

Perfective and imperfective aspect in Hungarian
(Invisible) differences

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The paper argues for the universality of the grammatical aspectual categories *perfective* and *imperfective*. They are shown to be present even in languages such as Hungarian, where they allow variable interpretations of events. In Hungarian, grammatical aspect can be detected only by its restriction on the distribution of particles. Quantized, perfective aspect allows all particles. Cumulative, imperfective aspect disallows those particles that delimit the event and impose a quantized interpretation. This approach derives the distribution of several particle types, based on their effect on aspectual properties.

1. Introduction

The general aim of this paper is to pinpoint universality and variation among languages. Once this goal is achieved, it is possible to give a treatment of languages that is as uniform as possible and which maximally restricts the search space for language-particular and idiosyncratic alternations. Apart from an aesthetic appeal, this also has advantages in practical applications. With this aim in sight, this paper focuses on universality in the aspectual domain. It is argued that certain aspectual distinctions, and the categories that encode these distinctions, are universally present. First, I discuss the properties of aspect in general, then turn to (universal) grammatical aspect in particular. Section 3 shows that grammatical aspectual variation can be observed in languages where it is not overtly encoded. The next section introduces a limited environment where grammatical aspect exceptionally surfaces in Hungarian, a language that leaves the distinction generally covert. The driving force behind the overt manifestation and exceptions to the overt distinction are also addressed. Finally, section 5 deals with negation, which masks the overt perfective – imperfective distinction, but not its semantic import. Grammatical aspectual categories thus form a part of an overall universal system across languages.

2. Aspectual categories

The paper focuses on grammatical aspect. I follow Smith (1997) in assuming a two-component theory of aspect. In this system, lexical aspect (which encodes (a)telicity) is distinguished from grammatical aspect (which encodes (im)perfectivity). In this section, I briefly justify this distinction and discuss the properties associated with perfective and imperfective aspect.

2.1 (A)telic and (im)perfective aspect

The independence of grammatical and lexical aspect can be shown by the contrasting values of the two aspects. Durative *in*-adverbials are compatible with a quantized (telic or perfective) predicate that possesses an inherent endpoint. *For*-adverbials can appear with a cumulative (atelic or imperfective) predicate, which lacks an endpoint inherent to the predicate. As (1) shows, the same predicate can be at once quantized (and compatible with an *in*-adverbial) and cumulative (as shown by the *for*-adverbial). This state of affairs arises because the lexical aspectual specification of the predicate is quantized (telic), while the grammatical aspectual specification is cumulative (imperfective).

- (1) a. Jean was writing a book in a month (for two weeks)
 b. Jean [IMP [write a book in a month]_{quantized}]_{cumulative} (for two weeks)

Grammatical aspect differs from lexical aspect in other respects as well. For instance, cumulativity, at the lexical and grammatical aspect level, has different characteristics. One distinguishing property is the framing effect (Jespersen 1931). Past imperfective predicates require another, contextually given event. The interpretation of the imperfective is anaphoric in that it is 'anchored' to the other event. A past perfective, lexically cumulative event shows no such effects.

- (2) a. ?Julie was singing
 b. Julie was singing when Jean knocked

Another difference between the aspect types is that grammatical, but not lexical, aspect determines event ordering. If the atelic predicate is imperfective (3a), then it is interpreted as an event in progress at the time when knocking takes place. If the same atelic predicate is perfective (3b), then it is interpreted as following knocking in its entirety.¹

- (3) a. Julie was singing when Jean knocked (simultaneous events)
 b. Julie sang when Jean knocked (consecutive events)

¹ The event ordering test requires *when*-clauses with instantaneous events. If the matrix event is durative, then *when* or *while*-clauses with durative events pattern like *for*- or *in*-adverbials.

A further difference is also suggested by the terminology. Grammatical aspect is typically encoded by grammatical, closed-class items, lexical aspect is determined compositionally by the lexical content of the constituents.

In sum, there are several arguments for treating lexical (telic or atelic) and grammatical aspect specifications (perfective or imperfective) separately. In the remainder of this section, I sketch a definition of these categories.

2.2 Formalization

The following sections give a definition of (a)telicity and grammatical aspect.

2.2.1 (A)telicity

To characterize (a)telic predicates, I adopt the definitions of cumulativity and quantization based on Krifka (1998).

- (4) A predicate P is *cumulative* iff $\forall x,y [P(x) \ \& \ P(y) \rightarrow P(x \oplus y)] \ \& \ \text{card}(P) \geq 2$
- (5) A predicate P is *quantized* iff $\forall x,y [P(x) \ \& \ P(y) \rightarrow y \not\subset x]$

Predicates can be cumulative or quantized within both the nominal and verbal domain. A predicate is cumulative iff whenever it applies to two or more entities, it also applies to their join. Given two portions of *water*, their union is also *water*; thus *water* is cumulative. A nominal predicate is quantized iff it only applies to disjoint arguments. For instance, if an entity is described as *an apple*, then it will not have a proper subpart that is also *an apple*.

Cumulativity and quantization can also be applied in the verbal domain. Given a (neo)Davidsonian approach (Davidson 1967), verbs take event arguments which are relevant for the definitions above.² According to the definitions, atelic predicates are cumulative, while telic predicates are quantized. For a telic event such as *building a house*, the event has no proper subpart that also counts as *building a house* (5). Atelic events are cumulative: if there are two events that can be described as *walking*, for example, then the union of these two events can also be described as *walking* (4).

2.2.2 (Im)perfectivity

For grammatical aspectual categories, I adopt definitions using time intervals (based on Pancheva 2003). Aspectual heads (section 3.3) take a predicate argument and are evaluated with respect to a time interval i , the reference time. Perfective requires i to be coextensive with the event time: the event is viewed

² With the predicate saturated for all arguments except for the event.

in its entirety. With imperfective aspect, i must be a subinterval of the event time.³ In this 'insider' view of imperfectives, only a part of the event is visible.

- (6) Perfective
 $f\text{Asp}_{\text{perf}}^i = \lambda P . \exists e [\tau(e) = i \ \& \ P(e)]$
- (7) Imperfective
 $f\text{Asp}_{\text{imp}}^i = \lambda P . \exists e [i \subset \tau(e) \ \& \ P(e)]$,
 where e is an event; $\tau(e)$ is the time interval during which the event holds (event time); P is a predicate of events; and i is a time interval

Given a modified definition of cumulativity and quantization, perfective aspect is quantized, and imperfective is cumulative. Consider imperfective aspect first. If an imperfective predicate P is true when evaluated with respect to the time intervals i and j , then it is also true with respect to the union of the intervals, $i \oplus j$. Perfectives are quantized: if a perfective predicate P is true when evaluated with respect to the time intervals i and j , then $i \not\subset j$ (in fact, $i = j$).

I proposed a treatment of lexical and grammatical aspectual properties. I also showed that cumulativity and quantization are relevant within both the lexical and grammatical aspect domains, applying to events and time intervals, respectively. In the next section, I discuss languages without overt grammatical aspectual distinctions and argue that the distinction is still present covertly. In later sections, I will provide an account of particle behavior in Hungarian based on the cumulativity/quantization restrictions on grammatical aspect.

3. No overt (im)perfective distinctions

Some languages, including German and Hungarian, lack overt perfective – imperfective distinctions. Others, such as French, lack the distinction only in certain tenses. I will argue that, in these environments, the unique verb form is ambiguous between a perfective and imperfective aspectual specification. That is, it can be seen as modified by a covert perfective or imperfective head.

This account is supported by the possible interpretations of simple verb forms, which show no overt grammatical aspect distinctions. These verbs can denote an event that is simultaneous with the subordinate event (8), or an event consecutive to it (9). With distinct grammatical aspectual forms, simultaneous readings arise with imperfective and consecutive readings with perfective verbs. Thus verb forms without overt grammatical marking show the union of readings of overtly marked forms. The readings are illustrated below; the adverbials in parentheses highlight the relevant readings.

³ In addition, the final endpoint of $\tau(e)$ must be excluded from i with imperfectives.

- (8) a. amikor megérkeztünk, Juli (éppen) telefonált
 when arrived-1PL J-NOM just.then phoned-3SG
 ‘when we arrived, Julie was talking on the phone’ (Hungarian; imperf.)
 b. als wir ankamen, telefonierte Julia (gerade)
 as we arrived phoned J just.then
 ‘when we arrived, Julie was talking on the phone’ (German; imperf.)
- (9) a. amikor megérkeztünk, Juli (rögtön) telefonált
 when arrived-1PL J-NOM straight.away phoned-3SG
 ‘when we arrived, Julie phoned straight away’ (Hungarian; perf.)
 b. als wir ankamen, telefonierte Julia (sofort)
 as we arrived called J straight.away
 ‘when we arrived, Julie phoned straight away’ (German; perf.)

Simple verb forms also show an ambiguity in the interpretation of present tense forms. As (10) shows, the present tense form can either denote an ongoing event, or a future/habitual one. The former meaning characterizes imperfective, and the latter, perfective forms.

- (10) Juli telefonál
 J-NOM calls-3SG
 ‘Julie is speaking on the phone’ (imperfective)
 ‘Julie will call’ / ‘Julie (often) calls’ (perfective)

To conclude, in languages without overt distinction of grammatical aspectual categories, verb forms show the union of readings that are available for perfective and imperfective verb forms. These readings were described by, among others, Smith (1997) and Bohnemeyer & Swift (2000). In the remainder of this section I summarize these accounts and propose that, in contrast to these suggestions, overt and covert grammatical aspect can be treated the same way.

3.1 Neutral grammatical aspect

Smith (1997) presents an extensive survey of aspect systems. She identifies three types of grammatical aspect: perfective, imperfective and neutral. Neutral aspect characterizes predicates in languages that lack overt grammatical aspect distinctions. Unlike Smith (1997), I propose that only two grammatical aspectual categories are needed cross-linguistically: perfective and imperfective.

According to Smith (1997), neutral aspect is characterized by variable interpretations: perfective or imperfective. Neutral aspect is, however, unlike imperfective aspect in that it cannot coerce an instantaneous predicate into a durative one. The possibility of coercion by an overt imperfective is illustrated in (11) with the instantaneous *win*. If the event consists of a single point in time, imperfective aspect – evaluated with respect to a proper subinterval of the event time, as in (7) – is not compatible with the default predicate meaning. When coupled with overt imperfective aspect, the predicate is coerced and

refers to an interval preceding the event itself. The imperfective of the instantaneous event can be true even if the event itself does not take place.

- (11) Seabiscuit was winning the race, but at the last moment Tedburrow jumped ahead and won the race

Coercion cannot be observed in languages without overt grammatical aspect marking. The bare verb form does not have a meaning parallel to (11); it cannot refer to a time interval preceding the event itself.

- (12) # Seabiscuit megnyerte a verseny-t, de az utolsó percben
 S-NOM won the race-ACC but the last minute-in
 Tedburrow az élre tört és megnyerte a verseny-t
 T-NOM the front-onto broke and won the race-ACC
 ‘same’ (Hungarian)

Only overtly marked imperfective aspect can coerce an instantaneous predicate. Lack of coercion is not, however, a conclusive argument for assuming a third type of grammatical aspect. Even some overtly marked imperfectives, such as the Chinese *zai*, fail to coerce instantaneous predicates.

- (13) a. tamen zai da qiu
 they *zai* play ball
 ‘they are playing ball’
 b. # ta zai ying sai pao
 he *zai* win race run
 ‘he is winning the race’ (Smith 1997)

As (13) shows, not all overt imperfectives induce coercion on an instantaneous predicate. It is thus possible to maintain an ambiguity-based account of covert grammatical aspect marking, without a third type of grammatical aspect. Under this view, German and Hungarian predicates are ambiguous between a perfective and imperfective interpretation.

Pancheva (2003) cites Bulgarian as having neutral aspect in addition to perfective and imperfective.⁴ Neutral is imperfective-like in that it does not assert the existence of the endpoint of the event and allows durative *for*-adverbials. The perfective-like properties of neutral aspect include consecutive event ordering. I suggest that the hybrid nature of neutral aspect can still be accounted for by assuming perfective grammatical aspect, which is compatible with the attested event ordering. If perfective aspect modifies an atelic rather

⁴ Perfective and imperfective forms are distinguished by a verbal prefix.

- (i) az *stroix* pjasâčna kula
 I build-neut.1sg.past sand castle ‘I was engaged in building a sandcastle’
 (ii) az *postroix* pjasâčna kula
 I build-perf.1sg.past sand castle ‘I built a sandcastle’ (Pancheva 2003)

than a telic predicate, then the lack of an inherent endpoint and compatibility with *for*-adverbials are expected. According to the proposal advocated here, neutral and perfective predicates are distinguished at the lexical rather than the grammatical aspect level.

In this section, I proposed that no more than two grammatical aspect categories are necessary. In section 3.2, I discuss an approach which does not require grammatical aspectual specification. In absence of a specified category, Bohnemeyer & Swift (2000) invoke a default aspectual interpretation.

3.2 Default aspect

Bohnemeyer & Swift (2000) advocate a different approach to languages without overt grammatical aspect marking. They suggest that the lexical aspectual values correlate with default grammatical aspect values: atelic predicates are imperfective by default and telic predicates are perfective. In contrast to a default interpretation that does not require the presence of an aspectual category, I suggest that the grammatical aspectual categories, perfective and imperfective, are specified for all events cross-linguistically.

In Bohnemeyer & Swift (2000), default aspectual interpretation surfaces in the absence of an overt grammatical aspect distinction, correlating with lexical aspect. The connection between lexical aspect and default grammatical aspect interpretations is the common property between the aspectual categories: both atelic and imperfective predicates are cumulative, while both telic and perfective predicates are quantized. The correlation is a tendency: it does not define an exclusive interpretation. As described earlier, predicates have an ambiguous interpretation in languages lacking overt grammatical aspect distinctions. In addition, a similar tendency exists in languages that overtly mark grammatical aspect.

- (14) a. ?she drew
 b. she was drawing
(15) a. she drew a circle
 b. ?she was drawing a circle

I suggest that the markedness of perfective atelic and imperfective telic predicates is due to coercion operations that are necessary to derive those interpretations. For an atelic predicate to be perfective, an endpoint is necessary. This endpoint is arbitrary, having no truth-conditional effect apart from yielding a delimited event.⁵ Atelic predicates do not possess an inherent endpoint, which is added as the result of an additional operation. Similarly, telic predicates have an inherent endpoint and imperfective events denote a cumulative event. Imperfective telic predicates require the inherent endpoint to be stripped off. The preferences encoded in the correlations by Bohnemeyer

⁵ The ‘perspective-based’ approach to grammatical aspect also requires a delimited event, as the prerequisite for viewing the event as a whole.

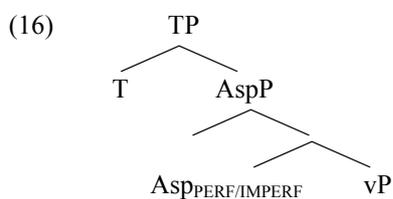
& Swift (2000) are ultimately due to the presence or absence of endpoints in the lexical and grammatical aspectual domain. As such, they characterize languages with or without overt grammatical aspect distinction.

3.3 Minimal aspectual categories

In the preceding sections, I argued that the interpretation of Hungarian and German verbs can be successfully accounted for by assuming ambiguous grammatical aspect specification. Extending this proposal, I suggest that it is a universal property that perfective and imperfective aspect is universally available, and that only these two categories of grammatical aspect exist.

The difference between coercive capacities of imperfectives across languages is due to the availability of a coercion operator. Let us assume that an operator O is responsible for coercing an instantaneous predicate into a durative one (section 3.1). Languages differ in whether O is available; it is present in English and French, but absent in Chinese. The operator O is also absent in languages without overt grammatical aspect marking. I assume (following de Swart 2000) that this absence follows from a requirement on coercion operators. De Swart (2000) argues that coercion operators must be triggered by an *overt* aspectual operator. Without overt grammatical aspect marking, no coercion operator is available.

To give a specific implementation of grammatical aspect, I assume that it is encoded by the functional head Asp, which can be perfective or imperfective. Asp takes vP as its complement and is dominated by TP.



In the next section, I present an environment where the distinction between perfective and imperfective predicates can be detected even in a language where this distinction is otherwise unmarked. I will argue that the distributional difference is due to the cumulativity of imperfective and quantization of perfective predicates.

4. Evidence for null (im)perfective heads

Until now, only examples of identical perfective and imperfective German/Hungarian verb forms were shown. Hungarian supplies a limited environment where grammatical aspect is overtly distinguished: particle verbs.

In the case of perfective predicates, the particle immediately precedes the verb. With imperfective aspect, the particle is immediately postverbal.⁶ After illustrating the construction, I propose an account in terms of the semantic restrictions imposed by grammatical aspect.

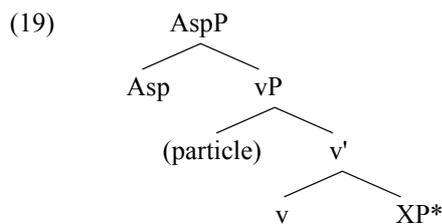
4.1 Particle verbs in Hungarian

(17) is an instance of perfective aspect. This is shown by the compatibility of the predicate with an *in*-adverbial, which diagnoses quantized predicates. (18), with a postverbal particle, is imperfective – as shown by its compatibility with a *for*-adverbial and the framing effect.

- (17) Juli (két perc alatt) *le_{particle} ment_v* a lépcsőn
 J-NOM two minute under down went the stair-on
 ‘Julie went down the stairs in two minutes’
- (18) Juli (két perc-e) *ment_v le_{particle}* a lépcsőn,
 J-NOM two minute-POSS went down the stair-on
 ??(amikor össze esett)
 when together fell
 ‘Julie was going down the stairs for two minutes when she collapsed’

4.2. Account of particle verb orders

Let us assume that particles are merged in Spec vP. The Hungarian verb phrase is non-configurational (É. Kiss 1987). Thus I assume that arguments can be ordered arbitrarily (indicated by XP*) under an *n*-ary branching v’ node. I also assume that the verb is the leftmost constituent within v’.



A further, necessary assumption is that the functional head Asp triggers overt movement to its specifier or head position. Asp does not impose a categorial restriction on the moved element; any overt constituent can satisfy

⁶ I am ignoring focus constructions and negation (with the exception of the discussion in section 5). In Hungarian, focus is immediately preverbal, with the particle following the verb. Thus a perfective sentence with focus is surface-identical to an imperfective sentence. Compare (i) with (18).

