquisition.

2. Overview

One hypothesis, defended by Rizzi (1982) and Bloom (1990), is that the initial setting of the null subject parameter is that subjects are *obligatory*, as in English. Only when exposed to declarative sentences without subjects, as in (6), will children reset this parameter. Since these sorts of sentences do not appear in languages such as English (but see Section 5), children exposed to non null-subject languages should never go through a period in which they accept subjectless sentences as grammatical. Children exposed to languages such as Italian, however, should quickly switch their parameter to the appropriate (null subject) setting.

(6) Sono bravo tato

Under this account, missing subjects in utterances such as (5) that appear in child English are not the result of grammatical knowledge--since, by hypothesis, the child's grammar is set to the obligatory subject setting and she knows that subjects cannot be omitted--but is instead the result of non-linguistic factors, such as production limitations on children's speech.

An alternative to this was advanced by Hyams (1986), who posits that all children start off with pro-drop grammars, in which subjects

are *optional*. Under this theory, it is children who are exposed to languages like English, and not to languages like Italian, who must switch their null subject parameter.

As it stands, this alternative would seem to raise a paradox with regard to the subset principle (see Dell, 1981). If the only effect of the null-subject parameter concerned the use of subjects, there would be no way for a child who started off assuming that subjects are optional (as in Italian) to learn through positive evidence that, in the target language, subjects are obligatory (as in English). This is because every sentence in English would also be an appropriate sentence in Italian, and thus English would be a proper subset of Italian. In other words, if Italian was the child's first guess, it's not clear what could ever cause her to switch the parameter; hearing tensed sentences with subjects, as in English, would not cause parametric change, because tensed sentences with subjects are fully acceptable in null subject languages (but see Bloom, in press a; in press b; Chomsky, 1981; Valian, 1990, 1991 for discussion of "indirect negative evidence" and how it might apply in this case).

Hyams has argued, however, that languages such as English and Italian are not in a subset relation; instead they *overlap*. Just as Italian has sentences that are not in English, such as (4), English has sentences that are not in Italian. In particular, it has been argued that every language which requires overt subjects has linguistic elements such as modals and expletives, while languages with optional subjects lack such elements. If so, then exposure to a sentence such as (7), where there is an expletive pronoun, could cause the child who starts off with an Italian-like grammar to switch to an English-like grammar, because such a sentence could not exist in a null subject language.

(7) It is raining.

One consequence of this theory is that it provides an elegant explanation of subjectless sentences in child English, as in (5) above. According to Hyams, these exist because all children go through a lengthy period in which they have null subject grammars, and English-speaking children up until the age of about 2-and-a-half have not yet switched their parameter to the appropriate setting for adult English. This period ends when (perhaps as the result of increasing processing abilities) children become sensitive to the grammatical properties of English that cause the parametric change, and at this point their sensitivity to sentences such as (7) causes them to switch their parameter to the non-null-subject setting.

A third perspective is developed by Valian (1990). Although she accepts the principles and parameters theory as an explanation for the **typological difference between languages** such as English and languages such as Italian, she rejects the notion of parameter setting as a theory of language development. She argues that there exists no "triggering data" that could cause the child to move from one setting of the null subject parameter to another, and thus she argues that a "hypothesis formation" model of language learning, where the child considers both possible grammars and uses all available evidence to compare the two, is more realistic in this domain. I return to some of Valian's criticisms of parameter-setting models in Section 5.

3. Evidence that the initial setting is for obligatory subjects

Under the theory that the initial setting of the null subject parameter is that subjects are obligatory, the relevant triggering input necessary for the acquisition of a language like Italian is abundant in adult speech to children--any tensed sentence without a subject will do. As such, one might expect children exposed to Italian to quickly determine that the target grammar allows null subjects, and that these children should therefore have different grammars than young children acquiring English, where the parameter does not have to change. This differs from Hyams' (1986) alternative, where 1- and 2-year-old children exposed to English are presumed to have an understanding of the conditions of subject omission that is identical to that of children exposed to Italian, since children exposed to English are presumed to be initially insensitive to the data that could cause the null subject parameter to change, and the initial setting of this parameter is that subjects are optional. Under this theory, then, children exposed to English and children exposed to Italian should have the identical grammatical knowledge with regard to subject omission and, all other things being equal, should omit subjects with roughly the same frequency.

The available evidence favors the theory that the initial setting is for obligatory subjects, and is problematic for the Hyams (1986) theory. Even at the earliest ages studied, children exposed to English omit subjects less frequently (about 30-40% of the time) than Italian children (about 70% of the time) (Valian, 1991). The simplest explanation for this is grammatical: English children omit subjects less frequently than Italian children because English children possess non-null-subject grammars and Italian children possess null-subject grammars.

But why do English children *ever* omit subjects? Why do they produce sentences such as "want water", which are unacceptable for

adults? Although such sentences do occur less frequently in English children than in Italian children, one might still argue that the fact that they exist at all is because these children have null subject grammars. One might then explain the English/Italian difference in terms of some other (possibly non-syntactic) differences between English and Italian that the children have internalized.

As summarized in Bloom (1990), however, there are several reasons to doubt that subjectless sentences in child English are the result of these children possessing null subject grammars. For one thing, 1- and 2-year-olds omit not only subjects; but also objects, verbs, adjectives, determiners, inflections, so on. This is hardly a novel observation; one of the most obvious facts of children's spontaneous speech is that they tend to produce very short sentences--usually about 2 or 3 words long--and this brevity is at least in part because so much is omitted.

Since it's unlikely that the child starts off with a grammar in which *all* constituents are optional, the simplest explanation for these omissions is in terms of performance factors, as originally argued by Chomsky (1964) and others. And given that children omit at least some constituents for non-linguistic reasons, it is most parsimonious to explain subject omission in the same way.

This sort of processing explanation gains support from a range of studies showing that subjects are more likely to be dropped when the performance load increases; for instance, the longer the VP gets, the more likely children are to omit the subject (Bloom, 1990; Valian, 1991). This is consistent with the view that very young children suffer from a production bottleneck that limits them to sentences that are about two or three words long and so when extra words are added to the rest of the sentence, the subject is more likely to be omitted.

4. Recent critiques

In a recent paper, Hyams and Wexler (in press) outline three main arguments against the claim that English children possess the appropriate non-null subject grammars. These are discussed below; for a more detailed reply, see Bloom (in press a, in press b).

Argument 1: There is no non-linguistic explanation for the subject/object asymmetry

Hyams and Wexler accept the notion of performance limitations in children's speech that cause them to sometimes omit constituents, including subjects. But they also note that all previous research has found that subjects in child English tend to be deleted more frequently than objects, and they argue that only some syntactic factor--in

particular, children's possession of null-subject grammars--can explain this subject/object asymmetry.

But, in fact, there are at least two other factors that can explain this asymmetry. The first is pragmatic; as noted in Bloom (1990), subjects are more likely to convey old or redundant information than objects and so the best way to cope with processing problems while still effectively communicating would be to omit subjects, not objects. Analyses of differences in word length and pronominal usage between subject NPs and object NPs suggest that 1- and 2-year-olds are sensitive to this pragmatic asymmetry.

A second source of evidence supports a different sort of non-grammatical asymmetry between subjects and objects, and comes from studies showing that utterance-initial elements appear to be more vulnerable to production problems than other parts of the sentence. For instance, Gerken (1991) used an imitation task to get 2-year-olds to produce sentences such as (8).

(8) The bear kissed the lamb

She found that subjects were omitted more frequently than objects, which is what one would expect under both the grammatical theory and the processing theory. But she also found that children were much more likely to omit the subject-*determiner* than the object-*determiner*; they would often say "bear kissed the lamb", but would almost never say "The bear kissed lamb". Since it is unlikely that there exists a parameter of "subject-determiner omission", this seems best explained as the result of processing factors (and in particular, it is consistent with the phonological production theory advanced by Gerken), and not as the result of syntactic knowledge.

Argument 2: Pronoun use

Another issue raised by Hyams and Wexler (in press) concerns pronoun use. Under the processing theory discussed by Bloom (1990), children are likely to omit subjects that, if they were overt, might be either lexical or pronominal. But Hyams and Wexler argue that their theory makes a strong prediction about the nature of children's omissions, as it entails that only subjects that should otherwise be pronouns will be dropped. As they put it, "... the young child has a null subject language, and their use of null subjects in contexts with which a non null-subject language uses pronouns is simply a property of null subject languages" (pp.38-39 in ms.). As such, if one examines the overt subjects used by speakers of null subject languages, there should exist a lower proportion of pronouns than found in the overt subjects used by

speakers of non null subject languages--because the null subject speakers are omitting subjects that would otherwise be pronouns and never omitting subjects that would otherwise be lexical.

Hyams and Wexler present an analysis of child English that is intended to show that these children use pronouns and lexical subjects in a manner that is consistent with the claim that they possess null subject grammars, while in Bloom (in press a), I argue that their data shows exactly the opposite. For the purposes here, I will restrict the discussion to a consideration of the cross-linguistic data and its implications for the Hyams and Wexler argument.

The prediction one derives from their premise is straightforward. According to Hyams and Wexler, if children acquiring English and children acquiring Italian both have null subject grammars then they should have about the same proportion of pronoun subjects in their speech--since presumably each group of children is only omitting subjects that would otherwise be pronouns. In contrast, if children acquiring English know that subjects are obligatory and only omit them due to processing problems, then they should also omit subjects that would otherwise be lexical. Given this, one would expect differences between the proportion of overt subjects that are pronouns found in the speech of English children and the proportion of overt pronoun subjects found in the speech of Italian children. (Note that under the processing account, Italian children should sometimes omit subjects that would otherwise be lexical--since, just as with the English children, they suffer from processing limitations. But given that the Italian children also have the grammatical option of pro-drop, which only applies to subjects that would otherwise be pronouns, we would expect the *proportion* of overt subjects to be pronouns to be different between child Italian and child English, given that the English children do not have this pro-drop option.)

In fact, clear differences exist. Valian (1991) found that the proportion of overt subjects that are pronouns is far higher in child English (about 70%) than in child Italian (about 30%) This suggests that Italian children are omitting subjects that would otherwise be pronouns to a far greater extent than the English children. And, accepting the logic of Hyams and Wexler, this suggests that the Italian children possess null subject grammars, and that the English children do not.

Argument 3: The end of the "null subject period" is correlated with the acquisition of other aspects of grammar

Hyams and Wexler's final argument is that the end of the null subject period is correlated with other aspects of language development that trigger the parametric change, and they review a range of proposals as to what the necessary trigger might be; these include the acquisition of modals, expletives, inflectional morphology, sentence-external negation, and verb-second in Germanic languages. If any such correlation existed, it would strongly support their theory, as it would show that subjectless sentences in child English are the result of a grammatical property of child language, and not due to a processing deficit.

As it stands, however, there is no evidence for these hypothesized correlations, and considerable evidence against them (for discussion, see Bloom, in press a; Bloom, in press b; Valian, 1990, 1991). Note that it is easy to be misled by casual observation; for instance, one might notice that at time 1, a child is omitting a lot of subjects and rarely uses inflection, while at time 2, she is omitting fewer subjects and frequently using inflection--and it is tempting to infer from this that the acquisition of inflection *causes* the end of the null subject period.

But when one examines a large group of children and applies statistical analyses, as done by Valian (1991), it turns out that just about all one can say about subjectless sentences in child English is that their frequency decreases as children get older and start to produce longer sentences. Since getting older is also linked up with other linguistic accomplishments such as better command of morphology, more frequent use of modals, and so on, it is easy to find spurious correlations between subject omission and acquisition of different aspects of grammar, when in fact no causal relationship appears to exist.

The issue is hardly closed. One could argue that some grammatical trigger exists that nobody has yet looked for. Or, alternatively, the child might only be able to switch grammars and move away from the null subject period as a result of neural maturation. For instance, Borer and Wexler (in press) argue that all children initially possess an innate principle called UEAPP and only after UEAPP disappears, as the result of neural maturation, is the child capable of encoding grammars in which subjects are obligatory.

One problem with all such proposals, however, is that there is actually no such thing as a "null subject period" or "null subject stage". Based on a casual reading of the acquisition literature, one might have imagined that for each child acquiring English, there is initially a long

period where he or she frequently omits subjects, then a relatively brief transition, followed by adult-like usage, in which subjects are never omitted. In fact, what you actually find (see Bloom, in press a) is a gradual decrease in omission as a function of age, which is entirely distinct from the sort of abrupt shifts one finds in cases of real grammatical change (e.g., the acquisition of word order). In other words, there is no "period" or "stage" where children frequently omit subjects; instead, very young children start by omitting subjects about 40% of the time, then they omit them about 35% of the time, and so on, until subject omission no longer occurs. There is no evidence for any grammatical transition at all.

For these reasons--the evidence for processing limitations that apply mainly to subjects, the early Italian/English difference in subject omission and pronoun use, and the gradual decline in English children's subject omission without any linguistic correlates--it seems reasonable to retain the hypothesis that the initial setting of the null subject parameter is that subjects are obligatory. Only when exposed to subjectless sentences, as happens very early with children exposed to pro-drop languages like Italian, will children reset their parameter to allow for optional subjects.

5. Triggers

The assumption above is that children exposed to languages such as Italian switch their parameter on the basis of hearing tensed subjectless sentences. But Valian (1990) notes that such sentences are relatively frequent in colloquial English. Her examples include elliptical questions like "want lunch now?", imperatives, like "put that down!", and hard to classify utterances such as the borderline aphasic sentences that George Bush was famous for, e.g., "Wouldn't be prudent". What a theory of the null subject parameter needs is some definition of trigger such that (i) the utterances that English-speaking adults use will not induce parameter-change, but that (ii) at least some of the utterances used by Italian-speaking adults *will* cause children to switch to an optional subject grammar.

One potential solution is that children have sufficient knowledge of the pragmatic conditions of imperatives and ellipsis so that they can filter out at least some of these sentences on pragmatic grounds (see Kim, in press). But another alternative, proposed by Roeper and Weissenborn (1990) and partially adopted by Valian, is that children can filter out these distracting utterances by ignoring matrix clauses, and focusing only on embedded sentences. All of the phenomena leading to subjectless sentences in a non null subject language like English appear utterance-initial; for instance, (9) and (10)

are acceptable, showing that the subject can be omitted when it is utterance-initial, but (12) is not acceptable, the subject must be present in the embedded clause, as in (11).

(9) It wouldn't be prudent

(10) Wouldn't be prudent

(11) He told me it wouldn't be prudent

(12) *He told me wouldn't be prudent

Restricting the triggering data to embedded sentences could constitute a solution: Since English-speaking adults never omit subjects from embedded clauses, but Italian-speaking adults do, children exposed to null subject languages will shift their parameter, while those exposed to non null subject languages will not.

We can conclude with a final puzzle for a triggering theory, what one can call the Evil Uncle problem. Imagine some sinister relative whispering to a 2-year-old a sentence such as "I know want something to drink" (meaning: "I know you want something to drink")--where the subject is clearly missing from the embedded clause. Under the most transparent version of the parameter theory, this sort of sentence should induce parametric change, and the child would thus possess a null subject grammar. But it would be bizarre to assume that this is what would happen; most likely, the child would simply ignore the utterance or categorize it as ungrammatical.

This illustrates that we have to move away from the simple idealization of a single triggering sentence, and towards to some more subtle notion of "weighted input". As it stands, however, we have no explicit notion of how much evidence (or what kind of evidence) is required to induce parameter change. Developing a theory of this--some precise theory of triggers--is an important next step in extending the theory of parameters as an explanation for syntactic development.

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References

- Bloom, P. (1990). Subjectless sentences in child language. *Linguistic Inquiry*, 21, 491-504.
- Bloom, P. (in press a). Grammatical continuity in language development: The case of subjectless sentences. *Linguistic Inquiry*.
- Bloom, P. (in press b). Recent controversies in the study of language acquisition. In M.A. Gernsbacher (Ed.), *Handbook of Psycholinguistics*, San Diego, CA: Academic Press.
- Borer, H. and Wexler, K. (in press). Biuniqueness relations and the maturation of grammatical principles. *Natural Language and Linguistic Theory*.
- Bowerman, M. (1973). *Early syntactic development: A cross-linguistic study, with special reference to Finnish*. Cambridge: Cambridge University Press.
- Chomsky, N. (1964). Formal discussion. In U. Bellugi and R. Brown (Eds.), *The acquisition of language, Monographs for the Society for Research in Child Development*, 29, 35-39.
- Chomsky, N. (1981). *Lectures on government and binding*. Dordrecht: Foris.
- Chomsky, N. (1988). *Language and problems of knowledge*. Cambridge, MA: MIT Press.
- Dell, F. (1981). On the learnability of phonological rules. *Linguistic Inquiry*, 12, 31-37.
- Gerken, L.A. (1991). The metrical basis for children's subjectless sentences. *Journal of Memory and Language*, 30, 1-21.
- Hyams, N. (1986). *Language acquisition and the theory of parameters*. Dordrecht: D. Reidel.
- Hyams, N. and Wexler, K. (in press). On the grammatical basis of null subjects in child language. *Linguistic Inquiry*.
- Jaeggli, O. and Safir, K.J. (1989). The null subject parameter and parameter theory. In O. Jaeggli and K.J. Safir (Eds.), *The null subject parameter*. Dordrecht: Kluwer.
- Kim, J.J. (in press). Null subjects: Comments on Valian (1990). *Cognition*.
- Rizzi, L. (1982). *Issues in Italian syntax*. Dordrecht: Foris.
- Roeper, T. and Weissenborn, J. (1990). How to make parameters work: Comments on Valian. In L. Frazier and J. de Villiers (Eds.) *Language processing and language acquisition*. Dordrecht: Kluwer.

- Valian, V. (1990). Null subjects: A problem for parameter-setting models of language acquisition. *Cognition*, 35, 105-122.
- Valian, V. (1991). Syntactic subjects in the early speech of American and Italian children. *Cognition*, 40, 21-81.

Nested Variables And Locality
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1. Introduction¹

Saito (1989) notes that the Proper Binding Condition (PBC) of Chomsky (1975), Fiengo (1977), and May (1977), accounts for the severe status of (1); see also Lasnik and Saito (1992). Under this view, the ungrammaticality of (1) is due to the fact that the trace nested inside the Wh-moved constituent is not C-commanded by its antecedent *which individual*.

(1) ?* [Which picture of t_i] did you wonder which individual $_i$ John bought t_j ?

It is, therefore, the failure of C-command which triggers the severe ungrammaticality of (1), under the PBC account. However, there are cases where C-command failure does not trigger ungrammaticality (2). The Proper Binding Condition wrongly predicts that (2) should have the same status as (1), if PP-extrapolation is indeed a Movement rule (cf. Chomsky 1986). Besides, the Proper Binding Condition also fails to account for the intermediate status of (3) over an extraposition island, and the severe ungrammaticality of (4) over a Wh-island. The pattern in (2)-(4) is totally unexpected under a Proper Binding treatment.

(2) [Which picture t_i] $_j$ did she say he bought t_j of John $_i$?

(3) ?? [Which picture t_i] $_j$ is it high time he bought t_j of John $_i$?

(4) ?* [Which picture t_i] did you wonder where Mary bought t_j of John $_i$?

Kayne (1984) notes that Proper Binding reduces to government since the latter is composed of a C-command requirement with a locality statement. I propose to eliminate the Proper Binding Condition (cf. Collins 1992). I propose that the data in (1)-(4) follow from an adequate theory of Movement based on Chomsky (1986) and Lasnik and Saito (1992). This account also follows a proposal by Cinque (1990) that the referentiality of an expression is tied to its ability to undergo long Movement. I show that the presence of a nested variable affects the derivational computation of the referentiality of the expression that includes it. Hence if a *which*-phrase is not susceptible to Weak Crossover (5a), a *which*-phrase containing a nested variable is (5b).

(5a) [Which picture of Paris] $_i$ did its $_i$ painter repurchase t_j ?

(5b) * [Which picture t_i] $_j$ did its $_j$ painter repurchase t_j of Paris $_i$?

I propose that the computation of the referentiality of an expression can be affected by prior movements, affecting subsequent movements. An adequate theory must distinguish expressions with nested variables from other expressions (cf. (3) vs. (6)), and Wh-islands from other weak islands (cf. (3) vs. (7)).

(3) ?? [Which picture t_i] $_j$ is it high time he bought t_j of John $_i$?

(6) [Which picture of John] $_i$ is it high time he bought t_i ?

(7) ?* [Which picture t_i]_j do you wonder where to buy t_j of John_i ?

I propose a theory of Movement that draws these distinctions. I propose that each application of Move α is subject to a government requirement defined in terms of C-command, co-indexing, subjacency and Relativized Minimality. This government requirement interacts with two types of chains: a head chain and an antecedent chain (cf. Chomsky 1986). The degree of violation is computed as a function of barriers on these chains. Referentiality interacts with the computation of Movement in the following way: non-referential expressions require subjacency on the antecedent chain, referential expressions do not, if the head chain obtains. (2), (3) and (4) implicate non-referential objects; hence, subjacency is required. In (2) no barriers intervene; hence, the extraction is perfectly grammatical. In (3) only subjacency fails; hence, its intermediate status. In (4) both subjacency and Relativized Minimality fail; hence, its severe status.

2. The Proper Binding Revisited

The Proper Binding Condition requires that a trace be C-commanded by its antecedent. However, many constructions in natural language violate the Proper Binding Condition. As we have just seen, A-bar Movement traces pose a challenge for the PBC as PP-extraposition data suggest (8).

(8) [Quelles représentations t_i]_j dites-vous avoir vues t_j des Misérables_i ?
 which performances say you have seen of Les Misérables
 'Which performances of Les Misérables did you say you saw?'

A-Movement traces also challenge the PBC, as (9) shows with VP preposing (cf. Huang 1990).

(9) [Arrive t_i]_j she said that John_i would t_j .

So do verb Movement traces. This can be seen with French Remnant Topicalization. In French, unlike English, the verb moves to Infl (cf. Emonds 1976; Pollock 1989). After verb raising, the VP remnant containing the trace of the verb may be topicalized as one constituent (10).

Elle affirma qu' elle observerait la représentation paisiblement, et
 she stated that she would observe the performance peacefully and
 'She stated that she would observe the performance peacefully and

(10) [t_i la représentation paisiblement]_j, elle observa_i souvent t_j .
 the performance peacefully she observed often
 observe the performance peacefully, she often did'

The trace left by the clitic *en*--'of it' also presents an empirical challenge to the PBC (11).

- (11) [Quelles représentations t_i] _j dites-vous que vous en_i avez vues t_j ?
 which performances say you that you of-it have seen
 'Which performances of it do you say that you saw?'

2.1. PP-Extrapolation Revisited

There can be little doubt that a nested trace is present in (9), (10) and (11). However, Culicover and Rochemont (1990) suggest that PP-extrapolation is not a Movement rule. Transformational Grammarians assumed that the rule of Extrapolation derived (12a) from (12b). Chomsky (1986) proposes that Extrapolation applies at PF; hence, no Subject Condition violation occurs.²

- (12a) [Des images t_i] _j sont apparues t_j à la télé de massacres odieux;
 images are appeared on TV of massacres vile
 'Images appeared on TV of vile massacres'
- (12b) [Des images de massacres odieux]_i sont apparues t_i à la télé
 images of massacres vile are appeared on TV
 'Images of vile massacres appeared on TV'

But, where PP-extrapolation obtains, *en*-cliticization also does; i.e., where a derivation that does not violate the Subject Condition obtains. Where it does not, PP-extrapolation is impossible (13a,b). This is unexpected under a base-generation account (cf. Culicover and Rochemont 1990).

- (13a) [Pictures t_i] _j arrived t_j of the massacre;
 (13b) * [Pictures t_i] falsified prior statements of the massacre;

(12a) is thus not transformationally related to (12b) but to (12c). Namely, extrapolation occurs from a position governed by the verb to a C-commanding position.

- (12c) Il est apparu [des images t_i] à la télé de massacres odieux;
 exp.is appeared images on TV of massacres vile
 'There appeared images on TV of vile massacres'

PP-extrapolation respects constraints on Movement. A class of French nominals allow multiple *de*-phrases, unlike English. However only the PP bearing the hierarchically highest role can be questioned or extraposed (14a,b) and (15a,b). Furthermore, double extraction is impossible out of an NP: hence, it is not possible to question a PP when *en*-cliticization also takes place (16a). Similarly, PP-extrapolation is impossible (16b).

- (14a) [Quel portrait d' Aristote t_i] _j le musée a-t-il acheté t_j de Rembrandt_i ?
 which portrait of Aristotle the museum has it bought of Rembrandt_i
 'Which portrait of Aristotle did the museum buy by Rembrandt?'

- (14)b De qui_i le musée a-t-il acheté [un portrait d' Aristote t_i] ?
 of who the museum has it bought a portrait of Aristotle
 'By who did the museum buy a portrait of Aristotle?'
- (15)a * [Quel portrait t_i de Rembrandt]_j le musée a-t-il acheté t_j d' Aristote_i ?
 which portrait of Rembrandt the museum has it bought of Aristotle
 'Which portrait by Rembrandt did the museum buy of Aristotle?'
- (15)b* De qui_i le musée a-t-il acheté [un portrait t_i de Rembrandt] ?
 of who the museum has it bought a portrait of Rembrandt
 'Of who did the museum buy a portrait by Rembrandt?'
- (16)a * [Un croquis t_j t_i]_k en_j a été acheté t_k de Rembrandt_i ?
 a sketch of-it has been bought of Rembrandt
 'A sketch of it was bought by Rembrandt'
- (16)b* De qui_i le musée en_j a-t-il acheté [un croquis t_j t_i] ?
 of who the museum of-it has it bought a sketch
 'By who did the museum buy a sketch of it?'

These facts present strong evidence that PP-extrapolation is a Movement rule. With respect to the Proper Binding Condition, a question remains. Is it the case that the PP does not C-command its trace in cases such as (8)? I present evidence that this is the case. Evidence comes from gapping (17a) and from the binding of anaphors (17b).

- (17)a Une statue a été vendue de Balzac et un croquis [e] aussi
 a statue was sold of Balzac and a sketch as well
 'A statue of Balzac was sold and a sketch was sold as well'
 'A statue of Balzac was sold and a sketch of Balzac was sold as well'
- (17b) [Quel portrait t_i]_j a-t-elle voulu qu'il choisisse t_j * d' elle-même_i/ d'elle_i ?
 which portrait has she wanted that she choses of herself / of her
 'Which portrait did she want that he chose *of herself/ of her?'

A gapped VP is interpreted by an LF copy rule (17a). Consider the hypothesis that the extraposed PP is adjoined to VP. When the VP copy rule applies, the rule may implicate either a segment including or excluding the adjoined PP, giving the two readings of (17a). Without VP-adjunction, the second reading of (17a) is mysterious. The data in (17b) show that an anaphor contained in an extraposed phrase must be bound within the lower clause. This also argues for VP-adjunction. Were the PP adjoined to IP, the matrix clause would be the governing category of the anaphor, contrary to fact. Hence, there is strong support for the view that not only A-Movement and V-Movement traces, but also *en*-cliticization and PP-extrapolation traces empirically challenge the validity of the Proper Binding Condition. A broad C-command condition like the Proper Binding Condition proves unable to distinguish ungrammaticality (1) from grammaticality (8)-(11).

3. An ECP Solution

Kayne (1984) points out that the notion of proper binding is included in the government relation which also encodes locality. When Movement tests are applied to constituents from which PP-extrapolation and *en*-cliticization have taken place, a pattern emerges which argues strongly that the distribution of nested traces follows not from Proper Binding but from the ECP. Full grammaticality obtains with bridge verbs (18a,b).

- (18)a [Quelles représentations t_j] j dites-vous avoir vues t_j des Misérables $_i$?
 which performances say you have seen of les Misérables
 'Which performances of Les Misérables did you say you saw?'
- (18)b [Quelles représentations t_j] j dites-vous que vous *en* $_i$ avez vues t_j ?
 which performances say you that you of-it have seen
 'Which performances of it do you say that you saw?'

But, severe unacceptability results over a Wh-island (19a,b). A stark contrast appears between (19a,b) and (19c) which implicates a constituent without a nested A-bar Movement trace.

- (19)a ?* [Quelles représentations t_j] j a-t-il su où voir t_j des Misérables $_i$?
 which performances has he known where to see of Les Misérables
 'Which performances of Les Misérables did he know where to see?'
- (19)b ?* [Quelles représentations t_j] j a-t-il su où *en* $_i$ voir t_j ?
 which performances has he known where of-it to see
 'Which performances of it did he know where to see?'
- (19)c ? Quelles représentations des Misérables a-t-il su où voir t_j ?
 what performances of Les Misérables has he known where to see
 'What performances of Les Misérables did he know where to see?'

However, a lesser degree of unacceptability obtains with factive (20a,b), manner-of-speaking (21a,b) and extraposition islands (22a,b).

- (20)a ?? [Quelles représentations t_j] j regrettes-tu de voir t_j des Misérables $_i$?
 which performances regret you of see of Les Misérables
 'Which performances of Les Misérables do you regret to see?'
- (20)b ?? [Quelles représentations t_j] j regrettes-tu d' *en* $_i$ voir t_j ?
 which performances regret you of of-it to see
 'Which performances of it do you regret to see?'
- (21)a ?? [Quelles représentations t_j] j a-t-il murmuré de voir t_j des Misérables $_i$?
 which performances has he murmured to see of Les Misérables
 'Which performances of Les Misérables did he whisper to see?'

- (21)b?? [Quelles représentations t_i]_j a-t-il murmuré d'en_i voir t_j ?
 which performances has he murmured to of-it see
 'Which performances of it did he whisper to see?'
- (22)a?? [Quelle scène t_i]_j est-il possible que nous voyions t_j des Misérables?
 which scene is it possible that we see of Les Misérables
 'Which scene of Les Misérables is it possible we will see?'
- (22)b?? [Quelle scène t_i]_j est-il possible que nous en_i voyions t_j ?
 which scene is it possible that we of-it see
 'Which scene of it is it possible that we will see?'

If (20a,b)-(22a,b), which implicate nested PP-extraposition and *en*-cliticization traces, have a marginal status, (20c)-(22c), which do not implicate such nested traces, are perfectly grammatical.

- (20)c [Quelles représentations des Misérables]_i regrettes-tu de voir t_i ?
 which performances of Les Misérables regret you of to see
 'Which performances of Les Misérables do you regret to see?'
- (21)c [Quelles représentations des Misérables]_i a-t-il murmuré de voir t_i ?
 which performances of Les Misérables has he murmured to see
 'Which performances of Les Misérables did he whisper to see?'
- (22)c [Quelle scène des Misérables]_i est-il possible que nous voyions t_i ?
 which scene of Les Misérables is it high time that we see
 'Which scene of Les Misérables is it high time that we will see?'

Hence, an adequate theory of Movement must distinguish Wh-islands from factive, manner-of-speaking and extraposition islands, since they trigger different levels of severity in the extraction of constituents with nested PP-extraction or *en*-cliticization traces. It must also distinguish constituents containing nested A-bar Movement traces from constituents with no such traces and from adjuncts.

3.1. A Movement Theory

I propose here a theory of Movement based on Chomsky (1986) and Lasnik and Saito (1992), which incorporates insights from Rizzi (1990), Cinque (1990), and Manzini (1992). I propose that government must hold of each application of Move α . This ensures against downward and sideways Movement. Government consists of a C-command requirement, co-indexation, Relativized Minimality and subjacency (23). Government is checked with respect to two types of chains: an antecedent chain and a head chain or percolation projection, which depends on selection. Stowell (1981) proposes that if α selects β then α and β share an index. A single index can percolate along a selection chain (24). The degree of violation is computed as a function of barriers on these chains. Two types of barriers obtain: subjacency and Minimality barriers. Subjacency requires that the antecedent be included in the immediate XP dominating a non L-marked XP (cf. Lasnik and Saito 1992). Minimality requires no intervening potential antecedent (cf. Rizzi 1990).

- (23) α governs β iff (i) α C-commands β
 and(ii) α and β are co-indexed
 and(iii) no typical potential antecedent intervenes
 and(iv) α is subjacent to β
- (24) α chain selects β iff there is a γ such that
 (i) α selects γ and (ii) γ selects β (where α , β , and γ are heads)

Head chains depend on selection and C-command by the head. Hence, the availability of head chains distinguishes subjects and adjuncts from objects. Furthermore, the availability of head chains distinguishes strong from weak islands. Weak islands are domains where head chains can compose, strong islands are domains where they cannot. The notion of head chain formalizes Huang's 1982 CED (cf. Manzini 1992). Consider a subject island (25a). Comp indexing allows the matrix C and embedded C to share an index. A head chain does not obtain, because the two Cs are not subjacent. The lower CP is not L-marked and is therefore a barrier for subjacency. But, for a valid head chain to obtain, the matrix C must be included in the first XP dominating CP; namely IP. This is not the case. On the antecedent chain, subjacency is also violated because the antecedent is not included in the first XP dominating CP; namely IP. This still holds with adjunction to IP (cf. Lasnik and Saito 1992).

(25)a * [CPWho_i [C₀_i did] [IP[CP t_i [C₀_i that] [IP John saw t_i]] [VP please you]]?

Weak islands implicate a head chain. However, this theory distinguishes Wh-islands which implicate Relativized Minimality violations (25b) from other weak islands that do not implicate Relativized Minimality (25c). Hence, the contrast between (25b) and (25c).

- (25)b*? Which picture_i did you wonder [CP where [IP he bought t_i of John]] ?
 (25)c ?? Which picture_i is it possible [CP t_i that [IP he bought t_i of John]] ?

Cinque's (1991) observes that referentiality voids weak islands. This still remains unexplained. I do not attempt at an explanation, but I show that Cinque's generalization is responsible for the extraction pattern of nested variables. Cinque's generalization can be stated as is: non-referential objects require subjacency on the antecedent chain, referential expressions do not. A tri-partite distinction is made between referential (26a), non-referential objects (26b) and adjuncts (26c).

- (26)a ? [CPWhich book_i [C₀_i did] [IP you wonder [CP where [IP to buy t_i]]]] ?
 (26)b?* [CPWhat the hell_i [C₀_i did] [IP you wonder [CP where [IP to buy t_i]]]] ?
 (26)c * [CPHow_i [C₀_i did] [IP you wonder [CPwhere [IP to buy the book t_i]]]] ?

In (26a) and (26b) a head chain is available. In (26a) subjacency is waived on the antecedent chain, since the expression is referential and a head chain obtains, but Relativized Minimality is not respected. In (26b), however, the expression is non-referential; hence, subjacency is required. Thus (26b) violates both subjacency and Relativized Minimality; hence, its severity. In (26c) a head chain is not available

since *how* is not selected. Both subadjacency and Relativized Minimality are violated on the antecedent chain. Neither chain obtains; hence, the unmitigated status.

3.2. Syntactic Computation of Referentiality³

There is evidence that a variable interferes with the computation of the referentiality of a phrase in which it is included. A topicalized referential expression binding a trace or a clitic does not trigger Weak Crossover (cf. Lasnik and Stowell 1991). *Which*-phrases behave like referential expressions for Weak Crossover. However, a *which*-phrase containing a variable triggers ungrammaticality. *Which*-phrases with nested variables behave with respect to Weak Crossover like non-referential phrases such as *qui diable* —'who the hell.'

- (27)a Cette peinture_i, son_i créateur l_i'a rachetée
 this picture its creator it bought back
 'This picture, its creator repurchased'
- (27)b [Quelle peinture de Giverny]_i est-ce que son_i créateur a rachetée t_i?
 which painting of Giverny is it that its creator bought back
 'Which painting of Giverny did its painter repurchase?'
- (27)c * [Quelle peinture t_i]_j est-ce que son_j créateur a rachetée t_j de Giverny_i?
 which painting is it that its creator bought back of Giverny
 'Which painting did its painter repurchase of Giverny?'
- (27)d * [Quelle peinture t_i]_j est-ce que son_j créateur en_j a rachetée t_j?
 which painting is it that its creator of-it bought back
 'Which painting did its painter repurchase of Giverny?'
- (27)e * Qui diable_j est-ce que sa_j mère a vu t_j?
 who the hell is it that his mother saw
 'Who the hell did his mother see?'

I propose that the presence of a variable changes the nature of the *which*-phrases in (27c,d). [Quelle peinture de Giverny] denotes a set of paintings of Giverny. *Which*-phrases come with a uniqueness presupposition. Hence [quelle peinture de Giverny] denotes a singleton set. [Quelle peinture de Giverny] picks out a unique painting. It is therefore referential. [Quelle peinture t_i] ranges over paintings of a₁, a₂...a_n. It ranges over sets of paintings. The uniqueness presupposition applies to sets of paintings, rather than to individual paintings. Hence, [Quelle peinture t_i] cannot pick out some unique painting. [Quelle peinture t_i] is thus non-referential.

I suggested that a nested variable determines the referentiality of the *which*-phrase. This can be checked by substituting the quantifier *tout le monde* 'everyone' for the nested trace. (28a) has three readings: a group reading where everyone refers to the sum individual; it has also a functional reading.⁴ The answer might then be: the charcoal sketch, where Jean made a corresponding charcoal for each individual.

Finally (28a) has a distributive reading to which an appropriate answer might be: Jean presented his charcoal sketch of Rosie, his pencil sketch of Marc and his etched sketch of Eric. Crucially, the distributive reading where 'everyone' has a quantificational reading disappears totally in the context of a Weak Crossover (28b).

- (28)a [Quelle esquisse de tout le monde]_i est-ce que Jean a présentée t_i ?
 which sketch of everyone is it that Jean has presented
 'Which sketch of everyone did Jean present?'
- (28)b [Quelle esquisse de tout le monde]_i est-ce que son_i créateur a présentée t_i ?
 which sketch of everyone is it that its creator has presented
 'Which sketch of everyone did its creator present?'

3.3. Reducing Proper Binding to Movement

I have put forward evidence that suggests that the computation of the referentiality of an expression is a cyclical syntactic process, which is potentially affected by Movement. I have proposed that Move α cyclically respects government, and that referentiality together with the presence of a licensed head chain determines whether subjacency is required on the antecedent chain. Weak Crossover data have shown that expressions with nested variables behave in the course of derivation as non-referential expressions. An account of the behavior of expressions with nested variables is now possible in terms of referentiality and long Movement (cf. Cinque 1990).

This theory is thus able to explain the contrast between (29a) and (29b). (29a) implicates the presence of a variable which affects the computation of the referentiality of the VP. (29b) implicates an anaphoric A-Movement trace, which does not affect the computation of the VP.

- (29)a ?* [Sing t_i]_j I wonder which song_i John will t_j ?
 (29)b ? [Arrive t_i]_j I don't know for sure where all the runners_i will t_j

The severity of 'Proper Binding' violations like (30a) is due to the fact that a nested variable affects the derivational computation of the referentiality of the constituent containing it so that subjacency is absolutely required on the antecedent chain for the trace of the expression containing the variable to be identified. 'Proper Binding' violations thus involve both subjacency and Relativized Minimality violations on antecedent chains. (30a-c) implicate the nested A-bar Movement traces of referential elements (cf. Sportiche (1990) on *en*-cliticization).

- (30)a ?* [Quelles représentations t_i]_j a-t-il su de quelle œuvre voir t_j ?
 which performances did he know of which work to see
 'Which performances did he know of which work to see?'
- (30)b ?* [Quelles représentations t_i]_j a-t-il su où voir t_j des Misérables ?
 which performances has he known where to see of Les Misérables
 'Which performances of Les Misérables did he know where to see?'

- (30)c ?* [Quelles représentations t_i]_j a-t-il su où en_i voir t_j?
 which performances has he known where of-it to see
 'Which performances of it did he know where to see?'
- (30)d? [Quelle représentation]_j a-t-il su où voir t_j?
 which performance did he know where to see
 'Which performance did he know where to see?'

Data problematic for the Proper Binding Condition find a natural explanation under this proposal. When no barriers intervene, then the extraction is expectedly fully grammatical.

- (18)a [Quelles représentations t_i]_j dites-vous avoir vues t_j des Misérables_i?
 which performances say you have seen of les Misérables
 'Which performances of Les Misérables did you say you saw?'
- (18)b [Quelles représentations t_i]_j dites-vous que vous en_i avez vues t_j?
 which performances say you that you of-it have seen
 'Which performances of it do you say that you saw?'

Cinque proposes that complements of manner-of-speaking and factive verbs are extraposed arguments (cf. Kayne 1984). This is also the case for extraposition islands. On the head chain, as a selected complement of the matrix verb, the C of the lower clause is co-indexed with V and I. The extraposed CP is a subjacency barrier since it is not L-marked. But I is included in IP the first maximal projection immediately dominating the CP barrier. Hence I and C are subjacent so that the head chain obtains in (31a,b)-(33a). Consider the antecedent chain. The SpecCP is available as a landing site which de-barrierizes the IP. But CP is a barrier. Crossing the CP violates subjacency. Adjunction to VP is not an option, since expressions adjoined to one node do not have relative scope (cf. May 1985), and the IP-adjoined site is not included in the first IP segment. In other words, subjacency does not obtain. No minimality barriers are present. The intermediate status of (31a,b)-(33a,b) is computed from barrierhood on the two chains. Referential arguments incur no violation since subjacency is not required of them (33b). But non-referential argument incur a subjacency violation on the antecedent chain.

- (31)a ?? [Quels livres t_i]_j regrettez-vous de vendre t_j de Balzac_i?
 which books do you regret of sell of Balzac
 'Which books of Balzac's do you regret selling?'
- (31)b ?? [Quelle version t_i]_j regrettez-vous d' en_i vendre t_j?
 which version do you regret of of-it to sell
 'Which version of it do you regret selling?'
- (32)c ?? [Quel portrait t_i]_j a-t-elle murmuré qu'elle s'était procuré t_j de Balzac?
 which portrait has she whispered that she had obtained of Balzac
 'Which portrait of Balzac did she whisper that she had obtained?'

- (32)d ?? [Quel croquis t_i]_j a-t-elle murmuré qu'elle s'en_i était procuré t_j ?
 which sketch did she whisper that she of-it had obtained
 'Which sketch of it did she whisper that she had obtained?'
- (33)a ?? [Quels passages t_j]_i est-il temps [CP t_j de considérer t_j de la déclaration]_i?
 which passages is it time to consider of the declaration
 'Which passages is it high time we considered of the declaration?'
- (33)b [Quels passages]_i est-il grand temps [Cp_i de considérer t_j]?
 which passages is it high time of to consider
 'Which passages is it high time we considered?'

The well-foundedness of the claim that nested variables are responsible for Weak Crossover effects and the pattern of extractability over islands can be independently motivated. The quantifier *everyone* loses its distributive reading in Weak Crossover contexts. Under this proposal, *everyone* is expected to lose its distributive reading across subjacency barriers. (34a) has three readings: a functional reading, a group reading and a distributive reading. To the functional reading, corresponds an answer like the charcoal sketch. To the group reading, corresponds a specific group sketch. To the distributive reading, corresponds an answer like the charcoal sketch of Rosie, the pencil sketch of Marc, and the etched sketch of Eric.

- (34)a [Quelle esquisse de tout le monde]_i Marie a-t-elle dit qu'elle achèterait t_i ?
 which sketch of everyone Marie has-she said that she would buy
 'Which sketch of everyone did Marie say that she would buy?'

With subjacency islands, the distributive reading disappears (34b) and (34c).

- (34)b [Quelle esquisse de tout le monde]_i est-il temps que Marie achète t_i ?
 which sketch of everyone is it time that Marie buys
 'Which sketch of everyone is it time that Mary bought?'
- (34)c [Quelle esquisse de tout le monde]_i regrettez-vous de devoir acheter t_i ?
 which sketch of everyone regret you to have to buy
 'Which sketch of everyone do you regret that you must buy?'

Only variables interfere with the referentiality of the expression in which they are located. Expressions containing anaphoric A-Movement traces show no sensitivity to one barrier islands (35a). Chomsky (1986) points out that verb traces and A-Movement traces pattern together; verb traces also show no sensitivity to one barrier islands (35b).

- (35)a [Arrive t_i]_j, it is high time that all the runners_i would t_j

Elle promet qu'elle observerait la représentation paisiblement,
 she promised that she would observe the performance peacefully, and
 'She promised that she would observe the performance peacefully, and

- (35)b [*t_y la représentation paisiblement*], il est grand temps qu' elle observe.
 the performance peacefully it is high time she observed
 observe the performance peacefully it is high time she did'

4. Conclusion

The Proper Binding Condition has been shown to be empirically inadequate and to reduce fully to the Theory of Movement. This reduction leads to greater empirical and conceptual adequacy. The Proper Binding Condition, as a broad C-command requirement fails to distinguish ungrammaticality from grammaticality. I argue that the presence of a variable, either a quantifier or an A-bar Movement trace, affects the derivational computation of the referentiality of the expression that contains it, which interacts with the Theory of Movement. Anaphoric elements do not have such an effect. A three-way distinction appears between referential objects, non-referential objects and adjuncts. Also, Wh-islands are shown to differ significantly from other weak islands. A theory was proposed. Government holds of each application of Move α , preventing downward Movements. An extraction is computed with respect to an antecedent and a head chain where available. The head chain is only available for head-governed expressions, distinguishing adjuncts from objects. Referential expressions are not subject to subadjacency on the antecedent chain if requirements on the head chain are satisfied. The two types of chains interact with barriers yielding an algorithm for the computation of the severity of an extraction.

Notes

- 1 The French judgments which this paper discusses are mine. For English, I have consulted Vicki Carstens and John Whitman. I thank Mamuro Saito for his input at WECOL 92. I thank them all for their comments. Possible errors are my own.
- 2 Tanya Reinhart (pc) pointed out to me that PP-extraposition obeys semantic restrictions imposed by the predicates (i) and (ii). These restrictions are unexpected under a PF account.
 - (i) [Pictures t_j] appeared t_j of the candidates_i
 - (ii) * [Pictures t_j] disappeared t_j of the candidates_i
- 3 Mamuro Saito (pc) suggests that this distinction is best captured in terms of quantificationality, rather than referentiality. Pesetsky (1987) states that non-D-linked *wh*-phrases are quantifiers, but D-linked *wh*-phrases are not quantifiers. The present use of referentiality seems to capture the intuition.
- 4 Speakers vary in allowing the distributive reading. The French judgments are mine. Vicki Carstens tells me that the distributive reading is unavailable in English. John Whitman's intuitions in English, however, agree with those I have in French. Chris Collins (pc) also confirms these judgments.

Bibliography

- Aoun, J. (1986) *Generalized Binding : the Syntax and Logical Form of Wh-interrogatives*, Foris, Dordrecht, Holland.
 Aoun, J., N. Hornstein, and D. Sportiche. (1981) "On Some Aspects Of Wide

- Scope Quantification," *Journal of Linguistic Research* 1.3.
- Barss, A. (1986) *Chains and Anaphoric Dependencies*, Doctoral dissertation, MIT, Cambridge, Massachusetts.
- Chomsky, N. (1975) "Questions of Form and Interpretation," *Linguistic Analysis* 1, 75-109.
- Chomsky, N. (1986) *Barriers*, MIT Press, Cambridge, Massachusetts.
- Chomsky, N. (1992) "A Minimalist Program For Linguistic Theory," MIT Occasional Papers in Linguistics 1.
- Cinque, G. (1990) *Types of A-bar Dependencies*, MIT Press, Cambridge, Massachusetts.
- Collins, C. (1992) "Economy of Derivation and Generalized Proper Binding Condition," ms., MIT, Cambridge, Massachusetts.
- Culicover, P., and S. Rochemont (1990) "Extrapolation and the Complement Principle," *Linguistic Inquiry* 21., 23-47.
- Emonds, J. (1976) *A Transformational Approach to English Syntax*, Academic Press, New York, New York.
- Fienko, R. (1977) "On Trace Theory," *Linguistic Inquiry* 8, 35-61.
- Huang, J. (1982) *Logical Relations in Chinese and the Theory of Grammar*, Doctoral dissertation, MIT, Cambridge, Massachusetts.
- Huang, J. (1990) "Reconstruction and the Structure of VP: Some Theoretical Consequences," ms., University of California, Irvine.
- Kayne, R. (1984) *Connectedness and Binary Branching*, Foris, Dordrecht, Holland.
- Lasnik, H., and M. Saito (1992) *Move α* , MIT Press, Cambridge, Massachusetts.
- Lasnik, H., and T. Stowell (1991) "Weakest Crossover," *Linguistic Inquiry* 22, 687-720.
- May, R. (1977) *The Grammar of Quantification*, Doctoral dissertation, MIT, Cambridge, Massachusetts.
- May, R. (1981) "Movement and Binding," *Linguistic Inquiry* 12, 215-243.
- May, R. (1985) *Logical Form: Its Structure and Derivation*, MIT Press, Cambridge, Massachusetts.
- Manzini, R. (1992) *Locality: A Theory and Some of Its Empirical Consequences*, MIT Press, Cambridge, Massachusetts.
- Pesetsky, D. (1987) "Wh-in-situ: Movement and Unselective Binding," in *The Representation of (In)definiteness*, E. Reuland, and A. ter Meulen, eds., MIT Press, Cambridge, Massachusetts.
- Pollock, J.Y. (1989) "Verb Movement, UG and the Structure of IP," *Linguistic Inquiry* 20, 365-424.
- Rizzi, L. (1990) *Relativized Minimality*, MIT Press, Cambridge, Massachusetts.
- Rochemont, S., and P. Culicover (1990) *English Focus Constructions and the Theory Of Grammar*, Cambridge University Press, Cambridge, England.
- Saito, M. (1989) "Scrambling as Semantically Vacuous A'-Movement," in *Alternative Conceptions of Phrase Structure*, M. R. Baltin, and A. S. Kroch, eds., University of Chicago Press.
- Saito, M. (1992) "Long distance Scrambling in Japanese," *Journal of East Asian Linguistics* 1, 119-123.
- Sportiche, D. (1990) *Movement, Agreement and Case*, ms., University of California, Los Angeles.
- Stowell, T. (1981) *Origins of Phrase Structure*, Doctoral dissertation, MIT, Cambridge, Massachusetts.

Comparative Complementation with Verbs of Appearance in English

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1. The Problem

An understanding of the syntactic and semantic properties of the two constructions illustrated in (1) has been an important achievement of generative grammar and has played a key role in the development of current syntactic theories.

- (1) a. It seems/appears (to me) [_S that the tire's flat].
b. The tire, seems/appears (to me) [_S *t*, to be flat].

As is well known, in classical transformational grammar and its derivatives in which transformations are preserved in some form, the (b)-sentences are related, in part, to the (a)-sentences by RAISING, a phenomenon whereby what is the subject of the embedded clause at an underlying level of representation becomes the subject of the main clause at a superficial level of representation.¹ More precisely, in the principles and parameters framework, as developed in Chomsky (1981) and much subsequent work, it is assumed that such verbs have no external argument (or underlying subject) and subcategorize for either a tensed or infinitival clausal complement. When the complement is infinitival, its subject must move into the empty subject position of the main clause in order to be Case-marked, since there is no Case-assigning governor of the embedded subject position and all NPs must be assigned Case; the result is the construction in (1b), in which a trace of the moved NP occupies the embedded subject position. When the complement is tensed, the embedded subject finds a Case-assigning governor within the complement itself (i.e., the agreement inflection); the result is the construction in (1a), in which the underlyingly empty main clause subject position is filled by the expletive pronoun *it*.

A much less celebrated fact about *seem* and *appear* is that their state of affairs argument, otherwise expressed as a tensed clause (with or without the complementizer *that*), can also be expressed as what I will call a COMPARATIVE COMPLEMENT, that is, a phrase headed by *like* or *as if*, as shown in (2) and (3).²

- (2) a. It seems (to me) like the tire's flat.
b. The tire seems (to me) like it's flat.
(3) a. It appears (to me) as if the tire's flat.
b. The tire appears (to me) as if it's flat.

These constructions present a problem that can be summarized as follows. Since (2a) and (3a) and the corresponding sentences in (1a) are thematic paraphrases, it must be the case that *seem* and *appear* have the same argument structure whether they take a clausal complement or a comparative complement, which is to say, they have an optionally expressed experiencer argument and a state of affairs argument.³ If this is so, a question arises as to the status of the referential main clause subjects in (2b) and (3b). It would apparently not suffice to analyze verbs of appearance as having an optional third argument, since if such were allowed one would expect this argument to be able to surface in the construction with the tensed clausal complement — something that is not possible, as illustrated by (4).

(4) * The tire seems (to me) that it's flat.

Thus, where the subjects in (2b) and (3b) come from is not altogether clear.

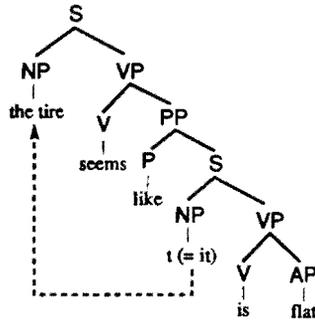
In this paper I consider some different potential solutions to this problem and present some arguments for adopting one and rejecting the others. Having proposed and justified an analysis that arises as a natural possibility within the principles and parameters framework, I briefly discuss what I see as outstanding questions concerning this phenomenon.

2. Some Nonsolutions and a Solution

2.1. *The Copy Raising Hypothesis*

The first possibility I want to consider is that the relationship between (1a) and (1b) is in relevant respects the same as that between the (a)-sentences and the (b)-sentences in (2) and (3) — a hypothesis that seems quite natural given the structural and semantic parallels. More specifically, following the analysis originally proposed for this phenomenon within classical transformational grammar by Rogers (1971, 1972) and Postal (1971, pp. 162–163), one might analyze the (b)-sentences as involving so-called COPY RAISING, essentially as has been proposed for Modern Greek (Joseph 1976, Perlmutter and Soames 1979, §43) and other languages. This analysis is illustrated in (5).

(5)



The idea would be that an NP from within the clausal complement of *like* optionally raises into the underlyingly empty subject position of the *seem* clause, the main difference between this construction and that exemplified by (1b) being that the trace is governed by a Case assigner. One might simply suppose that Case-marked traces of NP movement are necessarily overtly realized, taking the shape of pronouns.

One apparent virtue of this kind of analysis is that it provides a possible explanation for why a pronoun in the comparative complement must be bound by the referential subject of *seem*, if it has one, as shown by (6).

(6) Wayne_i seems like he_i/*you/*I/*Garth must be in trouble.

The explanation would be that raising necessarily involves leaving a trace; if the trace happens to be Case-marked, it is overt. Another potential virtue of this approach is that it would provide an interesting kind of motivation for trace theory, if it turned out to be correct, since the visibility of the trace would make its existence hard to question.

Unfortunately, there are serious problems with such an analysis. To begin with, the BINDING THEORY is specifically designed to prohibit raising out of a tensed complement clause. Principle A of the binding theory requires that a trace of NP movement (being an anaphor like reflexive pronouns) be bound within a domain defined (sufficiently precisely for present purposes) as the minimal clause containing it, unless it is the subject of an infinitival clause, in which case the domain is the minimal clause containing the infinitival clause. If raising were allowed in cases such as (2b), the binding theory would have to be relaxed in such a way as to allow raising out of a tensed clause, in which case there would be no obvious explanation for the ungrammaticality of (4).

A second and much more serious problem with the copy raising hypothesis is that it leaves unexplained the fact that the construction exemplified by (2b) systematically differs from the raising construction with respect to established criteria for a raising analysis. Consider, for example, the implications of examples involving quantified NPs, as in (7).

- (7) a. Some customs official checked every passing car.
Ambiguous as to whether or not for each car the *same* customs official did the checking
- b. Some customs official seems to have checked every passing car.
Ambiguous in same way as (7a)
- c. Some customs official seems like he has checked every passing car.
Unambiguous: must be the *same* customs official for each car

Following Burzio (1986) and May (1977), a reasonable account of this ambiguity is that the two quantifiers can be ordered differently at the level of LOGICAL FORM (LF), the relative ordering corresponding to the different readings. The LF representation in which *some* has "wider scope" than *every* is shown in (8a).

- (8) a. $(\exists x, x \text{ a customs official}) (\forall y, y \text{ a passing car}) (x \text{ checked } y)$
b. $(\forall y, y \text{ a passing car}) (\exists x, x \text{ a customs official}) (x \text{ checked } y)$

This representation corresponds to the reading according to which the same customs official did the checking for every car. The other reading corresponds to the case where *every* has wider scope than *some*, as shown in (8b). The fact that (7a) is ambiguous is due to the possibility of any relative ordering of quantifiers within a given clause. Now although quantifier scope is generally clause-bound, (7b) is ambiguous in the same way as (7a), even though the *some* phrase has raised in the syntax to the main clause. The explanation is that quantified phrases can be reconstructed into their trace's position at LF, allowing for the variable ordering of quantifiers within the embedded clause in the case of (7b). Crucially, if raised NPs can be reconstructed into their trace's position at LF, one would expect to find the ambiguity in question in cases like (7c), if this sentence involves raising of the sort schematized in (5). However, the only reading available is that with *some* having wider scope than *every*.

Another well-known defining characteristic of the raising construction is that its meaning does not change as a function of whether the complement clause whose subject has apparently raised is active or passive. Consider in this light the following two scenarios. In the first a doctor has just finished attending to a patient and she comes into the waiting room alone with blood all over her. In the second

scenario the patient comes into the waiting room alone with blood all over him. As illustrated by the sentences in (9), active/passive paraphrases of the infinitival complement construction with *seem* are cognitively synonymous, both versions being appropriate as descriptions of either scenario.

Scenario 1: The doctor (alone) emerges into the waiting room with blood all over her

Scenario 2: The patient (alone) emerges into the waiting room with blood all over him

- (9) a. The doctor seems to have butchered the patient.
 b. The patient seems to have been butchered by the doctor.
 OK both scenarios

The active and passive versions of the comparative complement construction, on the other hand, are not synonymous in this way, as shown by the examples in (10).

- (10) a. The doctor seems like she has butchered the patient.
 OK scenario 1 only
 b. The patient seems like he has been butchered by the doctor.
 OK scenario 2 only

The active version is an appropriate description of only scenario 1; the passive version of only scenario 2. There is no apparent account of why there should be such a difference, if the sentences in (10), like those in (9) involve raising.

Finally, there appears to be a significant difference between the two types of construction with respect to their tolerance for nonargument subjects that must be analyzed as originating in the embedded clause — i.e., expletive *there*, and pieces of idiomatic expressions. As shown by the contrast between (11) and (12), nonargument subjects that originate in the complement are generally fine with *seem* when it takes an infinitival complement but not when it takes a comparative complement. It is unclear why there should be such a contrast, if both constructions involve raising.⁴

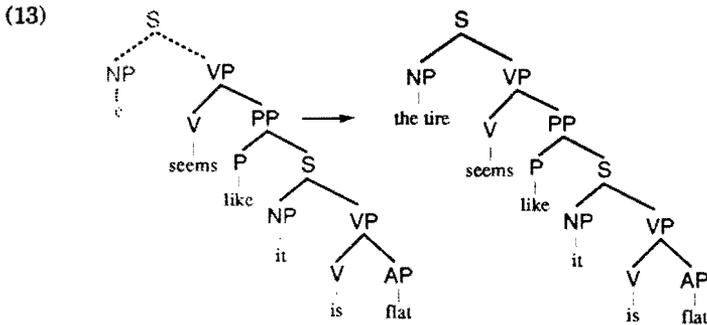
- (11) a. There seems to have been an accident.
 b. Not much attention seems to have been paid to the details.
 c. The cat seems to have your tongue. (Idiomatic)
 (12) a. * There seems like there/it has been an accident.
 b. * Not much attention seems like it has been paid to the details.
 c. * The cat seems like it has your tongue. (Idiomatic)

In short, the obstacles facing the copy raising analysis schematized in (5) seem to be insurmountable. This analysis not only requires weakening the binding theory in such a way as to lose an explanation

for the ungrammaticality of (4), but it also leaves several important differences between the comparative and infinitival construction unaccounted for.

2.2. *Out of Thin Air Hypothesis*

A second possibility is that in a way similar to that suggested by Chomsky for the *tough* movement construction (as in *Wayne is tough to trick*), a referential NP may be inserted into the nonthematic subject position of verbs of appearance, either at S-structure (Chomsky 1981, pp. 312–314) or by GENERALIZED TRANSFORMATION (Chomsky 1992), as shown in (13).



The problem with such an analysis is that, unlike with the *tough* movement construction, it does not seem possible to link this operation to an independently justifiable restructuring process and thus there is no apparent way to limit it for principled reasons to just the construction for which it is needed. It is unclear what would prevent this kind of operation from taking the structures underlying (14a) and (15a), for example, and giving (14b) and (15b) as output.

- (14) a. It seems that it's flat.
 b. * The tire seems that it's flat.
 (15) a. It's obvious that he likes Garth.
 b. * Wayne's obvious that he likes Garth.

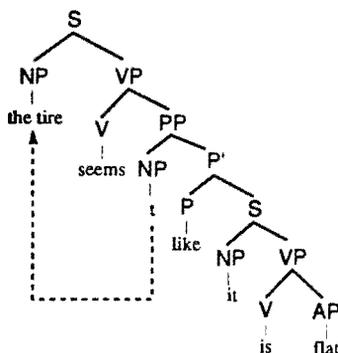
There is, then, a good reason for rejecting this hypothesis as well.

2.3. *Raising from Small Clause Hypothesis*

Fortunately, there is an analysis that solves or avoids the various problems that face the two rejected hypotheses. This analysis is built on the idea that the subject of sentences such as (2b) and (3b) is indeed

a raised NP; however, unlike on the copy raising analysis, it is an ordinary raised NP that leaves an ordinary trace that is both phonologically null and properly bound. Since the trace is an ordinary one, it clearly cannot be located within the complement of *like*. There is, then, only one natural possibility: it must be the subject of *like*. A comparative complement must be able to be analyzed as a so-called SMALL CLAUSE, whose subject, having no governing Case-assigner, moves to the nonthematic subject position of *seem*, as shown in (16).⁵

(16)



Given such an analysis, it is clear, to begin with, why examples like (4) (**The tire seems (to me) that it's flat*) are ungrammatical. As *that* is a complementizer rather than a comparative preposition, it does not have an external argument. Since *seem* has only experiencer and state of affairs arguments, there is no source for the referential subject in this example. The standard account of (4) can be maintained. Furthermore, all of the differences observed above between the comparative complement construction and the infinitival complement construction follow naturally from this analysis. Consider the restriction on quantifier interpretation illustrated by the examples in (7), for example. The subject position of the small clause is a thematic position, filled at D-structure. A quantified NP occupying this position could not possibly be reconstructed at LF into the clause embedded under *like*, since it does not originate there. Hence, *some* must have wider scope than *every* in (7c). A similar explanation is available for the meaning difference between the corresponding active and passive versions of the comparative raising construction, illustrated by (10a) and (10b). This difference can be attributed to the fact that the external argument of *like* is different in the two cases. (10a) is a statement about what the doctor is like; (10b) is a statement about what the patient is like. The fact that a nonargument from the complement of *like* cannot be the subject of *seem* (as illustrated by the

examples in (12)) follows as well from the fact that there is simply no raising out of the complement of *like*, as guaranteed by Principle A of the binding theory.

There is also some independent motivation for the claim that comparative prepositions can have an external argument. In cases like (17a-b), the NP expressing the putative external argument shows up in situ — something made possible, apparently, by the fact that verbs such as *imagine* are Case-assigning governors of this position.

- (17) a. Try to imagine/picture/remember [Wayne like he was as a child].
 b. I want you to imagine [your brother as if he had been drinking].

One piece of evidence for the claim that the bracketed string is a phrasal constituent in this construction comes from its ability to be the focus in the pseudocleft construction, something that is only possible for constituents, as is well known. (18a) illustrates this possibility.⁶

- (18) a. What I want you to imagine is [Wayne like he was as a child].
 b. I can remember both [Wayne like he was as a child] and [Garth like he was as a teenager].
 c. * I persuaded both Garth to sing a song and Wayne to dance.

It is also possible to conjoin this string with another *like* string in a coordinate construction governed by *both*, as shown in (18b). This kind of coordination is not possible with nonconstituents, as shown, for example, by (18c).

The generalizations that emerge are that there is a certain class of cognitive verbs, including *seem*, *appear*, *imagine*, *remember*, and *picture*, whose state of affairs argument can be expressed as a PP complement with *like* and/or *as if* as head and *like* and *as if* have an optional external argument. The fact that the external argument of the comparative phrase must raise with verbs of appearance and cannot raise with verbs in the *imagine* subclass follows from independently needed aspects of the analysis of these verb types: verbs of the *seem* type lack an external argument and accusative Case, verbs of the *imagine* type do not. Thus, a straightforward analysis is available for the type of raising that occurs with comparative complements embedded under verbs of appearance. The only stipulations needed are that verbs of appearance subcategorize for a comparative complement and comparative prepositions have a potentially transitive argument structure — much like verbs such as *open* and *melt*. These truly inescapable stipulations are not unlike those needed quite generally for argument-taking lexical items. The syntactic properties of the construction follow as a consequence of these minimal assumptions and general principles of universal grammar.

3. Remaining Questions

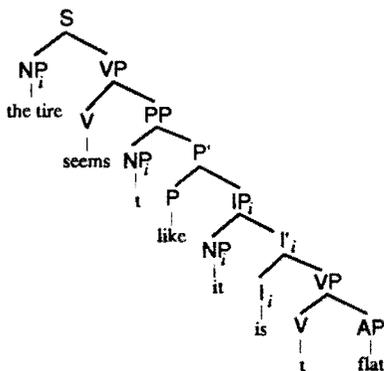
There are of course potential problems and further issues that a more comprehensive study would need to address. I would like to briefly examine two questions that remain in my mind. The first has to do with dialectal variation. There are apparently speakers who accept nonargument subjects in the comparative complement construction, that is, as in examples such as those in (12). Indeed, the motivation for the copy raising analysis proposed by Rogers and Postal was that they considered such examples to be acceptable.⁷ Given this difference, the possibility that some version of the copy raising analysis may be valid for some speakers cannot be dismissed. What precise form it would have to take and how the problems raised by such an analysis might be overcome are, however, not clear. One possibility of course is that examples such as those in (11) do not provide evidence for raising for these speakers. Another possibility is that these speakers have the structure shown in (16), but allow copy raising from the complement of *like* into the subject position of the small clause — and, in a second step, ordinary raising into the main clause subject position. While this kind of analysis would involve a binding theory violation, it would at least provide a potential means of differentiating comparative complements from tensed complements and thus of accounting for the ungrammaticality of the structure illustrated by (4).

A second remaining question concerns the fact that the raised NP that occupies the subject position in the *seem* clause must apparently bind a pronoun within the complement of *like*, as illustrated by (6) (*Wayne_i seems like he_i/*you/*I/*Garth must be in trouble*). Now, consider the fact that an NP can be the complement of *like*, in which case it is construed as a secondary predicate that takes the superficial subject of *seem* as its subject, as illustrated by (19).

(19) Wayne_i seems [pp *t_i like* [NP a nice guy]_i]

A natural way of approaching this question would be to consider the complement of comparative prepositions to be a secondary predicate whether it is a clause or an NP. Such an approach is appealing in that nothing beyond what is needed for (19) would have to be posited in order to explain (6). Assuming that secondary predication involves coindexing of an argument of the primary predicate with the secondary predicate (e.g., Napoli 1989, Williams 1980, Culicover and Wilkins 1984), (20) would necessarily be the structure of *The tire seems like it's flat*, given standard conventions for specifier–head agreement and mother–head index sharing.

(20)



That the subject of the clausal complement of *like* is pronominal and necessarily bound by the superficial subject of *seem* follows as a consequence. The problem is that this analysis seems to entail a false claim — i.e., that the bound pronoun must be the subject of the clausal complement of *like*. Although examples such as (21a) and (21b) make clear that it is not the case that a bound pronoun anywhere in the complement of *like* suffices, (21c) shows that a subject only constraint is too strong.

- (21) a. * Wayne_i seems like Garth thinks he_i must have been hurt.
 b. * Wayne_i seems like Garth doesn't like his_i sister.
 c. Wayne_i seems like something's bothering him_i.

In fact, *look*, which otherwise has the properties of *seem* with respect to comparative complementation, allows nonsubject pronouns to satisfy the pronoun binding constraint perhaps even more freely than *seem*, as shown by (22a-b); although, again, there are limits, as (22c) demonstrates.

- (22) a. Ted_i looks like Jane has been hassling him_i again.
 (from Postal 1974, p. 268)
 b. Ted_i looks like his_i wife tried to cut his_i hair again.
 c. * Ted_i looks like Jane thinks Wayne has been hassling him_i again.

It appears that the complement of *like* must be fundamentally about its subject, in some sense that is difficult to make precise. Presumably, this is a fact about the semantics of comparative prepositions. How exactly it should be dealt with formally and whether it in fact reveals

something more general about the nature of secondary predication are intriguing questions that invite further investigation.

4. Conclusion

Comparative complements with verbs of appearance are initially perplexing in that they both appear to allow raising and not to allow it. Two seemingly plausible analyses were considered and shown to be problematic. The copy raising approach advocated in previous work on this construction (Rogers 1971, 1972, Postal 1971) runs into trouble with the binding theory and fails to account for certain differences between comparative and infinitival complement constructions. Although perhaps technically viable, the possibility that the apparent raised NP is inserted into the nonthematic subject position at S-structure (or by generalized transformation) fails to yield a satisfying explanation, since there is no principled reason for restricting such an operation, if allowed, to just the construction in question. A straightforward analysis turns out to be possible by appealing to the theoretical construct known as a small clause, i.e., a phrase not headed by a verb which nevertheless has a subject position. The main clause subject in sentences such as *The tire seems like it's flat* has been raised from the subject position of the PP headed by *like*. To the extent that the analysis is successful, it offers additional motivation for recognizing small clauses and for a theoretical framework in which such an analysis can be naturally expressed.

Acknowledgments

I gratefully acknowledge the beneficial influence of discussions of the issues and data treated in this paper with Farrell Ackerman, Steve Lapointe, and David Perlmutter. Thanks also to Sandra Farrell, who provided intuitions concerning some of the data.

Notes

¹ Although many theories do not allow transformations as such, they generally have some kind of analogue of raising. The problem dealt with here could thus be cast and investigated in a similar way in most theories of syntax.

² With *seem* either *like* or *as if* may be used; *appear* does not allow *like*. *As though* is an alternative to *as if* that is preferred by some speakers. Some verbs of appearance (e.g., *look* and *sound*) take a comparative complement but neither an infinitival nor a tensed complement.

³ The claim is not of course that the two types of sentence are necessarily entirely semantically equivalent; rather, it is simply that both types of complement express the same semantic argument of *seem*. It is possible that *like* or *as if* contribute to the overall meaning in some way that *that* does not, although what exactly this contribution is is not obvious. It has been suggested to me that what I call comparative complements may be adjuncts. Although it is true that the comparative construction can function as an adjunct in some cases (as for example in *Wayne wolfed down the pizza (as if he hadn't eaten in days)*), there are good reasons for analyzing it as a complement when it occurs with verbs like *seem* and *appear*. First, unlike adjuncts in general, it cannot simply be omitted (**The tire seems, *It seems*), which indicates that it expresses a semantic argument. Second, since extraction from adjuncts is not otherwise possible (due to Huang's (1982) CONDITION ON EXTRACTION DOMAIN or whatever principle is assumed to hold an explanation for the ungrammaticality of **Who did Mary cry after John hit?*), the fact that it is possible to extract a *wh* phrase from within a comparative complement (as for example in *Which of these does it seem like Wayne made?*) suggests rather clearly that it is not an adjunct.

⁴ There is apparently some variation across speakers with respect to examples like those in (12). This issue is taken up in §3.

⁵ There have been different implementations of the idea of a small clause. Although it is not clear if anything hinges on implementation in the present context, I have in mind here the approach proposed by Stowell (1983). The idea is simply that various kinds of maximal projections (PPs, APs, etc.) can have subjects. In an analysis like that adopted here, Stowell appeals to the idea of raising from an adjectival small clause to account for cases such as *The proposal seems absurd*.

⁶ For some reason, constituency tests give somewhat less clear results with the *as if* complements than with *like* complements. Some speakers find examples such as (?)*What I want you to imagine is your brother as if he had been drinking less than perfect*. Still, for everyone there appears to be a sharp contrast between such examples and clearly ill-formed attempts to put nonconstituents in the focus position in the pseudocleft construction (for example, **What I want you to persuade is your brother to quit drinking*).

⁷ Their examples are with verbs such as *look* and *sound*. For me, these basically only differ from *seem* in that they do not occur in constructions of the type illustrated in (1). I assume therefore that their judgments would probably also differ from mine with respect to examples such as in (12).

References

- Burzio, Luigi (1986) *Italian Syntax: A Government-Binding Approach*, D. Reidel, Dordrecht.
- Chomsky, Noam (1981) *Lectures on Government and Binding*, Foris, Dordrecht.
- Chomsky, Noam (1992) "A Minimalist Program for Linguistic Theory," *MIT Occasional Papers in Linguistics*, Dept. of Linguistics and Philosophy, MIT.
- Culicover, Peter W. and Wendy K. Wilkins (1984) *Locality in Linguistic Theory*, Academic Press, Orlando.
- Huang, C.-T. James (1982) *Logical Relations in Chinese and the Theory of Grammar*, Doctoral dissertation, MIT.
- Joseph, Brian D. (1976) "Raising in Modern Greek: A Copy Process?," in *Harvard Studies in Syntax and Semantics*, Vol. 2, Jorge Hankamer and Judith Aissen (eds.), Harvard University.
- May, Robert (1977) *The Grammar of Quantification*, Doctoral dissertation, MIT.
- Napoli, Donna Jo (1989) *Predication Theory: A Case Study for Indexing Theory*, Cambridge University Press, Cambridge and New York.
- Perlmutter, David M. and Scott Soames (1979) *Syntactic Argumentation and the Structure of English*, University of California Press, Berkeley and Los Angeles.
- Postal, Paul M. (1971) *Cross-Over Phenomena*, Holt, Rinehart and Winston, New York.
- Postal, Paul M. (1974) *On Raising: One Rule of English Grammar and its Theoretical Implications*, MIT Press, Cambridge, Mass.
- Rogers, Andy (1971) "Three Kinds of Physical Perception Verbs," *Papers from the Seventh Regional Meeting of the Chicago Linguistic Society*, University of Chicago, Chicago.
- Rogers, Andy (1972) "Another Look at Flip Perception Verbs," *Papers from the Eighth Regional Meeting of the Chicago Linguistic Society*, University of Chicago, Chicago.
- Stowell, Tim (1983) "Subjects across Categories," *The Linguistic Review* 1, 219-246.
- Williams, Edwin (1980) "Predication," *Linguistic Inquiry* 11, 203-238.

Verbal Aspect and Object Case Marking: A Comparison between Czech and Finnish*

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0. Abstract. The comparison of Czech and Finnish shows that their different morphological strategies for expressing aspect can be viewed in terms of a difference in the grammatical encoding of the cross-categorial semantic distinction 'bounded/unbounded', a distinction that concerns the dimension of quantity of objects and events. Czech encodes it on the verb with V^0 -modifiers, whereas Finnish in the NP with case suffixes. In Finnish, the accusative/partitive case alternation that expresses the 'bounded/unbounded' distinction in the domain of individuals is systematically exploited to indicate the aspectual distinction, a distinction in the domain of events. In Czech, the encoding system of V^0 -modifiers that expresses the 'bounded/unbounded' distinction (among other distinctions) in the domain of events is exploited for conveying certain meanings that are related to those of articles within NPs in such languages as English, for example. Czech and Finnish clearly differ in the *language-specific schematizations* that are associated with their respective linguistic representations. However, the interaction between verbal and nominal predicates in Finnish and Czech is based on the *same general principles* that can be best accounted for within the lattice-theoretic analysis.

1. Basic Distinctions and Data.

1.1. Aspect and Aktionsart. Every state of affairs, which is changeable in time, has, in principle, a beginning, a certain extent, and an end. Every such state of affairs may be conceived of as having boundaries. In general, a perfective operator selects the boundaries that are typical for the various classes of states of affairs denoted by the predication in its scope. Since telic verb expressions (*accomplishments* and *achievements*) entail an inherent definite change that necessarily terminates the denoted state of affairs, perfective operator focuses on the final, right boundary, on the fact that the change was (or will be) attained. *Stative* states of affairs, such as those involving knowledge, beliefs, dispositions, for example, are states that can be acquired or entered into and they do not typically entail any definite end state. Therefore, it is cognitively significant to mark their beginning, that is, their left boundary (or inchoative phase), and this can be achieved by applying a perfective operator to an imperfective stative verb, as in the following Czech sentence *Zamiloval^P se do ni* - 'He fell in love with her.' The corresponding imperfective verb would be used in a sentence denoting the resulting states of affairs: *Miloval^P ji* - 'He loved her.' A perfective operator applied to verbs denoting *activities* also selects the left boundary (inchoative phase), as in *Rozplakal^P se* - 'He started to cry'. In short, perfective propositions may be characterized by a semantic representation that contains a temporal boundary on the denoted state of affairs. They are 'bounded' in this sense. Imperfective propositions lack such a boundary, they are 'unbounded' (this principle of contrast goes back to the Praguean markedness analysis; cf. Jakobson 1936/71).

In order to describe the interaction between aspect and lexical semantics of verbal expressions on which aspect operates, aspect must be distinguished from

Aktionsart (German term meaning 'a kind of action'). In Slavic and Germanic linguistics, this notion is mainly used in the narrow sense for semantic distinctions expressed by lexical-derivational morphology (cf. Isačenko 1962, for example). More recently, *Aktionsart* has been extended beyond its narrow, morphologically based, understanding to include certain semantic distinctions not only on the level of lexical semantics of individual verbs but also on the level of VPs and sentences. In this broad sense, it comprises Vendler's (1957;67) classes *state*, *activity*, *accomplishment* and *achievement* (cf. Hoepelman 1981; Hinrichs 1985, among others) or the corresponding 'telic-atelic' distinction that was coined by Garey (1957).

1. 2. *Aspect and Nominal Reference in Czech*. In Czech, as in other Slavic languages, the aspectual 'perfective (P)-imperfective (I)' distinction is coded by prefixation (*psát* 'to write' - *pře-psát* 'to write over/again'), suffixation (*otráhat* - *otráhd-va-t* 'to pick'), change of the stem extension (*skákat* 'to jump, i.e., to be jumping' or 'to jump repeatedly' - *skočit* 'to jump') or suppletion (*brát* - *vzít* 'to take'). Apart from their aspect coding function, many V⁰-modifiers also have effects on the lexical semantic properties of verbs, some of which are described under the narrow notion of 'Aktionsart'. For instance, they may indicate, among others, 'distribution', 'succession', and 'iteration' of events. Czech verbs are often morphologically complex and carry a heavy informational load. And often verbs may influence the interpretation of NPs. This can be best illustrated in transparent contexts with examples that contain determinerless NPs headed by mass and plural nouns, as is illustrated by the pair of sentences in (1) and (2):

(1-a)

<i>Pil</i> ^I	<i>kávu.</i>
drank-3SG-MASC	coffee-ACC
'He was drinking coffee.'	

(1-b)

<i>Vypil</i> ^P	<i>kávu.</i>
PREF-drank-3SG-MASC	coffee-ACC
'He drank up (all) the coffee.'	

(2-a)

<i>Dal</i> ^I	<i>jim</i>	<i>knihy.</i>
gave-3SG-MASC	them-DAT-3PL	books-PL-ACC
'He was giving them books.'		

(2-b)

<i>Porozdal</i> ^P	<i>jim</i>	<i>knihy.</i>
PREF-PREF-gave-3SG-MASC	them-DAT-3PL	books-PL-ACC
'He gave them (all) the books.'		
	[i.e., (all) the books were given away, one after another]	

The crucial point illustrated by the pair of sentences in (1) and (2) is that the perfectivizing prefixes, and their absence, provide the only formal clue as to how the mass and plural NPs are to be interpreted. The most striking examples are those with mass and plural DO-NPs in such perfective sentences as (1b) and (2b). Such examples clearly show that the mass and plural DO-NPs here derive their bounded and referentially specific ((1b) and (2b)) as well as quantificational (distributivity, (2b)) interpretation from the perfective verb. Even though mass and plural NPs in

general do not have referents with inherent boundaries, in (1b) and (2b), the mass NP 'coffee' and the plural NP 'books' are understood as referring to a contextually *specific* or *known* portion of coffee and to a *specific* bounded set of books, rather than as denoting coffee and books, in general. The use of determinerless NPs with mass and plural noun heads here corresponds to the referential use of definite descriptions in languages that have a definite article. This is significant, in particular given that Czech, like most other Slavic languages, does not have an overt article system. The semantic differences that are carried by articles in English, for example, are here inferred through, or expressed by, a variety of morphological, syntactic, prosodic and lexical devices: word order, stress, determiner quantifiers, function words and various other lexemes that modify nouns. What has been less frequently noticed, let alone systematically described, is the fact that verbs also may affect the interpretation of their nominal arguments.

In addition, the complex perfectivizing prefix *po-roz-* in (2b) behaves like a determiner quantifier in so far as it contributes distributivity to the meaning of (2b). Since both (1b) and (2b) also have an *all-inclusive* or *holistic* entailment with respect to their DO arguments 'coffee' and 'books', the determiner quantifier *all* may be used in their English translation.

In uttering (1a) and (2a), the speaker asserts that some coffee and some sweaters were subjected to the denoted event. The DO-NPs in (1a) and (2a) have an *unbounded* or *partitive* interpretation. (cf. also the co-occurrence restrictions with determiner quantifiers, and various other quantifying and measure expressions, Filip 1992.) In addition, the referential specificity of their referents may be irrelevant for the purpose of communication. The use of determinerless NPs with mass and plural noun heads in such simple imperfective sentences as (1a) and (2a) most closely corresponds to English NPs with no articles (or perhaps with the unstressed 'some').

We may conclude that V^0 -modifiers have effects on the interpretation of NPs that are comparable (i) to those of articles and also (ii) to those of determiner quantifiers and various quantifying and measure expressions. They may extend such semantic effects not only over the DO-NPs, as in all the above examples, but also over subject-NPs, and PPs (both obligatory and optional).

One of the puzzles that needs to be explained concerns such pairs of sentences as those in (3):

(3-a)

<i>Míchala</i> ^I	<i>jsem</i>	<i>polévku.</i>
stirred-1SG-FEM	am-AUX-1SG	soup-ACC
'I was stirring (the) soup.'		

(3-b)

<i>Zamíchala</i> ^P	<i>jsem</i>	<i>polévku.</i>
PREF-stirred-1SG-FEM	am-AUX-1SG	soup-ACC
'I stirred (the) soup.'		

(3) shows that the difference in verbal aspect is not necessarily correlated with a difference in the interpretation of nominal arguments. If there is any difference in the interpretation of DO-NPs in such sentences as (3a) and (3b), it will stem from other factors than just the difference in verb aspect. In other words, some V-

modifiers (their uses, to be more precise) have no effect on the interpretation of nominal arguments.

1. 3. Case Suffixes and Aspect in Finnish. In Finnish, the 'bounded/unbounded' distinction that characterizes aspect may be inferred through the partitive/accusative case alternation, as is shown in (4a) and (4b):

(4-a)

<i>Join</i>	<i>kahvia.</i>	-	<i>Luin</i>	<i>kirjoja.</i>
drank-1SG	coffee-PART	-	read-1SG	books-PL-PART
'I was drinking coffee.'			'I was reading books.'	

(4-b)

<i>Join</i>	<i>kahvin.</i>	-	<i>Luin</i>	<i>kirjat.</i>
drank-1SG	coffee-ACC	-	read-1SG	books-PL-ACC
'I drank up (all) the coffee.'			'I read (all) the books.'	

The main point illustrated by these sentences is that the meaning of a completed event is required in such Finnish sentences as (4b), but not in (4a), even though the verb does not carry any formal marking that would encode this difference. In standard Finnish grammar handbooks this is expressed in the following way: "The object is in the partitive when it expresses an indefinite, non-limited quantity (divisible words and plural words)" (Karlsson 1983:81). At the same time, it may be used if the action is directed at an indefinite part of the object, if it does not lead to "any 'important' final result (i.e. the action is irresultative)" (Karlsson 1983:80). The accusative suffix marks the object for "a whole quantity or a definite quantity" (Karlsson 1983:94) and it also expresses a resultative action in affirmative sentences (cf. Karlsson 1983:94; Dahl & Karlsson 1976:11; Tommola 1990:361), that is, it may indicate a 'crucial change in the state of the object' (cf. Dahl & Karlsson 1976:8).

However, the partitive/accusative alternation does not always convey a difference in aspect, as is shown in (5a) and (5b):

(5-a)

<i>Näin</i>	<i>kukkia.</i>
saw-1sg	flowers-PL-PART
'I saw (some) flowers.' - i.e. there were others I did not buy.	

(5-b)

<i>Näin</i>	<i>kukat.</i>
saw-1sg	flowers-PL-ACC
'I saw the flowers.' - i.e. all of them, a total quantity.	

The Finnish aspectual distinction has a much narrower range than the Slavic does, because it applies only in affirmative clauses and it depends on the dimension of quantity marked by the case suffixes on nouns and also on certain semantic properties, such as those that are somewhat vaguely described with the notions like 'resultativity' and 'a crucial change of object'. What (4) and (5) have in common is the fact that the partitive/accusative case alternation here indicates the difference in partial/whole quantity and that it also tends to indicate differences in referential specificity. Since Finnish does not have an overt article system, the case alternation can, to a certain extent, compensate for its lack.

1. 4. Summary. Viewed from a broad typological perspective, we may distinguish two main syntactic classes into which various expressions of aspect fall. Aspect can be expressed by lexical-derivational means on verbs (Slavic languages), by verbal periphrastic constructions (English), or by verb compounds (Japanese, Hindi), for example. Aspect can be also expressed by means of NPs (with case suffixes, as in Finnish, Estonian, Latvian, Lithuanian), or PPs (the partitive construction with the preposition *an* 'at', 'on' in German, see Filip 1989). While verb-centered expressions of aspect primarily encode distinctions in the domain of events, noun-centered expressions of aspect primarily encode distinctions in the domain of individuals.

Czech and Finnish represent these two radically different ways in which aspect can be cross-linguistically expressed. Their different morphological strategies for encoding aspect can be viewed in terms of a difference in the grammaticalization of the 'bounded/unbounded' distinction. This cross-categorical distinction concerns the dimension of quantity of objects and events. Czech encodes it on the verb with V^0 -modifiers. In Finnish, the encoding system that is primarily designed for expressing the 'bounded/unbounded' distinction in the domain of individuals is systematically exploited to indicate a distinction in the domain of events, namely the aspectual distinction.