(i) JULI *ment_v le_{particle}* a lépcső-n
 J-nom went down the stair-on
 'It was Juli who went down the stairs'

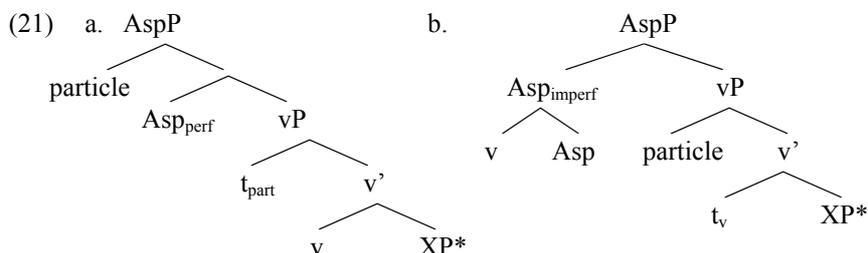
this requirement. Locality – defined by c-command and precedence – determines which element moves: from two constituents C_1 and C_2 c-commanded by Asp, it is C_1 that moves if C_1 c-commands or precedes C_2 .

Recall from section 2.2.2. that perfective events are quantized and imperfectives are cumulative. Particles denoting an endpoint (goal or result) yield quantized predicates. The endpoint in (20), for instance, converts an atelic predicate into a telic one. I assume that the same holds for grammatical aspect.

- (20) a. [Julie walked]_{cumulative}
 b. [Julie walked out / to the store]_{quantized}

Armed with these assumptions, let us consider how word order is derived. With a perfective Asp, it is the particle – which c-commands all other constituents within the vP – that moves to Spec AspP (21a). The particle yields a quantized interpretation compatible with the denotation of the perfective Asp. Particle movement is string-vacuous, leaving the linear order of constituents intact.

If Asp is imperfective, then the particle is excluded from Spec AspP. Imperfective Asp is, by assumption, cumulative, and particles in Spec AspP yield a quantized interpretation. Licensed by semantic compatibility, the verb, rather than the particle, moves to Asp (21b). This movement is not string-vacuous, as it reverses the particle – verb order.



The particle moves to satisfy the requirement of Asp, except when movement leads to conflicting specifications imposed by Asp and the particle. That is, particle movement is blocked only by aspectual conditions.

An alternative strategy is to require the verb to raise to Asp in all cases. Particle movement to a perfective Spec AspP is then triggered to ensure quantization. Such a triggering account requires a particle to yield a quantized interpretation with perfective aspect. Particles are, however, not required for a quantized interpretation. Recall that bare verbs, which lack particles, can have perfective and imperfective interpretation alike. In addition, Hungarian possesses elements whose distribution closely mimics that of particles.⁷ These

⁷ Bare objects and other elements – including manner adverbs and inessives – have a distribution similar to particles. They follow the verb in negative sentences and focus constructions. In restructuring contexts, they raise to the preverbal position in the matrix clause. The only difference is the position in imperfectives: endpoint-denoting particles are postverbal, and other

elements, including bare objects (not modified by quantifiers or determiners), are preverbal in both perfective and imperfective sentences.

- (22) a. amikor megérkeztünk, Juli (éppen) ebéd-et_{OB} főzött_V
 when arrived-1PL J-NOM just.then lunch-ACC cooked-3SG
 ‘when we arrived, Julie was cooking lunch’
 b. amikor megérkeztünk, Juli (rögtön) ebéd-et_{OB} főzött_V
 when arrived-1PL J-NOM straight.away lunch-ACC cooked-3SG
 ‘when we arrived, Julie cooked lunch straight away’

As indicated by the ordering interpretation of the events, (22a) is perfective, while (22b) is imperfective. The relevant difference between particles and bare objects is that while particles denote an endpoint, bare objects do not. Thus bare objects fail to quantize imperfectives and can freely move to Spec AspP.⁸

The distribution can be captured easily by assuming, as suggested above, that particles always move to Spec AspP except when movement results in conflicting aspectual specifications. The alternative view, where particle movement is triggered by perfective aspect, must assume separate mechanisms to treat these elements. I conclude that the structure proposed in (19), along with the cumulativity/quantization restrictions on grammatical aspect and a blocking account of particles, provides a simple account of the facts.

4.3 Particles as perfectives only

Not all endpoint-denoting particles behave alike in Hungarian. Some, such as the particle *meg* that signals completion, can only appear with perfective aspect.

- (23) a. Juli meg_{particle} ette_V a tortá-t
 J-NOM part ate the cake-ACC
 ‘Julie ate the cake’
 b. *Juli ette_V meg_{particle} a tortát (amikor Mari észrevette)
 J-NOM ate perf the cake-ACC when M-NOM noticed
 ‘Julie was eating the cake (when Mary noticed)’⁹

Particles limited to perfective environments denote an endpoint or result. To account for the lack of imperfective readings, I assume that these particles are merged in Spec AspP rather than Spec vP. Since the particles denote an

particle-like elements are preverbal. The wide range of particle-like elements with similar distribution recall Icelandic stylistic fronting (SF) (e.g. Holmberg 2000). The two structures, however, differ in a number of respects. For instance, SF has no effect on interpretation, while Hungarian particle position does; and a subject gap is required for SF, but not for particles. It is not clear then whether a single treatment is required.

⁸ Idiomatically interpreted particles – including *fel_{particle} karol* (up embrace ‘support, embrace’) and *be_{particle} rúg* (in kick ‘become drunk’) also show this behavior. Their constant preverbal position follows, since the particle does not denote an endpoint.

⁹ (23b) is grammatical with the subject in focus, a reading ignored here (see footnote 3).

endpoint, they cannot be merged with an imperfective Asp: this operation would yield a quantized interpretation, while imperfectives must be cumulative. Merging the particle with a perfective Asp satisfies the aspectual requirements.

To wrap up: while most predicates in Hungarian are ambiguous between a perfective and imperfective interpretation, endpoint-denoting particles show an overt difference. These particles are preverbal with perfective aspect and postverbal with imperfective aspect (section 4.1). With a subset of endpoint-denoting particles, the imperfective reading is absent (section 4.3). Bare objects are preverbal with both perfective and imperfective aspect. This pattern can be accounted for by assuming that (i) particles can be merged in Spec vP or Spec AspP and (ii) particle movement is blocked if it would quantize an imperfective Asp, but is allowed otherwise. In the next section, I show that the different behavior of endpoint-denoting particles and the associated meanings can also be detected in negative sentences, where the overt difference is masked.

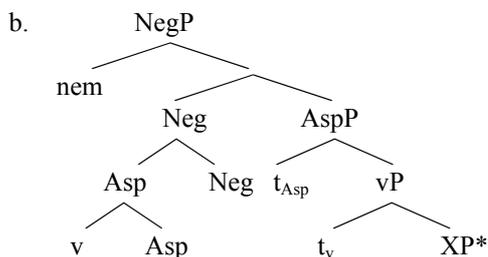
5. Negation

Negative sentences provide an environment where word-order differences between perfective and imperfective sentences are neutralized. The asymmetric behavior of particles can still be detected: the imperfective reading is available only if it is also available in affirmative sentences. This suggests a compositional view of negation (as in Giannakidou (2000), contra Verkuyl (1993), among others).

5.1 Structure of negation

I assume that negation (*nem*) is merged in Spec NegP and that Neg requires *v* to raise to Neg via Asp. The structure is illustrated in (24) for a non-particle verb.

- (24) a. Juli *nem* futott
 J-NOM not ran-3SG
 ‘Juli didn’t run’

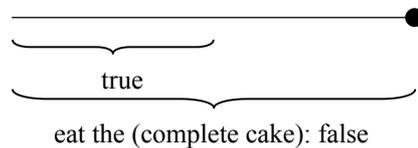


With particle verbs, all particles are postverbal since the verb moves to a head position above Asp. Even though aspectual differences are masked, they can be shown to persist by considering the interpretation of negative sentences.

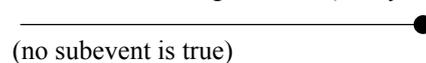
5.2 Interpretation of negation

Given a compositional view of meaning, it is expected that the differences between perfective and imperfective negative sentences can be detected even with negation. When a perfective event is negated, negation applies to the complete event, including the endpoint. Negation in this case implies, but does not entail, negation of all proper subintervals: a proper subevent can be true, while the complete event is false. With a negated imperfective event, the truth conditions are stricter. Negation in this case applies to all subevents; thus no subevent can be true if negation holds.¹⁰ The difference is illustrated below, where the solid line represents the complete cake-eating event with its endpoint.

(25) a. Julie didn't eat the cake [allows a subevent to hold]



b. Julie wasn't eating the cake (at any time) [no subevent holds]



Given this difference, if a subevent is true, then only the negation of the perfective event can hold, since it falsifies negation of an imperfective.

5.3 Negated particle constructions

The difference between negated perfective and imperfective sentences sketched above can be detected in Hungarian. Recall that most particle constructions and all bare verbs allow ambiguous readings. (26) is either perfective or imperfective, shown in (26a,b). Similar distinctions arise with simple verb predicates and bare objects.

¹⁰ As the reviewer notes, a negated imperfective can, in some circumstances, allow the truth of the event. Such an environment is shown below.

(i) Juli was eating a cake and watching a movie. During the most frightening scenes she wasn't eating, but sat motionless glued to the screen

The structure in (i) recalls aspect shift with negation, illustrated below. (ii) asserts that no event of finding glasses took place. In contrast, (iii) with an aspect shift allows for Juli's locating her glasses eventually, as long as it took place outside of a two-hour interval.

(ii) Juli didn't find her glasses

(iii) For two hours, Juli didn't find her glasses

I suspect that this type of aspect shift (also Verkuyl 1993, a.o.) is only possible if a salient time interval is present (*during the most frightening scenes* in (i)). With the aspect shift, it is asserted that during the interval there was no event of a specific kind in progress. The aspect shift allows discontinuous events to hold, as the cake-eating event of (i) shows. I'm disregarding this shifted reading here.

- (26) Juli nem *ment*_V *le*_{particle} a lépcső-n
 J-NOM not went down the stair-on
 ‘Julie didn’t go down the stairs’
- a. *Perfective*: Julie didn’t go down the stairs. Even though she started, she never got to the bottom
- b. *Imperfective*: Julie wasn’t going down the stairs. She never even started

Unlike (26), (27) allows only the perfective reading. This is expected since, as shown in section 4.3, this predicate is compatible with only perfective grammatical aspect.

- (27) Juli nem *ette*_V *meg*_{particle} a tortá-t
 J-NOM not ate-3SG part the cake-ACC
 ‘Julie didn’t eat the cake’
- a. *Perfective*: Julie didn’t eat the cake. Even though she started, she never finished all of it
- b. *#Imperfective*: Julie wasn’t eating the cake. She never even started.

The unavailability of (27b) can be shown by a short dialogue. (26) can be interpreted as the negation of an imperfective event. As such, it is falsified by the truth of a proper subevent. Thus if the event has already started, the negation is false:

- (28) Perfective / imperfective particle
- A. Juli nem *ment*_V *le*_{particle} a lépcső-n
 J-NOM not went down the stair-on
 ‘Julie didn’t go down the stairs’ (= (26))
- B. de igen, már elindult
 but yes, already started
 ‘but yes, she already started’

In contrast, no imperfective reading is possible for (23), the affirmative counterpart of (27). The fact that the event has started does not render the negation false, hence the markedness of (29b).

- (29) Perfective participle only
- A. Juli nem *ette*_V *meg*_{particle} a tortá-t
 J-NOM not ate-3SG part the cake-ACC
 ‘Julie didn’t eat the cake’ (= (27))
- B. #de igen, már elkezdte enni
 but yes already started eat-INF
 ‘but yes, she already started eating it’

Negative sentences provide further support to the claim that grammatical aspect distinctions are relevant, even in languages where the difference is not (necessarily) overt. Negation masks the word-order differences that distinguish perfective and imperfective particle constructions in Hungarian. The difference in meaning can still be shown to be present. As expected, those predicates that allow only perfective aspect fail to have an ambiguous interpretation.

6. Conclusion

One of the goals in this paper was to minimize the range of universally available aspectual categories. It was argued that grammatical aspectual distinctions are universally restricted to perfective/imperfective and that these aspectual categories are present in all languages. Hungarian was shown to provide a restricted environment where the distinction between perfective and imperfective is overt. This environment is limited to particle verbs where the particle denotes an endpoint; in this case, word-order difference corresponds to differences in interpretation. I argued that the word-order difference follows from the incompatibility of quantization imposed by the particle and the cumulative requirement of imperfectives. The approach also accommodates the distribution of particles that do not denote an endpoint and of those that only appear in perfective predicates. It was also shown that while negation masks surface differences, the meaning differences persist, suggesting a strictly compositional approach to the interpretation of negation.

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The Specificity Condition as Crossover

Yukio Furukawa

This paper proposes that the specificity condition is an instance of crossover, by appealing to the semantics of definite/specific DPs: since indexical values assigned to the determiners of definite/specific DPs depend on the value of the Wh-variable within the domains of such DPs, their values are offending to the operator-variable chain formed by the Wh-phrase. The data about DP-internal A-scrambling in Japanese, which repairs the ill-formedness of the specificity condition, support this analysis, although their grammaticality is not predicted by any previous analysis.

1. Introduction

Extraction out of a definite/specific DP is generally prohibited.¹ Compare (1) and (2) with (3), where extraction occurs out of non-specific DPs. The literature calls this phenomenon the specificity condition (SC).

- (1) a. ?? Who_i did you see the picture of t_i ?
b. *? Who_i did you see every picture of t_i ?
c. *? Who_i did you see most pictures of t_i ?
d. *? Who_i did you see each picture of t_i ?
e. * Who_i did you see John's picture of t_i ?
f. ?? Who_i did you see the pictures of t_i ? (Diesing 1992)

¹ French allows this type of Wh-extraction.

- (i) De qui Jean a-t-il vu la photo?
of whom John has-he seen the picture
'(lit.)*Of whom did John see the picture?' (Michel Paradis p.c.)

Since I am still investigating whether or not *la photo de qui* 'the picture of whom' is definite (cf. Chierchia 1998), I leave the issue about why French allows this type of extraction as an open question.

- (2) a. * Who_i did Mary say you saw a certain picture of t_i ?
 b. * Who_i did you destroy a picture of t_i ? (Diesing 1992)
- (3) a. Who_i did you see pictures of t_i ?
 b. Who_i did you see a picture of t_i ?
 c. Who_i did you see many pictures of t_i ?
 d. Who_i did you see several pictures of t_i ?
 e. Who_i did you see some pictures of t_i ? (Diesing 1992)

This paper proposes that SC is an instance of weak crossover (WCO), by appealing to the semantics of definite/specific DPs. Section 2 discusses some characteristic properties of SC, and, especially, presents some pieces of evidence that SC differs from subjacency. Then, Section 3 discusses why it is an instance of WCO. Section 4 presents two pieces of empirical evidence that support the proposal. Section 5 argues against some previous analyses of SC. Section 6 raises three problems in the proposal. Section 7 concludes the paper.

Before starting the discussion, I need a few assumptions about definiteness/specificity and WCO, since I am going to claim that SC is an instance of WCO. As for definiteness/specificity, I assume the following. Since what is definiteness/specificity is a debatable issue even in today's literature, I do not believe that this issue has a unified account. In this paper, I simply follow the proposal by Heim (1982)²³, that is, since definiteness/specificity requires that its referent be linked to a previously established discourse referent, it requires a definite discourse index, while non-specificity does not require it since its referent should not be linked to such a referent. I also assume that presuppositionality is equivalent to definiteness/specificity, following Diesing (1992). Finally, for the purpose of decomposition, I assume the iota-operator notation (but with a slight modification).

As for WCO, it is also a debatable issue even in today's literature, and I do not believe that a unified account exists about it, either. Moreover, WCO itself is a descriptive generalization, and hence I do not assume that WCO is a uniformed phenomenon. In this paper, I roughly assume that the configuration (4) is illegitimate in terms of WCO.⁴

- (4) *^{??}Op_i [... x_i ... t_i]

² See also Enç (1991).

³ In this sense, what is relevant to the discussion here is not uniqueness (cf. Russell 1905), but familiarity.

⁴ As is illustrated in (4), this paper assumes that not the bijection principle (cf. Koopman & Sportiche 1982; Reinhart 1983; Safir 1984) but 'leftness' (cf. Chomsky 1976; Higginbotham 1980) is the condition on WCO (see the discussion in Section 6.2 and Büring 2004). In any case, what is crucial in (4) is that the trace is an A'-trace.

2. Basic facts about SC: SC is not an instance of Subjacency.

As is observed in (1), Wh-extraction out of a DP headed by a strong determiner is not allowed. Although extraction out of a DP headed by a non-definite article is possible, the grammaticality will be changed once the specific reading of the DP is forced. Compare (2) with (3).

In this paper, I am going to focus my attention on the ill-formedness of (1a), (1f) and (2a), but I will not discuss details of the ill-formedness of (1b-e) and (2b). Although it seems hard to judge the subtle difference of the ungrammaticality between (1a) and (1b-d), it might be plausible to think that the ungrammaticality of (1b-d) involves at least one additional factor, namely the scope interaction between Wh-phrases and quantifiers.⁵ Also, this paper will not discuss anything about (2b). Diesing (1992) reports that verbs of destruction (e.g. *break*, *burn*, *destroy*, *tear up* and so on) require presuppositional DPs as their object arguments, and that, for many native speakers of English, (2b) is less acceptable than (3b). However, the grammaticality contrast between (2b) and (3b) seems to be less obvious, as far as I can see, in other words, the grammaticality judgment about (2b) diverges between native speakers.

In the following subsections, I am going to present one of the remarkable characteristics of SC, i.e. its distinct property from subjacency.

2.1. SC in covert Wh-movement languages

As is observed in (1) and (2), overt Wh-movement languages like English obey SC, but here I would like to point out that Wh-in-situ languages like Japanese also obey SC. Let us look at some data of Japanese. In the literature on Japanese syntax and semantics, the following two things are observed: (i) a DP associated with a floated numeral classifier is, in general, non-presuppositional, and (ii) individual-level predicates require presuppositional arguments. (See Kamio 1983; Ishii 1997, 1999; Watanabe 2002.) Let us assume (i) and (ii).

- (5) a. *? [Susi-no gakusei]-ga **san-nin** doitugo-ga umai. (NC floated)
 [Susi-GEN students]-NOM 3-CL German-NOM good
 b. [**san-nin-no** Susi-no gakusei]-ga doitugo-ga umai. (NC unfloated)
 ‘Three students of Susi’s are good at German.’

Since the subject in (5a) is non-presuppositional by the association of a floated numeral classifier, it is incompatible with the individual-level predicate. Note that, the subject in (5b) is presuppositional by its compatibility with the individual-level predicate.

Let us replace *Susi-no* ‘Susi’s’ with a Wh-phrase, *dare-no* ‘whose’. The ungrammaticality of (6a), which is the Wh-counterpart of (5a), is not surprising, because the subject DP is non-presuppositional, and hence is not compatible with the individual-level predicate.

⁵ In Furukawa (2004), I discuss the ill-formedness of (1b-d).

- (6) a. *? [*dare-no* gakusei]-ga **san-nin** doitugo-ga umai no?
 [whose students]-NOM 3-CL German-NOM good Q
 b. * [**san-nin-no** *dare-no* gakusei]-ga doitugo-ga umai no?
 ‘Whose three students are good at German?’