In both Finnish and Czech the functions that are typically ascribed to articles can be, to a certain extent, taken over by the same devices that are used to convey the 'bounded/unbounded' distinction. As Tommola observes "the most obvious discourse functions [i.e. of case suffixes, HF] could be found - in functions, related to those of articles" (Tommola 1990:361). "If compared with Germanic languages, the partitive can be said to correspond to the lack of an article, with at least as good evidence as it is said to correspond to NSV if compared with Slavic languages" (Tommola 1990:351-2). "In fact the reverse is true, in the traditional aspect realm - in Slavic linguistics - an approach has gained ground that takes such notions as definiteness and specificity into consideration (Leinonen 1984, Kabakčiev 1984)". I try to show that in Czech, as in most other Slavic languages, verbs encode not only aspect and Aktionsart, two semantic categories in the domain of events, but they also constrain the interpretation of NPs in a similar way in which articles and determiner quantifiers constrain the interpretation of whole NPs. A similar interaction between verb morphology and nominal arguments that can be observed in Slavic languages like Czech was also noticed in such typologically different languages as Warlpiri and Gun-djeyhmi (cf. Hale's and Evans' work on these languages in Bach, Partee and Kratzer 1987; Partee 1990; also in Hindi, Japanese, among others).

Despite the difference in the morphological expression of aspect, the perfective and imperfective construction in Finnish and the corresponding constructions in Czech are associated with the same clustering of semantic properties: we can observe an affinity between perfective aspectual meaning and a 'bounded' or 'a whole quantity' reading associated with certain nominal arguments, and an imperfective meaning and an 'unbounded' or a 'partial quantity' reading of nominal arguments. So while in Czech sentences, such as (1) and (2), both the differences in the aspectual properties of sentences and in the interpretation of DO-NPs arise from verbal morphology, in Finnish sentences, such as (4a) and (4b), they stem

from the case marking on NPs.

The interaction between verbal and nominal predicates deserves more attention as it promises to give us valuable insights into the language-specific schematizations and semantic universals. My contribution is to analyze the above Czech and Finnish data and to answer the following questions: (1) What are the constraints for associating a V^0 -modifier with the appropriate nominal argument in Czech? (2) How do we appropriately restrict the class of sentences in Finnish in which the case alternation conveys aspect?

2. Lattice-Theoretic Approach. The data in sections 1. 2. and 1. 3. suggest that the interaction between verbal morphology and NPs in Czech and the expression of aspect through case suffixes on NPs in Finnish typically take place in sentences denoting events in which the extent of one participant is intrinsically tied to the individuation and temporal structure of the event. By this I mean events like the following one, for example: If somebody mows the lawn, I can conclude something about the progress of this event from the state of the lawn, because the lawn acquires a new property in distinguishable, separate stages, it changes *incrementally* in lockstep with the progression of the mowing event.

It is well-known that the NP that corresponds to the participant with respect to which an event can be 'measured' determines the telic/atelic reading of VPs or sentences in which it occurs. For example, in (i) *John drank wine*, the mass NP *wine* yields an atelic verbal predicate. Whereas in (ii) *John drank a glass of wine*, the measure NP *a glass of wine* yields a telic verbal predicate. Verkuyl (1972) and Dowty (1972; 1979) introduced this phenomenon into modern linguistics and their pioneering work has since been an inspiration for a number of insightful studies. The most explicit and precise account of examples like (i) and (ii) was provided by Hinrichs (1985) and Krifka (1986; 1989). They apply Link's (1983) *lattice-theoretic analysis* of mass and plural NPs to both objects and events and convincingly argue that the explanation for the Aktionsart difference between (i) and (ii) lies in establishing a homomorphism between algebraically structured NP and event denotata.

Within the lattice-theoretic analysis the domain of events and objects can be characterized as two non-overlapping sorts of entities, each of which has the structure of a join semi-lattice without a bottom element. Algebraic relations, which characterize a homomorphism, are then defined between the lattice representing the predicates of objects and that of events (cf. Krifka 1986; 1989). In lattice sorts, we can also specify the cumulative reference property of mass and plural NPs as well as of atelic verb expressions, activities such as *running*, and states, such as *knowing*. Cumulative expressions pass the additivity test: "(a) If *a* is water and *b* is water, then the sum of *a* and *b* is water" and "(b) If the animals in this camp are horses, and the animals in that camp are horses, then the animals in both camps are horses" (Link 1983:303). On the other hand, singular count NPs (*an apple*), quantified NPs (*five apples*) and measure NPs (*a glass of wine*) as well as telic expressions (accomplishments like *building a house*, and achievements like *arriving*) are quantized (cf. Krifka 1986; 1989). An expression is quantized if it does not pass the additivity test, or conversely if it is non-divisible: one cannot divide its referent up and get individual parts that can be named by the *same* expression.

This apparatus allows us to map the state of parts of the NP *a glass of wine* (or *wine*) and their part-whole relationships into the parts of the event of drinking a glass of wine (or wine) and its part-whole relationships. Therefore, since the entity denoted by the NP *a glass of wine* has a definite extent, the drinking of that glass of wine has a definite extent as well. Krifka (1986; 1987; 1989) and Dowty (1988; 1991) assume that the influence of NPs on the telicity (Aktionsart) of complex verbal expressions should be stated relative to thematic roles. Dowty (1988; 1991) coins the term 'Incremental Theme' for the thematic role assigned to the NP that 'measures out' the denoted event. And such verbs as *to drink*, *to eat*, *to destroy*, *to mow*, etc. are said to entail a Theme-to-event homomorphism (cf. Dowty 1991:567). These assumptions motivate the following behavior: A quantized Incremental Theme NP yields a quantized (telic) verbal expression, while a cumulative one yields a cumulative (atelic) verbal expression.

3. Application of the Lattice-Theoretic Approach to the Czech and Finnish Data. Since aspect interacts in a systematic way with Aktionsart, it should not be surprising that the Incremental Theme role that gives rise to the Aktionsart difference in telicity should also play a role in the interaction between aspect coding verb morphology and nominal arguments in languages like Czech. It might be argued (cf. Krifka 1989:186-189; 1992:49-51) that the Czech data can be described in essentially the same way as the English examples (i) *John drank wine* and (ii) *John drank a glass of wine*. On this view, it is assumed that the verb 'to drink' also in Czech is a Theme-to-event homomorphism. In order to uphold this assumption, two further assumptions are made: First, there is a syntactic rule 'NP → N' that allows two different semantic interpretations, cumulative and quantized. In other words, NPs are ambiguous. Second, perfective operators can be only applied to quantized verbal predicates, while imperfective operators to cumulative ones. Notice that such an approach allows one to give a compositional description for the data ((1a) and (1b)) which does not seem to be compositional.

Krifka's account is the first attempt to give a systematic description of the interaction between verbal and nominal predicates in Czech. However, the following objections can be raised against it. First, a perfective operator is not always applied to quantized (telic) verbal predicates and an imperfective operator to cumulative (atelic) ones. For example, there is a class of perfective verbs derived from atelic stative verbs by the prefix *pro-* and *po-*, as in Czech and Russian *postát*, *postojat* 'to stand for a while or *prostát*, *prostojet* 'to stand through (some period)', which are best classified as atelic (cf. also Kucera 1983:174). The existence of such verbs shows that a perfective operator can be applied to atelic/cumulative verbal predicates and that we need to integrate into our verbal system a class of perfective atelic verbs. This requires that we distinguish between the *bounded* temporal profile associated with the semantics of perfective aspect, on the one hand, and the entailment of a definite change of state inherent in the lexical semantics of *telic/quantized* verbal expressions, on the other hand.

Second, if imperfective operators, and also progressive operators as their special case, required cumulative verbal predicates and cumulative Incremental Theme NPs, how would we capture the simple intuition behind what Dowty (1972; 1977; 1979) calls the 'imperfective paradox'? In uttering *John was drawing a circle*, the speaker attaches no existential claim to the object denoted by the NP *a circle*,

because the circle does not exist in its entirety at the relevant reference point, and yet the speaker has the concept of a whole circle, of a whole quantized entity, and consequently of the ultimate potential outcome of the denoted event. Since such sentences as *John was drawing a circle* denote events that have a definite end state, they are telic. At the same time, the partitive (or unbounded) meaning conveyed by the progressive operator here amounts to the assertion that this state was not reached at the relevant reference time. However, on the account that is based only on the two-way distinction between cumulative and quantized expressions, we would have to assume that the NP *a circle* in *John was drawing a circle* is cumulative, and the whole VP is cumulative (or atelic) as well. And similarly in (6)

(6)

Jan pil^I sklenici viha.
 John drank-3SG-MASC glass-ACC wine-GEN
 'John was drinking a glass of wine.'

that combines a quantized Incremental Theme NP 'a glass of wine' and an imperfective verb, the above approach predicts that the imperfective aspect here forces a cumulative interpretation of the Incremental Theme NP 'a glass of wine'. Intuitively, (6) makes an assertion about some unspecified subpart of the portion denoted by 'a glass of wine' whose definite extent delimits the event. In other words, it is unclear whether and how such an account can distinguish clearly between Aktionsart and aspect, between the telic/quantized property of verbal predicates and the unbounded temporal profile associated with the semantics of imperfective aspect.

Third, the claim that NPs are ambiguous between a quantized and cumulative interpretation leads to the impression that the interpretation of an Incremental Theme NP as quantized or cumulative is essentially established by a choice within such an NP, rather than by the verb aspect. The perfective/imperfective aspect then simply selects the quantized/cumulative interpretation of a given Incremental Theme NP. Notice that this view seems to involve a redundancy. If it is assumed that the complex verbal predicate selects or forces a quantized/cumulative interpretation of the Incremental Theme NP, in a similar way as in *rob the bank* the appropriate reading of *bank* is selected by the lexical meaning of the verb *to rob* (cf. Krifka 1992:50), then why do we also need the 'transfer of referential properties' from the Incremental Theme NP into the complex verbal predicate to motivate the quantized or cumulative interpretation of the verbal predicate? I propose to modify Krifka's and Dowty's lattice-theoretic analysis in three important respects. First, it can be shown that individual verbs cannot often be classified once and for all as denoting a homomorphism. (Notice that we seem to be here faced with a similar problem as Vendler's attempts to classify surface verbs as activities and accomplishments; see Dowty's (1979:60ff.) criticism of Vendler.) Therefore, the rules governing the influence of NPs on the meaning of complex verbal predicates cannot be always stated relative to "A SET OF ENTAILMENTS OF A GROUP OF PREDICATES WITH RESPECT TO ONE OF THE ARGUMENTS OF EACH" (Dowty 1991:552). If such an influence were to be attributed solely to an Incremental Theme role, as Krifka (cf., for example, 1987:12) and Dowty suggest, then how could we account for the fact that the decision whether a denoted event is understood as evolving in an incremental way, and whether it may also be regarded

as telic, often depends on other factors? Various adjuncts (*The truck rumbled vs. The truck rumbled from the street into the garage*) and additional arguments (*He sneezed vs. He sneezed the napkin off the table*), for example, may play an important role in this decision. Even though Dowty states that "THE MEANING OF A TELIC PREDICATE IS A HOMOMORPHISM FROM ITS (STRUCTURED) THEME ARGUMENT DENOTATIONS INTO A (STRUCTURED) DOMAIN OF EVENTS, modulo its other arguments" (Dowty 1991:567), it is not clear how the influence of other arguments and of adjuncts should be handled. One way in which we could account for the above examples would be to postulate two senses for each predicate, or two different verbs, connected by lexical rules, whereby only one of them would denote a homomorphism. However, such an account would force us to postulate quite implausible senses of verbs. For example, we would have to postulate a special sense of *rumble* in *The truck rumbled from the street into the garage*, 'to move from X to Y by rumbling'.

In addition, the decision whether a given sentence denotes an event that can be viewed as proceeding in an incremental way may also depend on the cognitive schemas associated with particular form-meaning linguistic pairings. This can be illustrated with such examples as *John saw twenty-five elephants* and *The doctor examined the patient*. Such sentences can be construed as describing events that involve some established procedure (consisting of a number of successive steps, for example) that delimits them. Only under such an 'incremental' construal are the above sentences telic, otherwise, they are atelic. (These examples were brought to my attention by Charles J. Fillmore.)

I suggest that we maintain the notion 'Incremental Theme' for the NP that is associated with the participant that 'measures out' the event, as in Krifka's and Dowty's theory. However, at the same time, we allow for the possibility that a homomorphism may have other sources than just the lexical semantics of individual verbs, sources whose domain may be the meaning of a whole sentence. I propose that a homomorphism between algebraically structured Theme NP and event denotata characterizes a fragment of conceptual structure, an *Incremental Schema*. And it is against this schema that certain Aktionsart and aspect properties of sentences are interpreted. The status of the Incremental Schema in the conceptual representation of sentences is comparable to that of a *scalar model* with respect to which, for example, a *let alone* sentence is interpreted (cf. Fillmore, Kay, O'Connor 1988).

Second, the semantic property that is determined by aspect should not be characterized in terms of the 'cumulative/quantized' distinction, but rather in terms of the 'bounded/unbounded' distinction, which characterizes aspect. The 'cumulative/quantized' distinction should be primarily reserved for the semantic properties of NPs as well as for those of verbs, VPs and of sentences that are relevant for Aktionsart (telicity). The distinctions 'quantized/cumulative' and 'bounded/unbounded' belong to a finite set of primitives that characterizes parts of conceptual structure. Just like the 'quantized/cumulative' distinction, the 'bounded/unbounded' distinction is orthogonal to the distinction between individuals and events. The application of the distinction 'bounded/unbounded' in the domain of events and objects is determined by the different topological properties of their respective cognitive schematizations. Following Jackendoff (1990), I

assume that the condition "on dimensionality of boundaries is that the *schematization* of a boundary has one dimension fewer than the *schematization* of what it bounds" (Jackendoff 1990:24). While the progression of states of affairs through time can be schematized as a time line, objects can be schematized as two- or three-dimensional entities, as regions or volumes. If we apply the distinction 'bounded/unbounded' to states of affairs, the boundaries will be schematized as single points on a time-line. In the domain of objects, a region will be bound by a line, and a volume by a surface. Saying that a given NP is 'bounded', in addition to saying that it is 'quantized', means that we view the entity denoted by it in its entirety, that is, in this sense, we focus on its boundaries. Therefore, a 'bounded' NP must be 'quantized', as well. However, a 'quantized' NP need not be 'bounded'. While 'unbounded' simply means that we abstract away from the boundaries of the entity and instead consider some of its parts.

And third, the directionality that is implicit in such notions as 'Theme-to-event' homomorphism (Dowty 1991:567) or 'transfer of reference mode' (Krifka 1986; 1989) is mainly motivated by the influence of NPs on the telic properties of complex verbal predicates in English. However, it does not do justice to the influence of aspect and Aktionsart (in the narrow sense) semantics on the interpretation of NPs in Czech. If we want to capture in a straightforward way the fact that it is the verbal aspect that determines the interpretation of an Incremental Theme NP in Czech, we should abandon the assumption that the Czech verbs that correspond to such English verbs as *to drink*, *to eat*, *to mow*, *to destroy* entail a homomorphism from their (structured) Incremental Theme argument denotations into a (structured) domain of events. Instead of Krifka's and Dowty's approach that seems to be implicitly directional and procedural, my description is declarative and based on the unification-based approach to natural language description (cf. Shieber 1986; Pollard & Sag 1993; Fillmore & Kay 1992). Within the unification-based approach a verbal predicate and an Incremental Theme NP each specify partial information about a single linguistic object, a sentence. They introduce instances of the same parameters: *bounded* and *cumulative*. These parameters encode information coming from three sources: Aktionsart, characterized in terms of the 'quantized/cumulative' distinction, aspect, characterized in terms of the 'bounded/unbounded' distinction, and Incremental Theme NP which is characterized in terms of both these distinctions, as it interacts, at the same time, with both Aktionsart and aspect. Constraints imposed by language require that information coming from these three sources be compatible. Such a unification-based account has the following advantages: it allows us (i) to distinguish between the interaction of nominal and verbal predicates on the level of aspect and on the level of Aktionsart as well as to define the relation between the two; (ii) to provide an intuitively more plausible account of the data from such Slavic languages as Czech; (iii) to compare the different morphological and syntactic strategies for encoding aspect in typologically distinct languages in terms of a difference in the grammaticalization of the 'bounded/unbounded' distinction.

The interaction between verbal and nominal predicates in Czech and Finnish is subjected to the same basic restriction: it takes place in sentences that evoke an Incremental Schema (*shared schematization*). If a given Czech or Finnish sentence contains an Incremental Theme NP, we can make the following predictions: In Czech, an encoding system of V^0 -modifiers, designed for expressing distinctions in

the domain of events, is exploited for drawing inferences about the properties of the individual denoted by the Incremental Theme NP ('boundedness' and quantification). For Czech, and other Slavic languages, I suggest that V^0 -modifiers have semantic effects on the Incremental Theme NP of the verbs they modify that are comparable to those of articles and also to determiner quantifiers. In Finnish, the case suffixes on Incremental Theme NPs, that is, an encoding system that is primarily designed for expressing the 'bounded/unbounded' distinction in the domain of individuals, is exploited for drawing inferences about the aspectual properties of affirmative sentences. In both Czech and Finnish, the semantic representation of sentences containing Incremental Theme involves the following correlations: 'bounded event - bounded object' and 'unbounded event - unbounded object'. This correctly predicts that only the DO-NPs in such pairs of Czech sentences as (1) and (2) will have different interpretations with respect to the 'bounded/unbounded' distinction, while this is not the case for the DO-NPs in (3). And similarly for Finnish, we can predict that only in (4) the case alternation induces a difference in aspect, but not in (5).

The apparent "flow" of information in one direction, from the verb onto the Incremental Theme NP in Czech, or in the opposite direction, from the Incremental Theme NP onto complex the verb-headed expression in Finnish, is due to this difference in the morphological encoding of the relevant aspectual information. The fact that this information is encoded in the verb in Czech and in the NP in Finnish is clearly not imposed by the real world (facts, or states-of-affairs), but rather it is a matter of *language-specific schematizations* that are associated with the whole system of their respective linguistic representations.

For Finnish, this hypothesis has the clear advantage over previous proposals in so far as it allows us to narrow down the core class of aspectually-relevant sentences to a semantically well-defined set, instead of relying on such vague notions as 'resultativity' or 'a crucial change in the state of the object'. For Czech and other Slavic languages, this semantically based account allows us to predict which syntactic argument will be accessible to the semantic effects of a given V^0 -modifier. If we assume that V^0 -modifiers extend their effects over the Incremental Theme argument of the verb they modify, as I suggest, then this will follow from the general principles that govern the association of semantic and syntactic argument structure proposed, for example, in Dowty (1991). Moreover, this hypothesis also motivates the co-occurrence restrictions between perfective and imperfective verbs and various quantified and measure NPs in Slavic languages (cf. Filip 1992).

In order to illustrate how the interaction between verbal and nominal predicates may be implemented in terms of the unification-based approach, let us consider the Czech situation. It may be assumed that NPs have different feature specifications for the head noun and the whole phrase. The head nouns will be specified with the feature attribute 'cumulative', while the whole NP in terms of the feature attributes 'cumulative' and 'bounded'. A mass or plural noun head will be specified with the feature specification '[cumulative +]' that reflects its inherent lexical properties. If the whole NP functions as an Incremental Theme NP of a perfective verb, it "acquires" a '[bounded +]' status from it via unification. In imperfective constructions, the Incremental Theme NP construction "acquires" via unification the '[bounded -]' status from the imperfective verb.

Aktionsart properties of sentences are determined by the feature attribute 'cumulative': it characterizes the inherent lexical semantic properties of the head noun of an NP and its value is inherited by the whole NP construction provided that it is sanctioned by the following feature co-occurrence restriction: '[bounded +] → [cumulative -]'. Notice that this restriction is motivated by the general cognitive principles mentioned above: An entity that is viewed in its entirety, with respect to its boundaries, must be quantized, as well. The value assigned to the 'cumulative' feature attribute of the whole NP construction unifies with the values assigned to the 'cumulative' feature attribute of the head verb, which in turn unifies with the value of the attribute 'cumulative' of the whole sentence. This yields the right results, namely that perfective sentences with cumulative Incremental Theme NPs are bounded and quantized (telic), while imperfective sentences with cumulative Incremental Theme NPs are unbounded and cumulative (atelic). Imperfective sentences with quantized Incremental Theme NPs are quantized (telic) and unbounded.

In both Czech and Finnish, the referential specificity of NPs is a by-product of a 'bounded' reading assigned to cumulative NPs. While in Finnish this reading concerns all the cumulative NPs, regardless whether they are linked to the Incremental Theme or not (cf. (4) and (5)), in Czech, it is restricted to cumulative Incremental Theme NPs (cf. (1), (2) as opposed to (3)). Once a cumulative NP is assigned a bounded reading, either because it is in the accusative case (Finnish) or because it is an Incremental Theme of a perfective verb (Czech), its referentially specific reading follows from the same general pragmatic and cognitive principles. In order to make an assertion about the whole extent of a given object or about the whole sum individual (Link 1983) its extent must be known to the interlocutors. Since cumulative NPs do not denote entities with a known or prototypical extent, the only way in which the extent of their referents can be fixed, is to anchor them to an entity or a set of entities easily identifiable in the discourse context (linguistic or non-linguistic). An 'unbounded' NP, on the other hand, may be quantized or cumulative, and it may be referentially unspecified, because making an assertion about a subpart or subparts of an entity does not presuppose the existence of a whole bounded entity, rather it merely allows for the possible existence of some (or other) contextually relevant additional quantity or continuation.

It is important to emphasize that the correlation between a 'bounded' interpretation of an NP and the referential specificity of the entity that it refers to, on the one hand, and an 'unbounded' interpretation and an unspecified entity interpretation, on the other hand, does not apply if the relevant NP is quantized (that is, if it is singular count, or if it contains a determiner quantifier or a measure expression), or if a sentence contains other quantifying expressions, including 'adverbs of quantification' (Lewis 1975). This correlation is also weakened if the NP functions as a subject that occurs in the sentence initial position. Subjects often function as topics. And topicalized constituents that occur in a sentence-initial position are often highly individuated and definite. Therefore, it would be wrong to claim, for example, that in Finnish perfective constructions the direct object reference is always specific and quantitatively definite, as Tommola (1990:352-353) seems to assume when he speaks of 'specific resultativity'.

4. Conclusion. Czech and Finnish differ in the grammatical encoding of the

cross-categorical 'bounded/unbounded' distinction. In Czech it is encoded on the verb and in Finnish in the NP. In Czech, an encoding system of V^0 -modifiers, designed for expressing this distinction in the domain of events, that is, for expressing aspect, is exploited for drawing inferences about the properties of NPs. In Finnish, an encoding system that is primarily designed for expressing the 'bounded/unbounded' distinction in the domain of individuals, case suffixes, is systematically exploited to indicate a distinction in the domain of events, namely aspect. Despite the differences in the language-specific schematizations that are associated with the Czech and Finnish linguistic representations, I suggest that this interaction between verbal and nominal predicates can be best accounted for within the lattice-theoretic analysis and on the basis of the same general principles. My analysis focuses on the role played by verbal aspect in connection with Incremental Theme role (cf. Krifka 1986, 1987, 1989; Dowty 1988, 1991). I propose that in Czech the V^0 -modifiers that are applied to a verb direct their semantic effects at an Incremental Theme NP. In Finnish, on the other hand, the presence of an Incremental Theme NP serves as a defining characteristic of the core class of aspectually-relevant sentences.

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References

- Dahl, O and F. Karlsson. 1976. "Verbal Aspects and Object Marking: A Comparison between Finnish and Russian." In: *International Review of Slavic Linguistics 1:1*, 1-29.
- Dowty, D. R. 1977. "Toward a semantic analysis of verb aspect and the English 'Imperfective' progressive." In: *Linguistics and Philosophy*, 1, pp. 45-79.
- Dowty, D. R. 1979. *Word Meaning and Montague Grammar. The Semantics of Verbs and Times in Generative Semantics and in Montague's PTQ*. Dordrecht: Reidel.
- Dowty, D. R. 1988. "Thematic Proto-Roles, Subject Selection, and Lexical Semantic Defaults", ms. (Paper presented at the 1987 LSA Colloquium, San Francisco)
- Dowty, D. R. 1991. "Thematic Proto-Roles and Argument Selection". In: *Language*, 67, 3, 547-619.
- Filip, H. 1989. "Aspectual Properties of the AN-Construction in German." In: Abraham, Werner and Theo Janssen (Eds.) *Tempus - Aspekt - Modus*. Tübingen: Max Niemeyer Verlag, pp. 259-292.
- Filip, H. 1992. "Aspect and Interpretation of Nominal Arguments." In: *Proceedings of the Twenty-Eighth Meeting of the Chicago Linguistic Society*. Chicago: The University of Chicago.
- Fillmore, Ch. J., Kay, Paul, and M. C. O'Connor. 1988. "Regularity and Idiomaticity in Grammar: The Case of *Let Alone*." In *Language*, Vol 64, No.4.

- Fillmore, Ch. J. and P. Kay. 1992. *On Grammatical Constructions*. Department of Linguistics, The University of California at Berkeley. ms.
- Garey, H. B. 1957. "Verbal Aspects in French". In: *Language* 33, pp. 91-110.
- Hinrichs, E. 1985. *A Compositional Semantics for Aktionsarten and NP Reference in English*. Ph.D. Thesis, Ohio State University.
- Hoepelman, J. Ph. 1981. *Verb Classification and the Russian Verbal Aspect: A Formal Analysis*. Tübingen: Gunter Narr Verlag.
- Isačenko, A. V. 1962. *Die russische Sprache der Gegenwart, Part I, Formenlehre*. Halle (Saale): Niemeyer.
- Jackendoff, R. S. 1990. "Parts and Boundaries". ms.
- Jakobson, R. 1936/71. "Beitrag zur allgemeinen Kasuslehre: Gesamtbedeutung der russischen Kasus". In: *Selected Writings*, vol. 2: *Word and Language*. The Hague-Paris, pp. 23-71.
- Karlsson, F. 1983. *Finnish Grammar*. Werner Söderström Osakeyhtiö: Porvoo, Helsinki, Juva.
- Krifka, M. 1986. *Nominalreferenz und Zeitkonstitution. Zur Semantik von Massentermen, Individualtermen, Aspektklassen*. Doctoral Thesis, The University of Munich, Germany. A revised version was published in 1989 by Wilhelm Fink Verlag München.
- Krifka, M. 1992. "Thematic Relations as Links between Nominal Reference and Temporal Constitution." In: Sag, I. A. and A. Szabolsci (Eds.), *Lexical Matters*, pp. 29-53.
- Lewis, D. 1975. "Adverbs of Quantification." In: E. L. Keenan (Ed.), *Formal Semantics of Natural Language*. Cambridge: Cambridge University Press.
- Link, G. 1983. "The Logical Analysis of Plurals and Mass Terms". In: Bäuerle, R., Ch. Schwarze and A. von Stechow (Ed.). *Meaning, Use, and Interpretation of Language*. pp. 302-323.
- Kučera, H. 1983. "A Semantic Model of Verbal Aspect." In: *American Contributions to the Ninth International Congress of Slavists, Kiev, September 1983, Volume 1: Linguistics*, Ed. Michael S. Flier. Columbus, Ohio, pp. 171-184.
- Partee, B. H. 1990. "Domains of Quantification and Semantic Typology." In: Ingeman, F. (Ed.) *Proceedings of the 1990 Mid-America Linguistics Conference*, University of Kansas.
- Partee, B., E. Bach, and A. Kratzer (1987) "Quantification: A Cross-Linguistic Investigation". NSF proposal, University of Massachusetts at Amherst (ms.).
- Pollard, C. and I. A. Sag. 1993. *Head-Drive Phrase Structure Grammar*. Chicago: Chicago University Press and Stanford: CSLI Publications.
- Shieber, S. M. 1986. *An Introduction to Unification-Based Approaches to Grammar*. Center for the Study of Language and Information. Stanford.
- Tommola, H. 1990. "On Finnish 'Aspect' in Discourse". In: Thelin, Nils B. (Ed.) *Verbal aspect in discourse*. Amsterdam/Philadelphia: John Benjamins Publishing Company. pp. 349-366.
- Vendler, Z. 1957. "Verbs and Times". In: *Philosophical Review*, 56, pp. 143-160.

AGREEMENT FEATURES:**Dutch and various stages of English vs modern English**

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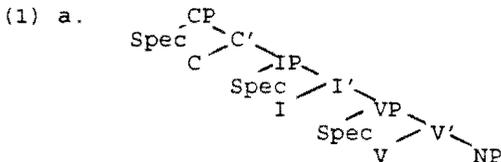
Introduction

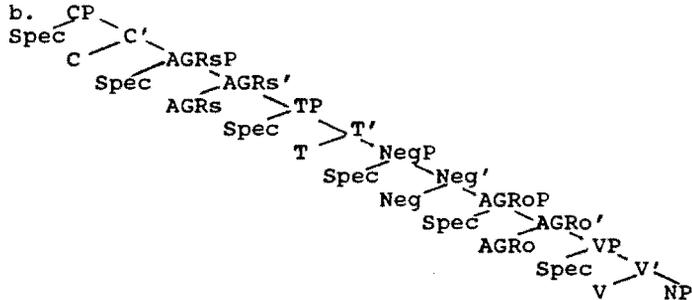
This paper is about AGRs (as introduced in Pollock 1989 and Chomsky 1989; 1992) and the agreement features responsible for nominative Case. I argue that there is no evidence for AGRs in Dutch or in the earlier stages of English. The agreement features must therefore be placed elsewhere. In English, they are placed in T, but in Dutch and older stages of English, they are placed in C or in V. This points to the presence of two UG parameters to be set in all languages: one about the presence or absence of functional categories and one about where (agreement) features are to be placed.

The paper is organized as follows. In 1, I sketch the background to AGRs and argue that there is evidence in modern English for just one functional category between C and Negation. I also provide evidence against the presence of more than one Specifier of a functional category between C and Neg. In 2, I examine the position of the features if no AGRs node is available. I will argue, along the lines of Koopman and Sportiche (1991) that there are two different kinds of structural Case, one comes about through Spec-Head Agreement and the other one is assigned under government. In 3, I explore the evidence for these two kinds of Case.

1. Evidence against the AGRs node (in addition to T):

The sentence structure in Chomsky (1986), i.e. as in (1a), in which only C and I(nflection) appear as functional categories, is much less elaborate than the one in Chomsky (1992), i.e. (1b), in which many functional categories appear:





Evidence for the I position, i.e. for one functional category between C and VP, can be found in, for instance, Akmajian, Steele and Wasow (1979). It is quite clear in English that modals, do and to are in a separate category because (a) they remain when the VP is deleted and preposed and (b) modals, to and do are in complementary distribution. There is other evidence which I will not go into here. Neither will I examine the status of Neg and AGRO in this paper. The emphasis will be on AGRs.

In Chomsky (1989), it is suggested that postulating AGRs as well as T eliminates the odd dual function of I, i.e. as a holder for tense as well as agreement features. There is no actual empirical evidence for English. The advantage of assuming AGRs (and AGRO) is that it is then possible to regard "structural Case as an expression of the SPEC-Head relation, with the head being AGR and the NP with Case in the SPEC-AGR position" (Chomsky 1989: 5). The same Spec-Head relation would hold if the agreement features were placed in T, however.

There is empirical evidence against an AGRs in addition to a T-position because only one position in which verbal material occurs exists between C and the element expressing sentential negation as in (2):

- (2) *He may have not been seen.

In (2), both may and have are situated before not and the sentence is ungrammatical.

If only one functional category exists in (2), it can be expected that this functional category will have a specifier, but not two specifier positions. This is indeed the case as is shown in (3) and (4):

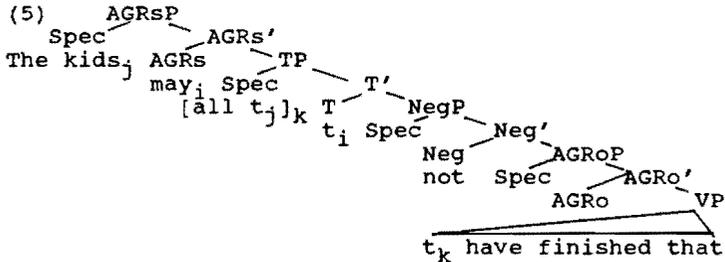
- (3) *The kids might all not go there.
 (4) *The kids may all yesterday have gone there.

Following Koopman and Sportiche (1991), sentences such as

(3) have a deep-structure as in (3'):

(3') e might not [all the kids] go there.

All the kids must move out of VP leaving all behind in positions that it itself moves away from. The derivation of (3) is shown in (5):



Sentences such as (3) and (4) are ungrammatical which is unexpected if there were two specifier positions as in (5). These data, therefore, provide evidence that there is only one specifier position. I will call this specifier Spec TP, but it might as well be called Spec AGRsP or Spec IP as in Chomsky (1986).

Assuming languages exist where AGRs is present, the consequence for Universal Grammar is that, even though some languages may employ an AGRs, not all languages need to. Thus, a Parameter as in (6) can be formulated:

(6) Subject Agreement Parameter: +AGRs/AGRsP.

If AGRs is not present, the features will be placed elsewhere. This I discuss in the sections that follow.

2. Agreement Features and Nominative

2.1 Features on C in English

Assuming there is no AGRs in English, the agreement features are in T and Spec-Head Agreement between the subject in Spec TP and the agreement features in T would account for nominative Case and verbal agreement. There are some dialects of English that indicate that agreement features may be in C. This shows that such features are not always in one position: they 'float'. Kimball and Aissen (1971) describe such a dialect in which relative clauses as in (7) and (8) are well-formed but those as in (9) are not:

(7) The people who the boy **think** t are
in the garden.

- (8) The people who the boy **think t** the girl **know**
t are in the garden.
- (9) *The people who t think that John **know**
the answer.

In (7) and (8), the nominative plural wh-element agrees with the verb of a higher clause. This can be accounted for if the agreement features are in C and the wh-element moves cyclically through Spec CP and Spec-Head agreement occurs. Sentence (9) shows that this type of agreement only takes place if the wh-element indeed moves through the relevant Spec CP.

2.2 Features on C or V

I have argued elsewhere (e.g. van Gelderen 1989) that there is no evidence in Dutch for a T position: modals behave like main verbs. There is no comparable do and te 'to' is not in a node separate from the VP (because VP-deletion deletes te as well, because split infinitives do not occur, and because accusatives-with-infinitives which involve a TP analysis are not present). Thus, if there is no evidence for even one functional category, there is no need to look for confirmation for two such categories.

If there is neither a T nor an AGRs in Dutch, where are the agreement features placed? I will argue they are placed in either C or V. The subject in an active sentence must be adjacent to the Complementizer in most varieties of Dutch. This can be accounted for if the agreement features are in C (cf. also Koopman 1984: 207ff). Thus, (10) is ungrammatical because gisteren 'yesterday' appears between dat and the subject Ingrid. Sentence (11) is the correct version:

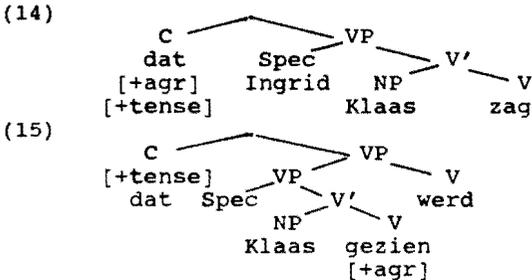
- (10) *dat gisteren Ingrid Klaas zag,
'that yesterday Ingrid Klaas zag'.
(11) dat Ingrid gisteren Klaas zag
'that Ingrid yesterday Klaas saw'.

In passive sentences (and others where the subject originates as an 'object'), the nominative subject need not be adjacent to the complementizer as (12) shows in which mijn oom 'my uncle' separates the subject deze boeken 'these books' from dat:

- (12) dat mijn oom deze boeken toegestuurd zijn,
'that my uncle these books sent are'.
(13) dat deze boeken mijn oom toegestuurd zijn,
'that these books my uncle sent are'.

Den Besten (1985) accounts for these constructions by

means of a complicated system of assigning Case inside the VP. I will account for it by arguing that agreement is either in C or in V. If it is in C, the element that needs to be assigned nominative must be adjacent to C as in (14), the structural representation of a sentence such as (11) and (13) where the subject adjoins to VP. If the features are placed in V, the sentence would be ungrammatical because the subject is not governed by V. In a passive sentence, the 'subject' is governed by the Verb because it is the original object. In this way, the features could be either on C as in (11), shown in (14) or on V as in (12), shown in (15):



Confirmation for (14) and (15) can be found in preposing. If the subject is still part of the VP, it should be able to prepose when the VP preposes. This is indeed the case with passives as in (16), but not with actives as in (17):

- (16) [Boeken gegeven] werden hem,
'Books given were him'.
(17) *[Hij gezien] heeft een boek,
'He seen has a book',
i.e. 'Seen a book he has'.

The implication of this move for Universal Grammar can be formulated as follows:

- (18) Feature Parameter: agreement features must be situated in a functional node (C, T, etc) or be on V.

I will now show that agreement features are on C or V in older versions of English as well.

3. Structure of the VP¹

Older versions of English are like Dutch in that their agreement features appear on C or V. There is a

difference though in that in Dutch, only certain subjects receive nominative from V, namely those subjects that originate as 'objects' but that in Old and Middle English, regular subjects receive Case in VP as well. The argument I use is based on double negatives (or negative concord) which indicate that the VP is 'flat', i.e. without a Specifier position. This fits with Fukui (1986).

In many of the languages displaying double negatives, one negative must c-command the other. This seems to be true in early Middle English as well. The sentences in this section are taken from Layamon's Brut, written in the thirteenth century. They show that ne (or its prefix) c-commands the negative constituent:

- (19) Layamon, Brut, Caligula 8096
 Ne mihten þer na cniht ... makien fiht,
 'Not might there no knight make a fight'.
 (20) l. 8209 Nulle ich na more fleon,
 'Not want I no more to flee'.
 (21) l. 8510 ne recche ich noht his landes.
 his seoluer no his goldes...,
 'Not ruled I nothing his land,
 his silver, nor his gold'.

Yet, there are many cases where the ne does not seem to c-command the negative constituent:

- (22) l. 395 þat nan ne beo so wilde,
 'that none not is so wilde'.
 (23) l. 4700 7 nauere seoððen heo ne aras,
 'and never since then they not arose'.
 (24) l. 6449 þat heore fader na lengere
 ne moste libben,
 'that her father no longer not must live'.

These are all instances where V-to-C movement does not take place and the Verb as well as the negation stay in their original positions. Assuming c-command by ne is necessary, it seems as if the negation in e.g. (22) has scope over nan. This means the subject must be sister to V as in:

- (25)
- ```

 CP
 / \
 XP C'
 / \
 C NP
 / \ / \
 pat nan V'
 / \
 neg-V
 ne beo

```

A structure as in (25) is possible because, as argued in section 3, agreement features may be on V. The

difference between Dutch and older versions of English lies in the structure of the VP: in Dutch, a Specifier is present in Old and Middle English, it is not.

Thus, in Dutch the subject in a regular active sentence must be adjacent to the C, but in Old and Middle English, it need not. This fits with the fact that topicalization in subordinate clauses occurs (cf. Allen 1977: 52ff) which causes the subject to no longer be adjacent to C:

- (26) 1. 953 ah **na-wiht** he hit **ne** mende,  
'but nothing/not at all he it not softened'.

In (26), he gets Case from mende since the agreement features are on V; they are on C in (22).

#### 4. The contents of agreement features and Case

In this section, I discuss the contents of the features and the differences between the Dutch and English nominative Case systems. I also argue tentatively that these two might be related: the more agreement (and Case), the less use there is for (structural) Spec-Head agreement.

##### 4.1 Agreement features

For English, Kayne (1991) has argued that only number features are marked. He argues that the third person -s can be considered as singular and all the others as plural. The same cannot be said for Dutch. In Dutch, verbal endings display both number and person:

- |      |             |              |
|------|-------------|--------------|
| (27) | ik ga       | 'I go'       |
|      | jij gaat    | 'you(sg) go' |
|      | hij gaat    | 'he goes'    |
|      | wij gaan    | 'we go'      |
|      | jullie gaan | 'you(pl) go' |
|      | zij gaan    | 'they go'    |

One cannot argue that gaat in (27) is singular and the others (ga and gaan) are plural because there are too many forms.

There is some evidence (cf. van Gelderen 1992) that Dutch has gender as well as person and number: het 'it' is an element that is third person masculine but it is underspecified for number which it must get from a person/gender-compatible postverbal NP. Hence, (28ab) are grammatical, but (28cde) are not:

- (28) a. Els weet dat het hem was,  
'Els knows that it him was'.  
b. Els weet dat het hun waren,



and (33)).

How can the feature content be related to the type of Case assigned? It might be possible to argue that if the features are strong, Case assignment by government can occur, otherwise, it must occur through Spec-Head agreement. This would be similar to the relation between weakening of Case endings in Old English and the introduction of structural (rather than inherent) Case.

### Conclusion

I have argued that AGRs does not exist in either Dutch or English. If there is no automatic position for agreement features, a position must be selected. Thus, there seems to be a parameter that agreement features will be placed on T, C or V. I indicate that C and V are used for this purpose in Dutch and older versions of English. I show that this Case assignment is different from that brought about through Spec-Head agreement. Finally, I argue that Old English has no Spec VP.

### Notes

<sup>1</sup>I have used of the Oxford Text Archive's computer-readable version of Layamon as well as TACT.

### Bibliography

Texts used:

- Brook, G. L. and R. F. Leslie (eds), Layamon: Brut, Oxford: OUP, 1963 edition of EETS 250.

Linguistic references:

- Akmajian, A., S. Steele and T. Wasow (1979), "The category of AUX in Universal Grammar", Linguistic Inquiry 10.1: 1-64.

- Allen, C. (1977), Topics in English Diachronic Syntax, UMass PhD.

- Besten, H. den (1985), "The Ergative Hypothesis and Free Word Order in Dutch and German", in Studies in German Grammar, J. Toman (ed), Dordrecht: Foris.

- Chomsky, N. (1986), Barriers, Cambridge: MIT Press.

- Chomsky, N. (1989), "Some Notes on Economy and Derivation", MITWPL 10.

- Chomsky, N. (1992), "A Minimalist Program for Linguistic Theory", MIT Occasional Papers in Linguistics 1.

- Fukui, N. (1986), A Theory of Category Projection and its Applications, MIT PhD.

- Gelderen, E. van (1989), "The Rationale behind Split Infinitives", Archiv für das Studium neueren Sprachen und

Literaturen 141: 1-18.

- Gelderen, E. van (1992), "Arguments without number: the case of it and het", Linguistics 30: 381-7
- Kayne, R. (1991), "Agreement and Verb Morphology in Three Varieties of English", talk, Stuttgart Workshop on Comparative Germanic Syntax.
- Kayne, R. (1992), "Word Order", talk, GLOW.
- Kimball, J. and J. Aissen (1971), "I think, you think, He think", Linguistic Inquiry 2.2: 241-6.
- Koopman, H. (1984), The Syntax of Verbs, Dordrecht: Foris.
- Koopman, H. and D. Sportiche (1991), "The position of Subjects", Lingua 85: 211-58.
- Pollock, J.-Y. (1989), "Verb Movement, UG and the Structure of IP", Linguistic Inquiry 20.3: 365-424.

SPEC-head Agreement as the Motivation for NP-movement  
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In current syntactic theory, there is a basic difference between processes like wh-movement and head-to-head movement on the one hand, and NP-movement on the other. In the former, movement is often said to occur because of properties of the landing site. Thus with wh-movement, the wh-phrase must move to SPEC of CP in order to satisfy the SPEC-head agreement requirement of WH in C, as in Rizzi's WH-Criterion (Rizzi 1991). With head-to-head movement, such as V-to-I movement, V moves to I because I is unable to stand on its own morphologically. With NP-movement, on the other hand, movement does not occur because of any special requirement of the landing site, but because the moved NP is unable to get Case in its D-structure position.

I will argue here that this current view is incorrect and that NP-movement is more similar to wh-movement and head-to-head movement than usually imagined. Specifically, I will suggest that NP-movement occurs not because the NP necessarily lacks Case in its D-structure position, but because of an abstract agreement requirement on I that requires that some lexical NP occupy SPEC of IP. My evidence will come from the passive construction, although the results are extendable to other types of NP-movement as well.

### I. Chinese

I begin by examining the passive construction in Mandarin Chinese, and I will show that it is impossible to give a consistent characterization of the passive morpheme in this language in terms of Case. The passive construction in Mandarin, an example of which is given in (1b), bears some important similarities to its counterpart in English.

- (1)a. Wo dasile Zhangsan.  
I kill-ASP Zhangsan  
'I killed Zhangsan.'  
b. Zhangsan bei wo dasile.  
Zhangsan PASS I kill-ASP  
'Zhangsan was killed by me.'

First, the subject position is clearly a non- $\theta$  position, as evidenced by the fact that idiom chunks may appear there:

- (2)a. Wo bu xihuan kai zheige dao. (from Li (1990))  
 I not like open this knife  
 'I don't like to do this operation.'  
 b. Zheige dao bei ta kai-huai le.  
 this knife PASS he open-bad ASP  
 'This operation was done badly by him.'

The sentence in (a) is active and contains a VP idiom, while (b) is passive and has the object chunk of the VP idiom in subject position.

Second, the passive morpheme seems to trigger Case absorption, since the object must move into subject position, as seen in (3).

- (3) \*Bei wo dasile Zhangsan.  
 PASS I kill-ASP Zhangsan  
 'It was killed Zhangsan by me.'

In addition, passives of intransitives are disallowed, as seen in (4).

- (4) \*Bei (wo) zoule.  
 PASS I leave-ASP  
 'There/it was left (by me).'

Chinese passives differ from the English ones, though, with regard to sentences such as (5).

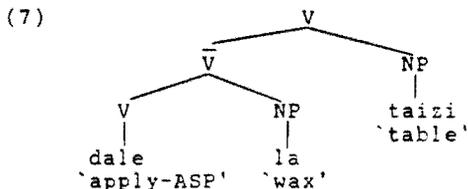
- (5)a. Taizi bei ta dale la.  
 table PASS he apply-ASP wax  
 'He applied wax to the table.'  
 b. Xuesheng bei laoshi ganchule xuexiao.  
 student PASS teacher force-leave-ASP school  
 'The teacher expelled the student from school.'  
 c. Wuge mantou bei ta chile liangge.  
 five roll PASS he eat-ASP two  
 'He ate two out of the five rolls.'

In these examples, the apparent direct objects la 'wax', xuexiao 'school', and liangge 'two' are to the right of the verbs (as in an active sentence), while other NP's, taizi 'table', xuesheng 'student', and wuge mantou 'five rolls', occupy the subject position. The sentences exemplify what is usually known as the "retained object construction" in Mandarin Chinese (see Lü (1948) and Thompson (1973)).

What is perhaps even more surprising about the above sentences is that there is no corresponding active version, as shown in (6).

- (6)a. \*Ta dale la taizi.  
 he apply-ASP wax table  
 a'. \*Ta dale taizi la.  
 he apply-ASP table wax  
 b. \*Laoshi ganchule xuexiao xuesheng.  
 teacher force-leave-ASP school student.  
 b'. \*Laoshi ganchule xuesheng xuexiao.  
 teacher force-leave-ASP student school  
 c. \*Ta chile liangge mantou wuge.  
 he eat-ASP two roll five  
 c'. \*Ta chile wuge mantou liangge.  
 he eat-ASP five roll two

Despite this, there is some evidence that the surface subject in (5) originates as an object, along the lines of (7) (see Thompson (1973), Huang (1982)).



This "outer" object (*taizi* in (7)) must move, which is what we saw in (6). One possible explanation for this obligatory movement is that there is a surface X'-filter which allows head-initial structures only at the lowest level expansion, as proposed in Huang (1982). Another possibility is that the verb is only able to assign one Case, which goes to the first object, leaving the outer object no recourse but to move in order to get Case. I will not try to decide this issue here, but will simply assume that for whatever reason the outer object must move from its D-structure position.

What really matters for our purposes is the fact that the inner object continues to receive structural Case from the verb. This is evidenced by the fact that this NP may be preposed by means of the *ba*-construction, as shown in (8).

- (8) Taizi bei ta ba la dale.  
 table PASS he BA wax apply-ASP  
 'He applied wax to the table.'

Here *la* 'wax' appears to the left of the verb, preceded by *ba*. (8) would not be possible if *la* were incorporated into the verb, so this NP must be licensed

in (5) by virtue of being assigned Case, most plausibly by the verb (just like an ordinary object).

We can now see that there is a serious problem in trying to account for the Chinese passive by means of Case. With the regular passive in (1), Case absorption is obligatory and so the direct object must move (see (3)). With the retained object passive in (5), on the other hand, Case absorption does not occur. Given that identical morphology is involved in each type, it is impossible to give a consistent lexical specification of the Case properties of the passive morpheme. What the two types of passive have in common is in fact not Case, but movement.

We thus seem forced to conclude that the passive morpheme is lexically specified to require movement into the subject position, thus yielding a unified treatment of both regular and retained object passives. One way of implementing this idea is to say that the passive morpheme requires I to agree with a lexical NP in its SPEC.

## II. Kannada

Suppose now that it is universally true that NP-movement (at least for passives) occurs in order to satisfy an abstract SPEC-head agreement requirement. Since this requirement is imposed by a particular morpheme (i.e. the passive morpheme), we then predict that such morphemes will vary as to whether they require agreement at S-structure or at LF (i.e. before or after spell-out, in the system of Chomsky (1992)). In like fashion, *wh*-movement in some analyses occurs either at S-structure or LF because of the properties of the *wh*-morpheme in C, and V-to-I movement occurs either at S-structure or LF depending on the properties of I.

In languages like English and Chinese, the passive morpheme clearly requires agreement at S-structure, so we see overt movement of a lexical NP into SPEC of IP. If a passive morpheme were to require only LF-agreement, then of course we would see no such movement. I claim that this is precisely the property of the passive morpheme *agu* in the Dravidian language Kannada. Examples of a typical active and passive sentence are given in (9) (data in this section are from Cole and Sridhar (1976), Siewierska (1984), and Sridhar (1980)).

- (9)a. Krishna- $\emptyset$ -nu Rama-nannu kond-an-u.  
 Krishna-nom-3s Rama-acc-3s kill-3s-past  
 'Krishna killed Rama.'  
 b. Rama-nannu kollalayitu.  
 Rama-acc:3s kill:pass:past  
 'Rama was killed.'

In the active version in (a), we see that this is an SOV language with overt case-marking. In the passive version in (b), notice that the object continues to receive accusative case, thus suggesting that it remains in object position. No overt movement occurs, just as would be expected of an LF-agreement requirement. How can we tell that movement does occur at LF? What shows this is the fact that there must be an object NP in this construction. In other words, passives of intransitives are disallowed, as shown in (10).

- (10)a. Magalu- $\emptyset$  hadid-al-u  
 daughter-nom sing-3s-past  
 'The daughter sang.'  
 b. \*Hadalayitu.  
 sing:pass:past  
 'There/it was sung.'

Here there is no way that the agreement properties of the passive morpheme can be satisfied. In (9), in contrast, the object is available for movement at LF, thus satisfying the agreement requirement.

We can see, then, that the hypothesis that NP-movement is forced by SPEC-head agreement makes exactly the right predictions. We expect some passive morphemes to require S-structure agreement and others to require LF-agreement and as we have seen, these two types are exemplified by passives in English/Chinese and Kannada. This variation is not expected under a Case-based account. If we say that the passive morpheme does not trigger Case-absorption, as (9b) would seem to show, we then have no explanation for the ungrammaticality of (10b).

It should be emphasized that the level at which SPEC-head agreement is required is a property of the individual morpheme, not the language. Thus Kannada, whose passive morpheme *agu* requires LF-agreement, also contains the passive morpheme *padu*, which seems to require S-structure agreement, as seen in (11).

- (11) Krishnanu-indu Ramu- $\emptyset$  ko-pattu-nu.  
 Krishna-3s-inst Rama-nom kill-pass-past  
 'Rama was killed by Krishna.'

Here we see overt movement, just as in Chinese and English.

### III. Typology

Let us now examine in more detail the nature of the agreement that I am assuming motivates NP-movement. We have seen two types so far, but both have required agreement, in the sense that the morpheme in I can only be satisfied if a lexical NP occupies SPEC of IP. In English/Chinese the morpheme can only be satisfied at S-structure, and with Kannada agu only at LF. Following Chomsky's (1992) principle of "procrastinate", the lexical NP in Kannada will only move when it needs to, i.e. at LF and not at S-structure.

Another type of morpheme we would expect to find is one which may be satisfied whether there is agreement with a lexical NP or not. Let us call this optional agreement. The effect of this type of agreement would be that movement is allowed, but not required. This predicted type of passive morpheme is in fact found in Nepali. Examples of ordinary transitive clauses in this language are given in (12). (data from Bandhu (1973)).

- (12)a. Ram-le hxri-lai kut'-io.  
 Ram-NOM Hari-ACC hit-3ps+past  
 Ram hit Hari.  
 b. Tes-le mx-lai kut'-io.  
 he-NOM me-ACC hit-3ps+past  
 He hit me.

Notice that the object is overtly marked with accusative case. When the passive morpheme i is added to the verb, both sentences in (13) are possible:

- (13)a. Tx' kut'-i-is  
 you hit-PASS-2ps+past  
 'You were hit.'  
 b. Tx'-lai kut'-i-io.  
 you-ACC hit-PASS-3ps+masc+past  
 'It was hit you.'

In (a), the lack of accusative case and the agreement on the verb suggest that tx' 'you' has moved into SPEC of IP. In (b), the presence of accusative case and the third person agreement on the verb suggest that tx' has remained in object position. These two sentence types are exactly what we would expect of a passive morpheme with optional agreement. In addition, since agreement is not required, passives of intransitives are also

possible, as shown in (14).

- (14) Ha's-i-io.  
 laugh-PASS-3ps+masc+past  
 'It was laughed.'

The same morpheme is involved in both (13) and (14).

Now imagine a passive morpheme which has optional agreement, but at LF rather than at S-structure. The result should look just like Nepali, except that (13a), in which there is overt movement, should not be possible. Such a passive morpheme is exemplified by Finnish tään. This morpheme may appear with both transitive and intransitive verbs, as shown in the (b) examples of (15) and (16) (data from Comrie (1975, 1977), Siewierska (1984)).

- (15)a. Maija söi sen.  
 Maija:nom eat:3s it:acc  
 'Maija ate it.'  
 b. Syötiin sen.  
 eat:pass.part it:acc  
 'It was eaten.'  
 (16)a. Me elämme hauskasti täällä.  
 we:nom live-pres:1pl pleasantly here  
 'We live pleasantly here.'  
 b. Täällä eletään hauskasti.  
 here live:pass.part pleasantly  
 'It is lived pleasantly here.'

In (15b), the object *sen* 'it' continues to receive accusative case, suggesting that there is no movement. Nominative case on this pronoun is disallowed, again as would be expected in the absence of overt movement.

We have now seen examples of required agreement and optional agreement, both at S-structure and LF, yielding four distinct types of passive morphemes, all of which are attested. It should also be possible to have a passive morpheme which has one type of agreement at S-structure and another at-LF. There are three possible combinations, but only one of them yields a result which is distinguishable from the passives we have already seen. This combination is required agreement at S-structure and optional agreement at LF. The result will be that if there is an available lexical NP, it will be required to move into SPEC of IP at S-structure. If there is no such NP, however, the morpheme can still be satisfied at LF because at that level, no agreement is required. This exactly describes the passive in German, where passives of transitives require movement, as in English and

Chinese, but where passives of intransitives are also possible, as in (17).

- (17) Es wurde getanzt.  
 it was dance+part.  
 'It was danced.'

In (17) the passive morpheme does not get satisfied at S-structure, but it does at LF, so the sentence is acceptable. In languages like English and Chinese, the morpheme would not be satisfied at either level.

We now have the following typology of passive morphemes with regard to agreement:

| (18) | <u>S-structure</u> | <u>LF</u> | <u>example</u>          |
|------|--------------------|-----------|-------------------------|
| a.   | required           |           | English, Chinese        |
| b.   |                    | required  | Kannada ( <u>agu</u> )  |
| c.   | optional           |           | Nepali                  |
| d.   |                    | optional  | Finnish ( <u>tään</u> ) |
| e.   | required           | optional  | German                  |

There is an interesting lack of symmetry in the types of languages predicted in (18). We know there are passive morphemes like Kannada agu which do not induce overt movement but which only occur with transitive verbs. A priori, we should then expect to find a passive morpheme which occurs only with intransitive verbs. However, it strongly appears that no such morpheme exists in any language. We have seen passive morphemes which appear with both transitive and intransitive verbs, and with just transitives, but nothing that appears just with intransitives. This asymmetry can be expressed as an implicational universal: if a morpheme allows passives of intransitives, it also allows passives of transitives.

Why should this asymmetry exist? The reason is that it is impossible with the system developed here for a passive morpheme to be restricted just to intransitives. The closest we could come would be to say that the passive morpheme does not require agreement. This would then include passive of intransitives, since in fact intransitives have no NP with which to satisfy agreement, but it would also include passives of transitives, since as long as the object remains in place there will be no agreement. There is no way to prevent transitives from being included here. The asymmetry under discussion thus follows directly from the hypothesis that NP-movement occurs because of agreement.

#### IV. Other types of NP-movement

Let us now address the question of whether this way of inducing movement through agreement can be extended to other types of NP-movement. I will show here very briefly that although there appear to be no empirical advantages to handling other types of NP-movement this way, it does reveal a very striking parallel between passive morphemes on the one hand, and unaccusative and raising verbs on the other.

Consider first unaccusative verbs. If they indeed have properties analogous to those of passive morphemes, then we should find some which require agreement at S-structure, others for which it is optional at S-structure, and still others which have agreement only at LF or not at all. These three types of unaccusatives in fact seem to exist, as shown in (19).

| (19) | <u>agreement</u>        | <u>example</u>             |
|------|-------------------------|----------------------------|
| a.   | required at S-structure | English unaccusatives      |
| b.   | optional at S-structure | most Spanish unaccusatives |
| c.   | LF/none                 | Spanish <u>haber</u>       |

English unaccusatives generally exemplify type (a) in that the object must move into subject position, and Spanish unaccusatives generally exemplify type (b) in that such movement is optional. The Spanish verb haber is probably of type (c), since the single argument of this verb appears to receive accusative Case, thus implying that it does not move into subject position. This may be seen in (20), where this argument shows up as an accusative clitic.

(20) Los hay en el salón.  
 them exist in the room  
 'There are some/them in the room.'

Raising predicates also fall into the above three types, as shown by the English examples in (21).

| (21) | <u>agreement</u>        | <u>example</u>  |
|------|-------------------------|-----------------|
| a.   | required at S-structure | <u>bound</u>    |
| b.   | optional at S-structure | <u>likely</u>   |
| c.   | LF/none                 | <u>probable</u> |

This corresponds to the traditional classification of predicates into those that require raising ((a)), those that allow it ((b)), and those that prohibit it ((c)).

### V. Conclusion

There remain many important issues which still need to be explored, but we have seen here that there are some significant and compelling advantages to treating NP-movement in the passive (and possibly elsewhere) in terms of a SPEC-head agreement requirement.

### Footnote

1. Languages like Ukrainian (see Sobin (1985) and Goodall (in press)), which allow sentences like (13) but not (14), can be accounted for by saying that the passive morpheme requires agreement either at S-structure or LF.

### References

- Bandhu, Churamani: 1973, 'Clause patterns in Nepali', in A. Hale and D. Watters (eds.), Clause, Sentence, and Discourse Patterns in Selected Languages of Nepal, Part II, Clause, Summer Institute of Linguistics, University of Oklahoma, Norman, pp. 1-79.
- Chomsky, Noam: 1992, 'A minimalist program for linguistic theory', MIT Occasional Papers in Linguistics, number 1.
- Cole, Peter and S. N. Sridhar: 1976, 'Clause Union and Relational Grammar: evidence from Hebrew and Kannada', Studies in the Linguistic Sciences 6, 216-227.
- Comrie, Bernard: 1975, 'The Antiergative: Finland's Answer to Basque', Papers from the Eleventh Regional Meeting of the Chicago Linguistic Society, 112-121.
- Comrie, Bernard: 1977, 'In defense of spontaneous demotion: the impersonal passive', in P. Cole and J. Sadock (eds.), Syntax and Semantics, volume 8, Academic Press, New York, pp. 47-58.
- Goodall, Grant: In press, 'On Case and the passive morpheme', Natural Language and Linguistic Theory
- Huang, C.-T. James: 1982, Logical Relations in Chinese and the Theory of Grammar, Doctoral dissertation, MIT, Cambridge.
- Li, Yen-Hui Audrey: 1990, Order and Constituency in Mandarin Chinese, Kluwer, Dordrecht.
- Lü, Xiang: 1948, 'Ba zi yong-fa yanjiu', Zhongguo Wenhua Yanjiu Huikan 8, 111-130.
- Rizzi, Luigi: 1991, 'Residual Verb Second and the WH-Criterion', Technical Reports in Formal and Computational Linguistics, number 2, Université de Genève.

- Siewierska, Anna: 1984, The Passive: A Comparative Linguistic Analysis, Croom Helm, London.
- Sobin, Nicholas: 1985, 'Case assignment in Ukrainian morphological passive constructions', Linguistic Inquiry 16, 649-662.
- Sridhar, S. N.:1980, 'New evidence for spontaneous demotion', International Journal of Dravidian Linguistics 8, 312-322.
- Thompson, Sandra: 1973, 'Transitivity and the ba construction in Mandarin Chinese', Journal of Chinese Linguistics 1, 208-221.

## THE RESIDUE AS A DOMAIN FOR STRESS ASSIGNMENT

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Virtually all generative theories of stress assignment make use of the concept of extrametricality (henceforth, *EM*). This device, which was first proposed in Hayes 1979, is the exclusion of some peripheral element, typically either a syllable, mora or segment, from the domain of stress assignment. Although the need for such a notion has been clearly demonstrated (e.g., Hayes 1981, 1982, Inkelas 1989), its application has in some cases been rather unconstrained. For example, Halle and Vergnaud 1987 (henceforth, *H&V*) allow the effect of *EM* to be overridden by the presence of lexical accent in Macedonian, and *H&V* include an unprecedented *EM* rule in Polish; both situations are discussed below. In contrast, this study argues, based on the theory of Inkelas 1989, that lexical accent cannot override *EM* under any circumstance. Independent evidence for this claim is presented from Guarijío, a Uto-Aztecan language of northern Mexico.

I begin with a review of *H&V*'s analysis of stress in Macedonian and Polish, followed by Hammond's 1988 critique of their proposal. A new set of analyses is then proposed based on Hagberg's 1992 claims that (i) stress and metrical structure are logically independent of one another and (ii) stress is an autosegment. Further support for this approach is presented from the stress systems of Guarijío and a related language, Tarahumara. It is argued that the autosegmental analyses of Polish and Macedonian are superior to those of *H&V*.

1. *H&V*'S ACCOUNT OF STRESS IN MACEDONIAN AND POLISH. Macedonian has only one stress per word. Stress is quantity insensitive and normally falls on the antepenultimate syllable, as illustrated in the following data from Lunt 1952. Notice that stress is initial if there are less than three syllables.

|                  |         |               |         |
|------------------|---------|---------------|---------|
| (1) (a) vodéniča | mill    | (b) vodéničar | milller |
| (2) (a) ráбота   | work    | (b) pólkovnik | colonel |
| (3) (a) véčer    | evening | (b) zbor      | word    |

Although most words have the above stress pattern, a few words exhibit exceptional stress on the penultimate or final syllable. The following examples are from Comrie 1976 and Franks 1983.

- (4) (a) *literatúra* *literature* (b) *citát* *quotation*  
 (5) (a) *komunizam* *communism* (b) *autobús* *bus*  
 (6) (a) *konzumátor* *consumer* (b) *restorán* *restaurant*

H&V's analysis of Macedonian stress is as follows.

- (7) (a) Mark the final syllable EM if unaccented.  
 (b) Line 0 parameter settings are [+bounded, left-headed, right to left].  
 (c) Construct constituent boundaries on line 0.  
 (d) Locate the heads of line 0 constituents on line 1.  
 (e) Line 1 parameter settings are [-bounded, right-headed].  
 (f) Construct constituent boundaries on line 1.  
 (g) Locate the heads of line 1 constituents on line 2.  
 (h) Conflate lines 1 and 2.

Steps (b)-(d) build maximally binary, left-headed feet from right to left; steps (e)-(g) build an unbounded right-headed constituent on top of the heads of feet. Conflation (step h) has the effect of eliminating all but the rightmost stress. These steps are illustrated below for a word with regular antepenultimate stress.

|                   |                |                   |
|-------------------|----------------|-------------------|
| (8) <u>Input:</u> | <u>Step a:</u> | <u>Steps b-d:</u> |
| * * * *           | * * * < * >    | * * *             |
| vodeniča          | vodeniča       | (*) (* *) < * >   |
|                   |                | vo deni ča        |
| <u>Steps e-g:</u> | <u>Step h:</u> | <u>Output:</u>    |
| * *               | * *            |                   |
| (*) (* *) < * >   | (. *)          |                   |
| vo deni ča        | * (* *) < * >  | vodéniča          |

In order to derive the exceptional forms, H&V assume the presence of a lexical accent on the syllable that surfaces with stress. This is illustrated in (9) and (10) for words with penultimate and final stress, respectively.

|                   |                |                   |
|-------------------|----------------|-------------------|
| (9) <u>Input:</u> | <u>Step a:</u> | <u>Steps b-d:</u> |
| * * * *           | * * * < * >    | * * *             |
| konzumator        | konzumator     | (*) (*) (*) < * > |
|                   |                | konzu ma tor      |

|                    |                   |                   |
|--------------------|-------------------|-------------------|
| <u>Steps e-g:</u>  | <u>Step h:</u>    | <u>Output:</u>    |
| *                  | *                 |                   |
| (*   *)            | (.   *)           |                   |
| (* *) (*) <*>      | * * (*) <*>       |                   |
| konzu ma tor       | konzu ma tor      | <i>konsumátor</i> |
| (10) <u>Input:</u> | <u>Step a:</u>    | <u>Steps b-d:</u> |
| *                  |                   | *                 |
| *   *   *          | Blocked by Accent | (* *) (*)         |
| restoran           |                   | resto ran         |
| <u>Steps e-g:</u>  | <u>Step h:</u>    | <u>Output:</u>    |
| *                  | *                 |                   |
| (*   *)            | (.   *)           |                   |
| (* *) (*)          | * * (*)           |                   |
| resto ran          | resto ran         | <i>restorán</i>   |

Next, I review the facts of main stress in Polish. Stress is quantity insensitive and occurs in most cases on the penultimate syllable, as illustrated in the following data from Comrie 1976, Franks 1983, 1985 and Rubach and Booij 1985. Notice that the pattern of penultimate stress is preserved under suffixation.

- (11) *hipopótam* *hippopotamus* (NOM) *hipopotám-a* (GEN)  
 (12) *repórter* *reporter* (NOM) *reportér-ski* (ADJ, NOM)  
*reporter-ówi* (DAT)

Rubach and Booij 1985 (and Hammond 1988) note that there are two classes of exceptions to the above stress pattern, and they cite numerous examples of stems belonging to each class. Stems from the first class, which is exemplified in (13), exhibit penultimate stress in their unsuffixed form, antepenultimate stress when they contain a single suffix, and penultimate stress when they contain two or more suffixes.

- (13) Class I Exceptional Stress:  
 (a) *gramátyk* *grammar* (GEN PL)  
 (b) *gramátyk-a* (NOM SG)  
 (c) *gramatyk-á-mi* (INST PL)

Stems from the second class, which is exemplified in (14), exhibit antepenultimate stress in their unsuffixed form and penultimate stress when they contain one or more suffixes.

- (14) Class II Exceptional Stress:  
 (a) *uniwérsytet* *university* (NOM SG)  
 (b) *uniwersytét-u* (GEN SG)  
 (c) *uniwersytet-á-mi* (INST PL)

Hammond 1988 points out that none of these suffixes are lexically marked, as evidenced by the following forms. Notice that all of the (a) forms in (15) through (17) are *NOMINATIVE SINGULAR*, whereas all of the (b) forms are *GENITIVE SINGULAR*. Nevertheless, the distribution of stress cannot be predicted from inflection. In (15), both the (a) and the (b) forms have antepenultimate stress. In (16), however, the (a) form has antepenultimate stress while the (b) form has penultimate stress, and the situation is reversed in (17).

|      |                    |                    |            |
|------|--------------------|--------------------|------------|
|      | (a) <i>NOM SG:</i> | (b) <i>GEN SG:</i> |            |
| (15) | gramátyk-a         | gramátyk-i         | grammar    |
| (16) | uniwérsytet        | uniwérsytét-u      | university |
| (17) | katólik            | katólik-a          | catholic   |

It must be concluded, then, that exceptional stress is always marked in the stem and never in a suffix.

H&V account for the above set of facts as follows. First, regular stress is derived via the same rules that were used for Macedonian (7), minus the EM rule; this is illustrated below.

|                    |                   |                   |                |
|--------------------|-------------------|-------------------|----------------|
| (18) <u>Input:</u> | <u>Steps b-d:</u> | <u>Steps e-g:</u> | <u>Step h:</u> |
|                    |                   | *                 | *              |
|                    | *   *   *         | (*   *)           | (.   *)        |
| * * * *            | (* *) (* *)       | (* *) (* *)       | * *(*) *       |
| hipopotam          | hipo potam        | hipo potam        | hipopotam      |
| <u>Output:</u>     | <i>hipopótam</i>  |                   |                |

In order to account for the exceptional stress pattern of Class I, H&V propose that these stems are lexically marked so as to trigger the following rule.

(19) Special Extrametricality: Make the syllable following the stem extrametrical.

In uninflected forms such as *gramátyk*, this rule has no effect because there is no syllable following the stem. Hence, regular penultimate stress is observed. If, however, there is exactly one syllable following the stem, then Special EM applies and antepenultimate stress is observed, as illustrated below.

|                    |                    |                   |
|--------------------|--------------------|-------------------|
| (20) <u>Input:</u> | <u>Special EM:</u> | <u>Steps b-d:</u> |
|                    |                    | *                 |
| * * * *            | * * * <*>          | (*) (*) <*>       |
| gramatyk-a         | gramatyka          | gra maty ka       |

|                                            |                                          |                |
|--------------------------------------------|------------------------------------------|----------------|
| <u>Steps e-g:</u>                          | <u>Step h:</u>                           | <u>Output:</u> |
| *<br>(* *)<br>(*) (* *) <*><br>gra maty ka | *<br>(. *)<br>* (* *) <*><br>gra maty ka | gramátyka      |

If more than one syllable follows the stem, as in *gramatyk-á-mi*, then Special EM cannot apply because the syllable following the stem is non-peripheral.

H&V account for Class II exceptional stress by assuming that the final syllable of the stem is lexically marked as EM. This results in antepenultimate stress in unsuffixed stems and penultimate stress in suffixed stems, since the lexical EM is not peripheral in the latter case. Examples follow, first for an unsuffixed stem and then for a suffixed stem.

|                                                       |                                               |                |
|-------------------------------------------------------|-----------------------------------------------|----------------|
| (21) <u>Input:</u>                                    | <u>Steps b-d:</u>                             |                |
| * * * * <*><br>uniwersitet                            | * *<br>(* *) (* *) <*><br>uni wersi tet       |                |
| <u>Steps e-g:</u>                                     | <u>Step h:</u>                                | <u>Output:</u> |
| *<br>(* *)<br>(* *) (* *) <*><br>uni wersi tet        | *<br>(. *)<br>* * (* *) <*><br>uniwersi tet   | uniwérsytet    |
| (22) <u>Input:</u>                                    | <u>Steps b-d:</u>                             |                |
| * * * * *<br>uniwersitet-u                            | * * *<br>(* *) (* *) (* *)<br>uni wersi tetu  |                |
| <u>Steps e-g:</u>                                     | <u>Step h:</u>                                | <u>Output:</u> |
| *<br>(* * * *)<br>(* *) (* *) (* *)<br>uni wersi tetu | *<br>(. . *)<br>* * * * (* *)<br>uniwersitetu | uniwersytétu   |

Hammond 1988 points out three problems with H&V's account of stress in Macedonian and Polish. First, the similarity between these languages is obscured in that exceptional stress is attributed to lexical accent in Macedonian and to lexical EM in Polish. Second, the language-internal analysis of Polish is non-uniform in that two different kinds of EM are utilized. Finally, the device of EM is unconstrained under H&V's account of Polish stress. If rules such as Special EM are admitted, then one ought to observe similar kinds of rules which use lexical accent such as, *accent the syl-*

lable following the stem. To my knowledge, no such behavior has ever been attributed to accent.

2. AN AUTOSEGMENTAL ACCOUNT OF STRESS IN POLISH AND MACEDONIAN. This section analyzes the stress systems of Polish and Macedonian in terms of Hagberg's 1992 theory. The latter argues that (i) stress and metrical structure are logically independent of one another and (ii) stress is an autosegment. After arguing that the foot may serve as a domain for the application of phonological rules, Hagberg 1992 relates autosegmental stresses to inherently headless feet via insertion and linking rules. This approach may be applied to the analysis of Polish as formalized below.

- (23) Autosegmental Analysis of Polish Stress:  
 (a) Mark the final syllable EM.  
 (b) Build a single disyllabic foot from R to L.  
 (c) Insert & link a stress in the foot from R to L.

The derivation of regular stress using (23) is illustrated below; stress is represented by \*.

|                    |                |                    |
|--------------------|----------------|--------------------|
| (24) <u>Input:</u> | <u>EM:</u>     | <u>Build Foot:</u> |
| hipopotam          | hipopo<tam>    | hi(popo)<tam>      |
| <u>Add Stress:</u> | <u>Output:</u> |                    |
| *                  |                |                    |
|                    |                |                    |
| hi(popo)<tam>      | hipopótam      |                    |

Thus, assuming that stress is an autosegment whose domain of insertion and linking (in this case) is the foot, the regular stress pattern of Polish is accounted for. Other analyses of regular stress are also possible under this approach. For example, one could eliminate the EM rule and link stress from left to right instead of from right to left. However, I argue below that the EM rule is needed in order to account for the complete absence of final stress in Polish.

How, then, is exceptional stress to be derived under this approach? In order to answer this question, I assume the Obligatory Contour Principle (Leben 1973, McCarthy 1986; henceforth, OCP), stated below.

- (25) Obligatory Contour Principle: Within a tier, adjacent identical elements are prohibited.

For a precise definition of adjacency as well as extensive discussion of the OCP, see Archangeli and Pulleyblank 1992.

Contrary to H&V, I attribute exceptional stress in Polish to lexical accent rather than lexical EM. In words whose stems belong to Class I, I assume that the stem has a stress autosegment prelinked to the penultimate syllable in underlying representation. The foot-building rule applies as shown below, but the regular rule which inserts and links a stress autosegment cannot apply because the resulting representation would violate the OCP.

|                         |            |                    |                    |
|-------------------------|------------|--------------------|--------------------|
| (26) <u>Input:</u>      | <u>EM:</u> | <u>Build Foot:</u> | <u>Add Stress:</u> |
| *                       | *          | *                  |                    |
|                         |            |                    |                    |
| gramatyk                | grama<tyk> | (grama)<tyk>       | Blocked by<br>OCP  |
| <br>                    |            |                    |                    |
| <u>Output:</u> gramátyk |            |                    |                    |

The result of adding a single suffix to such a stem is that the lexical accent is now linked to the antepenultimate syllable. The OCP again blocks the application of the regular rule of stress assignment, so the lexical accent surfaces as exceptional stress:

|                                          |             |                                 |
|------------------------------------------|-------------|---------------------------------|
| (27) <u>Input:</u>                       | <u>EM:</u>  | <u>Build Foot:</u>              |
| *                                        | *           | *                               |
|                                          |             |                                 |
| gramatyka                                | gramaty<ka> | gra(maty)<ka>                   |
| <br><u>Add Stress:</u><br>Blocked by OCP |             | <br><u>Output:</u><br>gramátyka |

It was noted earlier that regular stress is observed in longer words derived from exceptionally stressed stems. In order to account for this, I assume that a lexical accent delinks following foot-building if the accent is not linked to a footed syllable. This delinking is presumably triggered by a language-particular constraint which requires a stress autosegment to be foot-internal at those levels of representation where foot structure exists. As for the delinked stress, either it relinks later to the rightmost syllable of the foot or else it disappears via Stray Erasure (Ito 1986, 1989). In either case, the word surfaces with regular penultimate stress as illustrated below.

|                    |               |                    |
|--------------------|---------------|--------------------|
| (28) <u>Input:</u> | <u>EM:</u>    | <u>Build Foot:</u> |
| *                  | *             | *                  |
|                    |               | ‡                  |
| gramatykami        | gramatyka<mi> | grama(tyka)<mi>    |

Add Stress:                      Output:  
                                           \*  
                                           |  
 grama (tyka) <mi>              *gramatykámí*

Thus, stems from Class I have a prelinked lexical accent on the penultimate syllable. Using the same approach, I assume that stems from Class II have a pre-linked lexical accent on the antepenultimate syllable. In unsuffixed stems from Class II, therefore, stress surfaces on the antepenultimate syllable:

(29) Input:                              EM:                              Build Foot:  
                                           \*                                              \*                                              \*  
                                           |                                              |                                              |  
 uniwersitet                      uniwersi<tet>                      uni(wersi)<tet>

Add Stress:                              Output:  
 Blocked by OCP                              *uniwérsytet*

The derivation of *uniwersytétu* is as in (28), where it was observed that a lexical accent delinks if it is out of the range of foot-building.

To summarize thus far, the first class of exceptionally stressed stems have lexical accent on the penultimate syllable of the stem and the second class of exceptionally stressed stems have lexical accent on the antepenultimate syllable of the stem. If a stem were to have a lexical accent on any syllable to the left of the antepenultimate syllable, that accent would never surface because it would never fall within the domain of the foot.

This analysis raises the following question. Does lexical accent ever occur on the final syllable of a stem? If the answer is no, then we have an asymmetrical distribution which has no apparent explanation. If, on the other hand, the answer is yes, then why are there no words with final stress? I propose that it is possible, in principle, for lexical accent to occur on the final syllable of a stem, but that the EM rule would prevent such an accent from surfacing because of the following principle.

(30) Strict Invisibility Principle (SIP):

Lexical accent delinks under extrametricality; it cannot prevent extrametricality from applying.

The SIP actually follows from the theory of Inkelas 1989, although she does not pursue this idea. If some Polish stem actually had final lexical accent, the SIP (in conjunction with the foregoing analysis) predicts

that this stem would exhibit regular penultimate stress in its unsuffixed form as well as when it had a single suffix, as illustrated in the following two hypothetical derivations.

|                           |                        |                            |
|---------------------------|------------------------|----------------------------|
| (31) <u>Input:</u>        | <u>EM:</u>             | <u>Build Foot:</u>         |
| *<br> <br>hipopotam       | *<br>‡<br>hipopo<tam>  | *<br>hi (popo) <tam>       |
| <u>Add Stress:</u>        | <u>Output:</u>         |                            |
| *<br> <br>hi (popo) <tam> | <i>hipopótam</i>       |                            |
| (32) <u>Input:</u>        | <u>EM:</u>             | <u>Build Foot:</u>         |
| *<br> <br>hipopotama      | *<br> <br>hipopota<ma> | *<br> <br>hipo (pota) <ma> |
| <u>Add Stress:</u>        | <u>Output:</u>         |                            |
| Blocked by OCP            | <i>hipopotáma</i>      |                            |

One question remains. The foregoing analysis predicts that exceptional antepenultimate stress should surface if two suffixes are added to a stem with final lexical accent. Since no such behavior has been reported, I assume that stem-final accent is in fact unattested in Polish. How might this be explained? As was just pointed out, stem-final accent, if it existed, would surface as exceptional stress only in words with two suffixes. In contrast, lexical accent surfaces in unsuffixed stems if it is on the antepenultimate syllable of the stem, and it surfaces in stems with just one suffix if it is on the penultimate syllable of the stem. It may be that, even if a word were to have a stem-final accent, the regularity of the stress pattern in forms with zero or one suffix would lead the language learner to conclude that these stems were unaccented. The less-frequently encountered forms with two suffixes might then be regularized even though the previous generation of speakers treated them as exceptionally stressed.

Thus, I conclude that Polish stress assignment proceeds as stated in (23), i.e., the final syllable is rendered EM and a disyllabic foot is built on the right edge of the remainder of the word; a stress autosegment is then inserted and linked to the right edge of the foot. Exceptional stress is accounted for with prelinked lexical accent, and the SIP is invoked in order to account for the absence of final stress. This

analysis, unlike that of H&V, universally constrains the behavior of EM and also accounts for the distribution of lexically-determined stress.

Independent evidence for the SIP is presented in the next section. First, however, the autosegmental theory of stress is applied to the Macedonian data. Recall that stress regularly occurs on the antepenultimate syllable. Like Polish, Macedonian has a number of words with exceptional stress but, unlike Polish, some of those words exhibit stress on the final syllable. Consequently, if the EM rule of Polish were to be included in the grammar of Macedonian, it would have to be stipulated that the SIP does not apply in Macedonian. This is in fact what H&V do, but there is another way to derive a three-syllable stress window which does not violate the SIP. This approach makes use of the concept of the residue. According to McCarthy and Prince 1990, the residue is that which remains after a single element (generally a syllable, mora or foot) has been parsed away from it. McCarthy and Prince utilize the residue as a domain for phonological and morphological operations in a number of languages. Although they do not apply it to the derivation of stress systems, this approach is made possible (and in fact suggested) by the autosegmental theory of stress since the latter treats stress as an autosegment rather than as an inherent part of foot structure.

The basic idea that is adopted here is that the residue serves as the domain for the insertion and linking of a stress autosegment in Macedonian in the same manner as the foot serves as the domain for these same operations in Polish (and many other languages). This is formalized and illustrated below.

(33) Autosegmental Analysis of Macedonian Stress:

- (a) Build a single disyllabic foot from R to L.
- (b) Insert and link a stress autosegment to the right edge of the residue.

|                    |                    |                       |                |
|--------------------|--------------------|-----------------------|----------------|
| (34) <u>Input:</u> | <u>Build Foot:</u> | <u>Link * to Res:</u> | <u>Output:</u> |
|                    |                    | *                     |                |
|                    |                    |                       |                |
| vodeniča           | vode(niča)         | vode(niča)            | vodéniča       |

Recall that it was assumed for Polish that a lexical accent (which is actually an autosegmental stress) cannot surface unless it is linked to a footed syllable. For Macedonian, I assume just the opposite, i.e., a stress cannot be linked to a footed syllable. In this case, however, delinking is not observed. Instead, the presence of a stress autosegment linked to a

syllable prevents that syllable from being incorporated into a foot. Consequently, the lexical accent surfaces intact, as illustrated below.

|                    |                    |                       |                |
|--------------------|--------------------|-----------------------|----------------|
| (35) <u>Input:</u> | <u>Build Foot:</u> | <u>Link * to Res:</u> | <u>Output:</u> |
|                    | *                  |                       |                |
|                    |                    |                       |                |
| restoran           | Blocked by *       | Blocked by<br>OCP     | restorán       |

Likewise, a penultimate lexical accent surfaces intact as shown below. I assume (non-crucially) that a degenerate foot is built on the final syllable.

|                    |                    |                       |                |
|--------------------|--------------------|-----------------------|----------------|
| (36) <u>Input:</u> | <u>Build Foot:</u> | <u>Link * to Res:</u> | <u>Output:</u> |
|                    | *                  |                       |                |
|                    |                    |                       |                |
| komunizam          | komuni(zam)        | Blocked by<br>OCP     | komunízam      |

Thus, Macedonian's three-syllable stress window may be derived without the use of EM if stress is viewed as an autosegment and the residue is allowed to serve as a domain for the autosegmental operations of insertion and linking.

In summary, Hagberg's 1992 theory of stress, which views stress as an autosegment, has been utilized to account for the Polish data in the following manner. First, regular stress is derived by rendering the final syllable EM, then building a single disyllabic foot from right to left and, finally, inserting and linking a stress autosegment in the foot from right to left. The exceptional forms are derived via a lexical accent which may be prelinked to either the penultimate or antepenultimate syllable of the stem. Although an accent could, in principle, be prelinked to the final syllable of the stem, the SIP accounts for the observation that stress never occurs in this position.

The Macedonian stress patterns, on the other hand, have been accounted for as follows. First, a single disyllabic foot is built from right to left, as in Polish but without the EM. Then, a stress autosegment is inserted and linked not in the foot domain but rather in the residue. This produces antepenultimate stress in those cases where there is no accent, and the exceptional patterns are accounted for by means of a lexical accent which may, in principle, be prelinked to any syllable of the stem.

The autosegmental account of stress for these two languages is superior to that of H&V in three respects. First, the behavior of EM is universally constrained by the SIP; it is not necessary to stipulate on a language-particular basis whether or not EM is overridden

by accent, nor is it necessary to utilize an unprecedented rule such as H&V's Special EM. Second, the new proposal attributes exceptional stress to a single device (lexical accent) in both languages rather than to two different devices. Third, the limited distribution of lexical accent (with respect to where it may occur in the stem) is accounted for in both languages under the new proposal but not under H&V's proposal.

Next, I examine the stress systems of two Uto-Aztecan languages and argue that they utilize essentially the same strategy for stress assignment as do the grammars of Polish and Macedonian. In addition, independent evidence for the SIP is presented.

3. STRESS IN TARAHUMARA AND GUARIJIO. Tarahumara and Guarijío belong to the Taracahitic branch of Uto-Aztecan; both are spoken in the mountains of Chihuahua in the Republic of Mexico. This section argues that Tarahumara utilizes the residue in the assignment of stress in essentially the same manner as does Macedonian, while the grammar of Guarijío uses the same basic set of rules as does the grammar of Polish. Looking first at Tarahumara, stress always occurs on one of the first three syllables of the word; examples of each stress pattern are repeated below from Hilton 1959. Some of these words are also found in Brambila 1976, although the two works represent different dialects.

(37) First syllable stress:

|         |                   |          |            |
|---------|-------------------|----------|------------|
| mísi    | cat               | wásarami | cooked     |
| wérachi | high in mountains | túrusi   | peach tree |
| wériga  | Be strong!        | káraka   | completely |

(38) Second syllable stress:

|         |            |          |            |
|---------|------------|----------|------------|
| mo'néra | son-in-law | rosákami | white      |
| noráwa  | client     | siwára   | intestines |
| charóra | beard      |          |            |

(39) Third syllable stress:

|            |                |         |                    |
|------------|----------------|---------|--------------------|
| rokogó     | (during) night | asibáma | will sit down (SG) |
| sopichí    | bat            | soporí  | star               |
| nakarópari | butterfly      | chariwá | loose branches     |

Notice that Tarahumara's stress window is the mirror image of that which was observed for Macedonian. Accordingly, the same analysis is proposed, except that the direction for the rules of foot-building and linking of the stress autosegment is from left to right in this case; this is formalized and illustrated below.



(45) Third Syllable Stress:

|           |               |           |           |
|-----------|---------------|-----------|-----------|
| sa'watóni | yellow        | mahaní    | is afraid |
| waginá    | dry           | muguná    | dies (SG) |
| yasimá    | will sit (SG) | tehpékúma | long      |

The above stress patterns may be accounted for in the same manner as those of Polish, except that the direction for the rules of EM and foot-building are from left to right in this instance.