The ungrammaticality of (6b) (the Wh-counterpart of (5b)) shows that Japanese obeys SC, since (covert) Wh-movement occurs out of the presuppositional subject. In fact, this type of ungrammaticality never happens if the subject is non-presuppositional. Contrary to (6), the matrix predicate in (7) is a stage-level predicate, and can take a non-presuppositional DP as its subject.⁶

- (7) [go-dai-no dono-syooboosyo-no syooboosya]-ga (genzai)
 [5-CL-GEN which-fire.station-GEN fire.engines]-NOM (now)
 syutudoukanou-desu ka?
 available-CPL Q
 ‘(lit.) 5 fire engines of which fire station are available now?’

Note that, the ill-formedness of (6b) cannot be identified with that of the complex NP constraint (CNPC). (8) is an instance of CNPC in Japanese. As is shown in (8), the question itself is grammatical (though it is claimed that Japanese obeys CNPC, see Nishigauchi 1990, 1999; Pesetsky 1987; Watanabe 1992).

- (8) Mary-wa [DP [CP John-ni [DP nani-o] ageta] hito]-ni atta no?
 Mary-NOM [[John-to [what-ACC] gave] person]-with met Q
 ‘(lit.)*What did Mary meet the person who gave t to John?’

Contrary to (8), the question is ungrammatical in (6b). Thus, (6b) is not identical to CNPC.

2.2. The absence of the additional Wh-effect in SC

The additional Wh-effect (see Richards 1998, 2001; Watanabe 1992), which remedies the ill-formedness of subjacency, cannot rescue the ill-formedness of SC. As the contrast between (9)

⁶ Some people may point out the quantificational nature of the unfloatable numeral classifier, and may further claim that the blocking effect of Wh-movement by the numeral occurs in (6b). In fact, Japanese shows the blocking effect.

- (i) a. What did everyone bring?
 b. ??daremo-ga nani-o kaimashita ka?
 everyone-NOM what-ACC bought Q
 c. nani-o_i daremo-ga t_i kaimashita ka?
 what-ACC everyone-NOM bought Q (Hoji 1985, 1986)

However, the ill-formedness of (6b) cannot be identified with the blocking effect. As the grammaticality of (7) shows, Wh-dependency is allowed across a numeral if the DP is non-presuppositional.

(and/or (10)) and (11) shows, the unacceptability of SC differs from the unacceptability of subjacency.⁷

- (9) a. ?* What_i did Mary read a report that John bought t_i?
 b. Who read a report that John bought what? (Watanabe 2001)

- (10)a. * What_j do you wonder who bought t_j?
 b. Who_i t_i wonders who bought what? (Richards 1998)

- (11)a. */??Who_i did John see the picture(s) of t_i?
 b. */??Who (said John) saw the picture of whom? (Norvin Richards p.c.)

3. Proposal

Contrary to any previous proposal, I would like to propose the following:

(12)SC comes from the crossover effect by claiming that, in SC sentences (like (13a)), the indexical value assigned to the definite/specific determiner is offending to the operator-variable chain formed by the Wh-phrase, because its value depends on the value of the Wh-variable.

- (13)a. */??Who_i did you see **the** picture(s) of t_i?
 b. */??Op_i [... x_i ... t_i]

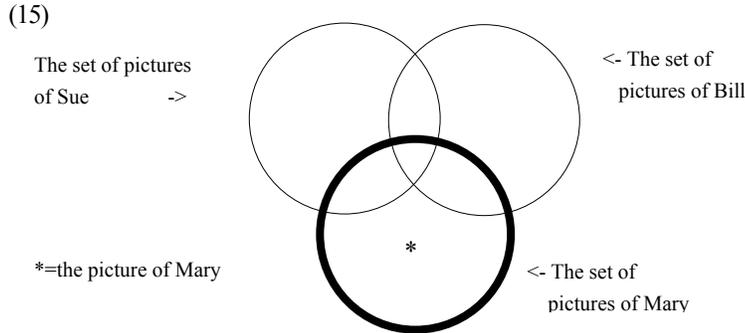
Needless to say, it is not obvious that SC sentences like (13a) really fall in the WCO configuration (13b). The (un)grammaticality of (14) may suggest that WCO is limited to cases where the pronoun requires the bound variable interpretation. However, the definite determiner in (13a) is referentially disjointed from the operator. How can I say that (13a) is an instance of WCO?

- (14) Who_i did his_{*i} mother love t_i?

Although the definite determiner in (13a) is referentially disjointed from the Wh-phrase, I am going to claim that the value assigned to the determiner depends upon the value of the Wh-phrase. For the convenience of my explanation, I am going to use the following example, first. *The picture of Mary* denotes one of the pictures whose subject for the photography is Mary. The value of the picture that *the picture of Mary* denotes cannot be the value of a picture where Mary is not included in its subjects, in other words, it is never chosen from the complement set

⁷ The ill-formedness of (11b) indicates that the claim that SC differs from subjacency is maintained even in Huang's (1982) type theory about subjacency, i.e., subjacency is an S-structure condition.

of pictures of Mary (see the Venn diagram (15)). It is reasonable to say that each candidate for its indexical value is restricted by the restriction of the determiner, namely [*picture of Mary*].



Suppose that *who(m)* replaces *Mary* in *the picture of who(m)*. The restriction on the assigned value to the determiner may not be changed even in this case. That is, the value of the picture cannot be the value of a picture where ‘*who(m)*’ is not (included in) its subjects. Thus, it is possible to say that each candidate for the value is restricted by the restrictor, namely [*picture of who(m)*], though *who(m)* is replaced by its variable for saturation.

To express the restricted nature of the assigned value to the definite determiner, I use the following iota-operator notation: the iota-operator binds a function as its variable whose argument is the restrictor NP (e.g. [*picture of Mary*] in (16a)).

- (16)a. **the** picture of Mary
 b. [ι_f [f [*picture of Mary*]] [*picture of Mary*]]

What (16b) means is that there is a definite function from the set of pictures of Mary (in the universe) to the value that *the picture of Mary* denotes. In this sense, the decomposition (16b) can correctly express the meaning of *the picture of Mary*.⁸

This iota-operator notation will decompose (17a) into the structure (17b). The dependent value on the Wh-variable within the function is offending to the operator-variable chain and creates the WCO configuration in (17b).

- (17)a. **??*Who_i did you see **the** picture(s) of t_i ?
 b. who_i you saw [ι_f [f [*picture of x_i*]] [*picture of t_i*]]
 c. **??*Op_i [... x_i ... t_i]

⁸ Because of the limit of the space, I only discuss the syntactic architecture (16b). Furukawa (2004) provides its semantic calculus.

However, (16b) is a tentative decomposition at this stage, because it is one of the descriptions of the meaning of (16a). In fact, there are several ways to decompose the meaning of *the picture of Mary*. The standard iota-operator notation may decompose *the picture of Mary* as (18).

(18) ιx .picture of Mary(x)

Furthermore, there might be proposals that do not assume the iota-operator notation to express the meaning of *the picture of Mary*. I do not have any good explanation about whether or not the decomposition (16b) is the only one possible description of (the meaning of) *the picture of Mary*.⁹ At this stage, however, this analysis does not adhere to the (modified) iota-operator notation, since the basic reasoning for this analysis is (12).

This analysis correctly predicts the grammaticality of (19a) and (20a). Since no Wh-phrase occurs within the restriction of the definite determiner in (19a), no variable occurs within the argument of the function. Hence, it does not create the WCO configuration.

(19)a. Who saw the picture of John?

b. who_i [t_i saw [ι_r [f[picture of John]] [picture of John]]]

(20)a. Who_i did you see a picture of t_i ? (non-specific interpretation)

b. who_i [you saw [a picture of t_i]]

Since the object DP in (20) is non-specific, its article does not require any discourse value. I assume that the iota-operator is absent in (20), and, at the same time, the function is also absent. (Otherwise, the function is unbound.) Hence, it does not create the WCO configuration.

Note that, some people may worry about the existential quantificational nature of the indefinite DP in (20a). In fact, Diesing (1992) claims that indefinites undergo obligatory QR if and only if they are presuppositional. Although I admit that QRed indefinites are sometimes presuppositional, it is not clear to me whether or not every QRed indefinite is presuppositional. In (21), *three review articles* can take wider scope than *two graduate students*. In addition to this, its matrix predicate is a creation verb (*write*). Suppose (i) that *write* can take a non-presuppositional object argument, following Davies & Dubinsky (2003), Diesing (1992) and Heycock (1995), and (ii) that *three review articles* undergoes QR to obtain its wide scope interpretation. It is not necessary that *three review articles* is presuppositional, though it undergoes QR.

(21) Two students will write three review articles (for the next issue of our workingpaper).

⁹ In Furukawa (2004), however, I insist that the 'redundant' restrictions are necessary for familiarity.

4. Empirical evidence

4.1. Prediction about judgments

Jonathan Bobaljik (p.c.) pointed out to me that, if my analysis is the right analysis for SC, the judgment about SC should correlate with the judgment about WCO. That is, those people who have a weak marginality about SC also have a weak marginality about WCO. In fact, the marginality of WCO is weak in his judgment and also he does not find the specificity effect very strong. I also asked some native speakers of English, and WCO is a weak violation for those who have a weak marginality about SC.¹⁰ (I thank Jonathan Bobaljik and Susi Wurmbrand for this point.)

4.2. Japanese

In the literature, WCO is used as a diagnostic to verify whether or not scrambling has an A-property. As is shown in (22b), A-scrambling can remedy its ill-formedness.

(22)a. *Canonical order*

[soitu_{*ij}-no hahaoya]-ga dare_i-o aisiteiru no
 [the guy-GEN mother]-NOM who-ACC love Q
 ‘Who_i does his_{*ij} mother love?’

b. *A-scrambling of the Wh-phrase*

dare_i-o [soitu_{ij}-no hahaoya]-ga t_i aisiteiru no
 who-ACC [the guy-GEN mother]-NOM love Q
 ‘Who_i does his_{ij} mother love?’

c. *A'-scrambling of the Wh-phrase*

dare_i-o Taro-ga [soitu_{*ij}-no hahaoya]-ni [keisatu-ga t_i
 who-ACC Taro-NOM [the guy-GEN mother]-to [police-NOM
 sagasiteiru]-to tatae-ta no
 be.looking.for]-COMP tell-PAST Q
 ‘Who_i did Taro tell his_{*ij} mother that the police was looking for t_i?’

In Japanese, word order is less restrictive even in the DP level, and, in fact, there is a piece of

¹⁰ However, Jon Nissenbaum (p.c.) pointed out to me that the unacceptability of the typical WCO sentence (14) is stronger in his judgment than the unacceptability of SC. In fact, he has a strong unacceptability about (14), though he does not find the WCO effect very strong in the case of non-typical WCO sentences (e.g. the weakest crossover sentences).

evidence that shows the existence of DP-internal A-scrambling. Since the disjunctive phrase *Yukizirusi ka Nihonham* ‘Yukizirusi or Nihonham’ neither precedes nor c-commands the bound variable *soko-no-kogaisya* ‘its subsidiary’, the DP (23a) is ungrammatical. Once the disjunctive phrase is shifted to the initial position of the DP, however, it can bind the variable, as the grammaticality of (23b) indicates. The contrast between (23a) and (23b) indicates that the disjunctive phrase undergoes A-movement in (23b), because its fronting changes the variable binding relation.

- (23)a. [ni-do-no soko_{i,j}-no-kogaisya-no [Yukizirusi ka
 [2-CL-GEN its subsidiary company-GEN [Yukizirusi or
 Nihonham]_i-nitaiste-no kokuhatu]-ga...
 Nihonham]-against-GEN accusation]-NOM
 b. [[[Yukizirusi ka Nihonham]_i-nitaiste]_j-no ni-do-no soko_{i,k}-no-kogaisya-no t_j
 kokuhatu]-ga...
 ‘(lit.)two accusations by its_{i,j} subsidiary company against [Yukizirusi or Nihonham]_i.’

At this stage, we have a prediction: if my analysis is the right analysis for SC, A-scrambling of a Wh-phrase (across the offending determiner) can remedy its ill-formedness. Coming back to (5), there are several patterns among the association of the unfloatable numeral classifier in Japanese. (5a) and (5b) are repeated in (24a) and (24b), respectively. Also (24c-d) are unfloatable cases.

- (24)a. *? [Susi-no gakusei]-ga **san-nin** doitugo-ga umai. (NC floated)
 [Susi-GEN students]-NOM 3-CL German-NOM good
 b. [**san-nin**-no Susi-no gakusei]-ga doitugo-ga umai. (NC unfloatable)
 c. [Susi-no **san-nin**-no gakusei]-ga doitugo-ga umai. (NC unfloatable)
 d. [Susi-no gakusei **san-nin**]-ga doitugo-ga umai. (NC unfloatable)
 ‘Three students of Susi’s are good at German.’

We have already seen that (25a) and (25b), which are the Wh-counterparts of (24a) and (24b), respectively, are ungrammatical, and especially that the ungrammaticality of (25b) is the evidence for SC in Japanese. The analysis here decomposes the structure of (25b) as (25c).

- (25)a. *? [*dare-no* gakusei]-ga **san-nin** doitugo-ga umai no?
 [whose students]-NOM 3-CL German-NOM good Q
 b. * [**san-nin**-no *dare-no* gakusei]-ga doitugo-ga umai no?
 ‘Whose three students are good at German?’
 c. [wh-Op_i [[t_r[f [3 students of x_i]] [...wh-t_i...]] ...] Q]

Let us look at the Wh-counterparts of (24c) and (24d), namely (26a) and (26b), respectively. Again, the subjects of (26a) and (26b) are presuppositional by the compatibility

with the individual-level predicate. Since the Wh-dependency occurs out of the presuppositional subjects, it may be predicted that both (26a) and (26b) should be ungrammatical. Contrary to (25b), however, they are grammatical.

- (26)a. [*dare-no* **san-nin**-no gakusei]-ga doitugo-ga umai no?
 [whose 3-CL-GEN students]-NOM German-NOM good Q
 b. [*dare-no* gakusei **san-nin**]-ga doitugo-ga umai no?
 ‘Whose three students are good at German?’

The Crossover analysis can predict its grammaticality by assuming that the Wh-phrase in (26a) and the constituent containing the Wh-phrase in (26b) undergo DP-internal A-scrambling to the initial position of the subject DP. Although determiners are not overtly pronounced in Japanese, I propose that their A-scrambling moves across the determiner (with the offending variable) in (26). Then, the structures for (26a) and (26b) should be analyzed as (27a) and (27b), respectively, and their structural configurations are abbreviated in (27c) and (27d), respectively. Both (27c) and (27d) do not fall in the WCO configuration.

- (27)a. [*dare-no*_i [**san-nin**-no t_i gakusei]]-ga doitugo-ga umai no?
 b. [[*dare-no* gakusei]_i [**san-nin** t_i]]-ga doitugo-ga umai no?
 ‘Whose three students are good at German?’
 c. [wh-Op_i [[wh-t_i [t_r[f[3 students of x_i]][…(A-t_i?)…]]]]…]]
 d. [wh-Op_i [[[…wh-t_i…]]_i[t_r[f[3 students of x_i]][…(A-t_i?)…]]]]…]]

5. Some notes on previous analyses

5.1. Diesing (1992)

Diesing (1992) claims that extraction out of every presuppositional DP must be prohibited. Thus, her approach does not predict any possibility of Wh-extraction out of presuppositional DPs. We have already discussed in (27), however, that Wh-movement out of presuppositional DPs really exists in Japanese.¹¹

5.2. SC as the subject condition (Mahajan 1992)

Mahajan (1992) proposes that SC is an instance of the subject condition, and claims that SC is absent in those languages that do not show any subject condition effect. Since no one has revealed what the subject condition is, I have few things to say about this approach. However, one thing that I would like to mention here is the following: Japanese does not display any

¹¹ See also the discussion in Section 3.

subject condition effect.¹² As we observed above, however, it obeys SC. This is what he does not predict.

6. Problems in the crossover analysis
6.1. Revisiting CNPC

As I have concluded in Section 2.2, SC differs from CNPC. Through the discussion there, we obtained the following generalization (28) by the contrast between (9) and (11).

(28) **Generalization:**

The additional Wh-effect can remedy the ill-formedness of CNPC, while it cannot remedy the ill-formedness of SC.

SC and CNPC are configurationally similar to each other, and, in fact, there seem to be cases where the domain of CNPC and the domain of SC overlap. For example, if the specificity of the head noun in CNP is forced, even the additional Wh-effect cannot repair the unacceptability. Compare (30) with (29b). The unacceptability of (30) may suggest that (31) violates both CNPC and SC.

- (29)a. ?* What_i did Mary read a report that John bought t_i ?
b. Who read a report that John bought what?

- (30)a. * Who read each report that John bought what?
b. * Who read the detective's report that John bought what? (Roger Martin p.c.)

¹² Some previous analyses point out that Japanese does not show the subject condition. For example, Lasnik & Saito (1992) observe that there is no contrast between (ia) and (ib). The Wh-word *dono hon-o* 'which book' in (ia) is extracted by the Wh-scrambling out of the sentential object in the embedded clause, whereas that in (ib) is extracted out of the sentential subject of the embedded clause. Although those two sentences are marginal because the Wh-scrambling moves across a CNP, they report that the grammaticality of (ib) is the same as that of (ia). Thus, the lack of contrast between them indicates that Japanese does not obey the subject condition.

(i) a. ??dono hon-o_i Mary-ga [John-ga t_i katta koto]-o mondai-ni
which book-ACC Mary-NOM [John-NOM bought fact]-ACC problem-to
siteiru no?
making Q
'(lit.) Which book is it that Mary is calling the fact that John bought it into question?'

b. ??dono hon-o_i Mary-ga [[John-ga t_i katta koto]-ga mondai-da
which book-ACC Mary-NOM [[John-NOM bought fact]-NOM problem-CPL
to] omotteru no?
COMP think Q
'(lit.) Which book is it that Mary thinks the fact that John bought it is a problem?'

(Lasnik & Saito 1992)

- (31)a. * What_i did Mary read each report that John bought t_i?
 b. * What_i did Mary read the detective's report that John bought t_i?

Now, look at (32). There seems to be a possibility that (32a) violates both CNPC and SC, because *which car* moves across the head noun of the relative clause whose determiner is *the*. If the generalization (28) is correct, however, (32a) does not violate SC, as the grammaticality of (32b) shows. Then, how can my analysis save (32b) (and (32a))?¹³

- (32)a. * Which car_i did John persuade the man who bought t_i to sell the hubcaps?
 b. Who_i t_i persuaded the man who bought which car to sell the hubcaps?
 (Richards 1998)

This is an open question, but, basically, (32) is everybody's problem if SC is applicable to covert Wh-movement.

6.2. SC in Japanese

6.2.1. String-vacuous scrambling

By the compatibility with the individual-level predicate, the subject of (33), which lacks the numeral classifier, is also presuppositional.

- (33) [*dare-no* gakusei]-ga doitugo-ga umai no?
 [whose students]-NOM German-NOM good Q
 'Whose students are good as German?'