(46) Autosegmental Analysis of Guarijío Stress:

- Mark the initial syllable EM.
- Build a single disyllabic foot from L to R.
- Insert and link \* in the foot from R to L.

Assuming that third syllable stress is the unmarked case, it is derived as follows.

|                    |            |                    |                |                |
|--------------------|------------|--------------------|----------------|----------------|
| (47) <u>Input:</u> | <u>EM:</u> | <u>Build Foot:</u> | <u>Link *:</u> | <u>Output:</u> |
|                    |            |                    | *              |                |
|                    |            |                    |                |                |
| muguna             | <mu>guna   | <mu>(guna)         | <mu>(guna)     | muguná         |

If lexical accent were to occur on the first syllable, the SIP would force it to delink, resulting in regular third syllable stress; this is analogous to the hypothetical Polish derivation in (31). If, on the other hand, lexical accent were to occur on the second syllable, it would surface in its original position, just as in the hypothetical Polish derivation in (32). As was already argued for Polish, if lexical accent occurs anywhere else, the regular stress pattern will be observed.

To summarize thus far, the Guarijío stress patterns are essentially the mirror image of those of Polish. Accordingly, I have analyzed these two stress systems using the same approach; the only difference is the direction in which the rules of EM and foot-building apply. The SIP plays a crucial role in the analysis of both stress systems, but thus far this principle has been supported only by theory-internal arguments. Next, I present additional Guarijío data (again, from Miller 1989) which constitute an independent empirical argument for the SIP.

In Guarijío, reduplication is a very productive process that copies the first syllable of a stem. It has a number of syntactic functions, but in general reduplication imparts plurality to nouns and iterativity to verbs. In most cases, stress falls on the third syllable of a reduplicated form regardless of where stress occurs in the unreduplicated stem. For example,

in (48) through (50), both the unreduplicated and reduplicated forms have third syllable stress.

|      | <u>Stem:</u> | <u>Reduplicated form:</u> | <u>Gloss:</u> |
|------|--------------|---------------------------|---------------|
| (48) | talaní       | tataláni                  | buy           |
| (49) | sa'watóni    | sa'sawároni               | yellow        |
| (50) | tehimá       | tetehíma                  | spouse        |

In (51) through (53), stress occurs on the second syllable in the unreduplicated form and on the third syllable in the reduplicated form.

|      | <u>Stem:</u> | <u>Reduplicated form:</u> | <u>Gloss:</u> |
|------|--------------|---------------------------|---------------|
| (51) | e'méruma     | e'eméruma                 | short         |
| (52) | lunéci       | lulunéci                  | Monday        |
| (53) | oérumé       | o'oéru                    | woman         |

The above stress patterns may be explained by assuming that stress assignment follows reduplication. Consequently, an unaccented reduplicated form will have stress on the third syllable, as in (48) through (50). However, a stem with lexical accent on the second syllable will have second syllable stress when it has no prefix and third syllable stress following reduplication, as is observed in (51) through (53).

Thus, the alternation between second syllable stress in unreduplicated stems versus third syllable stress in the corresponding reduplicated forms is accounted for by the presence of lexical accent on the second syllable of the stem. But what stress pattern might be expected to result if lexical accent were to occur on the first syllable of the stem? It was already argued that the SIP prevents first syllable accent from surfacing in unprefixed stems, but there is nothing to prevent it from surfacing in prefixed forms; such forms are in fact attested in the following data.

|      | <u>Stem:</u> | <u>Reduplicated form:</u> | <u>Gloss:</u>   |
|------|--------------|---------------------------|-----------------|
| (54) | werumá       | wewéruma                  | big             |
| (55) | ki'cuná      | ki'kína                   | bite            |
| (56) | welakáme     | we'wélame                 | little old lady |
| (57) | te'marí      | tehtémari                 | little boy      |
| (58) | mucimári     | mu'múcimari               | sister-in-law   |
| (59) | warihó       | wa'wáriho                 | Guarijío        |

In order to account for the stress alternation in each of these derivational pairs, I claim that each of the stems has first syllable lexical accent which surfaces only when the stem has a prefix. (60) gives the derivation for the reduplicated form in (54). In spite of the fact that the derivation of the unprefixed form in

(54) would come out the same with or without an initial lexical accent (see the discussion of 31), the only way to obtain the correct output in (60) is with the accent. Since the lexical accent in this case is not linked to a peripheral syllable, it is able to surface in its original position.

|                    |               |                |                    |
|--------------------|---------------|----------------|--------------------|
| (60) <u>Input:</u> | <u>Redup:</u> | <u>EM:</u>     | <u>Build Foot:</u> |
| *                  | *             | *              | *                  |
|                    |               |                |                    |
| weruma             | we-weruma     | <we>weruma     | <we>(weru)ma       |
| <u>Add Stress:</u> |               | <u>Output:</u> |                    |
| Blocked by OCP     |               | wewéruma       |                    |

The conclusion, then, is that a number of Guarijío stems such as *werumá* have lexical accent on the first syllable, and EM prevents this lexical accent from surfacing except when it becomes non-peripheral, as predicted by the SIP.

4. SUMMARY AND CONCLUSIONS. This study reviewed H&V's analysis of the stress systems of Macedonian and Polish, followed by Hammond 's critique of the latter. A new set of analyses were then proposed based on Hagberg's 1992 claims that (i) stress and metrical structure are logically independent of one another and (ii) stress is an autosegment. In order to universally constrain the use of EM, the SIP was proposed. This principle forces a linked lexical accent to delink when its anchor is rendered invisible by an EM rule. Independent evidence for the SIP was presented based on the stress alternations which accompany reduplication in certain Guarijío words. In order to derive the stress systems of Macedonian and Tarahumara without violating the SIP, it was claimed that the grammars of these languages select the residue rather than the foot as the domain in which stress is inserted and linked. Using the residue in this manner makes it possible to derive a three-syllable stress window without the use of EM.

This analysis of Macedonian and Polish has three advantages over that of H&V. First, the behavior of EM is properly constrained. Second, exceptional stress is attributed to a single device (lexical accent) in both languages rather than to two different devices. Finally, the distribution of lexical accent is readily explained. H&V's proposal lacks these characteristics.

#### BIBLIOGRAPHY

Archangeli, Diana and Douglas Pulleyblank (1992, in press) *Grounded phonology*. MIT Press: Cambridge, MA.

- Brambila, David (1976) *Diccionario Rarámuri-Castellano (Tarahumar)*. La Obra Nacional de la Buena Prensa, A.C.: México, D.F.
- Comrie, Bernard (1976) 'Irregular stress in Polish and Macedonian', *International Review of Slavic Linguistics* 1.2-3:227-240.
- Franks, Steven (1983) 'Stress in Polish and Macedonian', ms., Cornell University, Ithaca, NY.
- \_\_\_\_\_ (1985) 'Extrametricality and stress in Polish', *Linguistic Inquiry* 16:144-151.
- Hagberg, Lawrence (1992, in prep) *An autosegmental theory of stress*. Doctoral dissertation, University of Arizona.
- Halle, Morris and Jean-Roger Vergnaud (1987) *An essay on stress*. MIT Press: Cambridge, MA.
- Hammond, Michael (1988) 'Lexical stresses in Macedonian and Polish', *Phonology Yearbook* 6.
- Hayes, Bruce (1979) 'Extrametricality', *MIT Working Papers in Linguistics* 1:77-86.
- \_\_\_\_\_ (1981) *A metrical theory of stress rules*. Doctoral dissertation, MIT, Cambridge, MA.
- \_\_\_\_\_ (1982) 'Extrametricality and English stress', *Linguistic Inquiry* 13:227-276.
- Hilton, Kenneth (1959) *Vocabulario Tarahumara*. Serie de Vocabularios Indígenas Mariano y Silva Aceves, No. 1. Instituto Lingüístico de Verano: México, D.F.
- Inkelas, Sharon (1989) *Prosodic constituency in the lexicon*. Doctoral dissertation, Stanford University, Palo Alto, CA.
- Ito, Junko (1986) *Syllable theory in prosodic phonology*. Doctoral dissertation, MIT, Cambridge, MA.
- \_\_\_\_\_ (1989) 'A prosodic theory of epenthesis', *Natural Language and Linguistic Theory* 7.
- Leben, W. (1973) *Suprasegmental phonology*. Doctoral dissertation, MIT, Cambridge, MA. Distributed by the Indiana University Linguistics Club.
- Lunt, H. (1952) *A grammar of the Macedonian literary language*. Skopje.
- McCarthy, John (1986) 'OCP effects: gemination and antigemination', *Linguistic Inquiry* 17.2:207-263.
- McCarthy, John and Alan Prince (1990) 'Foot and word in prosodic morphology: the Arabic broken plural', *Natural Language & Linguistic Theory* 8:209-83.
- Miller, Wick (1989) *Gramática Guarijío*. Universidad Nacional Autónoma de México: México, D.F.
- Rubach, J. and G. Booij (1985) 'A grid theory of stress in Polish', *Lingua* 66:281-319.
- Stoltzfus, Ron (1979) 'Guarijío phonology', ms., Summer Institute of Linguistics, Tucson, AZ.

## Multiple Head Comparison and Infinite Regress

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### 1. Simple Comparison vs. Multiple Head Comparison<sup>1</sup>

It is generally assumed that the truth value of a simple comparative is established by comparing the two degrees or quantities expressed by the part of the comparative preceding *than* (or *as*) and the part of the comparative following *than* (or *as*) (cf. Cresswell 1976, among others). In (1), for example, the number of dogs that ate rats is compared to the number of cats that ate mice.

- (1) More dogs ate rats than cats ate mice.
- (1') The number of dogs that ate rats is greater than the number of cats that ate mice.

The truth conditions of (1) are expressed by (1'). The operation of comparison is triggered by the elements *more*, *fewer*, *less*, *as* and *-er*. One of these elements always has to be present in the part of the comparative preceding *than* or *as*. Therefore, I will refer to these elements as 'comparative operators'. Comparative operators usually immediately precede the element of which the degree or quantity is compared. So, whereas in (1) the number of dogs is compared to some element in the *than*-clause, in (2) the number of rats is compared to some element in the *than*-clause because the comparative operator precedes the noun *rats* instead of the noun *dogs*.

- (2) Dogs ate more rats than cats ate mice.
- (2') The number of rats that were eaten by dogs is greater than the number of mice that were eaten by cats.

Sometimes a comparative can also contain more than one occurrence of a comparative operator. The following example is taken from von Stechow (1984:43):

- (3) More dogs ate more rats than cats ate mice.

There is much disagreement as to the acceptability of this sentence, a so-called multiple head comparative. Some speakers have no difficulty interpreting sentences like (3), others find them unacceptable. The question

that arises here is why there is so much variation in the grammaticality judgements with respect to multiple head comparatives. And furthermore, what exactly is the interpretation of multiple head comparatives? In this article, I will investigate the semantics of multiple head comparatives and I will show that multiple comparison leads to infinite regress and hence to unacceptability if the two elements introduced by a comparative operator both have a lexical counterpart in the *than/as*-clause. A second comparative operator is only possible if the element it precedes is compared to an element salient in the discourse.

## 2. Multiple Instances of Comparison and Their Relation

In this section, the relation between the two instances of comparison in a multiple head comparative will be investigated. The main question is whether the instances of comparison function independently of each other or whether they are interrelated. According to von Stechow (1984), the truth conditions of (3) are as in (3'):

- (3') The number of dogs that ate rats is greater than the number of cats that ate mice & the number of rats that were eaten by dogs is greater than the number of mice that were eaten by cats.

Note that the first part of the truth conditions in (3') is obtained by interpreting the sentence as if only the first comparative operator were present (= sentence (1)), and the second part of the truth conditions is obtained by interpreting the sentence as if only the second comparative operator were present (= sentence (2)). The semantics for multiple head comparative (3), corresponding to the truth conditions in (3'), is given in (4) (von Stechow 1984:44):

- (4)  $(\exists x)(\exists n)[x \text{ is a set of dogs \& } x \text{ has at least } n\text{-many members}$   
 $(\exists y)(\exists m)[y \text{ is a set of rats \& } y \text{ has at least } m\text{-many members \& } x$   
 $\text{ate } y \text{ \& } \neg(\text{For at least } m: \text{ cats ate } m \text{ mice})] \text{ \& } \neg(\text{For at least } n: \text{ cats ate mice})]$

This formula states that a certain number of dogs that is at least  $n$  ate a certain number of rats that is at least  $m$ , a number of cats that is smaller than  $n$  ate mice, and cats ate a number of mice that is smaller than  $m$ . If, for the moment, we ignore the fact that there are several reasons that the formula appears not to be well-formed, it can be observed that in (3') and in (4) the two instances of comparison function completely independently of each other. The numbers of rats and mice are not of any importance in

comparing the number of dogs in the first part of the comparative to the number of cats in the *than*-clause. In the same way, the numbers of dogs and cats are not of any importance in comparing the number of rats to the number of mice.

If von Stechow's analysis were correct, then it should not make any difference for the acceptability of a multiple head comparative whether the two comparative operators are identical, as in (3), or different. Sentences (5) and (6), both containing two different comparative operators, should be acceptable as well and they should have truth conditions (5') and (6'), respectively. However, these sentences sound rather odd to most people and, moreover, they do not have the interpretation expected.

- (5) ?More doors are higher than windows are wide.  
 (5') The number of doors that are high is greater than the number of windows that are wide & the height of doors is greater than the width of windows.

In this article, question-marks will be used to indicate the oddness of the sentence and the difficulty that people have interpreting it, rather than (relative) ungrammaticality.

- (6) ??Fewer dogs ate more rats than cats ate mice.  
 (6') The number of dogs that ate rats is smaller than the number of cats that ate mice & the number of rats that were eaten by dogs is greater than the number of mice that were eaten by cats.

We noticed before that not everybody agrees on the acceptability of (3). There is also some disagreement as to the unacceptability of (5): not everybody dislikes (5). However, those speakers which find (5) acceptable also have problems with (3) either. Multiple head comparatives (3), (5), and (6) show a clear hierarchy in acceptability: almost everyone agrees on the unacceptability of (6), most speakers find (5) unacceptable, and only some speakers think (3) is unacceptable. The group that finds (6) acceptable is a subset of the group that finds (5) acceptable, and this latter group again is a subset of the group that finds (3) acceptable.

Sentence (5) contains two different comparative operators: the comparative operator *more* and the comparative suffix *-er*. Sentence (5) is generally considered to be much worse than sentence (3) and clearly does not have the truth conditions expressed by (5'). Multiple head comparative (5) does not state that a certain number of doors is high in an absolute sense. Only the height of doors as compared to the measurements of something else is relevant in establishing the truth value of the sentence. Also, (5) does not mean that the height of all doors is greater than the

width of all windows. Sentence (5) does not compare doors and windows in general, but rather a specific subset of doors and windows. If either the comparative operator *more* or the comparative operator *-er* is omitted, the result is an acceptable and interpretable comparative. This suggests that only one comparative operator and hence only one instance of comparison is allowed in a comparative. However, the fact that multiple head comparative (3) is acceptable for most speakers seems to refute this.

Because multiple head comparatives containing two different comparative operators are much worse than multiple head comparatives containing two identical comparative operators, the two comparative operators must be related in some way. In the next section, I will investigate this relation between the two comparative operators in a multiple head comparative.

### 3. Mutual Dependency and Infinite Regress

In the previous section we saw that the two comparative operators in a multiple head comparative must be related in some way. Instead of two independent instances of comparison, multiple head comparatives involve two mutually dependent instances of comparison. This means that von Stechow's (1984) analysis of multiple head comparative (3) cannot be correct. In order to establish the exact meaning of this sentence, let us first take a closer look at the rather odd example (5) and its most likely interpretation. The two instances of comparison in (5) differ in that the first instance of comparison is a comparison between numbers and the second one a comparison between measures. Therefore, it is easier to disentangle the two instances of comparison in this sentence than in the more or less acceptable sentence (3), which involves two instances of comparison between numbers. Sentence (5) is repeated below for convenience.

- (5) ?More doors are higher than windows are wide.  
 (5'') The number of doors that are higher than the windows are wide, is greater than the number of windows that are less wide than the doors are high.

The truth conditions of (5) must be approximately as in (5''). This should become clear if we go through the different possibilities step by step. First, since the element *more* precedes the noun *doors*, a number of doors is compared to another number. The only element in the *than*-clause that can have a cardinal interpretation, is *windows*. So a number of doors is compared to a number of windows. However, these doors and windows are

not just doors and windows, but subsets of the set of doors and windows that have a certain property. These properties are supplied by the clause in which the noun *doors* is contained and the clause in which the noun *windows* is contained, respectively. The doors in the comparison have the property of being higher (not high!). The element to which the height of the doors is compared must be found in the *than*-clause. Therefore, the height of the doors is compared to the width of the windows. So the doors of which the number is compared to the number of windows, are those doors of which holds that their height is greater than the width of the windows. These windows are not windows in general but also distinguish themselves through a certain property. This property is that these windows are less wide than the doors mentioned in the first part of the comparative are high. However, these doors were not doors in general, as we noticed, but the subset of doors of which holds that they are higher than the windows mentioned in the second part of the comparative are wide. And these windows were again not windows in general, but windows of which holds that they are less wide than the doors in the first part of the comparative are high. So *the windows* in (5'') refers to the windows mentioned in the *than*-clause, and *the doors* refers to the doors mentioned in the first clause of the comparative.

It is easy to see that the definition of the doors referred to by the comparative is dependent on the definition of the windows referred to by the comparative, and that the definition of the windows is dependent on the definition of the doors. Because of this mutual dependency of the definition of the doors and the definition of the windows, no semantics can be given for this multiple head comparative that does not involve infinite regress. So the correct truth conditions of multiple head comparatives are not given as a conjunction of two independent instances of comparison, as von Stechow claims, but rather as a combination of two mutually dependent instances of comparison. Because the two instances of comparison are mutually dependent, the first one cannot be solved without having solved the second one and the second one cannot be solved without having solved the first one. This leaves us with two unsolvable instances of comparison.

The occurrence of infinite regress seems to be the reason for the unacceptability of (5) and (6). But why is (5) slightly better than (6), then? An explanation for this might be that it is also possible to interpret (5) as a simple comparative involving only one pair of compared elements. On this interpretation, the number of doors that are higher is compared to the number of windows that are wide. In this case, the doors are higher than some standard provided by the discourse. Such an interpretation is almost impossible for (6), witness the difference in acceptability between (7a) and (7b):

- (7) a John makes people prettier.  
 b ?John makes more people pretty.

(7a) contains an adjective that is modified by the comparative operator *-er*. In (7b), on the other hand, the comparative operator *more* modifies a noun. Without a context that provides the implicit compared element, sentence (7b) is much worse than (7a). Presumably, it is easier for comparative adjectives to be associated with some standard provided by the discourse than it is for nouns. The difference between (5) and (6) is comparable to the difference between (7a) and (7b). So the reason why (5) and (6) differ in acceptability is an independent one and is not related to the multiple head construction. In section 4, we will return to interpretations which depend on the discourse in more detail.

The same mutual dependency that occurred in sentence (5), can be observed in the acceptable multiple head comparative (3). The nouns in (3) depend on each other for their interpretation; *dogs* depends on the interpretation of *cats* and *cats* on the interpretation of *dogs*:

- (3) More dogs ate more rats than cats ate mice.  
 (8) The number of [dogs that ate more rats than the cats<sub>i</sub> ate mice]<sub>i</sub>,  
 is greater than the number of [cats that ate fewer mice than the  
 dogs<sub>i</sub> ate rats]<sub>i</sub>.

This mutual dependency should also lead to infinite regress. Nevertheless, sentence (3) is much better than sentences (5) and (6). It is not immediately clear what causes this difference in acceptability.

Because multiple occurrences of comparative operators lead to infinite regress and hence to unacceptability (except in the case of identical comparative operators), the following hypothesis can be formulated:

- (9) Hypothesis (first version):  
 Comparatives may contain at most one instance of comparison.

There are a number of problems with this hypothesis, though. First, the mutual dependency with respect to the interpretation of the compared elements in a multiple head comparative bears some resemblance to the crossing coreference in so-called Bach-Peters sentences. These sentences, however, are perfectly acceptable:

- (10) [Every pilot who shot at it]<sub>i</sub> hit [some MIG that chased him]<sub>i</sub>.

For the interpretation of Bach-Peters sentences I will adopt the analysis of Jacobson (1979). She argues that sentences like (10) involve one instance

of binding and one instance of quantification, rather than two instances of binding. Therefore, there is no crossing coreference and hence no infinite regress. In a multiple head comparative like (6), on the other hand, the relation between dogs and cats must be the same as the relation between cats and dogs, whatever this relation may be. So there is no way to escape from infinite regress and hence from unacceptability.

A second problem is something that we just observed: why do comparatives containing identical comparative operators not lead to unacceptability? In other words, why is sentence (3) still acceptable, if it involves infinite regress? We will return to this problem in the next section. The following examples, taken from von Stechow (1984) and Williams (1975) respectively, constitute another problem:

- (11) Less land produces more corn than ever before.  
 (12) John made more people prettier than I thought he would.

These sentences contain two non-identical comparative operators, just like (5) and (6). Nevertheless, these sentences are acceptable and interpretable. So what is the difference between (5) and (6) on the one hand, and (11) and (12) on the other hand? In the remainder of this article, I will try to answer these questions and, furthermore, I will give independent evidence for the hypothesis in (9).

#### 4. Evidence from Discourse Comparatives

Discourse comparatives provide evidence for the assumption that the unacceptability of (5) and (6) under the multiple comparison reading is the result of the mutual dependency of the compared elements. Discourse comparatives generally lack a *than/as*-clause. The compared element is inferred from the context instead of being overtly or covertly present in the *than/as*-clause. Compared elements in discourse comparatives are usually compared to a previous event, to something that has been mentioned earlier, or to something that is the case (cf. Rayner & Banks 1990). This is illustrated by the following sentences:

- (13) a That evening, the wind was blowing more strongly.  
       b John was a disaster. Mary hired a more competent engineer.  
       c Mary wished she had a faster car.

In (13a), a comparison is made between the present state of affairs and a previous state of affairs in which the wind was blowing only softly. The comparative in (13b) compares the competence of the engineer that Mary

hired to the competence of John, about which a statement was made in the preceding sentence. (13c) states that Mary wished she had a faster car than she actually does.

In these sentences, the interpretation of the element that is introduced by the comparative operator (*strongly* in (13a), *competent* in (13b), *fast* in (13c)) is not dependent on the interpretation of any other material in the sentence. Hence, the comparison involving this element can be solved without having to depend on the resolution of some other comparison in the sentence. The prediction now is that multiple comparison involving non-identical comparative operators is possible with discourse comparatives. This prediction is borne out by the following example:

- (14) Newer generations of microchips contain more electronic switches on a smaller surface.

Here, there is no mutual dependency between the different instances of comparison. The instances of comparison involving the compared elements *new*, *electronic switches* and *small* are evaluated with respect to a previous situation, or possibly with respect to all previous situations. The interpretation of the compared elements does not depend on the interpretation of other material in the sentence. *Newer generations of microchips* means 'newer generations of microchips than the ones that were mentioned earlier'; *more electronic switches* means 'more electronic switches than the number of switches that were used in previous generations of microchips'; *smaller surface* means 'smaller surface than the size of the surface in previous generations of microchips'. Since discourse comparatives allow for several non-identical comparative operators, whereas other comparatives do not, the occurrence of several non-identical comparative operators in the latter constructions must be blocked by the impossibility of finding an interpretation for the compared elements.

Now let us return to sentences (11) and (12) of the previous section again. The acceptability of these sentences was a problem for the hypothesis in (9). However, if we reexamine these sentences, it turns out that it is possible to interpret at least one instance of comparison in these sentences as an instance of discourse comparison. In (11), the amount of land and the amount of corn at the time of the utterance are compared to amounts of land and corn on all previous points in time. Moreover, it is also possible to omit the *than*-phrase, witness (15). This means that the elements that *land* and *corn* in the first part of the comparative are compared to are inferred from the discourse. The interpretation of those elements is not dependent on the presence of a *than*-phrase. So although (11) contains a *than*-phrase, both the comparison involving *less land* and the comparison involving *more corn* are instances of discourse comparison.

- (15) Nowadays, less land produces more corn.

In (12), the situation is slightly different. The two instances of comparison in (12) are not of the same type. This can be observed by comparing (12) to (16), a sentence in which the element *prettier* is not only present in the first part of the comparative but also in the *than*-clause.

- (16) John made more people prettier than I thought he would make people prettier.

The first instance of comparison in (16), introduced by the comparative operator *more*, involves two numbers of people. A number of people defined by the first part of the comparative is compared to a number of people defined by the *than*-clause. The second instance of comparison in this sentence is introduced by the comparative suffix *-er*. This instance of comparison, however, does not involve the second occurrence of *prettier*. Because compared elements in the *than/as*-clause of a comparative always have to be quantifiable elements (cf. Hendriks 1992), the element *prettier* in the *than*-clause in (16) cannot be the element to which *prettier* in the first part of the comparative is compared.<sup>2</sup> Therefore, the first occurrence of *prettier* in this sentence must be compared to something in the discourse. Because sentences (12) and (16) have exactly the same interpretation, the element *prettier* in (12) must also be compared to an element in the discourse. So the interpretation of both (12) and (16) is as in (12'):

- (12') The number of people that John made prettier is greater than the number of people that I thought John would make prettier & the degree of prettiness of the people that John made prettier is greater on reference time than on some earlier point of time.

The truth conditions in (12') make it clear that (12) only contains one instance of sentence-internal comparison, with both compared elements involved in the comparison lexically present. The second instance of comparison is an instance of discourse comparison.

Sentences (11) and (12) are no counterexamples to the claim that one single comparative can contain at most one comparison, if by comparison is understood 'sentence-internal comparison'. (17) is the slightly revised version of hypothesis (9) in the previous section:

- (17) Hypothesis (final version):  
Comparatives may contain at most one instance of *sentence-internal* comparison.

In addition to one instance of sentence-internal comparison, it is very well possible to have one or more instances of discourse comparison. And, of course, it is also possible to have only instances of discourse comparison, as was illustrated by (11). What is blocked is the occurrence of more than one pair of compared elements, not the occurrence of more than one first element of a pair of compared elements. This explains why sentences (11) and (12) are acceptable, whereas (5) and (6) are not.

The question that remains, however, is why sentence (3) is still acceptable. This sentence contains two pairs of compared elements, namely the pair *dogs* - *cats* and the pair *rats* - *mice*, and should therefore be unacceptable. Although I do not have a well-defined solution to the problem, it seems to me that there are two possible answers to this question. The first possibility is that the comparison in (3) is not a comparison between numbers of entities but between numbers of events. In that case, two numbers of events, rat-eating events and mouse-eating events, are compared. Such an interpretation would predict that sentence (3) is true in a situation in which three dogs ate the same rat (they share it) and one cat ate two mice, because in that case the number of rat-eating events (three) is greater than the number of mouse-eating events (two). Intuitively, however, this does not seem to be true (see also von Stechow 1984).

Another solution might be that the second occurrence of *more* is a vacuous occurrence which is dependent on the presence of the first element *more*, analogous to double attraction in negative concord languages. Consider the following example of double negation:

(18) Nobody said nothing.

*Nobody* is assumed to be built up of something that indicates negation and the affirmative element *everybody*; *nothing* consists of negation and the element *anything*. If the two instances of negation would cancelled each other, the meaning of (18) would be 'everybody said something'. However, in negative concord English this sentence means 'nobody said anything', the second instance of negation simply being omitted (van der Wouden & Zwarts 1992). This same process of double attraction which occurs with negation in negative concord languages, could also have occurred with the comparative operator *more* in (3). Double attraction is only a plausible explanation for the acceptability of multiple head comparative (3), though, if the meaning of (3) is approximately identical to the meaning of (1), the corresponding simple comparative. It is not really clear to me whether this is indeed the case. So what the semantics of multiple head comparative (3) exactly is still remains an open question. But whichever interpretation is the

correct one for (3), in any case it is an interpretation that involves only one instance of comparison.

### 5. More Evidence from Comparative Deletion

If an element is compared to something in the discourse, no compared element is overtly or covertly present in the *than/as*-clause. A *than/as*-clause only contains a compared element in the case of sentence-internal comparison. If our hypothesis were correct that only one instance of sentence-internal comparison is possible in a comparative, a *than/as*-clause would contain at most one compared element. This assumption can be tested by investigating the possibilities of application of Comparative Deletion in comparatives. A compared element in the *than/as*-clause of a comparative can be optionally deleted by an operation called Comparative Deletion (Bresnan 1975). This operation applies to compared elements in *than/as*-clauses only and is illustrated by the following examples:

- (19) a Mary has written more books than John has read - .  
 b More students steal bikes than - buy bikes.  
 c More students read than - write.

The compared element can be deleted from any position in the *than*-clause and there is no restriction on the amount of lexical material that is left behind by the deletion operation. Hypothesis (17) now would predict that Comparative Deletion can apply at most once in a single sentence. This prediction is borne out by the following examples (Corver 1990:85):

- (20) a \*More people have read more books than - have written - .  
 b \*More students steal more bikes than - buy - .

Because Comparative Deletion can apply only once in a *than/as*-clause, at most one compared element can be present in a *than/as*-clause. If multiple sentence-internal comparison were possible, we would expect two compared elements to be possible in the *than/as*-clause.

### 6. *Than* and *as* as Coordinators

Discourse comparatives allow for two non-identical comparative operators. Comparatives containing a *than*-clause or *as*-clause, on the other hand, do not. Hence, discourse comparatives cannot be viewed as reduced clausal comparatives but have to receive a direct interpretation. This means that in

discourse comparatives the comparative operator alone is enough to establish the comparison. The interpretation of discourse comparatives and other comparatives is similar: two quantities or degrees are compared. The first quantity or degree is present in both types of construction; the only difference concerns the second quantity or degree. This quantity or degree is inferred from the context in the case of discourse comparison, but is expressed by the *than/as*-clause or *than/as*-phrase in all other cases. Therefore, one could say that the comparative conjunctions *than* and *as* merely function as a kind of coordinator in comparative constructions, their only purpose being that they introduce the second degree or quantity in the comparison. This offers an explanation for the coordination-like behavior of clausal comparatives (cf. Napoli 1983, Hendriks 1991). In coordinate constructions involving sentence coordination, certain elements can be deleted under identity with material in the other conjunct. Movement is in principle not allowed out of a conjunct of a coordinate construction, unless it occurs in an Across-the-Board manner, i.e. from all conjuncts simultaneously (Ross 1967).

- (21) a Students steal bikes and teachers buy cars.  
 b Students steal bikes and teachers - cars.  
 c Students steal bikes and - buy cars.  
 d Students steal - and teachers buy expensive 15 speed bikes.  
 e What do students steal - and teachers buy - ?

In (21b) the finite verb in the second conjunct has been deleted (Gapping), in (21c) left-peripheral material has been deleted from the second conjunct (Forward Conjunction Reduction) and in (21d) right-peripheral material has been deleted from the first conjunct (Right Node Raising). (21e) is an example of Across-the-Board extraction of the Wh-element *what*. These deletion and movement operations are also possible in clausal comparatives, as is illustrated by (22):

- (22) a More students steal bikes than teachers buy cars.  
 b More students steal bikes than teachers - cars.  
 c Students steal more bikes than - buy cars.  
 d More students steal - than teachers buy expensive 15 speed bikes.  
 e What do more students steal - than teachers buy - ?

In (22b) Gapping has applied, (22c) is an example of Forward Conjunction Reduction in comparatives, in (22d) Right Node Raising has applied, and in (22e) the Wh-element *what* has been extracted in an Across-the-Board manner. Subordinate clauses, on the other hand, do not allow for operations like Gapping, Forward Conjunction Reduction, Right Node

Raising and Across-the-Board extraction. Because these operations are restricted to coordinate constructions and comparatives and are not allowed in subordinate clauses, the *than/as*-clause in a comparative should be analyzed as the second conjunct in a non-hierarchical construction rather than as a relative clause belonging to the comparative operator.

## 7. Conclusions

In this article, I have argued that multiple comparison is not possible if all compared elements are lexically present, because this would lead to infinite regress. This infinite regress is the result of the fact that the compared elements are dependent on each other for their interpretation. Only one compared element is allowed in the *than/as*-clause. This element is compared to an element in the first part of the comparative which is introduced by a comparative operator. Other comparative operators are only allowed if they introduce an element that is compared to an element which is not overtly or covertly present in the *than/as*-clause but is inferred from the discourse.

The claim that multiple sentence-internal comparison leads to infinite regress has an interesting configurational correlate. It is generally assumed that the comparative operator binds the empty quantifier position in the *than/as*-clause (see footnote 2). In the multiple head comparatives we discussed in this article, the comparative operator always immediately preceded the compared element in the first part of the comparative. Because according to von Stechow's analysis the first compared element in the first part of the comparative is compared to the first compared element in the *than/as*-clause, and the second compared element in the first part of the comparative to the second compared element in the *than/as*-clause, the first operator would have to bind the first empty quantifier position and the second operator would have to bind the second empty quantifier position. This is not allowed because it would violate the cross-over condition.

### Footnotes

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2. The obligatory presence of a quantifiable element in the *than/as*-clause accounts for the so-called Subdeletion-effects in comparatives. Although others have accounted for these effects by assuming that a quantifier modifying the compared element in the *than/as*-clause is obligatorily deleted (Bresnan 1975) or moved to the complementizer position of the *than/as*-clause by the operation of Wh-movement (Chomsky 1977), Hendriks (1992) shows that an analysis involving a base-generated empty quantifier position (cf. Pinkham's null operator (Pinkham 1982)) does not encounter the problems that a deletion or movement approach would. As a result of this base-generated empty quantifier position all compared elements in the *than/as*-clause of a comparative must be quantifiable elements.

### *Bibliography*

- Bresnan, J. (1975) 'Comparative Deletion and Constraints on Transformations'. *Linguistic Analysis* 1.1, 25-74.
- Chomsky, N. (1977) 'On Wh-movement'. In: A. Akmajian, P. Culicover & T. Wasow (eds.) *Formal Syntax*. Academic Press, New York, 71-132.
- Cresswell, M.J. (1976) 'The Semantics of Degree'. In: B.H. Partee (ed.) *Montague Grammar*. Academic Press, New York, 261-292.
- Corver, N. (1990) *The Syntax of Left Branch Extractions*. Doctoral Dissertation, KUB Tilburg.
- Hendriks, P. (1991) 'The Coordination-like Structure of Comparatives'. In: F. Drijkoningen & A. van Kemenade (eds.) *Linguistics in the Netherlands 1991*. John Benjamins Publishing Company, Amsterdam/Philadelphia, 41-50.
- Hendriks, P. (1992) 'Subdeletion and the Lambek Calculus'. In: P. Dekker & M. Stokhof (eds.) *Proceedings of the Eighth Amsterdam Colloquium*. Institute for Logic, Language and Computation, University of Amsterdam, 233-252.
- Jacobson, P. (1979) *The Syntax of Crossing Coreference Sentences*. Doctoral Dissertation, Brown University.
- Napoli, D.J. (1983) 'Comparative Ellipsis: A Phrase Structure Analysis'. *Linguistic Inquiry* 14.4, 675-694.
- Pinkham, J.E. (1982) *The Formation of Comparative Clauses in French and English*. Indiana University Linguistics Club, Bloomington, Indiana.
- Rayner, M. & A. Banks (1990) 'An Implementable Semantics for Comparative Constructions'. *Computational Linguistics* 16.2, 86-112.
- Ross, J.R. (1967) *Constraints on Variables in Syntax*. Doctoral Dissertation, MIT.

- von Stechow, A. (1984) 'Comparing Semantic Theories of Comparison'. *Journal of Semantics* 3, 1-77.
- Williams, E.S. (1975) *Comparative Reduction and the Cycle*. Unpublished manuscript.
- van der Wouden, T. & F. Zwarts (1992) 'Negative Concord'. In: D. Gilbers & S. Looyenga (eds.) *Language and Cognition* 2, Yearbook 1992 of the research group for Linguistic Theory and Knowledge Representation of the University of Groningen, 317-331.

## Extrametricality and syllable weight in Turkish

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### 1 Introduction

The syllable structure of Turkish is well known: syllables are maximally bimoraic, and coda consonants contribute to weight. Thus, CVC syllables are bimoraic, as in (1a), and long vowels shorten in closed syllables (1b):

- (1) a.  $\sigma$
- |                |
|----------------|
| Λ              |
| μ μ            |
| Λ              |
| yen            |
| [yen] 'defeat' |
- b.  $\sigma \sigma$
- |         |
|---------|
| Λ       |
| μ μ μ μ |
| Λ Λ     |
| zama:n  |
- 
- |                |
|----------------|
| σ σ            |
| Λ              |
| μ μ μ          |
| Λ Λ            |
| zaman          |
| [zaman] 'time' |
- (cf. [zama:n-ɪ] 'time-acc')

Less well known, however, is that there are departures in both directions from the canon illustrated in (1). In this paper we discuss the existence of superheavy syllables, which exceed the expected maximum size, and of exceptionally light syllables, which dip below the expected minimum.

In this paper we present a moraic analysis of Turkish syllable structure, showing that it is possible to give an insightful structural account of the observed exceptions which makes no appeal to diacritic exception features. The primary structure with which we account for exceptions to syllable structure conditions is underlying extrametricality.

We begin with the "regular" data, demonstrating the accuracy of the standard analysis of Turkish syllable structure.

### 2 Turkish syllable structure

There are three independent pieces of evidence that coda consonants are moraic in Turkish: stress, prosodic minimality, and vowel shortening.

#### 2.1 Place name stress

Sezer 1981 demonstrates that the assignment of stress to place names in Turkish is quantity sensitive, formulating the generalization in (2):

- (2) Stress penult if heavy or if both penult and antepenult are light; otherwise (i.e. if antepenult is heavy and penult is light), stress the antepenult (Sezer 1981)

|     |                       |                       |                       |                       |
|-----|-----------------------|-----------------------|-----------------------|-----------------------|
| (3) | a. <i>light-light</i> | b. <i>light-heavy</i> | c. <i>heavy-heavy</i> | d. <i>heavy-light</i> |
|     | A.dá.na               | E.dír.ne              | Is.pár.ta             | Án.ka.ra              |
|     | Ka.rá.man             | Si.lív.ri             | Is.tán.bul            | Ér.ge.ne              |
|     | Gi.ré.sun             | Ma.lát.ya             | An.tál.ya             | Çán.kı.rı             |
|     | Si.ló.pi              | Ta.ráb.ya             | Is.tín.ye             | Ád.li.ye              |

(3) shows that CVC syllables count as heavy, distinct from CV syllables.

## 2.2 Prosodic minimality

As observed by Dobrovolsky 1987 and Itô and Hankamer 1989, Turkish has some sort of minimal size condition on words. Itô and Hankamer suggest that the minimality condition might be bimoraic, as in (4):

(4) Minimality condition:  $[\mu \mu]$

This has been confirmed by Orgun and Inkelas 1992, who demonstrate that, for some speakers, the bimoraic minimality condition induces vowel lengthening in CV roots (5a).<sup>1</sup>

|     |          |   |                 |                     |
|-----|----------|---|-----------------|---------------------|
| (5) | a. /fa/  | → | [fa:]           | 'musical note 'fa'' |
|     | /do/     | → | [do:]           | 'musical note 'do'' |
|     | b. /kap/ | → | [kap] (*[ka:p]) | 'container'         |
|     | c. /ad/  | → | [ad] (*[a:d])   | 'name'              |

As shown in (5b), vowels do not lengthen in CVC roots. This is explained if coda consonants bear weight. CVC roots are already bimoraic, and satisfy the minimality condition.

## 2.3 Closed syllable vowel shortening

The moraic status of codas is further supported by the fact that underlyingly long vowels shorten when the syllable acquires a coda consonant. (6a) shows that an underlying long vowel surfaces if the following consonant can syllabify as an onset; otherwise, i.e. if the root-final consonant forms a coda, the long vowel shortens (b).

|     |                  |               |                    |
|-----|------------------|---------------|--------------------|
| (6) | a. Open syllable |               | b. Closed syllable |
|     | i. şa:n-ı        | 'glory-acc'   | şan                |
|     | ii. zama:n-ı     | 'time-acc'    | zaman              |
|     | iii. evla:d-ı    | 'child-acc'   | evlat              |
|     | iv. mefhu:m-u    | 'concept-acc' | mefhum             |

(7) shows that underlyingly short vowels do not lengthen in open syllables (disregarding the minimality-induced lengthening shown in (5)); rather, vowel length alternations are due to closed-syllable shortening (Clements and Keyser 1983).

| (7)  | a. Open syllable |             | b. Closed syllable |
|------|------------------|-------------|--------------------|
| i.   | kitab-ı          | 'book-acc'  | kitab              |
| i.   | kan-ı            | 'blood-acc' | kan                |
| ii.  | saman-ı          | 'hay-acc'   | saman              |
| iii. | kanad-ı          | 'wing-acc'  | kanat              |
| iv.  | ka:nun-u         | 'law-acc'   | ka:nun             |

Our analysis of these facts is straightforward: syllables in Turkish are maximally bimoraic, and coda consonants contribute to weight. Therefore, long vowels must shorten in closed syllables.

In order to ensure that root-final consonants do not syllabify as codas on the root cycle, which would incorrectly predict long vowel shortening even if a vowel-initial suffix is added on a later cycle, we assume a cyclic rule of final consonant extrametricality:

(8) Final consonant extrametricality<sup>2</sup>:

$$[\dots C] \rightarrow [\dots] \overset{\mu}{\underset{|}{C}}$$

Note that such a rule has already been proposed for Turkish on independent grounds by Rice 1990, in an analysis of final noncontinuant obstruent devoicing. It is well known that root-final noncontinuant obstruents devoice when word-final or preceding a consonant-initial suffix (9a,b):

|     |              |           |            |            |
|-----|--------------|-----------|------------|------------|
| (9) | a. kitab     | 'book'    | c. kitab-ı | 'book-acc' |
|     | b. kitab-lar | 'book-pl' |            |            |

However, the fact that voicing is preserved on consonants which are able to syllabify as onsets (9c) suggests that root-final consonants need to be extrametrical on the root cycle to protect them from being syllabified there as codas.<sup>3</sup> Later, presumably at the phrase level (Rice 1990), extrametricality is lost and moraic codas adjoin, shortening preceding long vowels where necessary to preserve the bimoraic syllable maximum.

The complete morification and syllabification procedure we assume is outlined in (10):

- (10) Rules of metrical structure assignment (first approximation)
- a. Morification
    - i. Assign a mora to each (C)V unit.
    - ii. Assign mora to each remaining unmorified consonant
  - b. Final consonant extrametricality (turns off at phrase level).
  - c. Build maximally bimoraic syllables (shortening vowels where necessary)

Sample derivations are given in (11). Bracketed forms are those exhibiting extrametricality. Parenthesized letters denote rules in (10).<sup>4</sup>

|      |                     |                                                                                                           |                                                                                                                     |
|------|---------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| (11) | <b>UR</b>           | $\begin{array}{c} \mu\mu \\ \vee \\ zaman \end{array}$                                                    | $\begin{array}{c} \mu\mu \\ \vee \\ zaman + 1 \end{array}$                                                          |
|      | <b>Cycle 1</b>      |                                                                                                           |                                                                                                                     |
|      |                     | $\begin{array}{c} \mu\mu \\ \vee \\ zaman \end{array}$                                                    | $\begin{array}{c} \mu\mu \\ \vee \\ zaman \end{array}$                                                              |
|      | (a)                 | $\begin{array}{c} \mu\ \mu\mu\mu \\ \wedge\ \vee\   \\ zaman \end{array}$                                 | $\begin{array}{c} \mu\ \mu\mu\mu \\ \wedge\ \vee\   \\ zaman \end{array}$                                           |
|      | (b)                 | $\begin{array}{c} [\mu\ \mu\mu]^\mu \\ \wedge\ \vee\   \\ [zama]_n \end{array}$                           | $\begin{array}{c} [\mu\ \mu\mu]^\mu \\ \wedge\ \vee\   \\ [zama]_n \end{array}$                                     |
|      | (c)                 | $\begin{array}{c} [\sigma\ \sigma] \\   \wedge \\ \mu\ \mu\mu \\ \wedge\ \vee\   \\ [zama]_n \end{array}$ | $\begin{array}{c} [\sigma\ \sigma] \\   \wedge \\ \mu\ \mu\mu \\ \wedge\ \vee\   \\ [zama]_n \end{array}$           |
|      | <b>Cycle 2</b>      |                                                                                                           |                                                                                                                     |
|      |                     |                                                                                                           | $\begin{array}{c} \sigma\ \sigma \\   \wedge \\ \mu\ \mu\mu\mu \\ \wedge\ \vee\   \\ zaman_1 \end{array}$           |
|      | (a)                 |                                                                                                           | $\begin{array}{c} \sigma\ \sigma \\   \wedge \\ \mu\ \mu\mu \\ \wedge\ \vee\   \\ zaman_1 \end{array}$              |
|      | (b)                 |                                                                                                           | —                                                                                                                   |
|      | (c)                 |                                                                                                           | $\begin{array}{c} \sigma\ \sigma\ \sigma \\   \wedge   \\ \mu\ \mu\mu\mu \\ \wedge\ \vee\   \\ zaman_1 \end{array}$ |
|      | <b>Phrase cycle</b> |                                                                                                           |                                                                                                                     |
|      |                     | $\begin{array}{c} \sigma\ \sigma \\   \wedge \\ \mu\ \mu\mu\mu \\ \wedge\ \vee\   \\ zaman \end{array}$   | $\begin{array}{c} \sigma\ \sigma\ \sigma \\   \wedge   \\ \mu\ \mu\mu\mu \\ \wedge\ \vee\   \\ zaman_1 \end{array}$ |
|      | (a)                 | —                                                                                                         | —                                                                                                                   |

|         |         |       |           |
|---------|---------|-------|-----------|
| (c)     | σ       | σ     | —         |
|         |         | /#\\  |           |
|         | μ       | μ μ μ |           |
|         | Λ       | Λ     |           |
|         | zaman   |       |           |
| Output: | [zaman] |       | [zama:ni] |

### 3 Superheavy syllables

Having covered regular syllabification in Turkish, we proceed to the complications. In this section we discuss syllables which appear to exceed the maximal size of two moras. There are two sources of such syllables: suffixation (systematic) and the lexicon (lexical exceptions). Let us begin with the former.

#### 3.1 Derived superheavy syllables

As shown in (12), suffixal consonants do not shorten long vowels with which they syllabify.

| (12) | Open syllable | Closed syllable |             |                        |
|------|---------------|-----------------|-------------|------------------------|
| a.   | fa:           | 'note 'fa''     | fa:-n       | ''fa'-2sgposs'         |
|      |               |                 | fa:-n-dan   | ''fa'-2sgposs-abl'     |
| b.   | kaza:         | 'accident'      | kaza:-m     | 'accident-1sgposs'     |
|      |               |                 | kaza:-m-dan | 'accident-1sgposs-abl' |
| c.   | bela:         | 'trouble'       | bela:-n     | 'trouble-2sgposs'      |
|      |               |                 | bela:-m-dan | 'trouble-2sgposs-abl'  |

The observed shortening failure cannot be attributed to sonority considerations. The consonantal possessive suffixes are nasals, and in the derivation of *zaman* in (11) we have just seen that a nasal coda *does* induce shortening when *tautomorphic* with the preceding long vowel. Shortening failure cannot be written off to lexical exceptionality, either: possessive suffixation is extremely productive and regular.

It thus appears necessary to build some morphological information into the closed syllable shortening process. But what might this be? Theoretical considerations rule out the two standard approaches to morphological conditioning, namely appeal to the Strict Cycle Condition (Mascaró 1976, Kiparsky 1982) or inclusion of a morpheme boundary in the shortening rule.

Reference to the Strict Cycle Condition is ruled out by the fact that closed syllable shortening applies only in *nonderived* environments — namely root-internally — and never in *derived* environments, such as in the suffixed words in (12). This is exactly the opposite of what the Strict Cycle Condition would predict. The Strict Cycle Condition restricts the

cyclic application of structure changing rules to derived environments only. It can account neither for the data in (6) nor for that in (12).

The other possibility is to include a specific morpheme boundary — a root boundary — following the coda consonant in the shortening rule. This analysis would correctly block shortening by consonantal suffixes. However, its interaction with final consonant extrametricality — a crucial component of the shortening process — leads to an incorrect prediction in the case of root-internal shortening. Assuming that extrametricality is turned off only at the phrase level, it follows that syllabification of word-final consonants must be accomplished by phrase-level rules. However, it is a fundamental assumption of Lexical Phonology (Kiparsky 1982, Mohanan 1982) that phrase level rules are insensitive to information about the internal morphological structure of words. The analysis thus incorrectly predicts shortening failure in any word-final syllable. It can account for the data in (12) but not for the data in (6).

To account for the enigmatic behavior of consonantal suffixes, we propose adding a consonant adjunction rule to the morification algorithm (13aii). This rule, which links a consonant to the mora dominating a preceding vowel, has independently been proposed in moraic theory for languages in which coda consonants do not contribute to weight (Hayes 1989, Zec 1988). In Turkish, however, coda consonants do normally contribute to weight, as we have seen from a study of CVC syllables. The Turkish adjunction process is apparently limited to long vowels.

Adjunction is intrinsically ordered between the two existing clauses of the morification algorithm. It bleeds coda morification, and is itself bled by onset morification.

(13) Rules of metrical structure assignment (final version)

- a. Morification
  - i. Onset formation: assign a mora to each maximal (C)V unit.
  - ii. Coda adjunction: Link C' to preceding weak vocalic mora.
  - iii. Coda morification: Assign mora to each remaining C'
- b. Final consonant extrametricality (turns off at phrase level)
- c. Syllabification (build maximally bimoraic syllables, shortening vowels where necessary)

Because consonant adjunction refers to a preceding weak mora, it is intrinsically ordered after syllabification. The strong-weak labeling of moras is a property of their position in the syllable. Because syllabification follows morification on the cycle, consonant adjunction is thus intrinsically restricted to noninitial cycles of the phonology.

An illustrative derivation comparing a consonant-final root to consonant-final suffixed word is given in (14). (Parenthesized letters refer to rules in (13).) As can be seen, the intrinsic ordering of adjunction and

syllabification explains why shortening is caused only by root-final consonants and never by suffix consonants. Root-final consonants receive moraic structure on the first cycle of phonological rule application — before syllable structure has been assigned. By contrast, suffixes undergo morification on a noninitial cycle. Suffixes are added to a base which has already undergone syllabification. If the base ends in a long vowel, e.g. *kaza:*, a consonantal suffix will be adjoined by clause (13aii). It does not receive a mora by clause (13aiii).

|      |              |                                                                                                                                                           |                                                                                                            |
|------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| (14) | UR           | $\begin{array}{c} \mu\mu \\ \vee \\ \text{zaman} \end{array}$                                                                                             | $\begin{array}{c} \mu\mu \\ \vee \\ \text{kaza} + n \end{array}$                                           |
|      | Cycle 1      | $\begin{array}{c} \mu\mu \\ \vee \\ \text{zaman} \end{array}$                                                                                             | $\begin{array}{c} \mu\mu \\ \vee \\ \text{kaza} \end{array}$                                               |
|      | (ai,iii)     | $\begin{array}{c} \mu\mu\mu\mu \\ \wedge \vee   \\ \text{zaman} \end{array}$                                                                              | $\begin{array}{c} \mu\mu\mu \\ \wedge \vee \\ \text{kaza} \end{array}$                                     |
|      | (b)          | $\left[ \begin{array}{c} \mu\mu\mu \\ \wedge \vee   \\ \text{zama} \end{array} \right] \begin{array}{l} \mu \\ n \end{array}$                             | —                                                                                                          |
|      | (c)          | $\left[ \begin{array}{c} \sigma\sigma \\   \wedge \\ \mu\mu\mu \\ \wedge \vee   \\ \text{zama} \end{array} \right] \begin{array}{l} \mu \\ n \end{array}$ | $\begin{array}{c} \sigma\sigma \\   \wedge \\ \mu\mu\mu \\ \wedge \vee \\ \text{kaza} \end{array}$         |
|      | Cycle 2      |                                                                                                                                                           | $\begin{array}{c} \sigma\sigma \\   \wedge \\ \mu\mu\mu \\ \wedge \vee \\ \text{kaza} \quad n \end{array}$ |
|      | (aii)        |                                                                                                                                                           | $\begin{array}{c} \sigma\sigma \\   \wedge \\ \mu\mu\mu \\ \wedge \vee \\ \text{kazan} \end{array}$        |
|      | (b)          |                                                                                                                                                           | —                                                                                                          |
|      | (c)          |                                                                                                                                                           | —                                                                                                          |
|      | Phrase cycle | $\begin{array}{c} \sigma\sigma \\   \wedge \\ \mu\mu\mu\mu \\ \wedge \vee   \\ \text{zaman} \end{array}$                                                  | $\begin{array}{c} \sigma\sigma \\   \wedge \\ \mu\mu\mu \\ \wedge \vee \\ \text{kazan} \end{array}$        |
|      | (a)          | —                                                                                                                                                         | —                                                                                                          |

|               |         |       |          |
|---------------|---------|-------|----------|
| (c)           | σ       | σ     | —        |
|               |         | /≠\   |          |
|               | μ       | μ μ μ | —        |
|               | ∧       | ∧≠    |          |
|               | zaman   |       |          |
| <b>Output</b> | [zaman] |       | [kaza:n] |

By accounting for the morphological sensitivity of closed syllable vowel shortening in an indirect manner, the analysis avoids the theoretical complications encountered by more direct attempts to encode a root boundary in the shortening rule.

We have now accounted for the systematic generation of overlong CV:C syllables in suffixed words. We turn to the problem of lexically exceptional superheavy syllables.

### 3.2 Lexical superheavy syllables

A small number of V:C-final roots unexpectedly fail to undergo tautomorphemic closed-syllable vowel shortening:

- (15) a. a:b 'water'                      b. a:b-dan 'water-abl'  
       ya:d 'remembrance'                ya:d-dan 'remembrance-abl'

These cannot be accounted for by the analysis thus far, as there is no way to distinguish them from the roots in (6), which do undergo shortening.

One might propose that these roots are simply pre-morphed or presyllabified in underlying representation (see e.g. Buckley 1992), thus failing to undergo the metrical processes which would lead to closed syllable vowel shortening. However, this analysis would fail to capture an apparent distributional generalization: tautomorphemic superheavy syllables occur only in word-final position.

We propose that the final consonants of these roots are marked as extrametrical in underlying representation.

- (16) UR:                       $\left[ \begin{array}{c} \mu \mu \\ \vee \\ a \end{array} \right]_b$                        $\left[ \begin{array}{c} \mu \mu \\ \vee \\ \dot{y}a \end{array} \right]_d$

As a consequence of extrametricality, these consonants avoid morification on the first cycle — by being extrametrical throughout. When they ultimately do become visible, syllable structure already exists on the preceding long vowel. In case clause (13ai) of the morification algorithm — the onset clause — is inapplicable, then these consonants undergo clause (13aii) and syllabify as nonweightbearing codas. This is why they never shorten tautosyllabic long vowels. Derivations are shown in (17):

|      |              |                                                                           |                                                                              |
|------|--------------|---------------------------------------------------------------------------|------------------------------------------------------------------------------|
| (17) | UR           | $\begin{bmatrix} \mu\mu \\ V \\ a \end{bmatrix} b$                        | $\begin{bmatrix} \mu\mu \\ V \\ ya \end{bmatrix} d$                          |
|      | Cycle 1      | $\begin{bmatrix} \mu\mu \\ V \\ a \end{bmatrix} b$                        | $\begin{bmatrix} \mu\mu \\ V \\ ya \end{bmatrix} d$                          |
|      | (ai)         | —                                                                         | $\begin{bmatrix} \mu\mu \\ \wedge \\ ya \end{bmatrix} d$                     |
|      | (b)          | —                                                                         | —                                                                            |
|      | (c)          | $\begin{bmatrix} \sigma \\ \wedge \\ \mu\mu \\ V \\ a \end{bmatrix} b$    | $\begin{bmatrix} \sigma \\ \wedge \\ \mu\mu \\ \wedge \\ ya \end{bmatrix} d$ |
|      | Phrase cycle | $\begin{array}{c} \sigma \\ \wedge \\ \mu\mu \\ V \\ ab \end{array}$      | $\begin{array}{c} \sigma \\ \wedge \\ \mu\mu \\ \wedge \\ yad \end{array}$   |
|      | (aii)        | $\begin{array}{c} \sigma \\ \wedge \\ \mu\mu \\ \wedge \\ ab \end{array}$ | $\begin{array}{c} \sigma \\ \wedge \\ \mu\mu \\ \wedge \\ yad \end{array}$   |
|      | (c)          | —                                                                         | —                                                                            |
|      | Output       | [a:b]                                                                     | [ya:d]                                                                       |

The roots in (15) have in common with regular suffixed ...V:-C stems a failure to undergo vowel shortening. The proposed analysis captures this similarity by assigning both the same (relevant) structure. The final consonant of each type of form is absent from the rule domain when the preceding long vowel is syllabified.

The account also explains the distributional generalization observed to hold of the roots in (15). Because extrametricality is restricted to edges (Hayes 1981, Harris 1983, Inkelas 1989), lexical (C)V:C syllables are correctly predicted to occur only in root-final position.

#### 4 'Superlight syllables'

In this section we turn to the other type of unusual syllable, namely CVC syllables which behave as though they are monomoraic, at least at one stage in the derivation. As with the so-called 'superheavy syllables', these

so-called ‘superlight syllables’ come in two varieties: systematic and lexical.

#### 4.1 Derived ‘superlight syllables’

The observed systematic ‘superlight’ behavior shows up in the interaction between aorist and passive suffixation. We turn first to aorist suffixation.

**Aorist suffixation.** The aorist suffix has two distinct allomorphs, as shown in (18). (Vowels are shown in uppercase to indicate their harmonic alternations.)

- (18) a. -Er  
       b. -r (surfaces as *-Ir* following a consonant)

The distribution of these allomorphs is predictable from the prosodic size of the stem. As shown in (19), *-Er* is used with monosyllabic roots (a), while *-r* occurs elsewhere (i.e. with polysyllabic roots) (b).

- (19) a. yen-er       ‘defeat-aor (=defeats)’  
       sun-ar       ‘present-aor(=presents)’  
       b. imren-ir   ‘covet-aor(=covets)’  
       koru-r       ‘protect-aor (=protects)’

*-r* is also the allomorph of choice for CV roots:

- (20) ye-r           ‘eat-aor (=eats)’  
       de-r          ‘say-aor (=says)’

The generalization is that *-Er* selects for a closed bimoraic syllable (i.e. a CVC base), as shown below.<sup>5</sup>

- (21) a.  $\left[ \left[ \begin{array}{c} \mu \quad \mu \\ | \\ C \end{array} \right] -Er \right]$                       b.  $\left[ \left[ \quad \right] -r \right]$

**Aorist suffixation to passives.** Unexpectedly, however, the *-r* allomorph is used for monosyllabic (CV-C) passive stems formed from CV roots (22).

- (22) ye-n-ir       ‘eat-pass-aor (=is eaten)’  
       de-n-ir       ‘say-pass-aor (=is said)’

That is to say, these derived CV-C syllables behave as though they were monomoraic, grouping with CV roots for purposes of aorist suffixation.

How does the aorist suffix distinguish derived CV-C syllables from nonderived CVC syllables? The situation is similar to that of the superheavy syllables in §3: a suffixal consonant is not contributing its expected mora to the representation.

We propose that the passive suffix is underlyingly extrametrical. It therefore fails to receive a mora on the cycle at which it is attached. As a consequence, a CV root ending in the passive *-n* will appear monomoraic in the input to the following cycle, in this case at the stage at which weight is computed and aorist allomorphy determined.<sup>6</sup> This leads to the selection of the ‘elsewhere’ *-r* allomorph of the aorist.

One might question the need for underlying extrametricality, given the independent existence of a final consonant extrametricality rule. However, underlying extrametricality is crucial if we are to distinguish suffixed CVC stems (for example *ye-n*) from nonderived ones (for example *yen*). A final consonant extrametricality rule would apply to both, neutralizing the contrast. Only if the passive suffix is underlyingly extrametrical can we prevent it from receiving a mora by clause (13ai) of the morification algorithm. Its failure to receive a mora is what explains the failure of the *-Er* aorist allomorph to be selected.<sup>7</sup>

#### 4.2 Lexical ‘superlight syllables’

We now turn to the existence of nonderived, lexically exceptional superlight CVC syllables. Listed in (23a), these take the *-r* aorist suffix — normally reserved for monomoraic or polysyllabic stems, or for the derived passivized CV roots. For comparison, regular CVC syllables are given in (23b), and derived CV-C syllables are given in (c).

- (23) a. al-ir      ‘take’                      b. sal-ar      ‘release’  
       dur-ur      ‘stop’                                      bur-ar      ‘twist’  
       c. ye-n-ir    ‘be eaten’  
       de-n-ir    ‘be said’

Sounding a familiar chord, we propose that the final consonants of the roots in (23a) are underlyingly extrametrical.

- (24) a. [a]l        ‘take’  
       [du]r        ‘stop’

This explains their patterning with passivized CV-C roots (25b) and with nonderived CV roots (25c). All possess only a single mora at the stage at which aorist suffix allomorphy is determined.<sup>5</sup>

- (25) a. [du]r        ‘stop’  
       b. [ye]-n      ‘eat-passive’  
       c. [ye]         ‘eat’

## 5 Conclusion

In this paper we have presented an analysis of syllable structure in Turkish which accounts for the difference between derived and nonderived words and also extends to the attested lexical exceptions.

The same mechanism of underlying extrametricality is at the root of the two seemingly disparate types of exceptions discussed: the so-called 'superheavy' and 'superlight' syllables. Both share the property that their final consonant does not contribute to weight. This is accounted for by making it invisible to the processes that would assign weight to it, namely morification. We conclude that, contra Inkelas 1989, underlying extrametricality is a necessary component of phonological theory.

## Notes

- 1 The prosodic minimality condition of Turkish is subject to interspeaker variation and to lexical exceptions. Certain speakers have a disyllabic minimality condition; these speakers do not 'repair' CV roots by lengthening vowels. Some speakers with only the bimoraic minimality condition have underlyingly long vowels in words like that in (5a), and thus also exhibit no lengthening rule; even for speakers who do lengthen vowels as in (5a), there are a number of exceptional CV roots which surface with short vowels. See Orgun and Inkelas 1992 and Inkelas and Orgun 1993 for details.
- 2 We use the representation for invisibility proposed in Inkelas 1989, namely the exclusion of the extrametrical item from the prosodic constituent functioning as the rule domain at the appropriate stage of the derivation.
- 3 Rice's analysis does not account for all the complexity of noncontinuant obstruent devoicing. For example, as observed by Kaisse 1986, only root-final codas devoice. Root-internally, voiced obstruent codas are tolerated, as in *ecdāt* 'ancestors', *ecdād-ı*. See Kaisse 1986, Inkelas and Orgun 1993 for further discussion of this point.
- 4 We are assuming that extrametricality persists across cycles as long as it remains peripheral (Buckley 1992), although this is not crucial in the analysis; we could have just as easily reassigned extrametricality on each cycle. We are also noncrucially assuming that extrametricality affects only unsyllabified material (see (14)).
- 5 The prediction is that a monosyllabic verb root ending in a long vowel (i.e. (C)V:) should take the *-r* allomorph of the aorist. We know of one such root, *yü:* 'wash', used by some (though not all) speakers of Istanbul Turkish. The aorist form is, as predicted, *yü:r*, with the *-r* allomorph.
- 6 If the final consonant is later syllabified as a coda, it will receive a mora by clause (13bii) of the morification algorithm. Thus, the roots that appear to be exceptionally monomoraic to aorist allomorphy surface as bimoraic syllables unless their final consonant syllabifies as an onset.
- 7 Itô and Hankamer 1989 offer a different account of aorist allomorphy. They assume that *-r* is the basic aorist allomorph but that *-Er* is resorted to whenever *-r* suffixation would produce a verb of subminimal size. According to their account, the output of suffixing *-r* to a CVC verb such as *yen* is monomoraic, and therefore subminimal. As a result, *-Er* is selected instead.

This account does not, however, explain why *-r* is selected by CV roots, which are clearly monomoraic. Itô and Hankamer suggest that the aorist suffix *-r* is moraic and that when it combines with a CV root the output is bimoraic. However, this is inconsistent with their earlier claim that the combination of *-r* with a CVC root is monomoraic.

- <sup>8</sup> These forms are counterexamples to vowel lengthening, and thus to minimality; we assume they can be handled in the same manner as the monomoraic verb roots *ye* and *de*. See Inkelas and Orgun 1993.

## References

- Buckley, E. 1992. *Theoretical aspects of Kashaya phonology and morphology*. PhD dissertation, UC Berkeley.
- Clements, G. N. and S. Keyser. 1983. *CV Phonology*. MIT Press.
- Dobrovolsky, M. 1987. Why CVC in Turkish reduplication? In P. Liliw and M. Saari (eds.), *The Nordic languages and modern linguistics* 6. Helsinki. 130-146.
- Harris, J. 1983. *Syllable structure and stress in Spanish*. MIT Press.
- Hayes, B. 1981. *A metrical theory of stress rules*. PhD dissertation, MIT.
- Hayes, B. 1989. Compensatory lengthening in moraic phonology. *Linguistic Inquiry* 20.253-306.
- Hyman, L. 1985. *A theory of phonological weight*. Dordrecht: Foris.
- Inkelas, S. 1989. *Prosodic constituency in the lexicon*. PhD dissertation, Stanford University. Published in 1990 by Garland Publishing Co.
- Inkelas, S. and O. Orgun. 1993. Turkish coda devoicing: a prosodic constraint on extrametricality. LSA meeting, Los Angeles.
- Itô, J. and J. Hankamer 1989. Notes on monosyllabism in Turkish. In J. Itô and J. Runner (eds.), *Phonology at Santa Cruz*, vol. 1. UC Santa Cruz.
- Kaisse, E. 1986. Locating Turkish devoicing. *Proceedings of WCCFL* 5.
- Kiparsky, P. 1982. Lexical morphology and phonology. In I.-S. Yang (ed.), *Linguistics in the morning calm*. Hanshin: Seoul. pp. 3-91.
- Lewis, G. 1967. *Turkish grammar*. Oxford: Clarendon Press.
- Mohanan, K. P. 1982. *Lexical phonology*. PhD dissertation, MIT.
- Orgun, O. and S. Inkelas 1992. Turkish prosodic minimality. Sixth International Conference on Turkish Linguistics, Anadolu University, Eskişehir, Turkey.
- Rice, K. 1990. Predicting rule domains in the phrasal phonology. In S. Inkelas and D. Zec (eds.), *The phonology-syntax connection*. CSLI Publications and the University of Chicago Press.
- Sezer, E. 1981. On non-final stress in Turkish. *Journal of Turkish Studies/TÜBA* 5:61-69.
- Underhill, R. 1976. *Turkish grammar*. MIT Press.
- Zec, D. 1988. *Sonority constraints on prosodic structure*. PhD dissertation, Stanford University.

## Negative Polarity and Type Assignment

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### 1. Introduction

In this paper we will focus on some asymmetries in the licensing (or *triggering*; we will use both terms) of Negative Polarity Items (NPIs) in Dutch and English. Most of these asymmetries are well-known from the literature on negative polarity (e.g. Hoeksema 1983, Ladusaw 1980, 1983). But we will bring some less well-known facts into the discussion and will then argue that this entire body of facts can be accounted for using the assignment of semantic types to various kinds of phrases. More in particular we will draw on proposals made by Partee and Rooth (1983) and Partee (1987). We will conclude that NPI-triggers do not only have to have the right monotonicity properties, they also have to meet conditions on their semantic type. We will demonstrate that these conditions provide the right explanation for the facts we consider.

This paper is organized as follows. In the next section we will present the problem of the relation between verbs and verb phrases on the one hand and direct objects and complement sentences on the other. Two solutions to the problem are discussed, both of which are unsatisfying in some respects. In section 3 we will turn to a seemingly unrelated problem and in the fourth and last section we will suggest our solution.

### 2. Verb phrases, direct objects and complement sentences

In (1) below the NPI *anything* is not licensed, but in (2) it is:

- (1) \*Haroun denied anything.
- (2) Haroun denied that he had done anything.

The fact that an inherently negative verb like *deny* does not license an NPI in Direct Object (DO) position is rather surprising in the light of Ladusaw's work. In line with the semantic approach towards negative polarity brought forward by Ladusaw (1980, 1983), Hoeksema (1983) and Zwarts (1986, 1990), the theory of Generalized Quantifiers (cf. Van Benthem 1986, Westerståhl 1989) can be used to explain the difference between (1) and (2). (e.g. Hoekstra 1989, 1991; see for a syntactic account Progovac 1988, 1992 and for discussion Kas 1992). In the GQ-framework, NPs, for instance the DO in (1), denote functors that take the verb as their argument. Since only functors can act as triggers, we expect NPs to trigger negative polarity on verbs. That this is the case, is attested in (3) and (4), where the Dutch negative polarity

verb *hoeven* 'need' is triggered by the downward entailing (DE) NPs *niemand* 'nobody' and *niets* 'nothing'.

- (3) Jan hoeft niemand te vrezen.  
 Jan need nobody to fear  
 (4) Jan hoeft niets te doen.  
 Jan need nothing to do

However, we don't expect verbs to trigger negative polarity on NPs. This expectation is borne out in (1) and similar examples from Dutch in (5) and (6).

- (5) \*Jan ontkende ook maar iets.  
 Jan denied anything  
 (6) \*Jan weigerde ook maar iets.  
 Jan refused anything

In (2), on the other hand, our best guess would be that the NPI *anything* is licensed by the verb *deny*. That this is a good guess indeed appears on closer inspection of the verb. It turns out that *deny* qualifies as a monotone decreasing expression. This is demonstrated in (7), which shows an inferential pattern typical for downward monotonicity: if it were the case that Haroun denied that he dreamed, this implies that he also denied that he dreamed restlessly. If, on the other hand, Haroun denied that he dreamed restlessly, we cannot conclude that he denied that he dreamed. Maybe he denied that he dreamed beautifully.

- (7) Haroun denied that he dreamed --> <-/  
 Haroun denied that he dreamed restlessly

The opposite pattern is found in (8), which shows that the verb *confess* is upward monotone.

- (8) Haroun confessed that he dreamed -/> <--  
 Haroun confessed that he dreamed restlessly

We thus observe that a verb like *deny* behaves differently in the neighbourhood of an DO-NP and a complement S. Hoekstra explains this state of affairs as follows: *deny* is apparently an argument with respect to DO-NPs and a functor with respect to complement Ss.

This analysis, however, raises the question how to deal with the classic negative polarity facts in (9) and (10).

- (9) No child has said anything.

- (10) \*All children have said anything.

In (9) the NPI is licensed by the downward entailing expression *no child*. In (10) *all children* is upward monotone, thus the NPI is not triggered. Compare these sentences with (1), (5) and (6). Why is in these latter sentences the DO-NP the functor and in (9) and (10) the subject NP? Is there a reason why it is not the other way around? Why does the DO-NP in (9) obviously not have the status of functor? If *anything* were a functor, we would have predicted that (11) is unacceptable. In short, why is the solution to the ungrammaticality of (1), (5) and (6) not applicable to (9), a sentence with exactly the same structure?

We have to conclude that Hoekstra's analysis provides an answer for the difference between (1) and (2), but fails to do so with respect to (9) and (10).

Another analysis was suggested to us by Frans Zwarts (p.c.). Verbs like *deny*, he argues, are assigned two (independent) categories. In sentences like (1), with a DO-NP, they get the category VP/NP and in sentences like (2), with a complement sentence, they get the category VP/S. Note that on the syntactic level the verb is treated in both cases as a functor. The crucial difference between these assignments shows up at the semantic level. In (1) the predicate *Haroun denied*, taking the DO as an argument, can be considered to be denoting a *homomorphism* (cf. section 3), the complement sentence-taking predicate *Haroun denied* can not. As is demonstrated in e.g. Keenan and Faltz (1985) and Zwarts (1986) homomorphisms are always monotone increasing. Therefore the NPI *anything* cannot occur in (1): the necessary decreasing environment is not available.

As we have already seen above, *Haroun denied* is decreasing with respect to a complement S, which explains the occurrence of the NPI.

Thus according to Zwarts there are two different *deny*'s: the DO-NP-taking *deny* is a functor of category VP/NP and denotes a homomorphism, the complement sentence-taking *deny* is of category VP/S and denotes a decreasing function.

There may be, however, some doubts about the semantic status of the predicate *Haroun denied*. Consider the examples (11) and (12) from Dutch.

- (11) Geen van de kinderen hoorde ook maar iets.  
None of the children heard anything
- (12) \*Ook maar iets hoorde geen van de kinderen.  
Anything heard none of the children

In (11) the decreasing predicate *geen van de kinderen* 'none of the children' forms together with the verb *hoorde* 'heard' a predicate. This predicate appears to be decreasing as well, since it licenses the NPI *ook maar iets* 'anything'. But, surprisingly, the same predicate fails to do so in (12). Hence we cannot be sure about the semantic status of predicates.

But if we do not know for sure whether the predicate in (1) is monotone increasing or decreasing, this deprives Zwarts of his explanation of the ungrammaticality of this sentence, since it is now unclear whether the predicate can act as a trigger or not.

To summarize, we have considered two analyses to deal with the facts in (1) to (6). Neither turned out to be satisfactory. We will therefore explore yet another track. But before we do so, we first turn to a seemingly unrelated matter.

### 3. Linearity restrictions on NPIs

In literature on NPIs it is generally assumed that an NPI may not precede its trigger. Consider the Dutch example (13).

- (13) \*Ook maar iemand heeft niemand gezien.  
           Anyone           has nobody seen

This rule of thumb has been accounted for along syntactic lines (cf. c-command relations) and semantic lines (the formation of non-DE predicates from DE and non-DE expressions). Hoekstra, De Hoop and Zwarts (1988) (= HHZ) show that neither the syntactic nor the semantic account suffices. C-command falls short of explaining sentences with negative polarity verbs, like Dutch *hoeven* 'need' in (4) and (5) above and (14) below.

- (14) U hoeft zich tegen niemand te verzetten.  
       You need you-REFL against nobody to resist

The trigger *niemand* 'nobody' is embedded in a PP and can impossibly c-command the NPI *hoeft*.

The shortcomings of the formation of predicates has already been demonstrated in (11) and (12) above.

HHZ nevertheless observed that in Dutch there are sentences in which the NPI *can* precede its trigger, witness (15) and (16).

- (15) [Dat ook maar iemand ontslagen zou worden] had niemand  
 That anyone fired would be had nobody  
 verwacht.  
 expected

Thus it appears that sometimes NPIs may not be topicalized (as in (12) and (13)), while at other times they may (cf. (15)). From facts like these HHZ conclude that only *naked* NPIs may not precede their trigger. Once the NPI is embedded in another constituent, for instance a complement S in (15), the 'linearity restriction' does not longer hold, although it is unclear why this is the case.

#### 4. NPIs and type assignments

##### 4.1 Possible types

To deal with the matters we have raised, that is the facts in (1) to (6) and the linearity restrictions illustrated in (12), (13) and (15), we propose to look at the semantic types of NPIs and their triggers. The table in (16) lists type assignments that have been proposed in e.g. Partee (1987) and Partee and Rooth (1983).

(16)

|   | category | type                                                         | example                    |
|---|----------|--------------------------------------------------------------|----------------------------|
| a | NP       | $e$                                                          | John                       |
| b |          | $\langle e, t \rangle$                                       | an island                  |
| c |          | $\langle \langle e, t \rangle, t \rangle$                    | every child                |
| d | IV       | $\langle e, t \rangle$                                       | sleep                      |
| e | TV       | $\langle e, \langle e, t \rangle \rangle$                    | buy                        |
| f | AdvP     | $\langle \langle e, t \rangle, \langle e, t \rangle \rangle$ | never                      |
| g | PP       | $\langle \langle e, t \rangle, \langle e, t \rangle \rangle$ | in                         |
| h | S        | $t$                                                          | ...that John<br>saw a bear |

In Partee (1987) the types listed in (16a, b and c) are connected to each other through Typeshifting Principles. These principles are needed, since Partee proposes (contra Montague 1973) to enter phrases in their lowest type. As a consequence a proper name like *John* is initially assigned type  $e$ , and this type is lifted to  $\langle \langle e, t \rangle, t \rangle$  only in case it is needed. For instance, assuming that phrases can only be conjoined compositionally if they bear the same type (but cf. Hoeksema 1988), *John* has to be of type  $\langle \langle e, t \rangle, t \rangle$  to be conjoined with a quantificational NP like *every child*. Compare (17).

- (17) [John and every child] ran on the beach.

Partee calls  $e$  and  $\langle \langle e,t \rangle, t \rangle$  the unmarked types for NPs. The so-called predicative type  $\langle e,t \rangle$  is marked, but is needed in sentences like (18).

(18) I consider that (to be) an island.

Partee notes that not every NP can occur in a predicative position, witness (19).

(19) I consider that (to be) two islands/many islands/the harbor/  
\*every island/\*most islands/\*this island.

This means that NPs are, in fact, associated with various interpretations. The Typeshifting Principles are needed to predict what possible interpretations an NP will have.

#### 4.2 The type of NP-NPIs

Returning to our NPIs we may wonder whether there are reasons to assign NP-NPIs a type higher than just  $e$ . As we have seen, the sentence *I consider that (to be) X* is diagnostic for the  $\langle e,t \rangle$ -interpretation of an NP. However, this test cannot be applied in this form to NPIs, since NPIs need a downward entailing environment. Even the negation of the predicate (as in (20)) is insufficient, since we have seen that NPIs cannot occur as direct objects of downward entailing predicates.

(20) \*I [did not consider] that (to be) anything.

Parallel to (11) we have to take a downward entailing subject NP to create the right testing environment. We then obtain (21).

(21) \*No man considered that (to be) anything.

We see that the sentence is still unacceptable and therefore conclude that NPIs are not of type  $\langle e,t \rangle$ .

The next question is whether NPIs can be of type  $\langle \langle e,t \rangle, t \rangle$ . To find an answer we could apply the conjunction test (cf. (17)). (22) shows a perfect Dutch sentence in which the negative adverb *nooit* 'never' triggers the NPI *ook maar iemand* 'anyone'.

(22) Nooit heb ik ook maar iemand in de tuin gezien.  
Never have I anyone in the garden seen



- (25) Each man runs.  
 $\langle\langle e, t \rangle, t \rangle \langle e, t \rangle$   
 -----  
 t
- (26) Each man runs.  
 $\langle\langle e, t \rangle, t \rangle \langle e, t \rangle$   
 ----- lift  
 $\langle\langle\langle e, t \rangle, t \rangle, t \rangle$   
 -----  
 t

In (25) the quantifier *each man* is the functor, taking the VP as argument. In (26) the argument *runs* is lifted to the status of functor, now being able to take *each man* as an argument.

There is a lot to say about this view on VPs and its consequences (see for instance Van Benthem 1991), but we will leave these problems undiscussed. The only thing what matters here is the observation that lifting turns a VP into a functor. This is undesirable for negative polarity verbs, since they always have to be the argument of a downward entailing expression. Lifting a verb like *hoeven* would trigger the lifting of the downward entailing expression which licenses it. Although this is not impossible, it is in defiance of the assumption that phrases enter in their lowest type and that lifting is heavily restricted. We therefore conclude that negative polarity verbs are, just like the NP-NPIs, never lifted.

### 5. Degree and conditions

Our next step is to formulate conditions on the types of various kinds of phrases. To be able to do so, we use a semantic adaptation of the syntactic notion *degree* which can be found in Moortgat (1988).

- (27) Degree of a type (syntactic version) = the number of typeforming connectives in it.

In a semantic environment the relevant factor is not the number of typeforming connectives, but the number of *t*'s. The number of *t*'s expresses how many sets are involved in the denotation and can therefore be considered to be a measure of the semantic complexity of the type. Hence we establish:

- (28) Degree of a type (semantic version) = the number of *t*'s in it.

The conditions are listed in (29), where  $D(NP, PP)$  means: the degree of an NP or PP. So (29b) states that for NPI licensing it is necessary that the degree of an NP or PP must be greater than that of a verb or a VP, which in its turn needs to be greater than the type of a complement sentence.

Conditions with respect to NPI licensing

- (29) a  $D(\text{NPI}) \leq D(\text{trigger})$   
 b  $D(\text{NP}, \text{PP}) > D(\text{V}, \text{VP}) > D(\text{S})$   
 c If an  $\text{NP}_1$  or  $\text{PP}_1$  precedes an  $\text{NP}_2$  or  $\text{PP}_2$  and if  $\text{NP}_1/\text{PP}_1$  and  $\text{NP}_2/\text{PP}_2$  are clausemates, then  $D(\text{NP}_1/\text{PP}_1) > D(\text{NP}_2/\text{PP}_2)$

## 6. Our analysis

Let us see how we can now deal with (1) to (6) and (9) to (15). We first concentrate on sentences (1), (5), (6), because they all have the same syntactic structure:

(30)

|          |              |             |               |
|----------|--------------|-------------|---------------|
| a        | *Haroun      | denied      | anything      |
| b        | *Jan         | ontkende    | ook maar iets |
| c        | *Jan         | weigerde    | ook maar iets |
| category | (subject) NP | VP          | (object) NP   |
| type     | e            | <e, <e, t>> | e             |
| degree   | 0            | 1           | 0             |

We begin by assigning the phrases their lowest types. Hence the NPs enter as *e* and the VP as <*e*, <*e*, *t*>>. We observe that in this constellation condition (29a) is obeyed, whether we consider the subject NP to be the trigger or the VP. In both cases the degree of the NPI is smaller than or equal to the degree of the trigger.

Condition (29b), however, is violated. (29b) prescribes that  $D(\text{NP}_1) > D(\text{VP})$ . Since in (30)  $D(\text{NP}_1) = 0$  and  $D(\text{VP}) = 1$ , this condition is not met.

The same holds for condition (29c). According to this condition for clausemates  $\text{NP}_1$  and  $\text{NP}_2$  it holds that  $D(\text{NP}_1) > D(\text{NP}_2)$ , which is not the case.

Since two of the three conditions are not observed, we now enter into the lifting of types along the lines sketched by Partee and indicated above. This means that the only phrase that is eligible for lifting is the subject NP. We thus obtain the following distribution of types.

(31)

|          |              |             |               |
|----------|--------------|-------------|---------------|
| a        | *Haroun      | denied      | anything      |
| b        | *Jan         | ontkende    | ook maar iets |
| c        | *Jan         | weigerde    | ook maar iets |
| category | (subject) NP | VP          | (object) NP   |
| type     | <<e, t>, t>  | <e, <e, t>> | e             |
| degree   | 2            | 1           | 0             |

Condition (29a) is still obeyed, but, more importantly, (29b) and (29c) are now also met:  $(29b) = D(\text{NP}_1) > D(\text{VP}) = 2 > 1$ ;  $(29c) = D(\text{NP}_1) > D(\text{NP}_2) = 2 > 0$

So in (31) we have created the right analysis of the sentences involved. The reason why they are ungrammatical is now perfectly clear: the subject NP functions in (31) as a functor, which takes (ultimately) the NPI as an argument. Since the subject NP is in none of the three sentences downward increasing, the monotonicity condition for negative polarity licensing is not fulfilled. Hence the sentences are ungrammatical.

We can attest the viability of this line of reasoning by taking into account the sentences (9) to (11). Cf. (32).

- (32) a No child has said anything (= (9))  
 b \*All children have said anything (= (10))  
 c Geen van de kinderen hoorde ook maar iets (= (11))

In (32) the subject NPs enter directly type  $\langle\langle e,t \rangle, t \rangle$  because of their quantificational nature. Thus the type assignment of (32) reaches in one step the constellation depicted in (31). We observe that (32a) and (32c) are grammatical, whereas (32b) is not. The reason is now obvious: (32a) and (32c) do not only obey the conditions in (29), the subject NPs *no child* and *geen van de kinderen* 'none of the children' are both downward entailing and thus do also observe the monotonicity condition for NPI licensing. In (32b) all conditions on the degrees of types are met, but the monotonicity condition is violated.

How does our analysis work if the verb is the NPI? Consider (33).

(33)

|          | Jan<br>'Jan' | hoeft<br>'needs'                          | niemand<br>'nobody'                      | te vrezen<br>'to fear' |
|----------|--------------|-------------------------------------------|------------------------------------------|------------------------|
| category | NP           | VP                                        | NP                                       | V                      |
| type     | e            | $\langle e, \langle e, t \rangle \rangle$ | $\langle\langle e, t \rangle, t \rangle$ | (not relevant)         |
| degree   | 0            | 1                                         | 2                                        |                        |

Condition (29b) is obeyed, because the degree of the quantificational NP *niemand* 'nobody' is greater than the degree of the negative polarity verb *hoeven* 'need'. (29a) is also obeyed, just like the monotonicity condition. Hence the sentence is grammatical. Sentences (4) and (14) can be dealt with along the same lines.

The only problematic sentences we have not discussed yet are the ones in which the 'linearity restriction' holds (see section 3). We first focus on (12), repeated and analyzed in (34).

(34)

|          |                                 |                   |                                                      |
|----------|---------------------------------|-------------------|------------------------------------------------------|
|          | *Ook maar<br>iets<br>'Anything' | hoorde<br>'heard' | geen van de<br>kinderen<br>'none of the<br>children' |
| category | NP                              | VP                | NP                                                   |
| type     | e                               | (not<br>relevant) | <<e,t>,t>                                            |
| degree   | 0                               |                   | 2                                                    |

The NPI *ook maar iets* precedes the downward entailing expression *geen van de kinderen*. In this sentence the NPI and the downward entailing expression are clausemates. However, the degree of the NPI is smaller than the degree of the downward entailing expression. Thus condition (29c) is violated. Since there is no way available in which this situation can be changed (the NPI may not be lifted), the sentence has to be ruled out. Sentence (13) can be treated in the same way.

Our last example is (15), repeated in (35). In this sentence the complement sentence, in which the NPI is embedded, is preposed. In this case the relevant type is not that of the NPI, but the type of the complement S (*NR* = Not Relevant).

(35)

|          |                                                                                |              |                     |                        |
|----------|--------------------------------------------------------------------------------|--------------|---------------------|------------------------|
|          | Dat ook maar iemand<br>ontslagen zou worden<br>'That anyone would<br>be fired' | had<br>'had' | niemand<br>'nobody' | verwacht<br>'expected' |
| category | S                                                                              | VP           | NP                  | V                      |
| type     | t                                                                              | NR           | <<e,t>,t>           | NR                     |
| degree   | 1                                                                              |              | 2                   |                        |

Since both (29a) and (29b) (and on top of that the monotonicity condition) are obeyed, the sentence is predicted to be grammatical. Which is indeed the case.

## 7. Conclusion

We have demonstrated that a collection of seemingly unrelated facts concerning NPI licensing in English and Dutch can be given a coherent explanation by (1) using a semantic version of the notion degree and (2) defining three conditions on the degree of the semantic types assigned to various kinds of phrases. This approach shows that even NPI-phenomena which appear at first sight to have a syntactic basis, like the linearity restrictions discussed in section 3, can be accounted for in semantic terms.

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## References

- Benthem, J. van (1986) *Essays in logical semantics*. Dordrecht: Reidel.
- Benthem, J. van (1991) *Language in action*. Amsterdam: North-Holland.
- Hoeksema, J. (1983) Negative Polarity and the Comparative, in: *Natural Language and Linguistic Theory* 1, 404-434.
- Hoeksema, J. (1988) 'The Semantics of Non-Boolean AND', in: *Journal of Semantics* 6, 19-40.
- Hoekstra, E. (1989) Polaire asymmetrieën tussen NP en S, in: *TABU* 19, 86-97.
- Hoekstra, E. (1991) *Licensing Conditions on Phrase Structure*. Doctoral dissertation University of Groningen.
- Hoekstra, E., H. de Hoop and F. Zwarts (1988) Lineaire restricties op negatief polaire uitdrukkingen, in: *TABU* 18, 226-235.
- Kas, M. (1992) Negative Polarity and a Hierarchy of Grammatical Functions, in: D. Gilbers and S. Looyenga (eds.) *Language and Cognition* 2. University of Groningen, 181-192.
- Keenan, E., and L. Faltz (1985) *Boolean Semantics for Natural Language*. Dordrecht: Reidel.
- Ladusaw, W. (1980) *Polarity sensitivity as inherent scope relations*. New York: Garland
- Ladusaw, B. (1983) Logical Form and Conditions on Grammaticality, in: *Linguistics and Philosophy* 6, 373-392.
- Moortgat, M. (1988) *Categorial Investigations*. Diss Univ of Amsterdam.
- Partee, B. (1987) Noun Phrase Interpretation and Type-shifting Principles, in: J. Groenendijk, D. de Jongh and M. Stokhof (eds.) *Studies in Discourse Representation Theory and the Theory of Generalized Quantifiers*. Dordrecht/Providence: Foris.
- Partee, B., and M. Rooth (1983) Generalized Conjunction and Type Ambiguity, in: R. Bäuerle, C. Schwarze and A. von Stechow (eds.) *Meaning, Use, and Interpretation of Language*. Berlin: De Gruyter.
- Progovac, L. (1988) *A Binding Approach to Polarity Sensitivity*. Diss USC.
- Progovac, L. (1992) Nonnegative Polarity Licensing Must Involve Comp. in: *Linguistic Inquiry* 23, 341-347.
- Westerståhl, D. (1989) 'Quantifiers in natural languages'. In: D. Gabbay and F. Guenther (eds.) *Handbook of philosophical logic IV*. Dordrecht: Reidel, 1-131.
- Zwarts, F. (1986) *Categoriale grammatica en algebraïsche semantiek*. Doctoral dissertation, University of Groningen.
- Zwarts, F. (1990) 'The syntax and semantics of negative polarity'. In: S. Busemann et al. (eds.) *Views on the syntax-semantics interface II*. Berlin: to appear.

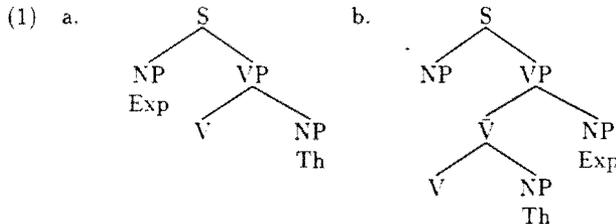
# Russian Psych Verbs and Refining the UTAH

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The Uniformity of Theta Assignment Hypothesis (UTAH) states that identical thematic relations are represented by identical structural relations at D-structure (Baker 1988). The structure of psych verbs often poses a problem for the UTAH. In this paper I discuss the structure of Russian psych verbs and show that the different classes of verbs actually have different semantics. These semantic differences are relevant for the construction of thematic roles. The first section of this paper discusses Belletti and Rizzi's account of Italian psych verbs. The next section shows that although Russian psych verbs superficially resemble their Italian counterparts, their underlying structure differs significantly. The structures needed for Russian violate any direct interpretation of the UTAH: in some structures the experiencer is projected higher than the theme, while in others the theme is higher. The third section is concerned with semantic differences amongst the predicates, and the fourth provides an analysis using Dowty's Proto-roles. The basic proposal is that the traditional thematic role labels are too vague and that certain semantic components, similar to the information often assumed to be used to derive theta-roles, are necessary for projection into the syntax. This allows us to maintain a modified version of the UTAH in which thematically higher arguments are projected higher in the syntax.

## 1 Italian Psych Verbs: Belletti and Rizzi 1988

Belletti and Rizzi 1988 identify three classes of psych verbs in Italian. The first has an experiencer subject and a theme object (*temere* type verbs). These verbs are assigned a D-structure similar to that of any other transitive verb with the subject generated under S, (1a). The other two types have the theme as the subject, and the experiencer is either marked with accusative (*preoccupare* type) or with dative case (*piacere* type), (1b).



In (1b) both the experiencer and the theme are generated VP internally (evidence for this structure includes: anaphoric cliticization, arbitrary pro.

causatives, passives, anaphors, island facts, and choice of auxiliary). The experiencer is assigned inherent, not structural, case: either accusative or dative depending on the verb. In order to get case the theme must move to subject position since the verb itself does not assign structural case to that position.

## 2 Russian Psych Verbs

Belletti and Rizzi's analysis of Italian psych verbs cannot be adopted outright for Russian, although the verb classes are similar as far as case marking is concerned.

- (2) a. Type I: ja ljublju starje knigi  
I-NOM love old books-ACC  
I love old books.
- b. Type II: mne nravjatsja starje knigi  
me-DAT like old books-NOM  
I like old books.
- c. Type III: menja interesujut starje knigi  
me-ACC interest old books-NOM  
Old books interest me.

(2a) is like the Italian *temere* class with a nominative experiencer and an accusative theme. (2b) is like the Italian *piacere* class with a nominative theme and a dative experiencer. (2c) is like the Italian *preoccupare* class with a nominative theme and an accusative experiencer. I will refer to these as Type I, II, and III verbs respectively. Some sample verbs from each type are shown below; note that Type II verbs form a very small class compared to Type I and III verbs.

Type I: *ljubit* 'love', *uvažat* 'respect', *nenavidet* 'hate'...  
Type II: *nravit sja* 'please', *naskučit* 'bore', *dosaždat* 'annoy'...  
Type III: *očarovat* 'fascinate', *ogorčat* 'upset', *interesovat* 'interest'...

### 2.1 The Genitive of Negation

The genitive of negation marks certain NPs in Russian with the genitive case when the verb is negated (many factors determine whether the genitive or the accusative is preferred in a given context (Timberlake 1986)). Objects which would otherwise be marked with accusative case may be marked with the genitive when they are in the scope of sentential negation. (3).

- (3) ja ne vižu knigi  
 I not see book-GEN  
 I do not see the/a book.

The genitive of negation can apply to the subjects of certain intransitive verbs, namely unaccusatives, (4), and passives, (5), in contrast with unergatives, (6).

- (4) ne pojavilos' studentov  
 not show up-SG students-GEN  
 No students showed up. (Pesetsky 1982:66)

- (5) ni odnogo goroda ne bylo vzjato  
 not one city-GEN not was-SG taken  
 Not one city was taken. (Chvany 1975:184)

- (6) \*v pivbarax kul'turnyx ljudej ne p'jet  
 in beerhalls cultured-GEN people-GEN not drink-SG  
 Cultured people do not drink in beerhalls. (Pesetsky 1982:43)

The data in (3)–(6) might indicate that the genitive of negation is sensitive to themes, but not agents. However, accusative time adverbials, (7), and accusatives marking distance may also appear in the genitive (Chvany 1975).

- (7) ja ni odnoj minuty ne spal  
 I not one minute-GEN not slept  
 I did not sleep a single minute. (Chvany 1975)

The distribution of the genitive of negation in Russian has been linked to the existence of a VP (Pesetsky 1982). In Pesetsky's account the genitive of negation affects phrases appearing as right sister to the verb at D-structure. Direct objects, subjects of unaccusatives and passives, and the adverbials all originate within the VP as sister to the verb. Subjects of transitive verbs and unergatives do not.

Pesetsky did not discuss sentences with two genitives, as in (8). In (8) both the direct object *televizora* and the time adverbial *odnoj minuty* are in the genitive.

- (8) ja ni odnoj minuty ne smotrel televizora  
 I not one-GEN minute-GEN not watch television-GEN  
 I didn't watch television for a single minute.

I assume that (8) has a D-structure in which both the object and the adverbial are in the VP at D-structure and both are assigned structural Case. Since both can undergo the genitive of negation, I assume that the domain of the genitive of negation is the VP and is not restricted to direct sisters of V.

- (9) **Genitive of Negation:** any NP within the maximal projection of V at D-structure may be assigned genitive case when the sentence is negated, if that NP does not receive inherent Case.

### 2.1.1 Genitive Themes of Psych Verbs

If Russian psych verbs are similar to their Italian counterparts, then the theme of Type I, II, and III verbs will be in the VP at D-structure. Since these themes originate in the VP as sister to V, they should be able to appear in the genitive under negation.

- (10) ja ne ljublju knjig  
I not love books-GEN  
I don't like books. (Type I)
- (11) \*ni odnogo studenta tam mne ne ponravilos'  
not one student-GEN there me-DAT not like  
I didn't like a single student there. (Type II)
- (12) \*menja ne udivilo ni odnogo studenta  
me-ACC not surprise not one student-GEN  
Not a single student surprised me. (Type III)

The theme in Type I verbs like (10) can undergo the genitive of negation. This is not surprising given that the theme is the object of the verb: objects are the canonical undergoers of the genitive of negation. Next consider Type II and III verbs, (11) and (12). The theme of these is marked with nominative case and the experiencer with dative and accusative case respectively. With these verbs, the theme cannot appear in the genitive under negation, even when emphatic negation is used.

Thus, there appears to be split in the behavior of Russian psych verbs: 1) Type I verbs allow their theme to appear in the genitive, as predicted if they have a structure similar to the Italian; 2) Type II and III verbs do not allow genitive themes, contrary to what would be expected given an Italian-like structure.

### 2.1.2 Genitive Experiencers of Psych Verbs

The Italian-like structure predicts that the experiencers of Type I, II, and III verbs will not undergo the genitive of negation. The experiencer of Type I verbs will not appear in the genitive because it is an external argument. As for Type II and III verbs, the genitive of negation only applies to NPs that receive structural Case. Belletti and Rizzi claim that the accusative and dative experiencers of Italian psych verbs are inherently case marked. If the experiencer of Type II and III verbs is inherently case marked, then that argument must always appear in that case.

- (13) \*detej            ne ljubit ètot fil'm  
 children-GEN not love this film  
 Children don't love this film. (Type I)
- (14) \*ètot fil'm        ne naskuèit detej  
 This film-NOM not bore children-GEN  
 This film will not bore (the) children. (Type II)
- (15) ni odin student        ne udivil učitel'nicy  
 not one student-NOM not surprise teacher-GEN  
 Not one student surprised the teacher. (Type III)

In (13) and (14) the experiencer cannot appear in the genitive. The experiencer of the Type I verb in (13) is an external argument, and that of the Type II verb in (14) is inherently marked with dative case. However in (15) the experiencer can appear in the genitive. This indicates that the accusative case assigned to the experiencer of Type III cannot be inherent Case, unlike the Italian. Instead, the experiencer is assigned structural Case.

## 2.2 Passives and Inherent Case

There is additional evidence that the accusative assigned by Type III verbs is not inherent. It is possible to form passives from these verbs in which the experiencer surfaces as a nominative case subject. If accusative case were assigned inherently to the experiencer, as it is in Italian, the experiencer would not receive nominative case when the verb was passivized.

- (16) student        byl ogorèen ploxoj otmetkoj  
 student-NOM was upset bad grade  
 The student was upset by the bad grade. (Type III)

Type I verbs can also undergo passivization. With these verbs, it is the theme that becomes the grammatical subject. However, Type II verbs cannot. There may be independent reasons that Type II verbs cannot undergo passivization. The first is that the inherent dative case is incompatible with subject position. The second is that the dative may in fact not be an object, but an oblique.

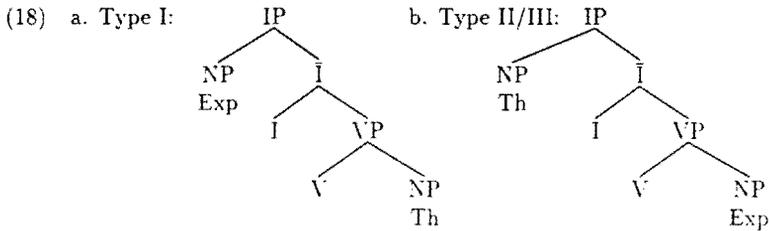
## 2.3 The Structure of Psych Verbs

The main syntactic differences between the different types of Russian psych verbs are summarized in (17).

(17)

|                    | I | II | III |
|--------------------|---|----|-----|
| Theme in Genitive: | ✓ | *  | *   |
| Exp in Genitive:   | * | *  | ✓   |
| Inherent Case:     | * | ✓  | *   |
| Passive Form:      | ✓ | *  | ✓   |

Type I psych verbs have a structure as in (18a), similar to the Italian verbs. The experiencer is projected as the external argument and the theme as the internal argument. The theme, but not the experiencer, will undergo the genitive of negation since only the theme meets the structural requirements in (9). Type II and III psych verbs are unlike their Italian counterparts. The genitive of negation facts indicate that the theme is not within the VP at D-structure, while the experiencer is, (18b).



### 3 Theta-Roles

The structures in (18a) and (18b) do capture the Russian facts. However, they violate the UTAH if, as usually assumed, these verbs involve an experiencer and a theme. If Baker's version of the UTAH is taken literally, (19), the experiencer and theme are not projected identically at D-structure since the experiencer is an external argument in (18a), but an internal one in (18b).

- (19) **UNIFORMITY OF THETA ASSIGNMENT HYPOTHESIS (UTAH):**  
 Identical thematic relationships between items are represented by identical structural relationships between those items at the level of D-structure. (Baker 1988:46)

Even if a somewhat weaker version of the UTAH is considered, these structures are not consistent with it. For example, Speas 1990 proposes that relative prominence is relevant for the UTAH, (20).

- (20) The UTAH states that relative prominence in the Thematic Hierarchy must correspond to relative prominence in syntax. (Speas 1990:90)

The structure of Italian psych verbs ((1a) and (1b)) is consistent with the UTAH as interpreted in (20). However, consider the structure of the Type II and III verbs in (18b). The theme has been projected into a higher position than the experiencer, which should not be possible, especially given the structure of Type I verbs in (18a).

The answer to this problem lies in the actual theta roles assigned to the different verb classes. In addition to the syntactic differences amongst the classes, there are also semantic differences that affect theta role assignment. It is notoriously difficult to accurately label thematic roles (see discussion and references in Dowty 1991), and there have been a number of proposals concerning deriving thematic roles from various semantic factors (Grimshaw 1990, Jackendoff 1990, Dowty 1991, etc.). The semantic differences amongst the predicates potentially allow for the predicates to project different thematic roles, which in turn project differently into the syntax.

For the sake of simplicity, I will continue to refer to the arguments of the different types of psych verbs as themes and experiencers.

### 3.1 Reflexives

There are several dialects of the possessive reflexive *svoj*. In all dialects, grammatical subjects are the preferred antecedents of the reflexive. The split occurs when the subject is an inappropriate antecedent. The dialect discussed here allows non-subject antecedents when they are the 'most prominent' argument of the predicate (see Klenin 1974, Bailyn 1991).

With Type I verbs a reflexive can only refer to the experiencer, which is both the grammatical subject and, by most accounts, the most prominent argument on the theta hierarchy.

- (21) *anna nenavidit innu v svoem dome*  
 Anna-NOM hates Inna-ACC in self's house  
 Anna<sub>i</sub> hates Inna<sub>j</sub> at her<sub>i,\*,j</sub> house. (Type I)

With Type II psych verbs, since the theme is the grammatical subject, it should be the antecedent of the reflexive, (22).

- (22) *boris nraivitsja ivanu v svoem dome*  
 Boris-NOM likes Ivan-DAT in self's house  
 Ivan<sub>i</sub> likes Boris<sub>j</sub> at his<sub>j,\*,i</sub> house. (Type II)

In (22) the theme, *Boris*, is the antecedent of the reflexive. The experiencer, *Ivanu*, cannot be the antecedent. However, if the nominative subject is an inappropriate antecedent, the reflexive can take the experiencer as its antecedent.

- (23) *anne nraivitsja èta kniga v svoem dome*  
 Anna-DAT like this book-NOM in self's house  
 Anna<sub>i</sub> likes this book at her<sub>i</sub> house. (Type II)

The dative experiencer, *anne*, is the antecedent of the reflexive in (23). Although the experiencer is not the grammatical subject, it can antecede a reflexive.

With Type III verbs, since the theme is the grammatical subject, it can be the antecedent of a reflexive pronoun, (24).

- (24) *pisatel' zainteresoval ivana v svoem dome*  
 writer-NOM interested Ivan-ACC at self house  
 The writer<sub>i</sub> interested Ivan<sub>j</sub> at his<sub>i,j</sub> house. (Type III)

If the Type III verbs are like the Type II verbs, then when the subject is not an appropriate antecedent for the reflexive, the experiencer should be able to antecede the reflexive. However, this is not possible, (25).

- (25) \**ivana zainteresovala èta kniga v svoem dome*  
 Ivan-ACC interested this book-NOM in self's house  
 This book interested Ivan<sub>i</sub> at his<sub>i</sub> house. (Type III)

At first glance, the difference between Type II and III verbs would seem to indicate a difference in prominence: in Type II verbs the experiencer is more prominent than the theme, while in Type III verbs it is not. However, in this dialect, accusatives can never be antecedents of *svoj*. Consider (26) where the accusative experiencer is the only argument of the verb, hence by default the most prominent, yet it cannot antecede the reflexive.

- (26) \**innu tošnilo v svoem dome*  
 Inna-ACC sick in self's house  
 Inna<sub>i</sub> was sick at her<sub>i</sub> house.

Thus, it is possible that the relative prominence of the arguments in Type II and Type III verbs is identical. The difference in their behavior with reflexives is due to the difference in case marking.

### 3.2 Volitionality

Volitionality is often associated with agents, although volitionality in itself is not sufficient for agentivity. The themes of Type I, II and III verbs need not be volitional since they can be inanimate. Also, although the experiencers of all three types of verbs must be sentient, they need not be volitional.

One test for volitionality is whether a predicate is compatible with adverbs like *namerenno* 'intentionally'. Co-occurrence with such adverbs indicates that the predicate is compatible with volitionality.

- (27) a. \**inna namerenno nraivilas' borisu*  
 inna-NOM intentionally pleased-IMP Boris-DAT  
 Inna intentionally was pleasing Boris. (Type II)

- b. inna namerenno ponravilas' borisu  
 inna-NOM intentionally pleased-PERF Boris-DAT  
 Inna intentionally pleased Boris. (Type II)
- (28) a. \*inna namerenno interesovala borisu  
 Inna-NOM intentionally interested-IMP Boris-DAT  
 Inna intentionally was interesting to Boris. (Type III)
- b. inna namerenno zainteresovala borisu  
 Inna-NOM intentionally interested-PERF Boris-DAT  
 Inna intentionally interested Boris. (Type III)

Intentionality can be attributed to the theme in the perfective (27b) and (28b), but not the imperfective (27a) and (28a). This may be due to the fact that the perfective forms imply that the theme causes a *change* in state in the experiencer, while the imperfective forms simply imply the existence of a particular state. The intentionality described by the adverb only applies to predicates that involve a change of state or other event.

With Type I verbs, (29), the adverb *namerenno* is impossible, regardless of whether it is construed on behalf of the experiencer or the theme. If the above description of *namerenno* is correct, it is predicted that this adverb cannot occur with Type I verbs since these predicates only have imperfective forms and are always stative.

- (29) \*inna namerenno ljubila borisa  
 Inna-NOM intentionally loved-IMP Boris  
 Inna intentionally loved Boris. (Type I)

### 3.3 Perfective Aspect and Inchoatives

Type I verbs only have imperfective forms, while Type II and III verbs have both perfective and imperfective forms. Croft 1986 noticed that cross-linguistically psych verbs with experiencer subjects have only stative forms, while ones with theme subjects also have inchoative readings. That is, psych verbs with theme subjects describe not only states, but also change of states. If the semantic structure of the verb helps determine the projection of arguments into the syntax, then perhaps the semantic structure that is necessary for inchoatives assigns roles to its arguments that result in this difference (see section 4.1).

### 3.4 Causation and Instrumentals

A final difference between the themes of Type II and III verbs and those of Type I verbs is their ability to appear with an instrumental, indicating causation. Even in the imperfective, Type II and III verbs can appear with an instrumental while Type I verbs cannot.

- (30) a. èti starye knigi interesujut menja svoimi illjustracijami  
 these old books-NOM interest-IMP me-ACC their illustrations-INST  
 These old books interest me by their illustrations. (Type III)
- b. \*ja ljublju èti starye knigi (ix) illjustracijami  
 I-NOM love-IMP these old books-ACC (their) illustrations  
 I love these old books by their illustrations. (Type I)

In (30a) the theme can appear with an instrumental, *svoimi illjustracijami*, while in (30b) it cannot. This suggests that the theme of Type III verbs is the cause of the state, while that of Type I verbs is not. Note that since the theme is inanimate, this behavior cannot be the result of the Type I verb being interpreted as an agentive psych verb.

In conclusion, (31) reiterates the semantic differences and similarities found amongst the predicates.

(31)

|                            | Type I     | Type II/III                 |
|----------------------------|------------|-----------------------------|
| Sentient                   | Exp        | Exp                         |
| Antecede Reflexives        | Exp (Subj) | Th (Subj)/Exp               |
| Intentionality             | —          | Th (perfective)             |
| Cause with Instrumental    | —          | Th                          |
| Change of State/Inchoative | —          | Th: cause<br>Exp: undergoer |

## 4 Analysis

Section 2 argued that Russian psych verbs divide into two classes syntactically, shown in (18a) and (18b). This poses a significant problem for the UTAH if the thematic roles of all three types of psych verbs are identical, i.e., theme and experiencer. Section 3 showed that there are semantic differences between the different types of psych verbs that are indicative of differences in the thematic roles the arguments have, in particular causation of a state or change of state. This section outlines how these differences might be captured, building on previous proposals concerning the semantics of psych verbs. By positing different thematic roles for the different predicates, it is possible to maintain a 'relative prominence' version of the UTAH, (20).

### 4.1 Proto-Agents and Proto-Patients: Dowty 1991

Dowty 1991 proposes that instead of thematic roles there are proto-roles, namely P(roto)-agent and P(roto)-patient. These are defined by the set of properties in (32) (Dowty 1991:572).

- |                                                                 |                                               |
|-----------------------------------------------------------------|-----------------------------------------------|
| (32) Properties of P-agents:                                    | Properties of P-patients:                     |
| 1. volitional involvement in the event/state.                   | 1. undergoes a change of state.               |
| 2. sentience.                                                   | 2. incremental theme.                         |
| 3. causing an event or a change of state in the other argument. | 3. causally affected by the other argument.   |
| 4. movement.                                                    | 4. stationary relative to the other argument. |

In a transitive verb the argument with the most P-agent properties will be realized as the subject and the one with the most P-patient properties as the object. Arguments can have no proto-role properties or both proto-agent and proto-patient properties simultaneously (see below for examples).

Dowty suggests that in psych predicates each argument has one property that is typical of P-agents (Dowty 1991:579–581). The P-agent property of the experiencer is that it must be sentient; the P-agent property of the theme is that it causes an emotional reaction in the experiencer (this presumably corresponds to (32:3) where the emotional reaction is a type of event). So, both have equal claim to being the subject. However, predicates that allow inchoatives entail a change of state for the experiencer. Change of state is a P-patient property. Thus, the experiencer of these verbs will be realized as the object since it has more P-patient properties than the theme does. Dowty's proposal is summarized in (33).

(33)

|                                                           |                                                                                                  |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Stative Only:                                             | Inchoative Possible:                                                                             |
| Theme: cause of event (P-agt)<br>Exp: sentient (P-agt)    | Theme: cause of event (P-agt)<br>Exp: sentient (P-agt)<br>Exp: undergoes change of state (P-pat) |
| Exp subject; Theme object.<br>?Theme subject; Exp object. | Theme subject; Exp object.                                                                       |

Initially, there seem to be several problems with this analysis. First, why are the stative meanings of the potentially inchoative verbs realized identically to the inchoative readings? Dowty predicts that 'please-INCHOATIVE' selects the theme as subject and the experiencer as object, but why couldn't 'please-STATIVE' be realized with an experiencer subject and theme object? This is not a problem if the selection of arguments for any given predicate is fixed in the lexicon. Every verb must conform to the argument selection principles based on the proto-role properties, but the actual linking is specified for each verb, it is not rederived every time the verb is used. The argument selection principles are constraints on the types of lexical predicates that can exist; they are not used in the derivation of the sentence (Dowty 1991:576). If these are constraints on the potential linkings that are part of the verb entry, then the

fact that a verb sometimes must have the theme as subject is sufficient to guarantee that the theme will always be the subject.

However, there is a real problem for Dowty's account of psych verbs: why couldn't there be two stative verbs, 'love1' and 'love2', one with an experiencer subject and one with a theme subject? It seems that verbs which have only stative forms always have experiencer subjects. Dowty's account predicts that there should be such verbs with theme subjects. The next section resolves this problem, considering the behavior of the Russian psych verbs.

## 4.2 Russian Psych Verbs

I argue that in Type I verbs the experiencer has one P-agent property in that it experiencer is sentient. The theme has no proto-role properties. Thus, for Type I verbs, the argument with the most P-agent properties is the experiencer and so it will be the subject. However, the Type III verbs, which form inchoatives, have themes with a P-agent property of causing an event and experiencers with two P-patient properties, causally affected and undergoing a change of state, as well as the P-agent property of sentience. This results in the theme being realized as the subject in Type III verbs and the experiencer as the object; although the experiencer and the theme have equal claim to being the subject, the experiencer has more P-patient properties and thus is a better object.

(34)

|                                              |                                                                                                     |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Type I: <i>ljubit</i> 'love'<br>Stative only | Type III: <i>(za)interesovat</i> 'interest'<br>Inchoative possible                                  |
| Theme: $\emptyset$                           | Theme: cause of event (P-agt)<br>(Theme: cause of change of state (P-agt))                          |
| Exp: sentient (P-agt)                        | Exp: sentient (P-agt)<br>Exp: causally affected (P-pat)<br>(Exp: undergoes change of state (P-pat)) |
| Exp subject; Theme object.                   | Theme subject; Exp object.                                                                          |

(34) uses Dowty's proto-properties with 'cause of event' accounting for the differences between Type I and III predicates regarding instrumentals (section 3.4). The difference between the stative and inchoative forms of Type III verbs is that in the inchoatives the theme is the cause of a *change* of state, in addition to a cause of an event, and the experiencer correspondingly undergoes a change of state. In both forms the experiencer will have the P-patient property of being causally affected.

Finally, consider Type II verbs. Dowty's system accounts for transitive verbs. Since the experiencer in Type II verbs is a dative, it is not clear that it is a direct object. If it is not a direct object, then the verb is intransitive. (The intransitive nature of Type II verbs must be stipulated. However, since this

class is relatively small and unproductive, such a stipulation is not unreasonable.) Let us assume that Dowty derives the difference between unaccusatives and unergatives by projecting the argument of unaccusatives as the object and that of unergatives as the subject. Intransitive verbs whose argument has more P-agent properties project that argument as the subject, and those whose argument has more P-patient properties project it as the object. Like Type III verbs, the theme of Type II verbs is external to the VP at D-structure, which means that the system should treat it as an unergative (see the structure in (18b)). According to the properties assigned to the arguments of the other psych verbs, the theme has a P-agent property, in that it causes a change of state in the inchoative form and an event in the stative form, and no P-patient properties. So, the theme is projected as the subject, as desired.

(35)

|                                                                |
|----------------------------------------------------------------|
| Type II: <i>(po)nravit'sja</i> 'please'<br>Inchoative possible |
| Theme: cause of event (P-agt)                                  |
| (Theme: cause of change of state (P-agt))                      |
| Theme subject.                                                 |

## 5 Conclusion

Evidence from the syntax suggests that Russian psych verbs divide into two classes. In one, the experiencer is the external argument and in the other the theme is the external argument. This contrasts with Italian in which the experiencer is always projected higher than the theme and with some accounts of English psych verbs. The Russian structures violate any interpretation of the UTAH if all psych verbs are assigned experiencer/theme theta-roles. However, if theta-roles are dependent on more detailed semantic properties of the verb, such as sentience and causality, the psych verbs are not in violation of the UTAH when it is interpreted as a statement of relative prominence. Of particular importance for the projection of the arguments of psych verbs is whether the theme causally affects the experiencer. The semantic information used to thematically rank the arguments for projection into the syntax must be sensitive to this distinction. Exactly what form this more elaborated thematic information should take, and whether thematic roles should mediate between the semantic structure and D-structure or whether the D-structure should access semantic structure directly is a matter for further investigation.

## End Notes

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## References

- Bailyn, J. 1991. The Configurationality of Case Assignment in Russian. In *Cornell Working Papers in Linguistics 9*, 56-98.
- Baker, M. 1988. *Incorporation*. University of Chicago Press.
- Belletti, A., and L. Rizzi. 1988. Psych-verbs and  $\Theta$ -Theory. *NLLT* 6:291-352.
- Chvany, C. 1975. *On the Syntax of BE-Sentences in Russian*. Slavica.
- Croft, W. 1986. Surface Subject Choice in Mental Verbs. Linguistic Society of America, New York.
- Dowty, D. 1991. Thematic Proto-roles and Argument Selection. *Language* 67: 547-619.
- Grimshaw, J. 1990. *Argument Structure*. MIT Press.
- Jackendoff, R. 1990. *Semantic Structures*. MIT Press.
- Klenin, E. 1974. *Russian Reflexive Pronouns and the Semantic Roles of Noun Phrases in Sentences*. PhD dissertation, Princeton University.
- Pesetsky, D. 1982. *Paths and Categories*. PhD dissertation, MIT.
- Speas, M. 1990. *Phrase Structure in Natural Language*. Kluwer Academic Publishers.
- Timberlake, A. 1986. Hierarchies in the Genitive of Negation. In R. Brecht and J. Levine (eds.), *Case in Slavic*, 338-360. Slavica Publishers.

## ***Toward A Unified Articulator Theory***

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### **0. Introduction**

Although there have been arguments for an articulator-based hierarchical feature representation (Sagey (1986), McCarthy (1988)), Cho (1991) questions the universality of the subplace articulator nodes. She argues that certain natural classes of segments cannot be defined by postulating the articulator nodes even though these articulator nodes function as a real phonological entity in languages like Sanskrit. She also contends that place assimilation in Korean can be captured in a simpler way if one assumes binary features such as [+/- coronal] under the Place node, hence favoring a parameterized option for the structure of the Place node.

It is more desirable if we can provide a Universal Grammar for all languages since, in that case, we have a more constrained and general theory of what phonological systems can be like, thus attaining a more explanatory theory. For example, if we can solve the problems pointed out by Cho by introducing a Peripheral node dominating Labial and Dorsal nodes and if we have evidence for postulating the node itself, we no longer need the parameterized option for languages like Korean. In this article I argue that we can maintain the universalist position for phonological representations by adopting the Peripheral node.

This article is organized as follows: section 1 examines /n/-retroflexion in Sanskrit and rounding harmony in Ponapean to give arguments for Articulator Theory. Section 2 discusses Cho's arguments for Place of Articulation Theory, focusing on Korean place assimilation. Section 3 examines some problems in Cho's analysis and shows that the problems pointed out by Cho can be solved by introducing the Peripheral node. In this section I also provide some evidence for postulating this node. The conclusion consists of some closing remarks.

### **1. Articulator Theory**

McCarthy (1988) distinguishes two theories concerning the internal structure of the Place node, that is: Articulator Theory (hereafter AT) and Place of Articulation Theory (hereafter PT), which are represented in (1):



across an intervening Coronal node. Hence AT can explain the fact that coronals function as blockers in /n/-retroflexion by the presence of a Coronal node. In contrast, PT cannot explain the fact that only coronals block /n/-retroflexion while non-coronals are transparent to the application of the rule because there is no single class node which groups dentals, retroflexes, and palatals in this theory. In other words, they are all marked for [+coronal] within PT and /n/-retroflexion should be formulated as applying across the [-coronal] segments. However, why only non-coronals but not coronals can optionally intervene between the trigger and the target would remain arbitrary as Cho (1991) points out.

Ponapean also gives an argument for AT. Within a root morpheme, labials in Ponapean must agree in rounding as in (4) (Yip (1989)):

- (4) paip 'boulder'                  parem 'nipa palm'  
       p<sup>w</sup>op<sup>w</sup>e 'shoulder'              m<sup>w</sup>op<sup>w</sup> 'out of breath'

As McCarthy argues, Ponapean rounding harmony follows naturally from the OCP if we assume the dependency relation between [round] and the Labial node (cf. Mester (1986)). That is, disagreement in rounding is possible only if there are two separate Labial nodes. But this violates the OCP as demonstrated in (5) (McCarthy (1988)):

- (5) pVm/p<sup>w</sup>Vm<sup>w</sup>      \*p<sup>w</sup>Vm
- |          |   |    |          |   |   |          |
|----------|---|----|----------|---|---|----------|
| C        | V | C  | *        | C | V | C        |
| PL       |   | PL | PL       |   |   | PL       |
| LAB      |   |    | LAB      |   |   | LAB      |
| [αround] |   |    | [αround] |   |   | [βround] |

In contrast, PT has to stipulate the fact that labials must agree in rounding within a root morpheme by means of a constraint such as the following: \*[[+ant,-cor,αround] [+ant,-cor,βround]]<sub>root-morpheme</sub>. Then rounding harmony in Ponapean gives another argument in favor of AT over PT.

## 2. Place of Articulation Theory

### 2.1 Problems of AT

In section 1 I examined some arguments for AT. However, as Cho (1991) notes, AT cannot define certain natural classes of segments

even though labial, coronal and velar consonants each form a natural class by themselves. In other words, the articulator nodes are privative in nature so non-coronals or anteriors do not form a natural class. On the other hand, PT expresses places of articulation in terms of both values of the features [anterior] and [coronal]. Hence the use of the binary value for each feature results in the four natural classes as in (6) (Cho (1991:162)):

(6) Classification of segments within PT

[+ant]: labials, dentals (Philadelphia English, Klamath)

[-ant]: palatals, velars (palatalization)

[+cor]: dentals, palatals, retroflex (Baule, Fe?fe?)

[-cor]: labials and velars (Korean, Hungarian, Old English)

(6) shows that labials and alveolars, and labials and velars form a natural class respectively in some languages. Cho gives evidence for the feature [+anterior] from Philadelphia English where /æ/ is tensed before tautosyllabic labial and alveolar nasals (/m/, /n/) and voiceless fricatives (/f/, /θ/, /s/) as in "jam, pan, staff, path, glass" but not in "bang, catch, cash, badge". She also gives an argument for [-coronal] from Old English in which only labials and velars participate in the lenition of intervocalic voiced stops as in the following (7) (Cho (ibid.:163-4), Lass & Anderson (1975:183)):

(7) Old English Lenition:

|                   |                                  |
|-------------------|----------------------------------|
| būgan > [būyan]   | 'bow'                            |
| plēgan > [plējan] | 'play' (γ > j by palatalization) |
| hydan > 'hide'    | *hyðan                           |
| glīdan > 'glide'  | *glīðan                          |

In addition, Lass (1984:98) gives another example from Hungarian where labials and velars form a natural class: Proto-Uralic initial \*/p, k/ become /f, h/ respectively in Hungarian, while \*/t/ remains unchanged.

Thus the facts above indicate that both anterior and non-coronal form a natural class in some languages. However, as Cho points out, AT cannot define either of these segment classes as a natural class because of the '*privative nature*' of articulators.

## 2.2 Korean place assimilation

Korean has the following consonantal inventory (8) and optional place assimilation (9) (Kim (1982), Cho (1991)):

## (8) The consonantal inventory of Korean

|           | Bilabial             | Alveolar             | Palatal              | Velar                | Glottal |
|-----------|----------------------|----------------------|----------------------|----------------------|---------|
| Stop      | p,p <sup>h</sup> ,pp | t,t <sup>h</sup> ,tt |                      | k,k <sup>h</sup> ,kk |         |
| Affricate |                      |                      | c,c <sup>h</sup> ,cc |                      |         |
| Fricative |                      | s,ss                 |                      |                      | h       |
| Nasal     | m                    | n                    |                      | ŋ                    |         |
| Liquid    |                      | l                    |                      |                      |         |
| Glide     | w                    |                      | y                    |                      |         |

## (9) Place assimilation

## a. Dentals assimilate to labials, palatals, and velars:

|         |          |          |                  |
|---------|----------|----------|------------------|
| kotpalo | >kopparo | *kottalo | 'straight'       |
| pat+ko  | >pakko   | *patto   | 'to receive and' |
| kət+ci  | >kəcci   | *kətti   | 'let us uncover' |
| sinpal  | >simbal  | *sintal  | 'shoes'          |
| hankaŋ  | >hanŋaŋ  | *hantaŋ  | 'the Han river'  |

## b. Labials and velars do not assimilate to dentals:

|       |        |        |        |             |
|-------|--------|--------|--------|-------------|
| papto | >papto | *patto | *pappo | 'rice also' |
| kaŋto | >kaŋdo | *kando | *kaŋko | 'robber'    |

## c. Labials and palatals assimilate to velars but velars never undergo assimilation:

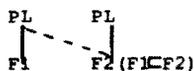
|        |         |         |                       |             |
|--------|---------|---------|-----------------------|-------------|
| kam+ki | >kaŋgi  | *kampi  | 'a cold'              |             |
| əp+ko  | >əkko   | *əppo   | 'to bear on the back' |             |
| nac+ko | >nakko  | *nacco  | 'to be low and'       |             |
| kukmul | >kuŋmul | *kupmul | *kukŋul               | 'soup'      |
| kukpap | >kukpap | *kuppap | *kukkap               | 'rice soup' |

In order to account for the asymmetry of place assimilation shown in (9), Cho assumes that the dental segment /t/ is the least marked segment in Korean and proposes the following underspecified matrix (10) and assimilation rule (11) (1991:171-2)<sup>1</sup>:

## (10) Underspecified matrix

|     | labial | dental | palatal | velar |
|-----|--------|--------|---------|-------|
| ant |        |        | -       | -     |
| cor | -      |        |         | -     |

(11)



According to Cho, Korean place assimilation (11) is one feature-filling rule which spreads F2 onto the preceding Place node when a set of features F1 in the Place node is a subset of F2. First, dentals that are totally unspecified assimilate to the following consonants which have a specified feature under the Place node since zero specification is the subset of any specification. Second, each feature specification of labials and palatals is a subset of the specification of velars, and hence labials and palatals assimilate to velars. However, velars never undergo the assimilation rule because they are more marked than any other segment.

In addition, Cho argues that AT cannot capture the asymmetry of Korean place assimilation because it assigns equal complexity to labials, palatals, and velars, and thus fails to explain why labials and palatals assimilate to velars but not vice versa. Thus she contends that PT provides a better explanation for Korean place assimilation than AT and concludes that the choice of the relevant structure for the Place node should be parameterized rather than universally determined because Korean favors PT over AT while other languages such as Sanskrit favor AT over PT.

### 3. Toward A Unified Articulator Theory

#### 3.1 Some problems in Cho's analysis

Although Cho's argument that the Place node of Korean should refer to binary features can explain the asymmetry of Korean place assimilation, it has the following problems. First, concerning the Korean data Cho contends that labials and palatals assimilate to velars (cf.9c: *nac+ko* > *nakko* 'to be low and'). However, the palatal segment *c* never assimilates to velars; rather the dental segment *t* assimilates to velars because all the coronal obstruents are obligatorily neutralized to *t* in syllable final position. The actual alternating pronunciations of *nac+ko* are given in (12):

(12) /*nac+ko*/ 'to be low and'<sup>2</sup>  
 a. [nat.ko]<sup>3</sup> b. [nat.kko] c. [na.kko] d. [nak.ko] e. [nak.kko]

(12) shows that the palatal segment *c* does not undergo velarization although it undergoes several other phonological processes; coda neutralization applies in (12a) while coda neutralization and tensification apply in (12b) since a plain (unaspirated, nontense) obstruent in Korean becomes a tensed segment in the initial position of the second word in compounds and in many other environments. Further, Korean optionally deletes a coda consonant in fast speech. Hence, optional coda consonant deletion and tensification apply in (12c) whereas optional place assimilation applies after coda neutralization in (12d). Coda neutralization, place assimilation and tensification apply in (12e). In addition, unlike Cho's claim that there is no interaction between labials and palatals because labials and palatals are marked for different unrelated features [-coronal] and [-anterior] respectively, there is interaction between labials and palatals as in (13) (H.S.Kim:1982):

(13) /to<sup>h</sup>pæ/ 'a sailing ship'

a. [tot.pæ] b. [tot.ppæ] c. [to.ppæ] d. [top.pæ] e. [top.ppæ]

/nacpəŋ/ 'the day shift'

a. [nat.pəŋ] b. [nat.ppəŋ]. c. [na.ppəŋ] d. [nap.pəŋ]. e. [nap.ppəŋ]

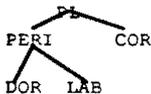
The data in (13) can be explained along the same lines as in (12). The palatal segments *c<sup>h</sup>* and *c* are neutralized to the dental segment *t* in (13a) and (13b). After coda neutralization, *t* optionally assimilates to labials in (13d) and (13e), contradicting Cho's claim. Hence the asymmetrical behavior of Korean place assimilation should be limited to one fact: labials assimilate to velars, but not vice versa.

Furthermore, Avery and Rice (1991) introduce a Peripheral node which groups labials and velars. With this node, we can solve the problems pointed out by Cho as we will see in section 3.2, hence eliminating the parameterized option for languages such as Korean.

### 3.2 Articulator theory with a peripheral node

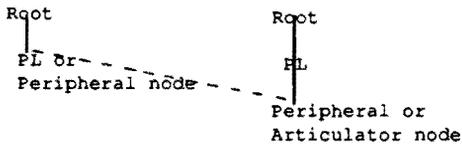
Recently Avery and Rice have recognized a Peripheral node dominating Labial and Dorsal nodes and claim that this node can solve the problem of characterizing the class of non-coronals (1991:195):

(14)



Moreover, with this Peripheral node, the asymmetry of Korean place assimilation can be explained in a principled manner. Here, in order to solve the asymmetrical behavior of assimilation, I assume that dentals are unspecified for place and that Labial is the unmarked daughter of the Peripheral node, following Avery and Rice. Then Korean place assimilation can be explained by the leftward spreading of a more specified (marked) node to the preceding less specified (marked) node as shown in (15):

(15)



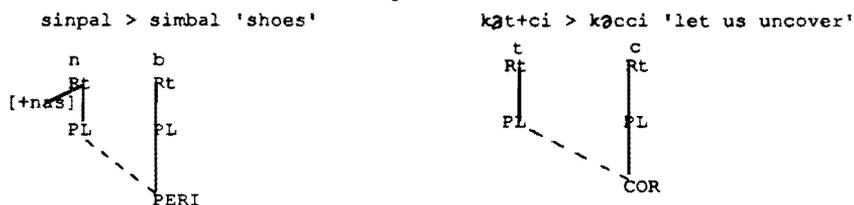
Here note that dentals assimilate to labials or velars but not vice versa because dentals are unspecified for place. Furthermore, velars do not assimilate to labials since velars are more marked than labials which have only a Peripheral node without a Labial node in underlying representation, hence solving the problem of asymmetry. Concerning the underspecification of Korean, two facts are worth mentioning. First, there is considerable evidence from insertion and deletion that dentals, especially *t*, are unmarked segments and thus unspecified for place as the following facts show (16) (Kim (1982), Kim (1987)):

- (16) a. /t/ is inserted between the two elements of a compound: /ko/ 'nose' + /t̃iŋ/ 'ridge' > [kot.t̃iŋ] 'the ridge of the nose'.  
 b. All coronal obstruents are neutralized to /t/ in syllable final position: t, tt, t<sup>h</sup>, s, ss, c, cc, c<sup>h</sup> > t.  
 c. Coronal obstruents are deleted regardless of their position in cluster simplification: /kaps+to/ > [kap.to] 'the price also', /salmta/ > [sam.da] 'to boil'.

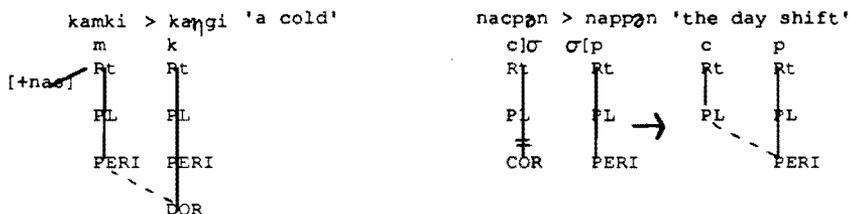
Now let us consider another aspect of underspecification in Korean. While Korean has labial, coronal, palatal and velar consonants, Ponapean has labial, velarized labial, coronal and velar consonants. Further, in Ponapean, although /n/ assimilates to the following consonant in place, the labial nasal does not assimilate in place to a following dorsal. Then, as Avery and Rice (1991) suggest, the lack of velar assimilation in Ponapean could be related to the presence of the Labial node in underlying representation in order to distinguish labials

and velarized labials unlike Korean, hence supporting the unmarked status of the Labial node under the Peripheral node in Korean. Some examples of Korean place assimilation (9) are given below:

(17) a. Dentals assimilate to labials, palatals, and velars.<sup>4</sup>



b. Labials assimilate to velars; palatals assimilate to labials or velars after coda neutralization.<sup>5</sup>



Thus, by positing the Peripheral node with the assumption that Labial is its unmarked daughter, we can take account of the asymmetry of Korean place assimilation in a straightforward manner in AT without appealing to binary features such as [coronal] and [anterior].

At this point, we can ask an important question: Is there any evidence for the Peripheral node in a feature tree? Actually, there is quite an extensive literature that motivates the Peripheral node or the feature [grave] as in Jakobson et al (1963), Hyman (1973), and Odden (1978). Namely, [grave] is acoustically defined in order to distinguish peripheral sounds from medial sounds. Phonological rules also refer to [grave] or a Peripheral node as a natural class in many languages. For example, in fifteenth century Korean, there was a rounding process in which /i/ (the back unrounded vowel) became [u] before all labials and velars but not before dentals and palatals. The fact that labials and velars form a natural class in Korean can be captured by the Peripheral node, thus presenting evidence for the node in Korean (Cho (1991), Lee (1971)):

(18) †Rounding: † > u / - m, p, p<sup>h</sup>, k, k<sup>h</sup>  
 ɔ̄tɪp > ɔ̄tʊp 'dark'      tɔ̄k > tɔ̄uk 'more'  
 cɪzɪm > cuzum 'at the time' (the first [u] due to Vowel harmony)).

Odden also gives examples from Tibetan where the peripheral consonants *p, k, q* become voiced fricatives *β, γ, ɣ* inter-vocally if the preceding vowel is non-nasal, while the medial consonants *t, ṭ, ṭ̣, ḳ* remain unchanged (Odden (1978:143)):

|                    |            |               |
|--------------------|------------|---------------|
| (19)a. Affirmative | Negative   |               |
| pāāβðrēè           | māβāāβareè | 'he lit'      |
| kʊùβðrēè           | mðɣʊùβðrēè | 'he waited'   |
| qāpðrēè            | māɣāpðrēè  | 'he dried'    |
| čāāβðrēè           | māčāāβðrēè | 'he went'     |
| tāāpðrēè           | māṭāāpðrēè | 'he sufficed' |
| tāāβðrēè           | māṭāāβðrēè | 'he roasted'  |

As it has been assumed in McCarthy (1988) and Yip (1989), three kinds of evidence can be used to argue for a particular constituent for features: spreading, delinking, and identification by phonological rules or constraints such as the OCP. The facts from Korean and Tibetan support the hypothesis for postulating the Peripheral node in a feature tree, thus solving the problems of characterizing non-coronals as well as the asymmetrical behavior of Korean place assimilation.

However, as noted in section 2, there are some limited cases such as Philadelphia English in which [+anterior] forms a natural class. But there have been objections against the feature [anterior] because of its dubious status, as in McCarthy (1988:99): "[anterior] cannot be defined in either articulatory or acoustic terms (it refers neither to a distinct articulatory gesture nor to a distinct acoustic outcome)."<sup>6</sup> Hence I assume that other features such as [high] can be used instead of [anterior] to refer to the class of anteriors. For example, in the case of Philadelphia English, labials and alveolars which trigger the tensing of /æ/ can be referred to as [-high] while alveo-palatals and velars which do not trigger the tensing can be referred to as [+high].

#### 4. Conclusion

In this article I have examined Articulator Theory, Place of Articulation Theory, and Articulator theory with a Peripheral node. I have shown that Cho's question of the universality of the articulator

nodes because of the asymmetry of Korean place assimilation and the problem of defining natural classes can be handled by positing the Peripheral node. Furthermore, I provided evidence for the Peripheral node from Korean and some other languages. Therefore, with the Peripheral node, we can maintain the universalist position for phonological representations, attaining a more explanatory theory.

### Acknowledgments

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### Notes

<sup>1</sup> The direction of spreading is possible only from right to left since the target of the rule is a coda consonant while the trigger is a syllable initial consonant (cf.9).

<sup>2</sup> (12a) is used in slow, emphatic speech while (12b) is used in normal speech. (12c) is used in fast speech.

<sup>3</sup> . designates a syllable boundary.

<sup>4</sup> After the spreading of the Peripheral node, the default rule which specifies the Labial node applies.

<sup>5</sup> The delinking of the Coronal node is an independently motivated process in Korean because all the coronal obstruents are neutralized to the placeless *t* in syllable final position.

<sup>6</sup> In Articulator Theory, [anterior] is not the same feature as in Place of Articulation Theory. Rather, it gives a finer distinction in the Coronal node according to location of the constriction on the passive articulator (cf. McCarthy (1988)).

### References

- Archangeli, Diana and Douglas Pulleyblank. (1989). Yoruba vowel harmony. *Linguistic Inquiry* 20, 173-218.
- Avery, Peter and Keren Rice. (1991). Segmental Structure and Coronal Underspecification. In Paradis and Prunet (1991), 179-99.
- Clements, G.N. (1985). "The Geometry of Phonological Features," *Phonology Yearbook* 2, 225-52.

- Cho, Y.Y. (1991). On the Universality of the Coronal Articulator. In Paradis and Prunet (1991), 159-79.
- Hyman, L. (1973). "The Feature [grave] in Phonological Theory," *Journal of Phonetics* 1, 329-37.
- Jakobson, R., G. Fant, and M. Halle. (1963). *Preliminaries to Speech Analysis*. MIT Press. Cambridge, Massachusetts.
- Kim, H. S. (1982). *New Korean Linguistics*. Seoul: Ilchokak
- Kim, K. H. (1987). *The Phonological Representation Of Distinctive Features: Korean Consonantal Phonology*. Doctoral Dissertation, Univ. of Iowa.
- Kiparsky, P. (1985). Some Consequences of Lexical Phonology, Ewen, C. and J. Anderson eds., *Phonology Yearbook* 2, 85-138.
- Lass, R. (1984). *Phonology*. Cambridge University Press. Cambridge, England.
- Lass, R. and J. Anderson. (1975). *Old English Phonology*. Cambridge, England.
- Lee, B.G. (1971). "A Reconsideration of NC/MH's Feature System," Ms., Indiana Univ., Bloomington.
- McCarthy, J. (1988). "Feature Geometry and Dependency." *Phonetica* 43, 84-108.
- Mester, A. (1986). *Studies in Tier Structure*. Doctoral Dissertation. University of Massachusetts, Amherst.
- Odden, D. (1978). "Further Evidence for the Feature [grave]," *Linguistic Inquiry* 9, 141-4.
- Sagey, E.C. (1986). *The Representation of Features and Relations in Non-linear Phonology*. PhD Thesis, MIT.
- Steriade, D. (1987b). Locality conditions and feature geometry. *NELS* 17, 595-617.
- Steriade, D. & B. Schein. (1986). "On Geminates". *Linguistic Inquiry* Vol. 17, 691-744.
- Yip, M. (1989). Feature geometry and cooccurrence restrictions. *Phonology* 6. 349-74.

### Blocking and the Principle of Conventionality\*

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The principle of conventionality stated briefly is:

- (1) If a single lexeme exists in a language to express a meaning, use it; do not construct a new, morphologically complex word or do not construct a phrase. Use of a new expression will imply a different meaning.

A part of this phenomenon has also been described in terms of the mechanism of **blocking**, a concept introduced into contemporary American linguistics by Aronoff (1976).<sup>1</sup>

- (2) Blocking is the nonoccurrence of one form due to the simple existence of another (Aronoff, 1976: 43).

Kiparsky (1982) builds blocking into his model of lexical phonology, such that word-specific items are inserted into a derivation before the general rule. More recently, Clark (1992) has formulated this principle, which she calls **pre-empting**, as follows:

- (3) By Conventionality, if there is a conventional term already available, the speaker must make use of it, and not of something else, if he is to make sure he will be understood by his addressee. If the speaker does not use the conventional established term for the meaning he intends, he runs a strong risk of being misunderstood (Clark, 1992: 172).

Conventionality works together with Contrast, "the principle that different forms in a language have different meanings" (ibid.). And if the conventional word does not convey the precise meaning intended, the speaker is free to construct a new one. For example, \**uneatable*, meaning 'can't be eaten', derived by the productive suffix *-able* added to transitive verbs, is blocked by *inedible*. However, *inedible* has the connotation that the food is poisonous or harmful. But on one occasion a lunch companion was served a very thick

submarine sandwich which she described as *uneatable*, an appropriate new word, since *inedible* would not have conveyed the right meaning.

Clark's treatment is wider than Aronoff's since it is not just rival affixes on the same base but rival words (synonyms) that block a new creation. The implication is that one must look at the whole lexicon--not just the morphological component. (Cf. Carstairs-McCarthy, 1992: 32-38; Di Sciullo and Williams, 1988: 10-14.)

In the first part of this paper I will briefly survey the uses to which blocking and conventionality have been put and the criticisms and counterexamples. Then I will try to show the more constrained conditions under which blocking operates, and finally relate it to a mental model of the lexicon that accounts for the data.

### Morphology

Aronoff introduces blocking to explain the non-existence of nominalizations which add *-ity* to adjectives ending in *-ous* by the existence of base nouns. He says that *glory* blocks the formation of *\*gloriosity*, whereas *curiosity* can be derived, because there is no base noun *\*cury*. Nominalizations in *-ness* are not blocked, says Aronoff (p. 45), because *-ness* is completely productive and thus words ending in *-ness* will not be listed in the lexicon unless there is something unusual about the meaning. Doublets are possible when semantic drift has resulted in nonsynonymous words, such as *humanness* and *humanity* or *recital* and *recitation*. But there won't be two words with the same meaning that have the same stem in the lexicon of a single speaker. Aronoff, unlike Clark, however, is not willing to rule out synonyms completely.<sup>2</sup>

First of all, there are questions of fact: namely questions involving the acceptability of some of the nominalizations ending in *-ness*. My intuitions as well as those of my consultants are that the items in (4) are questionable, if not outright bad.

- (4) ?synonymousness  
 ?larcenousness  
 ?decentness  
 ?singularness  
 ?accurateness  
 ?aberrantness  
 ?felicitousness  
 ?exoticness

So it seems that nominalizations with *-ness* are not completely free. The explanation for the unacceptability of the words in (4) is provided by the principle of blocking: *synonymy, decency, singularity, etc.* are the conventional words for these concepts.

Secondly, the productivity of an affix is somewhat of a red herring and does not seem relevant to blocking. In most accounts, the existence of a nonproductive form, eg., a irregular past tense, will block the regular rule (the elsewhere condition), but most morphological rules, especially derivational ones, are not either completely productive or completely unproductive (Van Marle, 1985; Baayer and Lieber 1991; Myers, 1992). Conventional nominalizations with *-ness* can also block other nominalizations. For example, *laboriousness* and *graciousness* block *\*laborosity* and *\*graciousity*, not the base form *labor* and *grace*, which have quite different meanings from *laboriousness* and *graciousness*.<sup>3</sup> The conventional agent noun *cook* blocks the construction of *cooker*, meaning 'one who cooks', as expected,<sup>4</sup> and *stealer* by blocked by *thief*, unless a different meaning is intended (Bolinger, 1975, 109; Bauer, 1983, 87). But consider the rival agentive affixes *-er* and *-ist*. (According to Marchand, *-er* can be added to nouns as well as verbs.) *-ist* is especially productive in the semantic field of music: *oboist, violinist, cellist, pianist, etc.* Yet *drummer* and *fiddler* block the creation of *\*drummist* and *\*fiddlist*.<sup>5</sup>

A third problem is the existence of doublets: pairs of morphologically complex terms that do not seem to differ in meaning, such as the following (from Szymenek, 1989: 156 and Bauer, 1983: 290).<sup>6</sup>

|     |                  |                 |
|-----|------------------|-----------------|
| (5) | falseness        | falsity         |
|     | morbidity        | morbidity       |
|     | impecuniousness  | impecuniosity   |
|     | inextricableness | inextricability |
|     | flippantness     | flippancy       |
|     | recentness       | recency         |
|     | zesty            | zestful         |
|     | grammaticalize   | grammaticize    |
|     | minimalize       | minimize        |
|     | lech             | lecher          |
|     | normality        | normalcy        |
|     | complacence      | complacency     |

Some cases of doublets reflect a change in progress, such as *disinterested*, replacing *uninterested*, (in spite of protests from language purists). In other cases, doublets reflect an indeterminacy about the most

appropriate new word for a new concept (or new to the lay public). For example, when many new linguistics departments were established in the United States in the 1960s, a member of such a department was often called a *linguistician*, analagous to *mathematician*, since *linguist* had the meaning (to the nonlinguists anyway) of 'a person who speaks many languages', a concept that linguists lexicalized as *polyglot*. With time and experience, however, *linguistician* ceased to be heard.

Kiparsky (1982) lists a few doublets from inflectional morphology: *dreamed/dreamt*, *kneeled/knelt*; *crocuses/croci*; *indexes/indices*, which he treats as being marked as optionally taking the special rule. Some of these cases can be explained away as differences in stylistic meaning or geographical dialect, and others, like *shined/shone* correlate with different senses of the base verb *shine*.

- (6) a. The sun shone/shined on us.  
b. His shoes shined/?shone.

In addition to the cases discussed above, Clark and Clark (1979) apply the principles of Conventionality and Contrast to deverbal noun creations.

- (7) If a potential innovation would be precisely synonymous with a well-established term, the innovative term is normally pre-empted by the well-established one and is therefore considered unacceptable (Clark, 1992, 174; also cf. Clark & Clark, 1979, 798).

Thus formations like *\*to car* and *\*to airplane* are blocked by *to drive* and *to fly*.<sup>7</sup> But formations like *to bus*, *to bicycle*, *to jet* are acceptable because there are no suppletive verbs that specifically mean 'go by bus', 'go by bicycle', 'go by jet'.<sup>8</sup>

#### **Lexemes, Phrases, and Synonymy**

McCawley (1978) has used examples involving phrases that are paraphrases of lexemes, arguing that the use of the phrase evokes certain implicatures. For example, in describing a color as *pale black* or *pale red*, one is implicating that the colors are something other than *gray* or *pink*.<sup>9</sup> The periphrastic causative of *kill* as *cause to die* or *open as cause to open* implicates that the causation was indirect.

- (8) a. He killed the sheriff.  
b. He caused the sheriff to die.

- (9) a. She opened the door.  
b. She caused the door to open.

There is no such implicature in (10)

- (10) Bill made Mary (caused Mary to) lose her  
balance/laugh/ drop her parcel

because there is no lexeme that expresses the meaning.

Lehrer (1992) has also invoked the principle of conventionality in response to Fillmore's work on frames. Fillmore has argued that semantic frames provide a more suitable set of concepts than semantic fields.<sup>10</sup> One of the substantive disagreements between Fillmore's theory of semantic frames and classical theories of semantic fields is whether the meaning of one term is constrained by other words in that field. Fillmore (1985) says that one can know the meaning of an individual word in isolation;<sup>11</sup> field theories deny this (as a rule). Since knowing the meaning of a term involves knowing its range of meaning, which is usually constrained by its semantic neighbors, a speaker needs to know what those semantic neighbors are.

Fillmore (1985) says that we can understand *devein* and *scratch* without needing to know other related words. Let us take one sense of *scratch*, for example, defined in Longman's *Dictionary of Contemporary English* as follows:

- (11) Verb: 'to make a mark on (a surface) or  
a small wound in (a person's skin) by  
rubbing with something pointed or rough'  
Noun: 'a mark or small wound made by  
scratching'

It seems likely that the 'small' in the definition is related to the fact that there are specific terms for large wounds: *gash*, *slash*, as well as a specific term for deeper wounds: *puncture*. A field theorist would suggest that the existence of these words plays a role in the range of meaning of *scratch*. If no single word exists, a speaker resorts to a compositional process. Therefore, if a speaker describes a wound as a *small gash*, there is an implicature that the wound is deeper and larger than a *scratch*.

#### Constraints on blocking

One of the factors that interacts with blocking is the frequency of a word, though often frequency is a reflection of something else. (See Forster, 1981, for

references on the effects of frequency.) One property reflected by frequency is a word's basicness, as discussed in Berlin and Kay's work on color words (1960) and Rosch's work on prototypes (eg. 1978). They all show that not all words in a semantic domain are equal. Basic object-level words are the preferred ones for talking about things. And while it is trivial to say that people do not use words they do not know, they may avoid using words that they believe their interlocutors may not know--or they may avoid using precise words that may sound affected or too technical for the situation. For example, I know the word *taupe*, but I may prefer to describe something as *dark brownish gray* without intending to create any implicature that the color is something other than *taupe*. Or I may describe a dwelling as a *small house, all on one floor*, without implicating that it is not a *bungalow*, even though the single word *bungalow* may describe the concept precisely. The implicatures involved in using phrases instead of single available words may be limited to the basic-object level vocabulary and superordinates.

Unfortunately, the concept of basic words has been largely limited to concrete nouns in a small number of domains with hierarchical structures and to a few relatively concrete verbs and adjectives. Much more work on the concept must be done to determine how it might work on the more abstract part of the lexicon or even if this notion is applicable. Meanwhile, salience and frequency might serve as operational substitutes. Of the words listed in (4) and (5) above, the frequencies from the Brown Corpus (Kucera and Francis, 1967) are as follows:

|               |    |
|---------------|----|
| (12) accuracy | 36 |
| minimize      | 16 |
| normalcy      | 4  |
| falsity       | 3  |
| singularity   | 1  |
| lecher        | 1  |

None of the other words appears in the corpus.

Another constraint on this sort of blocking--where a single lexeme blocks a phrase--pointed out by R. Janda (pc) is found in certain registers, such as bureaucratic and academic styles. Even media weather reporters use phrases like *thundershower activity* for rain.

#### **Psychological issues.**

Aronoff (1976: 56) remarks that different speakers may have different words with the same stem with the

same meaning. Or a speaker may forget the conventional word at a particular time and make up one on the spot. "In fact, the blocking rule, stated as a condition on the filling of slots, predicts that the fewer the number of stably filled slots one has, the more likely one is to accept new words. This seems intuitively correct."

Anshen and Aronoff (1988: 642) among others<sup>12</sup> provide evidence that at least some morphologically complex words are stored as wholes, whereas others are not--they are produced as needed. They argue that when searching for a word speakers are likely to look for -ity words that are stored in memory, while speakers are more likely to construct -ness words as needed. Anshen and Aronoff go on to propose that in fact speakers simultaneously search their lexicons for stored words, for rules, and for analogies (novel words based on partial similarities). The speaker then uses the first item to appear (p, 648).

James Myers (1992) in his dissertation develops such a theory hinted at by Anshen and Aronoff, which he calls "double lookup". Although Myers's theory is an on-line theory for phonological production, at least parts of it can be adapted to morphological concerns as well. Myers' model involves lexical lookup and rule lookup. "In *Lexical Lookup*, phonological forms are sought and retrieved from memory. In *Rule Lookup*, rules are sought in memory and then applied, if appropriate, to the forms that were retrieved during *Lexical Lookup*" (p.6). Myers goes on to point out that "any given surface generalization may arise either through pre patterning or on-line rule application" (p. 18). Novel forms must always be derived by rule, of course, but conventional forms can be produced either by retrieval from memory or by rule. In general, the more productive a rule is, the less likely are the forms to be pre patterned (and vice-versa), but productive forms can be pre patterned as well.

Myers' model, adapted to morphology, is consistent with that of Anshen and Aronoff, where complex lexical items will be listed in the mental lexicon. If this model is correct, then any morphologically complex frequent word will be stored as a whole, regardless of the productivity of its affix. Therefore, words ending in -ness, -er, or any regular inflectional affix could either be retrieved from memory, even if there is nothing special about the meaning, or it could be produced by rule. Further evidence that frequent forms of morphologically complex forms are stored as wholes can be found in Stemberger and MacWhinney (1988).

### Summary and Conclusions

To the extent that blocking and the principle of conventionality apply, they apply to the lexicon as a whole, and there is nothing special about the morphological cases involving rival suffixes for the same stem. In general, if there is a conventional word to express a given meaning, that word blocks or pre-empts the construction of a new one. But the same principle applies to the construction of phrases, where there are existing conventional words.

Secondly the productivity of an affix in a particular domain is not relevant to the question of blocking. In the absence of a conventional word, a speaker may construct a morphologically complex one using the most productive appropriate rival, or she may construct a phrase. However, a common conventional word that contains a highly productive affix will block or preempt, too.

A third point is that usually only the productivity and semantic coherence of the affix is discussed, without consideration of the semantics of the stem. However, the semantic coherence of the class of stems should not be overlooked in deciding which rival affix to use. Consider *-hood*, which in some cases competes with *-dom* as well as other nominalizations. *-Hood* has become a completely productive suffix for bases denoting linguistic categories, with the resulting meaning of 'status of X': *nounhood*, *verbhood*, *sentencehood*, *clausehood*, *morphemehood*, etc. A second coherent base class is that of kin terms: *motherhood*, *fatherhood*, *parenthood*, etc. In addition, there are words which have undergone semantic drift (*childhood*, *neighborhood*) plus other items that do not occur in either semantic class (*likelihood*). Bauer (1983) presents many cases where a coherent semantic base underlies the productivity of an affix. This line of research is promising for finding other factors that influence choice of a rival affix.<sup>13</sup>

Fourthly, the pragmatics of using a blocked word needs further elaboration. For Clark and McCawley creating such a word carries implicatures that the conventional word is not quite right, a definite phenomenon in many circumstances; in other cases, listeners will judge the utterance to involve a speech error or simple ignorance. However, not all words in the lexicon are equal, and the above judgments are more likely to occur with the central and basic parts of the vocabulary, not with the less frequent, more technical and more esoteric parts.

Finally, the on-line psychological processing models suggested by Anshen and Aronoff and developed by

Myers are consistent with the observations discussed above. Lexical retrieval of frequent words needed to express a concept--whether morphologically complex or not--are likely to be found by lexical look-up quickly; therefore, when they are found, no rule will apply to produce a morphologically complex word or a phrase. Infrequent words, by contrast, may not be found quickly, and therefore a word or phrase construction rule will apply.<sup>14</sup> Even in comprehension analogous processes will apply. If a speaker uses a novel morphologically complex word, for example, *singularness*, the hearer may access *singularity* along with the base *singular* and the suffix *-ness*, in which case she must interpret the speakers' intention. Is it an error or is there an intended implicature?

Aronoff's original proposal (1976) that complex words created by highly productive affixes not be listed is therefore wrong; potentially all existing words in a speaker's lexicon may be listed; certainly all common words are. However, in production (or even comprehension for that matter) the double lookup may retrieve the form or construct it or by rule, whichever works fastest. Therefore, a mental model involving double lexical lookup where potentially any complex word is stored, and a mental model that represents basicness and frequency (or whatever frequency may be a reflection of) appears to account for the observations above.

#### Notes

- \* I wish to thank Richard Janda, Keith Lehrer, James Myers, Shaun O'Connor, Paul Saka, and Susan Steele for comments and suggestions on earlier versions of this paper.
1. Actually, earlier accounts are found in Paul (1896) and Schultinck (1961). A discussion of Schultinck can be found in van Marle (1985: 63).
  2. Blocking has been widely used and discussed in explaining the nonexistence of other complex words (sometimes with additional conditions and subtleties (eg., Miyagawa, 1984; Horn, 1989; Andrews, 1990; Zwanenburg, 1981).
  3. Szymanek writes, "In any event, the frequent occurrence of virtually synonymous rival pairs like *Xness/Xity*, etc. demonstrates that the effect of blocking is markedly reduced or suspended in the derivation of English *Nomina Essendi*. The suffix *-ness* emerges here as a super-formative of sorts, usable no matter whether a particular ad-

- jectival base is capable of taking some other suffix or not" (Szymanek, 1989: 156).
4. Presumably in areas where *cooker* exists as an instrument, *stove* is not used to block it; or *stove* has a different meaning. Paul Saka points out that *cooker* is used frequently in compounds, such as *rice-cooker*.
  5. One could argue that *drummer* and *fiddler* are formed from verbs in turn formed from nouns by zero derivation, but that is completely *ad hoc*. Marchand cites the OED and Jespersen as arguing that the denominal forms with *-er* are historically earlier.
  6. In fact, Kiparsky (1982:7) and Scalese (1984:157) treat blocking in derivational morphology as a general tendency rather than as a firm principle.
  7. Clark (1992: 172) includes dialect differences (geographical, social) as well as differences involving differences of style, age, sex, or technical expertise as constituting grounds for non-synonymy. Perhaps *nonequivalence* would be a better term.
  8. Powell (1992) in an analysis of the word *literally* shows that speakers use conventional words even when they extend the conventional meaning of a term. That is, they choose not to invent a new word even when some contrast is present in order to show the similarity of the intended sense with the conventional/historical sense.
  9. McCawley (1978: 242-3) attributes this observation to Householder (1971). He also discusses the objection that *pale red* is not the same as *pink*.
  10. Since Fillmore's objections are true of early semantic field theories (eg. Trier, 1931), but not true of later work, his objections do not necessarily hold.
  11. Actually Fillmore fudges on this point. He does not assert that it is always the case, only that it is at least sometimes the case. Similarly, field theories are not necessarily committed to the view that no words can be understood in isolation.
  12. Bradley (1980) and Taft (1979), for example.
  13. Some linguists may consider this phenomenon "analogy", but word construction of this sort may well be rule-governed.
  14. Although I have lumped together creating morphologically complex words and phrases, this may not be correct.

## References

- Andrews, A. D. 1990. Unification and morphological blocking. *NLLT* 8: 507-58.
- Aronoff, M. 1976. *Word Formation in Generative Grammar*. Cambridge, MA: MIT Press.
- Anshen, F. and Aronoff, M. 1988. Producing morphologically complex words. *Linguistics* 26: 641-655.
- Bauer, L. 1983. *English Word Formation*.
- Baayer, H. and Lieber, R. 1991. Productivity and English derivation: a corpus-based study. *Linguistics* 29: 801-843.
- Berlin, B. and Kay, P. 1969. *Basic Color Terms*. Berkeley: University of California Press.
- Bolinger, D. 1975. *Aspects of Language*. NY: Harcourt, Brace & Jovanovich.
- Bradley, D. 1980. Lexical representation of derivational relation. In *Juncture*, M. Aronoff and M. L. Kean (eds). Saratoga, CA: Anna Libri.
- Carstairs-McCarthy, A. 1992. *Current Morphology*. London & New York: Routledge.
- Clark, E. 1992. Conventionality and contrast: Pragmatic principles with lexical consequences. In *Frames, Fields, and Contrasts*, A. Lehrer & E.V. Kittay (eds). Hillsdale, NJ: Lawrence Erlbaum and Associates.
- Clark, E. and Clark, H. When nouns surface as verbs. *Language* 55: 767-811.
- Di Sciullo, A. M. and Williams, E. 1988. *On the Definition of Word*. Cambridge, MA: MIT Press.
- Fillmore, C. J. 1985. Frames and the semantics of understanding. *Quaderni di Semantica* 6:223-94.
- Forster, K. I. 1980. Frequency blocking and lexical access. *JVLVB* 20: 190-203.
- Horn, L. R. 1989. *A Natural History of Negation*. Chicago: University of Chicago Press.
- Kiparsky, P. 1982. Lexical morphology and phonology. *Linguistics in the Morning Calm*. Seoul: Hanshin.
- Lehrer, A. 1992. Frames and Fields: Are they alternatives? In *Studien zur Wortfeldtheorie*, Peter Lutzeier, (ed). pp. 149-162. Tübingen: Max Niemeyer.
- Marle, J. van. 1985. *On the Paradigmatic Dimension of Morphological Creativity*. Dordrecht: Foris.
- McCawley, J. 1986. Conventional implicatures and the lexicon. In *Pragmatics, Syntax and Semantics Vol 9*, P. Cole, ed. NY: Academic Press.
- Miyagawa, S. 1984. Blocking and Japanese causatives. *Lingua* 64: 177-207.

- Myers, J. 1992. A processing model of phonological rule application. Unpublished PhD dissertation. University of Arizona.
- Powell, M. J. 1992. Encoding literal attitudes. In *Frames, Fields, and Contrasts*, A. Lehrer & E.V. Kittay (eds). Hillsdale, NJ: Lawrence Erlbaum and Associates.
- Rosch, E. 1978. Principles of categorization. In *Cognition and Categorization*, E. H. Rosch and B. B. Lloyd (eds). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Schultink, H. 1961. Produktiviteit als morfologisch fenomeen. *Forum der Letteren* 2: 110-125.
- Stemberger, J. P. and MacWhinney, B. 1988. Are inflected forms stored in the lexicon? In *Theoretical Morphology*, M. Hammond and M Noonan (eds). pp. 101-116. New York: Academic Press.
- Szymanek, F. 1989. *Introduction to Morphological Analysis*, Warsaw: Panstwowe Wydawnictwo Naukowe.
- Taft, M. 1979. Recognition of affixed words and the word frequency effect. *Memory and Cognition* 7: 263-72.
- Trier, J. 1931. *Der deutsche Wortschatz im Sinnbezirk des Verstandes*. Heidelberg: Winter.
- Zwanenburg, W. 1981. Le principe du blocage dan la morphologie derivationnelle. In *Linguistics in the Netherlands*, S. Daalder and M Gerritsen (eds). pp. 65-72. Amsterdam: North Holland.

**'LIGHT' VERBS ARE TAKING OVER: COMPLEX VERBS  
IN PERSIAN\***

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**I Introduction**

Since the thirteen century, compound verbs have gradually replaced the simple verbs in Persian (Khanlari, 1973). As a result, The number of simple verbs does not exceed 115 in contemporary Persian, many of them are not even used in the every day application of the language<sup>1</sup>. The verbal concepts are, therefore, productively expressed by a combination of a non-verbal element and a verb, traditionally called "compound verbs" (Khanlari 1976, Moyne 1970, among others). The tendency of forming complex verbs has resulted in the existence of two sets of verbs, simple and complex, for a number of verbal concepts. In most cases, the usage of the simple verb is restricted to the written and elevated language. A few examples of simple/ complex pairs are given in (1).

| (1) Simple | Complex |        |          |
|------------|---------|--------|----------|
| geristan   | gerye   | kardan | 'to cry' |
|            | weeping | do     |          |
| kušidan    | kuses   | kardan | 'to try' |
|            | trying  | do     |          |
| porsidan   | porsân  | kardan | 'to ask' |
|            | asking  | do     |          |

The productivity of the complex verb formation is evidenced by the fact that the nominal element of the complex verb is not restricted to native Persian elements, nor to Arabic words which had entered the language centuries ago, but that it also includes recent borrowings from European languages (e.g. tâyp kardan, 'to type' (lit. typing do), telefon kardan 'to call' (lit.calling do). It has been argued that the complex verb formation has completely replaced the former morphological rule of simple verb formation in this language (Bateni, 1989). The verbal element of these predicates ranges over a number of simple verbs such as zadan 'to hit', dâdan 'to give', xordan 'to eat, to collide', boardan 'to carry', kešidan 'to draw, to pull' gereftan 'to catch, to take', and a few more.

Taking the complex predicates as compound verbs, the nominal element can be interpreted as the internal argument of the complex verb in the sense of Lieber (1983). However, even in these cases a number of morphological and syntactic problems emerge (Karimi 1987): these complex elements violate the restrictions for compounding proposed by Mohanan (1982) and Kiparsky (1983), among others, in the sense that the nominal element is separable from the verb by morphological units, including the progressive and negation prefixes. These facts are presented in (2).

- (2) *kimiâ be rádio guš dâd* (guš na-dâd, guš mi-dâd)  
 Kimea to radio ear gave ear NEG-gave, ear PROG-gave  
 'Kimea listened to the radio.' 'did not listen, was listening'

In (2), the nominal element *guš* is in fact the structural direct object of the verb which can be separated by a number of elements.

There is yet another type of so-called compound verbs which provides a different property. Examples are given in (3) and (4):

- (3) *kimiâ in otâq-ro be mehmun extesâs dâd*  
 Kimea this room-râ to guest allocation give  
 'Kimea allocated this room to the guest.'
- (4) *kimiâ mehmun-ro da?vat kard*  
 Kimea guest - râ invitation did  
 'Kimea invited the guest.'

The basic difference between the sentence in (2), on the one hand, and those in (3) and (4), on the other, is that the latter allow two noun phrases: in addition to the nominal element *extesâs* in (3), there is also the noun phrase *in otâq* followed by the element *râ*, a particle which marks oblique case for specificity in Persian, provided the noun phrase is in a non-argument position (Karimi 1990, see also Mahajan, 1990, for a discussion on Hindi). The sentence in (4) exhibits a similar situation regarding *da?vat* and the specific noun phrase *mehmun*.

At the first glance, Persian complex verb constructions suggest a case of noun incorporation in the sense of Baker (1988). Heny and Samiiian (1992) have suggested a Reanalysis process for these constructions. We will first examine these two hypotheses, in addition to Larson's (1988) V' Reanalysis. We



- (9) guš̄ dige ne - mi -kon - e  
 ear no more NEG-Prog-do -3rd.Sg  
 'S/he does not listen anymore.'

The bold elements separate the nominal **guš** from the verb in (7)-(9)<sup>5</sup>.

Indirect object incorporation in Persian provides independent syntactic evidence supporting the argument that the complex predicate in Persian cannot be considered a case of noun-incorporation: the verb incorporates the bare indirect object only from the right, as evidenced by the contrast in (10) and (11) (Karimi 1989).

- (10) sāsân Ketâb-â ro dâd **kimiâ**  
 Sasan book-Pl râ gave . Kimea  
 'Sasan gave Kimea the books.'

- (11) \*sāsân ketâb-â ro **kimiâ** dâd

The indirect object cannot be separated from the verb by any intervening element, as evidenced by the ill-formedness of (12).

- (12) \*sāsân ketâb- â ro dâd **diruz** **kimiâ**  
 Sasan book -Pl râ gave yesterday Kimea

As argued elsewhere (Karimi, 1989), the indirect object in (10) behaves like a pronoun cliticized into the verb, as in (13).

- (13) Sāsân ketâb-â ro dâd **unâ**  
 Sasan book-Pl râ gave them  
 'Sasan gave'm the books.'

The Persian sentence in (13) is similar to its English translation where the pronoun is cliticized into the verb. If cliticization is a case of incorporation, as suggested by Kayne (1989), incorporation uniquely applies from the right in this language.

On the basis of these empirical arguments, it follows that the complex predicate in Persian is not an instance of syntactic incorporation.

As mentioned before, Heny and Samiiian (1992) have proposed a Reanalysis hypothesis to account for Persian complex predicates. Their proposal is restated in (14):

- (14) **Restructuring** (Heny/Samiiian, 1992)  
 Restructure non-branching N with its unique sister,  
 where "non-branching" N refers to the structure

N  
 / \  
 N N

The rule in (14) will prune the N'' and N' levels, turning (15a) into (15b):



Heny/Samiian's analysis faces a number of problems as well: First, these authors do not account for sentences in (3) and (4), where the complex verb requires an additional object. Second, the nominal element allows limited branching in many cases, as in (6).

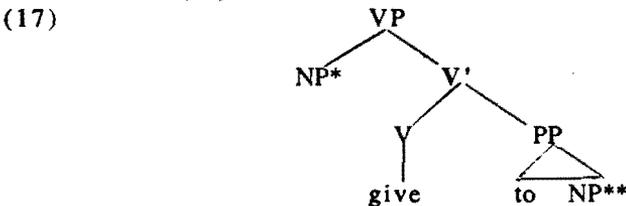
Third, the object NP and V can be separated by a number of elements, as in (7)-(9), and in the examples in footnote (7).

Heny and Samiian argue that in those cases where the nominal element is separated from the verb, we have a VP rather than a reanalyzed V'. This argument cannot account for sentences with two VP internal NP's, as in (16).

- (16) *kimiâ in otâq-ro extesâs be mehmun dâd*  
 Kimea this room-râ allocation to guest give  
 'Kimea allocated this room to the guest.'

Since be mehmun is intervening in (16), the reanalysis hypothesis has to consider the nominal extesâs as the direct object of the verb, and therefore, cannot account for the status of the NP in otâq ro.

Larson's (1988) model of V' Reanalysis provides a better account of Persian complex predicates than Heny and Samiian's: analyzing the double object construction in English, Larson argues that the verb and the indirect object form a small predicate, with the direct object outside this predicate. This is illustrated in (17)



In (17), the verb and the prepositional phrase constitute a predicate, while the direct object NP\* is outside this predicate.

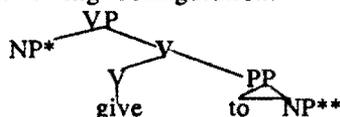
Larson further introduces the following optional rule of V' Reanalysis.

(18) **V' Reanalysis** (Larson 1988)

Let  $\alpha$  be a phrase [V'.....] whose theta-grid contains one discharged internal theta role.  
Then,  $\alpha$  may be reanalyzed as [V.....].

According to (18), V' may be reanalyzed as V if it has one unsaturated theta-role left outside of V'. This optional rule will modify (17) into the following configuration.

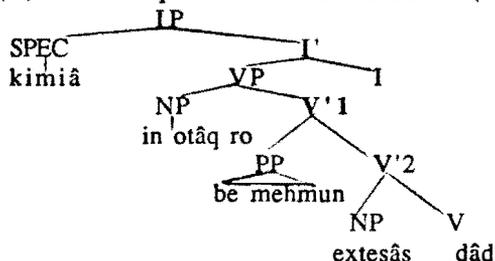
(17')



In (17'), the direct object NP\* is the THEME of the verb. However, it is outside the V'. Therefore, V' can be reanalyzed as V. This V now can assign Case to the direct object NP\*<sup>6</sup>.

Having the basic ideas of Larson's model in mind, consider the structure in (3') which represents the sentence in (3).

(3')



On the basis of (18), V'1 has exactly one discharged internal theta role (=the THEME), and therefore, can be reanalyzed as V, assigning Case to the direct object. This analysis accounts for the sentences in (3) and (4), where the THEME of the verb is outside the V'. On the basis of this analysis, the facts in (6)-(9) are also explained: the nominal element is a maximal projection as in (6), and hence can undergo scrambling, allowing the sentences in (7) and (9). However, many problems emerge: first, the V' Reanalysis includes not only the nominal element and the verb, but also the indirect object. However, it is V'2 in (3') that requires to be reanalyzed as one unit, a process that is not allowed by (18), since V'2 has two discharged theta grids

(THEME and GOAL), while (18) allows V' Reanalysis only when exactly one discharged theta grid is available.

second, Larson's V' Reanalysis is an optional rule. Although it can remain optional in the case of sentences like the one in (2), it has to be obligatory in the case of (3) and (4). There are still more serious problems regarding the V' Reanalysis hypothesis. We will come back to this issue in the final section of this paper.

The descriptive discussion so far indicates that the Reanalysis hypothesis and the Incorporation process cannot be maintained for Persian based on empirical reasons. In the next section, we will provide arguments indicating that these processes are ruled out on theoretical grounds as well.

### III 'Light' Verb Analysis

In this section, we will propose that the verbal element of Persian complex predicates are 'light' verbs in the sense of Jespersen (1954), and that they are compatible with suru in Japanese and other 'light' verbs discussed in the literature for a number of languages (DiSciullo & Rosen 1990 for Italian, Miyagawa 1989 and Dubinsky 1990 for Japanese, Pelletier 1990 for Telegu, among others). We will further show that the thematic relation of the nominal element to the verb in Persian complex predicate constructions supports the Argument Transfer Hypothesis proposed by Grimshaw and Mester (1988) (G&M henceforth). We will show that this hypothesis, combined with a distinction between specific/nonspecific NP's on the one hand, and the existence of split Case, on the other, will provide a generalized account of Persian complex predicate constructions.

#### 1. Properties of Light Verbs

The verbal element of Persian complex predicate is semantically empty. The complex predicate receives an idiomatic reading, with the nominal element carrying the semantic burden, as is detectable from the examples in (2)-(4). The claim that the semantic content is based on the nominal element is supported by the examples in (19) and (20), where a and b have different verbs, but the same nominal element and the same meaning. The only difference between them is of a stylistic nature: b is used only in the written language.

- (19) a. ezhâr kardan      b. ezhâr      dâstan 'to state'  
           statement do            statement have
- (20) a. majbur kardan    b. majbur nemudan 'to force'  
           forced do            forced show

A crucial property of the light verb is that it does not bear a thematic relation to its nominal element. This fact follows from the simple syntactic test in (21)-(23): only the NP bearing a thematic relation to the verb can appear in an EZAFE construction, a construction that consists of a head noun and its thematic arguments.

- (21) a. kimiâ be râmin **ketâb** dâd  
           Kimea to Ramin book gave  
           'Kimea gave (a) book to Ramin.'
- b. dâdan-e **ketâb** be râmin dorost na-bud  
           giving-EZ book to Ramin right NEG-was  
           'Giving (a) book to Ramin was not right.'
- (22) a. kimiâ be râdio **guş** dâd  
           Kimea to radio ear gave  
           'Kimea listened to the radio.'
- b. \*dâdan-e **guş** be râdio dorost na-bud  
           giving-EZ ear to radio right NEG-was
- (23) a. kimiâ in otâq-ro be mehmun **extesâs** dâd  
           Kimea this room-râ to guest allocation give  
           'Kimea allocated this room to the guest.'
- b. \*dâdan-e **extesâs** otâq-ro be mehmun dorost  
           giving-EZ allocation room-râ to guest right  
           na-bud  
           NEG-was

The verb **dâd** theta-marks **ketâb** in (21a), therefore the latter can follow the nominalized verb in (21b). No thematic relationship holds between the verb **dâd** and the nominals **guş** and **extesâs** in (22a) and (23a), respectively. Hence, the ungrammaticality of (22b) and (23b) is explained.