If I apply my analysis (to explain the grammaticality of (27a)) to (36), one problem will arise. Since the determiner is not overtly pronounced in Japanese, the fronting of the Wh-phrase does not change its PF-string, in other words, its scrambling looks like a string vacuous scrambling.

- (34)a. [*dare-no*_i [t_i gakusei]]-ga doitugo-ga umai no?
 [whose [students]]-NOM German-NOM good Q
 b. [wh-Op_i [[wh-t_i [t_i[f [student of x_i]] [A-t_i]]] ...]]
 (The underlined part indicates an unpronounced element.)

¹³ This approach does not assume that every DP headed by *the* is definite. For example, some nouns in English (e.g. *king*, *president*, *prince* etc.) allow Wh-movement out of their domains even if they are headed by *the*. These nouns share a property: in order for them to be definite, their belongings must be specified. For example, *the king* can be definite if and only if the country where he belongs is specified.

- (i) a. Which country_i did James Bond kill the king of t_i?
 b. Which company_i did Forbs introduce the president of t_i? (Jon Nissenbaum p.c.)

6.2.2. The c-command relation in WCO

To explain the grammaticality of (27b), repeated in (35a), I claimed that the constituent containing the Wh-phrase (*dare-no gakusei* ‘whose students’) undergoes A-scrambling.

- (35)a. [[*dare-no* gakusei]_i [**san-nin** t_i]]-ga doitugo-ga umai no?
 [[whose students] [3-CL]]-NOM German-NOM good Q
 ‘Whose three students are good at German?’
 b. [wh-Op_i [[[...wh-t_i...]_j [_v[f[3 students of x_i]][(A-t_j?)...]]]...]]Q]

As is shown in its abbreviated structure (35b), however, the Wh-trace of *dare-no* ‘whose’ does not c-command the offending variable within the function. The problem behind (35) is the following: Safir (1984) claims that not precedence (or ‘leftness’) but the c-command relation (or the bijection principle) is the condition on WCO by the following evidence.

- (36)a. ?? Who_i did you give a picture of t_i to him_i?
 b. ?? Who_i did you give a picture of him_i to t_i?
 c. who_i[... [... wh-t_i...][...vbl_i...]]...

He observes that (36a) and (36b) are equally ungrammatical, and concludes that (36a) still violates WCO. If the c-command relation is necessary to explain WCO, as he claims, (35a) should still fall in its configuration. However, (35a) is grammatical. To reduce the grammaticality of (35a) to the absence of WCO, I have to assume the ‘leftness’ condition.

Note that, however, there seem to be some pieces of evidence that indicate that not the bijection principle but ‘leftness’ is preferred as the condition on WCO in Japanese. The bound variable in the matrix clause (*sono sensei* ‘his teacher’) can be bound by the QP within the CNP (*dono gakusei* ‘which/every student’). The availability of the bound variable interpretation in (37) may suggest that the c-command relation between the surface position of QP and the bound variable is not necessary for the bound variable interpretation.

- (37) [[dono gakusei]-ga syootaisita] pianisuto]-mo sono_i sensei datta.
 [[which student-NOM invited] pianist]-MO¹⁴ his teacher was
 ‘For every student_i, the pianist who he_i invited was his_i teacher.’ (Shimoyama 2001)

¹⁴ In the literature of Japanese syntax & semantics, the particle MO is usually considered to be an operator that quantifies over quantificational elements, so-called indeterminates (*dono gakusei* ‘which student’ in (37)), within the domain it attaches.

7. Conclusion

This paper proposed that SC is an instance of WCO, by appealing to the semantics of definite/specific DPs. This analysis differs from an approach taken by Diesing (1992), who claims that extraction out of any presuppositional DP is disallowed, in that it allows extraction out of presuppositional DPs if the Wh-movement occurs from an A-scrambled position. Japanese shows this type of extraction, and its grammaticality is correctly predicted by this approach, though Diesing's approach cannot predict it. Note that, my analysis may have significance in another aspect: further extension of the functional indexing approach by Engdahl (1986), Chierchia (1991) and Hornstein (1995) is possible.

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Distributed Morphology and vocabulary organisation

Alexandra Galani

The purpose of this paper is to investigate the status and the organisation of the vocabulary in Distributed Morphology (DM) (Halle and Marantz 1993). Based on evidence drawn from the verbal forms in Modern Greek I claim that the vocabulary has an independent structure where word formation processes may occur, and it is the repository not only of syntactic and phonological but also morphological features. As far as the organisation of the vocabulary entries is concerned, I propose that they are organised in tree hierarchies based on the degree of markedness of theme vowels – and not blocks organised in terms of specificity as in the standard DM approach. Finally, this view of the vocabulary has important consequences for word formation and the treatment of allomorphy.

1. Introduction

In this paper I discuss the status of the vocabulary in Distributed Morphology (DM) (Halle & Marantz 1993). I revisit the standard view in DM, which strictly sees the vocabulary as the repository of syntactic features onto phonological ones of underspecified entries. The proposal put forward considers the vocabulary as a component where morphological features are further incorporated in the Vocabulary Items (VIs). Crucial to this alternative view is the claim that the vocabulary is governed by its principles and has an independent structure. It is also seen as the component of grammar that actively participates in word formation by the application of operations affecting the formation of suppletive stems. Nevertheless, it should be noted that even though its function is now extended, it is still less complicated and more restricted than the lexicon in other theories (Di Sciullo & Williams 1987, Lieber 1992, Aronoff 1994). Additionally, the incorporation of morphological features in the vocabulary dictates the application of a feature checking order mechanism.

Moreover, the discussion of the empirical data, drawn from the verbal forms in Modern Greek (MG), also sheds light on the organisation of the VIs. It is argued that VIs are organised in tree structures, *contra* the standard view in

DM; VIs are organised in blocks in terms of specificity. As this position no longer holds, it is claimed that the organisation of the tree structures is dependent upon a hierarchy based on the degree of markedness (Ultra-Massuet 1999) of certain VIs. The view regarding the tree structures renders certain similarities with the organisation of the lexemes in Head driven-Phrase-Structure-Grammar (HPSG) (Koenig 1999). Nevertheless, no processes operate within the branches. On the other hand, an ultimate advantage of the hierarchical organisation of the VIs is that it allows one to interrelate items to one another to a certain extent.

As is shown in what follows, this analysis makes intriguing predictions about the degree of frequency, regularity and diachrony of the morphological units that participate in the formation of the verbal forms in MG. From a wider theoretical perspective, it also has significant consequences not only for the purposes of word formation but also as far as an alternative treatment of allomorphy is concerned.

However, the application of the new theory is restricted to the verbal forms in MG due to space limitations. The interested reader is referred to Galani (in preparation) for a discussion around nominative forms in MG. Its application, though, to other languages is subject to further and thorough investigation.

The rest of this paper is organised as follows: in section 2, I present the data drawn from MG. In the following section, I summarise the key features of the vocabulary in DM, before presenting the problems such theory faces for the given analysis of the data. In section 4, the alternative view of the DM vocabulary is unfolded. Its consequences are briefly highlighted in section 5, whereas the paper concludes with an overview of the main points that have been raised, in section 6.

2. Data

In this section, I pay attention to the facts any treatment of the verbal forms in MG should account for. The following points are based on claims made in Galani (2002) and subsequent work to which the interested reader is referred for extensive discussion.¹ I will first start off by discussing the morphological units of which verbal forms in MG consist as well as the features these units represent. Attention will be paid to the theme vowels (TVs), not only as far as their morphosyntactic content is concerned, but also in relation to the position in which they appear within the forms. Finally, the discussion in this section will be rounded off by looking at suppletive verbal stems. The way the analysis is presented in what follows, it remains theory neutral.

It has been argued that verbal forms consist of the root followed by the morpheme representing not only the aspectual but also morphological features

¹ Galani (2002a-b, 2003a-c, to appear a-b).

- (3) (a) gd - ár - thik - e
 $\sqrt{\text{.skin[+}\alpha, -\beta]} - \text{PER[+}\alpha, -\beta] - \text{NAps.per[+}\alpha, -\beta] - 3\text{SG.PS}$
 ‘He/she/it was skinned.’
- (b) agap - í - thik - e
 $\sqrt{\text{.love[+}\alpha, -\beta, +\gamma]} - \text{PER[+}\alpha, -\beta, +\gamma] - \text{NAps.per[+}\alpha, -\beta, +\gamma] - 3\text{SG.PS}$
 ‘He/she/it was loved.’

This mapping ensures that the correct morphological pieces are matched to the correct stems. This is important in cases where the morphological spell-out of voice differs for stems belonging to different classes. This pattern is exemplified in (4).

- (4) (a) gd - ern - ó - mun
 $\sqrt{\text{.skin[+}\alpha, -\beta]} - \text{IMP[+}\alpha, -\beta] - \text{NAimp[+}\alpha, -\beta] - 1\text{SG.PS}$
 ‘I was being skinned.’
- (b) agap - \emptyset - ió - mun
 $\sqrt{\text{.love[+}\alpha, -\beta, +\gamma]} - \text{IMP[+}\alpha, -\beta, +\gamma] - \text{NAimp[+}\alpha, -\beta, +\gamma] - 1\text{SG.PRES.na}$
 ‘I was being loved.’

Ungrammaticality, for instance, results if *-ern-* (4a) is matched to *-ió-* (4b). The only way to ensure that the correct combinations occur, is achieved, is through the matching of the morphological features (class) TVs represent.

What has to be made explicit about these morphological units is that they represent syntactico-semantic (aspect, tense, voice, agreement), morphological features and they also have a phonological content, overt or covert. All of these features should be included in the storage unit of the grammar of any given theory.

Moreover, the formation of such forms based on non-suppletive stems –as the ones exemplified in (1) and (3-4)- seems to follow a regular and productive pattern of formation. Consider the formation of nominal forms.

- (5) (a) gd - ár - simo
 $\sqrt{\text{.skin[+}\alpha, -\beta]} - \text{TV[+}\alpha, -\beta] - \text{NOM.SG.NEUT}$
 ‘Skinning.’
- (b) agáp - \emptyset - i
 $\sqrt{\text{.love[+}\alpha, -\beta, +\gamma]} - \text{TV[+}\alpha, -\beta, +\gamma] - \text{NOM.SG.FEM}$
 ‘Love.’

The root is matched to the TV –which also serves as a class marker– followed by the nominal suffixes.³ Consequently, the TV is a marker of class independently of whether this is declensional or conjugational. This is determined by the external environment of the stem (voice versus case and gender agreement).

³ Whether aspect is represented in the nominals is not discussed in this paper. The reader is referred to Galani (to appear, a), instead.

To conclude, the facts around the verbal morphology in MG have been presented in this section. Section 3 discusses the standard DM principles.

3. *Vocabulary in Distributed Morphology and problems*

The aims of this section are to highlight the DM principles, especially in relation to the status of the vocabulary and the organisation of the vocabulary entries, before considering some of the key problems and questioning the validity of these proposals for the formulation of the above account of the verbal morphology in MG within this framework.

3.1. *Vocabulary: DM principles*

DM is a post-syntactic framework developed by Halle & Marantz (1993). A significant aspect of this framework is the way syntactic terminal nodes are seen. Syntactic terminal nodes are complexes of syntactic and semantic features that are called morphemes. These morphemes lack any phonological specification. Head-movement applies at the syntactic component. Once the syntactic operations are complete, the structure enters the morphological component. Morphological processes may further modify the structure mainly before Vocabulary Insertion. Fusion, for instance, is the morphological operation by which two terminal nodes are fused into a single one. Only one VI, the specification of which matches the specification of the fused node, can compete for insertion in this node.

Moreover, Vocabulary Insertion is the operation that supplies the terminal nodes with phonological features. It should be noted that Vocabulary Insertion is subject to the Subset Principle (Halle 1997); the most highly specified item for the features of the given terminal node wins the competition between the VIs.

DM assumes that there is no lexicon, *contra* other theories, such as Lieber (1992). Its function is now distributed across the syntactic, morphological and phonological components. The storage unit of the VIs is the vocabulary which serves as the repository of the mapping of syntactico-semantic features onto phonological ones of underspecified entries. No operations apply here. Any readjustment rules apply at the morphological component. So, the vocabulary does not participate actively in the process of word formation.

Finally, as far as the organisation of the VIs is concerned, DM assumes that the Subset Principle also serves as the ordering mechanism of these entries. The most specified entry will precede less specified ones. VIs are grouped in blocks, although the exact ways by which this grouping is achieved are not particularly clear. The inadequacies such view raises for the analysis of the MG verbal forms are discussed in what follows.

3.2. Vocabulary: DM problems for Modern Greek

I would now like to turn to the problems the principles of DM face as far as the analysis of the data presented in section 2 is concerned. Let me first start off by making reference to the features VIs carry in the vocabulary.

It is not explicitly stated that morphological features may be also stored in the repository of the grammar. As the theory stands at present, the mapping of syntactico-semantic to phonological features clearly excludes the presence of any morphological ones. This obviously creates an obstacle for the analysis of the verbal morphology in MG; the morphological features of class carried in all the pieces of morphology participating in verb formation are not accounted for. This has important consequences for ensuring that only the correct pieces are matched to one another so that grammatical forms are derived, as well as for retaining the assumption that the grammar has the mechanisms to derive non-suppletive versus suppletive stems under distinct processes.

As was suggested in section 2, the formation of suppletive stems cannot be seen as the result of productive processes, where the root is matched to the TV followed by the morpheme representing the features of voice and the one representing agreement and tense. On the contrary, the system does not have the mechanisms to interpret diachronic information in such a regular and productive way. There is no way to derive suppletive stems in the syntactic, the morphological and/or the phonological components. The formation of suppletive stems can be only seen as information passed on in the grammar.

On the other hand, the possibility of the application of morpho-lexical rules in the morphological component is also not desirable, and is consequently abandoned. Suppose that the system in the morphological component comes across the morphological feature that denotes a suppletive pattern. The first question relates to how the system knows that this is so. There are two ways: either this information is incorporated in the morphological component and, consequently, the tree structures are altered in order to create the appropriate environment for the insertion of the VI which matches the specification of the nodes, or, alternatively, morphology looks into the vocabulary prior to insertion and then morphological processes further apply. Nevertheless, if morpho-lexical rules can be only interpreted in the morphological component, the system would be required to look into the vocabulary, select the items that match the specification of the nodes and then alter them once vocabulary insertion has occurred. Bearing in mind economy considerations, this option is not particularly appealing.

Moreover, there is also the question as to where these rules are stored. Is it the morphology or the vocabulary? How does the system know where to look? If the morpho-lexical rules are stored in the vocabulary, this necessarily means that it is not only a repository of mapping of features. On the contrary, if it is the morphological component, it means that a relation must hold and relate the rules that are stored in the morphology to the items stored in the vocabulary. Again, taking into account the economy of this proposal, it appears not to be

explicitly motivated, as it makes sense to store both the rules and the items they refer to together.

The next issue regarding the vocabulary in DM relates to the ways VIs are organised. Based on the Subset Principle, it is claimed that the most specified entry precedes less specified ones. Consider example (1), repeated here as (7).

- (9) (a) gd - ár - thik - e
 √.skin[+α, -β] - PER[+α, -β]- NAPS.per- 3SG.PS
 ‘He/she/it was skined.’
- (b) agap - í - thik - e
 √.love[+α, -β, +γ] - PER[+α, -β, +γ]- NAPS.per - 3SG.PS
 ‘He/she/it was loved.’

In line with the principle, one predicts that the TV that appears in forms such as (7b) should precede the one in (7a), as it is more specified. Nevertheless, recall what has been said about the degree of frequency, regularity, and diachrony of the morphological pieces participating in the formation of the verbal forms in MG. Adopting the Subset Principle, one is led to predict that the items appearing in (7b) are more frequent, regular and diachronically neuter than the ones in (7a). Nonetheless, this does not mirror the real picture. As Koutsoudas (1964) also suggests, forms such as the one in (7b) are less frequent, more irregular and bear a stronger diachronic relation to the equivalent forms in previous stages of the language.

Moreover, the organisation of the vocabulary entries in blocks does not capture the degree of relation between the items. There is also the question of how the items are organised in blocks. Is the organisation made in terms of the syntactico-semantic features or, in this case, the morphological ones? Based on what has been sketched in the literature, the syntactico-semantic features are used as the mechanism for organising the items in blocks.

Finally, this view has further consequences for economy considerations. Consider the process of vocabulary insertion; the system would have to look into different blocks to pick out the items that match the specification of the nodes. On the other hand, if all the items bearing the same morphological feature were arranged all together in a way, the system would have to look at a specific ‘chunk’ to choose the item which wins the competition and not throughout the vocabulary. Nonetheless, this cannot be maintained, if one still assumes that blocks are the best way to organise the entries. An alternative way is explored in section 4.

4. Vocabulary: an alternative view

In this section, I present an extended version of the status of the vocabulary in DM and explore an alternative method as far as the organisation of the vocabulary entries is concerned.

- (10) 1. (a) $\gamma \rightarrow \emptyset / [+V] V \#$
 where +V = [verb] and V = vowel
 (b) $\gamma + V \rightarrow \emptyset / [+V] V$
 but [V + PAST, +NON-ACTIVE] \rightarrow [Rule 9]
 2. $\sqrt{leg-} + [+perfective, (+past)] \rightarrow V[ip-]$

(10a) will produce the stem appearing in (9a), whereas (10b) the one in (9b). Here, it should be made clear that the formation of such stems occurs only once and they are then available forms to compete for vocabulary insertion. In addition, an important difference between this view and other theories in the literature is that suppletive stems are formed in the vocabulary. Their formation is the result of the interpretation of syntactico-semantic and morphological information. It is not the result of abstract readjustment rules which say: ‘take stem X and change it to Z’, without defining the exact conditions under which the suppletion occurs. An alternative analysis is offered by Joseph & Smirniotopoulos (1993) who suggest that such stems are stored in the lexicon, they are not formed or derived under any rules.

Moreover, the proposal that rules are stored in the vocabulary is further supported, if we consider cases such as the rule which conditions the insertion of the augment –the morpheme inserted in some verbal forms to occupy the stress in the past tenses, see Galani (2002c) for an extensive discussion- or the one under which the suffixation of certain nominal morphemes is constrained.⁶

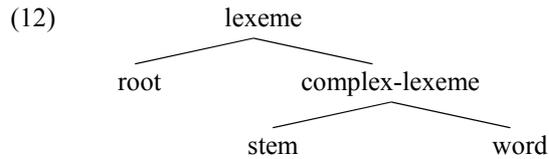
- (11) (a) \acute{e} - grapsa
 AUG - $\sqrt{\text{write}}$.PER.AC.1SG.PS
 ‘I wrote.’
 (b) $\acute{p}\acute{e}\tau\acute{r}$ - ino
 $\sqrt{\text{stone}}$ - NOM.nom.sg.neut
 ‘Of stone.’
 (c) molivé- nio
 $\sqrt{\text{lead}}$ - NOM.nom.sg.neut
 ‘Leaden.’