The third property of light verbs is that the subcategorizational framework of these verbs is not the same as the corresponding 'heavy' verb. The heavy verb **dâdan** 'to give', for example, takes a direct and an indirect object, similar to its English counterpart. The light verb, however, will take different types of complements depending on the nominal element in the complex predicate. Consider the following examples.

- (24) kimiâ zabânšenasi-ro edâme dâd  
 Kimea linguistics -râ continue gave  
 'Kimea continued (studying) linguistics'
- (25) kimiâ bâ rahju mosâbeqe dâd  
 Kimea with Rahju compete gave  
 'Kimea competed with Rahju.'

The subcategorizational framework of the 'light' verb dâd in (24) and (25) is not the same as the 'heavy' dâd in (21a). Also the thematic relationship of the 'light' verb to the internal arguments of the VP is not the same as its heavy counterpart: ketâb and Ramin in (21a) are the THEME and the GOAL of the verb, respectively. The same thematic relationship does not hold between the verb and the internal arguments in (24)-(25).

## 2. The Argument-Transfer Hypothesis

Following G&M (1988), we suggest that the 'light' verb in Persian cooccurs with theta transparent NP's, noun phrases that assign theta role outside their maximal projections. The noun lends arguments to the verb, turning it into a theta-marker. The theta transparent NP's in Persian reveal similar properties as those in Japanese described by G&M.

a. they have a nonreferential, predicate like character<sup>7</sup>.

b. they cannot be relativized, as in (26):

- (26) a. \*kimiâ be râdio guš-i ro ke xeyli xub bud dâd  
 Kimea to radio ear-Rel râ that very good was gave
- b. Kimiâ be râmin ketâb-i ro ke xunde bud dâd  
 Kimea to Ramin book-Rel râ that read was gave  
 'Kimea gave Ramin the book she had read.'

The nominal element guš in (26a) does not allow relativization, as evidenced by the ill-formedness of this sentence. The referential NP ketâb in (26b), however, allows relativization, and hence the sentence is grammatical.

Finally, the combination of a transparent NP with a light verb turns the head noun into the functional equivalent of a verb regarding theta role assignments, as the sentences in (24) and (25) attest.

If the nominal element of the complex predicate is not incorporated, how does it satisfy the Case filter<sup>8</sup>? This question is crucial in the case of those complex predicates where two VP

internal NP's depend on the verb for accusative Case assignment. This issue takes us to the next section.

#### IV Case Assignment and the Complex Predicate

The questions to address here are: (a) how to account for the two positions of the VP internal NP's in (3) and (4), and (b) how to account for their Case in order to satisfy the Case filter (Rouveret and Vergnaud, 1980, and Chomsky 1981:49).

##### 1. Double Object/Case Positions

In a paper on obliqueness and specificity, Karimi (1990) argues that râ in Persian follows a noun phrase if the latter is marked [-NOM], [+Specific], and is outside of the governing domain of a lexical head, as illustrated by the contrast in (27).

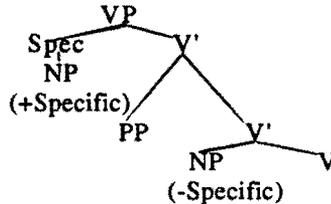
- (27) a. \*kimiâ be râmin ro ketâb dâd  
           Kimea to Ramin râ book gave  
       b.     râmin ro kimiâ be-heš ketâb dâd  
           Ramin râ kimea to-him ketâb gave  
           'Ramin, Kimea gave him books.'

The noun phrase râmin is in the domain of a lexical head (the preposition be) in (27a), and therefore, the sentence is illformed. In (27b), this noun phrase is outside of the domain of the lexical head, and the result is grammatical.

The generalization regarding râ in Persian holds for the specific direct object which is always followed by râ. The implication of this generalization is that the specific direct object is never in the argument position in the surface structure. A similar argument is presented by Mahajan (1990) for specific direct objects in Hindi. Koopman and Sportiche (1991) have suggested a derived S-structure for direct objects in Dutch, and Johnson (1991) has argued that accusative-Case marked NP's are moved from their base positions<sup>9</sup>.

The previous proposal (Karimi, 1990) is taken one step further, suggesting two object positions in Persian clauses (forthcoming in Karimi Persian Syntax (PS, henceforth)): one position for non-specific NP's as a sister to the verb, and yet another one for specific NP's in the SPEC position of VP. This is illustrated in (28).

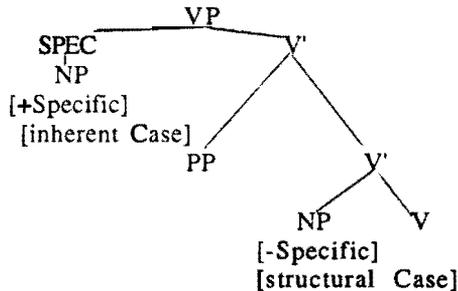
(28)



In (28), the non-specific NP is a sister to the verb, while the specific NP is higher up in VP, c-commanding the indirect object. As argued in (PS), this configuration is based on the syntactic behavior of the specific/nonspecific direct objects. It is further supported by anaphoric binding conditions in this language: the indirect object can only be in the scope of the specific direct object, and not vice versa.

The analysis in (PS) further suggests that the lower NP is structurally Case marked by the verb, while the higher NP, always specific, receives inherent object Case, bearing thematic relationship being the core property of the inherent Case<sup>10</sup>. On the basis of these assumptions, the configuration in (28) is revised as in (29):

(29)



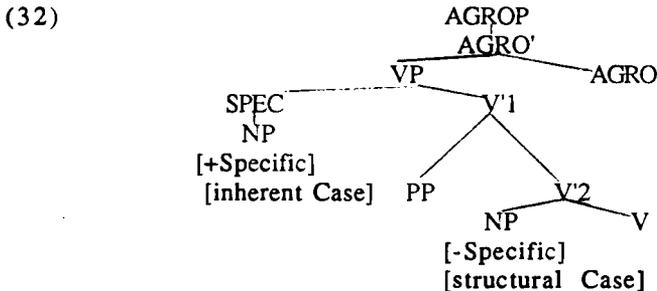
The structure in (29) supports the analysis of complex predicates in Persian outlined in this paper: the nominal element of the complex predicate, a nonspecific NP, appears as the sister of the verb, receiving structural Case. The specific direct object in the SPEC of the VP receives inherent Case under government.

The idea of two accusative Cases has been suggested previously by a number of linguists, including Larson (1988), Belletti (1988), and Mahajan (1992), among others<sup>11</sup>. Larson suggests that "...quite generally in transitive structures two

objective Cases are involved-one structural and one inherent..." He continues that "...the double object construction [in English] is simply an instance where the two Cases are "pulled apart" and assigned to two different arguments." The same idea applies to sentences in (3) and (4), repeated in (30) and (31), for convenience.

- (30) *kimiâ in otâq-ro be mehmun extesâs dâd*  
 Kimea this room-râ to guest allocation give  
 'Kimea allocated this room to the guest.'
- (31) *kimiâ mehmun-ro da?vat kard*  
 Kimea guest - râ invitation did  
 'Kimea invited the guest.'

The nonspecific NP's in (30) and (31) are structurally Case marked by the verb. The specific NP's followed by *râ* in these sentences are the direct objects of the complex predicates, and hence bear a thematic role. Adopting Mahajan's (1992) theory of Case assignment to object NP's, it has been argued in (PS) that both object Cases are assigned under government in this language. On the basis of this discussion, the configuration in (29) is revised as in (32)<sup>12</sup>:



In (32), the nonspecific NP receives structural Case by the verb, while the verbal inherent Case is assigned to the specific direct object by AGRO. The crucial point is that the Specific NP bears the thematic role which is not necessarily true of the nonspecific NP. Therefore, a basic distinction is made between the inherent versus structural Case on the basis of thematic relation of the noun phrase to the verb. This analysis indicates that the Case responsible for nonspecificity is structural as suggested by Mahajan(1990:140). It further confirms Chomsky and Lasnik's

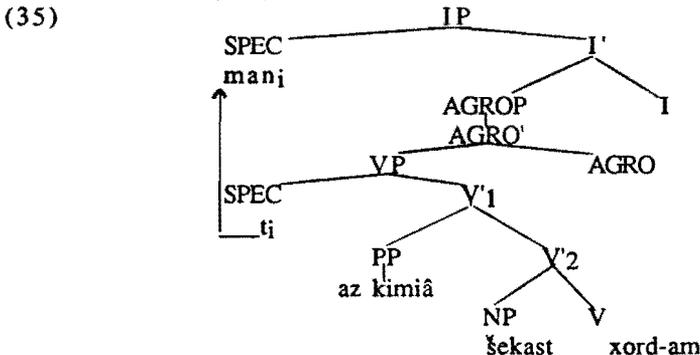
(1991) suggestion that the inherent Case is assigned to an NP only if it is theta marked.

## 2. Unaccusative Complex Predicates

The split Case in Persian is further supported by a class of light verbs that are marked "unaccusative" in the lexicon. These verbs are typically employed as syntactic counterparts of certain transitive verbs in complex predicate constructions. The verb *xordan* 'to collide, to eat' is among those that are marked [unaccusative] as light verbs. The examples in (33) and (34) indicate this fact.

- (33) a. kimiâ man ro šekast dâd  
Kimea I râ defeat gave  
'Kimea defeated me.'
- b. man (az kimiâ) šekast xord-am  
I of Kimea defeat ate - 1st Sg  
'I was defeated (by Kimea.)'
- (34) a. dowlat mardom ro farib dâd  
government people râ deception gave  
'The government deceived the People'
- b. mardom (az dowlat) farib xord-and  
people of government deception ate -3rd PL  
'People were deceived (by the government).'

The sentences in a are transitive, while those in b are their unaccusative counterparts. We are suggesting the configuration in (35) for the sentence in (33b). This configuration represents the structure of (34b) as well. Irrelevant details are absent.



The subject optionally appears in a PP construction, as in (35).

The crucial point is that although the unaccusative verb xord does assign a structural Case to its structural object sekast, but the AGR-O is not able to assign inherent Case to the NP in the SPEC of VP, due to the existence of the unaccusative verb, forcing the object to move to the subject position in order to receive nominative Case. That this noun phrase is in the subject position in (33b) and (34b) is supported by the verb agreement. Furthermore, the oblique-specificity marker râ is excluded, as the ill-formedness of (36) attests.

(36) \*man ro az kimiâ sekast xord-am

The fact that the external thematic role is not transferred to the verb in (33b) and (34b) does not detract from the relevance of Argument Transfer Hypothesis: the implication of the existence of light transitive versus light unaccusative verbs in Persian is that the transparent NP of the complex predicate lends its theta roles to the verb as long as the verb is capable of hosting them. The unaccusative light verb blocks the transition of the external theta role. In this case, the transparent NP optionally projects its external role into the sentence in the format of a prepositional phrase. Unaccusative light verbs, therefore, confirm the existence of split Case in this language: the unaccusative verb in (35) assigns structural Case to its sister NP, but cannot assign inherent Case to the specific direct object<sup>13</sup>. This analysis suggests a revised version of Burzio's Generalization as in (37).

(37) Burzio's Generalization (revised)

+external THETA ROLE<-----> +internal INHERENT CASE

Belletti has suggested a similar revision of Burzio's Generalization. She argues that ergative verbs in Finnish do not assign accusative Case, but they do assign partitive Case (=indefinite NP's). Belletti's structural Case is closely related to our inherent Case.

## V Conclusion

We have shown in this paper that the verbal element in Persian complex predicates is semantically empty, and that it cooccurs with a transparent NP. The latter transfers its thematic roles to the verb. This fact accounts for the differences between the light and the corresponding heavy verb, on the one hand, and the differences observed between

complex predicates that appear with the same verb, on the other hand. We have also shown that the nominal element of the light verb in a complex predicate construction is a nonspecific NP, that does not bear thematic relationship to the verb. This fact excludes the Incorporation hypothesis since incorporation involves an NP that is assigned a thematic role by the verb. Our analysis further indicates that a Reanalysis hypothesis, as outlined by Heny and Samiian, cannot account for Persian data since such an analysis does not explain the differences between a heavy verb and its light counterpart with respect to thematic roles and subcategorizational frameworks. Furthermore, their analysis does not account for the lack of theta role regarding the nominal element of the complex predicate. Larson's V' Reanalysis, although compatible with the idea of the existence of two object positions and the split Case assignment, does not account for the lack of a thematic role regarding the nominal element of the complex verb. Similar to Heny and Samiian's Reanalysis hypothesis, it also fails to account for the differences between the 'light' and its corresponding 'heavy' verb regarding their thematic roles and subcategorizational frameworks.

Our discussion on unaccusatives supports the split Case and the existence of two object positions in Persian. It further suggests that the external theta role assignment is closely related to Accusative Inherent Case.

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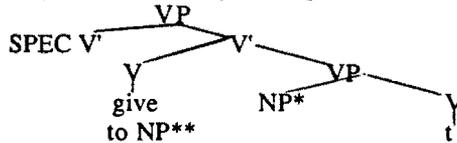
#### NOTES

\*The data in this paper are taken from Tehrani dialect and Dari.

1. See Bateni (1989).
2. The element **Ex** in (6) refers to a construction called EZAFE in Persian. A short definition of this construction will appear in section III. For an analysis of EZAFE constructions see Samiian (1983) and Karimi (1990).
3. The element ye in (6) is not a real numeral in these types of examples, since it can only be replaced by a degree word.
4. Persian is a pro-drop language, as indicated by the examples in (7-9) in the text.
5. The nominal element can be separated from the verb by elements other than those in (7)-(9), as in (i)-(iii).

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- (i) guš *čerâ* be man ne - mi - kon-e  
 ear why to me NEG-Prog-do-3rd Sg  
 'Why doesn't s/he listen to me?'
- (ii) guš *bâyad* bo - kon-i  
 ear must Subj- do -2nd Sg  
 'You must listen.'
- (iii) guš *ham* ne - mi - tun-i bo - kon-i  
 ear even Neg-Prog-can-2nd Sg Subj- do-2nd Sg  
 'You can't even listen?'

6. According to Larson's model, V+PP moves to the left of the direct object yielding the following configuration:



This structure is derived based on theoretical arguments, satisfying Case assignment under government as well as the directionality of government (Stowell 1981, Koopman 1984, Travis 1984).

7. The NP guš and similar noun phrases do not reveal a referential reading when cooccurring with light verbs.

8. Baker (1988) argues that the Case Filter can be satisfied by adjoining the head of a nominal to the verb that theta marks it. In other words, incorporation satisfies the Case Filter.

9. The landing site of the object NP is different in each one of these analyses.

10. It is important to notice that the NP in the SPEC position of VP is not necessarily followed by râ. The point is that this NP is always MORE specific than the sister NP of the verb.

11. Belletti's structural Case, which is closely related to the thematic relation of the NP to the verb, corresponds to my inherent Case.

12. Thanks go to Ezat Karimi for helpful suggestions.

13. The implication of this analysis is that the subject of an unaccusative verb has to be specific. This proposal has been , in fact, argued for in (PS). See also Keenan (1974), who argues

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that the subject of passives ( and the head of relative clauses) have to be referential.

### REFERENCES

- Baker, M. 1988. Incorporation. Chicago: The University of Chicago Press.
- Batani, M. R. 1989. "Farsi Zabani Aghim?" (Persian, a Sterile Language?). Tehran: Adine 33.
- Belletti, A. 1988. "The Case of Unaccusatives." LI 19.
- Chomsky, N. 1981. Lectures on Government and Binding. Dordrecht: Foris.
- Chomsky, N., and H. Lasnik. 1991. "Principles and Parameters Theory." MIT: ms
- Dubinsky, S. 1990. "Light Verbs and Predicate Demotion in Japanese" in Grammatical Relations: A Cross-Theoretical Perspective, edited by Dxiwirek, K. et al.
- DiSciullo, A.M., and S.T. Rosen. 1990. "Light and Semi-Light Verb Constructions." In Grammatical Relations: A Cross-Theoretical Perspective, edited by Dxiwirek, K et al.
- Grimshaw, J. , and A. Mester. 1988. "Light Verbs and Theta-Marking." LI 19.
- Heny, J., and V. Samiiian. 1992. "Three Cases of Restructuring in Modern Persian." Proceedings of WECOL.
- Johnson, K. 1991. "Object Positions." Natural Language and Theory. 9.
- Karimi, S. 1987. "Compound Verbs in Persian." Linguistics Working Papers. University of Washington.
- 1989. "Word Order and Incorporation." Paper presented at the annual meeting of the Middle Eastern Studies Association, Toronto.
- 1990. "Obliqueness, Specificity, and Discourse Functions: Râ in Persian." Linguistic Analysis. 20. 139-191
- (in preparation) Persian Syntax: A Generative Study.
- Kayne, R. 1989. "Null Subjects and Clitic Climbing." In The Null Subject Parameter, edited by Osvaldo Jaeggli et al. Dordrecht: Kluwer Academic Publishers.

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- Keenan, E.L. 1974). "The Functional Principle: Generalizing the Notion of 'Subject of.'" In Papers from the Tenth Regional Meeting of the Chicago Linguistic Society, Chicago.
- Khanlari, P. 1973 Tarix-e Zabân-e Farsi (The History of Persian Language), Vol.2. Tehran: Bonyad-e Farhang.
- 1976. Dastur-e Zabân-e Farsi (The Grammar of Persian Language). Tehran: Bonyad-e Farhang.
- Kiparsky, P. 1982. "Lexical Morphology and Phonology." Linguistic Society of Korea.
- Koopman, H. 1984. The Syntax of Verbs: From Verb Movement Rules in the Kru Languages to Universal Grammar. Dordrecht: Foris.
- Koopman, H. and D. Sportiche. 1991. "The Position of Subjects." In The Syntax of Verb-Initial Languages, edited by J.McCloskey. Elsevier (Special issue of Lingua)
- Larson, R. 1988. "On the Double Object Constructions." LI. 19.
- Lieber, R. 1983. "Argument Linking and Compounds in English." LI. 14
- Mahajan, A. 1990. The A/A-Bar Distinction and Movement Theory. MIT:Ph.D. dissertation.
- 1992. "The Specificity Condition and The CED." LI. 21.
- Miyagawa, S. 1989. "Light Verbs and the Ergative Hypothesis." LI. 20.
- Mohammad, J. 1992. "Structural Accusative Case Assignment in Kati." University of Arizona: ms.
- Mohanan, K. 1982. Lexical Phonology. IULC Publication.
- Moyne, J. 1970. The Structure of Verbal Constructions in Persian. Harvard University. Ph.D dissertation.
- Pelletier, R. 1990. "Light Verbs in Telegu: A Clause Union Analysis." In Grammatical Relations: A Cross-Theoretical Perspective, edited by Dxiwirek et al.
- Rouvert, A., and J.R. Vergnaud. 1980. "Specifying Reference to the Subject." LI. 11.
- Samiian, V. 1983. Structure of Phrasal Categories in Persian: An X-Bar Analysis. UCLA. Ph.D. dissertation.
- Stowell, T. 1981. Origins of Phrase Structures. MIT. Ph.D. dissertation.
- Travis, L. 1984. Parameters and Effects of Word Order Variation. MIT. Ph.D. dissertation.

Material Antecedents

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A momentous discovery in the Theory of Anaphora was made in the first half of the XIIth century when a disciple of William de Conches named Petrus Helias suggested a refinement of the prevailing theory on anaphora due to Priscianus, a theory which had influenced both logical and grammatical thought since the VIth century A.D. [For the historiographical background I rely mainly on Kneepkens 1976, 1977 and Covington 1984.] Priscianus' theory of the relatio (which was the name of the relation holding between antecedents and pronouns) amounted to the following definition:

- (1) Relatio est antelatae rei representatio  
'The relatio is the representation of an antecedent thing'  
[Priscianus XII, 16; from Kneepkens 1977:5]]

Petrus Helias suggested that different types of relatio obtained between pronouns and their antecedents and hence distinctions should be made inside Priscianus' monolithic statement. Several grammarians took up Helias' suggestion: in the Glose **Promisimus** (dating from the 1170s) the glossator includes new notions to make sense of Priscianus' statement and in Robert Blund's **Summa in arte grammatica** (which belongs to the last quarter of the the XIIth century) a systematic study of the relatio can be found. Among the distinctions introduced by Master Blund one of special importance to us must be noted: the distinction between the *relatio personalis* and the *relatio simplex*. Perhaps to our surprise they are defined thus:

- (2) a. Relatio Personalis: antecedent and pronoun refer to the same object.  
b. Relatio Simplex: antecedent and pronoun-DO NOT refer to the same object.

But now, what sense of 'antecedence' is this in which a pronoun takes a certain noun as antecedent but does not refer to the same object as the noun? [It was not some type of obviation they were thinking on: some pronouns require an "antecedent" they must be disjoint from]. Medieval grammarians give several examples; the following is a typical one:

- (3) homo est Socrates, quod est nomen appellatium  
 'a man is Socrates, which is a proper name'  
 [Kneepkens 1977:6]

where the antecedent stands for the res (=appellatum) and the relative for the noun itself (materialiter). The reverse is also attested:

- (4) homo est nomen appellatium, qui est Socrates  
 'a man is a proper name who is Socrates'  
 [Kneepkens 1977:6]

Also attested are examples like:

- (5) a. iste est Socrates, qui ille uocatur  
 'this is Socrates, who is called that'  
 [Kneepkens 1977:7]
- b. Socrates est nomen proprium, qui iste uocatur  
 'Socrates is a proper name, who is called that'  
 [Kneepkens 1977:7]

which offer a singular type of structure (especially (5b)) that I will discuss in detail in a moment.

The well-formedness status of the relatio simplex also has a curious history. At first, grammarians only accepted the relatio personalis, calling the relatio simplex a figura (belonging to the *mos docentis* of the logicians) or leaving it aside for logico-theological speculation, like the one provided by the following well-known example:

- (6) mulier quae damnavit, salvavit  
 'woman who condemned, saved'  
 [Kneepkens 1976]

analyzed as: woman, who brought damnation (=Eve), also brought salvation (=Virgin Mary). Here 'mulier' is the universal antecedent of different particulars. It was only later, towards the end of the XIIth century that grammarians started acknowledging the relatio simplex as a fully well-formed construction which syntactic theory should deal with. There is a second breakthrough in medieval grammatical studies in Anaphora worth mentioning. Peter Helias, who started the post-Priscian investigations on the subject, stated that the relatio between an antecedent and a pronoun did not amount to a *constructio*. In fact, his position was more drastic still: even in the cases of the relatio personalis (when pronoun and antecedent did refer to the same object) no syntactic construction related them. His arguments were

based on a number of examples showing mismatches in Case, gender, person, and number between pronoun and antecedent. Consider as illustration of his point:

- (7) a. Socrates currit quem video  
       [nom]                  [acc]  
       'Socrates, whom I see, is running'
- b. ex semine tuo qui est Christus  
       [neut]                  [masc]  
       'from Thy seed, which is Christ'
- c. ego sum qui sum  
       [1P]                  [3P]  
       'I am who I am'
- d. Deus creavit hominem; masculum et feminam  
                                           [sg]  
       creavit eos  
                                   [pl]  
       'God created man; male and female He created  
       them'  
       [Covington 1984:116]

Around 1300 A.D. Radulphus Brito suggested a different treatment: "relativum habet construi cum suo antecedente". And the relation is that of referential dependency: "relativum (...) significat per modum dependentis referentis rem antelatum". There is after all, argues Brito, a grammatical requirement (which is not Case, gender, number nor person) exerted by the relation: that the antecedent be a Noun and not an Adjective. I see in Brito's intuition that a syntactic construction must exist relating antecedent and pronoun the origins of modern indexing mechanisms.

Present day examples of the relatio simplex are not easy to come by and in many ways (but perhaps one) they are dissapointing. Straightforward versions of our original examples (3) through (5) render dubious results. Consider:

- (8) a. A man is Socrates, which is a proper name.  
       b. A man is a proper name, which is Socrates.  
       c. This is Socrates, which was so called.

But I want to call your attention to a modern day version of (8c) which may be regarded as a paradigmatic case of the relatio simplex as well as one of the most famous sentences in the philosophical literature dealing with opaque domains and propositional attitudes.

In **Reference and Modality** (Quine 1953) Quine gives (9) as an example of a non purely referential occurrence of the term 'Giorgione', a conclusion allegedly supported by the failure of substitutivity (salva

veritate) illustrated by (10), otherwise possible given the truth of (11):

- (9) Giorgione was so-called because of his size
- (10) Barbarelli was so-called because of his size
- (11) Giorgione = Barbarelli

But Quine is quick to point out that example (9) is a subtle one, for "it is a statement about a man and not merely about his name. It was the man, not his name, that was called so and so because of his size" (Quine 1953). In *Word and Object* Quine completes his characterization (cf. Quine 1960 §32): he dubs 'Giorgione' a "two role" Subject, notes that only one of the two roles is referential, and observes that this impure referential status makes existential generalization nonsensical, as (12a) interpreted as (12b) reveals:

- (12) a. Someone was so-called because of his size
- b. (Ex)(x was called x because of x's size)

It is this impure referential status that explains the failure of substitutivity.

Now, the "two role" Subject function can be opened up by a paraphrase like (13), treating 'so' as if it were a "pronoun of laziness" (in Geach's (1962:\$76) sense):

- (13) Giorgione was called Giorgione because of his size

and the intended coreference between the first occurrence of the name and the personal pronoun can be adequately rendered through coindexation of the familiar sort as in (14):

- (14) Giorgione<sub>i</sub> was called Giorgione because of his<sub>i</sub> size

[By coindexation of the familiar sort I mean the idea advanced by G.Evans that coindexation ought to be construed as referential dependency; roughly, if x is referentially dependent on y then x picks its reference from y (cf. Evans 1980). The distinction between coreference and referential dependency is a relevant one: the former notion is not at issue here, maybe it is not even a relevant grammatical notion. This is important because, after all, (10) can mean (14). And although this is true, it is irrelevant, as Cartwright (1971) has noted.

That (10) can mean (14) is shown by examples like the following:

(i) Talking about the name Giorgione, did you know that Barbarelli was so-called because of his size.

That grammar ought not to regiment coreference but referential dependency can be illustrated by the fact that the ungrammaticality of

(ii) John<sub>i</sub> likes him<sub>i</sub>

does not mean that 'John' and 'him' cannot refer to the same object because after all they can: suppose John points to an individual in a photograph and expresses his liking of him. We can report this by saying (ii); but it may well happen that the ostended individual is John himself. So, the ungrammaticality of (i) means that as a point of grammatical fact the pronoun cannot be referentially dependent on the name. But it says nothing about coreferential possibilities. I believe that the same point is made by Higginbotham (1985)].

Now the same general coindexing method used in (14) seems inappropriate in (9) for both (15) and (16) are wanting (in their neglect of one of the two roles) and (17) is plainly false:

(15) Giorgione<sub>i</sub> was so-called because of his<sub>i</sub> size

(16) Giorgione<sub>i</sub> was so<sub>i</sub>-called because of his size

(17) Giorgione<sub>i</sub> was so<sub>i</sub>-called because of his<sub>i</sub> size

The representation in (15) makes the Subject purely referential and thus substitutivity is regained: indeed if (15) is True then so is (10). (16) on the other hand appears to make the Subject purely non-referential and thus the statement ends up being not about a certain man (to wit, a certain XIV century Italian artist) but merely about a certain name (that is, about a certain trysyllabic Italian expression). And finally (17) fails because it tries to solve these shortcomings by brute force. Admittedly if two elements pick their reference from the same source then they refer to the same object; but certainly it is at least clear that 'so' and 'his' do not refer to the same element. In fact, they don't even refer to the same type of element. Thus, here we see a modern reincarnation of the relatio simplex.

This is then our problem: is there a grammatical representation of (9) that means (14) and that makes (10) false? Note the two conditions I have imposed on any candidate solution: first the resulting representation of (9) must mean (14) and second, such representation must make (10) false. This second condition is crucial because we have already seen that (10) can mean (14) if substitution is allowed (i.e. if

the particle 'so' is free and the Subject is purely referential). Indeed, (15) meets the first condition but not the second; and (16) satisfies the second but not the first. In other words, our problem reduces to the following question: is there a syntactic way to represent "two role" NPs?

[In this discussion I'm leaving aside the possibility that 'so' is a free pronoun, a legitimate possibility after all, as example (18) shows:

- (18) The plane was so-painted/painted-so to avoid detection

because the predicate 'so-painted' does not trigger opacity.

A closely related construction, the [so-called+NP] I also leave aside because it doesn't trigger opacity either. Consider:

- (19) a. So-called ergative constructions were studied by Burzio.  
 b. ergative constructions = un-accusative constructions  
 c. So-called un-accusative constructions were studied by Burzio

Substitutivity preserves truth values. As opposed to the strict Giorgione sentence:

- (20) Ergative constructions were so-called/called-so by Burzio

which does not allow for substitution.]

Let us examine the two roles closer. The first one is the referential role that makes 'Giorgione' a possible antecedent of the pronoun 'his'. That this role is active there is no doubt: the Subject is referential enough to trigger Binding Theory effects. Consider:

- (21) Giorgione<sub>i</sub> was so-called only by himself<sub>i</sub>  
 (22) \*Giorgione<sub>i</sub> was so-called only by him<sub>j</sub>

In (21) 'Giorgione' is a suitable (local) antecedent for the reflexive and the sentence is grammatical.. In (22) 'Giorgione' counts as a local antecedent the pronoun must be disjoint from. Consequently, the referential role must be active in order to trigger these Binding effects.

What about the non-referential role? In fact, one might ask, what role it is? There seems to be a

type/token distinction buried in here. There are two ways to proceed: either 'Giorgione' is the antecedent of 'so' (and thus 'so' is referentially dependent on 'Giorgione'; which means that 'so' refers to whatever 'Giorgione' refers to, which in turn implies that 'Giorgione' refers after all!); or alternatively, 'Giorgione' is the referent of 'so' (that is, 'so' acting as a deictic of sorts has the material word 'Giorgione' as a referent. Perhaps one might add that this deictic skill of 'so' is activated when 'so' is attached with material antecedent seeking predicates such as 'called'). But this second option can't be correct. A simple proof (which I owe to Gennaro Chierchia) can be found in sloppy identity structures like the following:

(23) Giorgione was so-called because of his size  
and Pepino was too

Given that (23) can mean that Pepino was called 'Pepino' because of Pepino's size, the particle 'so' cannot refer materialiter to the expression 'Giorgione'.

So we are left with the suggestion that the token 'Giorgione' is somehow connected (I avoid considering reference as the nature of the connection) to the type 'Giorgione' and, by taking the former as an antecedent, the particle 'so' ends up picking up its reference from the latter.

A solution to all these questions raised above concerning the syntactic representation of the relatio simplex (or of structures containing "two role" NPs) will likely involve distinguishing between modes of antecedence. That is, referentially dependent elements can pick up at least referential or material antecedents; at least, because other aspects may well be involved, as in cases like (24) shown below:

(24) Who  $t_i$  thinks that  $we_j$  will fight

in the interpretation: "for which  $x$ ,  $x$  believes that  $x$  and I will fight", where ( $x$  and I) constitute the 'we'.

Here I'll only consider material antecedents, meaning by the term antecedent NPs taken in their non-referential mode; i.e. taken materialiter. If we rely on indexing mechanisms to convey the difference in antecedent modes, then sentence like (9) could be analyzed as in (25):

(25)  $Giorgione_{i,m}$  was  $so_m$ -called because of  $his_i$  size

where the NP 'Giorgione' contains a pair of indices  $\langle i, m \rangle$  "i" being the referential index and "m" the material one. Notice furthermore that if a solution along these lines can be worked out then a solution to the substitutivity problem is straightforward: although 'Giorgione' and 'Barbarelli' both share the referential index "i" they obviously do not share the same material index given that they are different expressions. Hence, substituting 'Giorgione<sub>i,m</sub>' by, say, 'Barbarelli<sub>i,n</sub>' will be illicit if the material index has been somehow activated by some syntactic trigger. In effect, this amounts to saying that the activation of the material index is triggered by whatever mechanism triggers the formation of an opaque domain.

Now, is there motivation for an analysis like (25) relying on indices to convey the desired results? I believe there is. First there is indirect motivation from a conceptual point of view from Creswell (1985) where it is suggested to treat the Giorgione sentence (9) as including a pronoun of laziness; thus, (9) should somehow be re-constructed as (13) above, which I repeat here:

(13) Giorgione was called Giorgione because of his size

and so substitutivity would be re-gained, eliminating the 'two role' structure in favor of a purely referential one. Leaving aside the actual technical reconstruction of the lazy pronoun into the full-blown NP, (25) and (13) coincide very much in what they want to say. But this latter solution, although conceptually pleasing in its simplicity will fail to generalize because, as we will see in a moment, not all relative simplex constructions involve laziness.

But there is more direct motivation for an analysis like (25). Edwin Williams has noted that reference is a feature of maximal projections and not of Heads (in X-bar jargon) (cf. Williams 1989:286). So consider the basic X-bar string:

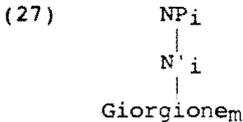
(26)

$$\begin{array}{c} \text{XP} \\ | \\ \text{X}' \\ | \\ \text{X}^0 \end{array}$$

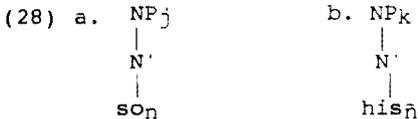
Williams argues that  $\text{X}^0$  is not a referential element; that is, words (or, in fact, anything insertable in the  $\text{X}^0$  slot) do not refer: reference is a feature of higher levels in the projection. Although Williams suggests

that only maximal projections are referential there is data available in the sense that intermediate levels (i.e. X' levels) are also referential (cf. e.g. Radford: 1988:175 for 'one-pronominalization' tests, and Contreras (1985) for empty categories of the X' level). I will not review here the arguments but I will suggest that it makes good sense to regard X<sup>0</sup> as non referential. In fact, it can help us justify our earlier indexing move.

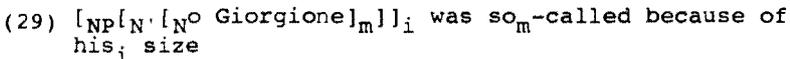
What can we do with these facts? Well, consider (25) again. What it expresses is that two different indices must be employed, one referential and another material. Suppose then that (following Williams' lead) the referential index is a property of intermediate and maximal projections, and that the material index is a property of Heads (= X<sup>0</sup>). Thus 'Giorgione' would be indexed in the following way (where {i,j,k,...} are referential indices and {m,n,n̄,...} are material ones):



And 'so' and 'his' as in (28a,b) respectively:



Thus, in a sentence like our original (9), the NP 'so' may have access to the material index  $\underline{m}$  of the NP 'Giorgione' (i.e.  $m = j$ ); and the NP 'his' may freely take the referential index  $\underline{i}$  of 'Giorgione' as its antecedent (i.e.  $i = k$ ). Note that every NP has both a material and a referential index, and that the referential index of a pronoun has access to the material index of a candidate antecedent only under special circumstances, such as being part of an opacity creating predicate. Thus the resulting structure will look something like:



That material indices are accesible only under certain circumstances is clear by examples such as (30)

- (30) a.\*[Giorgione<sub>m</sub>]<sub>i</sub> mentioned it<sub>m</sub>  
 b.\*[Giorgione<sub>m</sub>]<sub>i</sub> said that I mentioned it<sub>m</sub>

which cannot be construed as "Giorgione mentioned the word 'Giorgione'".

Perhaps only when opacity is induced, material indices are available. So only predicates like 'so-called', 'is a name', 'has 3 syllables', or those considered in the earlier latin examples, or more generally metalinguistic predicates, open the door to the interaction between differential indexing.

I am sure that there are more conspicuous and elegant ways of representing the indexing suggested above (e.g. Larson and Ludlow's Interpreted Logical Forms analysis of propositional attitudes can be easily extended to cover our problems) but I would like to keep plumbing aspects aside here.

Nevertheless, some real questions arise. For example: (a) what is the nature of the relation between referential and material indices?; (b) does Binding Theory apply to material indices? (or more generally to metalinguistic discourse?; by the way, Fiengo and May (p.c.) have shown that certain segments of metalinguistic discourse, in particular, some natural language translations of mathematical statements lie outside Binding Theory), and (c) when and how are material indices activated?; when are they relevant?

We have only trivially answered some of these questions. For example, the relation between the m and i indices within a single projection seems to be the 'naming' relation: i.e. if  $X^O$  bears the index m and  $XP$  the index i, then  $X^O_m$  is the name of  $XP_i$  (or of the referent of  $XP_i$  if one wants to be more conspicuous). And, material indices seem to be available only when opacity obtains. With respect to Binding Theory we have said nothing, so let me close with a traditional example involving circularity and a possible interaction between material and referential indices.

Constructions like (31) have been usually ruled out by invoking the anti-circular constraint known as the i-within-i condition.

- (31) \*John<sub>i</sub> is his<sub>i</sub> cook

where circularity is arrived at by assuming (following Hornstein (1984) among others) that both satellites of

the copula are to be coindexed, allegedly because that's what an equative copula *means*. Thus (31) looks like (32)

(32) \*[John]<sub>i</sub> is [his<sub>i</sub> cook]<sub>i</sub>

and the i-within-i violation is now clearly evident in the righthand NP. [This move of automatically coindexing the NPs at each side of the copula is not uncontroversial because it would signal that there is an analytical relation between both NPs, something which is not necessarily the case. For the moment I'll just assume the traditional analysis].

Now, it is clear that a contrast obtains between (31) and (33):

(33) John is his name

where the first natural construal is to take the pronoun 'his' to be coreferential with 'John'. Put in another way, here again 'his' can be viewed as a pronoun of laziness, reconstructing (33) as (34):

(34) John is John's name

But here again, like in the Giorgione example, one might ask what allows for the move.

At least this much is clear: that 'is a name' creates opacity and thus substitutivity (*salva veritate*) fails if we substitute 'John' for any other NP coreferential with the referential John, eg. 'Billy's brother':

(35) Billy's brother is his name (=F where (33) = T)

Hence we might suspect that material indices are involved, in particular the material index of the X<sup>0</sup> 'John'. We have been assuming that every NP has both a referential and a material index, hence we are bound to represent (33) as containing the following three NPs:

|                         |                    |                    |
|-------------------------|--------------------|--------------------|
| (36) a. NP <sub>i</sub> | b. NP <sub>j</sub> | c. NP <sub>k</sub> |
|                         |                    |                    |
| N'                      | N'                 | N'                 |
|                         |                    |                    |
| John <sub>m</sub>       | his <sub>n</sub>   | name <sub>n̄</sub> |

Now, it seems inappropriate to coindex both sides of the copula as in (37)

(37) [John]<sub>i</sub> is [his name]<sub>i</sub>

because clearly John and his name do not refer to the same object. 'John' refers to an individual (recall the NP bears the referential index  $i$ ) and 'his name' refers to a certain name. Hence  $i \neq k$ . But certainly 'his' may take 'John $_i$ ' as an antecedent. What, indeed, (33) expresses is that 'John $_m$ ' and 'his name $_k$ ' corefer (i.e. they both refer to the name-type 'John'). Hence 'his name $_k$ ' should be more adequately coindexed with 'John $_m$ ' (i.e.  $m = k$ ). The resulting configuration being:

(38) [John $_m$ ] $_i$  is [his $_i$  name] $_k$  (and  $m = k$ )

Notice however that if such indexing is correct, then a circular construction seems to obtain, similar in nature to that discussed in Higginbotham (1983):

(39) [his $_i$  wife] $_j$  loves [her $_j$  husband] $_i$

which is ungrammatical. The only difference between (38) and (39) is that in (39) all the indices are referential, suggesting that the  $i$ -within- $i$  constraint doesn't extend to any index, especially if the indices in question are material and not referential, or involve a combination thereof.

Further evidence that 'John' in (33/38) preserves its referential index can be found in structures like (40):

(40) John is his name and his best friend

which illustrate a traditional rhetorical figure known as Zeugma, whose grammatical status is still open to debate.

But all this is very tentative in nature, perhaps because, as St. Augustine (389) put it: "Discussing words with words is as entangled as interlocking and rubbing the fingers with fingers, in which case it may scarcely be distinguished (...) which fingers itch and which give the itching."

#### BIBLIOGRAPHY

- Augustine (389) Concerning the Teacher (De Magistro), G.G. Leckie (translator), Appleton-Century-Crofts Inc., New York.
- Cartwright, R. (1971) "Identity and Substitutivity", in R. Cartwright Philosophical Essays, MIT Press, Cambridge.

- Contreras, H. (1985) "Spanish Exocentric Compounds" in F.H.Nuessel (ed) Current Issues in Hispanic Phonology and Morphology, IULC, 14-27.
- Covington, M.(1984) Syntactic Theory in the High Middle Ages, Cambridge University Press, Cambridge.
- Cresswell, M.J.(1985) Structured Meanings, MIT Press, Cambridge.
- Evans, G. (1980) "Pronouns", *Linguistic Inquiry* 11, 337-362.
- Geach, P. (1962) Reference and Generality, Cornell University Press, Ithaca.
- Higginbotham, J.(1983) "Logical Form, Binding and Nominals", *Linguistic Inquiry* 14, 395-420.
- Higginbotham, J.(1985) "On Semantics", *Linguistic Inquiry* 16, 547-593.
- Hornstein, N.(1984) Logic as Grammar, MIT Press, Cambridge.
- Kneepkens, C.H. (1976) "Mulier Quae Damnavit, Salvavit", *Vivarium* XIV.1, 1-25.
- Kneepkens, C.H. (1977) "The Relatio Simplex in the Grammatical Tracts of the late Twelfth and early Thirteenth Century", *Vivarium* XV.1, 1-30.
- Quine, W.V.O. (1953) From a Logical Point of View, Harvard, Cambridge.
- Quine, W.V.O. (1960) Word and Object, MIT Press, Cambridge.
- Radford, A.(1988) Transformational Grammar, Cambridge University Press, Cambridge.
- Williams, E.(1989) "Maximal Projections in Words and Phrases" in M.Baltin and A.,Kroch (eds) Alternative Conceptions of Phrase Structure, University of Chicago Press, Chicago.

**NP Movement in Ergative Languages<sup>1</sup>**  
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 MIT

**1. Introduction**

In this paper, I present a theory of syntactic ergativity based on the Case feature requirements which motivate NP movement. I propose that the different properties found in ergative and accusative languages result from the movement of NPs to specifiers of functional projections. The Ergative Parameter I present in section 2 determines the kind of NP movement found in the two language types: Crossing Paths in an accusative language, and Nested Paths in an ergative one. This parameter is based on a system of morphological feature checking adapted from Chomsky (1992).

The basic criterion for identifying a language as ergative is the grouping together of the intransitive subject and object, excluding the transitive subject. This is illustrated in (1) with Case and agreement in Inuktitut, an ergative Inuit language. (1a) is transitive, and (1b), intransitive.<sup>2</sup>

- (1) **Inuktitut (Ergative)**  
 a. Jaani-up tuktu                   taku-v-a-a  
    John-Erg caribou(Abs) see-Ind-Tr-3sE.3sAb  
    'John saw a caribou'  
 b. Jaani        pisuk-p-u-q  
    John(Abs) walk-Ind-Intr-3sAb  
    'John walked'

In (1a), the transitive subject has ergative Case, and the object, absolutive Case. In (1b), the intransitive subject has absolutive Case, the same Case as the object. Agreement on the verb also follows an ergative pattern, with absolutive agreement for the intransitive subject and object, and ergative agreement for the transitive subject.<sup>3</sup>

In an accusative language, transitive and intransitive subjects have certain properties, different from those of the object. In example (2) below, both the transitive and intransitive subjects have nominative Case, while the object, him, has accusative Case:

- (2) a. I saw him  
      b. I slept

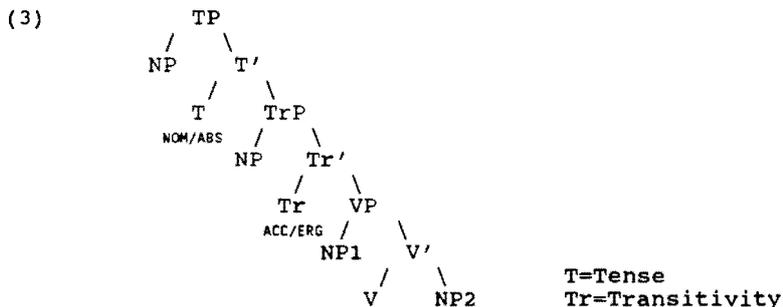
The status of ergativity as a syntactic or morphological phenomenon has been the source of much

discussion in the literature (e.g., Anderson 1976, Comrie 1978, Dixon 1979, Levin 1983, Marantz 1984). Since the grouping together of arguments with respect to Case and agreement is a morphological property, it has been claimed that, except in a few rare languages (e.g., Dyirbal), ergativity does not extend beyond morphology to the syntax. In this paper, I claim that ergativity is a syntactic phenomenon, as it involves a syntactic operation, Move  $\alpha$ .

## 2. Two Types of Movement: Crossing and Nested Paths

In this section, I first present my system of functional categories, which is developed in more detail in Murasugi (1992a). I then introduce the system of morphological features which motivates NP movement to specifiers of functional categories, adapted from Chomsky (1992). Finally, I present my Ergative Parameter and Economy Principles, which determine the type of movement found in ergative and accusative languages: Crossing Paths in accusative languages, and Nested Paths in ergative languages. In the following section, I provide evidence for Nested Paths movement in ergative languages.

Shown in (3) is the structure I propose for clauses universally (see Murasugi 1992a):



The two functional projections are T(ense)P and Tr(ansitivity)P. In an accusative language, T is associated with nominative Case and agreement, while in an ergative language, it is associated with absolutive Case and agreement. Tr is associated with accusative Case/agreement in an accusative language, and with ergative Case/agreement in an ergative language.

The names "nominative", "accusative", "absolutive" and "ergative" are simply labels used to identify the Cases associated with T and Tr in the two types of

languages. I consider T to be associated with the unmarked Case in both language types, and Tr, with the marked Case. The unmarked Case is the form generally used for citation, and the most likely to be morphologically null. These properties are shared by the nominative in accusative languages, and the absolutive in ergative languages. In contrast, accusative and ergative Case are usually the marked Cases morphologically. In this paper, I will refer to both nominative and absolutive as simply "Nominative". However, in order to distinguish between the two types of languages, I will refer to the marked Case as either "accusative" or "ergative".

Given my claim that specific Cases are associated with certain functional heads, the reverse Case-marking on transitive subjects and objects in accusative and ergative languages cannot result from T/Tr having different Case features in the two language types. My proposal is that the differences originate in the movement of NPs to specifier positions.

As shown in (3), I assume the VP-internal subject hypothesis, where subjects are generated within the VP projection (see Fukui and Speas 1986, Kitagawa 1986, Kuroda 1986, and Koopman and Sportiche 1987, among others). I also adopt Chomsky's (1991, 1992) proposal that both subject and object Case/agreement involve a SPEC-head relation between a functional head and its specifier. (This will be discussed in more detail below). Together, these assumptions imply that the subject and object must raise out of the VP to a specifier position in order to satisfy Case and agreement requirements. In Chomsky's system, the subject raises to the higher SPEC, and the object, to the lower, resulting in Crossing Paths. However, within a principles-and-parameters approach to language, where rules and construction-specific principles do not exist, we would predict the possibility of two types of movement: Crossing Paths, and also Nested Paths, where the subject raises to the lower SPEC, and the object, to the higher. Although Chomsky claims that Crossing Paths is the only possible movement (see Chomsky 1992), in this paper, I propose that the alternative movement, Nested Paths, is also possible, and is the one found in ergative languages.

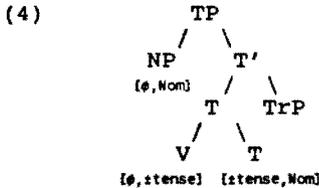
Following Chomsky (1992), I assume that Move  $\alpha$  (i.e., both NP movement and verb raising) is motivated by the need to have legitimate objects by checking morphological features. An element is inserted from the lexicon with all its morphological features, which must be checked with the features of a functional head (in my system, T and Tr). Once features are checked

and matched, they disappear, although they leave behind their morphological form on the NP or verb. The strength of a feature determines whether it is checked at s-structure or LF. Strong features are checked at s-structure, as they are visible at PF, and will cause a derivation to fail. Weak features, however, do not require checking until LF, as they are invisible at PF.

T has the feature [*tense*], and Tr, the feature [*t:trans*]. T and Tr also have Case features. As mentioned above, T has Nominative (i.e., the unmarked) Case features, and Tr, accusative/ergative Case features. Case features are present only with [+*tense*] T or [+*t:trans*] Tr, and not with "-" features.

NPs have  $\phi$ -features such as person, number, gender, etc., and Case features. Verbs have the features [*tense*], [*t:trans*], and  $\phi$ -features corresponding to their arguments. A transitive verb has two sets of  $\phi$ -features, for its subject and object, and an intransitive verb has only one set.

Case involves the checking of Case features between a functional head and an NP in its specifier. The NP raises to the SPEC position via NP movement. Agreement involves the checking of  $\phi$ -features between a verb which has raised to T or Tr, and the NP in the SPEC of the functional head. Verb raising is motivated by the need to check the [*tense*] or [*t:trans*] feature of the verb with that of T or Tr. The structure in (4) illustrates the correct configuration for feature checking:



The NP in (4) has  $\phi$ -features, and Nominative Case features. The  $\phi$ -features are checked with those of the verb, when the verb raises and adjoins to T, entering into a SPEC-head relation with the NP. The motivation for the verb raising to T is the requirement that its [*tense*] feature be checked in a sister relation with that of a functional head. The Nominative Case features of the NP are checked with the Case features of T, again in a SPEC-head configuration.

In an accusative language, it is the subject NP which must raise to SPEC TP and check its features with the Nominative features of T. In an ergative language,

the NP which raises must be the object. I propose the Ergative Parameter in (5) which, together with the Economy Principles in (6), determines which NP raises to which SPEC position:

(5) **Ergative Parameter**

In an accusative language, the Case features of T are strong. In an ergative language, the Case features of Tr are strong.

Recall that the strength of features determines the level at which movement takes place. In an accusative language, the strong Case features of T require overt movement to SPEC TP at s-structure. In an ergative language, the strong features of Tr require movement to its SPEC at s-structure.

The interaction of the Ergative Parameter in (5) and the Principles of Economy presented in (6) result in different types of NP movement paths in the two types of languages.

(6) **Principles of Economy for NP Movement**

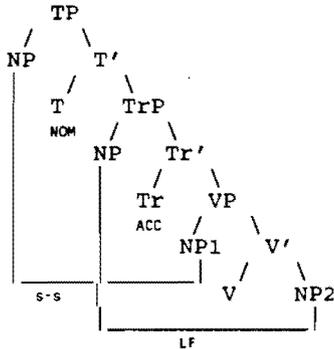
1. Closest Available Source: At each level of a derivation, a target must take the closest available source NP.
2. Closest Featured Target: At each level of a derivation, a source NP must move to the closest featured target.
3. Procrastinate: An operation must be done as late as possible.<sup>4</sup>

I will discuss only the first principle, Closest Available Source, as it is the one which is relevant to the present discussion.<sup>5</sup> NP movement involves the movement of a source NP to a target position. A target is the specifier position of a functional head which requires its Case features to be checked (i.e., SPEC TP, SPEC TrP). According to the Principle of Closest Available Source, at each level of a derivation (i.e., s-structure or LF), this source NP must satisfy two requirements: (i) it must be the closest NP before any movement at that level, and (ii) it must be available for movement by not already having its Case features checked. These criteria determine that it is always the subject in SPEC VP which raises at s-structure to the SPEC of the functional head with the strong features. This principle applies cyclically, first at s-structure, and then at LF.

The interaction of the Ergative Parameter and Economy Principles result in the two movement paths

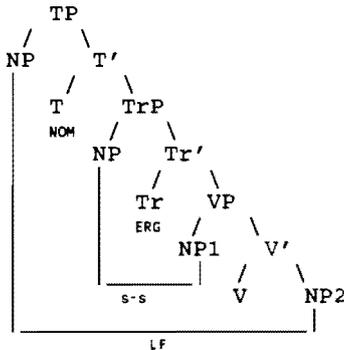
illustrated in (7) and (8): Crossing Paths in an accusative language, and Nested Paths in an ergative language. In (7), the strong features of T require movement to its SPEC at s-structure. By the Principle of Closest Available Source, the subject in SPEC VP, NP1, raises to that position. The object raises to the other SPEC position, SPEC TrP, at LF (because of Procrastinate).

(7) Crossing Paths (Accusative)



In (8), an ergative language, the strong Case features of Tr require movement to SPEC TrP at s-structure. Again, it is NP1, the subject in SPEC VP, which is the closest available source NP. The object raises to SPEC TP at LF.

(8) Nested Paths (Ergative)



In an intransitive clause, the subject raises to SPEC TP in both types of languages, as [-trans] Tr does not have Case features to check. Since T is strong in an accusative language, raising occurs at s-structure. In an ergative language, the subject does not raise until LF.

In the following section, I provide two types of evidence for Nested Paths movement in ergative languages: (i) the order of verbal agreement morphemes, and (ii) the absence of transitive infinitives in Mayan.

### 3. Evidence for Nested Paths in Ergative Languages

#### 3.1 Order of Verbal Agreement Morphemes

The order of subject and object verbal agreement morphemes, in a transitive clause, are reversed in accusative and ergative languages. In an accusative language, object agreement is closer to the verb than subject agreement. In an ergative language, subject agreement is closer than object agreement.

However, if we look at the Case associated with subjects and objects in the two types of languages, we see a uniform pattern emerge: the agreement associated with Tr (i.e., accusative/ergative) is closer to the verb than the Nominative agreement of T. Bittner (1991) suggests that this pattern is derived by the order of head incorporation, where functional categories which are closer to the verb structurally, in this case Tr, show agreement closer to the verb morphologically. Shown in (9) is a representation of subject and object agreement morphemes, and the Case associated with them.

- (9) a. Accusative      S<sub>NOM</sub> O<sub>ACC</sub> V    or    V O<sub>ACC</sub> S<sub>NOM</sub>  
       b. Ergative        O<sub>NOM</sub> S<sub>ERG</sub> V    or    V S<sub>ERG</sub> O<sub>NOM</sub>

In (10)-(14), I give examples from actual languages. The accusative examples in (10) and (11) are from Chi-Mwi:ni, a Bantu language, and Chickasaw, a Muskogean language. In these examples, accusative agreement is closer to the verb than Nominative agreement:

- (10) **Chi-Mwi:ni (Bantu)**  
 ni-m-pele        Ja:ma kujá  
 1sN-3sAc-gave Jama food  
 'I gave Jama food'

(Marantz 1984:240; in Kimenyi 1980)

- (11) **Chickasaw (Muskogean)**  
 has-sa-shoo-tok  
 2pN-1sAc-hug-past  
 'you all hugged me' (Payne 1982:33)

In the ergative examples in (12)-(14), from Tzutujil (Mayan), Abkhaz and Inuktitut, ergative agreement is closer to the verb than Nominative agreement.

- (12) **Tzutujil (Mayan)**  
 n-e7-a-kamsa-aj  
 Incomp-3pN-2sE-kill-Suff  
 'you kill them' (Dayley 1985:83)
- (13) **Abkhaz**  
 Marà š°arš š°-aa-bò-yt'  
 we you.p 2pN-1pE-see-Fin  
 'we see you' (Hewitt 1979:104)
- (14) **Inuktitut**  
 Jaani-up taku-j-a-anga  
 John-Erg see-Part-Tr-3sE.1sN  
 'John sees me'

In my system, as the verb raises to each functional node, it checks its agreement features with those of the specifier NP. I propose the Principle of Feature Checking in (15) to account for the relation between the order of agreement features and the hierarchy of functional categories in syntactic structure.

- (15) **Principle of Agreement Feature Checking**  
 Agreement features which are closer to the verb are checked first.

The verbal morphology of accusative and ergative languages reflects the two movement paths proposed for the two types of languages. When the verb raises to Tr and then T, it checks the agreement features of different NPs in SPEC TrP and SPEC TP in the two language types. In an accusative language, the verb first checks the features of the object in SPEC TrP, and then the features of the subject in SPEC TP, resulting in object agreement appearing closest to the verb. In an ergative language, the features of the subject in SPEC TrP are checked first, and thus appear closest to the verb. Although the subject and object morphemes are reversed, what remains constant is the proximity of the agreement morpheme associated with Tr (i.e., accusative/ergative) compared to the Nominative agreement associated with T.<sup>7</sup>

### 3.2 The Absence of Transitive Infinitives in Mayan

The second piece of evidence for Nested Paths movement comes from the absence of transitive infinitives in the Mayan languages. The system of Nested Paths movement for ergative languages prohibits the usual type of uninflected infinitive with a transitive verb. In these languages, the subject raises to SPEC TrP, and the object, to SPEC TP (see (8) above). A legitimate derivation requires feature matching between the subject and Tr, and the object and T. In an infinitival clause, the [-tense] T lacks Case features. The raising of a lexical object to SPEC TP will therefore result in an illegitimate derivation, as the Case features of the object cannot be checked. The only NP which is permitted in SPEC TP with [-tense] T is PRO, which does not have Case features.

Intransitive infinitives, on the other hand, result in grammatical derivations, since the PRO subject, which has no Case features, raises to SPEC TP, whose [-tense] T head also lacks Case features.

The Mayan languages clearly exhibit a transitive/intransitive contrast with respect to infinitives. Only intransitive infinitives appear as complements to control verbs, and as purpose clauses. With transitive complements, a gerundive nominal is used.

(16) is an example of object control in an intransitive infinitival clause in Jacaltec. The verb is uninflected for person, and is suffixed with the irrealis suffix -oj.

(16) **Jacaltec (intransitive)**

xc-ach w-iptze [munlah-oj]  
 Asp-2sN 1sE-force to work-Irr  
 'I forced you to work' (Craig 1977:312)

When the embedded verb is transitive, it must appear in an aspectless embedded clause, marked with verbal agreement:

(17) **Jacaltec (transitive)**

x- $\emptyset$ -(y)-iptze naj ix [hin s-col-o']  
 Asp-3sN-3sE-force Cl/he Cl/her 1sN 3sE-help-Fut  
 'he forced her to help me' (Craig 1977:321)

I propose that these constructions are not sentential, but nominal (i.e., they are gerunds).<sup>8</sup>

Transitive infinitives are also prohibited in subject control constructions:

(18) **Jacalteco**

- a. choche naj [caNalw-oj]  
 like Cl/he dance-Irr  
 'he likes to dance'
- b. \*ch-in to [col-o' hach]  
 Asp-1sN go help-Fut 2sN  
 'I go to help you' (Craig 1977:320)

Dayley (1985) observes that in another Mayan language, Tzutujil, an overt patient noun may be used only when it is indefinite or referentially non-specific, suggesting that the noun is incorporated:<sup>9</sup>

(19) **Tzutujil**

- x- $\emptyset$ -qaa-maj [choyoj chee7]  
 Asp-3sN-1pE-begin to.cut trees  
 'we began to cut trees' (Dayley 1985:393)

I have shown that in the Mayan languages, infinitival complement clauses are permitted only when the clause is intransitive. The intransitivity of the clause may be derived by passivization, antipassivization, or object incorporation. Transitive complements require the use of gerunds or some other verbal form. In the system proposed here, the absence of transitive infinitives in Mayan is explained by the fact that an object raising to SPEC TP will not be able to check its features with the [-tense] T.

Although I have claimed that transitive infinitives are prohibited in ergative languages, we do find transitive non-finite clauses in ergative languages such as Lezgian, Inuit, Abkhaz and Dyirbal. However, in all these languages, the non-finite clause, unlike the equivalent in Mayan, appears with Case-marked lexical arguments and/or agreement. Shown in (20) and (21) are examples from Abkhaz and Dyirbal. In (20), the verb, which appears with a non-finite marker, has Nominative and ergative verbal agreement. In the Dyirbal example in (21), there is no verbal agreement, but the nouns are Case-marked.

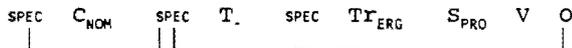
(20) **Abkhaz**

- [s-y<sup>o</sup>@za de-z-ba-r+c] à-kalak' [a-]ax'  
 1sG-friend 3sN-1sE-see-Nfin Art-town [it-]to  
 s-co-yt'  
 1sN-go-Fin  
 'I am going to town to see my friend'  
 [Lit.: 'my friend him-I-see town it-to I go']  
 (Hewitt 1979:42)

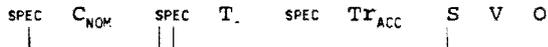
- (21) **Dyirbal**  
 bay-i yara walmanyu [bay-i ba-gu-n  
 the(Nom)-m man(Nom) get up he(Nom)-m the-Dat-f  
 dyugumbil-gu balgalngaygu]  
 woman-Dat hit.AP.Purp  
 'the man got up to (he) hit the woman'  
 (Cooreman 1988:729)

I claim that such clauses are the ergative counterpart to the "inflected infinitive" found in accusative languages such as Portuguese, and involve a C with [+finite] and Nominative Case features. The Nominative NP which cannot check its Case features with [-tense] T raises to SPEC CP and checks its features with those of C.<sup>10</sup> Consider the diagram in (22a) for an ergative language. The object (and intransitive subject) raises first to SPEC TP, and then to SPEC CP to check its Nominative Case features. This implies that transitive infinitives are permitted in ergative languages when exceptional Case-marking by C is available.

- (22) a. Ergative



- b. Accusative



In an accusative language such as Portuguese, it is the infinitival subject (transitive and intransitive) which is exceptionally Case-marked by C, since this is the NP which raises to SPEC TP (see (23b)).

In this paper, I presented an analysis of NP movement in ergative and accusative languages, based on the Ergative Parameter in (5), and Economy Principles in (6). Together, these result in two movement paths: Nested Paths for ergative languages, and Crossing Paths for accusative languages. I provided two kinds of evidence for Nested Paths movement in ergative languages: (i) the order of verbal agreement morphemes, and (ii) the absence of transitive infinitives in Mayan.

### Endnotes

1. The ideas presented in this paper are discussed more fully in Murasugi (1992a). I wish to thank the audience at WECOL92, and the members of my dissertation committee (Noam Chomsky, Ken Hale, Alec Marantz and David Pesetsky), for many helpful comments and suggestions. This research was supported in part by a doctoral and post-doctoral fellowship by the Social Sciences and Humanities Research Council of Canada.
2. The following abbreviations are used: Ab(s)= Absolutive; Ac(c)=Accusative; Dat=Dative; E(rg)= Ergative; G(en)=Genitive; N(om)=Nominative; 1,2,3= first, second, third person; s,p=singular, plural; m,f=masculine, feminine; AP=Antipassive; Art=Article; Asp=Aspect; Cl=Clitic; Fin=Finite; Fut=Future; Incomp= Incomplete; Ind=Indicative; Intr=Intransitive; Irr= Irrealis; Nfin=Nonfinite; Part=Participial; Pass= Passive; Purp=Purpose; Suff=Suffix; Tr=Transitive.
3. The morpheme for third singular ergative and third singular absolutive in (1a) is a portmanteau form. Other examples not illustrated here, but that do not involve a portmanteau morpheme, show more clearly the ergative pattern in Inuktitut.
4. This principle is from Chomsky (1991, 1992).
5. See Murasugi (1992a) for further discussion of the Ergative Parameter and Economy Principles.
6.  $\underline{S}$  and  $\underline{O}$  refer to subject and object agreement, respectively, and not to arguments of the verb.
7. I have only given examples of cases where the morphology clearly reflects syntactic structure. Noyer (1992) proposes that affixes and syntactic atoms ( $X^0$ s) are isomorphic only in the unmarked case, and develops a theory to account for deviations in the mapping from the output of syntax to the input to phonological form.
8. This construction is also used with intransitive complements:

- (i) **Jacaltec**  
 xc-ach w-iptze ha-munlayi  
 Asp=2sN 2sE-force 2sE-work  
 'I forced you to work' (Craig 1977:312)

In these structures, both transitive and intransitive subjects have ergative Case, and the object, Nominative Case. Although it has been claimed that such Case marking indicates split ergativity within Mayan (e.g., Larsen and Norman 1980, England 1983), this type of split is unique in that the Case on the subject is ergative, and not Nominative. In an accusative Case-marking system, both transitive and intransitive

subjects have Nominative Case. My claim that these constructions are gerunds is based on the proposal that ergative case here appears in its nominal, genitive use, as in the marking of the possessor in possessive constructions (see Murasugi 1992b). The clause in (i) can be roughly glossed as I forced you your working.  
 9. Craig (1977) also discusses object-incorporated infinitivals in Jacaltec.  
 10. I refer to this as "exceptional Case-marking" by C.

### References

- Anderson, S.R. (1976). On the notion of subject in ergative languages. In C.N. Li (ed.), Subject and Topic. New York: Academic Press, 1-24.
- Bittner, M. (1991). Basic Case Features. Manuscript, Rutgers University.
- Chomsky, N. (1991). Some notes on economy of derivation and representation. In R. Frieden (ed.), Principles and Parameters in Comparative Grammar. Cambridge: MIT Press.
- (1992). A Minimalist Program for Linguistic Theory. MIT Occasional Papers in Linguistics, Distributed by MIT Working Papers in Linguistics.
- Comrie, B. (1978). Ergativity. In W.P. Lehmann (ed.), Syntactic Typology: Studies in the Phenomenology of Language, 329-394. Austin: University of Texas Press.
- Cooreman, A. (1988). Ergativity in Dyirbal discourse. Linguistics 26, 717-746.
- Craig, C.G. (1977). The Structure of Jacaltec. Austin: University of Texas Press.
- Dayley, J.P. (1985). Tzutujil Grammar. Berkeley/Los Angeles: University of California Press.
- Dixon, R.M.W. (1979). Ergativity. Language 55, 59-138.
- England, N.C. (1983). A Grammar of Mam, a Mayan Language. Austin: University of Texas Press.
- Fukui, N. and M. Speas (1986). Specifiers and projections. MIT Working Papers in Linguistics, Volume 8, 128-172.
- Hewitt, B.J. (with Z.K. Khiba) (1979). Abkhaz. Linguistic Descriptive Studies, Volume 2. Amsterdam: North-Holland.
- Kimenyi, (1980). A Relational Grammar of Kinyarwanda. Doctoral dissertation, University of California at Los Angeles.
- Kitagawa, Y. (1986). Subject in English and Japanese. Doctoral dissertation, University of Massachusetts, Amherst.

- Koopman, H. and D. Sportiche (1987). Subjects. Manuscript, University of California, Los Angeles.
- Kuroda, S-Y. (1986). Whether You Agree or Not. Manuscript, University of California, San Diego.
- Larsen, T.W. and W.M. Norman (1989). Correlates of ergativity in Mayan grammar. In F. Plank (ed.), Ergativity: Toward a Theory of Grammatical Relations. London: Academic Press, 347-370.
- Levin, B. (1983). On the Nature of Ergativity. Doctoral dissertation, MIT.
- Marantz, A. (1984). On the Nature of Grammatical Relations. Cambridge: MIT Press.
- Murasugi, K.G. (1992a). Crossing and Nested Paths: NP Movement in Accusative and Ergative Languages. Doctoral dissertation, MIT.
- (1992b). Possessive and transitive constructions in Inuktitut. To appear in the Proceedings of the Canadian Linguistic Association Conference.
- Noyer, R.R. (1992). Features, Positions and Affixes in Autonomous Morphological Structure. Doctoral dissertation, MIT.
- Payne, D.L. (1982). Chickasaw agreement morphology: A functional explanation. In P.J. Hopper and S.A. Thompson (eds.), Syntax and Semantics, Volume 15: Studies in Transitivity. New York: Academic Press, 351-378.

The Route that Children Take to Retreat from Overgeneration  
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## 1. Introduction

Retreatment from overgeneration has received much attention in recent years in the study of language acquisition. One hypothesis, suggested in Baker (1979) and Pinker (1989), is that Universal Grammar (UG) simply does not make available to the learners rules that make them retreat from overgeneration, but lexical rules, according to Baker (1979), or the knowledge of semantics, according to Pinker (1989), rather play some important roles. Another hypothesis says that overgeneration pattern, traditionally taken as strong evidence for the application of explicit linguistic rules, are clearly simulated by network using a single learning mechanism that does not resort from procedural rules. A pioneering work using neural network modeling to study the overgeneration is found in Rumelhart and McClelland's (1986) simulation of the acquisition of English inflectional morphology. According to this hypothesis, the retreatment from overgeneration is also achieved by the simulation network.

This paper, as opposed to such a lexically/semantically-based learnability hypothesis and Parallel Distributed Processing (PDP) model-based hypothesis, argues that there are cases that children's grammatical assessment of particular syntactic principles triggers the retreatment from overgenerations. In particular, I present evidence that the Empty Category Principle (ECP) can work as a trigger for retreatment from an overgeneration in noun phrases, based on acquisition studies with Japanese speaking children.

## 2. Overgeneration

Harada (1980), Clancy (1985) and myself (1990, 1991a), among others, present some data of overgeneration that children produce in Japanese. Interestingly enough, it has been also found in Kin (1982), Lee (1991), and Lust (1992) that Korean-speaking children and Tamil-speaking children also make exactly the same type of overgeneration in noun phrases. The overgeneration pattern is illustrated in (1).

- (1) a. [ae: o: aoi] no buubuu  
           blue (+present) \*NO car  
           (the blue car) (Clancy, 1985)
- b. [ae: o: usachan-ga tabeta] no ninzin  
           rabbit -NOM ate \*NO carrot  
           (the carrot that the rabbit ate) (Harada, 1980)
- c. [ae: o: tigau ] no outi  
           different \*NO house  
           (the different house) (Emi, 3;0)
- d. [ae: o: gohan tabeteru] no butasan  
           food is-eating \*NO piggy  
           (the piggy that is eating the food) (Nagisa, 3;2)

Japanese speaking children, at around 2-3 years old of age, incorrectly insert "no" after prenominal sentential modifiers and produce forms like (1). Before discussing the learnability problem regarding the overgeneration of "no" in (1), the categorial status of the overgenerated "no" in question should be considered.

Compare the paradigm in (2) with (1). In Japanese, the genitive Case marker "no" appears after NP and PP prenominal modifiers, but not after CPs (relative clauses). In various syntactic analyses of these structures, a "no"-insertion operation is proposed to insert "no" in the appropriate structural positions (Saito (1982), Fukui (1986)).

- (2) a. [ae: [ae: Yanada]-no hon]  
                                 GEN book  
           (Yanada's book)
- b. [ae: [ae: koko kara]-no miti]  
                                 here from GEN road  
           (the road from here)
- c. [ae: [ae: o: Yanada-ga kaita] (\*no) hon]  
                                 -NOM wrote (\*GEN) book  
           (the book that Yanada wrote)

Besides the "no" as the genitive Case marker, there are two other kinds of "no". They are of the categories N and C. The "no" as N appears as the so-called pronoun "no" in (3a) and as the nominalizer "no" in (3b).

- (3) a. [<sub>NP</sub> akai no]  
           red one  
           (the red one)
- b. [<sub>NP</sub> [<sub>IP</sub> PRO tabesugiru] no]-wa yokunai  
           eat too much    -TOP is-not good  
           (It is not good to eat too much.)

The "no" as complementizer appears in cleft sentences, as shown in (4).

- (4) [CP [IP doroboo-ga kane -o nusunda] no]-wa koko kara da  
           robber -NOM money-ACC stole        -TOP here from is  
           (It is from here that the robber stole the money.)

Given that there are three kinds of "no" in Japanese adult grammar (see Murasugi (1991a)), a question arises as to what that over-generated "no" in (1) is.

Here, Murasugi (1990, 1991a) and Lee (1991) argue that the overgenerated item is complementizer, and those children at the stage of overgeneration have the CP relative clause structure in mind, incorrectly lexicalizing the complementizer "no" in (1). Given this hypothesis, the structure of relative clauses conjectured by the children at this stage is as in (5).

- (5)
- ```

      NP
     / \
    CP  NP
   / \  |
  IP C' N'
 / \  | |
no I  I
   
```

Note that this structure is identical to the one assumed for English relative clauses, aside from the linear order of constituents.

While no lexical complementizer appears in relative clauses in the adult grammar, some children do lexically realize the head C as "no". This could be done on the basis of their knowledge that the position C exists as the head position of a CP. The evidence which can be assumed to trigger this overgeneration of "no" is that C is realized as "no" in cleft sentences as in (4).

If CP is the unmarked category for relative clauses and this is part of the reason for the overgeneration of "no", then an

explanation must be provided for the fact that the "no" cannot occur as C in relative clauses in the adult grammar of Japanese. Two reasons for the invisibility of C in the adult grammar can be conjectured. One possibility is that the node C exists, but it simply cannot be lexically realized. The other is that there is no structural position for C. The former assumes that the Japanese relative clauses have a null complementizer. The latter assumes that Japanese relative clauses are not CPs. Rather, as Saito (1985) suggests, Japanese relative clauses are IPs.

3. Syntactic Evidence for the IP Hypothesis

I argued in Murasugi (1990, 1991a, b) for the latter possibility on the basis of a difference between Japanese and English relative clauses. The crucial difference is shown in (6).

- (6) a. the reason [(why) Mary thinks [that John left e.]]
 b. *Mary-ga [John-ga e kaetta to] omotteiru] riyuu:
 -NOM -NOM left C think reason
 (the reason Mary thinks that [John left t]
- (7) a. the book [(which) [Mary thinks [that John bought e]]
 b. [Mary-ga [John-ga e katta to] omotteiru] hon.
 -NOM -NOM bought C think book
 (the book Mary thinks that [John bought e]
- (8) a. the reason [(why) [John left e]]
 b. [John-ga e kaetta] riyuu
 -NOM left reason
 (the reason [John left e.]

In Japanese relative clauses, relativization of an argument position is unbounded, as shown in (7b), but relativization of a pure adjunct is clause bound, as the contrast between (6b) and (8b) shows. On the other hand, in English, relativization of either kind is unbounded, as shown in (6a) and (7a).

Here, it should be noted that argument relativization in Japanese does not even exhibit island effects. Thus, the following example from Kuno (1973) is perfect:

- (9) [[e. e. kiteiru] yoofuku_i]-ga yogoreteiru] sinsi_i
 is-wearing clothes -NOM is dirty gentleman
 (Lit.the gentleman whose clothes is dirty)

Perlmutter (1972) explains this fact as follows. Since Japanese allows pro in any argument position, e_i in (9) need not be a trace, but can be a pro. Hence, (9) can be base-generated without movement, and consequently, no island effects are expected.

Given Perlmutter's account, (7b) can also be base-generated without movement. On the other hand, the ungrammaticality of (6b) indicates that pro is not allowed in the position of an adjunct. It indicates further that adjunct relative clauses in Japanese cannot be derived by successive-cyclic movement. And this follows from the ECP, as formulated in Lasnik and Saito (1992), if Japanese relative clauses are IPs, not CPs. According to this IP hypothesis, the structure of (6b), when it is derived by movement, will be as follows:

- (10) [_{NP} [_{CP} Op [_{CP} ... [_{CP} t' [_{CP} ...t...]]]]] riyuu.]

The initial trace t' is antecedent governed by the embedded COMP, which receives index i from the intermediate trace via SPEC/head agreement. But the intermediate trace fails to be antecedent governed, and hence, violates the ECP. The potential antecedent governor for this trace is the empty operator adjoined to IP. But this operator cannot serve as an antecedent governor because of the condition in (11).

- (11) Only X' category can be antecedent governors.

Thus, (10) is ruled out by the ECP.

The analysis for (6b) presented above crucially relies on the hypothesis that Japanese relative clauses are IPs, and hence, if correct, provides support for this hypothesis. According to this analysis, relativization of manner/reason phrases is completely disallowed in Japanese. Let us consider (8b), repeated below as (12).

- (12) [John-ga e. kaetta] riyuu
 -NOM left reason
 (the reason [John left e])

This example cannot be base-generated as a relative clause since the *e*, being a reason phrase, cannot be base-generated as *pro*. Hence, it must be derived by movement. But if (12) involves movement and relative clauses are IPs in Japanese, the example has the configuration in (13).

(13) ..._{[IP Op_i [IP... t_i...]]...}

Since the trace in (13) is an adjunct trace, the ECP requires that it be antecedent governed. But as noted above, it is argued in Lasnik and Saito (1992) that only X-zero categories can be antecedent governors. In (13), the only potential antecedent governor is the empty operator, and it is not an X-zero. Hence, (13) is ruled out by the ECP.

Given this conclusion, (12) should be analyzed as an instance of pure complex NP like those in (14).

- (14) a. the reason for John's leaving
 b. the reason for Mary's saying that John left

Note that in (14b), 'the reason' cannot be construed with 'John left'. Thus, this analysis correctly predicts the "clause-boundedness of adjunct relativization" shown in (6b).

4. The Learnability of the IP Hypothesis

The previous section presented some syntactic evidence that Japanese relative clauses are not CP modifiers, but in fact, are IP modifiers. This section turns to the learnability problem concerning the acquisition of Japanese relative clauses.

The question to be addressed here is why and how those children who exhibit the overgeneration of "no" attain the knowledge that relative clauses are IPs in Japanese. According to this hypothesis, those children who show the overgeneration of "no" are those who initially hypothesize that relative clauses are CPs. This may be because the unmarked category for relative clause is CP. Those children know that "no" can be of the category C. This knowledge is accessible on independent grounds from positive evidence. C is realized as "no", for instance in Japanese cleft sentences as shown in (4), repeated below as (15).

- (15) [CP [IP doroboo-ga kane -o nusunda] no]-wa koko kara da
 robber -NOM money-ACC stole -TOP here from is
 (It is from there that the robber stole the money.)

Thus, the children overgenerate "no" in relative clauses. However, they clearly need to know that the target grammar has only IP relative clauses. Here, a lexical complementizer does not appear in relative clauses in the adult grammar of Japanese as shown in (16).

- (16) [John-ga mita (*no)] hito
 -NOM saw person
 (the person John saw)

And it may seem possible that this fact serves as positive evidence for children to attain the target grammar. The Japanese speaking children receive, as input, relative clauses without a lexical complementizer, and from this evidence, infer that Japanese relative clauses are IPs.

But this hypothesis immediately faces a problem. C is only optionally realized in English relative clauses, as shown below.

- (17) the cookie (that) Mary ate

Thus, English speaking children must receive input such as "the cookie Mary ate." But they apparently do not infer from such input that English relative clauses are IPs. Instead, they only find out that the realization of the complementizer "that" is optionally allowed. Hence, it is not clear how the Japanese speaking children could infer on the basis of examples like (16) that Japanese relative clauses are IPs.

Then, what evidence makes the Japanese speaking children attain their target grammar? The key to solve this learnability problem, I believe, can be found when we consider the syntax of pure complex NPs in English and Japanese. Observe the example of pure complex NP in (18).

- (18) the fact [_{CP}*(that) [_{IP} John is smart]]

In English, pure complex NPs require the head C of the modifying CP to be realized. In Japanese, on the other hand, as shown in (19), C does not show up, as in the case of relative clauses.

- (19) [John-ga kasikoi (*no)] koto
 -NOM is clever fact
 (That John is smart)

Stowell (1981) discusses English examples like (18), and proposes to explain the obligatoriness of "that" in terms of ECP.

He first notes the subject/object asymmetry illustrated in (20).

- (20) a. Bill thinks [_C (that) [_{IP} John is smart]]
 b. [_{CP} (that) [_{IP} John is smart]] is obvious

The complementizer that is obligatory when the CP is in the subject position, but not when it is in the object position. Stowell proposes that when that is missing, there is an empty category in C and it is subject to the ECP. When the CP is in object position as in (20a), the CP, and hence, the head C is lexically governed by the verb. Thus, an empty C is allowed. But in (20b), the CP is not lexically governed. Hence, the head C is not properly governed at all, and an empty C cannot occur in this position. Extending this analysis to (18), Stowell argues that in a pure complex NP, the N (even if it is a derived nominal) does not assign a theta role to the CP, but is in apposition to it. Given this, the obligatoriness of that in (18) follows from the ECP. When that is absent, there is an empty category in C. This empty category is not lexically governed by N, and thus, is not properly governed at all. Hence, the ECP rules out the possibility of an empty C in pure complex NP.

Suppose that the structure of pure complex NPs in Japanese is the same as that in English. Then, given that the ECP is a UG principle, we predict that C should be lexically realized in Japanese, exactly as in English. However, this prediction is not borne out. Therefore, if we assume the universality of the ECP, it follows that the sentential modifier in Japanese pure complex NPs is not CP, but IP. Note here that Japanese speaking children can attain this knowledge on the basis of examples such as (19). Given the ECP, (19) constitutes a straightforward piece of positive evidence that sentential modifiers in Japanese pure complex NPs are IPs. If the sentential modifier in (19) is a CP, then this example violates the ECP. Hence, the ECP implies that there is no C, and hence, no CP, in this example.

Suppose that the category of sentential modifiers in NP is parameterized; it is CP or IP depending on the language, and the unmarked setting is CP. That implies that in a given language, the

categories of pure sentential modifiers and relative clauses are both CP or both IP. Then, the learnability problem of Japanese relative clauses will be given a straightforward solution. Assume that children know the ECP in UG. On the basis of examples such as (19), the Japanese speaking children find out that the category of NP-internal sentential modifiers is IP in Japanese. In particular, they find out that relative clauses are IPs. Once this target structure is fully attained, the overgenerated "no", which was once realized in the C position, will not be considered even optional. Rather, it will be concluded that "no" should not appear. This is because there is no C position in which "no" can be realized in the attained grammar.

5. Conclusion

The goal of this paper was to show that there is a case that children's knowledge of a particular syntactic principle functions as the trigger for retreatment from the overgeneration. In particular, I provided evidence that the Empty Category Principle can work as the trigger for retreatment from an overgeneration in noun phrases, based on acquisition studies with Japanese speaking children.

This paper dealt with the following specific questions: why and how the Japanese children overgenerate "no" of the category C in relative clauses and why and how they retreat from it. I proposed that Japanese relative clauses are IPs, and showed that given this IP hypothesis, a difference between English and Japanese relative clauses directly follows from ECP, as formulated in Lasnik and Saito (1992). Japanese children make the initial hypothesis that relative clauses are CPs. They lexically realize the head C as "no", as there is independent evidence that C is lexically realized as "no", e.g., in cleft sentences. They later attain the knowledge that Japanese relative clauses are IPs, and hence, cease to generate "no" in relative clauses. It was shown that this hypothesis meets the learnability criterion. On the basis of positive evidence on pure complex NPs, Japanese children infer that all pronominal sentential modifiers are IPs. My proposal is that the trigger for the retreatment is the ECP, a principle of Universal Grammar. This paper, thus, provides a case study for a syntax-based learnability hypothesis for the overgeneration phenomenon.

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REFERENCES

- Baker, C. L. 1979. "Syntactic Theory and Projection Problem." *Linguistic Inquiry* 10.
- Clancy, P. 1985. "The Acquisition of Japanese." In the Cross-linguistic Study of Language Acquisition (vol 1). Slobin, D.I. (ed.) Hillsdale, NJ. Laurence Erlbaum Associates, Publishers.
- Fukui, N. 1986. Theory of Category Projection and Its Applications. Ph.D. dissertation. MIT.
- Harada, K-I. 1980. "Notes on the Acquisition of the Genitive Case Particle "no"." ns. The Summer Institute of Linguistic Society of America. New Mexico.
- Kin, Y. J. 1982. The acquisition of Relative Clauses in English and Korean: Development in Spontaneous Production. Ph.D. dissertation. Harvard University.
- Kuno, S. 1975. The Structure of Japanese Language. Cambridge, MA. MIT Press.
- Lasnik, H. and M. Saito. 1992. Move Alpha. Cambridge, MA. MIT Press.
- Lee, 1991. Ph.D. Dissertation. Cornell University.
- Lust, B. 1992. "Functional Projection and Phrase Structure Parameterization." Paper presented at Cornell University. April 24, 1992.
- Murasugi, K. 1990. "Overgeneration of Genitive Case marking in Japanese: Its Implication for Syntax and Acquisition theory." Paper presented at the BU conference. October 21, 1990.
- . 1991a. Noun Phases in Japanese and English: A Study in Syntax, Learnability and Acquisition. Ph.D. dissertation. University of Connecticut.
- . 1991b. "Locative/Temporal vs. Manner/Reason Phrases." Kinjo Gakuin Ronshu. Nagoya, Japan. Kinjo Gakuin University.

- Perlmutter, D. 1972. "Evidence for Shadow Pronouns in French Relativization." In The Chicago which hunt, Parabeau, P.M. et al. (eds.) Chicago. Chicago Linguistic Society.
- Pinker, S. 1989. Learning and Cognition: The Acquisition of Argument Structure. Cambridge, MA. MIT Press.
- Rumelhart, D.E. and J.L. McClelland. 1986. "On Learning the past tenses of English verbs." In Parallel Distributed Processing: Explorations in the Microstructure of Cognition. Vol. 2. Rumelhart, D.E., J.L. McClelland and PDP Research Group. (eds.) Cambridge, MA. Bradford Books/MIT Press.
- Saito, M. 1982. "Case Marking in Japanese: A Preliminary Study." ms. MIT.
- . 1985. Some Asymmetries in Japanese and Their Theoretical Implications. Ph.D. dissertation. MIT.
- Stowell, T. 1981. Origins of Phrase Structure. Ph.D. dissertation. MIT.

QUASI-ADJUNCTS AS SENTENTIAL ARGUMENTS

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1. Introduction

This paper is concerned with the exact nature of the typical ECP-type asymmetry illustrated in (1)-(2). (See Huang 1982 for detailed discussion.)

- (1)a. $\text{who}_i \text{ t}_i$ bought what
 b. * $\text{who}_i \text{ t}_i$ bought the book why / * $\text{who}_i \text{ t}_i$ solved the problem how
 (2)a. ? what_i does John wonder [whether Mary bought t_i]
 b. * why_i does John wonder [whether Mary bought the book t_i]

As shown in (1), an object wh what can be left in situ, but adjunct wh-phrases such as why and how cannot be. Further, as shown in (2), an object wh can marginally be extracted out of an island, but such extraction of an adjunct wh results in total ungrammaticality. As far as we know, there are two major approaches to this asymmetry that are proposed in the literature. The first one, proposed by Huang 1982, hypothesizes that it is an argument/non-argument asymmetry. (See also Lasnik and Saito 1984, and Chomsky 1986.) The second, proposed by Aoun 1985 and Aoun, et al. 1987, attributes the contrast to the referential/non-referential distinction. (See also Rizzi 1990 and Cinque 1990.)

These two approaches lead us to different accounts for the examples in (3).