Descriptively, the augment is inserted when the features of [+past] are represented, and only if the number of syllables is less than three in the past tenses, where the stress moves to the antepenultimate. On the other hand and in the nominal environment, the suffixation of *-ino* (11b) occurs when the number of syllables of the stem is less than three, whereas in the cases where the stem is phonologically heavy the suffix *-nio* (11c) wins the competition. Such rules, though, are only phonologically interpreted and they are available once the structure enters PF.

Now, let us turn to the last issue of this alternative view, which looks in to the organisation of the vocabulary entries.

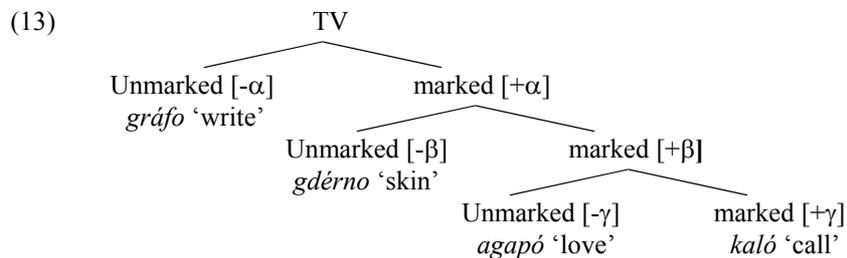
⁶ Special thanks to Gaberell Drachman for bringing it to my attention. (11b-c) are adapted from Drachman, Kager & Malikouti-Drachman (1995).

I propose that VIs are hierarchically organised in tree structures rendering similarities with the hierarchical structure of the syntactic, morphological and phonological components. Additionally, the tree structuring is also similar to the organisation of the lexemes in Koenig (1999) constructional morphology within the framework of HPSG.



A significant difference between the two theories, though, relates to the fact that no processes operate within the branches in DM, *contra* HPSG where the ways branches are organised leads to the formation of a lexeme and consequently a grammatical form.

Moreover, what remains to be seen is the ways by which VIs are arranged in the tree structure. I propose that the structure can be seen in terms of a hierarchy based on the degree of markedness –the notion is adapted from Oltra-Massuet (1999)- of the TVs. VIs that are less specified belong to the higher nodes of the tree, whereas the more deeply embedded an item is, the more specified it is. This is illustrated in the following structure, (13).



The way VIs are organised in (13) also denotes the degree of regularity, frequency and diachrony, reported in Koutsoudas (1964). The more deeply embedded an item is, the more irregular and less frequent it is. So, the items corresponding to suppletive stems are, in principle, the most deeply embedded ones.

Furthermore, the notion of level of embedding also enables us to account for the interrelation between the entries. It is predicted that forms will retain certain similarities as far as the morphological spell-out of some pieces may be concerned. Recall examples (1) and (4), repeated here as (14-15) respectively.

- (14) (a) gd - ár - thik - e
 √.skin[+α, -β] - PER[+α, -β]- Naps.per - 3SG.PS
 'It was skinned.'

- (b) agap - í - thik - e
 $\sqrt{\text{love}}[+\alpha, -\beta, +\gamma]$ - PER[$+\alpha, -\beta, +\gamma$] - N_{Aps.per} - 3SG.PS
 ‘She was loved.’
- (15) (a) gd - ern - ó - mun
 $\sqrt{\text{skin}}[+\alpha, -\beta]$ - IMP[$+\alpha, -\beta$] - N_{Aimp}[$+\alpha, -\beta$] - 1SG.PS
 ‘I was being skinned.’
- (b) agap - Ø - ió - mun
 $\sqrt{\text{love}}[+\alpha, -\beta, +\gamma]$ - IMP[$+\alpha, -\beta, +\gamma$] - N_{Aimp}[$+\alpha, -\beta, +\gamma$] - 1SG.PRES.na
 ‘I was being loved.’

Although the suffix representing the non-active voice and perfective aspect has the same morphological spell-out in both (14a) and (14b), this does not occur in the non-active, imperfective forms. This sort of relation would not have been incorporated in the system if items were arranged in blocks.

Finally, the last point that remains to be explained is the way features are checked during the vocabulary competition. I propose that a feature checking order (FCO) mechanism is available in the system. FCO ensures that morphological features are first checked and matching of the syntactico-semantic features follows. This has practical considerations serving as an economy principle during the derivation. The system will first look into the node specified for the given morphological feature –and not throughout the vocabulary- before selecting the items complying with the syntactic specification of the node.

5. Consequences

This alternative view of the DM vocabulary has interesting consequences not only from a language-specific point of view but also from a wider theoretical perspective. I first highlight the advantages for the analysis of the verbal forms in MG and I then move onto its theoretical significance.

An important aspect of the verbal forms in MG is the information regarding the conjugational classes. This information is represented in the system. It also serves as a mechanism to relate each morphological unit participating in the formation of any given verbal form, so that the correct matching of the pieces of inflection is achieved. Finally, information regarding the productivity of suppletive versus non-suppletive stems, frequency, regularity and diachrony is also welcoming. The major advantage of this treatment concerns the sharp distinction which is made between the derivation of suppletive stems in the vocabulary, as the result of morpho-lexical rules, and the formation of non-suppletive ones mainly in the morphological component.

Moreover, this alternative view also affects the process of word formation within DM. First of all, the number of the word formation processes is significantly reduced. The system looks into the vocabulary once before vocabulary insertion and picks out only the item that best matches the

morphological and syntactic specification of the node for which it competes for insertion. In addition, it turns out to be the most economical way under which the operation of vocabulary insertion applies. Again, the system does not have to search all the vocabulary entries. It will only look under the node specified for the given morphological feature. All items related to that feature are arranged under that node. Finally, the order according to which the features are checked is strictly specified. The items competing for insertion under any given terminal node in the morphological component should first match the morphological features of the node –as far as class is concerned- before checking the syntactico-semantic ones.

Lastly, the extended view of the vocabulary and its organisation influences the way allomorphic cases are explained within this framework. I assume that suppletive stems stored in the vocabulary, exhibit true allomorphy. True allomorphy is seen as an allomorphic pattern that is not conditioned phonologically –as in Hooper (1976)- or syntactically –Chomsky (1957). It is also a pattern for which morphology itself cannot account for. On the other hand, the degree of allomorphy TVs exhibit, is interpreted as distinct vocabulary entries which are also not conditioned syntactically or phonologically, as they represent different morphological features. These items are necessary to be treated as separate entries, as they serve as morphological input. Consequently, allomorphy –whether this is seen as true allomorphy or not- is considered to be the result of DM's vocabulary internal organisation and in most cases no extra stipulative rules are needed. Allomorphy is seen as a fully productive process, which has been further claimed by Lieber (1982), *contra* previous treatments (Chomsky 1957, Aronoff 1976). The ultimate result of this analysis is also that it does not complicate the grammar but, on the contrary, it flows from it.

6. Conclusion

The status and the organisation of the vocabulary in DM have been the central focus of this paper. It was argued that the vocabulary is an independent component. Readjustment rules may apply for the formation of suppletive stems, whereas the formation of non-suppletive ones mainly occurs across the syntactic and morphological components. Moreover, the vocabulary was also seen as the repository not only of syntactic but also morphological features to phonological ones. Contrary to what has been previously suggested in the literature, the VIs are not organised in blocks in terms of specificity; their organisation is subject to a hierarchy based on the degree of markedness of the TVs in MG. This hierarchy obeys to a tree-structuring pattern, similar to HPSG. The presence of morphological features, on one hand, gave rise to a feature checking order mechanism; the morphological features must be checked prior to the checking of the syntactic ones. On the other hand, the degree of markedness allowed us to account for the interrelation between VIs. This view had significant language-specific as well as theoretical consequences. Class

information was allowed to be encoded in the MG system. The relation between the units participating in the formation of the verbal forms was captured. This made the correct predictions about the productivity, frequency and diachrony of these forms. From a wider theoretical perspective, the number of processes participating in word formation was significantly reduced. The way vocabulary entries were arranged and selected for insertion was more economical, whereas the application of the processes was strictly ordered. Finally, as far as allomorphy is concerned, it was proposed that only suppletive stems formed in the vocabulary exhibit a true allomorphic pattern. On the other hand, the degree of allomorphy TVs show, is interpreted at the morphological component. Interestingly, allomorphy was treated as the result of DM's vocabulary internal organisation, and no extra rules were needed. Consequently, allomorphy is a fully productive process that does not complicate the grammar.

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A Dynamic Programming Algorithm for the Segmentation of Greek Texts

Pavlina Fragkou

In this paper we introduce a *dynamic programming* algorithm to perform linear text segmentation by global minimization of a segmentation cost function which consists of: (a) within-segment word similarity and (b) prior information about segment length. The evaluation of the segmentation accuracy of the algorithm on a text collection consisting of Greek texts showed that the algorithm achieves high segmentation accuracy and appears to be very innovating and promising.

Keywords: Text Segmentation, Document Retrieval, Information Retrieval, Machine Learning.

1. Introduction

Text segmentation is an important problem in information retrieval. Its goal is the division of a text into *homogeneous* ('*lexically coherent*') segments, i.e. segments exhibiting the following properties: (a) each segment deals with a particular subject and (b) contiguous segments deal with different subjects. Those segments can be retrieved from a large database of unformatted (or loosely formatted) text as being relevant to a query.

This paper presents a *dynamic programming* algorithm which performs *linear segmentation*¹ by global minimization of a *segmentation cost*. The *segmentation cost* is defined by a function consisting of two factors: (a) *within-segment word similarity* and (b) *prior information about segment length*. Our algorithm has the advantage that it can be applied to either large texts - to segment them into their constituent parts (e.g. to segment an article into sections) - or to a stream of independent, concatenated texts (e.g. to segment a transcript of news into separate stories).

¹As opposed to *hierarchical* segmentation (Yaari (1997))

For the calculation of the segment *homogeneity* (or alternatively *heterogeneity*) of a text, several segmentation algorithms using a variety of criteria have been proposed in the literature. Some of those use linguistic criteria such as cue phrases, punctuation marks, prosodic features, reference, syntax and lexical attraction (Beeferman et al. 1997, Hirschberg & Litman 1993, Passoneau & Litman 1993). Others, following Halliday and Hasan's theory (Halliday & Hasan 1976), utilize statistical similarity measures such as word cooccurrence. For example the linear discourse segmentation algorithm proposed by Morris and Hirst (Morris & Hirst 1991) is based on *lexical cohesion relations* determined by use of Roget's thesaurus (Roget 1977). In the same direction Kozima's algorithm (Kozima 1993, Kozima & Furugori 1993) computes the semantic similarity between words using a semantic network constructed from a subset of the Longman Dictionary of Contemporary English. Local minima of the similarity scores correspond to the positions of topic boundaries in the text.

Youmans (Youmans 1991) and later Hearst (Hearst & Plaunt 1993, Hearst 1994) focused on the similarity between *adjacent* parts of a text. They used a sliding window of text and plotted the number of first-used words in the window as a function of the window's position within the text. In this plot, segment boundaries correspond to deep valleys followed by sharp upturns. Kan (Kan et al. 1998) expanded the same idea by combining word-usage with visual layout information.

On the other hand, other researchers focused on the similarity between *all* parts of a text. A graphical representation of this similarity is a *dotplot*. Reynar (Reynar 1998; 1999) and Choi (Choi 2000, Choi et al. 2001) used *dotplots* in conjunction with *divisive clustering* (which can be seen as a form of *approximate* and *local* optimization) to perform *linear* text segmentation. A relevant work has been proposed by Yaari (Yaari 1997) who used *divisive / agglomerative clustering* to perform *hierarchical* segmentation. Another approach to clustering performs *exact* and *global* optimization by *dynamic programming*; this was used by Ponte and Croft (Ponte & Croft 1997, Xu & Croft 1996), Heinonen (Heinonen, O. 1998) and Utiyama and Isahara (Utiyama & Isahara 2001).

Finally, other researchers use probabilistic approaches to text segmentation including the use of *Hidden Markov Models* (Yamron et al. 1999, Blei & Moreno 2001). Also Beeferman (Beeferman et al. 1997) calculated the probability distribution on segment boundaries by utilizing word usage statistics, cue words and several other features.

2. The algorithm

2.1. Representation

Suppose that a text contains T sentences and its vocabulary contains L distinct words (e.g words that are not included in the stop list, otherwise most sentences would be similar to most others). This text can be represented by a $T \times L$ matrix

F defined as follows: for $t = 1, 2, \dots, T$ and $l = 1, 2, \dots, L$ we set

$$F_{t,l} = \begin{cases} 1 & \text{iff } l\text{-th word is in } t\text{-th sentence} \\ 0 & \text{else.} \end{cases}$$

The *sentence similarity matrix* D of the text is a $T \times T$ matrix where for $s, t = 1, 2, \dots, T$ we set

$$D_{s,t} = \begin{cases} 1 & \text{if } \sum_{l=1}^L F_{s,l}F_{t,l} > 0; \\ 0 & \text{if } \sum_{l=1}^L F_{s,l}F_{t,l} = 0. \end{cases}$$

This means that $D_{s,t} = 1$ if the s -th and t -th sentence have at least one word in common. Every part of the original text corresponds to a submatrix of D . It is expected that submatrices which correspond to actual segments will have many sentences with words in common, thus will contain many ‘ones’. In Figure 1 we give a *dotplot* of a matrix corresponding to a 91-sentences text. ‘Ones’ are plotted as black squares and ‘zeros’ as white squares. Further justification for the use of this similarity matrix and graphical representation can be found in Petridis et al. (2001), Kehagias, A et al. (2002), Reynar (1998; 1999), Choi (2000) and Choi et al. (2001).

We make the assumption that segment boundaries always occur at the end of sentences. A segmentation of a text is a partition of the set $\{1, 2, \dots, T\}$ into K subsets (i.e. *segments*, where K is a variable number) of the form $\{1, 2, \dots, t_1\}$, $\{t_1 + 1, t_1 + 2, \dots, t_2\}$, ..., $\{t_{K-1} + 1, t_{K-1} + 2, \dots, T\}$ and can be represented by a variable length vector $\mathbf{t} = (t_0, t_1, \dots, t_K)$, where t_0, t_1, \dots, t_K are the *segment boundaries* corresponding to the last sentence of each subset.

2.2. Dynamic Programming

Dynamic programming as a method guarantees the optimality of the result with respect to the input and the parameters. Following the approach of Heinonen (Heinonen, O. 1998) we use a *dynamic programming* algorithm which decides the locations of the segment boundaries by calculating the globally optimal splitting \mathbf{t} on the basis of a similarity matrix (or a curve), a preferred fragment length and a cost function defined. Given a similarity matrix D and the parameters μ, σ, r and γ (the role of each of which will be described in the sequel) the *dynamic programming* algorithm tries to minimize a *segmentation cost function* $J(\mathbf{t}; \mu, \sigma, r, \gamma)$ with respect to \mathbf{t} (here \mathbf{t} is the independent variable which is actually a vector specifying the boundary position of each segment and the number of segments K while μ, σ, r, γ are parameters) which is defined in equation (1).

$$J(\mathbf{t}; \mu, \sigma, r, \gamma) = \sum_{k=1}^K \gamma \cdot \frac{(t_k - t_{k-1} - \mu)^2}{2 \cdot \sigma^2} - (1 - \gamma) \cdot \frac{\sum_{s=t_{k-1}+1}^{t_k} \sum_{t=t_{k-1}+1}^{t_k} D_{s,t}}{(t_k - t_{k-1})^r} \quad (1)$$

Hence the sum of the costs of the K segments constitutes the total segmentation cost; the cost of each segment is the sum of the following two terms (with their relative importance weighted by the parameter γ):

1. The term $\frac{(t_k - t_{k-1} - \mu)^2}{2 \cdot \sigma^2}$ corresponds to the length information measured as the deviation from the average segment length. In this sense, μ and σ can be considered as the mean and standard deviation of segment length measured either on the basis of words or on the basis of sentences appearing in the text's segments and can be estimated from *training data*.
2. The term $\frac{\sum_{s=t_{k-1}+1}^{t_k} \sum_{t=t_{k-1}+1}^{t_k} D_{s,t}}{(t_k - t_{k-1})^r}$ corresponds to (word) similarity between sentences. The numerator of this term is the total number of 'ones' in the D submatrix corresponding to the k -th segment. In the case where the parameter r is equal to 2, $(t_k - t_{k-1})^r$ corresponds to the area of submatrix and the above fraction corresponds to 'segment density'. A 'generalized density' is obtained when $r \neq 2$ and enables us to control the degree of influence of the surface with regard to the 'information' (i.e. the number of 'ones') included in it. Strong intra-segment similarity (as measured by the number of words which are common between sentences belonging to the segment) is indicated by large values of $\frac{\sum_{s=t_{k-1}+1}^{t_k} \sum_{t=t_{k-1}+1}^{t_k} D_{s,t}}{(t_k - t_{k-1})^r}$, irrespective of the exact value of r .

Segments with high density and small deviation from average segment length (i.e. a small value of the corresponding $J(\mathbf{t}; \mu, \sigma, r, \gamma)$ ²) provide a 'good' segmentation vector \mathbf{t} . The *global* minimum of $J(\mathbf{t}; \mu, \sigma, r, \gamma)$ provides the *optimal* segmentation $\hat{\mathbf{t}}$. It is worth mentioning that the optimal $\hat{\mathbf{t}}$ specifies both the optimal number of segments K and the optimal positions of the segment boundaries t_0, t_1, \dots, t_K . In the sequel, our algorithm is presented in a form of pseudocode.

Dynamic Programming Algorithm

Input: The $T \times T$ similarity matrix D ; the parameters μ, σ, r, γ .

Initialization

```

For  $t = 1, 2, \dots, T$ 
   $Sum = 0$ 
  For  $s = 1, 2, \dots, t - 1$ 
     $Sum = Sum + D_{s,t}$ 
   $S_{s+1,t} = \frac{Sum}{(t-s)^r}$ 
End

```

End

Minimization

²Small in the algebraic sense; $J(\mathbf{t}; \mu, \sigma, r, \gamma)$ can take both positive and negative values.

```

 $C_0 = 0, Z_0 = 0$ 
For  $t = 1, 2, \dots, T$ 
   $C_t = \infty$ 
  For  $s = 1, 2, \dots, t - 1$ 
    If  $C_s + S_{s,t} + \frac{(t-s-\mu)^2}{2\sigma^2} \leq C_t$ 
       $C_t = C_s - (1 - \gamma) \cdot S_{s+1,t} + \gamma \cdot \frac{(t-s-\mu)^2}{2\sigma^2}$ 
       $Z_t = s$ 
    EndIf
  End
End
BackTracking
 $K = 0, s_K = T$ 
While  $Z_{s_K} > 0$ 
   $K = K + 1$ 
   $s_K = Z_{s_{K-1}}$ 
End
 $K = K + 1, s_K = 0, \hat{t}_0 = 0$ 
For  $k = 1, 2, \dots, K$ 
   $\hat{t}_k = s_{K-k}$ 
End
Output: The optimal segmentation vector  $\hat{\mathbf{t}} = (\hat{t}_0, \hat{t}_1, \dots, \hat{t}_K)$ .

```

3. Evaluation

3.1. Measures of Segmentation Accuracy

The performance of our algorithm was evaluated by three indices: *Precision*, *Recall* and Beeferman's P_k metric. *Precision* and *Recall* measure segmentation accuracy. For the segmentation task, *Precision* is defined as 'the number of the estimated segment boundaries which are actual segment boundaries' divided by 'the number of the estimated segment boundaries'. On the other hand, *Recall* is defined as 'the number of the estimated segment boundaries which are actual segment boundaries' divided by 'the number of the true segment boundaries'. High segmentation accuracy is indicated by high values of both *Precision* and *Recall*. However, these two indices have some shortcomings. First, high *Precision* can be obtained at the expense of low *Recall* and conversely. Additionally, those two indices penalize equally every inaccurately estimated segment boundary whether it is near or far from a true segment boundary.

An alternative measure P_k which overcomes the shortcomings of *Precision* and *Recall* and measures segmentation inaccuracy was introduced recently by Beeferman et al. (Beeferman et al. 1997). Intuitively, P_k measures the proportion of 'sentences which are wrongly predicted to belong to the same segment (while

actually they belong in different segments)’ or ‘sentences which are wrongly predicted to belong to different segments (while actually they belong to the same segment)’. P_k is a measure of how well the true and hypothetical segmentations agree (with a low value of P_k indicating high accuracy (Beeferman et al. 1997)). P_k penalizes near-boundary errors less than far-boundary errors. Hence P_k evaluates segmentation accuracy more accurately than *Precision* and *Recall*.

3.2. Experiments

For the experiments, we use a text collection compiled from a corpus comprising of text downloaded from the website <http://tovima.dolnet.gr> of the newspaper entitled ‘To Vima’. This newspaper contains articles belonging to one of the following categories: 1) Editorial, diaries, reportage, politics, international affairs, sport reviews 2) cultural supplement 3) Review magazine 4) Business, finance 5) Personal Finance 6) Issue of the week 7) Book review supplement 8) Art review supplement 9) Travel supplement. Stamatatos et al. (2001) constructed a corpus collecting texts from supplement no. 2) which includes essays on science, culture, history etc. They selected 10 authors from the above set without taking any special criteria into account. Then 30 texts of each author were downloaded from the website of the newspaper as shown in the table below:

Author	Thematic Area
Alachiotis	Biology
Babiniotis	Linguistics
Dertilis	History,Society
Kiosse	Archeology
Liakos	History,Society
Maronitis	Culture,Society
Ploritis	Culture,History
Tassios	Technology,Society
Tsakalas	International Affairs
Vokos	Philosophy

Table 1:

List of Authors and Thematic Areas dealt by each of those.

No manual text preprocessing nor text sampling was performed aside from removing unnecessary heading irrelevant to the text itself. All the downloaded texts were taken from the issues published from 1997 till early 1999 in order to minimize the potential change of the personal style of an author over time. Further details can be found in Stamatatos et al. (2001).

The preprocessing of the above texts was made using the morphosyntactic tagger (better known as part-of-speech tagger) developed by G. Orphanos (Orphanos & Christodoulakis 1999, Orphanos & Tsalidis 1999). The aforementioned tagger

is a POS tagger for modern Greek (a high inflectional language) which is based on a Lexicon capable of assigning full morphosyntactic attributes (i.e. POS, Number, Gender, Tense, Voice, Mood and Lemma) to 876.000 Greek word forms. This Lexicon was used to build a tagged corpus capable of identifying the behavior of all POS ambiguity schemes present in Modern Greek (e.g. Pronoun-Clitic-Article, Pronoun-Clitic, Adjective-Adverb, Verb-Noun, etc) as well as the characteristics of unknown words. This corpus was used for the induction of decision trees, which along with the Lexicon are integrated into a robust POS tagger for Modern Greek texts.

The tagger architecture consists of three parts: the Tokenizer, the Lexicon and finally the Disambiguator and Guesser. Raw text passes through the Tokenizer, where it is converted to a stream of tokens. Non-word tokens (e.g. punctuation marks, numbers, dates etc.) are resolved by the Tokenizer and receive a tag corresponding to their category. Word tokens are looked up in the Lexicon and those found receive one or more tags. Words with more than one tags and those not found in the Lexicon pass through the Disambiguator/Guesser, where the contextually appropriate tag is decided.

The Disambiguator/Guesser is a ‘forest’ of decision trees, one tree for each ambiguity scheme present in Modern Greek and one tree for unknown guessing. When a word with two or more tags appears, its ambiguity scheme is identified. Then, the corresponding decision tree, is selected, which is traversed according to the values of the morphosyntactic features extracted from contextual tags. This traversal returns the contextually appropriate POS along with its corresponding lemma. The ambiguity is resolved by eliminating the tag(s) with different POS than the one returned by the decision tree. The POS of an unknown word is guessed by traversing the decision tree for unknown words, which examines contextual features along with the word ending and capitalization and returns an open class POS and the corresponding lemma.

3.2.1. Preprocessing

For the experiments we use the texts taken from the collection compiled from the corpus of the newspaper ‘To Vima’. Each of the 300 texts of the collection of articles compiled from this newspaper is preprocessed using the POS tagger developed by G. Orphanos. More specifically, every word in the text was substituted by its lemma, determined by the tagger. Punctuation marks, numbers and all words were removed except from words that are either nouns, verbs, adjectives or adverbs. For those words that their lemma was not determined by the tagger, due to the fact that those words were not contained in the Lexicon used for the creation of the tagger, no substitution was made and the words were used as they were. The only information that was kept was the end of each sentence appearing in each text. We next present two suites of experiments. The difference between those suites lies in the length of the created segments and the number of authors

used for the creation of the texts to segment, where each text being a concatenation of ten text segments.

3.2.2. First suite of experiments

In the first suite of experiments, our collection consists of 6 datasets: Set0, ... , Set5. The difference between those datasets lies in the number of authors used for the generation of the texts to segment and consequently the number of texts used from the collection. The table below contains the aforementioned information.

Dataset	Authors	No. of texts per dataset
0	Kiosse, Alachiotis	60
1	Kiosse, Maronitis	60
2	Kiosse, Alachiotis, Maronitis	90
3	Kiosse, Alachiotis, Maronitis, Ploritis	120
4	Kiosse, Alachiotis, Maronitis, Ploritis, Vokos	150
5	All Authors	300

Table 2:

List of the datasets compiled in the 1st suite of experiments and the number of the author's texts used for each of those.

For each of the above datasets, we constructed four subsets. The difference between those subsets lies in the range of the sentences appearing in each segment for every text. If a and b correspond to the lower and higher values of sentences consisting each segment, we have used four different pairs: (3,11), (3,5), (6,8) and (9,11). In every dataset, before generating any of the texts to segment, each of which contains 10 segments, we selected the authors, whose texts will be used for this generation. If X is the number of authors contributing to the generation of the dataset, for all datasets, each text is generating according to the following procedure (which guarantees that each text contains ten segments):

For the j -th out of 10 segments (e.g. $j = 1, 2, \dots, 10$) of the generated text:

- (1) *Select randomly a number $i \in \{1, \dots, X\}$ corresponding to an author among those contributing to the generation of the dataset.*
- (2) *Select randomly a number $k \in \{1, 2, \dots, 30\}$ corresponding to the texts belonging to the i -th author.*
- (3) *Select randomly a number $l \in \{a, \dots, b\}$ corresponding to the number of consecutive sentences extracted from the k -th text (starting from the first sentence). Those sentences constitutes the generated segment.*

For every subset, using the procedure described above, we generated 50 texts. As it was mentioned before, our algorithm uses four parameters μ, σ, γ and r ,

where μ and σ can be interpreted as the average and standard deviation of segment length; it is not immediately obvious how to calculate the optimal values for each of the parameters. A procedure for determining appropriate values of μ, σ, γ and r was introduced using *training data* and a *parameter validation* procedure. Then our algorithm is evaluated on (previously unseen) *test data*. More specifically, for each of the datasets Set0,..., Set5 and each of their subsets we perform the procedure described in the sequel:

1. Half of the texts in the dataset are chosen randomly to be used as training texts; the rest of the samples are set aside to be used as test texts.
2. Appropriate μ and σ values are determined using all the training texts and the standard statistical estimators.
3. Parameter γ is set to take the values 0.00, 0.01, 0.02, ... , 0.09, 0.1, 0.2, 0.3, ... , 1.0 and r to take the values 0.33, 0.5, 0.66, 1. This yields $20 \times 4 = 80$ possible combinations of γ and r values. Appropriate γ and r values are determined by running the segmentation algorithm on all the training texts with the 80 possible combinations of γ and r values; the one that yields the minimum P_k value is considered to be the optimal (γ, r) combination.
4. The algorithm is applied to the test texts using previously estimated γ, r, μ and σ values.

An idea of the influence of γ and r on P_k on the first suite of experiments can be observed in Figures 2-5 (corresponding to subsets '3-11', '3-5', '6-8' and '9-11' of Set5). In those figures *Exp 1* refers to the first suite of experiments.

The above procedure is repeated five times for each of the six datasets and the resulting values of *Precision*, *Recall* and P_k are averaged. The performance of our algorithm (as obtained by the validated parameter values) is presented in Table 3.

3.2.3. Second Suite of experiments

In the second suite of experiments we used the same collection of texts compiled from the corpus of the newspaper 'To Vima'. The difference between those two suites lies in the way of generating the texts used for training and for testing. In this suite of experiments, we used all the available (300) texts of the collection of the Greek corpus, which means all the available authors. We constructed a single dataset containing 200 texts. Half of them were used for training while the rest of them were used for testing. Each of the aforementioned texts was generated according to the following procedure (which guarantees that each text contains 10 segments):

For the j -th out of 10 segments (e.g. $j = 1, 2, \dots, 10$) of the generated text:

- (I) Select randomly a number $i \in \{1, \dots, 10\}$ corresponding to an author among the 10 contributing to the generation of the dataset.
- (II) Select randomly a number $k \in \{1, 2, \dots, 30\}$ corresponding to the texts belonging to the i -th author. The selected text is read and scanned in order to determine the number of paragraphs that consists it. If Z is the number of paragraphs that consists it then:
- (III) Select randomly a number $l \in \{1, \dots, Z\}$ corresponding to the number of paragraphs appearing in the k - th text.
- (IV) Select randomly a number $m \in \{1, \dots, Z-l\}$ corresponding to the "starting paragraph". Thus the segment contains all the paragraphs of the k - th text starting from paragraph m and ending at the paragraph $m + l$.

<i>1st suite of Experiments</i>	(3,11)	(3,5)	(6,8)	(9,11)
Set0 Precision	70.65%	86.82%	96.44%	93.33%
Set0 Recall	71.11%	87.11%	96.44%	93.33%
Set0 Beferman's P_k	14.04%	6.20%	0.82%	0.84%
Set1 Precision	63.86%	82.98%	91.11%	94.67%
Set1 Recall	67.11%	83.56%	91.11%	94.67%
Set1 Beferman's P_k	15.82%	8.47%	2.81%	0.98%
Set2 Precision	71.14%	90%	91.11%	92.44%
Set2 Recall	60.89%	89.78%	91.11%	92.44%
Set2 Beferman's P_k	14.42%	3.45%	2.15%	1.247%
Set3 Precision	59.99%	84.44%	86.22%	91.11%
Set3 Recall	58.67%	83.56%	86.22%	91.11%
Set3 Beferman's P_k	17.93%	7.36%	3.28%	1.45%
Set4 Precision	57.99%	85%	88.89%	91.11%
Set4 Recall	51.11%	84.89%	88.89%	91.11%
Set4 Beferman's P_k	17.38%	6.76%	2.65%	1.39%
Set5 Precision	65.74%	81.56%	89.33%	88.89%
Set5 Recall	61.78%	81.78%	89.33%	88.89%
Set5 Beferman's P_k	14.54%	6.49%	3.57%	1.86%

Table 3

Exp.Suite 1: The Precision, Recall and Beferman's P_k metric values for the datasets Set0, Set1, Set2, Set3, Set4 and Set5, using sentences as a unit of segment, obtained by a validation procedure.

From the aforementioned method of generating texts, it is obvious that, the 200 generated texts for segmentation are longer than those generated during the first suite of experiments. Thus the segmentation of such texts consists a more difficult

problem. We used the same validation procedure as before with the same values for the parameters r and γ . The obtained validated results are listed in the table below:

<i>2nd suite of Experiments</i>	
Precision	60.60%
Recall	57.00%
Beeferman's P_k	11.07%

Table 4

Exp.Suite 2: The Precision, Recall and Beeferman's P_k metric values for the unique dataset using paragraphs as a unit of segment obtained by a validation procedure.

4. Discussion

Our algorithm was previously tested on Choi's data collection (Kehagias, A et al. 2003), which contains English texts, achieving significantly better results than the ones previously reported in Choi (2000), Choi et al. (2001) and Utiyama & Isahara (2001). Since the collection used here has not been previously used in the literature for the purpose of text segmentation, we cannot provide a direct comparative assessment. However, the performance obtained is comparable and in most cases better than the corresponding on the Choi's collection, even though, for several cases the problem dealt by our algorithm is more difficult. The difficulty lies in the fact that, the thematic area dealt by several authors is very similar (see Table 1). One of the reasons for the high segmentation accuracy is the robustness of the POS tagger used. We have observed that, in general, the tagger fails to find the tag and lemma of very technical words. The use of them as they appear in the original text, does not have a negative impact on the segmentation accuracy. The robustness of our algorithm is also indicated by the performance obtained at the second suite of experiments where the segment length is bigger and the deviation from the average length is high. Even in that case our algorithm achieved very high results. This is the result of the combination of the following facts: First, the use of the segment length term in the cost function seems to improve segmentation accuracy significantly. Second, the use of 'generalized density' ($r \neq 2$) appears to significantly improve performance. Even though the use of 'true density' ($r = 2$) appears more natural, the best segmentation performance (minimum value of P_k) is achieved for significantly smaller values of r . This performance in most cases is improved when using appropriate values of μ, σ, γ and r derived from training data and parameter validation.

Finally, it is worth mentioning that our approach is 'global' in two respects. First, sentence similarity is computed globally through the use of the D matrix and *dotplot*. Second, this global similarity information is also optimized globally by the use of the *dynamic programming algorithm*. This is in contrast with the local optimization of global information (used by Choi) and global optimization

of local information (used by Heinonen).

It is worth mentioning that, the computational complexity of our algorithm is comparable to that of the other methods (namely $O(T^2)$ where T is the number of sentences). Finally, our algorithm has the advantage of automatically determining the optimal number of segments.

5. Conclusion

We have presented a *dynamic programming* algorithm which performs text segmentation by global minimization of a segmentation cost consisting of two terms: within-segment word similarity and prior information about segment length. The performance of our algorithm is quite satisfactory considering that it yields a high segmentation accuracy in a text collection containing Greek texts. In the future we intent to use other measures of sentence similarity. We also plan to apply our algorithm to a wide spectrum of text segmentation tasks. We are interested in the segmentation of non artificial real life texts, texts having a diverse distribution of segment length, long texts, and change-of-topic detection in newsfeeds.

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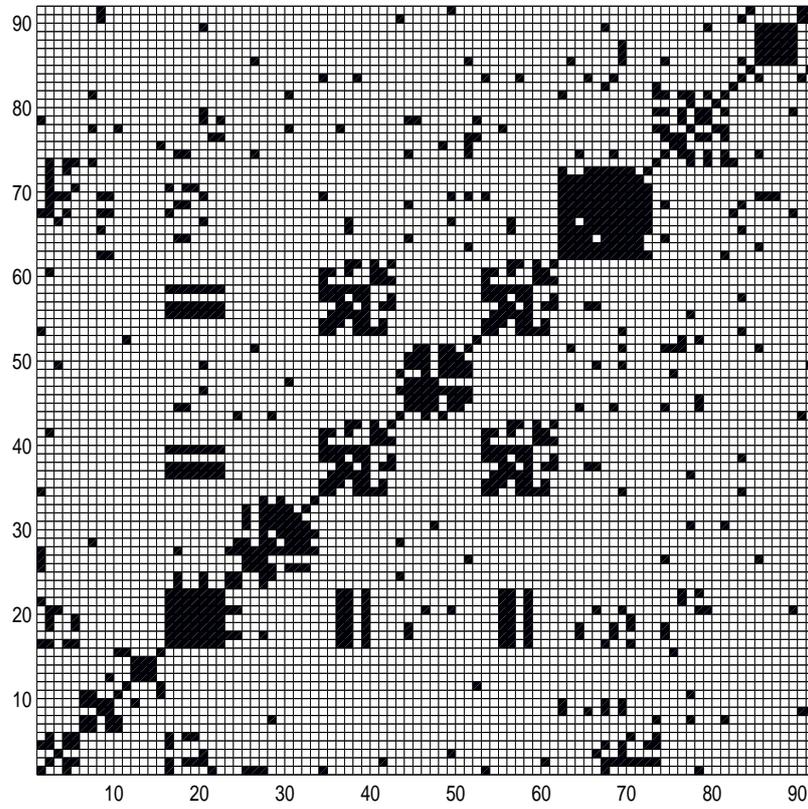


Figure 1: The similarity matrix D corresponding to a text from the dataset '9-11' of Set5. This text contains 91 sentences, hence D is a 91 x 91 matrix. A black dot at position (m,n) indicates that the m -th and n -th sentences have at least one word in common.