- (3)a. $\text{who}_i \text{ t}_i$ bought the book where
 b. $\text{who}_i \text{ t}_i$ bought the book when

The first will say that (3a-b) are allowed because where and when, like what in (1a), have argument status. A specific version of this hypothesis can be found in Huang 1982. He assumes that locative/temporal phrases in examples such as (3) are adjuncts. But noting the following contrast, he also assumes that where/when, as opposed to why/how, are NPs:

- (4)a. from where / since when
 b. *for why / *by how

(4a) shows that where/when can be the object of P, and thus, indicates that they are NPs. Then, given this categorial distinction between where/when and why/how, Huang suggests that where/when in (3) are objects (and hence, arguments) of an empty P. According to this analysis, the more precise structure of (3a) is as in (5).

- (5) $\text{who}_i \text{ t}_i$ bought the book [pp[pe] where]

The examples in (1b) cannot have a similar structure because why/how are not NPs, and hence, cannot be an object of P. This analysis is quite attractive since it accounts for (3) and (6) in exactly the same way.

- (6)a. $\text{who}_i \text{ } \underline{\text{E}}_i$ bought the book for what reason
 b. $\text{who}_i \text{ } \underline{\text{E}}_i$ solved the problem by which method

(3) and (6) are allowed because the *wh*-phrases in these examples are objects of P.

The approach to (1)-(2) based on referentiality, on the other hand, will say that (3a-b) are allowed because *where/when*, like *what* and unlike *why/how*, are referential. One motivation for this analysis is given by the fact that there are pronouns corresponding to *where/when*, i.e., *there/then*, but *why/how* do not have any pronominal form.

In this paper, we will pursue the first approach, and present supporting arguments for Huang's argument/non-argument distinction. At the same time, however, we will argue against the empty P analysis. Instead, we will entertain the hypothesis, suggested by Rizzi 1990 and Murasugi 1991, among others, that *where/when* in (3) are arguments of INFL or the event predicate. In the following section, we will discuss some facts of relativization in Japanese as evidence against the empty P analysis. In Section 3, we will consider extraction out of NPs in English, and argue that the relevant facts indicate that *where/when* in (3) in fact are arguments of INFL/event predicate. This conclusion, we argue, provides support for Huang's 1982 overall approach to explain (1)-(3) in terms of the argument/non-argument distinction. Then, in Section 4, we will consider the examples of amount quantification discussed in detail in Rizzi 1990 and Cinque 1990, and propose an account based on the argument/non-argument distinction. The appendix deals with some issues related to the analysis suggested in Section 4.

2. Relative Clauses and Empty Pronouns in Japanese

As is well known, Japanese relativization does not exhibit Subjacency effects.<1> The following example from Kuno 1973 shows that relativization out of a relative clause is possible:

- (7) [IP[NP[IPE_i e_j kiteiru] yoohuku $_j$]-ga yogoreteiru] sinsi_i
 is-wearing clothes -nom is-dirty gentleman
 (the gentleman $_i$ who $_i$ [[the suit that he $_i$ is wearing] is dirty])

An explanation for this absence of Subjacency effects is offered in Perlmutter 1972. He points out that Japanese allows *pro* in any argument position, and hence, that e_i in (7), for example, need not be a trace but can be a *pro*. Then, the relative clause in (7) need not involve movement, and consequently, no Subjacency effects are expected.

However, relativization in Japanese is not totally free. As shown in (8)-(9), relativization of reason/manner adjuncts out of an island results in total ungrammaticality.

- (8) [IP[NP[IPE_j *(sore_i de) kubi ni natta] hito $_j$]-ga minna
 it for was-fired person-nom all
 okotteiru] riyuu $_i$
 is-angry reason
 (the reason $_i$ that [[all the people who are fired for it $_i$] are
 angry])

- (9) [IP[NP[IP_e_j *(sore_i de) mondai -o toita] hito_j]-ga minna siken
 it by problem-acc solved person-nom all exam
 ni otiru_i hoo_ihoo_i
 in fail method
 (the method_i that [[all the people who solve problems by it_i]
 fail the exam])

(8)-(9) are fine with overt resumptive pronouns, but are totally out without them. This result is expected if *pro* is allowed only in argument positions in Japanese. Then, *pro* cannot appear in the position of *sore de* in (8)-(9), and hence, cannot save the examples from Subadjacency effects.

Let us now consider the examples in (10)-(11).

- (10) [IP[NP[IP_e_j e_i siken-o uketa] gakusei_j]-ga minna ukatta]
 exam -acc took student -nom all passed
 kyoositu_i
 classroom
 (the classroom_i that [[all the students who took the exam
 there_i] passed])
- (11) [IP[NP[IP_e_j e_i mensetu -o uketa] gakusei_j]-ga minna ukatta]
 interview-acc had student -nom all passed
 hi_i
 day
 (the day_i that [[all the students who took the oral exam then_i]
 passed])

These examples involve relativization of locative/temporal phrases out of an island. Since they are perfectly fine, they indicate that *pro* is allowed in the locative/temporal positions. And given our generalization that *pro* is allowed only in argument positions, this implies that locative/temporal phrases have argument status.

Here, it may be thought that the relevant generalization on the distribution of *pro* in Japanese is not that it can appear only in argument positions, as we argued above, but rather that it can occur only in NP positions. This, however, seems to be incorrect. In Japanese, temporal phrases can in fact occur as bare NPs, but locative phrases, like reason/manner phrases, cannot. <2> This is shown below in (12)-(13).

- (12)a. Taroo-ga sono hi (ni) mensetu -o uketa
 -nom that day on interview-acc had
 (Taroo had the oral exam that day)
 b. Taroo-ga soko *(de) siken-o uketa
 -nom there in exam -acc took
 (Taroo took the exam there)
- (13)a. Taroo-ga sore *(de) kubi ni natta
 -nom it for was-fired
 (Taroo was fired for it)
 b. Taroo-ga sore *(de) sono mondai -o toita
 -nom it by that problem-acc solved
 (Taroo solved the problem by it)

Hence, the locative phrase e_i in (10) must be of the category PP. Further, it is implausible that this empty PP has the internal structure in (14) with an empty P.

(14) [pp pro [pe]]

This structure would enable one to maintain the generalization that pro is allowed only in NP positions in Japanese. But once we assume that an empty P is possible in Japanese locative phrases, it is not clear why it is not allowed in examples like (12b). We, therefore, conclude that e_i in (10) is pro of the category PP, and is licensed because of its argumenthood.

We argued above that locative/temporal phrases, by themselves, have argument status in sentences. This conclusion makes Huang's 1982 empty P hypothesis for the examples in (3) redundant. Given this conclusion, his argument vs. non-argument approach predicts those examples to be grammatical without the postulation of empty P.

3. Movement of Locative/Temporal Phrases out of NPs

As noted in Section 1, the basic premise that led Huang 1982 to the empty P hypothesis is that locative/temporal phrases are adjuncts. We argued against this basic assumption in the preceding section. But Huang 1982, not surprisingly, does present some evidence for his assumption. For example, he discusses the following paradigm:

- (15)a. of which city_i did you witness [the destruction t_i]
 b. *on which table_i did you buy [the books t_i]
 c. *from which city_i did you meet [the men t_i]

(15a) involves extraction of an object out of an NP. On the other hand, in (15b), a locative PP is moved out of an NP. The latter example is even worse than the CED (Subjacency) violation in (16a), and has the status of an ECP violation.

- (16)a. who_i did you see [a picture of t_i]
 b. ?*who_i did you destroy [a book [about t_i]] (Chomsky 1977)

And as Huang points out, the ungrammaticality of (15b) can be attributed to the ECP only if the extracted locative phrase is an adjunct.<3>

Huang's argument based on (15b), it seems to us, is quite convincing. But at the same time, it seems to pose a problem for his empty P hypothesis. Let us first consider the examples in (17).

- (17)a. ?*which basket_i do you like [the food in t_i]
 b. *in which basket_i do you like [the food t_i]
 (cf. in which basket_i do you like [the food] t_i)

This contrast is nicely predicted by Huang's analysis. Since locative phrases are adjuncts, (17a) involves extraction out of an adjunct, and hence, is ruled out by the CED (Subjacency). On the other hand, (17b), which is even worse, is ruled out by the ECP, since an adjunct is moved out of an NP exactly as in (15b-c). But let us consider (18).

- (18) *where_i do you like [the food t_i]
 (cf. where_i do you like [the food] t_i)

This example, it seems to us, has the same status as (17b), and hence, should be considered an ECP violation. But given the empty P hypothesis, it should merely be a CED (Subjacency) violation. If where can be a complement of an empty P, this example should be able to have the following structure:

- (19) where_i do you like [the food [pp[pe] t_i]]

(19), like (17a), violates the CED (Subjacency) since a wh-phrase is moved out of an adjunct. But, again, like (17a), it is not an ECP violation, because the trace is in the object position of P. On the other hand, if there is no empty P, we correctly predict (18) to have the same status as (17b), since then, both examples involve extraction of an adjunct out of an NP.

A similar argument against the empty P hypothesis can be constructed with wh in situ. Let us consider the following examples:<4>

- (20)a. who_i t_i read [the books on which shelf]
 b. *who_i t_i read [the books where]
 c. *who_i t_i remembered [the TV shown when]

We expect (20a) to be grammatical, because, as in (1a), the wh in situ, which shelf, is in the object position. What is crucial here is the ungrammaticality of (20b-c). If an empty P is possible, nothing seems to prevent (20b), for example, from having the structure in (21).

- (21) who_i t_i read [the books [pp[pe] where]]

In this structure, where is in the object position of P. We, thus, predict falsely that (20b) should be perfect exactly like (20a).

Examples such as (20b-c) seem to provide strong evidence against the empty P hypothesis. At the same time, they provide strong support for Huang's 1982 conclusion, based on examples such as (15b), that locative/temporal phrases are adjuncts in NPs. These two conclusions, together with the well-formedness of (3a-b), repeated below, indicate that locative/temporal phrases can have argument status in sentences but not in NPs.

- (3)a. who_i t_i bought the book where
 b. who_i t_i bought the book when

We conclude, then, that where/when in (3) are arguments of INFL or the event predicate associated with V. Note also that the contrast between (3a-b) and (20b-c) suggests that the grammaticality of the former cannot be attributed simply to the referentiality of the wh-phrases. If (3a-b) are allowed because where/when are referential, then (20b-c) should be allowed for the same reason.<5> Thus, this contrast, we believe, provides support for Huang's 1982 basic approach to explain (1)-(3) in terms of the argument/non-argument distinction.

4. Amount Quantification and the Argument/Non-Argument Distinction

So far, we presented evidence against Huang's 1982 empty P hypothesis, and at the same time, argued for his overall approach to (1)-(3) based on the argument/non-argument distinction. If this distinction indeed plays a fundamental role in the account of the data discussed above, then a question should be raised as to whether other distinctions are needed at all to account for the ECP-type phenomena. In this section, we will consider the examples of amount quantification discussed by Rizzi 1990 and Cinque 1990 to motivate the referential/non-referential distinction. We will show that they, too, can be analyzed quite naturally in terms of the argument/non-argument distinction.

4.1. Quantificational Wh-Phrases

Let us first consider the following contrast:

- (22)a. ?what_i does John wonder [whether Mary bought t_i] (= (2a))
 b. *how much_i does John wonder [whether the book costs t_i]

Rizzi 1990 notes first that contrasts like this are quite similar to the one between (2a) and (2b). (2b) is repeated below.

- (2)b. *why_i does John wonder [whether Mary bought the book t_i]

Then, he points out that contrasts of this kind cannot be explained straightforwardly in terms of the argument/non-argument distinction, since the wh-phrases originate in the object position, for example, in both (22a) and (22b). He proposes that the ungrammaticality of examples like (22b) should be attributed to the non-referential nature of the wh-phrase. Or more precisely, he hypothesizes that how much in (22b) as well as why in (2b) fail to receive a "referential θ -role," and for this reason, cannot be extracted out of an island.

Cinque 1990 (Chapter 1), on the other hand, shows that the unacceptability of (22b) is related to the quantificational nature of the wh-phrase. <6> He discusses examples such as the following, attributed to Longobardi (1987):

- (23)a. how many books_i does John think that everyone bought t_i
 b. ??how many books_i does John wonder whether everyone bought t_i

(23a) is ambiguous in the same way that (24a) is.

- (24)a. what_i did everyone buy t_i
 b. who_i t_i saw everyone

As discussed in detail in May 1985, (24a) seems to exhibit scope ambiguity between what and everyone, but in (24b) only the wide scope reading of the wh-phrase is possible. The ambiguity, then, seems to arise when the quantified NP c-commands the wh-phrase at D-structure. Since everyone c-commands how many books at D-structure in (23a), this example is expected to be ambiguous.

The interesting case is (23b). In this example also, the

quantified NP c-commands the wh-phrase at D-structure. But the expected ambiguity does not obtain, and how many books necessarily takes wide scope over everyone. Here, Cinque argues that how many books can be non-quantificational, and hence referential. In this case, the wh-phrase does not scopally interact with everyone, and as a result, we obtain the interpretation equivalent to the wide scope reading of the wh-phrase. On the other hand, the wh-phrase must be interpreted quantificationally if it is to scopally interact with everyone and have narrow scope with respect to this quantified NP. But when the wh-phrase is interpreted as a quantifier, it is non-referential. And when it is non-referential, it, like why in (2b), cannot be moved out of an island. Thus, the lack of the narrow scope reading of how many books in (23b) follows.

The phenomenon instantiated by (23) seems to be quite general. For example, the same contrast obtains even when the wh-phrase is what, as shown in (25).

- (25)a. what_i does John think that everyone bought t_i
 b. ?what_i does John wonder whether everyone bought t_i

Everyone can take wide scope over the wh-phrase what in (25a) but not in (25b). A similar contrast obtains in Japanese, as the examples in (26) show.

- (26)a. nani-o_i kimi-wa [[John to Mary]-ga t_i katta to] omotteru no
 what-acc you -top and -nom bought COMP think
 (what do you think that John and Mary bought)
 b. ?nani-o_i kimi-wa [[John to Mary]-ga t_i katta kadooka]
 what-acc you -top and -nom bought whether
 siritai no
 want-to-know
 (what do you want to know whether John and Mary bought)

The plural NP John and Mary can take wide scope over the wh-phrase what in (26a), but not in (26b). Thus, if Cinque's account, which is certainly elegant, is correct, the referential/non-referential distinction seems to be well motivated.

In the following subsection, we will present an alternative account, based on the argument/non-argument distinction, for the contrast in (23). We will relate the contrast to the properties of QR, following the suggestions in Kroch 1989 and Frampton 1991, and extend the analysis of (24) proposed in Lasnik and Saito 1992 to this contrast.<7>

4.2. Scope Rigidity

It is argued in Hoji 1986, and Lasnik and Saito 1992 that examples such as (24a), repeated below, are not actually scopally ambiguous.

- (24)a. what_i did everyone buy t_i

According to them, everyone necessarily takes wide scope, and the

apparent narrow scope reading of this quantified NP is due to the "group interpretation" of this NP. Examples such as the following provide supporting evidence for this conclusion:

(27) what_i did everyone_j buy t_i for Max with his_j bonus money

When everyone binds the singular pronoun his, the only available interpretation is the wide scope reading of this quantified NP. This indicates that when everyone is interpreted quantificationally, it necessarily takes wide scope over what.

Then, building on the works by Kuroda 1971, Huang 1982, and Hoji 1985, among others, Lasnik and Saito 1992 propose the following rigidity condition to account for this fact:

(28) Rigidity Condition on Quantifier Raising (QR)

(a) Suppose that Q_1 and Q_2 are Operators. Then, Q_1 cannot take wide scope over Q_2 if t_2 c-commands t_1 (where t_1 and t_2 are variables).

(b) QR adjoins a quantified NP to a minimal node to satisfy (a).

According to their analysis, (24b), repeated in (29a), must have the LF representation in (29b).

(29)a. who_i t_j saw everyone
 b. who_i t_j [$\nu\text{peveryone}_j$ [$\nu\text{psaw } t_j$]]

This is so since the VP node is the minimal node that everyone can adjoin to, satisfying (28a). (24a), on the other hand, must have the LF in (30).

(30) [Cpeveryone_j [Cpwhat_i [$\text{did } [t_j$ [$\nu\text{pbuy } t_i$]]]]]]

If everyone adjoins to IP, for example, the resulting representation violates (28a). Thus, it must adjoin to CP, and take scope over what. (23a) will be analyzed in the same way. In order to satisfy (28a), everyone must adjoin to the matrix CP in LF, and take scope over how many books. The LF representation of this example is then as in (31).

(31) [Cpeveryone_j [$\text{Cphow many books}_i$ does John think that t_j bought t_i]]]

The "narrow scope" reading of everyone is attributed to its "group interpretation."

Here, we would like to suggest a slightly modified account for (23a). Note that the account in Lasnik and Saito 1992 assumes that how many books as a quantifier takes scope at the same position it takes scope as a wh-phrase. Since this phrase clearly contains a quantificational part x many books and a wh part how, this assumption is not necessary. We may assume that this phrase, as a quantifier, takes scope within its own clause and scopally interact with everyone in the embedded clause. According to this analysis, the LF of (23a) will be as in (32).<8>

- (32) [Cp_{how_k} [does John think that [Ipeveryone_j [IPE_j [vp[t_k many books]_i [vpbought t_i]]]]]]]

This analysis enables us to maintain that QR is in general "clause-bound." Further, it seems to make much sense under the copy theory of movement suggested in Chomsky 1992. In order to account for "reconstruction effects," Chomsky proposes that movement actually involves copying, as illustrated in (33a).

- (33)a. [Cp[whose brother] [did [I_p[whose brother] [I_{phe} [vp[whose brother] [vpsee [whose brother]]]]]]]
 b. [Cp_{who_i} [did [I_{phe} [vpsee [t_i's brother]]]]]

After the deletion of the appropriate parts of the chain, the desired operator-variable relation is derived as in (33b). And according to this theory, no extra mechanism is needed to construct the how-t_k and t_k many books-t_i relations in (32). We can simply delete many books in the matrix CP SPEC, how in the embedded VP-adjoined position, and how many books in the embedded object position. Note that according to this analysis, the initial movement of how many books to the embedded VP-adjoined position is QR, and the wh-movement originates from this position.

Let us now apply this analysis to (23b), repeated below.

- (23)b. ??how many books_i does John wonder whether everyone bought t_i

If how many books is to scopally interact with everyone, it must first undergo QR and adjoin to the embedded VP. Then, it undergoes wh-movement from this position to the matrix CP SPEC. Thus, the wh-movement is from a non-argument position. Since this movement involves extraction out of an island, we predict, on the basis of the argument/non-argument distinction, that it is illicit exactly as the wh-movement in (2b). Hence, the lack of scope interaction between how many books and everyone in (23b) is expected solely on the basis of the argument/non-argument distinction. This account for (23b) can be readily extended to (25b), if we assume that what contains a wh part and a quantificational part (wh + something), along the lines suggested in Kuroda 1968. Then, what in this example, like how many books in (23b), adjoins to the embedded VP by QR, before moving to the matrix CP SPEC by wh-movement.

The ungrammaticality of (22b), repeated below, can be accounted for in the same way.

- (22)b. *how much_i does John wonder [whether the book costs t_i]

Since how much in this example is interpreted quantificationally, it must first adjoin to the embedded VP by QR, and then, wh-move to the matrix CP SPEC. The resulting LF representation, after the LF deletion of the appropriate parts of the chain, will be as follows:

- (34) how_k does John wonder whether the book [vp[t_k much]_i [vpcosts t_i]]]

Since the *wh*-movement is from a non-argument position, and involves extraction out of an island, we expect it to be illicit. Thus, the ungrammaticality of this example is also accounted for on the basis of the argument/non-argument distinction. This account for (22b), it should be noted, is virtually identical to the account for (35b) proposed in Lasnik and Saito 1992.

- (35)a. ??what_i does John wonder who_j t_j bought t_i
 b. *what the hell_i does John wonder who_j t_j bought t_i

As discussed in detail in Pesetsky 1987, the extraction of *wh*-phrases like what the hell out of an island results in a severe violation. In order to account for this fact, Lasnik and Saito 1992 propose that those *wh*-phrases must undergo focus movement and adjoin to the embedded VP before moving on to the CP SPEC position. Thus, according to their analysis, the *wh*-movement in (35b) originates in a non-argument position, and this is why this example has the same status as (2b). Given Chomsky's 1992 copying + deletion analysis, we may assume that (35b) has the following LF representation:

- (36) what_k does John wonder who_j t_j [vp[t_k the hell]_i [vpbought t_i]]

The account for (22b) and (23b) presented above is based on Cinque's 1990 insight in that it appeals to the quantificational properties of how much and how many books. At the same time, however, it does not refer to the notion of referentiality, and is based solely on the argument/non-argument distinction. Hence, if it is successful, it raises doubt as to whether the referential/non-referential distinction plays any role in the analysis of the ECP-type phenomenon.

5. Conclusion

In this paper, we first discussed where/when and argued that they can have argument status in sentences, though not in NPs. We argued against Huang's 1982 empty P hypothesis, but at the same time, argued for his overall approach to account for the ECP-type phenomenon on the basis of the argument/non-argument distinction. Then, we discussed examples of amount quantification, and argued that they can be accounted for on the basis of this distinction. Our analysis suggests that this distinction plays a fundamental role also in the analysis of the facts that motivated the notion of referentiality.

Appendix: Some Related Issues

In this appendix, we will briefly discuss two issues related to the account we proposed in Section 4 for the examples of amount quantification. The first has to do with the rigidity condition on quantifier scope. We will show that this condition leads us to an additional argument for Mahajan's 1989 hypothesis that clause-internal scrambling, but not long-distance scrambling, can be A-movement. The second issue has to do with the exact derivations of examples such as (22b) and (23b). We will suggest that those examples provide us with additional evidence for Chomsky's 1989 Economy Principle on derivation.

The account of (22b) and (23b) suggested above relies crucially

on the rigidity condition on quantifier scope. As noted in Lasnik and Saito 1992, this condition seems to apply strictly to examples such as (37a), but to impose only preference to others like (37b).

- (37)a. some woman loves everyone
 b. someone loves everyone

As discussed in detail in Kuroda 1971 and Hoji 1985, this condition seems to apply rather strictly in Japanese. Thus, dareka takes wide scope over daremo in (38).<9>

- (38) dareka -ga daremo -o aisiteiru
 someone-nom everyone-acc love
 (someone loves everyone)

However, Kuroda and Hoji note one potential problem in Japanese for this condition. When the object NP is scrambled over the subject NP, either NP can take scope over the other. For example, (39a-b) are both completely ambiguous.

- (39)a. dareka -o_i daremo -ga t_i aisiteiru
 someone-acc everyone-nom love
 (everyone loves someone)
 b. daremo -o_i dareka -ga t_i aisiteiru
 everyone-acc someone-nom love
 (someone loves everyone)

If scrambling is A'-movement, then these examples will constitute clear counterexamples to the rigidity condition. Since the variable in the subject position asymmetrically c-commands that in the object position in LF, the condition predicts falsely that the subject quantified NP must take wide scope.

But it is argued in Mahajan 1989 that clause-internal scrambling can be either A- or A'-movement, while long-distance scrambling is necessarily A'-movement. And this hypothesis, together with the rigidity condition, predicts correctly that the examples in (39) are scopally ambiguous. If the scrambled object NP is in A-position, then it takes wide scope over the subject NP. On the other hand, if it is in A'-position, the subject NP takes wider scope. Mahajan's hypothesis, with the rigidity condition, predicts that when an NP is scrambled over a subject NP by long-distance scrambling, the latter takes wide scope. This is so since according to his hypothesis, long-distance scrambling is necessarily A'-movement. The prediction is in fact borne out as noted by Hiroaki Tada (p.c.) and Oka (1989). The strongly preferred reading of (40) is the one in which dareka takes wide scope over daremo.

- (40) daremo ni_i dareka -ga [John-ga t_i atta to] omotteiru
 everyone to someone-nom -nom met COMP think
 (someone thinks that John met everyone)

Thus, the rigidity condition and the scope facts in Japanese provide

us with an additional supporting argument for Mahajan's 1989 hypothesis on scrambling.

The second issue to be discussed in this appendix has to do with the exact derivations of (22b) and (23b). (23b) is repeated below.

(23)b.??how many books_i does John wonder whether everyone bought t_i

It was hypothesized above that how many books adjoins to the embedded VP by QR, and then, wh-moves from this position to the matrix CP SPEC. More precisely, the syntactic movement creates the representation in (41), and then, after LF deletion, the representation in (42) results.

(41) [how many books] [... [vp[how many books] [vpbought [how many books]]]]

(42) [how]_k [... [vp[t_k many books]_i [vpbought t_i]]]

Thus, according to this hypothesis, the movement creates a single A'-chain, and the two operator-variable pairs are created by deletion.

However, there is an alternative derivation of (42). It was simply assumed above that the initial movement of how many books to the VP-adjoined position counts as QR. But suppose that it does not, and the QR takes place in LF. Then, since the wh-movement originates in the object position, it becomes unclear why how many books cannot scopally interact with everyone in (23b). Hence, our analysis of (23b) implies that this alternative derivation is blocked on independent grounds.

Let us consider the problematic derivation in more detail. From (41), we first apply deletion to derive (43).

(43) [how]_k [... [vpbought [t_k many books]]]

Then, we apply QR to the embedded object and adjoin it to VP to derive (42). This derivation, unlike the one we assumed in Section 4, involves two independent A'-movements to create the operator-variable relations in (42). Thus, the Economy of Derivation would be the natural candidate to rule out this derivation. This principle blocks this derivation since there is another derivation that involves only one instance of "form chain." Thus, the analysis of (22b) and (23b) suggested in Section 4, if correct, provides additional support for Chomsky's 1989 Economy Principle.

FOOTNOTES

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1. See Murasugi 1991, 1992 for more detailed discussion of the material in this section.

2. More precisely, a locative phrase can be a bare NP, but only when it is a locative goal as in (i).

- Chomsky, N. (1992) A Minimalist Program for Linguistic Theory, MIT Occasional Papers in Linguistics 1.
- Cinque, G. (1990) Types of A'-Dependencies, MIT Press, Cambridge, Mass.
- Collins, C. (1992) "Economy of Derivation and the Generalized Proper Binding Condition," ms. MIT.
- Frampton, J. (1991) "Relativized Minimality, A Review," ms. Northeastern University.
- Hoji, H. (1985) Logical Form Constraints and Configurational Structures in Japanese, Ph.D. dissertation, University of Washington.
- Hoji, H. (1986) "Scope Interpretation in Japanese and its Theoretical Implications," WCCFL 5.
- Huang, C.-T. J. (1982) Logical Relations in Chinese and the Theory of Grammar, Ph.D. dissertation, MIT.
- Ishii, Y. (1990) "Half-Relatives in Japanese and Related Issues," MIT Working Papers in Linguistics 12.
- Kayne, R. (1981) "ECP Extensions," Linguistic Inquiry 12.
- Kroch, A. (1989) "Amount Quantification, Referentiality, and Long Wh-Movement," ms. University of Pennsylvania.
- Kuno, S. (1973) The Structure of the Japanese Language, MIT Press, Cambridge, Mass.
- Kuroda, S.-Y. (1968) "English Relativization and Certain Related Problems," Language 44.
- Kuroda, S.-Y. (1971) "Remarks on the Notion of Subject," reprinted in Journal of Japanese Linguistics 11 (1980).
- Lasnik, H. and M. Saito (1984) "On the Nature of Proper Government," Linguistic Inquiry 15.
- Lasnik, H. and M. Saito (1992) Move Alpha, MIT Press, Cambridge, Mass.
- Longobardi, G. (1987) "Extraction from NP and the Proper Treatment of Head Government," ms. Scuola Normale Superiore, Pisa.
- Mahajan, A. (1989) "On the A/A' Distinction: Scrambling and weak Crossover in Hindi," ms. MIT.
- May, R. (1985) Logical Form, MIT Press, Cambridge, Mass.
- Murasugi, K. (1991) Noun Phrases in Japanese and English: A Study in Syntax, Learnability and Acquisition, Ph.D. dissertation, University of Connecticut.
- Murasugi, K. (1992) "Locative/Temporal vs. Manner/Reason Phrases," Papers in English Linguistics and Literature, Kinjo Gakuin University.
- Oka, T. (1989) "On the SPEC of IP," ms. MIT.
- Perlmutter, D. (1972) "Evidence for Shadow Pronouns in French Relativization," in Chicago Which Hunt, CLS, Chicago.
- Pesetsky, D. (1987) "Wh-in Situ: Movement and Unselective Binding," in E. Reuland and A. ter Meuren, eds., The Representation of (In)definiteness, MIT Press, Cambridge, Mass.
- Rizzi, L. (1990) Relativized Minimality, MIT Press, Cambridge, Mass.
- Stowell, T. (1989) "Subjects, Specifiers, and X-Bar Theory," in N. Baltin and A. Kroch, eds., Alternative Conceptions of Phrase Structure, University of Chicago Press, Chicago.

A Note on Case Positions in Japanese

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1. Introduction

The possibility that scrambling can be A-movement has been raised in the literature (Kuroda 1986, Mahajan 1989, Webelhuth 1989, Tada 1990, Saito 1992, among many others). In this paper, I will be concerned with the characteristics of scrambling to the position between the subject and the indirect object, and show that the hypothesis that this position is an A-position (see Mahajan 1989, Tada 1990, and Miyagawa 1991) accounts for a reconstruction issue which seems to be otherwise mysterious.

Mahajan (1989) argues that clause-internal scrambling can be A-movement in Hindi¹, as he shows, for example, that the scrambled phrases can bind a reflexive. The relevant examples are cited in (1).

- (1)
- a. ? mohan₁-ko apne baccoN-ne t₁ ghar se nikaal diyan
 Mohan(DO) self's children(SUB) house from throw out
 (Mohan₁, self₁'s children threw out from the house)
- b. raam₁-ne ser₂ apne_{1/2} baccoN-ko t₂ dikhaaya
 Ram(SUB) tiger(DO) self's children showed
 (Ram₁ showed a tiger₂ to self_{1/2}'s children)

Saito (class lecture 1989, 1992) observes that this is the case in Japanese too.²

In (1a), scrambling is to a sentence initial position, crossing the subject. In (1b), scrambling is to a position between the subject and the indirect object. Let us call the former position the pre subject position and the latter position the post subject position for ease of exposition.

As noted in Mahajan (1990:46) (see also Saito (1992)), the grammaticality of the following example indicates that scrambling to the pre subject position can be A'-movement.

- (2)
- apne aap₁-ko raam₁ pasand kartaa hE
 himself(DO) Ram(SUB) likes
 (Himself, Ram likes)

2. Condition A Type Reconstruction and Scrambling

(1) suggests that both the pre subject position and the post subject position can be A-position in the sense that the phrase moved to either position can be a binder of a reflexive. Interestingly, however, Mahajan (1989:18) notes the following asymmetry. (3a) shows that "apnii" (self) can be bound by either the subject or the indirect object in the sentence. In (3b) and (3c), the phrase "apnii kitaab" (self's book) has been scrambled.

(3)

- a. raam₁-ne mohan₂-ko [apnii_{1/2} kitaab] 10Taaai
 Ram(sub) Mohan(io) self's book returned
 (Ram₁ returned Mohan₂ self_{1/2}'s book)
- b. raam₁-ne [apnii₁/_{*2} kitaab] mohan₂-ko t 10Taaai
 Ram(sub) self's book Mohan(io) returned
 (Ram₁ returned self₁/_{*2}'s book to Mohan₂)
- c. [apnii₁/_{*2} kitaab] raam₁-ne mohan₂-ko t 10Taaai
 self's book Ram(sub) Mohan(io) returned
 (Self₁/_{*2}'s book, Ram₁ returned Mohan₂)

In (3b), "apnii kitaab" is scrambled to the post subject position. In (3c), it is scrambled to the pre subject position. In both (2b) and (2c), only the subject can be the antecedent of the anaphor but not the indirect object.

We observe exactly the same phenomena in Japanese. Since Japanese reflexive "zibun" (self) exhibits strong subject orientation (Kuno 1973, among many others), even in the equivalent of (3a), the only possible antecedent is the subject.

(4)

- Michael₁-ga Joe₂-ni [zibun₁/_{*2}-no hon]-o watasita
 Michael-nom Joe-dat self's book-acc handed
 (Michael₁ handed Joe₂ self₁/_{*2}'s book)

Therefore, we cannot use a well-known reflexive "zibun" for our purpose. Instead, we use "karezisin" (himself), which can take a non-subject phrase as its antecedent (see Nakamura 1987, Katada 1991, among others).

(5)

- Michael₁-ga Joe₂-ni [karezisin_{1/2}-no hon]-o watasita
 Michael-nom Joe-dat himself's book-acc handed
 (Michael₁ handed Joe₂ himself_{1/2}'s book)

(6a, b) are Japanese equivalents of (3b, c) above.

(6)

a. Michael₁-ga [karezisin₁/*₂-no hon]₃-o Joe₂-ni t₃
 Michael-nom himself's book-acc Joe-dat
 watasita
 handed
 (Michael₁ handed himself₁/*₂'s book to Joe₂)

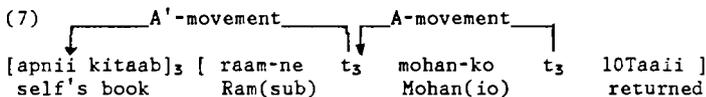
b. [karezisin₁/*₂-no hon]₃-o Michael₁-ga Joe₂-ni t₃
 himself's book=acc Michael-nom Joe-dat
 watasita
 handed
 (Himself₁/*₂'s book, Michael₁ handed Joe₂)

Here also only the subject can be the antecedent of the reflexive.

Mahajan assumes that the coreference between "apne" (self) and its antecedent in such an example as (3b, c) is due to a reconstruction possibility (see Barss (1986), among others). He argues that since the reflexive can refer only to the subject in (3b) and (3c) above, reconstruction must be restricted to some position higher than the indirect object. Mahajan proposes to account for the data as he assumes: (i) the position between the subject and the indirect object is an A-position; (ii) reconstruction is limited to cases of A'-movement.

Given these assumptions, let us observe (3b) and (6a). According to Mahajan's hypothesis, scrambling involved here is to an A-position, and therefore, reconstruction would not apply. Then, the indirect object does not bind the reflexive.

Let us next observe (3c) and (6b). In order to account for these examples, Mahajan has to assume that the movement is mediated through an intermediate position, more specifically, an intermediate A-position. He considers the movement in (3c) takes place in the following manner:



and assumes that reconstruction applies only to the second movement. Therefore, the scrambled phrase can be reconstructed to the intermediate position but not to the initial position. Hence, only the subject can be the antecedent of the reflexive.

Note, however, that Condition A type reconstruction effect is observed in A-movement. For example, *psych* movement as in (8) is considered to be A-movement, but it exhibits reconstruction effect (see Postal 1971, and Belletti and Rizzi 1986).

- (8)
- a. This picture of himself bothers Dan
 - b. Each other's parents annoy the men

Moreover, Barss (1986) observes that raising exhibits Condition A type reconstruction effect. His example is cited below.

- (9)
- [These pictures of each other₂]₁ seem [t'₁ to bother t₁ them₂]

Therefore, we cannot say that Condition A type reconstruction effect is limited to A'-movement.

The difference between Hindi and Japanese examples above on the one hand and English ones on the other is that in the former cases, the relevant phrases are assigned accusative Case, where the latter cases, they are assigned nominative Case. We can check Condition A type reconstruction effect with accusative phrase in English. Observe the following examples.³

- (10)
- a. I believe that [[pictures of himself] embarrass John]
 - b. ??I believe [[pictures of himself] to embarrass John]
 - c. *I believe that [[pictures of himself] prove that John is funny looking]

There is a three-way contrast. (10a) is a typical case of *psycho movement* and grammatical. The moved phrase is assigned the nominative Case. (10c) is ungrammatical: this is a straightforward case of a Condition A violation. (10b), in which the moved phrase is assigned the accusative Case, has an intermediate status. Although it is not clear why (10b) is not as good as (a), it appears that the contrast displayed in (10a) and (10b) is not as clear as one wishes it to be to say that the movement to an accusative position is not subject to Condition A type reconstruction effect⁴. We, therefore, look elsewhere to find some evidence that the post subject position is different from the pre subject position.

3. Pre Subject Position vs. Post Subject Position

As observed in Saito (1985, 1992), scrambling to the pre subject position exhibits Condition C type reconstruction effect.⁵ The relevant example is cited below.

- (11)
 *[Masao₁-no hahaoya]₂-o [kare₁-ga t₂ aisite iru] (koto)
 Masao's mother-acc he-nom love
 (Masao's mother, he loves)

A-movement does not exhibit Condition C type reconstruction effect as shown in (12), which is cited from Saito (1992).

- (12)
 [John₁'s picture]₂ struck him₁ t₂ as a good likeness

Let us now consider the case of scrambling to the post subject position. The grammaticality of (13b) indicates that this type of scrambling does not exhibit Condition C type reconstruction effect (see also Mahajan (1990)).

- (13)
 a. *Joe-ga kare₁-ni [Michael₁-no imooto]-o syookaisita
 Joe-nom he-dat Michael's sister-acc introduced
 (Joe introduced him₁ Michael₁'s sister)
 b. Joe-ga [Michael₁-no imooto]₂-o kare₁-ni t₂ syookaisita
 Joe-nom Michael's sister-acc he-dat introduced
 (Joe introduced Michael₁'s sister to him₁)

As in (14), even when the object phrase is scrambled to the pre subject position, if the relevant pronoun is the indirect object, we do not observe reconstruction effect.

- (14)
 [Michael₁-no imooto]₂-o [Joe-ga kare₁-ni t₂ syookaisita]
 Michael's sister-acc Joe-nom he-dat introduced
 (Michael₁'s sister, Joe introduced him₁)

Similarly, as observed by Tada (1990), scrambling to the pre subject position and scrambling to the post subject position behaves differently with respect to the remedy of strong crossover. The relevant examples are cited below.^{6 7} (15a) is a typical crossover example in Japanese with a WH-in-situ. (15b) involves scrambling to the pre subject position and the grammaticality does not improve.

(15)

- a. *soitu₁-ga [dare₁-no sensei]-o nagutta no
 HE-nom whose teacher-acc hit Q
 "He₁ hit whose₁ teacher"
 (Whose₁ teacher did he₁ hit?)
- b. *[dare₁-no sensei]₂-o [soitu₁-ga t₂ nagutta no]
 whose teacher-acc HE-nom hit Q
 "Whose₁ teacher did he₁ hit"
 (same as above)

A-movement saves an apparent strong crossover configuration as shown in below.

(16)

[Whose₁ mother]₂ t₂ struck him₁ t₂ as smart

Now observe (17), which is also cited from Tada (1990). (17b) involves scrambling to the post subject position and in this case, the grammaticality improves.

(17)

- a. *John-ga soitu₁-ni [dare₁-no sensei]-o syookaisita no
 John-nom HE-dat whose teacher-acc introduced Q
 "John introduced him₁ whose₁ teacher"
 (Whose₁ teacher did John introduce him₁)
- b. John-ga [dare₁-no sensei]₂-o soitu₁-ni t₂ syookaisita no
 John-nom whose teacher-acc HE-dat introduced
 "John introduced whose₁ teacher to him₁"
 (same as above)

And again, if the relevant pronoun is the indirect object, even if the direct object scrambled all the way to the pre subject position, the grammaticality improves.

(18)

[dare₁-no sensei]₂-o [John-ga soitu₁-ni t₂ syookaisita no]
 whose teacher-acc John-nom HE-dat introduced Q
 "whose teacher₁, John introduced him₁"
 (same as above)

The grammaticality of (13) and (17b) shows that reconstruction does not have to apply from the post subject position, whereas the ungrammaticality of (11) and (14b) shows that we cannot prevent reconstruction from applying from the pre subject position. The grammaticality of (14) and (18) indicates that scrambling to the pre subject position can go through the post subject position.

4. Impossibility of "Direct" Movement

Let us next examine whether reconstruction is possible at all from the post subject position. We have observed the cases where reconstruction effect causes ungrammaticality. We will now observe the cases which are saved by reconstruction effect.

First, we will examine a case of topicalization, A'-movement. Observe (19).

(19)
 Him_1 , $John_1$'s mother loves t_1

The grammaticality of (19) indicates that A'-movement exhibits reconstruction effect with respect to Condition B.

On the other hand, typical A-movement does not exhibit this characteristic.

(20)
 * he_1 seems to $John_1$'s mother t_1 to be smart

Next observe a case of scrambling to the pre subject position.

(21)
 $kare_1$ -o [$Michael_1$ -no sensei-ga minna-ni t_1 syookaisita]
 he-acc Michael's teacher-nom everyone-dat introduced
 (Him_1 , $Michael_1$'s teacher introduced everyone)

The grammaticality of (21) indicates that scrambling exhibits Condition B type reconstruction effect.

Let us now consider a case of scrambling to the post subject position.

(22)

a. Joe-ga Michael₁-no sensei-ni kare₁-o syookaisita
 Joe-nom Michael's teacher-dat he-acc introduced
 (Joe introduced Michael₁'s teacher him₁)

b. *Joe-ga kare₁-o Michael₁-no sensei-ni t₁ syookaisita
 Joe-nom he-acc Michael's teacher-dat introduced
 "Joe introduced him₁ to Michael₁'s teacher"

(22b) is not grammatical. That indicates that A'-adjunction to this position is not possible. Moreover, if the hypothesis that the movement in (22b) is to an A-position is correct, the ungrammaticality of (22b) is accounted for together with (20).

Interestingly enough, (23) is also ungrammatical.

(23)

*kare₁-o [Joe-ga Michael₁-no sensei-ni t₁ syookaisita]
 he-acc Joe-nom Michael's teacher-dat introduced
 (Him₁, Joe introduced Michael₁'s teacher)

This is a case of scrambling to the pre subject position. The grammaticality of (21) suggests that reconstruction should be possible from this position. However, the ungrammaticality of (23) indicates that reconstruction may be possible to the intermediate position, but not to the initial position. This is expected if Mahajan (1989) is correct that the movement like (23) goes through the intermediate position, which is an A-position.

Now a remaining question is why the direct movement is not possible. If the direct movement to the pre subject position is possible, it should be able to be a case of A'-movement, and therefore, reconstruction should be possible. In the rest of the paper, I will suggest to relate this observation to Chomsky's (1989) hypothesis that accusative Case will be checked at a functional category.

5. Case Positions in Japanese

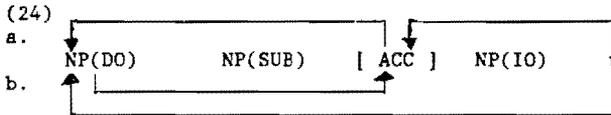
Chomsky (1989) attempts to unify the way structural Case assignment takes place. He proposes that both nominative and accusative Case will be checked at functional categories. This means that the object phrase must raise to get Case checked.

In English type languages, it is obvious that object raising takes place at LF because of the word order. However, as Mahajan (1989) notes, in such languages as Hindi and Japanese, it is possible to consider that scrambling, which is S-structure movement, can be to a Case position in a functional category.

Interestingly, scrambling to the post subject position exhibits the characteristics of A-movement as we have observed. If these characteristics

are the ones shared by the movement to a Case position⁸, the post subject position should be a Case position.

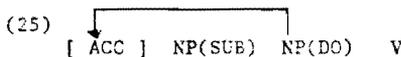
Let us hypothesize that the post subject position is a Case position and examine whether we can account for the ungrammaticality of (23). There are two ways to derive (23) as illustrated in (24).



In (24a) derivation, the object goes through the accusative position, whereas in (24b), it directly moves to the pre subject position. The ungrammaticality of (23) indicates that the derivation like (24b) is not available. Note that the object must get Case checked. This means that in (24b) derivation, the object must go back to the accusative position at LF.

Given that, there are at least two ways to prevent (24b).⁹ We may attribute to the length of chains. The total length of the chain is shorter in (24a) than (24b). Therefore, only the "economical" (in the sense of Chomsky (1989)) derivation is allowed. Or it may be that the pre subject position is an A'-position and the movement from an A'-position to a Case position is prohibited.

If this is in a correct line, we must make a note of the position of the subject. Koopman and Sportiche (1988), among others, argue that in Japanese type languages, the subject can stay at the Spec of VP. However, if we want to assume an accusative Case position as in (24), what we do not want to have is a configuration like (25).



This is because as observed by Tada (1990) and Saito (1992), the pre subject position is not an A-position¹⁰. Therefore, within Chomsky's (1989) system, the subject must raise to a functional category at S-structure in Japanese too¹¹.

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I would like to thank Andrew Barss, Naoya Fujita, Hiroto Hoshi, Howard Lasnik, Mamoru Saito, and Keiko Yoshida for their suggestions and help. All shortcomings are, of course, mine.

Notes

¹Both Hindi and Japanese allow "long distance" scrambling too. According to Mahajan (1989) and Saito (1992), "long distance" scrambling cannot be A-movement.

²Mahajan (1989) and Saito (1992) note that (1a) is somewhat worse than the perfect example in (1b). See Saito (1992) for some discussion. Tada (1990) argues that scrambling such as (1b), which does not cross the subject, should be distinguished from one such as (1a), which does cross the subject.

³I am indebted to Howard Lasnik and Andrew Barss for this observation. The examples in (9) are due to Andrew Barss.

⁴Therefore, the question why in (3b,c) and (6a,b), only the subject can be the antecedent of the reflexives remains unsolved.

⁵The fact that the phrase scrambled to the pre subject position can bind an anaphor (see (1a)) and the claim that this position is not an A-position seem to be contradicted. See Saito (1992) for some discussion.

⁶It is known that Japanese pronoun "kare" (he) cannot be a bound variable. Thus, (i) is ungrammatical.

(i) *dare-no sensei-ga kare-o aisiteiru no
 whose teacher-nom he+acc love Q
 (Whose teacher loves him)

However, it is observed by Hajime Hoji and Hiroaki Tada, among others, there are some pronouns which can be a bound variable and "soitu" (that guy) is one of them. See Hoji (1990) for detailed discussion. In this paper, I translate "soitu" as "HE" with capital letters for ease of exposition.

⁷Since the word order of the examples is crucial here, I provide with two types of translation. The one reflects the relevant word order of Japanese example (given in " ") and the other expresses the closest meaning (given in ()).

⁸Chomsky (1986:137) argues that an A-chain must be headed by a Case position.

⁹See Nemoto (forthcoming) for more discussion.

¹⁰Except that the phrase scrambled to the pre subject position can bind an anaphor.

¹¹See Takezawa (1987) and Ueda (1990) for some discussion on the position of the subject in Japanese.

References

- Barss, A. (1986) *Chains and Anaphoric Dependence: On Reconstruction and Its Implications*. Ph.D. dissertation, MIT.
- Belletti, A. and L. Rizzi (1986) Psycho Verbs and θ -Theory. *Natural Languages and Linguistics Theory* 6.
- Chomsky, N. (1986) *Knowledge of Language: Its Nature, Origins and Use*. Praeger, New York.
- Chomsky, N. (1989) Economy of Derivation and Representation. *MIT Working Papers in Linguistics* 10.
- Katada, F. (1991) The LF Representation of Anaphors. *Linguistic Inquiry* 22.
- Koopman, H. and D. Sportiche (1988) Subject. ms. UCLA.
- Kuno, S. (1973) *The Structure of the Japanese Language*. MIT Press.
- Kuroda, S.-Y. (1986) Whether We Agree or Not: A Comparative Syntax of English and Japanese. ms. University of California, San Diego.
- Mahajan, A. (1989) On the A / A-bar Distinction: Scrambling and Weak Crossover in Hindi. ms. MIT.
- Mahajan, A. (1990) *The A / A-bar Distinction and Movement Theory*. Ph.D. dissertation, MIT.
- Miyagawa, S. (1991) Functional Category and Case Assignment. ms. Ohio State University.
- Nakamura, M. (1987) Parameterized Extension of Binding Theory. *MIT Working Papers in Linguistics* 9.
- Nemoto, N. (forthcoming) Ph.D. dissertation, University of Connecticut.
- Postal, P. (1971) *Crossover Phenomena*. MIT Press.
- Saito, M. (1985) *Some Asymmetries in Japanese and Their Theoretical Implications*. Ph.D. dissertation, MIT.
- Saito, M. (1992) Long Distance Scrambling in Japanese. *Journal of East Asian Linguistics* 1.
- Tada, H. (1990) Scrambling(s). A talk presented at the Japanese Syntax Workshop, Columbus, Ohio.
- Takezawa, K. (1987) *A Configurational Approach to Case Marking in Japanese*. Ph.D. dissertation, University of Washington.
- Ueda, M. (1990) *Japanese Phrase Structure and Parameter Setting*. Ph.D. dissertation, University of Massachusetts, Amherst.
- Webelhuth, G. (1989) *Syntactic Saturation Phenomena and Modern Germanic Languages*. Ph.D. dissertation, University of Massachusetts, Amherst.

The Locality Condition and Binding at LF *

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1. Introduction

The concept of locality has been employed in Binding Theory to restrict a certain domain, i.e. the Binding Domain (BD), in which an anaphoric dependency is satisfied. Since Lebeaux (1983), however, the BD has been assumed to be able to expand as a function of LF-movement of anaphors, such that the long-distance anaphors move close enough to be locally bound by a remote antecedent in the enlarged BD at LF.

This notion of locality is somewhat loosely defined in that anaphors are only required to be in the c-commanding domain of antecedent. Chomsky (1986), Yang (1991), and Manzini (1992) give some restriction on locality, in an attempt to attribute Binding Theory to Government Theory. In this paper, I argue for a relaxation of the locality condition so that Principle A is subsumed by Relativized Minimality. By doing so, I basically dispense with the BD which is required in the definition of Principle A, relax Principle A in such a way that phrases in A' - as well as A-positions invoke binding theoretic effects, and show that an anaphoric dependency can be essentially and uniquely accounted for by a constraint which blocks A-binding after A'-binding, with a reformulation of the definition of A-/A'-position.

2. Anaphors

It is generally known that object-orientation is missing in long-distance binding, where an anaphor in the subject position finds its antecedent in a higher clause. So, in (1) and (2), the anaphors in the embedded subject position are anaphoric only to the subject, but not to the object, in the matrix clause.

- (1) John_i told Bill_j that pictures of himself_{i/*j} had arrived.
 (2) The men_i told the women_j that each other_{i/*j}'s pictures were on sale.

This is also true in Korean, where the phrasal reflexive *kucasin* 'himself' in (3) and the reciprocal *selo* 'each other' in (4) can be bound by the matrix subject only.¹

- (3) John-un Bill-ul [kucasin-i fiancée-lul manness-tun] kongwuen-ulo teylikokassta
 -top -acc himself-nom fiancée-acc met-rel park-to took
 'John_i took Bill_j to the park where himself_{i/*j} met (his) fiancée.'
 (4) yeintul-un wuli-lul [selo-ka fiancé-lul manness-tun] kongwuen-ulo teylikokassta
 women-top us-acc e.o.-nom fiancé-acc met-rel park-to took
 'The women_i took us_j to the park where each other_{i/*j} met (e.o.'s) fiancé.'

In cases where an anaphor finds its antecedent in the same (local) clause, I will call this 'short-distance binding,' however, the object as well as the subject can serve as an antecedent.

- (5) John_i told Bill_j about himself_{i/j}.
 (6) The girls_i told the boys_j about each other_{i/j}.

Thus, (5) and (6) are ambiguous, in that the anaphors can be bound either to the subject or to the object.

- (7) John-un Bill-eykey kucasin-eytayhaye malhayssta.
 -top -I.O. himself-about told
 'John_i told Bill_j about himself_{i/j}.'
- (8) sonyentul-un sonyetul-eykey selo-uy pang-ul poyecwuessta.
 boys-top girls-I.O. each other's room-acc showed.
 'Boys_j showed girls_j each other's room.'

(7) and (8) show that the phrasal reflexive and the reciprocal in Korean exhibit both subject and object-orientation in short-distance binding as well.

Interestingly, in Korean - Japanese and Chinese also -, there exists another type of anaphor, the so-called non-phrasal reflexive *casin*, *zibun* and *ziji*, respectively, meaning 'self'. The non-phrasal reflexive is similar to the phrasal reflexive and reciprocal in that it exhibits only subject-orientation in long-distance binding, as in (9) where the non-phrasal reflexive in Korean refers to the matrix subject only.

- (9) John-un Bill-ul [casin-i fiancée-lul manness-tun] kongwuen-ulo teylikokassta
 -top -acc self-nom fiancée-acc met-rel park-to took
 'John_i took Bill_j to the park where self_{i/*j} met (his) fiancée.'

The non-phrasal reflexive, however, differs from the phrasal reflexive and reciprocal in two respects. One is that the non-phrasal reflexive can be bound by the subject in the higher clause, even though there exists a c-commanding subject, object, or both between them (I will call this 'longest-distance binding'). That is, in (10), for example, the non-phrasal reflexive in the embedded object position is bound by the matrix subject, even though it is intervened by the matrix object and embedded subject.

- (10) John-un Bill-ul [Tom-i casin-uy pomwul-ul swumki-n] sem-ey ponayssta.
 -top -acc -nom self-gen treasure-acc hid-rel island-to sent
 'John_i sent Bill_j to the island where Tom_k hid self_{i/*j/k}'s treasure'

In contrast, the phrasal reflexive and the reciprocal do not invoke longest-distance binding, as shown in (11) through (14).

- (11) John_i told Bill_j that Tom_k saw pictures of himself_{i/*j/k}.
 (12) The men_i told them_j that the women_k met each other_{i/*j/k} in Boston.
 (13) John-un Bill-ul [Tom-i kucasin-uy pomwul-ul swumki-n] sem-ey ponayssta.
 -top -acc -nom himself's treasure-acc hid-rel island-to sent
 'John_i sent Bill_j to the island where Tom_k hid himself_{i/*j/k}'s treasure'
 (14) sonyentul-un wuli-lul [sonyetul-i selo-uy pomwul-ul swumki-n] sem-ey ponayssta.
 boys-top us-acc girls-nom e.o.'s treasure-acc hid-rel island-to sent
 'The boys_i sent us_j to the island where the girls_k hid each other_{i/*j/k}'s treasure'

The interesting fact is, that the matrix object still cannot participate in either long- or longest-distance binding.

Second, the non-phrasal reflexive also behaves differently from the phrasal reflexive and reciprocal in short-distance binding. In English, simple sentences containing anaphors are ambiguous.

- (15) John_i told Bill_j about himself_{i/j}.
 (16) The girls_i told the boys_j about each other_{i/j}.

In (15) and (16), the anaphors can be bound by either the subject, or the object.

In Korean, however, the anaphoric dependency in simple sentences varies, depending on what kind of anaphor is involved. First, consider the cases where a sentence contains the non-phrasal reflexive. This sentence may or may not be ambiguous. For example, the non-phrasal reflexive *casin* 'self' in (17) exhibits both subject and object-orientation.

- (17) John-i Bill-ul casin-uy pang-ey katwuessta.
 -top -acc self-gen room-in kept
 'John_i kept Bill_j in self_{i/j}'s room.'

In (18), however, object-orientation disappears, and the non-phrasal reflexive is anaphoric only to the subject.

- (18) John-i Bill-ul casin-uy pang-eyse mannassta.
 -nom -acc self room-at meet
 'John_i met Bill_j at self_i/*j's room.'

Park (1992) proposes that the anaphoric dependency correlates with the subcategorization of the verb, arguing that

- (19) object-orientation holds for the non-phrasal reflexive in a complement position.

Thus, the asymmetry in short-distance binding of the non-phrasal reflexive emerges from the fact that the non-phrasal reflexive in (17) is inside the PP complement subcategorized for by the verb *katwuta* 'keep', whereas that of (18) is not part of the complement of the verb *mannata* 'meet'.

The phrasal reflexive/reciprocal, however, is not sensitive to complement versus non-complement distinction. Object-orientation, thus, survives, by simply putting the phrasal reflexive/reciprocal in place of the non-phrasal reflexive in (18).

- (20) John-i Bill-ul kucasin-uy samwusil-eyse mannassta.
 -nom -acc himself-gen office-at met
 'John_i met Bill_j at himself_{i/j}'s office.'
 (21) wuli-nun kutul-ul selo-uy samwusil-eyse mannassta.
 we-top them-acc e.o.-gen office-at met
 'We_i met them_j at each other_{i/j}'s office.'

As (20) and (21) indicate, the anaphors again ambiguously refer to the subject or the object, even though they are not in the complement position of the verb.

The properties of the three types of anaphors can be thus described as in (22).

(22)

type of anaphor	short-distance		long-distance		longest-distance	
	subj-	obj-	subj-	obj-	subj-	obj-
non-phrasal refl.	yes	yes/no	yes	no	yes	no
phrasal refl.	yes	yes	yes	no	N/A	N/A
reciprocal	yes	yes	yes	no	N/A	N/A

To sum,

- (23) a. when an anaphor and its antecedent are in the same clause, the phrasal reflexive and reciprocal exhibit object-orientation, while the non-phrasal reflexive may or may not do so, and
 b. when an antecedent is in a higher clause, the phrasal reflexive and reciprocal can function as a long-distance anaphor, but not as a longest-distance anaphor, while the non-phrasal reflexive can do both.
 c. long- and longest-distance binding uniformly do not exhibit object-orientation.

3. Checking theory and anaphors

3.1. Feature-checking

For an account of (23), let's consider the following four possible analyses of anaphors.

- (24) a. anaphors undergo XP-adjunction movement.
 b. anaphors undergo XP-substitution movement.
 c. anaphors undergo X^0 head-movement.
 d. anaphors do not move at all.

The fact that the non-phrasal reflexive works as a longest-distance anaphor as summed up in (23b) can be accounted for by differentiating the type of movement it undergoes from that of a phrasal reflexive/reciprocal. For this, I propose that

- (25) a non-phrasal reflexive undergoes X^0 head-movement. ²

Imagine that (25) is right. Then, we immediately face the question as to why the non-phrasal reflexive moves. Recently, Chomsky (1992) provides a checking mechanism through which feature holders match their features under the SPEC-head relation. In Verb Raising (VR), for example, the verb is assumed to independently carry morphological features from the lexicon and move to the heads of phrases which contain verbal features, i.e. AGRPs and TP, in favor of checking features between the verb and heads which it moves through. In light of this, I conjecture that the non-phrasal reflexive carries features to be checked, arguing that

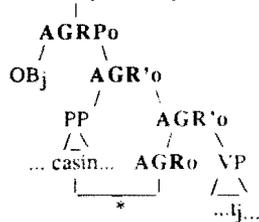
- (26) a non-phrasal reflexive moves for the sake of checking theory. ³

There are, however, three fundamental differences between VR and movement of non-phrasal reflexive in (26). One is that the features which the verb carries, i.e. L-features, are different from those which the non-phrasal reflexive carries. Let's refer the features of non-phrasal reflexive as B(inding)-features. L-features include features of agreement and tense, such that the verb moves to heads of AGRP and TP, while B-features contain only those features which are relevant to its antecedent, i.e. AGR features, such that the non-phrasal reflexive eventually moves to a head position, whose SPEC is occupied by its antecedent. Second, L-features are strong or weak, such that the verb moves before or after SPELL-OUT, respectively, depending on the language, while B-features are weak, such that the non-phrasal reflexive moves covertly, i.e. after SPELL-OUT. Third, the verb strictly moves to head positions within a clause, while the non-phrasal reflexive can undergo long- or even longest-distance movement. In Chomsky (1992), the

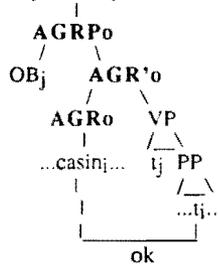
number of steps of movement depends on the number of sets of features which must be checked. For example, the verb carries at most three sets of features, {AGRs}, {Tense}, and {AGRo}, each of which is checked at three different head positions, i.e. AGRo, T, and AGRs, through successive cyclic movement. The non-phrasal reflexive, however, carries only one set of features, and moves as far as it matches its features with a possible antecedent. For example, in cases where the non-phrasal reflexive in the embedded object position is bound by the matrix subject, it moves up to the head AGRs. This movement must be undergone by successive cyclically landing in intervening head positions for the sake of the minimality and the economy of derivation in the sense of Chomsky (1991).

The analysis so far requires the non-phrasal reflexive to be bound under the SPEC-head relation. Now, as stated in (23a), the non-phrasal reflexive has the property of being flexible in exhibiting object-orientation in short-distance binding. This flexibility can be accounted for by exploring whether or not the non-phrasal reflexive and its antecedent enter into a SPEC-head configuration. That is, let's assume that the object moves to SPEC-AGRo for Case (cf. Mahajan (1991), Chomsky (1992), and Johnson (1992)), and that a non-complement PP is base-generated in AGRo'. The non-phrasal reflexive in a non-complement PP fails to be bound by the object in SPEC-AGRo, because the Proper Binding Condition in Fiengo (1980) prevents it from lowering to the head AGRo, as in (27a). This prevention, in turn, blocks the non-phrasal reflexive and its possible antecedent to enter into a SPEC-head configuration, as indicated by an arrow.

(27) a. in a non-complement position



b. in a complement position



On the contrary, the non-phrasal reflexive in a complement PP which is sister to the verb, as in (27b), can undergo upward movement to the head AGRo, establishing the appropriate configuration with its antecedent, i.e. the object.

3.2. Case-checking

It has been argued that AGRPs exist in Korean, given the fact that honorific expressions in Korean mediate the relation between the subject and the verb, as in (28), where the subject *pwumonim* 'parents' and the verb *kasiessta* 'went' agree in honorification. (cf. Cho (1990))

- (28) John-uy pwumonim-un konghang-ey kasiessta.
 -gen parents(hon)-top airport-to went (hon)
 'John's parents(hon) went(hon) to the airport.'

If this is so, then what is the nature of the subsequent movement of subject to SPEC-AGRPs? Let's consider two possibilities.

- (34) a. expand the A-chain in order to accommodate both Case- and feature-checking.
 b. regard the subsequent movement as an instance of (obligatory) short Scrambling.⁵

In Chomsky (1992), feature-checking applies not only to NP-, but to *wh*-movements, as well. That is, a *wh*-element moves to SPEC-CP in order to check its features with the head C. Webelhuth (p.c.) further proposes that Topicalization and Focus movement (even Scrambling) are motivated by checking theory. If this is the case, then, Case-checking differs from other feature-checking, in that the former applies only for A-movement, while the latter does for both A- and A'-movement. For this reason, (34a) is hard to defend.

Now, consider (34b). Mahajan (1991) argues that clause internal Scrambling may be A- or A'-movement in Hindi. (34b) then triggers two additional options, depending on how to define Scrambling, i.e. A- or A'-Scrambling. The choice in (34) will be made, by reformulating the following definition of A-/A'-position.

4. Definition of A-/A'-position

SPEC-CP and adjunction positions have been regarded as A'-positions, and all other SPECs as A-positions. Recently, however, much attention has been paid to redefining A-/A'-position, such as a three-way distinction of A-/A'-position (cf. Webelhuth (1992), and Chomsky (1992)) and a distinction of A-/A'-position based on Case-/ θ -marking (cf. Johnson (1992)).

In this paper, I propose

- (35) a. An A-position = def.
 (i) a SPEC position which is assigned Case or θ -role, or
 (ii) a head position whose SPEC is an A-position
 b. An A'-position = def.
 a SPEC or head position which is not an A-position

By (35), (i) there is no inherent A-/A'-position, (ii) not all, but some SPECs are A-positions, depending on whether or not they are Case- or θ -marked, and (iii) head positions are also classified into A- or A'-positions, and their status is determined by the status of their SPEC. In other words, under the VP-Internal Subject Hypothesis, SPECs of TP, AGRPo, and VP are counted as A-position, because the first two are Case-related and the third θ -related. By (35a(ii)), their head positions, i.e. T, AGRo, and V, are also counted as A-position. SPEC-AGRPs, however, becomes A'-position, in that it is neither Case- nor θ -related. Its head position, i.e. AGRs, is also an A'-position for the same reason.

In this respect, the local NP-movement can form either an A- or A'-chain. More importantly, the question raised in (34) is accounted for in such a way that the subsequent movement of subject to SPEC-AGRPs is an instance of short distance A'-movement. This movement is obligatorily, as the movement to SPEC-TP is. As such, the subject and the object now eventually land in A'- and A-positions, respectively.⁶

The argument that the subject occupies an A'-position attacks the general assumption that only phrases in A-position participate in binding theoretic effects.

- (36) a. * Who_i did each other_j's friends visit _ ?
 b. * Who_i did himself_i like _ ?

Sentences in (36) have been assumed to be ungrammatical, simply because the anaphors lack an antecedent in an A-position.

In Korean, however, sentences such as (36a) are allowed. For example, (37a) is grammatical even if the anaphor, for example, the non-phrasal reflexive *casin* 'self', and *wh*-word, *nwukwu* 'who', are in a coreference relation.

- (37) a. *nwukwu-lul* [*casin-uy chinkwutul-i* _ *pelyenohassni*]
 who-acc self-gen friends-nom spoiled-Q
 'Who_i did friends of himself_i spoil ?'
 b. * *nwukwu-lul* [*casin-i* _ *pinanhayssni*]
 who-acc self-nom criticized-Q
 'Who_i did himself_i criticize ?'

Since Korean is assumed not to exhibit Weak Cross-over effects, the grammaticality involved in (37) should not rely on whether or not the anaphor finds its antecedent in an A-position, but on the fact that (37b) simply invokes (Strong) Crossover effects, whereas (37a) does not. This account also applies to English, in that the examples in (36) above are ungrammatical, simply because they invoke Weak and Strong crossover, respectively. Furthermore, if the assumption that long-distance scrambling is an A'-movement is right (cf. Saito (1990) and Mahajan (1991)), the anaphoric dependency between the long-distance scrambled antecedent and the anaphor in (38) is an instance of A'-binding.

- (38) *John-ul* [*casin-uy emma-nun* [*Bill-i* _ *ttaylyessta-ko*] *mitessta*].
 -acc self's mother-nom -nom hit-that believed
 '(lit.) John_i, self_i's mother believed that Bill hit (him).'

Under this consideration, Binding Theory can be relaxed in such a way that phrases in A'- as well as A-positions can participate in binding theoretic phenomena. So, Principle A is defined as

- (39) an anaphor must be A- or A'-bound. ⁷

Assuming that Scrambling uniformly undergoes A'-movement, the anaphor in (37a) and (38) satisfies (39), by being A'-bound by the scrambled antecedent.

5. Generalized Relativized Minimality

Recall that the non-phrasal reflexive undergoes X⁰-movement. In order to accommodate this with respect to (39), I suggest the following generalized version of Relativized Minimality, based on a new definition of A-/A'-position in (35), in an attempt to attribute Binding Theory to Government Theory, particularly antecedent government.

(40) Generalized Relativized Minimality

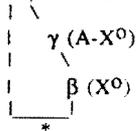
α antecedent governs β only if there is no γ such that γ is a typical potential antecedent governor for β , and γ c-commands β and does not c-command α .

- (41) a. γ is a typical potential antecedent governor for β , β 'an X^0 ' in an A-chain
 = γ is an A- X^0 c-commanding β .
 b. γ is a typical potential antecedent governor for β , β 'an X^0 ' in an A'-chain
 = γ is an A'- X^0 c-commanding β .
 c. γ is a typical potential antecedent governor for β , β 'an XP' in an A-chain
 = γ is an A-XP c-commanding β .
 d. γ is a typical potential antecedent governor for β , β 'an XP' in an A'-chain
 = γ is an A'-XP c-commanding β .

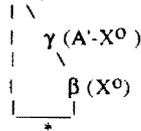
(40) and (41) basically differ from Rizzi (1990), in that not only SPECs but heads are sensitive to the distinction of A- or A'-position, as in (41a,b), such that an intervening head in an A-position functions as a relativized minimality barrier for an A-chain headed by an A- X^0 category (cf. (42a)), while an intervening head in an A'-position does so for an A'-chain headed by an A'- X^0 category (cf. (42b)). Since the non-phrasal reflexive has been assumed to be bound by an XP antecedent under the SPEC-head relation, (40) and (41) apply not only to the XP-to-XP (cf. (42c,d)), but to the X^0 -to- X^0 or X^0 -to-XP relation (cf. (42a,b)).

(42) non-phrasal refl.

a. α (A- X^0 or XP)

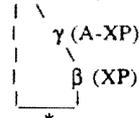


b. α (A'- X^0 or XP)

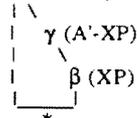


phrasal refl/reciprocal

c. α (A-XP)



d. α (A'-XP)



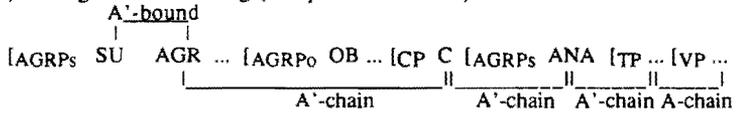
Now, I turn to the property of anaphors summed up in (23c), repeated here.

(23) c. long- and longest-distance binding do not exhibit object-orientation.

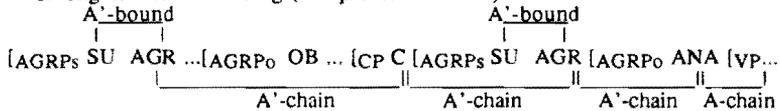
Let's consider the non-phrasal reflexive. As for long-distance binding, the embedded subject anaphor first undergoes XP-movement from SPEC-VP to SPEC-AGRs via SPEC-TP for L-feature checking, which forms an A'-chain, in that SPEC-AGRs is defined as an A'-position. Now, the non-phrasal reflexive undergoes X^0 -movement in favor of checking B-features under the SPEC-head relation. This movement may take place either to AGRs or AGRO of the matrix clause. Movement to the matrix AGRO is, however, canceled, simply because of Improper Movement Constraint (IMC) which prevents movement from A'- to A-position. That is, given that AGRO is defined as an A-position, the non-phrasal reflexive cannot move to AGRO, but to AGRs, via C which is the only relativized

minimality barrier for the A'-chain, as described in (43a). As for longest-distance binding, when the anaphor appears in the embedded object position, for example, the non-phrasal reflexive undergoes XP-movement to SPEC-AGR_o from SPEC-VP for L-feature checking, forming an A-chain. And it further undergoes X^o-movement to AGRs of the embedded clause for checking B-features, forming an A'-chain. Once it goes to AGRs, it cannot land in AGR_o by IMC. So, the next available landing site is the matrix AGRs, via C, for the same reason mentioned above, which is illustrated in (43b).

(43) a. long-distance binding (non-phrasal reflexive)



b. longest-distance binding (non-phrasal reflexive)



Let's consider now the phrasal reflexive and reciprocal. To begin with, I propose that they, as an XP projection, do not move.

(44) the phrasal reflexive and the reciprocal do not move.

As for long-distance binding, they first move to SPEC-AGRs for checking L-features, via SPEC-TP, forming an A'-chain. From here, it appears that they can be either A'-bound by the matrix subject or A-bound by the matrix object. In order to block object-orientation, however, it is required to constrain binding phenomena in such a way that A-binding relation applies only to anaphors in an A-position. For this, I further suggest Improper Binding Constraint (IBC) which blocks A-binding relation if an anaphor has undergone A'-binding, as in (45).

(45) Improper Binding Constraint (IBC)

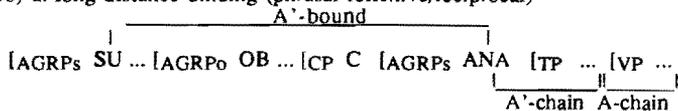
No A-binding relation is allowed after A'-binding relation in a chain.

(45) subsumes IMC, in the sense that IBC applies not only to the case where a movement is involved, i.e. the relation between the non-phrasal reflexive and its trace, but to the case where no movement is involved, i.e. the relation between the phrasal reflexive/reciprocal and its antecedent.

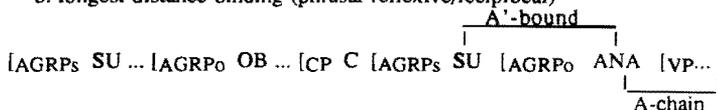
(45) thus prevents a coreference relation between an anaphor which is an A'-position or is A'-bound by the subject, and the object in a higher clause. The matrix subject remains as a possible antecedent, such that it can A'-bind the phrasal reflexive/reciprocal, which is shown in (46a). In this case, the matrix object does not function as a relativized minimality barrier, since it is in an A-position. The phrasal reflexive/reciprocal does not exhibit longest-distance binding, in that it cannot be either A'-bound by the matrix subject, or A-bound by the matrix object, as in (46b). This phenomenon is accounted for in such a way that the embedded subject blocks A'-binding relation, and the embedded object, if there is, prevents A-

binding relation. Even in case where the phrasal reflexive/reciprocal appears in the embedded object position, the matrix object can be excluded as a possible antecedent by means of (45), in the sense that an anaphor cannot be A-bound once it has been A'-bound

(46) a. long-distance binding (phrasal reflexive/reciprocal)

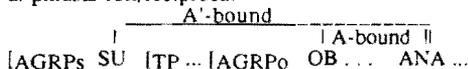


b. longest-distance binding (phrasal reflexive/reciprocal)

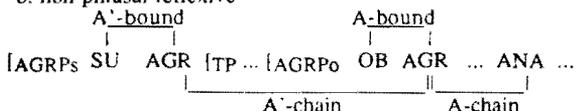


As for short-distance binding, the phrasal reflexive/reciprocal is either A-bound by the object, or A'-bound by the subject. The object does not function as a relativized minimality barrier for the A'-binding relation, as in (47a).

(47) a. phrasal refl/reciprocal



b. non-phrasal reflexive



The non-phrasal reflexive in a complement PP moves in favor of checking B-features to AGR_O to be A-bound by the object, and subsequently to AGR_S to be A'-bound by the subject, as in (47b).

6. Conclusion

Various binding phenomena have been considered in this paper. The movement analysis of anaphors is now based on the revision of Rizzi's Relativized Minimality in combination of the assumption about bar-levels, i.e. the non-phrasal reflexive is analyzed as an X⁰-level constituent, and thus undergoes X⁰-movement, whereas the phrasal reflexive/reciprocal is considered as an XP projection, and thus does not move. For the lack of object-orientation in long- and longest-distance binding, a new definition of A-/A'-position has been proposed to differentiate the status of subject from that of object, such that Case-checking applies at [T T] and [AGR AGR], and raising of subject to SPEC-AGRs is an instance of A'-movement. The anaphoric relation is ultimately attributed to the antecedent government, and the notion of BD required in Principle A is eliminated.

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Notes

- 1 Notice that Korean does not obey NIC effects.
- 2 See Pica (1987), Cole, et. al (1990) and Hestvik (1992), among others. For other possible analyses, see Huang & Tang(1989), Katada(1990) and Yang (1991).
- 3 This analysis is quite opposite to Huang & Tang (1989), who argue that the non-phrasal reflexive does not have either an R-index or \emptyset -features, and these are only assigned by Binding Theory at S-structure and LF.
- 4 In Johnson (1992)'s system, the object moves to SPEC-VP for Case where it is head governed by the [V- μ] complex.
- 5 The notion of "obligatory" comes from Mahajan (1991), who argues that raising of NP to a Case-marked position is an instance of obligatory short A-scrambling.
- 6 One interesting fact concerning the object position is that SPEC-AGRo is a position where both Case- and feature-checking occur. Under (35), this implies that the SPEC-AGRo is a mixture of A-/A'-position in the sense of Webelhuth (1992).

- (i) a. John-un [casin-uy sensayngnim-i hwulyunghan hakca-silako] mitnunta.
 -top self-gen teacher(hon)-nom eminent scholar-to be(hon)comp believes
 b. John-un [casin-uy sensayngnim-ul hwulyunghan hakca-silako] mitnunta.
 -acc
 'John believes that self's teacher is an eminent scholar.'

If this is so, then the problem raised in the ECM constructions in Korean - that is, as in (ib), the embedded subject *casin-uy sensayngnim* 'self's teacher gets accusative Case, even though there exists an overt complementizer in the embedded clause, and the honorification still holds between the embedded subject and embedded verb, such that the embedded subject must skip over SPEC-CP in favor of A-chain, - is accounted for in such away that the embedded subject successive cyclically moves to SPEC-TP (A-chain), -AGRPs, -CP, (A'-chain), and -AGRPO (A-/A'-chain).

7 In some sense, it is desirable to classify A'-positions into operator A'-positions and non-operator A'-positions (cf. Saito (1989) and Webelhuth (1992)) and to restrict (40) to the case where anaphors are bound by phrases in a non-operator A'-position. See Park (in preparation) for the details of this, and for the interaction of binding effects and Scrambling with respect to (40).

References

- Aoun, J. et al (1987) "Two types of Locality," LI 18. 537-577
 Baker, M. (1987) *Incorporation*. Univ. of Chicago Press

- Baker, M. & K. Hale (1990) "Relativized Minimality and Pronoun Incorporation," LI 21. 289-297
- Benmamoun, A. (1992) "Notes on Agreement in Arabic," ms. UW-Madison
- Bobaljik, J. & A. Carnie (1992) "A Minimalist Approach to Some Problems of Irish Word Order," in Proceedings of 12th Harvard Celtic Colloquium
- Cho, U. (1991) "Notes on Parameterization of INFL," *Une* 16.1 133-139 LSK
- Chomsky, N. (1986) *Knowledge of Language: Its Nature, Origin, and Use* Praeger
- (1991) "Some notes of Economy of derivation and representation,"
- (1992) *Minimalist Program for Linguistic Theory*," MITOPL 1
- Cole, P. et al (1990) "Principles and Parameters of long-distance reflexive," LI 21
- Contreras, H. (1990) "Two types of Minimality," LI 21. 467-470
- Fiengo, R. (1980) "Surface Structure," Harvard Univ. Press, Cambridge, Mass.
- Heim, I., Lasnik H., & R. May (1991) "Reciprocity and Plurality," LI 22. 63-101
- Hestvik, A. (1992) "LF Movement of Pronouns and anti-Subject Orientation," LI 23, 557-594
- Higginbotham, J. (1985) "On Semantics" LI 16. 547-593
- Huang, J. (1990) "Reconstruction and the Structure of VP," ms. Cornell Univ.
- Iatridou, S. (1986) "An Anaphor Not Bound in Its Governing Category," LI 17. 766-772
- Johnson, K. (1992) "Object Positions," NL< 10.1
- Jonas, D. (1992) "Nominative Case in Icelandic," ms. Harvard University.
- Katada, F. (1991) "The LF Representation of Anaphors," LI 22. 287-313
- Lebeaux, D. (1983) "A Distributional Difference between Reciprocals and Reflexives," LI 14. 723-730
- Mahajan, A. (1991) *The A/A-Distinction and Movement Theory* Ph.D. diss MIT
- Manzini, R. (1992) *Locality* LI monograph 19 MIT
- Park, S. (1992) "Obj. Position, LF-Binding, and Specificity in Korean," CLS 28 (in preparation) "A-bar-bound Anaphors and Scrambling," ms. UW-Madison
- Pica, P. (1987) "On the Nature of the Reflexivization Cycle," NELS 17
- Pollock, J-Y. (1989) "Verb Movement, UG and Structure of IP," LI 20, 365-424
- Rizzi, L. (1990) *Relativized Minimality* LI monograph 16 MIT
- Roberts, I. (1991) "Excorporation and Minimality," LI 22. 209-218
- Saito, M. (1989) "Scrambling as Semantically Vacuous A'-Movement," *Alternative Conceptions of Phrase Structure* (Baltin, M. eds.) Univ. of Chicago Press
- Webelhuth, G. (1992) *Principles and Parameters of Syntactic Saturation* Oxford
- Wilt, K. (1985) "Long Distance Anaphor in Dutch and Icelandic" LA 15.
- Yang, D. (1991) "Korean Anaphora and Universal Grammar," ms SNU

LOCATIVE INVERSION AND RELATED PHENOMENA*

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Introduction

This paper examines the phenomenon known as Locative Inversion, focusing on its syntactic and communicative characteristics and then comparing it to several other similar phenomena.

In the clause which undergoes Locative Inversion, the locative phrase assumes the surface linear position of the subject and the subject moves to a different linear position. In the following examples from Kirundi, Bantu, Locative Inversion relates a non-inverted clause in (1a) to the inverted one in (1b):¹

- K** (1) a. aba-shyitsi ba-ra-rirĩmbir-a mu gisagára
 CL2-guest CL2-PRES-sing-IMPF in village
 'The guests are singing in the village.'
 b. mu gisagára ha-ra-rirĩmbir-a aba-shyitsi
 in village(CL7) CL16-PRES-sing-IMPF CL2-guest
 'In the village there are guests singing.'

Locative Inversion has been attested in several Bantu languages, such as Chichewa (Bresnan and Kanerva 1989) and Shona (Perez 1983; Hartford 1988). According to my observations, it also occurs in Kinyarwanda and Kirundi. All these languages have the surface linear order subject-verb(-object). If a non-inverted locative is added to the clause, it follows the verb, as in (1a) or follows the object(s), as in the following Kirundi example:

- K** (2) umwaalimu yi-ø-gĩshiriz-a abána n'ibitabo m'iishũuri
 teacher CL1-PRES-teach-IMPF children with books in school
 'The teacher teaches children with the help of books at school.'

Under Locative Inversion, the locative phrase is preposed to the verb, just like the subject, and the initial subject follows the verb (1b).

The primary goal of this paper is to formulate a single syntactic rule describing Locative Inversion. The other major goal of this paper is to examine the effect of Locative Inversion on the communicative structure of the clause. This paper will also present a classification of Locative Inversion types based on a cross-linguistic comparison. Finally, Locative Inversion will be compared to several other phenomena which are syntactically or communicatively similar to it.

The syntactic and communicative analysis presented in this paper is carried out within the framework of functional syntax. This analysis views the clause as a linguistic sign having three distinct levels of representation, namely: the level representing the meaning of the clause (thematic roles and verbal semantics) and two distinct levels representing the form of the clause (the level of grammatical relations and the level of communicative functions). For each given clause, thematic roles remain unchanged in the analysis. However, these roles can be

mapped differently onto the grammatical relations and onto communicative functions.

To make the formal representation more explicit, the analysis assumes the distinction between initial and final grammatical relations, as in Relational Grammar. The argument whether the initial-final distinction is plausible from the viewpoint of actual speech production and processing is beyond the scope of this paper. However, this distinction is certainly relevant in an analysis of language material.

At the level of grammatical relations, the relevant distinction is between terms (which include subject, direct object, indirect object, and oblique object) and non-terms or adjuncts. Note that oblique object is considered a term, not an adjunct. This means that a language can have distinct object relations including direct, indirect, and oblique, and the latter would be different from such non-terms as, for instance, a passive agent.

For the purposes of the communicative analysis, it is sufficient to distinguish between topic and focus as the major functions representing the communicative structure of the clause. These functions, for the lack of an adequate definition, are assumed to be communicative primitives. Another important element of the communicative structure is the feature [\pm contrastive]. It can interact with both topic and focus. Contrastiveness implies that the given entity is selected out of a class of relevant similar entities and is opposed to the rest of the class in some respect.

The analysis below is based primarily on the data from Kinyarwanda and Kirundi. These two languages are very similar; unless there is some special need or a discrepancy, each point will be illustrated by data from one of these two languages.

The syntax of Locative Inversion

With respect to Locative Inversion, two separate problems arise, namely: first, what is the grammatical relation borne by the inverted locative, and second, what is the grammatical relation borne by the initial subject? To decide which grammatical relations are obtained in the Locative Inversion clause, we have to elicit the syntactic properties that characterize subject and object. Based on these properties, it will be possible to identify the grammatical relations borne by the NPs in the Locative Inversion clause.

1. Subject and object properties.

1.1. **Subject properties.** For Kinyarwanda and Kirundi, the relevant subject properties include:

1) Verbal agreement. In example (1a), repeated below, the verb agrees with the subject in grammatical class, which is signalled by the class prefix on the verb:

K (1) a. aba-shyitsi ha-ra-ririĩmbir-a mu gisagára
 CL2-guest CL2-PRES-sing-IMPF in village
 'The guests are singing in the village.'

2) Immediate preverbal position. Because of the strict SVO linear order, only subjects and temporal or locational expressions can precede the verb. Of these, only the subject can immediately precede the verb.

3) Selection of the word 'only' (ONLY-Selection). Kirundi and Kinyarwanda

have two different words denoting 'only', namely, *-nyiné*, which changes for class, and *gusa* whose form is fixed.² The word *-nyiné* occurs only with subjects and topics (see also footnote 8), while *gusa* occurs with all clause constituents other than the subject. Compare in Kinyarwanda:

KR (3) Subject-selected ONLY

- a. umugaanga wée-nyine y-a-vuu-ye umwáana
 doctor(CL1) CL1-only CL1-PAST-treat-PERF child
 'Only the doctor treated the child.'
- b. *umugaanga gusa y-a-vuu-ye umwáana
 doctor only CL1-PAST-treat-PERF child
 'Only the doctor treated the child.'

KR (4) Nonsubject-selected ONLY

- a. umugaanga y-a-vuu-ye umwáana gusa
 doctor CL1-PAST-treat-PERF child only
 'The doctor treated only the child.'
- b. *umugaanga y-a-vuu-ye umwáana wée-nyine
 doctor CL1-PAST-treat-PERF child CL1-only
 'The doctor treated only the child.'

4) Control of the null copy across clause. The subject can control the null copy in the adjoined clause, as illustrated by (5a):

- KR** (5) a. umugóre_i y-a-bon-ye inka_j ø_i
 woman(CL1) CL1-PAST-see-PERF cow(CL9) ø_i
 a-r-ishiim-a
 CL1-PRES-be happy-IMPF
 'The woman found the cow and was happy.'

Control of the null copy across clause characterizes both the subject and direct object (Polinsky and Kozinsky 1992). Where the nominals are already distinguished by the grammatical class, the controller of the null copy is unambiguously recovered by the class prefix on the conjoined verb: compare (5a), where "woman" is class 1 nominal; "cow" is class 9 nominal, and the verb "to be happy" is marked for class 1. That both the subject and the direct object are potential controllers of the null copy becomes clear when they belong to one and the same class, as in (5b), which is ambiguous:

- KR** (5) b. umugóre_i y-a-bon-ye umugabo_j ø_{i,j}
 woman CL1-PAST-see-PERF man(CL1) ø_{i,j}
 a-r-ishiim-a
 CL1-PRES-be happy-IMPF
 'The woman found the man and she/he was happy.'

5) Control of Equi-NP-Deletion in the purpose clause. The subject NP triggers Equi into the embedded infinitival clause. Compare in Kinyarwanda:

- KR** (6) a. uyu mugóre ya-ø-j-ye Ø ku-reba umwáana
 this woman CL1-PAST-come-PERF to-see child
 'This woman came to see the child.'

- b. uyu mugóre ya-ø-j-ye Ø ku-ku-vugúfisha
 this woman CL1-PAST-come-PERF to-2SG-talk
 'This woman came to talk to you.'