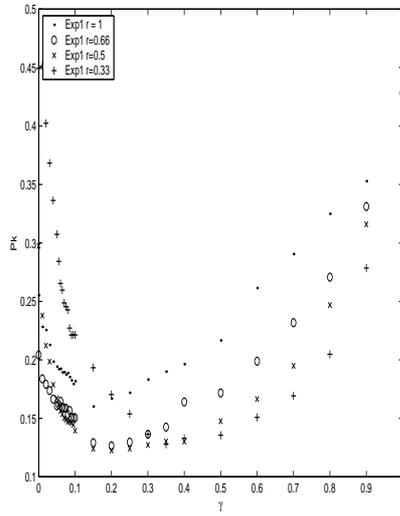


Figure 2: P_k for '3-11' of Set5

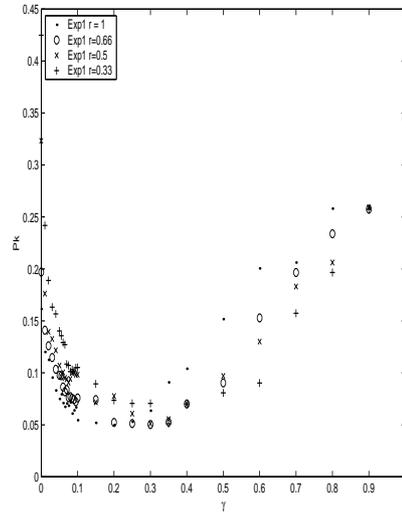


Figure 3: P_k for '3-5' of Set5

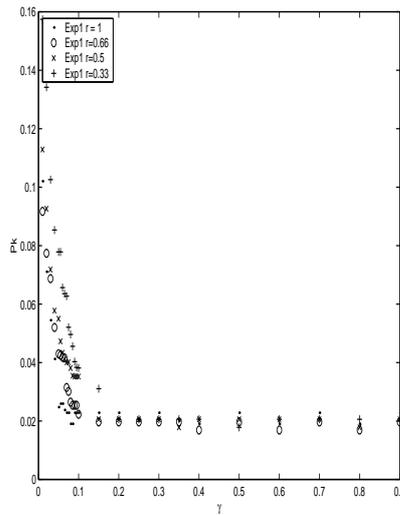


Figure 4: P_k for '6-8' of Set5

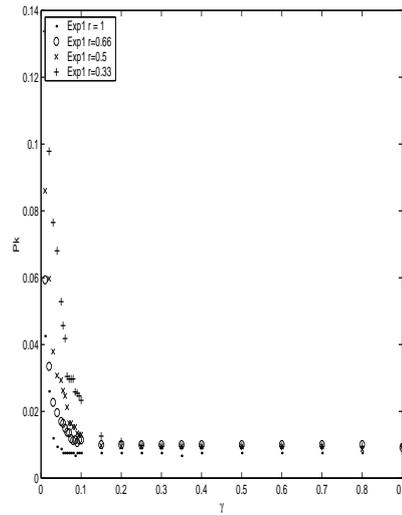


Figure 5: P_k for '9-11' of Set5

Infinitival clauses as syntactic subjects in Hungarian

György Rákosi

This paper outlines a novel LFG-theoretic analysis of *modal/evaluative predicate+infinitive* constructions in Hungarian in which the infinitival argument is argued to be the syntactic subject of the matrix clause. This claim is established as a result of a careful investigation of various embedding constructions sensitive to the subject function.

1. Introduction

Hungarian modal and evaluative predicates may occur in three different syntactic structures, depending on whether the non-dative-marked argument is a DP (1a), a finite CP (1b), or an infinitival IP (1c).

- (1) a. Péter-nek fontos a győzelem.
Peter-DAT important the victory.NOM
'Victory is important for Peter.'
- b. Péter-nek fontos (az), hogy győz-z-ön.
Peter-DAT important it.NOM that win-SUBJUNCTIVE-3SG
'It is important for Peter that he wins.'
- c. Péter-nek fontos (*az) győz-ni-e.
Peter-DAT important it.NOM win-INF-3SG
'It is important for Peter to win.'

This paper focuses on the infinitival construction represented by (1c) and I investigate pattern (1a) mainly to provide further support for my basic claim that the infinitival clause in (1c) is mapped onto the subject function. I present an LFG-theoretic analysis in which the argument structure of the matrix predicate is assumed to be similar across the three syntactic patterns above.

The structure of the paper is as follows. In section 2, a brief descriptive background is provided. In section 3, I present an exhaustive survey of the theoretically possible analyses of the functional status of the infinitival argument of modal and evaluative predicates. Then, various embedding constructions are examined in section 4 and I conclude that the current, LFG-

theoretic proposal (in which these infinitival clauses are syntactic subjects) (i) gives the right predictions where other approaches may not and (ii) represents the simplest solution in that it employs only well-established, non-superfluous grammatical machinery. Finally, a brief overview of a possible solution to the mapping problem is presented in section 5.

2. Descriptive background

The class of modal and evaluative predicates is categorially non-uniform but all members show the same distinctive syntactic behaviour we represented in (1). Some of the most frequently occurring modals and evaluatives are listed in (2) and (3) respectively.

- | | | |
|-----|---------------------------------------------------------|------------------------------------|
| (2) | <i>kell</i> (v) | ‘must, have to’ |
| | <i>szükségszerű</i> (adj) + (<i>van</i>) ¹ | ‘be necessary’ |
| | <i>lehet</i> (v) | ‘may, can’ |
| | <i>lehetséges</i> (adj) + (<i>van</i>) | ‘be possible’ |
| | | |
| (3) | <i>jó</i> (adj) + (<i>van</i>) | ‘be good’ |
| | <i>butaság</i> (n) + (<i>van</i>) | ‘be a stupidity’ |
| | <i>sikerül</i> (v) | ‘succeed, be a success, work well’ |
| | <i>kellemetlen</i> (adj) + (<i>van</i>) | ‘be unpleasant’ |
| | <i>tetszik</i> (v) | ‘appeal to, please, be liked’ |

The infinitival construction has been a target of discussion in the syntactic literature on Hungarian essentially for the following two noteworthy features.² First, there is general consensus that the matrix predicate can be either monadic or dyadic semantically. One argument is not marked for overt case (cf. 1) and the other bears dative case.³ Thus (4), for example, is monadic on its epistemic reading (a) and dyadic on its deontic reading (b).

- | | | | | | |
|-----|-----|-----------------------------------------|------------|-----------|--------------|
| (4) | A | gyerek-ek-nek | vonat-tal | kell-ett | jön-ni-ük. |
| | The | child-PL-DAT | train-with | must-PAST | come-INF-3PL |
| | a. | ‘The children must have come by train.’ | | | |
| | b. | ‘The children had to come by train.’ | | | |

Second, the infinitive may be marked for agreement (as in 4), in which case the dative argument may undergo *pro*-drop.

¹ The copula *van* ‘is’ has a zero form in third person singular, present tense, indicative mood.

² Recent works which discuss this construction at length in English include Dalmi (2002), É. Kiss (2002), Komlósy (1994) and Tóth (2000, 2002).

³ Whether the non-dative argument is caseless or it bears (non-marked) nominative case is an issue that I leave unattended in this paper. I simply gloss these DPs as nominative.

The purpose of this paper is to investigate the functional status of the infinitival argument. Whether the infinitive is inflected for agreement or not is immaterial. Similarly, the choice between an analysis in which the monadic reading is rendered by a raising construction (i.e. the dative-marked argument is a syntactic, but not a semantic argument of the matrix, cf. Dalmi 2002) or one in which the dative DP receives its *structural* case as the subject of the infinitival predicate (and therefore the matrix is monadic both semantically and syntactically, cf. Tóth 2000), is important but has no immediate bearing on the analysis. I will simply regard the dative DP as always a syntactic and optionally also a semantic, argument of the modal/evaluative predicate. To anticipate my subsequent claim that the non-dative argument is uniformly mapped onto the SUBJ function, the following two general LFG-style lexical entries are assumed for modal and evaluative predicates.⁴

- (5) a. $V_{\text{MOD/EVA}}$: (\uparrow PRED)=‘MOD/EVA<(SUBJ)>(OBL)’
 b. $V_{\text{MOD/EVA}}$: (\uparrow PRED)=‘MOD/EVA<(SUBJ), (OBL)>’

(5a) corresponds to the monadic reading (as in 4a) and (5b) represents the dyadic reading (as in 4b).

3. *Ways of analysis*

Though there is an extensive literature on this construction (cf. footnote 2), out of the many problems that need to be tackled, the question of the functional status of the infinitival argument of modal/evaluative predicates has, by and large, received relatively little attention. In the transformational frameworks (*GB* or *Minimalism*) that have been applied in developing the existing theories (Dalmi 2002, Kenesei 2000, É. Kiss 2002 and Tóth 2000), syntactic functions are treated as derived notions, whereas in LFG they are the primitives of the theory.⁵ What I set out to perform in this paper is a functional analysis of this construction. My strategy is to investigate these predicates in various embedding structures in which the subject slot is controlled and to show this way that the sole candidate that wins the race for subjecthood is the infinitival clause itself.

Let us provide an inventory of the possible analyses before starting the empirical investigation. The target structure is (1c), repeated here as (6).

⁴ Here I disregard the categorial differences noted above. Most of the modal/evaluative predicates that are investigated here are verbs, but, *mutatis mutandis*, the observations and claims to be made below carry over to the non-verbal predicates too. These make up a complex with the copula, as it has been pointed out above.

⁵ ‘In a theory like LFG, grammatical functions are theoretical primitives, not defined in phrasal or semantic terms; therefore we do not define grammatical functions in terms of a particular, invariant set of syntactic behaviors. Instead, grammatical phenomena can be seen to cluster and distribute according to the grammatical organization provided by functional roles.’ (Dalrymple 2001:11)

- (6) Péter-nek fontos (*az) győz-ni-e.
 Peter-DAT important it.NOM win-INF-3SG
 ‘It is important for Peter to win.’

No overt expletive pronominal is grammatical in these structures in Hungarian, as opposed to their English counterparts and therefore it is not immediately obvious which argument is mapped onto SUBJ in the matrix clause or whether there is a syntactic subject in the matrix at all.

I claim that it is the infinitival clause *győznie* ‘(for him) to win’ itself which is the subject of the matrix predicate and the dative DP *Péternek* ‘Peter-DAT’ is an oblique. There have been several proposals in the LFG literature which argue for the possibility of mapping clausal constituents to term functions.⁶ Thus, given the apparent lack of universally valid constraints against clausal subjects, it is legitimate to claim that infinitival clauses in Hungarian can be mapped onto SUBJ.

In the usual case, an infinitival clause would be mapped onto either XCOMP or COMP, depending on whether its subject is functionally or anaphorically controlled (cf. Bresnan 1982). There are three basic possible courses that we can take if these infinitives are treated as complement clauses. First, it can be argued that the matrix predicate does not have a syntactic subject. This is a possibility suggested by Komlósy (‘... impersonal matrix predicates [i.e. modal and evaluative predicates] are, most probably, subjectless entries themselves’ (Komlósy 1994:174).) and this option is also entertained in Kenesei (2000). Tóth (2000:178) relies on the traditional, descriptive terminology in referring to the infinitival arguments of modal/evaluative predicates as *subject infinitival clauses*, but she generates them in a complement position and not in Spec IP, where subjects are generated in the GB-theoretic frame she uses for representation. Thus, she basically subscribes to the no-subject analysis, which is, in principle, also compatible with an LFG theoretic approach, inasmuch as the *Subject Condition* need not necessarily be treated as a universal (Dalrymple 2001:19).

Second, one may also argue that there always is an expletive pronominal subject in the matrix, but that it is obligatorily covert. There are no such Hungarian-specific proposals available. In the LFG literature, an analysis of this kind was proposed for German impersonal passives in Berman (1999).

Third, we may treat the dative DP as a quirky subject on a parallel with the analysis of Icelandic quirky subjects. This view is explicitly argued for in Dalmi (2002) and is hinted at in Kenesei (2000). As expected, the quirky

⁶ See, for example, Dalrymple & Lødrup (2000); and Lødrup (1991, 2001). Arka & Simpson (1998) make the specific claim that clausal complements can be mapped onto SUBJ during objective voice alternations in Balinese. The term functions are the core subset of the subcategorizable functions including SUBJ, OBJ and the family of thematically restricted objects OBJ_θ.

proposal also includes the treatment of the infinitival clause as a syntactic object (Gréte Dalmi p.c.; cf. Dalmi 2002 for a detailed overview).

To sum up the preceding discussion, the possible analyses are as follows.

- (7) a. A1: The infinitival clause is mapped onto SUBJ.
 b. A2: Modal/evaluative predicates are subjectless.
 c. A3: An obligatorily covert expletive subject is present.
 d. A4: The dative DP is mapped onto SUBJ.

These analyses are tested against empirical data in the next section.

4. *Modal and evaluative predicates in embedding constructions*

4.1. *No quirky subjects in Hungarian*

To refute A4, I first investigate constructions in which the non-dative-marked argument of modal/evaluative predicates is a DP. The underlying assumption is that despite the categorial differences in realising the non-dative argument, the structures represented in (1) have similar functional properties. Therefore, if the quirky analysis of the dative-marked argument may be shown to be non-satisfactory in case the non-dative argument is a DP, then the plausibility of a quirky analysis of the infinitival construction is also reduced significantly.

The modal/evaluative predicate always shows agreement with the nominative-marked argument and not with the dative. In principle this does not exclude the possibility of analysing the dative as the subject, on the assumption that agreement is not included among the subjecthood tests. This is the approach taken by Dalmi (2002) with respect to what she argues to be Hungarian quirks and this is how Sigurðsson (2002) treats Icelandic quirky subjects. He argues that primary agreement in Icelandic correlates with nominative case and not with subjecthood and nominative non-subjects may show obligatory or optional agreement, depending on the construction. In the case of the DAT-NOM quirky construction, agreement is blocked with first and second person nominatives (8) and we find agreement in number with third person nominatives (9). These examples are from Sigurðsson (2002:719-720).

- (8) * *Ég veit að honum líkum við.*
 I know that him.DAT like.1PL we.NOM
Intended reading: 'I know that he likes us.'

- (9) *Ég veit að honum líka þeir.*
 I know that him.DAT like.3PL they.NOM
'I know that he likes them.'

In Hungarian, the nominative argument of modal/evaluative predicates agrees with the predicate in person and number, as regular nominative subjects do. So (10) is in direct contrast with (8).

- (10) Tud-om, hogy mi tetsz-ünk nek-i.⁷
 Know-1SG that we.NOM appeal-1PL DAT-3SG
 ‘I know that he likes us / I know that we appeal to him.’
- (11) Tud-om, hogy ők tetsz-enek nek-i.
 Know-1SG that they.NOM appeal-3PL DAT-3SG
 ‘I know that he likes them / I know that they appeal to him.’

If subjecthood is completely dissociated from the presence of agreement, then the Hungarian construction can be argued to be quirky. Nevertheless, full agreement of the non-dative argument in Hungarian contrasts quite sharply with the kind of partial argument we have in the Icelandic construction; and this weakens the plausibility of the quirky analysis of the Hungarian structure.

The non-quirky nature of the dative argument of Hungarian modal/evaluative predicates becomes even more apparent once we consider data from embedding constructions. Subject-control predicates control the nominative and not the dative slot, as is evident in (12).

- (12) Én próbál-ok tetsz-eni nek-ed.
 I.NOM try-1SG appeal-INF DAT-2SG
 ‘I try to appeal to you / I try to have you like me.’

Furthermore, the quirky-subject analysis would predict that in case one modal/evaluative predicate is embedded under another one, there may remain a nominative argument in the subordinate clause, as it is the subordinate dative argument which is either raised into or controlled from the matrix. This is exactly the case in Icelandic, cf. (14) (Sigurðsson 2002:702-703). *Bera* ‘be to, have to’ is a deontic modal verb.

- (13) Mér ber að fara.
 Me.DAT bears to leave
 ‘I have to leave.’
- (14) Svona fólki ber ekki að líka sjálfselkir leikarar.
 such people.DAT bears not to like egoistical actors.NOM
 ‘It is not for such people to like egoistical actors.’

Superficially similar embeddings also occur in Hungarian, though speakers tend to consider most of these odd and some of them even completely

⁷ Hungarian is a discourse configurational language, in which term functions are not coded through structure but basically through morphology. Thus there is no designated position for subjects. The reason why the nominative pronoun *mi* ‘we’ precedes the dative argument in the example is that pronominal subjects are in general *pro*-dropped if they have no discourse or logical function. Thus *mi* ‘we’ is a topic in (10) and topics have to occur on the left periphery.

unacceptable. Nevertheless, we may find examples that are accepted by almost everyone.⁸ The crucial difference between these Hungarian examples and the Icelandic type represented by (14) is that, in Hungarian, both DPs have to be dative, nominative case on either DP is ungrammatical. The following examples were judged to be acceptable to various degrees by native speakers.⁹

- (15) Nek-em fontos tetsz-en-em Gézá-nak.
 DAT-1SG important appeal-INF-1SG Géza-DAT
 ‘It is important for me that I appeal to Géza.’
- (16) ^(?)A terv-nek nem kell Mari-nak tetsz-eni-e.
 the plan-DAT not must Mary-DAT appeal-INF-3SG
 ‘Mary does not have to like the plan / The plan need not please Mary.’
- (17) [?]Mari-nak nem kell a terv-nek tetsz-eni-e.
 Mary-DAT not must the plan-DAT appeal-INF-3SG
 ‘Mary does not have to like the plan / The plan need not please Mary.’
- (18) ^(?)Miért pont en-nek a terv-nek kell-ene
 why exactly this-DAT the plan-DAT must-COND
 sikerül-ni-e Gézá-nak?
 succeed-INF-3SG Géza-DAT
 ‘Why is it exactly this plan that should succeed to Géza?’

I take this variation in judgements to indicate that this construction type itself is not ungrammatical in Hungarian, but there are stylistic constraints on its use. What is important to note is that the dative-subject analysis (A4) would predict that each of (15-18) is ungrammatical, because in A4 the matrix dative argument is related to the subordinate dative slot through control and consequently the second DP cannot be in dative case, only in its ‘original’ nominative. This prediction, however, has just been shown to be false. But if the subordinate subject slot is assigned to the otherwise non-dative-marked argument of the subordinate modal/evaluative predicate (as in the current analysis), then the existence of these data is non-problematic. The controller in

⁸ Each of (15-18) has a *that*-clause paraphrase, which is completely acceptable. This complies with the general tendency in Hungarian to prefer finite subjunctive clauses to infinitival complements in many cases where an infinitival clause would be employed in English. Thus, for example, (i) is completely acceptable, whereas its infinitival counterpart (16) is somewhat clumsy:

(i) Nem kell, hogy tetsz-sz-en a terv Mari-nak.
 not must that appeal-SUBJUNCTIVE-3SG the plan.NOM Mary-DAT

‘It does not have to be the case that the plan appeals to Mary.’

⁹ (16) and (17) are examples from Dalmi (2002), where they are claimed to be ungrammatical. The majority of the speakers I asked did not find them unacceptable, though (17) was in general claimed to be somewhat less fortunate than (16). With neutral prosody, (17) tends to be interpreted for many in such a way that it is Mary who has to appeal to the plan. Non-neutral prosody, especially contrastive intonation on the first dative DP, significantly increases the degree of acceptability in each case.

the matrix bears dative case and it controls the subordinate nominative subject slot and there is a second dative oblique argument in the subordinate clause.

It is possible, however, to maintain A4 by assuming the existence of an alternative lexical entry for modal/evaluative predicates (Gréte Dalmi, p.c.). These entries would have an Agent argument, which is nominative-marked and is mapped onto the subject function. This can explain the grammaticality of (12) and (15), by treating the embedded evaluative predicate as non-quirky. There are at least two reasons, however, why I reject this analysis. First, it does not explain why (16-18) are acceptable to many speakers: *the plan* can obviously never be a proper agentive participant in any situation, therefore no agentive lexical entry may be stipulated for the subordinate predicate. Second, if these alternative entries really existed, we should expect to find them in matrix clauses, too. But traditional Agent-tests do not give acceptable results, suggesting that the true agentive reading is not available in matrix clauses.

- (19) *Én szándékosan tetsz-ek nek-ed.
 I.NOM intentionally appeal-1SG DAT-2SG
Intended reading: ‘I appeal to you intentionally.’