1.2. **Object properties.** In general, terms in Kinyarwanda and Kirundi appear without prepositional marking (as bare nominals), which seems to distinguish them from non-terms.³ A striking fact about Kinyarwanda and Kirundi objects is that both languages can have a number of objects with similar syntactic properties within one clause. As concerns Kinyarwanda, the types of objects and the number which can occur per clause have been much debated in the literature, with some approaches claiming that this language allows the doubling of grammatical relations (Gary and Keenan 1977; Kimenyi 1980). It has been shown that Kinyarwanda distinguishes between direct, indirect, and oblique objects (Dryer 1983; Polinsky and Kozinsky 1992; Polinsky 1993a, b; Gerds and Whaley 1992).

In the examples above, it was shown that the direct object is characterized by the control of the null copy across clause (5b). This is an exclusive direct object property, distinguishing the direct object from the indirect. An example of an indirect object is "the child" in (7a):

- KR (7) a. umugóre ya-som-é-ye umwáana igitabo
 woman 3SG-read-APP-PERF child book
 Subject Indirect Object Direct Object
 'The woman read the child a book.'

Direct and indirect objects share the following properties:

1) Accessibility to direct Relativization (without copying). Compare the indirect object of (7a) which is relativized without a copy in the relative clause or on the verb of that clause:

- KR (7) b. umwáana umugóre yaa-som-é-ye igitabo
 child woman 3SG.REL-read-APP-PERF book
 'the child to whom the woman read a book'

We will see below (examples under (18)) that non-terms have to be copied to relativize.

2) Accessibility to passivization. Compare (7a) and (8), where the indirect object becomes the subject of the passive:

- KR (8) umwáana ya-som-é-w-e igitabo n'úmugóre
 child 3SG-read-APP-PASS-PERF book by woman
 'The child was read a book to by the woman.'

3) Control of the incorporated pronoun in the verb (for details see Kimenyi 1980; Dryer 1983; Polinsky and Kozinsky 1992). Compare (7a) with (9), where both direct and indirect object occurred previously as discourse antecedents and control the incorporated pronouns in the verb (the sentence in (9) is a possible continuation of "As for the child, you probably know this book..."):

2. The grammatical relation borne by the inverted subject.

2.1. Evidence that the inverted subject is a non-term. In clauses that undergo Locative Inversion, the initial subject has no subject properties. Most conspicuously, it no longer determines verbal agreement. Compare (1b), where the inverted subject belongs to class 2 and the verb has class 16 agreement marker:

- K (1) b. *mu gisagára ha-ra-rirímbir-a aba-shyitsi*
 in village(CL7) CL16-PRES-sing-IMPF CL2-guest
 'In the village there are guests singing.'

The inverted subject cannot occur with the subject word for *only*. Compare:

- K (12) **mu gisagára ha-ra-rirímbir-a aba-shyitsi bóo-nyine*
 in village(CL7) CL16-PRES-sing-IMPF CL2-guest CL2-only
 'In the village there are only guests singing.'⁶

The inverted subject cannot control coreference across clause, regardless of the class prefix on the conjoined verb and regardless of the word order. Compare:

- K (13) a. **mu gisagára ha-ra-rirímbir-a aba-shyitsi_i*
 in village(CL7) CL16-PRES-sing-IMPF CL2-guest
ø_i ba-ra-na-sakuz-a
ø_i CL2-PRES-and-cry-IMPF
 b. **mu gisagára ha-ra-rirímbir-a aba-shyitsi_i*
 in village(CL7) CL16-PRES-sing-IMPF CL2-guest
ø_i ha-ra-na-sakuz-a
ø_i CL16-PRES-and-cry-IMPF
 c. **mu gisagára ha-ra-rirímbir-a ha-ra-sakuz-a aba-shyitsi*
 in village CL16-PRES-sing-IMPF CL16-PRES-cry-IMPF CL2-guest
 'In the village there are guests singing and crying.'

Next, the inverted subject no longer triggers Equi-NP-Deletion into the purpose clause:

- K (14) **mu gisagára ha-ø-j-ye abashyitsi Ø ku-rirímbira*
 in village CL16-PAST-come-PERF guests to-sing
 'To the village, there came guests to sing.'

Thus, the inverted initial subject is not a final subject.

The next question is whether the inverted subject assumes any of the object grammatical relations. The answer to this question is also negative, as the inverted subject has no object properties. In particular, it does not meet the minimal criterion of relativization, as shown by (15a, b):

- K (15) a. **aba-shyitsi mu gisagára ha-ra-rirímbir-a*
 CL2-guest in village CL16-PRES-sing-IMPF
 'the guests that in the village are singing'

One could argue that (14a) is ill-formed because the head is separated from the

relative clause by the locative phrase. However, as (14b) indicates, relativization of the inverted subject remains ungrammatical even after the locative phrase is postposed to the verb:

- K (15) b. *aba-shyitsi ha-ra-rirĩmbir-a mu gisagára
 CL2-guest CL16-PRES-sing-IMPF in village
 'the guests that are singing in the village'

Thus, the inverted initial subject has no object properties; it is a non-term. This conclusion has bearing not only on the grammar of Locative Inversion but also on the internal grammar of Kinyarwanda and Kirundi because it shows, first, that not all bare nominals are terms, and second, that not every demotion is signalled by prepositional marking.

2.2. **Morphological fusion?** There is also evidence of morphological fusion between the verb and the inverted initial subject. The verb and this postposed noun cannot be separated by other lexical material; thus, (16) is ungrammatical:

- K (16) *mu gisagára ha-ra-rirĩmbir-a nóone aba-shyitsi
 in village(CL7) CL16-PRES-sing-IMPF today CL2-guest
 'In the village there are guests singing today.'

Further, the verb and the postposed noun form a single tonal phrase, which is evident because the tones on the entire group are determined by phrase-internal tonal rules, namely: tone spread, tone falling, tone rising, and tone alternation (compare Kimenyi 1979:78-81, 83-85).⁷ These rules are obligatory in the sequence "verb - inverted subject"; meanwhile, they can be optional in the sequence "verb - object" or "verb - non-term" (for instance, the verb and the following locative phrase, as in (1a), or the verb and the passive agent). This suggests that the verb and the postposed subject indeed form some kind of a morphological whole. If this supposition is correct, then the inverted initial subject differs from other non-terms in its morphological behavior.

3. **The grammatical relation borne by the inverted locative.** The next problem that arises with regard to Locative Inversion concerns the grammatical relation borne by the inverted locative.

In a construction such as (1b), the inverted locative does not acquire any subject or object properties. Apparently, it does not determine verbal agreement: the verb in Locative Inversion construction is invariably marked for class 16. This class marker, *-ha-*, has a generalized meaning of location. With nouns, it appears on *a-ha-antu* 'place' and on a number of lexicalized expressions all of which also denote location (*ha-asi* 'on the ground'; *ha-anzé* 'outside', etc.). It also appears, in a slightly different phonetic shape, on the word 'only' which was discussed above - *gusa*. Next, the inverted locative does not select the subject word for 'only', as shown by the next example from Kinyarwanda:

- KR (17) *ejo mu muryaango waa-njyé wó-nyĩne
 yesterday in extended family(CL3) CL3-POSS CL3-only
 ha-ø-vúuts-e umukoóbwa
 CL16-PAST-be born-PERF girl
 'Yesterday only in our family a girl was born.'⁸

The inverted locative also does not have object properties: it cannot passivize, control the incorporated pronoun in the verb, or relativize. As was shown above, accessibility to relativization is the minimal property that objects have; thus, the absence of this property is strong evidence of the non-term status. That the inverted locative is inaccessible to relativization is shown by the following examples from Kinyarwanda. These examples remain ungrammatical regardless of the word order:

- KR (18) a.** *muri wáa muryaango haa-vúuts-e umukoóbwa
 in that extended family CL16.REL-be born-PERF girl
 b. *muri wáa muryaango umukoóbwa haa-vúuts-e
 in that extended family girl CL16.REL-be born-PERF
 'in that family in which a girl was born'

The only way to relativize the locative phrase is by copying it into the verb of the relative clause, as shown in the next example:

- (18) c. muri wáa muryaango haa-vúuts-e--mo umukoóbwa
 in that extended family CL16.REL-be born-PERF-LOC girl
 'in that family in which a girl was born'

Thus, the inverted locative remains a non-term. As both the initial subject and the inverted locative are non-terms, the Locative Inversion clause should be interpreted as impersonal. It is, therefore, a clause with the null expletive subject.

4. **Locative Inversion across languages.** Another Bantu language that also has the expletive locative construction is Shona (Perez 1983).⁹ In the Bantu language Chichewa, according to Bresnan and Kanerva (1989), the Locative Inversion clause is personal, as the locative phrase becomes the subject of this clause. With regard to the inverted initial subject, Bresnan and Kanerva demonstrate that it loses the subject properties. They also present the following evidence that the inverted subject is an object: word order, at the clause level and at the VP level, and phrasal phonology. However, the evidence for the objecthood of the inverted subject is rather weak: in particular, evidence rendered by phrasal phonology and clausal word order is essentially similar to the evidence of morphological fusion presented above (subsection 2.2). This means that, at least, an alternative interpretation is possible which is dependent on morphological fusion rather than the grammatical relation borne by the inverted subject.¹⁰

With the exception of the problematic Chichewa case, it can be concluded that Locative Inversion involves the demotion of the initial subject to a non-term. Whether the subject position is then filled by the expletive subject or by the advanced locative is a secondary question. Accordingly, if the expletive is used, the construction is impersonal; if the locative advances to the subject position, the construction remains personal. In the Bantu languages discussed here, personal and impersonal Locative Inversion constructions are distributed as follows:

<u>language</u>	<u>Locative Inversion construction</u>	
	<u>personal</u>	<u>impersonal</u>
Chichewa	yes	no
Shona	no(?)	yes
Kirundi	no	yes
Kinyarwanda	no	yes

5. Locative Inversion and transitivity. The next question in the syntactic analysis concerns verb types that allow Locative Inversion. Locative Inversion is impossible in a transitive clause. Compare in Kirundi:

- K** (19) a. umugóre ya-guz-e ibi-intu by-finshi kw'iisôko
 woman 3SG-buy-PERF CL8-thing CL8-many in market
 'The woman bought a lot of things at the market.'
 b. *kw'iisôko ha-guz-e umugóre ibi-intu by-finshi
 in market CL16-buy-PERF woman CL8-thing CL8-many
 'At the market, the woman bought a lot of things.'

If we now turn to non-transitive verbs, a distinction can be drawn between genuine intransitive verbs and detransitivized verbs. With respect to genuine intransitive verbs, Bresnan and Kanerva (1989: 15-20) suggest for Chichewa that the inversion occurs only in unaccusative clauses. Specifically, they indicate that inversion does not occur in clauses with such presumably unergative verbs as 'sing' or 'urinate'. Kinyarwanda and Kirundi definitely allow Locative Inversion in clauses with unergative verbs; compare (1b), where the verb is 'sing', and the following examples from Kirundi (20) and Kinyarwanda (21):

- K** (20) a. umwálimu a-ø-vugir-a kw'iishuûri
 teacher CL1-PRES-speak-IMPF in school
 'The teacher speaks at school.'
 b. kw'iishuûri ha-ø-vugir-a umwálimu
 in school CL16-PRES-speak-IMPF teacher
 'At school there speaks a teacher.'
- KR** (21) a. ihéné ya-ø-gaanz-e mu iriba
 goat CL9-PAST-urinate-PERF in well
 'The goat urinated into the well.'
 b. mu iriba ha-ø-gaanz-e ihéne
 in well CL16-PAST-urinate-PERF goat
 'Into the well, there urinated a goat.'

There are no syntactic correlates of unaccusativity and unergativity in Kinyarwanda and Kirundi: based on the semantics, the conclusion that Locative Inversion is only possible with unaccusatives seems unwarranted.

With respect to detransitivization, verbs can be detransitivized either through passivization or through antipassivization. Locative Inversion with passive verbs is very common in both Kirundi and Kinyarwanda. Thus, while (19b) above is ungrammatical, (22) is well-formed:

- K** (22) kw'iisôko ha-ø-guz-w-e ibi-intu by-finshi n'umugóre
 in market CL16-PAST-buy-PASS-PERF CL8-thing CL8-many by woman
 'At the market, there were a lot of things bought by the woman.'

Kinyarwanda and Kirundi also have a mechanism of detransitivizing active verbs: the verb in this case must be marked with the applicative suffix *-ir-*, as shown in (23b) and (24b), and cannot take an object. Not all transitive verbs undergo such detransitivization and the lexical scope varies across speakers.¹¹ Exactly such verbs, which are morphologically marked as detransitivized, allow

frequency of occurrence.

2. **Discourse role of Locative Inversion.** The discourse role of the Locative Inversion construction has been described as presentational or presentative (Hetzron 1971; 1975). The presentative construction serves to introduce a new entity in the discourse: in this particular case, it is the referent of the inverted subject that is introduced or presented.¹⁶ Thus, the inverted subject often has the presentative function in discourse.

This discourse function is also related to the communicative and grammatical status of the inverted subject. As shown in the previous subsection, the inverted subject is focused. The focused element is regularly identified with the new information (Chafe 1976), and the new information, by virtue of being new, is naturally introduced into discourse. Thus, a correlation between the low grammatical relation and the new information status is warranted. This correlation is invariably characteristic of existential constructions, cf. a standard beginning of fairy tales (*Once upon a time, there was/lived an X...*).

A more interesting question concerns the relationship between the grammatical relation borne by the inverted subject and its presentative function. It is not incidental that the presentative function is borne by a nominal occupying a low position in the hierarchy of grammatical relations (27). Indeed, new referents tend to be introduced into discourse encoded as lower grammatical relations (see Chafe 1976; Givón 1979: 22; Polinsky and Nedjalkov 1987: 260). Conversely, of several clausemates, the one bearing a lower grammatical relation is more likely to introduce the new entity into discourse. It is important to note that this correlation between the presentative function and lower grammatical relations is relative, rather than absolute: of the several grammatical relations available in a given clause, the one that is lower corresponds to a new referent. Thus, if a clause contains a subject and a direct object, the direct object, rather than the subject, will serve to introduce the new referent. If a clause contains a subject, a direct object, and an oblique object, the latter becomes a better candidate for introducing a new referent.

To summarize, the correlation between the lower grammatical relation and the presentative function is the mirror image of the well-known correlation between higher grammatical relations and topicality, specifically, between subject and topic. Subject and/or topic also tends to correspond to the given information; the correlation between focus, lower grammatical relations, and the new information, of which new referent is just a particular case, is simply the reverse of the former.

In addition to maintaining the standard correlation between the low grammatical relation, the focus function, and the presentative function, Kinyarwanda and Kirundi have a more language specific requirement that the referent of the inverted subject be pragmatically salient. That pragmatic salience is a factor is clear from the following comparison. The Kinyarwanda sentence in (30a), though perfectly grammatical, is assessed as strange: indeed, every house has a bed, so there is no point in stating that; by comparison, (30b) is justified as it brings in some quantitative information. Further, given the cultural setting, (30c) is worth talking about: a telephone is a rare thing.

- KR (30) a. ??muri iyi inzu ha-ø-ri uburiri
 in this house CL16-PRES-be bed(CL14)
 'There is a bed in this house.'
- b. muri iyi inzu ha-ø-ri uburiri bu-biri
 in this house CL16-PRES-be bed(CL14) CL14-two

- 'There are two beds in this house.'
 c. *muri iyi inzu ha-ø-ri itéléfoni*
 in this house CL16-PRES-be telephone(CL5)
 'There is a telephone in this house.'

Similarly, (31a) is pragmatically odd because children get born in every village; meanwhile, (31b) is something unusual and worth mentioning:

- K** (31) a. *??muri iki gisagara ha-ø-vuuki-ye umwána*
 in this village CL16-PAST-be born-PERF child
 'In this village, there was born a child.'
 b. *muri iki gisagara ha-ø-vuuki-ye umwána w'umunyaamerika*
 in this village CL16-PAST-be born-PERF child of American(CL1)
 'In this village, there was born an American child.'

To conclude, the communicative structure of the Locative Inversion construction consists in focusing the inverted subject and topicalizing the inverted locative. The focusing of the inverted subject correlates with the lower grammatical relation borne by this nominal. This in turn is consistent with the presentative function of this nominal in discourse.

Related constructions

1. **Subject Inversion.** Locative Inversion involves demotion and dislocation of the initial subject and, at least, the fronting of the locative phrase. As was argued above, the latter is not the necessary and determining part of the relevant syntactic rule. Indeed, Kirundi and Kinyarwanda have another construction where the initial subject becomes a non-term and fuses with the verb; unlike Locative Inversion, this construction does not involve the locative. Pairs of non-inverted and inverted clauses are given in (32) and (33). In (32), there is no locative phrase altogether, in (33) the locative phrase remains *in situ*.

- KR** (32) a. Non-inverted clause
inshuti z-aanjye zi-r-iimk-a
 friends(CL10) CL10-my CL10-PRES-run-IMPF
 'My friends are running.'
 b. Inverted clause
ha-r-iiruk-a inshuti zaanjye
 2CL16-PRES-run-IMPF friends my
 'My friends are running.' ('There is running by my friends.')
- KR** (33) a. Non-inverted clause
ejó umukoóbwa ya-ø-vúuts-e mu muryaango waanjye
 yesterday girl CL1-PAST-be born-PERF in extended family POSS
 'Yesterday a girl was born in our family.'
 b. Inverted clause with *in situ* Locative
ejó ha-ø-vúuts-e umukoóbwa mu muryaango waanjye
 yesterday CL16-PAST-be born-PERF girl in extended family POSS
 'Yesterday there was a girl born in our family.'

The construction in (32b) and (33b) has the initial subject demoted to a non-term:

it can be demonstrated that "my friends" and "a girl" have no subject properties in the (b) clauses. However, no other element is fronted in this construction. This type construction will be called Subject Inversion. Just as in the case of Locative Inversion, this construction requires that the initial subject be demoted to a non-term and the final clause be intransitive. Another similarity with Locative Inversion is the communicative structure where the verb and the inverted subject are focused. Thus, (32b) is the answer to a possible question "Why all this noise?"

It appears that Locative Inversion is a particular subtype of a larger phenomenon of Subject Inversion. Both can be adequately described by a single syntactic rule that the initial subject becomes final non-term and the clause not have a final Direct Object. That the Subject Inversion is a broader phenomenon is clear from the fact that it applies in more cases, not just those of locative expressions.

The phenomenon of Subject Inversion puts Locative Inversion itself into a larger perspective. In fact, Locative Inversion would be more adequately described as a particular case of Subject Inversion involving Locative Fronting. In the impersonal construction, the locative phrase is simply fronted and does not assume a different grammatical relation. In the personal construction, as in Chichewa, the fronted locative advances to subject.

2. **Locative Advancement.** Another construction that occurs in both Kirundi and Kinyarwanda and specifically involves locatives is syntactically different from Subject Inversion. This construction involves Locative Advancement. Under Locative Advancement, the initial non-term locative becomes an object and the initial subject remains the final subject, as shown in (34). This type of Locative Advancement in Kinyarwanda was described by Kimenyi (1980), Dryer (1983), Gerds and Whaley (1992); I refer to it as dialect 1 rule.

(34) Locative Advancement: Kinyarwanda dialect 1

initial subject	LOC
final subject	Direct Object

An example of Locative Advancement is given in (35b); the initial clause (35a) is transitive:

- (35) a. umwáalímu y-ø-oohere-je igitabo kw'iishûri
 teacher CL1-PAST-send-PERF book to school
 'The teacher sent the book to school.'
- b. umwáalímu y-ø-oohere-jé-ho iishûri igitabo
 teacher CL1-PAST-send-PERF-LOC.ADV school book
 'The teacher sent the book to school.' (Dryer 1983: 134)

Kirundi speakers and all the Kinyarwanda speakers I surveyed insist that Locative Advancement is only possible if the advanced locative becomes primary topic and is fronted. Compare (35b), which is ungrammatical for such speakers, and (36), which is well-formed:

- KR (36) ishûri umwáalímu y-ø-oohere-jé-ho igitabo
 school teacher CL1-PAST-send-PERF-LOC.ADV book
 'To school, the teacher sent a book.'

would arise. However, the selection of *gusa* by the inverted locative results in a communicative conflict between the topic function of the locative and the typically focusing function of *gusa*.

According to Harford (1988), Shona has personal Locative Inversion clauses. My own preliminary work on Shona has so far revealed only impersonal clauses.

¹⁰The non-term status of the inverted subject poses a problem to the framework of Lexical Functional Grammar, used by Bresnan and Kanerva; in this framework, the inverted theme has to be either subject or object.

¹¹It also seems that in Kirundi, such detransitivization occasionally occurs without *-ir-* marking. No such cases have been attested in Kinyarwanda.

¹²That the inverted clause is more restricted in its discourse role is also confirmed by the fact that speakers insist on a special prior or subsequent context within which such clauses should appear and tend to find them awkward when they appear isolated.

¹³Note that structure 3 in (25c) requires emphatic intonation.

¹⁴The hierarchy is modified in comparison to the earlier hierarchies of accessibility (e.g. Keenan and Comrie 1977); the reasons for this modification are presented in Kozinsky and Polinsky 1993; Polinsky 1993a.

¹⁵This example also involves contrastive focus ("teacher" - "whoever wants to teach"). It seems that contrastive topic is always accompanied by contrastive focus, while the opposite is not necessarily true.

¹⁶The same discourse role has been demonstrated for Locative Inversion constructions in Chichewa (Bresnan and Kanerva 1989: 32-34) and Shona (Perez 1983: 144).

References

- Bresnan, Joan, and Jonni M. Kanerva. 1989. Locative Inversion in Chichewa: A case study in factorization in grammar. *Linguistic Inquiry* 20: 1-50.
- Chafe, Wallace. 1976. Givenness, contrastiveness, definiteness, subjects, topics, and point of view. In Charles N. Li (ed.), *Subject and Topic*, 27-55. New York: Academic Press.
- Dryer, Matthew. 1983. Indirect Objects in Kinyarwanda revisited. In David Perlmutter (ed.), *Studies in Relational Grammar 1*, 129-141. Chicago-London: U Chicago Press.
- Gerdts, Donna. 1991. Morphologically-mediated relational profiles. Papers from the 18th Annual Meeting of the Berkeley Linguistic Society.
- Gerdts, Donna, and Lindsay Whaley. 1992. Kinyarwanda Multiple Applicatives and the 2-AEX. Papers from the 28th Regional Meeting of the Chicago Linguistic Society.
- Givón, Talmy (ed.). 1979. *Discourse and syntax*. (Syntax and semantics 12.). New York: Academic Press.
- Harford, C. 1988. Locative Inversion in Chishona. Paper presented at the 19th Annual Conference on African Linguistics.
- Hetzron, Robert. 1971. Presentative function and presentative movement. *Studies in African Linguistics*, suppl. 2: 79-105.
- Hetzron, Robert. 1975. The presentative movement, or why the ideal word order is VSOP. In Charles Li (ed.), *Word order and word order change*, 345-388. Austin: U of Texas Press.
- Keenan, Edward, and Bernard Comrie. 1977. Noun Phrase accessibility and universal grammar. *Linguistic Inquiry* 8: 63-98.
- Kimenyi, Alexandre. 1979. *Studies in Kinyarwanda and Bantu phonology*.

Carbondale-Edmonton: Linguistic Research.

Kimenyi, Alexandre. 1980. *A Relational Grammar of Kinyarwanda*. (UCLA Publications in Linguistics, 91.). Berkeley and Los Angeles: University of California Press.

Kozinsky, Isaac, and Maria Polinsky. 1993. Causee and patient in the causative of transitive. In Bernard Comrie (ed.). *Causatives and transitivity*. Amsterdam: John Benjamins.

Perez, C. 1983. Locative Pseudo-Subjects in Shona. *Journal of African Languages and Linguistics* 5: 131-155.

Polinsky, Maria, and Vladimir Nedjalkov. 1987. Contrasting the absolutive in Chukchee. *Lingua* 71: 239-269.

Polinsky, Maria 1993a. Double objects in causatives: Towards a study of coding conflict. *Studies in Language*.

Polinsky, Maria 1993b. Oblique Objects as terms: Evidence from Bantu. Paper presented at the 1993 Annual Meeting of the LSA, Los Angeles.

Polinsky, Maria, and Isaac Kozinsky. 1992. Ditransitive constructions in Kinyarwanda: coding conflict or syntactic doubling? Papers from the 28th Regional Meeting of the Chicago Linguistic Society.

English AUX[^]NEG, Mainland Scandinavian NEG[^]AUX,
and the Theory of V to I Raising
Bernhard Rohrbacher, U Mass Amherst

I. Introduction

This paper explains why modals and finite have and be precede negation in English, but follow it in Mainland Scandinavian non-V2 contexts. I will first show that there are no synchronic differences between these languages that could account for the word order asymmetry at hand. I then sketch an independently motivated theory of V to I raising in which the morphological marking of person agreement plays a crucial role. Old Mainland Scandinavian and Old and Middle English had general V to I raising on the basis of their regular verb inflections. But modals, which inflected irregularly, exhibited the trigger morphology for V to I raising only in Old Mainland Scandinavian and not in Old or Middle English. In the absence of the trigger morphology, English modals raised past negation to I were reanalyzed as base-generated in I. Middle English finite have and be could no longer be analyzed as stem plus affix. Since syntactic affixation is the *raison d'être* of V to I raising, English finite have and be were also reanalyzed as generated in I. No reanalysis was motivated in Old Mainland Scandinavian, where the trigger morphology was visible on regular verbs, modals and have and be alike. Subsequent morphological impoverishment led to the loss of V to I raising and the birth of the modern word order in both languages, which now leave all verbs in their respective base-position.

II. Main Verbs and Auxiliaries in Embedded Word Order

English, Danish, Swedish, Norwegian and Faroese main verbs must follow negation or sentential adverbs in contexts where Verb Second caused by V to C is excluded. This is illustrated in (1) for embedded clauses that are not the complements of bridge verbs.

- (1) a. I regret that John never mentions his mother.
 b. De tillod at han ofte arbejdede
 they permitted that he often worked
 free-lance.
 free-lance

(Danish)

- c. Jag beklager att jag aldrig träffade henne.
I regret that I never met her
(Swedish)
- d. De er folk som om sommeren ikke tenker
they are people who in Summer-the not think
på vinteren.
of winter-the (Norwegian)
- e. Har vóru nógv fólk, eg ikki kendi.
here were many people I not knew (Faroese)

Mainland Scandinavian and Faroese modals (cf. (2b-e)) and have and be (cf. (3b-e)) also have to follow negation and sentential adverbs. But English modals (cf. (2a)) and finite have and be (cf. 3a)) precede negation and sentential adverbs.

- (2) a. I regret that you could not come to my party.
b. Hun bekræftede at hann ikke kunne have begået
she confirmed that he not could have committed
forbrydelsen.
crime-the (Danish)
- c. Vilken fest sa hon att vi inte skulle köpa
which party said she that we not should buy
roliga hattar till.
funny hats for (Swedish)
- d. Men det vilja me tenkja, at her alltid vil
but that will we believe, that here always will
finnast Folk, som ...
exist people who (Norwegian, 1859)
- e. Eg segði tað, at hann ikki skuldi havt nakað
I said it, that he not should have anything
(Faroese)
- (3) a. I regret that you have not read "Oblomov".
b. Hun bekræftede at hun ikke har læst den bog.
She confirmed that she not has read the book
(Danish)
- c. Jag beklager att Johan inte har köpt boken.
I regret that J. not has bought the-book
(Swedish)
- d. Bukken kom dit den aldri hadde vært
the-buck came (to a place) it never had been
før.
before (Norwegian)

- e. Tað var óvantað, at dreingirnir als ikki
 it was unexpected that boys-the at-all not
vóru ósamdir.
 were disagreed (Faroese)

These examples indicate that Mainland Scandinavian modals and have and be behave like Mainland Scandinavian and English main verbs and surface in situ inside VP. The Danish sentence in (2b) for example has the structure in (4)

- (4) Hun bekræftede [_C at [_{IP} hann_i [_I I [_{VP} ikke [_{VP} t_i
 [_{VP} [_V kunne [_{VP} have begået forbrydelsen]]]]]]]]

English finite auxiliaries on the other hand surface in I, and sentence (2a) has the structure in (5).

- (5) I regret [_C that [_{IP} you_i [_I I could] [_{VP} not [_{VP}
 t_i [_V come to my party]]]]]]

I assume contrary to Chomsky (1989), Kayne (1989) and Pollock (1989) that English modals as well as finite have and be are base generated in I, not base generated in V and raised to I. The raising analysis for sentences (2a, 3a) must be rejected because it cannot explain why Mainland Scandinavian auxiliaries are prohibited to undergo this type of movement.

III. Synchronic Approaches and their Problems

According to a proposal in Pollock (1989), English and Mainland Scandinavian main verbs (that is, verbs that assign primary θ -roles) may not raise to I because this position is θ -opaque in these languages. English auxiliaries do not assign primary θ -roles and may hence undergo V to I raising. More needs to be said about Mainland Scandinavian, where we have just seen that modals and have and be must remain in situ in cases where they do not assign primary θ -roles. Pollock and others since have pointed out the importance of overt subject-verb agreement for the licensing of V to I raising. Kayne (1989) utilizes this idea to explain the language specific differences in the placement of auxiliaries that we are concerned with here. He argues that English auxiliaries raise to I because English be shows some overt agreement and that their Danish, Swedish

and Norwegian counterparts stay in situ because none of them bears any overt agreement. The relevant paradigms are reproduced below in (6a) and (6b). A similar approach might hold that the English regular third person singular marker (cf. (7a)) and the absence of any comparable marker in Danish, Swedish or Norwegian (cf. (7b)) are responsible for the word order asymmetry in question. This seems to be the position adopted in Roberts (1991). Neither proposal works, since Faroese *vera* "be" with the paradigm in (6c) and Faroese main verbs with the paradigm in (7c) have as much overt verbal agreement as their English equivalents, yet we have seen in (2e, 3e) that like Mainland Scandinavian, Faroese requires modals and *have* and *be* to follow negation and remain inside VP.

(6) a. ENGLISH be	b. SWEDISH war-a	c. FAROESE ver-a
IND. PRES.	IND. PRES.	IND. PRES.
SG PL	SG PL	SG PL
1ST am are	1ST är är	1ST er-i er-u
2ND are are	2ND är är	2ND er-t er-u
3RD is are	3RD är är	3RD er er-u
(7) a. ENGLISH throw	b. SWEDISH kasta "throw"	
INDICATIVE PRESENT	INDICATIVE PRESENT	
SG PL	SG PL	
1ST throw throw	1ST kasta-r kasta-r	
2ND throw throw	2ND kasta-r kasta-r	
3RD throws throw	3RD kasta-r kasta-r	
c. FAROESE kasta "throw" (WEAK 1)	SG PL	
INDICATIVE PRESENT	1ST kast-i kasta	
	2ND kasta-r kasta	
	3RD kasta-r kasta	
INDICATIVE PRETERITE	kasta-ði kasta-ðu	
PRETERITE PARTICIPLE	kasta-ður	
IMPERATIVE	kasta kast-ið	

Given these comprehensive similarities between English and Faroese inflectional morphology, it is hard to see how a V to I raising approach to (2a, 3a) or for that matter any synchronic account could explain the different rules of auxiliary placement in English and Mainland Scandinavian. I therefore assume that all verbs in the modern languages under discussion are base generated in their respective surface positions. I will develop a diachronic explanation for these different positions. To this end, I now briefly sketch a theory of

V to I raising which is based on the morphological and verb raising properties of contemporary and historic variants of the Germanic SVO languages.

IV. V to I Raising Theory

Pollock observed that V to I raising is restricted to languages that are morphologically rich in some sense to be defined. In this spirit, Platzack & Holmberg (1989) propose that V to I raising is triggered by the existence of overt person agreement. English and Faroese pose a problem for this account, since both languages have (if only residual) person morphology. Kayne (1989) argues that English verbal *-s* marks in fact only singular and not third person, but a similar solution is not available for the Faroese paradigm in (7c). Roberts (1991) claims that V to I raising occurs if number agreement is distinctive and morphologically non-empty. In order for Faroese to comply with this generalization, the plurals of this language have to be analyzed as bare stems. This is a possible analysis for the verbs of the first weak class with the paradigm in (7c), but it is untenable for the roughly 60% of all verbs that belong to other classes. (8) exemplifies the paradigm of the second weak class. As I have shown in earlier work, this and similar paradigms of the third weak class and of the strong verbs force us to follow traditional grammarians like Haugen (1982) and recognize the distinctive and non-empty affix *-a* as the regular Faroese plural marker. Roberts theory then predicts that Faroese has V to I raising, but we saw above that V to I raising does in fact not occur in this language.

(8) FAROESE nevn-a "name" (WEAK 2)

		SG	PL
PRESENT INDICATIVE	1ST	nevn-i	nevn-a
	2ND	-nevn-ir	nevn-a
	3RD	nevn-ir	nevn-a
PRETERITE INDICATIVE		nevn-di	nevn-du
PRETERITE PARTICIPLE		nevn-dur	
IMPERATIVE		nevn	nevn-ið

Rizzi (1986) points out that referential *pro* needs to be identified by I with the specification of person and number. It seems reasonable to assume that it is in fact I itself that is referential in these cases. I propose that the referentiality of

the I affixes as defined in (9) is central not only to pro-drop theory, but also to the theory of V to I raising.

- (9) The I affixes of a language are referential iff in the inflection of regular verbs, a. and b.:
- a. In at least one number, the features [1st] and [2nd] are distinctively marked.
 - b. In at least one person, the feature [singular] is distinctively marked.

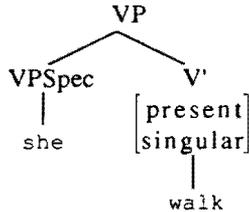
(9) is formulated in terms of privative features, but it can be easily translated into other frameworks. In the Germanic SVO languages, where the application or non-application of V to I raising is often directly reflected in surface word order, (9b) holds if (9a) holds but not the other way around. I will therefore concentrate on the person features. A privative feature such as [1st] or [2nd] is distinctively marked if the affixes of the forms bearing that feature are distinct from the affixes of the forms lacking it. Accordingly, a language with referential I affixes has at least one number where the forms for first and second person differ from each other as well as from the forms for third person and the infinitive. The table in (10) summarizes the correlation between the distinctive marking of the features [1st] and [2nd] and V to I raising in modern and historic variants of the Germanic SVO languages. Note that V to I raising occurs in all and only those languages whose I affixes are referential in the sense defined in (10). In other words: V to I raising is indeed restricted to languages which distinctively mark both [1st] and [2nd].

(10)	<u>V in Situ Languages</u>	<u>V to I Languages</u>
	<u>only [1st] marked:</u>	<u>[1st] & [2nd] marked:</u>
	Faroese	Icelandic
	<u>only [2nd] marked:</u>	Old Danish
	Early Modern English	Old Swedish
	<u>[1st] & [2nd] unmarked:</u>	Old Norwegian
	English	Älvdalen Swedish
	Danish	Old English
	Swedish	Middle English
	Norwegian	Yiddish

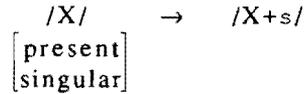
Referential I affixes, like other referential elements, are listed in the lexicon. The lexical entries for the Yiddish person

familiar from the interpretative approaches to inflectional morphology developed by Anderson (1992) and Beard (1991).

(12) a. Syntax



b. Morphology



I now turn to the diachronic explanation of English and Mainland Scandinavian auxiliary placement.

V. Main Verbs, Modals and Have and Be in Diachronic Syntax

Unlike their modern continuations, Old and Middle English and Old Mainland Scandinavian had V to I raising as a result of the distinctive marking of the I features [1st] and [2nd] in the Old and Middle English regular singular in (13a) and the Old Mainland Scandinavian regular plural in (13b) which ensured the referentiality of the I affixes in these languages. As (14-16) show, V to I raising was general in that it applied to regular verbs, modals and have and be alike.

(13) a. MIDDLE ENGLISH

sing-en
INDICATIVE PRESENT
SG FL
1ST sing-e sing-en
2ND sing-est sing-en
3RD sing-eþ sing-en

b. Old Swedish

älska "love"
INDICATIVE PRESENT
SG FL
1ST älska-(r) älsk-um
2ND älska-(r) älsk-in
3RD älska-(r) älsk-a

(14) a. Wepþng and teres counforteth not dissolute
weeping and tears comfort not dissolute
laghers.

(Middle English, 1400-1450)

b. æn han sivngær ægh thigianda messu.
if he sings not silent mass

(Old Swedish, 1290)

(15) a. A blynde man kan nat juggen wel in hewis.
a blind man can not judge well in colors

(Middle English, 1387)

- b. hafþe þu vitit at kon(ung)i ville eg lyba
 had you known that the-king would not listen
 (Old Swedish, 1367)
- (16) a. Ofte síþas hit ilamp, þ[æt] englæs beoð ofte
 often has it happened that angels are often
 hyder on middanearde isende (Old/Middle English,
 hither into the-world sent 12th century)
- b. nær thet är ey stenoghth
 when it is not stony (Old Swedish, 1515)

Old and Middle English and Old Mainland Scandinavian modals were members of the Germanic class of preterite-present verbs whose preterite had taken over the function of the present already in Proto-Germanic. As preterite-present verbs, they did not have the regular paradigms in (13), but the irregular paradigms in (17).

(17) a.	MIDDLE ENGLISH	conn-en	b.	OLD SWEDISH	kunn-a	
	INDICATIVE PRESENT			INDICATIVE PRESENT		
	SG	PL		SG	PL	
	1ST	can	conn-e(n)	1ST	kan	kunn-um
	2ND	can-st	conn-e(n)	2ND	kan-t	kunn-in
	3RD	can	conn-e(n)	3RD	kan	kunn-u/-a

Note that the Old and Middle English modal paradigm - unlike the regular paradigm - did not distinctively mark the 1 feature [1st], since the forms for first and third person singular were identical. The Old Mainland Scandinavian modal paradigm on the other hand distinctively marked both [1st] and 2nd], as did the regular paradigm.

In Old and Middle English, regular verb inflection triggered the raising from V to I of all verbs including the modals. But modals did not exhibit the morphological trigger for this movement. I propose that for this reason, modals were reanalyzed as base-generated in I. In other words, structure (18b) instead of structure (18a) was assigned to sentences containing modals.

- (18) a. [IP SUBJ_i [I' MODAL_j [VP not [VP t_i [VP t_j
 [VP MAIN-VERB]]]]]]]
- b. [IP SUBJ_i [I' MODAL [VP not [VP t_i [VP VERB]]]]]

Roberts (1985, 1991) proposes a similar reanalysis. He also observes that modals "had no 3sg present ending; the only verbs in the language to lack this ending" (Roberts (1991: 479)). But in his account, this state of affairs merely serves to morphologically distinguish modals from main verbs; it does not motivate the reanalysis and in fact cannot do so, given his theory of V to I raising. Instead, the loss of the infinitival marker *-en* and the subjunctive inflection towards the end of the Middle English period together with the irregular semantic interpretation of the past tense of modals conspired to trigger the reanalysis. This approach runs into the following problem.

English modals used to be able to occur in non-finite forms (cf. (19a)) and assign primary θ -roles (cf. (19b)).

- (19) a. I shall not konne answerē (Middle English, 1386)
 b. the leeste ferthyng þat y men shall
 (Middle English, ca 1425)

As a result of the reanalysis in (18), the non-finite forms and θ -assigning properties of the English modals were lost, presumably because I is associated with finiteness and no primary θ -roles can be assigned from I: θ -roles are assigned under sisterhood only, and the sister of I is VP, which is not a possible recipient of primary θ -roles. Warner (1983) and Kroch (1990) point out that these changes started very early. Thus it is noted in the MED that non-finite forms of shall and must are lacking throughout Middle English and evidence that they still existed in Old English is doubtful according the OED. This fact is compatible with the account proposed here, since the irregular modal paradigm (17a) was already in place in Old English and we expect the reanalysis in (18) to begin to take effect during this period. The early absence of the non-finite forms of shall and must militates against Roberts' analysis, since the infinitival marker *-en* and the subjunctive inflection were lost only towards the end of the Middle English period. Roberts therefore has to assume that the reanalysis of English modals started much later than it actually did.

A look back at the Old Swedish regular paradigm in (13b) and the Old Swedish modal paradigm in (17b) reveals that Old Mainland Scandinavian regular verbs and modals both

exhibited the trigger morphology for V to I raising. There was hence no motivation for a reanalysis such as the one in (18). Not surprisingly, the un-reanalyzed Mainland Scandinavian modal verbs kept their ability to occur in non-finite forms (cf. (20a)) and to assign primary θ -roles (cf. (20b)).

- (20) a. Han skal kunne svømme for at få jobbet
 he must can swim for to get the-job (Danish)
- b. Det eneste han vil er at svare på
 the only (thing) he wants is to answer on
 spørgsmålet
 the-question (Danish)

With respect to have and be, note that Old English had two paradigms for be: the one shown in (21a) with irregular singular forms and the one in (21b) with more or less regular singular forms.

- (21) OLD ENGLISH be-on "be"
 INDICATIVE PRESENT
- | | | | | | | |
|----|-----|------|-------------|-----|-------|-------------|
| a. | SG | PL | b. | SG | PL | |
| | 1ST | eom | sindon/sint | 1ST | bēō | bēō-ð/bio-ð |
| | 2ND | eart | sindon/sint | 2ND | bi-st | bēō-ð/bio-ð |
| | 3RD | is | sindon/sint | 3RD | bi-ð | bēō-ð/bio-ð |

In Middle English, the regular singular forms lost out against the irregular ones, cf. Chaucer's paradigm in (22).

- (22) MIDDLE ENGLISH be-e(n) "be"
 INDICATIVE PRESENT
- | | | | |
|---|-----|-----|---------|
| . | SG | PL | |
| | 1ST | am | be-e(n) |
| | 2ND | art | be-e(n) |
| | 3RD | is | be-e(n) |

It is crucial here that the singular forms cannot be analyzed as stem plus affix. In other words, these forms are not the result of syntactic affixation. I have argued above that syntactic affixation is behind all V to I raising. Middle English be was raised past negation like all other verbs on the basis of regular verbal inflection. But it did not take part in syntactic

affixation, the very process that motivates such V to I raising. Be was therefore reanalyzed as base-generated in I.

Have underwent a similar development. The regular Old English paradigm (23a) was replaced by the irregular Middle English paradigm (23b) after the stem-final consonant was lost in front of suffix-initial consonants. The majority of Middle English singular forms for have could again not be analyzed as the product of syntactic affixation and have was reanalyzed as base-generated in I.

(23) a.	OLD ENGLISH hæbb-an	b.	MIDDLE ENGLISH hav-e(n)
	INDICATIVE PRESENT		INDICATIVE PRESENT
	SG PL		SG PL
	1ST hæbb-e habb-aþ		1ST hav-e hav-e(n)
	2ND hæf-st habb-aþ		2ND hast hav-e(n)
	3RD hæf-þ habb-aþ		3RD has hav-e(n)

As for Old Swedish var-a "be" and hava "have", their plural forms in (24) were analyzable as stem plus affix, the product of syntactic affixation. There was therefore no motivation for a reanalysis similar to the one that changed the status of English finite have and be.

(24) a.	O. SWEDISH var-a "be"	b.	O. SWEDISH hava "have"
	INDICATIVE PRETERITE		INDICATIVE PRESENT
	SG PL		SG PL
	1ST vār vār-um		1ST hav-i(r)/-er hav-um
	2ND vā-st vār-in		2ND hav-i(r)/-er hav-in
	3RD vār vār-u		3RD hav-i(r)/-er hav-a

By the year 1500, the infinitival marker -en and the first person singular marker -e had all but vanished from English. At around the same time, the person distinctions had been leveled in Mainland Scandinavian. The paradigms in (13) were replaced by the paradigms in (25). In Early Modern English, the forms for the infinitive (without [1st]) and first person singular (with [1st]) were identical. In Early Modern Mainland Scandinavian, either the forms for first person plural (bearing [1st]) and second person plural (not bearing [1st]) or the forms

for second person plural (with [2nd]) and third person plural (without [2nd]) were identical.

(25) a.	EARLY MODERN ENGLISH	b.	EARLY MODERN SWEDISH	
	cast		kasta "throw"	
	INDICATIVE PRESENT		INDICATIVE PRESENT	
	SG	PL	SG	PL
	1ST cast	cast(-e)	1ST kasta(-r)	kast-e
	2ND cast-est	cast(-e)	2ND kasta(-r)	kast-e/-a
	3RD cast-eþ	cast(-e)	3RD kasta(-r)	kast-a

In other words, English and Mainland Scandinavian no longer distinctively marked both of the I features [1st] and [2nd]. Their I affixes were now non-referential, and V to I raising was lost in both languages as a result of this change during the second half of the sixteenth century. The loss of V to I raising did not affect the position of English modals, which were recognizable as base generated in I because they had ceased to occur in non-finite forms and, in most cases, to assign primary θ -roles. The un-reanalyzed Mainland Scandinavian modals on the other hand were affected: like all other verbs, they no longer raised to I and remained in their d-structure position inside VP. This is the origin of the modern word order, in which English main verbs and all Mainland Scandinavian verbs are base generated inside VP and thus surface after negation, whereas English auxiliaries are base generated in I and thus surface in front of negation.

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References

- Akmajian, A., S. Steele & T. Wasow. 1979. The Category Aux in Universal Grammar. *Linguistic Inquiry* 10: 1-64.
- Anderson, S. 1992. *A-Morphus Morphology*. Cambridge University Press, Cambridge.
- Beard, R. 1991. *Lexeme-Morpheme Based Morphology. A General Theory of Inflection and Word Formation*. Ms., Bucknell University.

- Chomsky, N. 1989. Some Notes on Economy of Derivation and Representation. MIT Working Papers in Linguistics 10: 43-74.
- Haugen, E. 1982. Scandinavian Language Structure. A Comparative Historical Survey. University of Minnesota Press, Minneapolis.
- Jensen, J. & M. Stong-Jensen. 1984. Morphology is in the Lexicon! Linguistic Inquiry 15: 474-498.
- Kayne, R. 1989. Notes on English Agreement. CIEFL Bulletin. Hyderabad, India.
- Kroch, A. 1990. Reflexes of Grammar in Patterns of Language Change. Language Variation and Change 1: 199-244.
- Lieber, R. 1992. Deconstructing Morphology. Word Formation in Syntactic Theory. University of Chicago Press, Chicago.
- MED Middle English Dictionary. 1954-. H. Kurath & S. Kuhn (eds.). University of Michigan Press, Ann Arbor.
- OED Oxford English Dictionary. 1971. Oxford University Press, Oxford et al.
- Ouhalla, J. 1990. Sentential Negation, Relativised Minimality and the Aspectual Status of Auxiliaries. The Linguistic Review 7: 183-231.
- Platzack, C. & A. Holmberg. 1989. The Role of AGR and Finiteness in Germanic VO Languages. Working Papers in Scandinavian Syntax 43: 51-76.
- Pollock, J.-Y. 1989. Verb Movement, Universal Grammar, and the Structure of IP. Linguistic Inquiry 20: 365-424.
- Rizzi, L. 1986. Null Objects in Italian and the Theory of *pro*. Linguistic Inquiry 17: 501-557.
- Roberts, I. 1985. Agreement Parameters and the Development of English Modal Auxiliaries. Natural Language & Linguistic Theory 3: 21-58.
- 1991. Verbs and Diachronic Syntax. Ms., University of Wales. To appear in Studies in Natural Language & Linguistic Theory. Kluwer, Dordrecht.
- Rohrbacher, B. 1992. V-to-AGR Raising in Faroese. To appear in the proceedings of FLSM III.
- Warner, A. R. 1983. Review Article of Lightfoot (1979). Journal of Linguistics 19: 187-209.

- OED Oxford English Dictionary. 1971. Oxford University Press, Oxford et al.
- Ouhalla, J. 1990. Sentential Negation, Relativised Minimality and the Aspectual Status of Auxiliaries. The Linguistic Review 7: 183-231.
- Platzack, C. & A. Holmberg. 1989. The Role of AGR and Finiteness in Germanic VO Languages. Working Papers in Scandinavian Syntax 43: 51-76.
- Pollock, J.-Y. 1989. Verb Movement, Universal Grammar, and the Structure of IP. Linguistic Inquiry 20: 365-424.
- Rizzi, L. 1986. Null Objects in Italian and the Theory of *pro*. Linguistic Inquiry 17: 501-557.
- Roberts, I. 1985. Agreement Parameters and the Development of English Modal Auxiliaries. Natural Language & Linguistic Theory 3: 21-58.
- 1991. Verbs and Diachronic Syntax. Ms., University of Wales. To appear in Studies in Natural Language & Linguistic Theory. Kluwer, Dordrecht.
- Rohrbacher, B. 1992. V-to-AGR Raising in Faroese. To appear in the proceedings of FLSM III.
- Warner, A. R. 1983. Review Article of Lightfoot (1979). Journal of Linguistics 19: 187-209.

Unification-Based Lexical Acquisition from Context

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1 Introduction

Any natural language understanding system accepting unrestricted input will encounter unknown words. Some of these may be simple misspellings, others will be proper nouns, still others will be words unanticipated by system designers and implementers. If certain of these are to be added to the system's lexicon, their syntactic and semantic properties must either be obtained from the user by a set of queries, or inferred automatically from context by the system. Regarding syntactic information, the process of querying can be annoying to the user, interrupting the task at hand, and elicits information which is frequently unreliable, particularly when the user does not have linguistic training. For these reasons, we prefer an approach attempting to infer these properties from context alone, obviating the need for dialogue with the user.

In this paper, we describe a means of extending a unification-based syntactic processor so that it is capable of inferring appropriate internal representations of the syntactic properties of newly encountered words. We begin with a description of the parser in §2, focusing on those aspects most relevant for the learning procedure. The hypothesis construction part of the procedure is discussed in §3, the hypothesis manager in §4. Section 5 discusses the instantiation of the procedure under an HPSG-style grammar. Formal foundations and definitions of the notions presented in the body of the paper are given in an appendix.

2 The Unicorn Parsing System

Shieber (1985) proposed a general technique for extending context-free grammar (CFG) parsing algorithms, which allow only a finite number of nonterminals, to the so-called unification-based grammar (UBG) formalisms, which may give rise to infinitely many nonterminals. Efficient algorithms for parsing context-free grammars are known; but the theoretical and computational linguistics community has largely abandoned CFGs in favor of formalisms in which it is possible to capture linguistic generalizations directly. Shieber's proposal indicated that the methods used in CFG parsing could be applied in UBG parsing, and promised a degree of efficiency comparable to CF parsing algorithms.

Central to Shieber's proposal is the notion of *restriction*. Restriction provides a means for partitioning the potentially infinite set of nonterminals into a finite set of equivalence classes. For example, when parsing a declarative

sentence, having processed an initial NP, the possible continuations include, among others, transitive, intransitive or ditransitive verbs. This situation may be represented in UBG rules as a subcategorization list of indefinite length. This leads the parser to predict verbs with subcategorization lists of any length, one through infinity. Restriction reduces this set of possibilities to the single prediction, ‘verb with a subcategorization list.’ When the particular lexical entry is found, it ‘fills in’ the complete specification of this information.

It is up to the grammar writer to determine an appropriate restrictor. Restrictors can be specified giving various degrees of information, ranging from gross syntactic category (*e.g.*, noun, verb) to fine distinctions (*e.g.*, verb taking a nominative singular third person subject, one accusative plural object, and one dative object). As the restrictor defines the domain of nonterminals explored by the parser, we will speak of the information in the restrictor as delineating a syntactic category. There is a trade-off in the amount of information included in the restrictor; too little leads to too many possibilities being explored, while too much places a greater burden on the scanner, which must match lexical items being looked up with all of the specifications in the restrictor.

Earley’s algorithm (1970) is a dynamic programming approach to CFG parsing which divides the task into three distinct steps:

1. predicting what might follow the current left context based on the grammar;
2. scanning the next word; and
3. completing predictions.

Shieber confined his application of restriction to the first step, prediction, and then only to guarantee termination. Gerdemann (1991) and Gerdemann and Hinrichs (1989) recognized that restriction could be profitably applied to the remaining steps in an implementation of Shieber’s extension to Earley’s algorithm, and from this starting point implemented the UNICORN grammar processing system.

The learning procedure fits into an implementation at the scanner step. When lexical lookup fails, the learning procedure is invoked to construct hypotheses based on the set of predictions. This is the topic of the next section.

3 Encountering an Unknown Lexeme

Gerdemann (1991) implemented several optimizations to Earley’s algorithm in Unicorn, one of which was to pass the set of predictions to the scanner. The scanner, responsible for identifying the possible syntactic categories of the next lexeme, uses this information to eliminate spurious lexical ambiguity whenever possible. For example, encountering the lexeme “lives” in a context which predicts only a noun results in only the nominal sense being considered

as a possibility. Without the use of restricted predictions, the scanner would have returned all of the possibilities for this item in the lexicon, including both the plural noun and third singular verb senses. There are, of course, contexts in which the predictions include both senses as possibilities. In the following sentences, at the point where we first encounter the word "lives," it could be either a plural noun or a third person singular verb.

- (1) The other lives in that house.
- (2) The other lives were lived well.

The learning procedure is integrated into the parser at the point of lexical lookup. When lexical lookup fails to identify a lexical entry appropriate to the current context, the learner constructs hypotheses based on the predictions. These hypothesized lexical entries are returned to the parser, and parsing continues. When parsing has completed, the successful parses are examined to determine what additional information became instantiated on the hypothesized lexical items. In this way, the learner acquires syntactic information not represented in the restrictor or specified by the left context.

There are thus two stages in inferring the syntax of an unknown word. First, the system constructs a set of hypotheses for its syntactic features, given the current context. This stage is described in the remainder of this section. These hypotheses are then compared with those which were constructed from previous contexts, and the hypothesis set is narrowed to those which fit both. The combination of hypothesis sets is described in the next section. This updated hypothesis set is then stored as the new set of hypotheses for the syntax of the word.

3.1 Hypothesis Construction

When an unknown word is encountered during parsing, sets of predictions have already been made by Earley's algorithm for certain of its features, namely those which have been specified in the restrictor. Each set of predicted features represents the minimum amount of information which must be present on a lexical item in order for it to satisfy the given context.

In addition, there is information which a lexical item must contain in order to be a valid lexical entry of a given syntactic category of English. This information is supplied by the component of the system which constructs hypothesized lexical items. For example, the left context of a transitive verb predicts, among other things, a next lexeme which is a nominal, either lexical or phrasal. But it is a property of all lexical items that they must be lexical, by definition. Therefore, in addition to the syntactic category features predicted from context, the system adds a feature to encode the fact that the new item must be lexical.

Other information supplied by the learning procedure is more category-specific. For instance, when Earley's algorithm predicts that one of the possible categories of the new word is 'adjective,' the hypothesis constructor stipulates that semantic content of the word is a set of restrictions, one of whose elements is the restriction found on the modified noun. This, in accordance with Pollard and Sag (forthcoming), is part of what it means to be an adjective in English. The addition of such features to guarantee well-formedness of learned lexical items amounts to an implicit encoding of some type hierarchy information in the learning procedure.

The information predicted for a newly encountered lexical item, along with the typing information supplied by the system, together constitute the information that must be contained in the lexical entry of this word. We refer to this set of information as the **lower bound** of information in the hypothesis space of a new word.

For each of these lower bounds, a lexical entry is constructed, and parsing continues, restarting from the point at which it failed previously due to the unknown word. If parsing still fails, then the hypothesized lexical entry must be incorrect, so the hypothesis is discarded.

If parsing succeeds, then we know that the hypothesis may be correct. We may be able to deduce quite a bit more than that, however. In the process of parsing by means of a unification grammar, features and values not specified in the original lower bound may well be assigned values. If a given lower bound leads to more than one successful parse, then different features may be assigned values, or the same values may be assigned in different ways.

For each of these features which is assigned a value in a successful parse, that feature-value may or may not be an essential part of the correct definition of the new word. Therefore, the instantiation of the word in a successful parse represents the **upper bound** of information that may be in the feature structure of the new word. So to each lower bound, there corresponds a set of one or more upper bounds (since if there are zero upper bounds, the corresponding lower bound is rejected). The actual target definition of the word is known to be intermediate in specificity between a lower bound and one of its corresponding upper bounds. However, it is not yet known which upper bound, if there is more than one, or exactly how much of the information of the upper bound the target definition contains.

The hypothesis set resulting from successful parses with a given lower bound can be represented in a data structure consisting of a lower bound and a set of upper bounds. This data structure resembles a **version space**, discussed by Mitchell (1977). However, a version space may have any number of lower bounds, while this structure has only one. We therefore refer to this data structure as a **version tree**.

In the work on concept learning with version spaces, the target concept is

known to reside somewhere within a single version space. While our version trees are simpler than version spaces in having only a single lower bound, the situation is complicated by the fact that the target lexical entry resides somewhere in a disjunction of version trees, which we refer to as a **version forest**. The challenge in dealing with multiple encounters with the unknown word is to combine these version forests in a meaningful way. This is the topic of the next section.

4 Hypothesis Management

For any single encounter with a new word in context, it is likely that there will not be sufficient information to assign it a unique feature structure. However, multiple encounters with the same unknown in different syntactic environments allow the number of lower bounds to be reduced and the upper bounds to be generalized or eliminated, so that the system converges on a syntactic representation for the new word.

On each encounter with a given unknown word, a version forest is created, representing the possibilities for the syntactic feature structure of the word in the current context. This section describes how multiple version forests are combined to produce an updated version forest. Formal definitions of the notions of unification, subsumption and generalization, referred to in this section, are given in the appendix.

4.1 Combining lower bounds

The version forest constructed during an encounter with an unknown word, and the version forest representing the previous hypotheses about the word each contain a set of lower bounds, the latter of which will be null on the first encounter with the word. In each set, there is one lower bound for each prediction made about the unknown. These two sets are combined to form the set of lower bounds for the updated version forest.

The method of combination here is similar to taking the intersection of the two sets, except that instead of saying that an element is in the output set if it is equal to elements in each of the two input sets, we want to say that an element is in the output set if it represents the successful **unification** of a pair of elements from the two input sets. In other words, we try to unify each element of one set with every element of the other set. The successful unifications are members of the output set. We call this operation **cross-unification**, from its similarity to taking a cross-product.

In the general case, the output set could be larger than the input sets, in fact the size of the product of their sizes. However, with reasonable assumptions about the feature structure information found in these sets of lower bounds, each element of one set will generally unify with at most one element of the other set. This is because the elements of both sets will be specified

for largely overlapping information, such as syntactic category. The specifications they receive must be different, or they would not have been established as separate lower bounds. Therefore, if a member of one set of lower bounds unifies with a certain member of the other set, it will most likely not unify with any other member of the other set. This is why cross-unification often behaves like intersection in this domain.

As a result, the updated set of lower bounds is generally either the same size as or smaller than the two input sets of lower bounds. Since members of the two input sets often have the same feature structure information, the elements in the unified output set will frequently be the same as those of the input set. But where there is a difference at all, it will be in the direction of greater informativeness.

4.2 Combining upper bounds

For each pair of version trees whose lower bounds unify, there is a unified lower bound in the output hypothesis set. The set of upper bounds corresponding to this lower bound is the combination of the sets of upper bounds corresponding to the two input lower bounds. The method of combination here involves comparing each member of one set with every member of the other, as above.

However, the pair-wise comparison of upper bounds does not involve unification. Almost any given pair of upper bounds will contain some inconsistent information and thus will fail to unify. This is because upper bounds may include very specific information about other elements in the tree of the successful parse, which will be distinct for almost any successful parses of different pieces of input. For example, the instantiation of a verb may include number and gender information about its objects, which is not generally part of the definition of the verb.

Rather, in comparing the two upper bounds, we determine what information they have in common. Several checks are then performed to determine whether this information should be added to the set of upper bounds corresponding to the updated lower bound. First, if the shared information is equal to that in the lower bound, then the combination of these upper bounds adds no information to the lower bound. Such an upper bound can be eliminated from consideration. Second, some of these pairwise comparisons may have the same shared information, so we check for duplicates in the result of the comparisons. Finally, some of the results of the pairwise comparisons may **subsume** other such results. Since the more general upper bound exists elsewhere in the version tree, between the more specific upper bound and the corresponding lower bound, the more general need not be maintained as a separate possibility.

The intuition here is that the correct definition of the word must be intermediate in informativeness between one of the hypothesized lower bounds

and one of the corresponding upper bounds. That is, if a given version tree contains the correct definition, then the correct definition may be equivalent to any of the upper bounds, or it may be more general than any of them. When we have more than one encounter with a word, the correct definition must be consistent with at least one of the successful parses found on each encounter. But we have no way of knowing which of the successful parses represents the actual definition of the word. By looking at the information shared by two successful parses, we can see what the definition of the word would have to be in order for this pair of parses to have been produced. Some of these comparisons are uninformative, and their shared information is eliminated.

Unlike the case with the lower bounds, here there is no guarantee that each member of one set will only successfully combine with one member of the other, so the set of upper bounds in the output may well be larger than those of the inputs. In practice however, the size of the set of upper bounds generally decreases as more input is examined. This is due to the fact that, as input-specific information is abstracted away, the shared information among a number of pair-wise comparisons is likely to contain a number of duplicates.

5 The Implementation

The system uses a grammar written according to the principles of Head-Driven Phrase Structure Grammar (HPSG), so that there are a small number of highly schematic grammar rules, with the bulk of the linguistic information found in the lexicon. For the purposes of learning lexical items, we are assuming that the rule schemata, and their instantiations in English, are already known to the learner.

In this section, we first give a detailed description of a learning episode using the procedure described in the previous two sections. We then discuss some exceptions to the general algorithm given so far, which are treated as special cases.

5.1 An Example Learning Episode

As an example, we will walk through the procedure for parsing sentence (3).

(3) John glarf left.

Having parsed "John" as a subject NP, the current test grammar predicts that a VP must come next. It therefore predicts two possible syntactic categories predicted for "glarf," adverb and verb. The restrictor used for this example distinguishes verbs according to how many complements they take, but not according to the syntactic category of each of those complements. Therefore, two lower bounds are constructed for the syntax of the lexical entry of "glarf." One contains the information known by the system about adverbs, the other

that which is known about verbs. For example, the system knows that all finite verbs must take subjects that are nominative case.

The upper bounds contain more detailed information. For the lower bound which assigns "glarf" to the category of adverb, there is a single upper bound with all of the feature structure used in producing a parse structurally isomorphic to that of (4). However, corresponding to the lower bound with "glarf" as a verb, there must be at least two separate upper bounds; one yielding a parse structurally similar to that of (5), the other to that of (6).

- (4) John quickly left.
- (5) John turned left.
- (6) John had left.

The reader may observe at this point that morphological clues could be used to give some indications of the syntactic category of the unknown. While we may investigate this possibility in future work, we have chosen not to do so at present, because such clues represent tendencies, rather than absolutes. While a form ending in "-ly" is frequently an adverb, and one ending in "-ed" frequently a past tense verb, there is not a one-to-one correspondence, due to pervasive irregular morphology in English. The tendencies that morphological clues show would be useful in a system whose task was to find the single most likely category of an unknown word. However, since the present system investigates all possibilities predicted by the grammar rules, such heuristics are not used.

The next piece of input is sentence (7). This yields the same two lower bounds as the previous input, adverb and verb. Therefore, the set of lower bounds remains the same. As with the previous input, the lower bound in which "glarf" is an adverb leads to a successful parse, so the elements in the two sets of upper bounds are unified. Since there is just one element in each of the input sets, the resulting updated set of upper bounds also has one element, containing the information which the two input instantiations have in common. For example, while the upper bounds on the two inputs specify the semantics of the verb modified by the hypothesized adverb "glarf," these specifications contradict each other, and so this information is unspecified in the resulting upper bound.

- (7) John glarf stopped.

In the case where "glarf" is a verb, the only successful parse with this input is one in which "stopped" is a past participle, since "stopped" cannot be an adverb, as "left" can. Therefore, we have a set with one element to do pairwise comparisons with the previous corresponding set with two elements.

Comparing the two uses of "glarf" as an auxiliary verb yields a more generalized version of the same analysis, as with the adverb hypothesis. However, comparing successful parses of "glarf" as an auxiliary verb with one piece of input and as a verb with an adverb complement with the other yields no information beyond that of being a verb, which is already present in the lower bound. Therefore, this possibility is eliminated.

5.2 Special cases

There are several special cases that must be given special treatment in the procedure described above. First, the question arises of what to do when the cross-unification of two sets of lower bounds yields the empty set. In this case, the most reasonable conclusion is that the learner has encountered two unrelated senses of words with the same surface forms. These are stored as separate lexical entries, each with a version forest representing a set of hypotheses about its feature structure.

For example, if the system did not contain a lexical entry for "train," and encountered instances of train as a verb (in the sense of 'educate') and as a noun (in the sense of 'locomotive'), the desired behavior would be for it to fail to find one feature structure which fit both pieces of input, and then to maintain two separate partial lexical entries, with future input adding further information to one or the other, but not both.

Of course, real-world input data may not immediately show up the need for separate lexical entries, or indicate which of two existing entries a new instance should belong to. In the above example, the system may encounter input which leads to the hypotheses that "train" is either a noun or an adjective in one case, and either a verb or an adjective in the other. This would lead to the incorrect conclusion that "train" must be an adjective.

The system is therefore susceptible to error from misleading data, which should not be surprising. Human language learners can also encounter new words in deceptive contexts, leading them to incorrect conclusions about the syntactic category of the word. In order for people to be able to acquire new words from context, however, such situations must be the exception rather than the norm, and will rarely be encountered in actual data. We assume that this is the case for the contexts encountered by our learning system as well.

Given such assumptions, incorrect conclusions such as that given above, while not advancing the knowledge of the system, will not be a serious hindrance to it, either. With further data containing the word in question, unless it occurs in similarly unusual contexts, the incorrect hypothesis will not lead to any successful parses. The learning procedure will therefore be invoked to learn the word again, generating hypotheses appropriate to the new contexts. At worst, therefore, the lexicon may contain some incorrect hypotheses that are not subsequently used, along with the correct hypotheses.

The second special case is the situation where only a unique upper bound remains at some point during a learning session, and it is equivalent to the lower bound. This indicates that the system has successfully converged on the complete feature representation for syntax of the new word. At this point, the word may be considered to have been completely learned, and is added to the permanent lexicon of the system.

It is possible, and even likely, that such complete convergence will never occur, particularly if a given word is only rarely encountered. It then becomes a matter of extra-grammatical heuristics to decide when a lexical item has been completely learned. A reasonable candidate for a completely learned word exists when its hypothesis space consists of a single version tree, with one lower bound and exactly one upper bound. If, after a reasonable number of encounters with a variety of input data, the upper bound is not lowered, the system should assume that this is because the upper bound is, in fact, correct. Further work, including empirical studies, will be necessary to determine what constitutes a reasonable number and variety of pieces of input to make this determination for a given word.

6 Conclusions and Future Work

The procedure we have described enables the parser to make use of context from multiple pieces of input in order to infer the syntactic feature structure of newly encountered lexical items. While it is susceptible to error from misleading presentations of data, such presentations are not the norm, and merely lead to the necessity of further input before the correct target lexical items are learned. The result of a learning episode is often not complete convergence, so the learned lexical items may be viewed as less than fully specified.

In this paper, we have discussed only the acquisition of syntactic feature structures. However, the parser also makes use of domain-specific real-world knowledge, for disambiguation by eliminating candidate parses. In future work, we will describe how this world knowledge can be used to infer the semantics of new words.

A Formal foundations

This appendix provides precise formulations of the notions presented in the main body of the paper.

A.1 Feature structures

Several characterizations of feature structures have appeared in the literature. The characterization we give here follows the lead of Kasper and Rounds (1986), who model feature structures as a restricted type of deterministic finite automaton (DFA). The DFA is a recognizer of strings over an alphabet of feature names, mapping such strings to states of the DFA.

Definition 1 (Feature structures) Given $F \subset \Sigma^+$, a finite set of feature names, and $V \subset \Sigma^+$, a finite set of feature values, a feature structure is a tuple $S = \langle Q, q_0, \delta, \eta \rangle$ where

- Q is a set of nodes;
- $q_0 \in Q$ is a distinguished root node;
- $\delta : Q \times F \rightarrow Q$; and
- $\eta : Q \rightarrow (2^V \cup T)_\perp$.

Both δ and η are partial functions. δ is analogous to the transition function of a finite automaton. $T = \{\text{atomic, complex, exists}\} \subset \Sigma^+$ is a set of distinguished atoms used for making weak “type” assertions about the node. η is a valuation function restricted so that for all $q \in Q$, if there exist $q' \in Q$ and $f \in F$ such that $\delta(q, f) = q'$, then $\eta(q) = \text{complex}$.

We refer to the set of all feature structures as \mathcal{F} ; when it is important to restrict our attention to a particular F and/or V , we state \mathcal{F}_{FV} .

Definition 2 (Cyclic structure) Let $S = \langle Q, q_0, \delta, \eta \rangle$ be a feature structure. Define the relation $R \subseteq Q \times Q$ as

$$\langle q, q' \rangle \in R \Leftrightarrow (\exists f \in F)(\delta(q, f) = q').$$

S is cyclic if and only if $\langle q, q \rangle \in R^+$, the transitive closure of R .

The theory of feature structures employed in UNICORN does not deal with certain types of cyclic feature structures. We have no need of cyclic structures, and so simply disallow them here.

A.2 Ordering feature structures

Our primary use of feature structures is to represent the information collected so far regarding the syntactic properties of a word. Hence, it must be possible to decide when two feature structures represent compatible constraints on said properties, and which one (if either) is more constraining. This is typically captured in a *subsumption ordering*. We choose to work in continuous complete lattices, and the remainder of this appendix constructs the lattice used here.

For the domain $(2^V \cup T)_\perp$, we choose a definition of subsumption based in large part on the superset relation, extended to capture the weak typing constraints.

Definition 3 (η -subsumption) *The subsumption ordering over the lifted domain $(2^V \cup T)_\perp$ is the smallest relation such that*

- (1) $\perp \sqsubseteq \text{exists} \sqsubseteq \top$
- (2) $\text{exists} \sqsubseteq \text{atom} \sqsubseteq \top$
- (3) $\text{exists} \sqsubseteq \text{complex} \sqsubseteq \top$
- (4) $\text{atomic} = V \sqsubseteq \top$
- (5) $X \sqsubseteq Y \Leftrightarrow X \supseteq Y$
- (6) $\{\} \sqsubseteq \top$.

Intuitively, \perp represents an undefined value; “exists” represents the constraint that a certain node must exist; “atom” represents the restriction to an atomic value; and “complex” represents the restriction to a structured, non-atomic value.

Subsumption in the feature structure domain \mathcal{F} is defined through the existence of a morphism between elements of \mathcal{F} .

Definition 4 (\mathcal{F} -subsumption) *Let $S = \langle Q, q_0, \delta, \eta \rangle$, $S' = \langle Q', q'_0, \delta', \eta' \rangle$ be feature structures. We say S' is subsumed by S (or S is less informative than S') and write $(S \sqsubseteq S')$ just when there exists a mapping $g : Q \rightarrow Q'$ such that*

- $g(q_0) = q'_0$,
- $(\forall q \in Q)(\eta(q) \sqsubseteq \eta'(g(q)))$,
- $(\forall q \in Q)(g(\delta(q, f)) = \delta'(g(q), f))$

This ordering allows certain formal distinctions to be made whose import is subtle, but which are crucial for the learning procedure. For instance, the least feature structure is the single node structure

$$\langle \{\! \{q_0\} \!\}, q_0, [], [q_0 \mapsto \perp] \rangle$$

The smallest feature structure greater than this under the above ordering is

$$\langle \{\! \{q_0\} \!\}, q_0, [], [q_0 \mapsto \text{exists}] \rangle,$$

which is only minimally more informative. However, such distinctions are essential for building up feature information with the learning procedure given in the main text.

A.3 Combining information

Given the definition of subsumption ordering, it is possible to define precisely the notion of unification.

Definition 5 (\mathcal{F} -unification) Let a and b be elements of \mathcal{F} . The unification of a and b is the **smallest** $s \in \mathcal{F}$ such that

$$a \sqsubseteq s \text{ and } b \sqsubseteq s.$$

We denote this by $s = a \sqcup b$, and refer to s as the “least upper bound.”

If \mathcal{F} -unification is viewed as an operator, then \mathcal{F} plus \mathcal{F} -unification forms a join semilattice, since $a \sqcup a = a$ (\sqcup is idempotent) and $x \sqcup y = y \sqcup x$ (\sqcup is commutative).

Generalization, or “anti-unification” as it is sometimes called, is usually taken as the dual of unification:

Definition 6 (\mathcal{F} -generalization) Let a and b be elements of \mathcal{F} . The generalization of a and b is the **largest** $s \in \mathcal{F}$ such that

$$s \sqsubseteq a \text{ and } s \sqsubseteq b.$$

We denote this by $s = a \sqcap b$, and refer to s as the “greatest lower bound.”

Given the domain \mathcal{F} and the two operations, unification and generalization, we get a (continuous complete) lattice, where if a and b are both elements of \mathcal{F} , both $a \sqcup b$ and $a \sqcap b$ exist.

\mathcal{F} -unification is the operation used to combine lower bounds from distinct encounters. \mathcal{F} -unification can also be defined procedurally, and can be computed quickly. Moshier (1988) gives such a definition, a proof that the procedure computes the least upper bound, and a proof of the essentially linear time requirements of the algorithm. \mathcal{F} -generalization can be similarly defined and computed. The extension of generalization and unification to sets is straightforward. See Stoy (1977) for further development of these ideas.

The combination of lower bounds is trivial, as no lower bound may subsume any other. The combination of upper bounds is more complicated, as the subsumption relation may obtain in either direction between any given pair of upper bounds.

Let \mathcal{U}_0 and \mathcal{U}_1 be sets of upper bound hypotheses. Define their combination, \mathcal{U}' , as follows. Let

$$T = \{a \sqcup b \mid (a, b) \in \mathcal{U}_0 \times \mathcal{U}_1\} \cup \{a \sqcap b \mid (a, b) \in \mathcal{U}_0 \times \mathcal{U}_1\}.$$

Divide T into n maximal ascending chains \mathcal{C}_i not including \top (i.e., $c_0 \sqsubseteq c_1 \sqsubseteq \dots \sqsubseteq c_k \neq \top$) such that for all $0 \leq i < j < n$, $\mathcal{C}_i \sqcup \mathcal{C}_j = \top$. Require that for each $t \in T - \{\top\}$ there is an i such that $t \sqsubseteq \mathcal{C}_i$. Then

$$\mathcal{U}' = \{x \mid x = \sqcup \mathcal{C}_i\}.$$

\mathcal{U}' is then the smallest set of maximally informative elements consistent with both \mathcal{U}_0 and \mathcal{U}_1 .

References

- Earley, J. (1970) An efficient context-free parsing algorithm. *Communications of the ACM*, 13(2):94-102. Also in *Readings in Natural Language Processing*, ed. by Barbara Grosz et al. (1986).
- Gerdemann, Dale (1991) Parsing and Generation of Unification Grammars. PhD dissertation, University of Illinois at Urbana-Champaign. Also published as Technical Report CS-91-06 (Language Series) Cognitive Science Department, The Beckman Institute.
- Gerdemann, Dale and Erhard W. Hinrichs (1988) UNICORN: A unification parser for attribute-value grammars. *Studies in the Linguistic Sciences*. Vol 18.2., pp. 41-86.
- Kasper, Robert and William Rounds. (1986) A logical semantics for feature structures. *ACL Proceedings, 24th Annual Meeting*, pp. 257-266.
- Mitchell, Tom M. (1977) Version spaces: A candidate elimination approach to rule learning. *Proceedings of the 1977 IJCAI*, pp. 305-310, Cambridge, MA.
- Moshier, M.A. (1988) Extensions to Unification Grammar for the Description of Programming Languages. PhD dissertation, U Michigan.
- Pollard, C. and I. A. Sag (1987) *Information Based Syntax and Semantics, Volume 1: Fundamentals*. CSLI Lecture Note Series No. 13. Stanford University: Center for the Study of Language and Information. Distributed by University of Chicago Press.
- Pollard, C. and I. A. Sag (forthcoming) *Agreement, Binding and Control: Information-Based Syntax and Semantics, Volume 2*. To be published by Stanford University: Center for the Study of Language and Information, and distributed by University of Chicago Press.
- Shieber, Stuart M. (1985) Using restriction to extend parsing algorithms for complex-feature-based formalisms. *ACL Proceedings, 23rd Annual Meeting*, pp. 145-152.
- Stoy, Joseph E. (1977) *Denotational Semantics: the Scott-Strachey Approach to Programming Language Theory*. MIT Press, Cambridge.

**THE DEFINITENESS REQUIREMENT
AND THE STRUCTURE OF PREDICATION**

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0. Introduction

It has long been noticed that Chinese noun phrases of frequency and duration (hereafter referred to as F/D phrases), like the *sanci* 'three times' in (1a) and the *liangtian* 'two days' in (2a), can occur in their bare form in the postverbal position. This particular constituent is usually classified as part of another syntactic category and its properties are assumed to be derived from some general principles. The purpose of this paper is to show that F/D phrases in the postverbal position form a class of their own and their properties can be accounted for under an analysis based on the notion of predication.

- (1) a. Ta kule sancǐ.
she cry Asp. three-time
'She cried three times.'
- (2) a. Wo bingle liangtian.
I sick Asp. two-day
'I was sick for two days.'

1. Adverbial or Argument?

Traditional grammarians usually treat postverbal F/D phrases as adverbials similar to the postverbal adverb *qi* 'all-present' in *dao qi* 'all arrive' of (3a) (e.g. Zhang 1987).

- (3) a. Women dao qi le.
we arrive all-present Part.
'We have all arrived.'

There is, however, strong evidence that adverbs like the *qi* 'all-present' in *dao qi* 'all arrived' do not behave the same as F/D phrases do in various syntactic processes. For instance, a so-called potential infix *de* can be inserted between the verb *dao* 'arrive' and the adverb *qi* 'all-present' of (3a), to produce a reading about possibilities and potentials, as in (3b). If the same infix is inserted between the verb and the F/D phrase in (1a) or (2a), the result will be an unacceptable sentence, as shown in (1b) and

(2b). The potential reading for (1a) or (2a) cannot be obtained in this way.

- (3) b. Women dao de qi.
 we arrive potential completely
 'It is possible for us to all arrive.'
- (1) b.*Ta ku de sancì.
 she cry potential three-time
 'It is possible for her to cry three times.'
- (2) b.*Wo bìng de liangtian.
 I sick potential two-day
 'It is possible for me to be sick for two days.'

Another difference between the behavior of postverbal adverbs and that of F/D phrases is their relation with the verb. Postverbal adverbs are so close to the verbs that a perfect aspect marker *le* cannot occur between the two, as shown by the contrast between (4a) and (4b). The relation between verbs and F/D phrases is much looser. As shown in (5), a perfect aspect marker *le* between a verb and an F/D phrase causes no problem at all. F/D phrases are not postverbal adverbs.

- (4) a. Wo chi wan le fan.
 I eat finish Asp. meal
 'I have eaten all that is for the meal.'
- b.*Wo chi le wan fan.
 I eat Asp. finish meal
 'I have eaten all that is for the meal.'
- (5) Wo deng le sange zhongtou.
 I wait Asp. three Cl. hour
 'I have waited three hours.'

Within the framework of generative grammar, the F/D phrase is usually analyzed as an argument of the verb (e.g. Huang 1982, Li 1990). In addition to differentiating F/D phrases from postverbal adverbs, this line of analysis is designed to account for another interesting phenomenon. Huang (1982) observes that although either a direct object NP or an F/D phrase can occur in the postverbal position alone, it seems that the two cannot occur in the same position at the same time. The sentence in (6a) is thus not acceptable, even though both (6b) and (6c) are grammatical. The same contrast exists between (7a) and (7b) or between (7a) and (7c).

- (6) a. *Wo kaile che liangci.
 I drive Asp. car twice
 'I drove a car twice.'
 b. Wo kaile che.
 I drive Asp. car
 'I drove a car.'
 c. Wo kaile liangci.
 I drive Asp. twice
 'I drove (the car) twice.'
- (7) a. *Ta dengle ren sange zhongtou.
 he wait Asp. man three Cl. hour
 'He waited for a man for three hours.'
 b. Ta dengle ren.
 he wait Asp. man
 'He waited for a man.'
 c. Ta dengle sange zhongtou.
 he wait Asp. three Cl. hour
 'He waited (for the man) for three hours.'

This constraint on the distribution of F/D phrases is usually described as the generalization that the F/D phrase and the object NP exclude each other from the postverbal position. This is then subsumed under the generalization that only one NP can occur in the postverbal position.

Given the two generalizations, it is possible to account for the phenomenon in question as part of a structural constraint. One possibility is suggested by Huang (1982) based on his Phrase Structure Condition, which states that a Chinese phrases structure can branch to the right only once and only at the lowest level. If both the object NP and the F/D phrase are arguments of the verb, the Phrase Structure Condition will allow only one of them to occur in the postverbal position, because the VP will otherwise branch to the right twice. The other NP thus has to be moved to some other positions, such as that in a reduplicated VP.

Another possibility is a suggestion made by Li (1990) on the basis of her Word Order Constraint, which in essence says a Chinese verb can only assign one accusative case and only to its right. When two NPs occur postverbally, one of them will receive the accusative case but the other will be caseless. Since every NP must have a case to satisfy the Case Filter (Chomsky 1981), the caseless NP has to move to some other positions in order to receive case. This means that the direct object NP and the F/D phrase cannot both occur in the postverbal position.

2. A Predication Approach

Both the analysis of Huang (1982) and that of Li (1990) rely on independently motivated principles to restrict the number of postverbal NPs to one and thus provide a plausible account for the generalizations. The only problem is that the generalizations themselves are not accurate. Although the frequency phrase in (6a) and the duration phrase in (7a) seem to exclude a direct object from the postverbal position, the same phrases in (8) and (9a) do not. The obvious difference between the two sets of data is that the object NP in (8) and (9a) is definite while that of (6a) or (7a) is indefinite. The main factor in these cases is obviously not the sheer number of postverbal NPs, but the definiteness of the object NP in multiple postverbal NP constructions.

- (8) Wo kaile zheliang che liangci.
 I drive Asp. this Cl. car two-time
 'I drove the car for three times.'
- (9) a. Ta dengle nage ren sange zhongtou.
 he wait Asp. that Cl. man three Cl. hour
 'He waited for that man for three hours.'

The correct generalization should be that only a definite object NP allows an F/D phrase to follow it. This definiteness requirement is comparable to a similar constraint on the subject of the so-called small clauses, shown by the contrast between (10a) and (10b). When the small clause subject, i.e., the object NP, is indefinite, it does not allow another NP to occur postverbally; but when the small clause subject is definite, an extra postverbal NP is acceptable.

- (10) a. *Women dang ren shagua.
 we consider man fool
 'We consider a man a fool.'
- b. Women dang zhege ren shagua.
 we consider this Cl. man fool
 'We consider this man a fool.'

Notice that the order of the two postverbal NPs in (10b) cannot be altered, as shown in (10c), nor can the order of the object NP and quite a number of F/D phrases be changed, as in the case of (9b). A natural explanation for this phenomenon is that there is a structurally coded relation between the two postverbal NPs. When the order of the constituents is altered and the relation is destroyed, the sentence becomes unacceptable. The proposal here is to assume that

there is a predication relationship between the object NP and the F/D phrase in the sense of Larson (1988) and Chomsky (1991), on a par with that between a small clause subject and its predicate. One of the conditions for the establishment of a predication is that the NP taking a predicate must be definite.

- (10) c. *Women dang shagua zhege ren
 we consider fool this Cl. man
- (9) b. *Ta dengle sange zhongtou nage ren.
 he wait Asp. three Cl. hour that Cl. man

The predication analysis can account for not only cases of small clauses and F/D phrase constructions, but also cases where the element after the object is non-nominal. The contrast between (11a) and (11b), pointed out by McCawley (1992), is analogous to that between (9a) and (9b); but the phrase *hen jiu* 'very long' is apparently adjectival. The analysis based on the sheer number of postverbal NPs does not apply here, but the account proposed in this paper will. The phrase *hen jiu* 'very long' in (11) is an adjectival predicate of the object NP *nage ren* 'that man', similar to cases where an adjectival phrase functions as the predicate of a subject NP. The contrast between (11a) and (11b) is the expected pattern since only a definite object NP can take a predicate.

- (11) a. *Wo dengle ren hen jiu.
 I wait Asp. man very long
 'I waited very long for a man.'
- b. Wo dengle nage ren hen jiu.
 I wait Asp. that Cl. man very long
 'I waited very long for the man.'

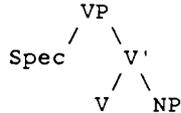
3. A Structurally Coded Solution

Given the predication analysis, it is now possible to establish a structural representation to code the definiteness requirement on the object NP in these constructions. The essence of the proposal is that the definiteness requirement can be derived as a direct consequence of the Spec-head agreement convention (Chomsky 1986). In the structural representation posited for Chinese VPs, there are two possible positions for the internal argument of the verb: one for the direct object without a predicate and the other for the object taking a predicate.

When the internal argument of the verb does not take a predicate, the representation of VP has the

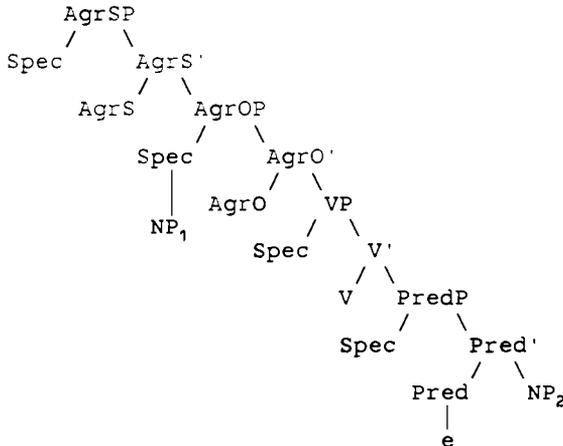
usual shape of (12), where the internal argument is generated directly under the V' node as a sister of the V node.

(12)



The structural representation for sentences with both the object and the F/D phrase is posited as (13) (details aside). Following Chomsky (1991), the VP is assumed to be dominated by the maximal projection of a functional head AgrO(bject), which is in turn dominated by the maximal projection of a functional head AgrS(ubject). The internal argument of the verb, i.e., the direct object NP₁, is generated in the Spec of AgrOP when the F/D phrase NP₂ is present (cf. Hoffman 1991). This is to represent the fact that the internal argument in this construction takes another maximal projection as its predicate. The verb undergoes head-to-head movement in the syntax to incorporate with AgrS and c-commands the Spec of AgrOP. This movement creates an S-structure configuration in which the usual VO order is obtained.

(13)



The small clause construction also has (13) as its structural representation, as does the construction with an adjectival phrase as the predicate of the object NP. The predicate of the internal argument is

posited as a maximal projection PredP, which is dominated by VP. The Spec of PredP is always empty and the PredP becomes an open clause in the sense of Williams (1980). The open clause will eventually have a predication relation with the internal argument in the Spec of AgrOP. The head of PredP is usually empty, but it can be a copula in certain small clause constructions, as in the case of (14). The F/D phrase is generated as the complement of the head of PredP, as is the NP predicate of small clauses.

- (14) Women dang ta shi shagua.
 we consider he be fool
 'We consider him to be a fool.'

The status of the adjectival predicate of the object NP is not very clear at this stage. It can be generated either under the Pred' node as the complement of the head of PredP, just like the NP predicate is, or under the Pred node as the head of the PredP, just like the copula in (14) is. The situation in this case is comparable to the two possible positions for the adjectival predicate of a subject NP and the issue bears no consequence to the analysis here.

The structural representation posited here provides a principled way to account for the definiteness requirement on the internal argument that takes an NP or an F/D phrase as predicate. Since such an internal argument is generated in the Spec of AgrOP, given the Spec-head agreement convention (Chomsky 1986), it must share all its features with the head AgrO, including the feature of definiteness or specificity. Following an assumption made by Mahajan (1992), AgrO is treated as being pronominal in nature and therefore always definite. A direct consequence of the agreement between the internal argument in the Spec of AgrOP and the head AgrO is that the former must be definite as the latter is. An indefinite NP in the Spec of AgrOP will have a conflict with the head AgrO on this particular feature and the construction will be ruled out. Sentences (6a), (7a) and (10a) are thus unacceptable because an indefinite NP is generated in the Spec of AgrOP; while (8), (9a) and (10b) are grammatical since the internal argument in question is definite.

The internal argument of the verb is generated in the Spec of AgrOP only when it takes a predicate. When the internal argument occurs alone, it is generated as the complement of the V node, as in (12). The NP in that position is not in agreement with the AgrO and therefore is exempt from the definiteness requirement.

The internal argument can thus be indefinite when it occurs alone.

The F/D phrase is always generated as the complement of the head of PredP. An underlying assumption here is that the PredP will not be generated unless an NP is generated in the Spec of AgrOP. A possible argument against this line of analysis is that there are cases where the F/D phrase seems to be generated alone in the postverbal position, as in (15). Notice, however, that the verb in (15) is transitive and has a slot for an internal argument in its theta-grid. Since sentence (15) is grammatical, the external theta-role must have been discharged properly. The solution proposed here is to assume that the position for the internal argument, i.e., the Spec of AgrOP, in this type of sentences is generated with an empty category and the sentence still has the structure of (13). This empty category is co-referential with an NP in the previous discourse. Since the empty category has an unequivocally determined antecedent, it is referential and definite. When such an empty category is generated in the Spec of AgrOP, no conflict will arise between the Spec and head with regard to the definiteness feature. These sentences are thus acceptable.

- (15) Wo kanle sancí.
 I read Asp. three Cl.
 'I read (it) three times.'

This line of analysis also accounts for another interesting phenomenon. Although sentences like (6c) and (7c) are acceptable, they are interpretable only within a given context. For example, if (6c) is uttered in isolation, the listener is likely to feel puzzled and will ask the question in (16) for clarification. If, on the other hand, (6c) appears as the second pair part of a conversation pair in which (17) is the first pair part, everyone will accept and understand the sequence with no difficulty. Given the structural representation in (13) and the above assumption about an empty internal argument, this is the expected result. The empty category generated as the internal argument in (6c) must have an antecedent in the previous discourse to provide it with reference. Otherwise the sentence will be un-interpretable. The NP **zheliang che** 'this car' in (17) serves as the discourse antecedent for the empty category in question and (6c) thus becomes acceptable as a second pair part of (17).

- (6) c. Wo kaile liangci.
 I drive Asp. twice
 'I drove (the car) twice.'
- (16) Ni kaile shenmo?
 you drive Asp. what
 'What did you drive?'
- (17) Ta kaile zheliang che sanc.
 he drive Asp. this Cl. car three times
 'He drove the car for three times.'

4. Concluding Remarks

The central thesis of this paper is that the definiteness requirement on certain object NPs can be coded in a structural representation. Two assumptions are essential to the analysis proposed here. One is that the definiteness requirement is a consequence of the predication relationship between the internal argument and certain elements; and the other is that the definiteness requirement can be coded as the agreement between the head of the AgrOP and an NP in its Spec. This is reminiscent of the definiteness requirement on subject NPs in Chinese. It seems that a similar analysis can be designed for subject NPs or for predication relations in general. The definiteness requirement seems to hold only in some languages. Its implication in language typology and linguistic theories is certainly worth further investigation.

REFERENCES:

- Chomsky, N. (1981). Lectures on Government and Binding, Foris Publications, Dordrecht.
- . (1986). Barriers, the MIT Press, Cambridge.
- . (1991). 'Some Notes on Economy of Derivation and Representation', in R. Freidin ed. Principles and Parameters in Comparative Grammar, the MIT Press, Cambridge.
- Hoffman, M. C. (1991). The Syntax of Argument Structure-Change Morphology, doctoral dissertation, MIT.
- Huang, J. (1982). Logical Relations in Chinese and the Theory of Grammar, doctoral dissertation, MIT.
- Larson, (1988). 'On the Double Object Construction', Linguistic Inquiry 19.3, 335-391.

- Li, A. (1990). Order and Constituency in Mandarin Chinese, Kluwer Academic Publishers, Dordrecht.
- MacCawley, J. (1992). Review on A. Li, Order and Constituency in Mandarin Chinese, Kluwer Academic Publishers, Dordrecht. Language 68.596-604.
- Mahajan, A. (1992). 'The Specificity Condition and the CED', Linguistic Inquiry 23.3, 510-516.
- Zhang, J. (1987). Hanyu Yufa Wenti (Issues in Chinese Grammar). The Social Science Press of China, Beijing.
- Williams, E. (1980). 'Predication', Linguistic Inquiry 11.1, 202-238.

A/A' Incorporation and Agreement
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0. Introduction

It is well known that French, Italian, and Spanish exhibit different patterns of the past participle agreement. Italian, in particular, shows interesting differences between first/second person and third person clitics. In this paper, I will argue that spec-head relation alone cannot be responsible to account for these agreement facts. I propose that head-head relation, under certain conditions to be defined in section 3 as A vs A' Incorporation, may also trigger past participle agreement. Under this analysis the differences among the three languages may be easily parameterized in terms of Case assignment.

The paper is organized as follows. Section 1 outlines the core data of the Romance agreement facts. Section 2 reviews previous analyses. In section 3, I propose an alternative hypothesis to account for a wider range of data of clitic-participle agreement than the previous attempts. Section 4 concludes the paper.

1. Data

French participle agreement is sometimes obligatory and sometimes optional as shown in (1):

- (1) a. ...avoir décrit/*décrite la robe à la femme
 'have described the dress to the woman'
- b. ...l'avoir décrit/décrite t à la femme
 'have described it to the woman'
- c. ...lui avoir décrit/*décrite la robe
 'have described to her the dress'
- d. La robe est faite/*fait.
 'the dress is made'
- e. La robe que tu as offert/offerte t.
 'the dress that you have offered'

We see that in (1a) the past participle *décrit* does not agree with the postverbal direct object or indirect object. When the direct object is cliticized to a preverbal position, as shown in (1b), agreement is optionally triggered.¹ (1c) shows that preverbal indirect objects do not trigger agreement at all. Note that (1c) is actually just one instance of a more general fact: no clitics other than a direct object can ever trigger agreement. In the passive construction of (1d) agreement between the surface subject and the past participle is obligatory. Relativized direct objects

such as *la robe* in (1e) again optionally trigger agreement.

Italian exhibits similar agreement facts to the French data in (1) in that the passive construction requires obligatory agreement and that only preverbal direct objects trigger agreement.

- (2) a. ... avere descritto/*descritta la gonna a
la donna
'have described the skirt to the woman'
b. ... averla descritta/*descritto a la donna
'have described it to the woman'
c. ... averle descritto/*descritta la gonna
'have described the skirt to her'
d. La gonna è fatta/*fatto.
'the skirt is done'
e. la gonna che hai offerto/*offerta
'the skirt that you have offered'

An important difference is that in (2e) a relativized direct object does not trigger agreement. In addition, there is one more difference shown in (3) that is rather unexpected:

- (3) a. Maria, l'ho incontrata/*incontrato.
'Maria, her I have met'
b. Tu (fem.), ti ho incontrato/incontrata.
'You, you I have met'

The preverbal third person clitic *la* in (3a) obligatorily triggers agreement while second (and also first) person clitic only optionally triggers agreement. In other words, Italian first and second person clitics behave like all French accusative clitics. It is the third person clitic makes the difference.

Spanish data exhibit a third agreement pattern.

- (4) a. ... haber descrito/*descrita la falda a la
mujer
'have described the skirt to the woman'
b. ... haber(se)la descrito/*descrita a la
mujer
'have described it to the woman'
c. ... haberle descrito/*descrita la falda
'have described to her the skirt'
d. La falda está hecha/*hecho.
'the skirt is made'
e. La falda que has descrito/*descrita.
'the skirt that you have described'

On the one hand, Spanish patterns with Italian in wh-constructions in that a relativized direct object does not trigger agreement; on the other hand Spanish differentiates itself from Italian and French by not allowing agreement between the preverbal accusative clitic and the past participle.

The chart in (5) summarizes the agreement typology presented so far. Note that all three languages allow no participle agreement when the clitic is not accusative. Also they all require obligatory agreement in passives.

(5) past participle agreement typology:²

	acc.	wh	passive	non-acc.
French	opt	opt	oblig	-
Italian	**	-	oblig	-
Spanish	-	-	oblig	-

Note: ** indicates obligatory agreement for third person clitics and optional agreement for first/second.

In this article I would like to suggest where in the Grammar the parameter may be set that results in three superficial agreement patterns.

2. Previous Analyses

The above well-known facts had been kept at a rather descriptive level before Kayne (1989) first made the suggestion that the agreement found between the past participle and the preverbal clitic is exactly like that found between the subject and the finite verb.

- (6) a. Paul a repeint les chaises.
 'Paul has repainted the chairs'
 b. Paul les a [e]_i Agri repeintes t_i.

Kayne suggests that the accusative clitic moves through an intermediate position before it reaches the preverbal position. As shown in (6b), agreement is triggered by the relation of [e]_i and Agri. Sportiche (1990)³ further proposes an account in terms of spec-head agreement. Since the basic assumption is that agreement is triggered only in a spec-head relation, to account for the clitic-participle agreement facts, Sportiche assumes that the NP containing the clitic first move as a maximal projection to the spec of the past participle phrase and the clitic later incorporates into Infl as a head.

structures. When there is agreement, the clitic *mi* and the participle *criticato* at some point hold a spec-head relation as described in (6b). When there is no agreement, *mi* is actually assigned oblique Case by an empty preposition higher than the participle. Since *mi* never appears in the spec of the participle, there is no agreement. Third person clitics, on the other hand, cannot have the option to be Case marked oblique exemplified by the ungrammatical (8b). A third person clitic can only move through the spec of the participle and thus always triggers agreement.

Kayne's proposal is appealing in many ways but it still leaves one question unanswered: why cannot a third person clitic take oblique Case? I have no answer for this question but I will instead suggest a modified theory of Case assignment that may account for this fact.

Another potential problem for Sportiche's analysis comes from a theoretical point of view. Although there is no violation of any sort in our Grammar for a combined movement of XP and head such as Sportiche's proposal for clitic movement. Empirical evidence really suggests that clitic movement is head movement throughout. Kayne's (1989b) studies of Italian clitic climbing constructions provide some convincing evidence as shown in (9), (10) and (11).

- (9) a. Non ti saprei che dire t.
'I won't know what to tell you'
b. *Non li sa se fare t.
'I don't know whether to do them'
- (10) a. Gianni vuole mostrarveli.
'Gianni wants to show them to you.'
b. Gianni ve li vuole mostrare.
c. *Gianni vi vuole mostrarli.
d. *Gianni li vuole mostrarvi.
- (11) a. Gianni vuole non vederli.
'Gianni wants to not see them.'
b. *Gianni li vuole non vedere.

(9a) and (9b) are instances of clitic climbing. In (9a), the clitic *ti* moves out of the embedded infinitival clause although there is an XP *che* sitting in the spec of CP.⁴ In (9b), the clitic *ti* cannot climb out with a filled C⁰ *se* blocking the path. Assuming that clitics move as XPs in intermediate steps would predict the opposite results because the XP *che*, instead of *se*, would incorrectly block the climbing. Sentences in (10) further show that when there are two clitics involved they must either both climb out to the higher Infl or both stay in the lower Infl as we can see from

the grammatical (10b) and the ungrammatical (10c) and (10d). Again under Sportiche's analysis we would expect the opposite results given that adjunction to CP is not allowed therefore only one XP can move out. (11) provides another piece of evidence: In (11b), the clitic *li* is prevented from moving out of a negative infinitival clause, presumably because the negative head *non* blocks the path of the head movement.

3. Proposal

I will make two very general assumptions before starting my proposal. First, I assume that clitics of all Romance languages move in the same fashion. Second, Case is assigned in the same fashion in all Romance languages. In other words, if Case assignment is available in some configuration in language A, it must be also available in other languages. Similarly, if Case assignment is prohibited in language A, it must be also prohibited in all other languages.

Following the analysis of passives in Jaeggli (1986) and Baker, Johnson, and Roberts (1989), I further assume an extension of the theory of Case assignment as follows:

- (12) A Case assigner can in principle assign Case under incorporation.

(12) basically describes instances of "case absorption" in the literature. In passives, the external argument, *-en* in BJR's theory, incorporates into the verb and receives the Case from the verb, therefore NP raising is triggered. Similar activities takes place in middle constructions as suggested by Bouchard (1984) for Romance.

Given that Case assignment are generally allowed under incorporation, I will extend the A/A' distinction for XPs to heads and distinguish two types of incorporation in terms of Case assignment. I propose that only A-incorporation can trigger head-head agreement. The proposal, stated in (13), maintains in spirit both Sportiche's spec-head account for passives and wh-constructions and Kayne's analysis of clitic movement as head movement.

- (13) A-incorporation triggers agreement.

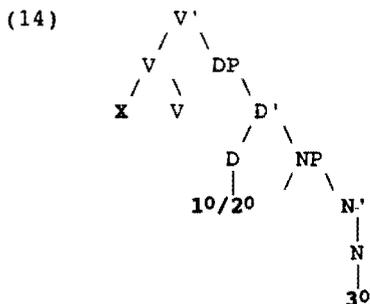
A-incorporation is defined as follows:

In [X^0 [H] [X]], H is in an A-position
iff X assigns Case to H.

Basically, (13) states that spec-head agreement is not the only type of agreement. Besides spec-head, head-head relation may also trigger agreement when Case assignment is done in that configuration. Otherwise, the incorporating head is in an A' position. This proposal accounts for the French data in a similar way to Sportiche's (1990) analysis in (7). Consider *l'avoir décrit/décrite à la femme (la = la robe)*. The clitic *la* can either receive Case in the canonical complement position or in the incorporation structure described in (13). In the former instance, *la* will still incorporate into the verb before it reaches Infl. However, since it is A'-incorporation, no agreement is triggered. In the latter instance, *la* receives Case under A-incorporation, head-head agreement is obligatorily triggered.

The Italian facts need some additional assumption due to their different treatment of persons. It is plausible at least at an intuitive level to say that first person and second person clitics are always definite but third person clitics may be indefinite. According to Ritter (1988), in modern Hebrew first and second person clitics are base-generated under DP while third person clitics are base-generated under NP. I will extend Ritter's analysis and assume that languages that syntactically distinguishing first/second person from third person have the same base structure as Hebrew.

Given the above assumption, the A/A' incorporation analysis, surprisingly enough, predicts the correct agreement facts described in (3). Consider the following structure.



First and second person clitics are base-generated under DP, governed by the verb under sisterhood. It can either receive Case in situ under government or receive Case under A-incorporation. The latter instance will trigger head-head agreement and the former instance does

not trigger agreement because when the clitic later moves up the adjoining position is an A' position. This explains why the agreement is optional. Third person clitics are base-generated under NP. They do not get Case in situ since the verb is too far to govern it. Head to head movement applies and first moves the third person clitic to D. Since the clitic is not the head of the structure [D [N] [D]], it cannot get Case there. The clitic moves further up to the verb, receive Case from it under A-incorporation, and trigger agreement. Since third person clitics can only receive Case under incorporation, agreement is obligatory.

So far the head-head agreement analysis successfully accounts for French and Italian clitic constructions but the Spanish data still needs explanation. Since French and Spanish both do not make the sort of person distinction that Italian does, the null hypothesis is that Spanish clitics are also base-generated under D. Now that we have attributed the French and Italian asymmetry to the claim that the third person is generated in N, the three-way difference among the three languages can be reduced to a two-way distinction between Spanish on one side and French and Italian on the other. I suggest a condition as stated in (15) to be responsible for this parametric variation.

- (15) Condition on Case Assignment Priority:
Case assignment under government takes
priority over Case assignment via movement.

(15) is not entirely a stipulation because it can be considered as derived from the Principle of Economy proposed by Chomsky (1991). Having established (15) as the parameter, we now can reduce the rather complex agreement facts summarized in (5) to the following paradigm:

(16) Parameter of Case Assignment Priority

	X ⁰	XP
French	-	-
Italian	-	+
Spanish	+	+

According to (16), all Spanish clitics receive Case under government in situ and not by A-incorporation. Therefore, Spanish preverbal clitics never trigger participle agreement. French and Italian preverbal accusative clitics show optional agreement since they allow Case to be assigned wherever possible. (16) can also readily account for the difference in wh-

constructions between Spanish and Italian on the one hand and French on the other hand. Following Sportiche's analysis, French relativized direct object may receive Case in situ and move out of VP by adjunction. It may also move to spec of VP and receive structural Case at that point, triggering agreement before it moves on. Spanish and Italian relativized direct objects receive Case in the canonical complement position, therefore it can move out of VP only by adjunction, allowing no agreement. A serious problem immediately arises: Nothing in our Grammar really prevents a Case-marked Spanish/Italian NP from moving through the spec of VP (there would be no Case conflict in doing so)? However, moving the NP to spec of VP would falsely trigger spec-head agreement. I have no satisfactory solution at this point.⁵

4. Conclusion

In this paper, I have argued that head-head agreement is triggered under A-incorporation defined in (13). This extension of Sportiche's spec-head account achieves three goals. First, it avoids the problem of moving clitics as XPs, which is challenged by Kayne's data presented from (9) to (11). Second, assuming third person clitic to be base-generated under N, the proposal allows a straightforward account for the Italian data in (3), namely the person asymmetry. Third, the rather complex agreement facts summarized in (5) can be reduced to a single parametric Condition of Case Assignment Priority.

Notes

- * I would like to thank Dominique Sportiche for his many helpful comments.
- 1 According to the judgement of Sportiche (1990). Prescriptive grammar requires obligatory agreement in this case.
- 2 It is obvious from the chart that a thorough survey of all constructions involving agreement is not attempted. Constructions such as impersonal unaccusatives, impersonal passives, *se* or *si* constructions, etc. are left unmentioned but not incompatible with the current analysis.
- 3 Sportiche (1992) analyzes clitic constructions differently yet the idea that agreement is triggered by the clitic's moving through spec of V remains unchanged.

- 4 An anonymous reviewer points out that it is impossible to say (8a) if the clitic is third person:
- i) *a. Non gli saprei che dire t.
'I won't know what to tell her'
- I have no suggestion for this interesting fact at this point.
- 5 This strongly suggests that spec-head configuration alone is not a sufficient condition for triggering spec-head agreement. A very similar notion to what I have suggested in (13). But if a condition of Case assignment is also added for spec-head agreement, it would be difficult to explain why passive constructions exhibits subject-participle agreement.

References:

- Baker, Johnson, and Roberts (1989) "Passive Argument Raised", *Linguistic Inquiry* 20, 219-251.
- Bouchard, D. (1984) *On the Content of Empty Categories*, Foris Publications, Dordrecht.
- Chomsky, N. (1991) "Some Notes on Economy of Derivation and Representation", in R. Fredin, ed. *Principles and Parameters in Comparative Grammar*, MIT Press, Cambridge.
- Jaeggli, O. (1986) "Passive", *Linguistic Inquiry* 17, 587-622.
- Kayne, R. (1989) "Facets of Romance Past Participle Agreement", in P. Beninca, ed., *Dialect Variation and the Theory of Grammar*, Foris Publications, Dordrecht.
- Kayne, R. (1989b) "Null Subjects and Clitic Climbing", in *The Null Subject Parameter*, O. Jaeggli and K. Safir, eds., Kluwer, Dordrecht.
- Ritter, E. (1988) *A Case Study in the Syntax of Agreement: Hebrew Noun Phrases and Benoni Verb Phrases*. Doctoral dissertation, MIT, Cambridge.
- Sportiche, D. (1990) "Movement, Agreement and Case", ms. UCLA
- Sportiche, D. (1992) "Clitic Constructions", ms. UCLA

The Experiential Marker: a Temporal Quantifier
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(I) **Experiential Constructions and the Traditional Definition**

Guo in Mandarin and *-ia toko ga aru* in Japanese are called experiential constructions (EXPER).¹ The traditional definition states that EXPER denotes an event which has happened (or has been experienced) at least once in the past. (Ma 1978; Inoue 1975) For instance,

- (1) Wangping da-guo wangqiu
 Wangping play-guo tennis
 "Wangping has played tennis before."
- (2) Risako wa uma ni no-tta koto ga aru
 Risako TOP horse LOC ride-PER fact SUB exist²
 "Risako rode horses before."

Guo is a verbal suffix. *-Ta koto ga aru* is used as a fixed construction. Literally, (2) means that Risako has had the experience of riding horses in the past. The traditional definition, however, is inadequate. First, the description does not distinguish an experiential construction from a sentence in the simple past which also presents a situation happening in the past. Second, EXPER is constrained by the 'recurrence' requirement. Consider (3) in Mandarin and (4) in Japanese.

- (3) *Gelunbu faxian-guo meizhou
 Columbus discover-guo America
 "Columbus discovered America."
- (4) *Koronbas wa Amerika-o hakken shi-ta koto ga aru
 Columbus TOP America-ACC discover do-PER koto SUB exist
 "Columbus discovered America (before)."

(3-4) are unacceptable. 'Recurrence' says that the EXPER can not present a situation such as [Columbus discover America] which only happens once. The question is why can not the EXPER present the experience of Columbus' discovery of America? The traditional definition does not provide an answer.

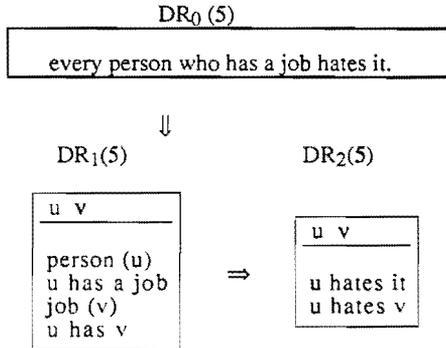
In this paper, I will suggest a semantics of EXPER from the perspective of temporal quantification. I propose that EXPER functions as a temporal quantifier, something like *always*. The approach is based on the study of Partee's (1984) analysis of temporally quantified sentences in the framework of Discourse Representation Theory (DRT, Kamp 1981). The current approach to EXPER will show that the constraint of 'recurrence' is a generalization shared by all temporal quantifiers.

In (II), I will first discuss the *if*-clause and *every* construction rule suggested by Kamp for building Discourse Representation Structures (DRSs), based on which Partee proposes that *always* constructs a similar DRS. In (III), the analysis of the temporal quantifier in DRT is the focus. I propose the semantics of EXPER in (IV). Lastly, in (V) I will return to the constraint of 'recurrence'. (VI) is the conclusion.

(II) Nominal Anaphora in Conditional and Universally Quantified Sentences

Both a conditional clause and a sentence quantified by *every* in the DRT framework create a complex DRS. Take (5) as an example. The construction rule for noun phrases introduced by *every* gives rise to two DRs with subordination structure.

- (5) Every person who has a job hates it.



DR₁ contains the antecedent, which introduces new entities and conditions on them corresponding to the content of the common noun with the relative clause. DR₂ consists of a condition corresponding to the rest of the matrix sentence. DR₀ is true if every embedding that satisfies DR₁ can be extended to an embedding that satisfies DR₂. In DR₁ the discourse entity *v* is introduced by *a job*. Since DR₁ and DR₂ are at the same level and DR₂ is subordinate to DR₁, *v* is accessible to the pronoun *it* in DR₂. 'Accessibility' of discourse entities depends on this subordination relation.

(III) A DRT-based analysis of quantified sentences

Partee (1984) notices a contrast between (6) and (7).

- (6) When Mary called, Sam was asleep.
 (7) When Mary called, Sam was always asleep.
 (or Whenever Mary called, Sam was asleep.)

In (7), we are not dealing with a simple linear narration anymore. She proposes to handle (7) in the same fashion as a conditional and universally quantified sentence. The main clause with *always* (or *whenever*-clause) triggers the same kind DRS-splitting as *if*-clause and *every* construction rules. First let us see the simple DRS (6) constructed by the sentence (6).

DRS(6)

r_0	e_1	r_1	e_2	r_2	u	v	now
[$r_p := r_0$]							
when Mary called, Sam was asleep							
$u = \text{Mary}$							
$r_0 \supseteq e_1$							
$e_1 \leq r_1 < \text{now}$							
[$r_p := r_1$]							
e_1 : Mary call							
u call							
$v = \text{Sam}$							
$s_1 \supseteq r_1$							
s_1 : Sam be asleep							
sleep (v)							

Partee follows Hinrichs (1981; 1986) in her presentation the temporal relation between sentences in a narration. According to Hinrichs, a new sentence introduces a new event entity and the temporal interpretation of the sentence relies on the reference point given by the previous discourse. Each new sentence also introduces a new reference time which becomes the current one for the following sentence to process. The discourse of (6) introduces a set of reference entities corresponding to individuals (u, v, \dots), events and states (e_1, s_1), and the reference time (r_1), which are presented on the top of the box. ' r_0 ' is a reference point established in the previous discourse. The speech time is presented by 'now'.

Besides a set of reference entities, there are conditions requiring that each event introduce a reference time located 'just after' that event ($e_1 \leq r_1$). ' \leq ' is used by Partee to characterize the relation 'just after.' '<' presents the relation of complete precedence between events. $r_0 \supseteq e_1, r_1 \supseteq e_2, \dots$, etc., are conditions stating that reference times have to include events. The relation of temporal inclusion ' \supseteq ' is definable in terms of '<' and overlap.

[$r_p := r_0$] says that the current reference time is updated by r_0 .³

In contrast, (7) *when always asleep* gives a complex DRS, since *always* triggers a splitting-DR.

DRS (7)

r_0 u v now
$[r_p := r_0]$
when Mary called, Sam was asleep
u = Mary
v = Sam

 \Downarrow
DR₁(7)

e_1 r_1
Mary called
$r_0 \supseteq e_1$
$e_1 < \text{now}$
$e_1 \leq r_1 < \text{now}$
e_1 : Mary call
u call
$[r_p := r_1]$

DR₂(7)

s_1
Sam was asleep
$s_1 \supseteq r_1$
s_1 : Sam be asleep
sleep (v)

 \Rightarrow

The embedding conditions for (7) are like those for the *if*-clause and *every* construction. DRS(7) is true iff every proper embedding of the antecedent DR can be extended to a proper embedding of the consequent DR.

Observe the parallel between nominal and temporal anaphora in the following unacceptable cases. (Partee 1984: 274)

- (8) *If every man_i owns a donkey, he beats it_i.
 (9) *If Sheila always walks into the room, Peter wakes up.
 (If Sheila walks into the room, Peter always wakes up.)

In Kamp's system, *every* in the antecedent of (8) creates two DRs which do not have a subordinate relation to the main clause. The discourse entity corresponding to *every man* introduced in the splitting DR is not accessible to the pronoun *he* processed in the main clause. Likewise, *always* in (9) triggers a similar DR-split where the reference time of the event in the antecedent is introduced. (9) is unacceptable, since the reference time is not introduced at the level of the *if*-clause as a whole, it will not be accessible for the main clause interpretation.

Partee's concern is to draw a parallel between temporal and nominal anaphora in the cases which involve quantified expressions. Here, I apply her analysis of temporal quantification and examine how a sentence like (7) can interact with other events in a narrative discourse. First consider the simple *when*-clause in a linear narration.

- (10) John invited Mary over for dinner. (e₁) John served a strawberry cake for desert. (e₂) When Mary ate it (e₃), she broke out in a rash. (e₄) She got very sick (e₅) and John took her to the emergency room. (e₆)

We can construct a DR for (10) in which all the events are ordered in a simple linear progression. All of the discourse entities for the individuals, the events and the reference times are introduced in the top box along with the the moment of speech now and the r₀ established in the previous discourse. The discourse of (10) constructs one single DR which is sketched as follows.

DRS(10)

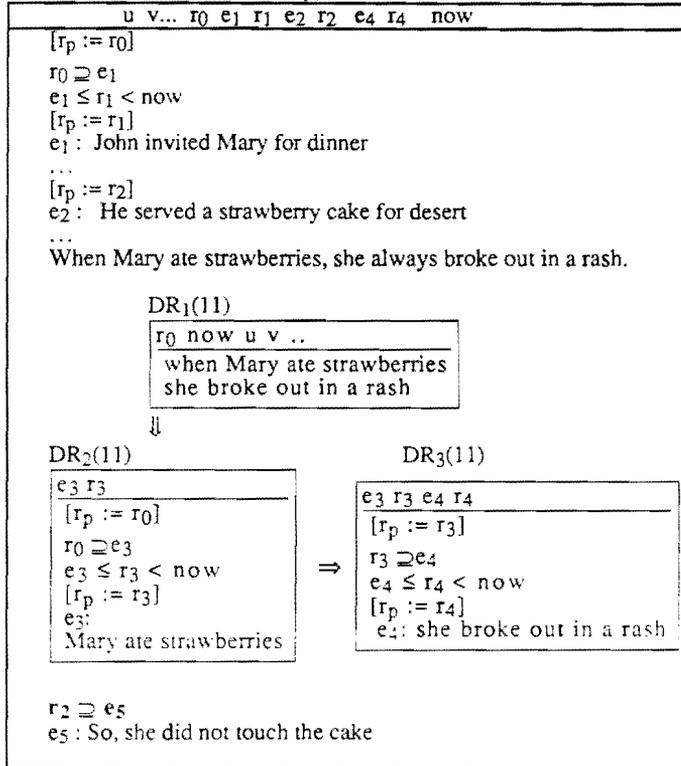
u	v	r ₀	e ₁	r ₁	e ₂	...	e ₆	r ₆	now
[r _p := r ₀]									
e ₁ ≥ r ₀									
e ₁ ≤ r ₁ < now									
[r _p := r ₁]									
e ₁ : John invited Mary for dinner									
u = John									
v = Mary									
u invited v for dinner									
.									
[r _p := r ₆]									
e ₆ : John took her to the hospital.									

In contrast, sentences with temporal quantifiers do not link to the other events in a linear fashion in a narrative discourse. (11) is an example.

- (11) John invited Mary over for dinner. (e₁) He served a strawberry cake for desert. (e₂) When Mary ate strawberries (e₃), she **always** broke out in a rash. (e₄) So, she did not touch the cake.(e₅)

The events e₃ and e₄ under the scope of *always* are not ordered relative to e₂ in (11). e₃ is not interpreted temporally relative to e₂. The last event e₅ is anchored to the reference time introduced by e₂, rather than e₄. The temporal relation in (11) can be made clear by following Partee's analysis. *Always* triggers two DRs which are not at the same level as e₅. That is, e₅ is not subordinate to DR₁ and DR₂ (as shown in DRS (11) below). The set of reference time and event entities (such as e₃, r₃, e₄, r₄) introduced in the split DR are not accessible for e₅. The complex DRS (11) has a configuration as illustrated below.

DRS(11)

DR₀(11)

The antecedent *when Mary ate strawberries* is not anchored to the specific reference time established by e_2 , yet the whole sentence does have to be interpreted relative to some sufficiently large reference point. Partee proposes to handle this by assuming that there is a reference time r_0 already present in the top box so that the discourse event in the antecedent box falls within the current reference time. In (11), both r_0 and r_1 are accessible for the discourse event e_3 in DR₂. To make Partee's proposal explicit, there should be a condition which requires that e_3 in the antecedent be included in r_0 rather than r_1 .⁴

The construction rule of *always* reflects the intuition that temporally quantified events do not refer to a specific situation, but to a set of events of the same type. In constructing a DRS, each occurrence of the same type is anchored to the same stretched reference time and does not shift the current reference time in the narration. The *always*-rule states that the set of discourse events and reference times introduced in a temporally quantified sentence are separated from the progression of

the narration. In (11), the interpretation of the pattern of events does not carry the story line forward, but provides background information.

Partee has demonstrated the parallel between nominal and temporal anaphora by suggesting that the temporal quantifier *always* creates the same kind of split-DR as the universal quantifier *every*. I have shown that the analysis of temporal quantification in DRT can account for the interaction of quantified sentences with other events in a narration. A temporally quantified sentence does not advance the narration, but constructs its own temporal system which is independent of other events. Partee's approach opens up a different perspective for viewing the function of a quantified event in the structure of narrative discourse. It is this perspective which I will apply to analyze the experiential sentence.

(IV) EXPER as a temporal quantifier

The general meaning of an experiential sentence is to express that an event happens at least once in the past. Li and Thompson (1981: 231) observe another feature of the temporal behavior of the experiential marker *guo* in Mandarin: *guo* does not present a series of successive events. Ijic (1990: 310) also comments that the temporal property of *guo* is to suppress the linearity of time. Their observations of *guo* are actually generalizations we can make about temporal quantifiers such as *always*, *often*, and *never...etc.* Recall that, in the preceding sections, events quantified by *always* did not form a temporal relation with the subsequent events in a narration. I suggest therefore that EXPER be treated as a temporal quantifier. A sentence in the scope of EXPER does not refer to a specific situation, but to a type of event. In the framework of DRT, similar to *always*, EXPER triggers a quantificational DRS, although a simpler one than that of *always*. Let us first look at an example of linear narration in Mandarin.

- (12) Aguan zou-jin xingzhen dalou,
Aguan walk-enter administration building

ta dianti dao er lou, zouchu dianti shi,
take elevator reach second floor, walk-out elevator time

pengjian Wang xiansheng
come-across Wang Mr.

"Aguan walked into the administration building and took the elevator to the second floor. When he came out from the elevator, he met Mr. Wang."

Mandarin does not have a tense system. The use of temporal adverbials specify the time for the occurrence. The successive events in (12) do not include an explicit time adverbial. The natural interpretation for this narration embeds it in a past context. If there is a specific future reference time set at the outset of the discourse, (12) may have a future reading. The perfective marker *le* may be suffixed to the verbs.⁵ The addition of *le* will not break up the temporal order. However, in contrast, when *guo* appears, the linear line is interrupted, as shown in (13):

- (13) Aguan zou-jin xingzheng dalou,
Aquan walk-enter administration building

ta-**le** dianti dao er lou,
*ta-**guo**
take elevator reach second floor,

zouchu dianti shi, pengjian-**le** Wang xiansheng
*pengjina-**guo**
walk-out elevator time, come-across le Wang Mr.

"Aguan walked into the administration building and took the elevator to the second floor. When he came out from the elevator, he met Mr. Wang."

Of course *guo* can appear in narration presenting background information.

- (14) Aguan zou-jin xingzheng dalou, (e₁)
Aquan walk-enter administration building

da dianti dao er lou, (e₂)
take elevator reach second floor

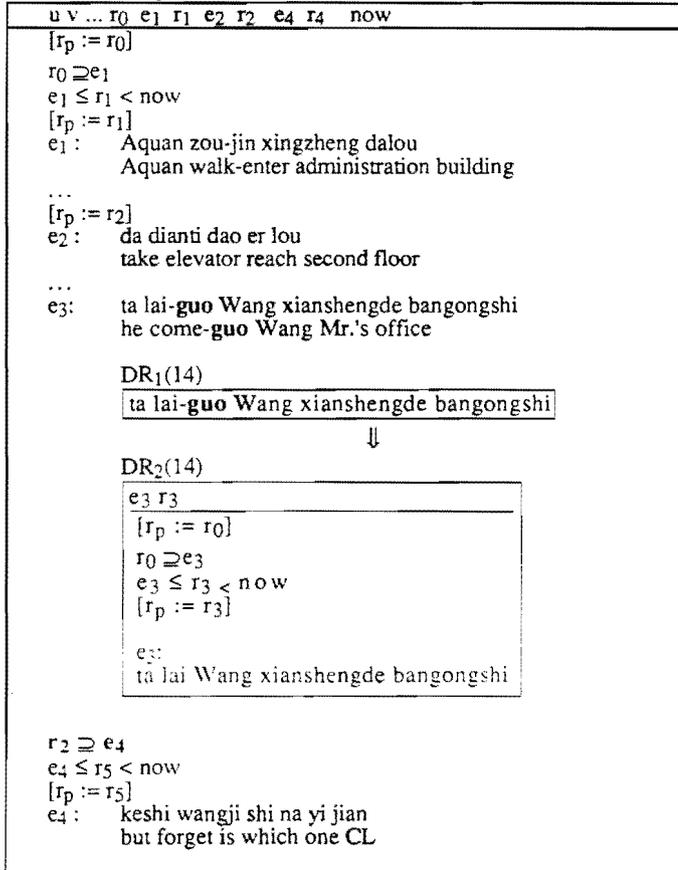
ta lai-**guo** Wang xiansheng-de bangongshi, (e₃)
he come-**guo** Wang Mr.'s office

keshi wangji shi na yi jian (e₄)
but forget is which one CL

"Aguan walked into the administration building and took the elevator to the second floor. He had come to Mr. Wang's office (before), but he forgot which one."

In (14), e₃ presented by *guo* is not related to the previous event or to the following event temporally. In terms of temporal relations, the last event e₄ is linked anaphorically to the time 'just after' when Aguan arrived at the second floor. We can present the temporal order of (14) in DRS (14). When the third sentence is processed, *guo* triggers the introduction of a new DR whose event entity is not related to the current reference time. For simplicity, in the following DRS, I am concerned with the discourse entities and conditions involving temporal relations.

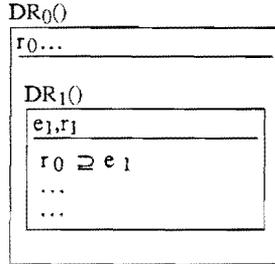
DRS(14)

DR₀(14)

The EXPER construction-rule builds a separate DR. The difference from the rule that treats quantifiers like *always* is that an EXPER-sentence does not have an antecedent. DR₂ is subordinate to the principal DR₀(14), but not vice versa. Without the subordinate relation, r_3 , introduced in DR₂, is not accessible for e_4 in the principal DR₀. Hence, e_4 is interpreted relative to r_2 .

For the type of event quantified by *guo*, just like other quantifiers, we should also assume that there is a r_0 , a sufficiently large period, available in the top box, and a condition that requires the event presented by EXPER to fall within r_0 , instead of being anchored to the previous specific reference point (such as r_2 in (14)). DR₂(14) is true iff there is an embedding from DR₂ to the model M. In the example of (14), in terms of the embedding condition, the events quantified by

EXPER do not differ from those introduced in the principal DR. The unique temporal behavior of EXPER, on the other hand, can be articulated in DRT by means of subordination and accessibility. An event quantified by EXPER is presented in a DR which has the following configuration:



The above DR_1 constructed by EXPER is subordinate to the main box. The event entities and reference times in DR_1 are not accessible for the situations following. An EXPER sentence builds up its own temporal system which does not shift the current reference point in the narration. From this perspective, I suggest that EXPER should be treated as a temporal quantifier similar to *always*.

(V) 'Recurrence' and The Plurality Condition on Quantification

We mentioned at the outset that a situation which does not recur cannot be presented by EXPER. (15) and (16) illustrate the contrast.

- (15) *Gelunbu faxian-guo meizhou
Columbus discover-guo America
"Columbus discovered America."
(16) Gelunbu faxian-guo yi ge xiaodao
Columbus discover-guo one CL small-island
"Columbus discovered one small island."

(16) is acceptable, since the situation [discover a small island] is repeatable. Interestingly, de Swart (1991) presents a similar contrast with temporally quantified sentences.

- (17) When Anne made a movie, she always recommended it to her friends.
(18) *When Anne made *Dangerous liaisons*, she always recommended it to her friends.

De Swart calls [Make *Dangerous liaisons*] a 'once-only' predicate, in contrast to [make a movie], which is recurrable. Parallel examples can also be found in individual-level predicates.

- (19) When a dog has blue eyes, it is always intelligent.
(20) *When Fido has blue eyes, it is always intelligent.

[Have blue eyes] is referred to as an individual-level predicate (Kratzer 1989). Unlike Kratzer's proposal, de Swart assumes that individual-level predicates have a spatio-temporal location (in Davidson's sense 1967).

The general picture de Swart draws from (17-20) is that quantification over situations is allowed if either the subject or the object is indefinite, thus creating a set of situations for the temporal quantifier to operate on. Individual-level and 'once-only' predicates have in common that they cannot be applied repeatedly to the same individual. In other words, the spatio-temporal location for both predicates is unique. The uniqueness presupposition is formulated as follows: (de Swart 1991: 59)

Uniqueness presupposition on the Davidsonian argument

The set of spatio-temporal locations that is associated with an individual-level or a 'once-only' predicate is a singleton set for all models and each assignment of individuals to the arguments of the predicate.

Thus, what blocks the quantification in (18) and (20) is the uniqueness of locations. The two situations involve a particular assignment of an individual to the location variable. In contrast, the predicates in (17) and (19), with an indefinite NP which introduces a variable and creates a plurality of situations, are felicitous with a quantifier adverb (Q-adverb). de Swart (p.119) formulates the plurality condition on quantification as follows:

Plurality condition on quantification

A Q-adverb does not quantify over a set of situations if it is known that this set has cardinality less than two.

A set of situations is known to be a singleton set if:

- 1) the predicate contained in the sentence satisfies the uniqueness presupposition on the Davidsonian argument, and
- 2) there is no (in)definite NP present in the sentence which allows indirect binding by means of quantification over assignments

Thus, the constraint of 'recurrence' is not particular to an experiential marker, but it is a generalization for all temporal quantifiers. In de Swart's analysis, the uniqueness presupposition and the plurality condition specify the well-formed sentences for Q-adverbs to quantify over. Especially, she discusses the presence of indefinite NPs which makes a plurality of situation possible. If either argument, subject or object, is indefinite, involving iteration of assignments to individual variable, the sentence can be presented by quantifier adverbs. This is exactly what happens in (15) and (16). Clearly, (15), as a 'once-only' predicate, does not satisfy the plurality condition. In contrast, the same predicate appears with *quo* in (16), by means of the presence of the indefinite NP. The indefinite NP *one small island* in the object position makes the situation susceptible to repetition. Thus, the constraint of 'recurrence' follows naturally, once *quo* is understood as a temporal quantifier.

(VI) Conclusion

In this paper, I approach the semantics of *EXPER* from the perspective of quantification, and propose the analysis of *quo* as a temporal quantifier. I follow

Partee's treatment of *always* in the style of DRT and show that a *guo*-sentence functions the same as a sentence quantified by *always*. *Guo*, *always* and other quantifiers trigger the introduction of a DRS separate from the current reference time in the narrative discourse. As a result, temporally quantified sentences do not move the main story line forward, but provide background information. I have also discussed the plurality condition, suggested by de Swart, shared by all quantifiers. Quantifier adverbs have to quantify over a set of situations which is not a singleton set. Obviously, EXPER, like *guo*, follows the plurality condition which is traditionally called the constraint of 'recurrence'.

NOTES

¹In English, the experiential meaning can be expressed by a perfect sentence, such as *John has been to China* or *I have had Chinese food before*. However, the experiential use is not grammaticalized in the English perfect which has various uses. For a discussion of the English perfect and the experiential use, see Yeh (forthcoming).

²The abbreviations used are: TOP=topic, LOC=locative marker, PER=perfective marker, SUB=subject marker.

³These conditions are specified in Hinrichs' construction rules for event structure. Partee spells out the intuitive notion of 'just after' between the event and the new reference time introduced by it. The notations in the discourse representation are used by Partee.

⁴Notice that the events quantified by *always* can be presented in the present tense---*when Mary eats strawberries, she breaks out in a rash*. In this case, the discourse event in the antecedent box should be included in the present time 'now'.

⁵In theory, *le* may be suffixed to all of the verbs in (12) to show the completion of the event. However, the use of *le* in every event sounds very redundant. Where *le* appears in a discourse like (13) may be related to its discourse function, which indicates the 'peak' of an event line (Chu and Chang, 1987).

REFERENCES

- Chu, Chauncey and V. Chang. 1987. The discourse function of the verbal suffix -*le* in Mandarin. *Journal of Chinese Linguistics* 15 (2), 309-333.
- Davidson, D. 1967. The logical form of action sentences'. In N. Rescher (ed.), *The Logic of Decision and Action*. Pittsburg: Pittsburg University Press, 105-122.
- de Swart, H. 1991. *Adverbs of quantification: A Generalized Quantifier Approach*. Diss, Rijksuniversitet Groningen.
- Hinrichs, Erhard. 1981. *Temporale anaphora im Englishchen*. University of Tübingen staats-examen thesis.
- Hinrichs, Erhard. 1986. Temporal anaphora in discourses of English. *Linguistics and Philosophy* 9, 63-82.
- Iljic, Robert. 1990. The verbal suffix -*guo* in Mandarin Chinese and the notion of recurrence. *Lingua* 81, 301-326.
- Inoue, K. 1975. *Studies in Perfect*. Diss, University of Michigan.
- Kamp, Hans. 1981. A theory of truth and semantic representation. In Groenendijk, Th. Janssen, and M. Stokhof (eds.), *Formal methods in the study of language*, Part 1, 277-322.

- Kratzer, A. 1989. Stage-level and individual-level predicates. In Bach, E., A. Kratzer, B. Partee (eds.), *Papers on Quantification*. University of Massachusetts at Amherst.
- Li, Charles and Sandra Thompson. 1981. *Mandarin Chinese: a functional reference grammar*. Berkeley: University of California Press.
- Ma, Jing Sheng. 1978. Some aspects of the teaching of -guo and -le. *Journal of the Chinese language Teachers Association* 12 (1), 14-26.
- Partee, Barbara H. 1984. Nominal and temporal anaphora. *Linguistics and Philosophy* 7, 243-286.
- Yen, Meng. Forthcoming. *The Semantics of Experiential Constructions*. Diss, University of Texas at Austin.

Scrambling Effects in Japanese*

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0. Introduction

Japanese is known as one of the languages which allow relatively free word order, presumably as the result of scrambling. For example, we can express "John gave Mary a book" in six different ways as shown in (1); the three arguments, "John", "Mary" and "a book" can be freely scrambled while the verb "give" stays at the end of the sentence.

- | | | | | |
|--------|----------|-----------|-----------|-----------|
| (1) a. | John-ga | Mary-ni | hon-o | age-ta. |
| | -NOM | -DAT | book -ACC | give-PERF |
| b. | John-ga | hon-o | Mary-ni | age-ta. |
| | -NOM | book -ACC | -DAT | give-PERF |
| c. | Mary-ni | John-ga | hon-o | age-ta. |
| | -DAT | -NOM | book -ACC | give-PERF |
| d. | Mary-ni | hon-o | John-ga | age-ta. |
| | -DAT | book -ACC | -NOM | give-PERF |
| e. | hon-o | John-ga | Mary-ni | age-ta. |
| | book-ACC | -NOM | -DAT | give-PERF |
| f. | hon-o | Mary-ni | John-ga | age-ta. |
| | book-ACC | -DAT | -NOM | give-PERF |
- "John gave Mary a book."

This paper deals with some restrictions on scrambling in Japanese. In particular, we observe that multiple WH questions containing "naze (why)" are restricted so as not to violate the conditions stated in (2):

(2) Constraints on scrambling in multiple WH Constructions

- a. An argument WH (what/who(m)) must precede an adjunct WH (why).
- b. WH elements must be adjacent.
- c. Non-WH elements must not precede two WHs.

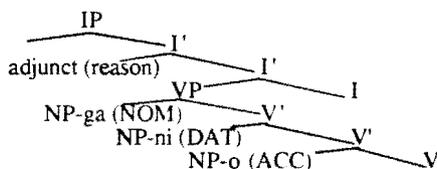
I will argue that the notion of "rigidity" stated in (3a) and the minimality condition as stated in (3b) will account for these descriptive generalizations.

- (3) a. "rigidity": the hierarchical relationship between two operators at LF corresponds to the one at pre-scrambling structure or post-scrambling structure.¹
- b. Minimality Condition: A governor cannot govern inside the domain of another governor. (Chomsky (1986))

1. Basic Assumptions

In this paper, we will base our arguments on the following three assumptions. First, we assume that transitive or ditransitive sentences have a binary branching structure as in (4) at D-structure.

(4)



We adopt VP-internal subject hypothesis, in particular the version that subject originates in [SPEC, VP] as in Kuroda (1988) and Huang (1990). But adopting this particular hypothesis does not affect any arguments in the following crucially. As for the hierarchical relationship among arguments, we follow Hoji (1985). We assume that adjuncts of reason are generated somewhere outside of VP. For concreteness, they are adjoined to I' in this paper.

Second, following Saito (1985) and Fukui (1986), we assume that scrambling is an adjunction operation. The exact adjunction site, however, is not clear. For example, Saito assumes an adjunction to XP; but in a Fukui-type of theory, adjunction to X' makes sense, where V' is treated as VP. How would it be like under the VP-internal subject hypothesis; is it an adjunction to X' or XP? Since it seems difficult to deny either possibility at this point, we tentatively assume both XP and X' adjunction are available for this scrambling movement. Thus (1c) is assumed to have the structure as in (5c); (1b) is associated with two representations as in (5b) and (5b'), though for expository purposes, we will use (5b) from now on.

- (1) b. John-ga hon-o Mary-ni age-ta.
 -NOM book -ACC -DAT give-PERF
 c. Mary-ni John-ga hon-o age-ta.
 -DAT -NOM book -ACC give-PERF
- (5) b. [_{VP}John-ga [_{V'} hon-o_i [_{V'} Mary-ni [_{V'} t_j age-ta]]]].
 -NOM book-ACC -DAT give-PERF
 b'. [_{IP}John-ga_i [_{VP} hon-o_j [_{VP} e_j [_{V'} Mary-ni [_{V'} t_j age-ta]]]]].
 -NOM book-ACC -DAT give-PERF
 c. [_{VP} Mary-ni_j [_{VP} John-ga [_{V'} t_j [_{V'} hon-o book-ACC give-PERF]]]].
 -DAT -NOM book-ACC give-PERF
 "John gave Mary a book."

Third, following Kuroda (1988), we assume that the subject can be optionally moved into [SPEC, IP]. We particularly assume that a sentence like (6b) involves this movement.

- (6) a. Nitiyoobi-da-kara John-ga sinbun-o kat-ta.
 sunday-COPL-because -NOM newspaper-ACC buy-PERF
 b. John-ga nitiyoobi-da-kara sinbun-o kat-ta.
 -NOM sunday-COPL-because newspaper-ACC buy-PERF
 "Because it is Sunday, John bought a newspaper."

If we assume the structure as in (4) at S-structure as well, (6a) does not involve scrambling; (6b) will have to involve the lowering of the "because" clause as in (7a) or the scrambling-like movement of the subject as in (7b).

As shown in (11), if the two WHs are arguments, basically they can be ordered in either way.

- (11) a. [VpDare-ga [V' dare-ni [V' hon-o age-ta]]] no?
 who-NOM who-DAT book-ACC give-PERFQ
 b. [VpDare-ni; [Vp dare-ga [V' t_i [V' hon-o age-ta]]]] no?
 who-DAT who-NOM book-ACC give-PERFQ
 "Who gave a book to whom?"

The generalization here is that an argument WH (such as "who", "what") must precede an adjunct WH ("why").

This fact reminds us of the Superiority Effects observed in the examples as in (12).

- (12) a. Who bought what?
 b. * What did who buy?
 c. Why did you buy what?
 d. * What did you buy why?

Superiority Effects are usually explained in terms of the ECP and Comp Indexing mechanism (as seen in Aoun, Hornstein and Sportiche (1981)). The crucial point of this explanation is that at Logical Form, all the WH elements should be in COMP, but only one WH can antecedent-govern its trace. If there is more than one WH, the syntactically moved WH has this privilege. A trace of "who" or "why", which is not in a lexically governed position, needs to be antecedent-governed unlike a trace of "what", so it must be moved into Comp at S-structure to antecedent-govern its trace at LF.

In Japanese, Subject is assumed to originate in the lexically-governed position, due to the well-known fact: the lack of subject/object asymmetry with respect to the ECP. An adjunct is the only NP type which derives in non lexically-governed position. Thus the trace we have to worry about here is exclusively the trace of "why". It is generally assumed that there is no WH movement at S-structure in Japanese. In other words, no element moves into COMP at S-structure. As Lasnik and Saito (1984) argues, this would mean that if there are two WHs, either WH can move into the COMP position first without any preference, and acquire the privilege of antecedent-governing its trace. If this is true, it would be the case that "naze (why)" can always move into the COMP first, and antecedent-govern its trace when there is "naze (why)" and some other argument WH in the sentence. There should be no superiority effects as we have seen in English examples in (12c) and (12d). But the Japanese data in (8) through (10) would indicate that this might not be the case.

How can we explain this fact? The key to our answer is based on the notion of "rigidity". It roughly means that there is a rather tight relationship between the structural information at pre-scrambling or post-scrambling structure on one hand and the some scopal information encoded in the structural relation at LF on the other hand. See examples in (13).

- (13) a. Dareka-ga daremo-o aisite-iru.
 someone-NOM everyone-ACC love
 b. Daremo-o_i dareka-ga t_i aisite-iru.
 everyone-ACC someone-NOM love
 "Someone loves everyone."

In English, "someone loves everyone" is said to be ambiguous. However, it is observed in Hoji (1985) that one of the possible Japanese counterparts, (13a), is not ambiguous: it has only one reading and it is "dareka (someone)" that takes a wide scope. In this example, "dareka (someone)" is in the structurally higher position than "daremo (everyone)" at pre-scrambling and post-scrambling structure. Hoji also noticed that the sentence in (13b), which involves scrambling, is ambiguous. We can get the reading which relates to the pre-scrambling structure configuration or the one which relates to the post-scrambling structure configuration: in one reading, it is "dareka (someone)" that gets wide scope and "dareka (someone)" is in the higher position than "daremo (everyone)" at pre-scrambling structure; in the other reading, it is "daremo (everyone)" that gets wide scope and "daremo (everyone)" is in the higher position at post-scrambling structure. If we follow May (1977), and assume that being "hierarchically higher (at LF)" somehow relates to being "scopally wider", the rigidity is defined as a syntactic condition as in (3a).

- (3) a. "rigidity": the hierarchical relationship between two operators at LF must correspond to the one at pre-scrambling structure or post-scrambling structure.

Hoji (1985) also shows that the rigid scope phenomenon of Japanese has been observed in WH-Q construction such as "what does everyone buy?" as well as the examples in (13). The question is whether it is plausible to extend this idea to multiple Wh constructions. It is generally assumed that two WHs in multiple WH construction share the same scope. But if we take the purely syntactic definition of rigidity as in (3a) as it is, WHs in multiple construction must also fall under this condition, and are mapped hierarchically in the projection of C. The observation that two WHs must share scope would be taken care of if we assume that every WH in the projection of C undergoes the absorption mechanism proposed in Higginbotham and May (1981) and Huang (1982).²

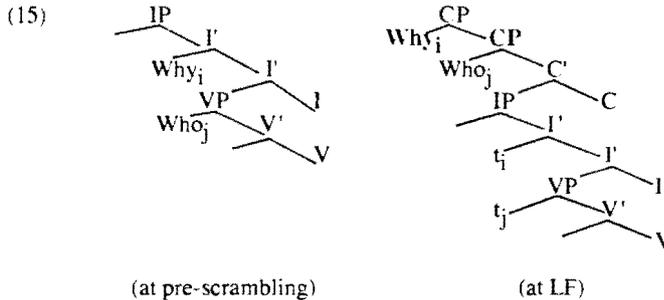
- (14) $[S' [COMP wh_1, wh_2, \dots, wh_n][S \dots]] \rightarrow [wh (1,2,\dots,n)] [S \dots]$
 (Huang (1982))

Now let us go back to the example (8a) and see how the proposed rigidity mechanism works.

- (8) a. [_{IP} Dare-ga_i [_{IP} naze [_{VP} t_i [_{V'} John-o nagut-ta]]]] no?
 who-NOM why -ACC hit-PERF Q
 "Who hit John why?"

Following the rigidity condition, there are two options at LF structure since at pre-scrambling structure "why" is higher than "who", but at post-scrambling structure, "who" is higher than "why". First, let us consider the case where "why" is higher

than "who" at LF, analogous to its pre-scrambling structure representation as in (15).

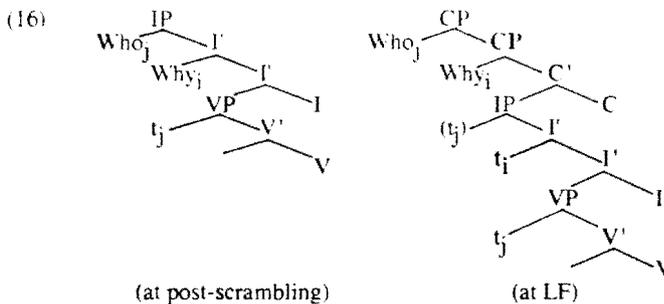


Notice that if antecedent-government is defined in terms of the minimality condition roughly stated in (3b), the trace of "why" is not antecedent-governed because it is inside the domain of a potential governor "who"; hence it violates the ECP.

(3b) A governor cannot govern inside the minimal domain of another governor.
(Chomsky (1986))

Note that in (3b) the minimal domain is defined in terms of maximal government. I consider that the adjoined XP is distinct from the original XP as in Lasnik and Saito (forthcoming).

Let us next consider the other case, where "who" is higher than "why" at LF, analogous to its post-scrambling structure representation as in (16).



We assume that the intermediate trace of "who" can be erased, following Lasnik and Saito (1984).

(17) A trace can be deleted (if it is not required by any principle).
(Lasnik and Saito (1984))

In (16), the trace of "why" is antecedent governed at LF and hence satisfies the

ECP.

Now consider (8b) again, which is repeated below.

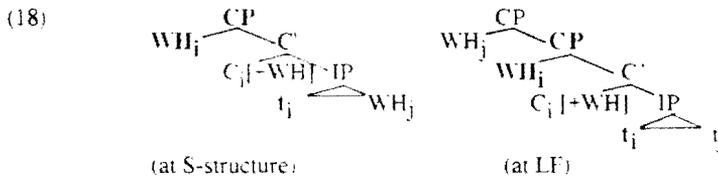
- (8) b. * [P Naze [VP dare-ga [V John-o nagut-ta]]] no?
 why who-NOM -ACC hit-PERF Q
 "Who hit John why?"

There is only one possible scope order at LF for (8b), since the hierarchical relation between the two WHs is unchanged from pre-scrambling structure to post-scrambling structure. The possible hierarchical relationship at LF is that "why" is higher than "who", which results in a violation of the ECP as seen in (15).

In sum, if we have "why" and an argument WH in the sentence, "why" must be in the lower position compared to an argument WH at pre-scrambling structure or at post-scrambling structure, in order to have any well-formed LF interpretation. Since at pre-scrambling structure, "why" is higher than any argument WH, an argument WH must be moved to create the structure in which it is higher than "why".

Note that we can explain the Superiority Effects in English in terms of the CP adjunction structure and the minimality condition as we did with Japanese multiple WH construction. Consider the example (12c) and (12d) again.

- (12) c. Why did you buy what?
 d. * What did you buy why?



As shown in (18), at S-structure, WH_i moves into SPEC of CP and at LF WH_j adjoins to CP. Since the bold faced CP (CP) is the minimal domain of WH_j , WH_j cannot antecedent-govern its trace. Thus if WH_j is "why", the sentence should be ungrammatical.

2. 2. The position of NP Elements

Now let us move on to the other constraints stated in (2b) and (2c).

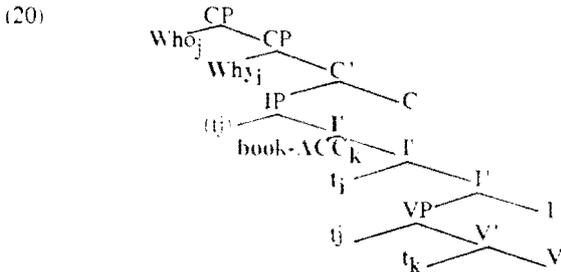
- (2) b. WH elements must be adjacent.
 c. Non-WH elements must not precede two WHs.

First look at the examples relevant to (2b). They are listed under (19).

- (19) a. * [IP Dare-ga_i [I' sono hon-o_j [I' naze [IP t_j [VP t_j kat-ta]]]]] no?
 who-NOM the book-ACC why buy-PERF Q
- b. * [I' Naze [VP sono hon-o_j [VP dare-ga [V' t_j kat-ta]]]] no?
 why the book-ACC who-NOM buy-PERF Q
 "Who bought the book why?"
- c. * [IP Nani-o_j [IP John-ga_i [I' naze [VP t_j [V' t_j kat-ta]]]]] no?
 what-ACC -NOM why buy-PERF Q
- d. * [I' Naze [VP John-ga [V' nani-o what-ACC buy-PERF Q]]] no?
 why -NOM what-ACC buy-PERF Q
 "Why did John bought what?"

Those data in (19) shows that if an NP intervenes between two WH elements, the sentences are ill-formed, regardless of the order of WH elements. This fact is not predictable from the previous discussion; we saw the sequences "why-who" and "why-what" are not good but the sequences "who-why" and "what-why" are good.

Let us take (19a) for example and consider what is wrong with this sentence. It is usually assumed that only WH(-related) elements are moved to [SPEC, CP] in this kind of question context. Thus (one of the possible) LF representations of (19a) will be like (20).



Obviously the trace of "why" violates ECP here: it is in the scope of book-ACC_k .

Thus it cannot be antecedent-governed by "why", given the minimality condition.³

Some examples relevant to the constraint (2c) are listed in (21). The ill-formedness of those examples can be explained in exactly the same way as did with the examples (19). Let us take (21a) for example. At LF, "naze (why)" moves up to [SPEC, CP]. But "the book-ACC" stays in the IP-adjoined position and because of this, the trace of "naze (why)" cannot be antecedent-governed.

- (21) a. * [IP Sono hon-o_j [IP dare-ga_i [I' naze [VP t_j [V' t_j kat-ta]]]]] no?
 the book-ACC who-NOM why buy-PERF Q
- b. * [I' Sono hon-o_i [I' naze [VP dare-ga [V' t_j kat-ta]]]] no?
 the book-ACC why who-NOM buy-PERF Q
 "Who bought the book why?"

- c. * [IP_{John-ga_i} [I' nani-o_j [I' naze [VP t_i [V' t_j kat-ta]]]]] no?
 -NOM what-ACC why buy-PERF Q
- d. * [IP_{John-ga_i} [I' naze [VP t_i [V' nani-o kat-ta]]]]] no?
 -NOM why what-ACC buy-PERF Q
 "Why did John buy what?"

There is some interesting contrast observed between (21a) and (22). These examples show that if the preceding element is a topic, but not a scrambled element, the sentence does not result in ill-formedness.

- (22) Sono hon-wa [dare-ga naze kat-ta] no?
 the book-TOP who-NOM why buy-PERF Q
 "The book, who bought it why?"

(22) goes along with the assumption, as seen in Hoji (1985) and Saito (1985), that the topic position is higher than CP (which WHs are to be moved to at LF). The topic element does not intervene between WH and its trace at any level.

This contrast between scrambled elements and topicalized elements reminds us of the contrast in the English examples in (23).

- (23) a. ?* The book, who gave to whom?
 b. The book, who gave it to whom?

(23a) has been considered as an instance of "topicalization", and (23b) as that of "left-dislocation". Lasnik and Saito (forthcoming) suggest that in English, the topicalized element may be IP-adjoined, but the dislocated element should be in a higher position than Comp.

3. Concluding Remarks

I have argued that in Japanese the multiple WH question construction with "naze (why)" is constrained by the "rigidity" and the minimality condition. As a final comment, let us reconsider the rigidity constraint. Basically what the rigidity constraint says is that the pre-scrambling or post-scrambling structure information must be copied unchanged at LF. This mechanism seems somewhat redundant. Especially when we think that we can track the information of pre-scrambling structure through the trace at post-scrambling structure, we find post-scrambling structure shows much information of LF in Japanese. Then one might ask the following question: why should we wait until LF to decide the relation between quantifier-like elements? A possible answer to this question would come from what we have observed in the previous discussion; that is, the superiority-like effects in multiple WH-question. We have explained the constraints in (2), referring to the antecedent-government relation created by LF movement.

Footnotes

*I would like to thank Gennaro Chierchia, Kazuhiko Fukushima, Hajime Hoji, James Huang, Robert May, Michael Rochemont, Mamoru Saito, John Whitman and Tomoyuki Yoshida for valuable comments and suggestions.

1. This condition is similar to *Isomorphic Principle* (Huang (1982)) and what Hoji (1985) assumes in his dissertation. Though I refer to both pre-scrambling and post-scrambling structures here, it could be the case that only post-scrambling structure configurations are crucial especially if adverbial expressions are involved. Though I cannot discuss this issue in this paper, it should be reminded that either approach explains the same set of data presented here.

2. See Kim (1989) and Nishigauchi (1990) for the quantificational nature of Japanese WH-phrases.

3. It is natural to ask here what if we can reconstruct *book-acc*? If we can do that, there should be no problem with the sentence. Saito (1989), for example, suggest that scrambled elements can be put back to their original positions at LF. But there is a problem that we must face with this reconstruction. That is, if we reconstruct *book-acc*, we expect that "who" can also be put back in its original position and move up to [SPEC, CP]. We know that if this happens, the order of the WHs at LF would be "why-who" and thus it should be ungrammatical. We might avoid this problem by saying that this movement of subject is not scrambling, hence it may not reconstruct. But if we say that, in the example (19c), the subject in [Spec, IP], which stays there at LF, must block the antecedent-government of the trace of "why" (cf. Rizzi (1990)'s minimality condition which crucially uses A/A' distinction).

References

- Aoun, J., N. Hornstein and D. Sportiche (1981) "Some Aspects of Wide Scope Quantification." *Journal of Linguistic Research* 1.
- Chomsky, N. (1986) *Barriers*. The MIT Press, Cambridge, Mass.
- Fukui, N. (1986) "A Theory of Category Projection and Its Applications." Doctoral dissertation, MIT.
- Higginbotham, J. and R. May (1981) "Questions, Quantifiers and Crossing." *The Linguistic Review* 1.
- Hoji, H. (1985) "Logical Constraints and Configurational Structure." Doctoral dissertation, University of Washington.
- Huang, C.-T. J. (1982) "Logical Relations in Chinese and the Theory of Grammar." Doctoral dissertation, MIT.
- Huang, C.-T. J. (1990) "Reconstruction and the Structure of VP: Some Theoretical Consequences." NELS 21.
- Kim, S.-W. (1989) "The QP Status of Wh-Phrases in Korean and Japanese." *Proceedings of WCCFL* 8.
- Kuroda, S.-Y. (1988) "Whether We Agree or Not." *Linguisticae Investigationes* 12.

- Lasnik, H. and M. Saito (1984) "On the Nature of Proper Government," *Linguistic Inquiry* 19.
- Lasnik, H. and M. Saito (forthcoming) *Move α* , ms. University of Connecticut.
- May, R. (1977) "The Grammar of Quantification." Doctoral dissertation, MIT.
- Nishigauchi, T. (1990) *Quantification in the Theory of Grammar*, Kluwer Academic, Dordrecht.
- Rizzi, L. (1990) *Relativized Minimality*. MIT Press, Cambridge, Mass.
- Saito, M. (1985) "Some Asymmetries in Japanese and Their Theoretical Consequences." Doctoral dissertation, MIT.
- Saito, M. (1989) "Scrambling as Semantically Vacuous A'-Movement," in M. Baltin & A. Kroch (eds.) *Alternative Conceptions of Phrase Structure*. The University of Chicago Press, Chicago.

**SPECIFICITY EFFECTS IN THE CHINESE
NP-MOVEMENT AND WH-EXTRACTION¹**

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Though recent Chinese linguistic studies have paid a great deal of attention to the BA-construction, no previous analysis addresses the issue of its specificity effect regarding the relationship between the preverbal and postverbal noun phrases, as exemplified by (1) and (2):²

- (1) a. wo mai-le zhe ben Lisi-de shu.
I sell-ASP this CL Lisi's book
'I sold this copy of Lisi's books.'
b. *wo ba Lisi-de shu, mai-le zhe ben t_i.
I BA Lisi's book sell-ASP this CL
- (2) a. wo mai-le yi ben Lisi-de shu.
I sell-ASP one CL Lisi's book
b. wo ba Lisi-de shu, mai-le yi ben t_i.
I BA Lisi's book sell-ASP one CL
'I sold one copy of Lisi's books.'

The specificity effect is exhibited in (1b) where the NP-complement of classifier (i.e. Lisi-de shu) appears right after BA. However, such a specificity effect does not show up in (2b) where the same NP follows BA. The presence and absence of the specificity effect is obviously attributable to the categorial distinction between the two postverbal NPs: the postverbal NP zhe ben in (1b) is definite while the postverbal NP yi ben in (2b) is indefinite.³

However, such a specificity effect is not exhibited in the BA-construction where the NP-specifier of the postverbal noun phrase appears after BA, even when the postverbal NP is definite:⁴

- (3) a. wo bang-le Lisi-de san ge zhitou.
I tie-ASP Lisi's three CL finger
b. wo ba Lisi_i bang-le t_i san ge zhitou.
I BA Lisi tie-ASP three CL finger
'I tied up Lisi's three fingers.'
- (4) a. wo bang-le Lisi-de zhe san ge zhitou.
I tie-ASP Lisi's this three CL finger
b. wo ba Lisi_i bang-le t_i zhe san ge zhitou.
I BA Lisi tie-ASP this three CL finger
'I tied up these three fingers of Lisi's.'

The comparison between (1b) and (4b) presents a clear case of the subject-object asymmetry: the NP-specifier of

a definite noun phrase can be extracted while the NP-complement of classifier in a definite noun phrase cannot. This kind of subject-object asymmetry does not only exhibit itself when an NP moves out of a definite noun phrase, but also is observed where there is a WH-element in a definite noun phrase. That is to say, a WH-element may occur in the spec-position of a definite noun phrase but cannot act as the complement of its classifier:

- (5) a. *Lisi na-le shei-de zhe ben shu?*
Lisi take-ASP whose this CL book
 'whose copy of this book did Lisi take away?'
 b. **Lisi na-le zhe ben shei-de shu?*
Lisi take-ASP this CL whose book

These specificity effects and their subject-object asymmetry fail to be accounted for by the Specificity Condition proposed by Fiengo and Higginbotham (1981): '*...x..., if x is free in a specific NP' (x is defined as a variable). Not only will it wrongly predict that (5a) is ungrammatical as the WH-variable *shei-de* is free in the specific noun phrase, but also it will not capture the specificity effect in (1b) since the NP-trace *t_i* is not a variable. Though the Subjacency Condition might account for (1b) under a DP analysis of noun phrases (cf. Bowers 1987), it does not explain the contrast between (5a) and (5b). This is because Subjacency is a condition on movement rather than on representation (Chomsky 1982) and there is no overt movement in (5ab). Even if WH-movement might take place at LF in (5ab), the Subjacency Condition may not be observed at LF (Huang 1982).

In order to offer a uniform account of the specificity effects displayed in both the overt NP-movement and non-overt WH-extraction and their subject-object asymmetry, I argue for an analysis based on the theory of Generalized Binding (Aoun 1985 & 1986) and the DP/KP hypothesis of noun phrases (see among others, Abney 1987, Fukui and Speas 1986, Hudson 1989, Tang 1990).

It is well known that English noun phrases require agreement between a determiner and a head noun, as shown by (6a). However, Chinese noun phrases do not have such agreement, as shown by (6b):

- (6) a. *that book / those three books*
 b. *na ben shu / na san ben shu*
that CL book that three CL book

This agreement difference can be treated as a parametric difference in the sense that there may exist AGR in the English noun phrase but not in the Chinese noun phrase.

This treatment actually captures a typological difference between English and Chinese regarding the parallelism between sentence and noun phrase: English has both subject-verb agreement and determiner-noun agreement but Chinese has neither of them. In other words, both the sentential AGR and the nominal AGR may exist in English but not in Chinese.⁵

Another important difference between Chinese and English noun phrases is that Chinese allows the co-occurrence of a possessive and a determiner in a noun phrase but English does not:

- (7) a. *John's those three books
 b. Lisi-de na san ben shu
 Lisi's that three CL book
 'those three books of John's'

Assume that a possessive in the English noun phrase receives Case from the nominal AGR, on a par with Case assignment to subject from the sentential AGR. The ill-formedness of (7a) can then be treated as a violation of the doubly-filled D filter which prevents the nominal AGR from occurring in a D-node filled by a determiner (Abney 1987). In other words, the presence of *those* in (7a) makes it impossible for the nominal AGR to appear in the same noun phrase. As a result, the possessive *John's* cannot get Case in-situ and (7a) is ruled out by the Case Filter:⁶

- (8) a. $\begin{array}{c} \text{CASE} \\ \swarrow \quad \searrow \\ \text{[DP John's [D' [D AGR] [NP three books]]]} \\ \text{b. * [DP John's [D' [D those] [NP three books]]]} \end{array}$

Now the question is how the possessive *Lisi-de* in (7b) gets its Case. It cannot get Case from the nominal AGR, as AGR is absent in the Chinese noun phrase. It might get Case from the determiner *na*, assuming that determiner is the head of DP in Chinese. This Case can be treated as an 'inherent Case' assigned under a version of the Uniformity Condition proposed by Chomsky (1985); i.e. the determiner *na* assigns a 'possessional Θ -role' to *Lisi* at D-structure and Case-marks *Lisi* at S-structure; and such Case is realized morphologically by the affixation of the inserted *-de* to *Lisi*:

- (9) $\begin{array}{c} \text{CASE} \\ \swarrow \quad \searrow \\ \text{[DP Lisi-de [D' [D na] [NP san ben shu]]]} \\ \text{Lisi's that three CL book} \end{array}$

If an NP in the spec-position of English DPs may get Case from the nominal AGR in D and if an NP in the spec-

position of Chinese DPs may get Case from a determiner in D, a natural hypothesis is to suggest that the Chinese determiner shares the same functional role with the English nominal AGR. That is, both the Chinese determiner and the English nominal AGR might serve as the SUBJECT of noun phrases. If this line of reasoning is plausible, the specificity effects and their subject-object asymmetry observed in the Chinese NP-movement and WH-extraction can be captured within the Generalized Binding theory, as presented below.

First, consider (1b), where the NP complement of classifier is moved out of the postverbal definite noun phrase, displaying the specificity effect. The S-structure of (1b) is represented below, under a morpho-syntactic analysis of BA-constructions (Zou 1992):⁷

(1b')* [_{IP} *wo* [_{BAP} [_{BA} *ba*] [_{ASPP} [*Lisi-de shu*]_i]
 I BA Lisi's book
 [_{ASP} *mai*_j-le][_{VP} *t_j*] [_{DP} [_D *zhe*][_{KP} [_K *ben*][_{NP} *t_i*]]]]]]
 sell-ASP this CL

Assume that D, being a functional head, is not an A-position, on a par with INFL (cf. Aoun 1985). Thus, in (1b') the coindexation of the NP-trace anaphor *t_i* with the SUBJECT *zhe* in D would not violate any grammatical principles. Since DP contains *t_i*, its governor *ben* and its accessible SUBJECT *zhe*, DP is a governing category for *t_i*. As *t_i* is not A-bound within DP, the sentence is then ruled out by Binding Principle A.

In contrast to (1b), no specificity effect is exhibited in (2b) where the NP complement of classifier is moved out of the postverbal indefinite noun phrase.⁸

(2b') [_{IP} *wo* [_{BAP} [_{BA} *ba*] [_{ASPP} [*Lisi-de shu*]_i]
 I BA Lisi's book
 [_{ASP} *mai*_j-le][_{VP} *t_j*] [_{KP} [_K *yi ben*] [_{NP} *t_i*]]]]]]
 sell-ASP one CL

In (2b') there is no SUBJECT for the NP-trace *t_i* in KP, so KP is not a governing category for *t_i*.⁹ However, there is a SUBJECT for *t_i* in ASPP, namely, its antecedent *Lisi-de shu_i*. *Lisi-de shu_i* is also accessible to *t_i* because their coindexation violates no grammatical principles. Since ASPP is the minimal maximal projection containing *t_i*, its governor *yi-ben* and its accessible SUBJECT *Lisi-de shu_i*, it is a governing category for *t_i*. As *t_i* is A-bound by *Lisi-de shu_i* in ASPP, the well-formedness of (2b) is then explained.

Now, let us consider (4b), in which the NP *Lisi* is moved out of the spec-position of DP, displaying no specificity effect.¹⁰ The S-structure of (4b) is

represented below, under the same morpho-syntactic analysis of BA-constructions mentioned above:

(4b') [IP wo [BAP [BA ba] [ASPP Lisi_i [ASP bang_j-le]
 I BA Lisi tie-ASP
 [VP t_j [DP t_i [D zhe][KP [K san ge][NP zhitou]]]]]]
 this three CL finger

In (4b'), *zhe* in D is an accessible SUBJECT for the NP-trace *t_i*, as their coindexation violates no grammatical principles. But *zhe* in D, being a functional category, is not a governor of *t_i*, assuming Chomsky's (1985:169) suggestion that only lexical categories can be governors.¹¹ As DP contains *t_i*, its accessible SUBJECT *zhe* but not its governor, it is not a governing category for *t_i*. In contrast to DP, ASPP is a governing category for *t_i* because ASPP contains *t_i*, its accessible SUBJECT *Lisi_i* and its lexical governor *bang_j-le* (i.e. DP, being L-marked by V, is not a barrier to such government of *t_i*; and VP, being L-marked by *bang_j-le*, is not a barrier to such government of *t_i* either (cf. Chomsky 1986)). As *t_i* is A-bound by *Lisi_i* in ASPP, the well-formedness of (4b) is explained.

The similar analysis also accounts for (3b), where the NP *Lisi* is moved out of the spec-position of KP and no specificity effect is exhibited:

(3b') [IP wo [BAP [BA ba] [ASPP Lisi_i [ASP bang_j-le]
 I BA Lisi tie-ASP
 [VP t_j [KP t_i [K san ge] [NP zhitou]]]]]]
 three CL finger

In (3b') there is no SUBJECT for the NP-trace *t_i* in KP, so KP is not a governing category for *t_i*. By the same argument given above, *Lisi_i* in the spec-position of ASPP is an accessible SUBJECT for *t_i*. Since ASPP contains *t_i*, its governor *san-ge* and its SUBJECT *Lisi_i*, ASPP is a governing category for *t_i*. As *t_i* is A-bound by *Lisi_i* in ASPP, the well-formedness of (3b) is also explained.

The above analysis extends itself to (5a), in which there is a WH-element in the spec-position of DP but no specificity effect is displayed. The LF-representation of (5a) is shown below, under the same morpho-syntactic analysis of the BA-construction:¹²

(5a') [CP Q_i [IP Lisi [ASPP na_i-le [VP t_j [DP shei-de_i
 Lisi take-ASP whose
 [D' [D zhe] [KP [K ben] [NP shu]]]]]]]]]
 this CL book

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² The following special abbreviations are used in this paper:

ASP(P)	---->	aspect marker (phrase)
BAP	---->	BA-phrase
CL/K	---->	classifier
KP	---->	classifier phrase

³ This phenomenon is reminiscent of the presence and absence of specificity effects in the following pair of English sentences involving WH-movement (cf. Fiengo & Higginbotham 1981):

- i) *Who did you buy this picture of?
 ii) Who did you buy a picture of?

The specificity effect is displayed in (i) where *who* is moved out of a definite noun phrase. But no specificity effect shows up in (ii) where *who* is extracted out of an indefinite noun phrase.

⁴ The 'inalienable' relation is required between the preverbal NP-specifier and the postverbal NP in this type of BA-construction. Otherwise, the sentence would be unacceptable:

- i) *wo ba Lisi_i bang-le t_i san ben shu.
 I BA Lisi tie-ASP three CL book
 ii) *wo ba Lisi_i bang-le t_i zhe san ben shu.
 I BA Lisi tie-ASP this three CL book

⁵ The absence of the sentential AGR in Chinese is evidenced by the contrast between Chinese and English regarding Binding Principle A:

- i) *John_i said [that himself_i AGR will come]
 ii) Lisi_i shuo [taziji_i hui lai]
 Lisi said himself will come

In (i), the governing category for *himself_i* is the embedded clause because it is the minimal clause containing *himself_i*, its governor AGR and its accessible SUBJECT AGR. Since *himself_i* is free in its governing category, (i) is ruled out by Binding Principle A. By contrast, the governing category for *taziji_i* in (ii) is

the matrix clause because the matrix clause contains *taziji_i*, its governor (the embedded INFL) and its accessible SUBJECT (*Lisi_i*). As *taziji_i* is A-bound by *Lisi_i* in the matrix clause, Binding Principle A is then satisfied (see Huang (1982) for a detailed discussion of the absence of AGR in the Chinese INFL).

⁶ Another possible analysis of (7a) is to base-generate the determiner *those* in the spec-position of DP (Hudson 1989). Under this analysis, AGR is the head of DP, not only assigning Case to a possessive but also regulating agreement between NP and determiner, in a way parallel to the agreement between VP and the specifier of IP. Hence, (7a) would be ruled out by the ban against the doubly-filled spec-position of DP:

- i) [_{DP} John's [_{D'} [_D AGR] [_{NP} three books]]]
- ii) [_{DP} those [_{D'} [_D AGR] [_{NP} three books]]]
- iii)*[_{DP} John's those [_{D'} [_D AGR] [_{NP} three books]]]

⁷ Based on the major properties and crucial constraints of the BA-construction, Zou (1992) proposes the following morpho-syntactic analysis: a) BA is the head of a base-generated functional category which selects an aspect phrase (ASPP) or a directional/resultative particle phrase (PARP) as its complement; b) ASPP and PARP are also functional categories and their head selects a VP as its complement; and c) the preverbal NP and postverbal NP form a single noun phrase at D-structure and are base-generated as a complement of V. Under this analysis, the BA-construction is derived by the verb-raising to ASP/PAR and by the NP-movement to the Spec of ASPP/PARP. The verb-raising is obligatory because the aspect marker and particle are bound morphemes requiring a verb host, and the NP-movement is forced by the ban against BA-stranding. As a consequence of this analysis, the possessive and partitive relations between the preverbal NP and the postverbal NP are captured by the spec-head and head-complement relations under X'-theory without any stipulation. See Zou (1992) for the arguments of this analysis.

The need for projecting KP in Chinese noun phrases is supported by the fact that classifiers are obligatory in Chinese noun phrases and there exists a selectional relation between classifier and its following NP:

na san be shu /*na san shu /*na san ge shu
 that three CL book that three book that three CL book
 'those three books' (CL is missing) (CL is not correct)

⁸ For the obligatory co-occurrence of numeral and classifier in the K-node, see Tang's (1990) arguments.

⁹ One may wonder why classifier in K cannot serve as a SUBJECT since its spec-position may also hold a possessive:

- i) [_{KP} Lisi-de [_K [_K san ben] [_{NP} shu]]]
 Lisi's three CL book
 'Lisi's three books'

The argument against treating classifier in K as a SUBJECT is based on the fact that K is a lexical category, but INFL and D, which host SUBJECT at sentential and phrasal levels respectively, are functional categories. Assuming that a functional head but not a lexical head can host SUBJECT, K would have the same status as N, since N never hosts SUBJECT but may have a possessive in its spec-position:

- ii) (san ben) [_{NP} Lisi-de [_N [_N shu]]]
 (three CL) Lisi's book
 '(three copies) of Lisi's book'

The evidence for treating classifier as a type of noun comes from the following facts: a) any nouns which denote measure or quantity can be used as classifiers (Chao 1968, Li & Thompson 1981); and b) when classifiers stand alone, they behave exactly like nouns rather than adjectives:

- iii) a. ta shihu hen xin.
 it seems very new
 'It seems very new.'
 b. *ta shihu yi ben shu.
 it seems one CL book
 c. *ta shihu yi ben.
 it seems one CL
 iv) a. you yi ben shu zai nali.
 have one CL book over there
 'there is a book over there.'
 b. you yi ben zai nali.
 have one CL over there
 'there is a copy over there.'
 c. *you hen xin zai nali.
 have very new over there

The evidence for treating classifiers as a lexical category is from the fact that classifiers do not have the properties of functional categories (cf. Abney 1987):
 a) functional categories are closed-class items but

REFERENCES

- Abney, S. (1987) *The English Noun Phrase in its Sentential Aspects*, Ph.D. Dissertation, MIT.
- Aoun, J. (1985) *A Grammar of Anaphora*, MIT Press.
- Aoun, J. (1986) *Generalized Binding*, Foris, Dordrecht.
- Aoun, J. and Y. Li (1990) "WH-ELEMENTS IN-SITU: SYNTAX OR LF?" Ms., University of Southern California.
- Baker, C. L. (1970) "Notes on the Description of English Questions: the Role of an Abstract Question Morpheme," *Foundation of Language* 6, 197-219.
- Bowers, J. (1987) "Extended X-bar Theory, the ECP and the Left Branch Condition," *Proceedings of West Coast Conference on Formal Linguistics VI*, 47-62.
- Chao, Y. R. (1968) *A Grammar of Spoken Chinese*, UC Press, Berkeley, California.
- Chomsky, N. (1981) *Lectures on Government and Binding*, Foris, Dordrecht.
- Chomsky, N. (1982) *Some Concepts and Consequences of the Theory of Government and Binding*, MIT Press, Cambridge.
- Chomsky, N. (1985) *Knowledge of Language: Its Nature, Origin and Use*, New York, Praeger.
- Chomsky, N. (1986) *Barriers*, MIT Press.
- Fiengo, R. and J. Higginbotham (1981) "Opacity in NP," *LINGUISTIC ANALYSIS* 7, 395-421.
- Fukui, N. and M. Speas (1986) "Specifiers and Projection," MIT Working Papers 8.
- Huang, C.-T. (1982) *Logical Relations in Chinese and the Theory of Grammar*, Ph.D. Dissertation, MIT.
- Hudson, W. (1989) "The Structure of Noun Phrases in English: Specificity Revisited," Ms., University of Southern California.
- Li, C. and S. Thompson (1981) *Mandarin Chinese: A Functional Reference Grammar*, UC Press, Berkeley, California.

- Tang, J. (1990) "A Note on the DP Analysis of the Chinese Noun Phrases," *LINGUISTICS* 28, 337-354.
- Zou, K. (1992) "The Chinese BA-Construction: a Morpho-Syntactic Analysis," Proceedings of the 3rd International Symposium on Chinese Language and Linguistics, Tsing Hua University, Taiwan.