Therefore, I will argue in Section 5 that there is only a single lexical entry for dyadic modal/evaluative predicates in Hungarian, both arguments of which show a restricted number of Proto-Agent properties in the sense of Dowty (1991), but neither is a proper Agent. The agentive nature of the first argument can be strengthened by certain (coercive) construction types, which accounts for the availability of the dyadic reading of the embedded modal/evaluative predicate in (12) and (15).

Thus A4 has been shown to be non-satisfactory if both arguments of the modal/evaluative predicate are DPs. This paves the way for a non-quirky analysis of *modal/evaluative+infinitive* structures too, inasmuch as the subject-analysis of infinitival clauses becomes more plausible.

4.2. Control constructions and infinitives

Modal/evaluative predicates, together with their own infinitival complement, may be embedded under control predicates. It is customary to distinguish between two types of control relations in LFG.¹⁰ *Functional control* is an identity constraint on the f(unctional)-structure of the controlled subject argument and that of the controller. *Anaphoric control* is established in the presence of an anaphoric binding relation between the controller and the controlled arguments, which are nevertheless functionally independent of each other. Raising (or ECM) is treated as functional control in LFG: the distinguishing property of raising predicates is that they select for controllers that are only their syntactic, but not semantic, arguments.

¹⁰ See Bresnan (1982) for a comprehensive presentation of the treatment of control in LFG.

Let us take now two control predicates that do not impose an agentivity constraint on the controlled subject argument: the subject-control predicate *látszik* ‘seem’ and the object-control predicate *lát* ‘see/consider’.¹¹ The reason why only these types of predicates are investigated is semantic in nature: the controlled slots in the construction types investigated below are filled by propositional arguments (i.e. infinitival clauses), which cannot be Agents.

Certain modal and evaluative predicates may appear in both types of control constructions. The subject-control construction is represented by (20-21) and (22-23) are examples for object-control structures.

- (20) Még lehetséges-nek látsz-ott idő-ben befejez-ni a munká-
t.
still possible-DAT seem-PAST time-in finish-INF the job-ACC
‘It still seemed possible to finish the job in time.’
- (21) ^(?)Pál-nak sikerül-ni látsz-ott megold-ani-a a problémá-t.
Paul-DAT succeed-INF seem-PAST solve-INF-3SG the problem-ACC
‘Paul seemed to succeed in solving the problem.’
- (22) Jobb-nak lát-t-am még ottmarad-n-om egy kicsi-t.
better-DAT see-PAST-1SG still stay-INF-1SG a little-ACC
‘I considered it better to stay there for a little more while.’
- (23) [?]Lehetséges-nek lát-t-am bemen-ni az épület-be.
Possible-DAT see-PAST-1SG go-INF the building-into
‘I considered it possible to go inside the building.’

Not all of these sentences are equally acceptable to everyone; as a general rule, *that*-clause paraphrases would be preferred in each case (cf. footnote 8). The construction types are, however, grammatical, as is evident from the full acceptability of (20) and (22).

The current proposal, which treats the infinitival argument of modal and evaluative predicates as a syntactic subject, gives a natural account of these structures. In (20) for example, the controlled predicate is *lehetséges* ‘possible’ and the “raised” subject is the infinitival clause *időben befejezni a munkát* ‘to finish the job in time’. Thus (20) would translate literally as ‘To finish the job in time still seemed possible’. (21-23) are analysed similarly.

These data, however, are also compatible with the covert expletive analysis

¹¹ I am using the LFG terminology here. As noted above, the traditional distinction in transformational grammar between control and raising (or ECM) predicates is treated in LFG as a distinction between the controller argument being or not being a semantic argument of the control predicate. The anonymous reviewer of this paper suggests that *lát* ‘see/consider’ is presumably not an ECM-predicate. É. Kiss (2002:200) shares this assumption, whereas Dalmi (2002: 4.3.3.2.2) argues against it. Whether *lát* ‘see/consider’ is an ECM predicate or not is a question orthogonal to our discussion here. What is important is that *lát* ‘see/consider’ does not impose an agentivity constraint on the controlled subject. I continue using the term *control* in the LFG-sense.

(Huba Bartos, p.c.). In that case the Hungarian construction would be like the English translations, except that, for some reason, the expletive pronominal cannot be pronounced in Hungarian. The quirky subject analysis (A4) may also be considered to be satisfactory in *this* case (suspending temporarily the conclusion reached in section 4.1), if control is thought to operate along the assumed dative subjects (which can be *pro*-dropped, as in 22, or there is a generic null pronominal occupying this argument slot, as in (20) and (23)).

The only analysis which is evidently incompatible with these data is the no-subject analysis (A2). The embedded subject is defined to exist in control constructions and this simply contradicts A2.

4.3. Adjunct adverbial participle clauses and infinitives

There are two types of adverbial adjunct clauses in Hungarian.¹² Adverbial participles marked with the $-vA$ ¹³ participial suffix may never have an overt subject and they are functionally controlled by the matrix subject.

- (24) (*János) haza-érkez-ve, mi is elkezd-t-ünk en-ni.
 John.NOM home-arrive-PART we.NOM too start-PAST-1PL eat-INF
 ‘(*John) Having arrived home, we also started to eat.’

Adverbial participles marked with the $-v\acute{A}n$ suffix may have a nominative-marked subject, which is referentially distinct from the matrix subject.

- (25) (János) haza-érkez-vén, mi is elkezd-t-ünk en-ni.
 John.NOM home-arrive-PART we.NOM too start-PAST-1PL eat-INF
 ‘(John) having arrived home, we also started to eat.’

This participial construction has an archaic flavour, but it is still used productively in journalism and native speakers have sound intuitions about its acceptability. Let us now see what happens if a modal or an evaluative predicate with its infinitival argument occurs both in the matrix and in the adverbial clause.

- (26) Nem sikerül-vén/*-ve idő-ben befejez-ni-e a feladat-ot,
 not succeed-PART time-in finish-INF-3SG the exercise-ACC
 Péter-nek abba kell-ett hagyni-a a verseny-t.
 Peter-DAT PARTICLE must-PAST finish-INF-3SG the competition-ACC
 ‘Not succeeding in finishing the exercise in time, Peter had to quit the competition.’

¹² Recent overviews of these constructions include É. Kiss (2002), Komlósy (1994) and Tóth (2000b).

¹³ The two participial suffixes in question show vowel harmony, i.e. the vowel changes in harmony with the phonological properties of the stem.

As indicated, native speakers uniformly reject the *-vA*-participle version and the majority considers the *-vÁn* version completely acceptable. However, in general, everyone finds a contrast between the two, favouring the latter.

(26) is an evident problem for the dative-subject analysis (A4), as it predicts that both participles are grammatical in the construction: the matrix dative (analysed in A4 as a subject) should be able to control the subject slot in the participial clause (the argument slot which is indexed to the dative argument in A4). But the *-vA*-participle version is unacceptable.

The no-subject analysis (A2) correctly predicts the *-vA*-participle version to be ungrammatical, as the functionally controlled subject slot of the participle has to exist for the necessary control relation to hold. It is not obviously evident what A2 would say about the acceptability of the *-vÁn*-version, as it may be possible that this type of participle, which is not functionally controlled, tolerates subjectless predicates, if such predicates really exist in Hungarian (for some related discussion, cf. Tóth 2000 and 2000b). As we have already found empirical evidence against A2 in section 4.2, this problem may be left unattended here.

The covert-expletive analysis (A3) can explain the difference in grammaticality between the two versions of (26). The *-vÁn*-version is grammatical as the covert pronominal subject of the participle does not have to be controlled. The *vA*-version is predicted to be ungrammatical because the matrix and the subordinate covert expletives bear different referential indices, as the infinitival complements are different. The control relation is, presumably, ruled out by the presence of these distinct indices. This would predict, however, that if the matrix and the participial predicate share the same infinitival complement (i.e. the structure is elliptic), then the *vA*-version is also grammatical, given the extensional equivalence of the two covert expletives. In fact, such constructions are ungrammatical with both participial types and it is not exactly clear why.

- (27) *Soká-ig nem sikerül-vén/-ve,
 long-for not succeed-PART
 a végén már nem is volt jó haza-men-ni.
 the finally yet not too was good home-go-INF
Intended reading: ‘As we didn’t succeed in doing so for a long time,
 going home wasn’t so good after all.’

This elliptical construction appears to be ungrammatical for reasons independent from the choice of the participle, which means that we cannot use it to decide whether A3 gives the right predictions in this case or not.

The current analysis (A1) gives the simplest account. The *vA*-version of (26) is out because there is an overt subject present: the infinitival argument itself. The presence of an overt subject is tolerated in *-vÁn* participial adjunct clauses and therefore in an A1-frame we expect the *-vÁn*-version to be grammatical, which it indeed is.

4.4. Summary

Now we have a sufficient amount of data at our disposal to reduce the number of empirically valid analyses of these infinitival structures by half. I argued against the quirky dative-subject analysis (A4) in 4.1 and in the preceding section, A4 has been shown to make the wrong predictions about grammaticality patterns in participial adverbial clauses. The no-subject analysis (A2) is incompatible with the existence of those control structures that we saw in 4.2. Therefore A2 and A4 can be rejected on empirical grounds: these modal/evaluative predicates do have a subject and that subject is not quirky.

On the other hand, no empirical data has been found which might be utilised to decide whether the infinitival clause argument of modal/evaluative predicates is a syntactic subject itself (A1), or it is a complement coindexed with an obligatorily covert expletive subject (A3).¹⁴ A3 can be accommodated in LFG by assuming that it is the verbal agreement morphology which specifies the subject (in which case the agreement morpheme is treated as an incorporated pronoun, cf. Bresnan 2001). This is how Berman (1999) analyses German impersonal passives of intransitive verbs, which do not license an overt expletive.

- (28) ... weil (*es) getanzt wurde.
 because it danced was
 ‘.... because there was dancing.’

The reader is referred to Berman (1999) for the details, but what is important to note is that the main driving force for her to propose that in (28) the subject is specified by the verbal agreement morphology, is that, this way, the Subject Condition can be saved.

We have already found empirical proof that Hungarian modal and evaluative predicates have a subject argument. As opposed to German

¹⁴ Tóth (2000) explicitly argues against A3. Her argumentation is based on double embedding data, which she takes to be ungrammatical, as the following example (Tóth:2000, 178):

- (i) *Nem szabad-na fontos-nak len-ni-e Kati-nakidő-ben megérkez-ni-e.
 not may-COND important-DAT be-INF-3SG Kate-DAT time-in arrive-INF-3SG
 ‘It should not be important for Kate to arrive in time.’

She claims that the agreement marker on *lennie* ‘be-INF-3SG’ could in principle license a covert expletive pronominal subject for the predicate *fontos* ‘important’, but the fact that the structure is ungrammatical compels us to abandon the covert pronominal subject analysis.

I do not discuss these structures in detail here but let me note the following. First, these constructions, in which one modal/evaluative predicate is embedded under another one as an infinitive itself, are distinctively awkward but not rejected uniformly by native speakers. Second, it is not obvious how the presence or absence of agreement marking on the first infinitive correlates with acceptability judgements. Third, the current approach would not predict these structures to be ungrammatical but only too complex for the general processing capability of the human mind. In any case, Tóth’s conclusion supports my analysis, but it is dubious whether we can regard these structures as firm empirical ground to argue against A3.

impersonal passives, these Hungarian constructions have an obvious candidate for subjecthood: the non-dative-marked argument. The least costly and the simplest solution, which gives a natural account of the various embedding data we have investigated, is to treat this argument, whether an infinitive or a DP, as the subject itself. Assuming that in the infinitival structures modal and evaluative predicates take obligatorily covert pronominals in Hungarian would make these predicates rather peculiar: Hungarian is a *pro*-drop language but there are no predicates that require obligatory covert pronominals with no inherent lexical content.

Therefore I claim that the only solution which is both empirically valid and does not utilise superfluous grammatical machinery is the analysis which treats these infinitival argument clauses as the subjects of the matrix predicate. This entails that these modal and evaluative predicates have the same argument structure, irrespective of the categorial variation in realising the non-dative argument and they have the general lexical entry in (5), repeated here as (29).

- (29) a. $V_{\text{MOD/EVA}}$: (\uparrow PRED)=‘MOD/EVA<(SUBJ)>(OBL)’
 b. $V_{\text{MOD/EVA}}$: (\uparrow PRED)=‘MOD/EVA<(SUBJ), (OBL)>’

Any differences among the three patterns represented in (1) are considered to be derivative of the categorial differences between the constituent parts of the constructions.¹⁵ At the functional level, the constructions are uniform. In the last section, I briefly discuss a possible approach to derive this functional uniformity from a single common argument structure.

5. *The mapping problem*

It is generally assumed that dyadic modal and evaluative predicates select for a dative Experiencer argument (cf. Dalmi 2002, Kenesei 2002 and Tóth 2000) and a Theme or Propositional second argument, depending on whether this argument is a DP or a clause. This basically fits in with the two-place unaccusative analysis of the Italian *piacere*-class (as in Belletti & Rizzi 1988), inasmuch as these Hungarian predicates are argued to have matching argument-structure properties (Dalmi 2002).

Not intending to deny the existence of possible correlations of this kind, I briefly describe the outlines of a different approach, which may also provide a satisfactory solution to the mapping problem these predicates represent. The starting point is Reinhart’s analysis (2001), in which the second (the dative)

¹⁵ I have not discussed the construction in which the non-dative argument is realised as a finite *that*-clause complement and which allows for overt expletive pronominals in the matrix. The current analysis generalises over to these structures if Lipták’s proposal (1998) is on the right track. She argues that *az* ‘it, that’ is base-generated in the specifier position of the finite CP complement. The main objective of this paper is to provide a proper functional characterisation of the infinitival structure. I consider Lipták’s analysis a natural path along which to extend the current one.

argument of two-place unaccusatives is a participant which necessarily bears no causal relation to the event and which may, but need not, be interpreted as an Experiencer. This allows for a somewhat more liberal understanding of the role of the second argument than Experiencer proper, or in Dowty's (1991) terms, to associate fewer Proto-Agent entailments with this argument slot than in the case of proper Experiencers. As is well-known, modals (and to a lesser degree, evaluatives too) allow for a wide spectrum of interpretational possibilities and it is indeed not very obvious to what extent *sentience*, this primary Experiencer property, is involved in being the subject of the modal in, for example, *We had to take a bus because taxi drivers were on strike*.

With respect to the first argument, Reinhart (2001:9) remarks that it 'appears to show volitionality properties, similar to those of Agents', her example being *Max appealed to the judge*. I have argued in section 4.1 that volitionality is a component compatible with the semantics of these participants and it can be strengthened in certain constructions, cf. especially (12) and (15). This is not to say that they are Agents, but only to deny that the Proto-Patient entailments *undergoes change of state* and especially *causally affected by another participant* are part of the semantic specification of these arguments. In fact, it is this participant which may be argued to have an influence in some sense (definitely weaker than the *cause* relation of Reinhart, which is interpreted as a sufficient condition for the relevant event to hold) on the dative argument. In other words, the first argument is not a Theme.

What this may suggest is that the semantics of these two argument roles approximate, in the sense that neither of them is more evidently Agent-like than the other. Thus which one of the two becomes a subject may not be decided through a straightforward algorithm at the level of the lexical semantics of these predicates. This scenario represents no a priori problems for a mapping theory such as the one generally employed in LFG (cf. Bresnan 2001 for details), which maps a(argument)-structures as *lexical syntactic structures* to f(unctional)-structures. As a lexical syntactic structure, an a-structure contains information also about the syntactic classification of each argument role, one of the lexical syntactic features being [+/-semantically restrictive]. As the second argument of dyadic modal/evaluative predicates is semantically restricted (which is clear at least in the case of clausal complementation, when this argument slot is the controller of the subordinate agentive subject and therefore this argument has [+human] denotation), if it is assigned the [+r] feature at a-structure then it is secured in the LFG mapping theory that this argument is mapped onto an oblique function: the one which is marked by dative case. It is the other argument, which is not restricted semantically and which I have argued to be non-patient-like, that is mapped onto SUBJ to satisfy the Subject Condition.

The details of this mapping are not presented here due lack of space. Besides, it needs to be admitted that these predicates represent a real challenge to any attempt at regularisation. My point is simply to show that an Experiencer – Theme analysis disregards important aspects of the lexical semantics of these predicates, which is considered to be the ultimate

determinant of thematic role types both in LFG and in Dowty (1991) and any other lexically-oriented frames. I believe the approach outlined here may provide a sound account for both the argument structure uniformity that is assumed to exist behind the three patterns of occurrence of modals (cf. 1) and for the mapping problems that these predicates represent.

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Transparent free relatives

Carla Schelfhout, Peter-Arno Coppen & Nelleke Oostdijk

This paper describes the transparent free relative construction as a variant of the free relative construction. Four analyses are described, viz. the backward deletion analysis, the shared structure analysis, the standard analysis and the parenthetical analysis. It is demonstrated that of these analyses the parenthetical analysis is the superior one.

1. Introduction

Relative clauses can be divided into two classes: *dependent* relative clauses and *independent* relative clauses. The latter are also known as *nominal* or *free* relative clauses. Dependent relative clauses depend on a certain referent in the clause, which is referred to by the relative pronoun, as exemplified in (1a). Independent relative clauses do not have a referent in the clause and behave as nominal expressions, as exemplified in (1b).

- (1) a. The things that you see *belong* to me.
b. What you see *belongs* to me.

As we see, the finite verb in (1a) shows number agreement with the referent, whereas the finite verb in (1b) has singular number. Apparently, free relatives are syntactically singular, independent of what they refer to. This, however, is not always true; cf. example (2):

- (2) What seem to be pebbles *are* strewn across the lawn.

In this sentence, we have a free relative clause which shows plural number agreement. This construction was called *transparent* free relative by Wilder (1999) and derives its name from the fact that the relative clause seems transparent with respect to the plurality of *pebbles*.

We will discuss transparent free relatives in both English and Dutch, under the assumption that these constructions are comparable. We will first take a

closer look at the characteristics of transparent free relatives, then discuss previous analyses and finally present an alternative analysis.

2. Transparent free relatives

Transparent free relatives differ from standard free relatives in the following respects:

A. Number. As discussed in section 1, free relatives always have singular number,¹ whereas the number of transparent free relatives may vary:

- (3) a. What you ordered *was*/**were* delivered a minute ago.
 b. What John calls pebbles *are* lying on the lawn.
 c. What John calls a banjo *is* lying on his desk.

B. Definiteness. Standard free relatives are definite, whereas the definiteness of transparent free relatives may vary. Definiteness can be checked by placing the free relative at an indefinites-only position, e.g. the existential construction *there is something somewhere*, where *something* can only be indefinite.²

- (4) a. * There is what you ordered on your desk.
 b. There is what John might call a banjo on his desk.
 c. * There is what John might call his banjo on his desk.

C. Reference. Standard free relatives cannot refer to human beings, whereas transparent free relatives can.

- (5) a. # What I adore kisses me.
 b. What I could best describe as my idol kisses me.
 c. # What I could best describe as my school kisses me.

D. Island effects. Standard free relatives show island effects, whereas transparent free relatives do not.

- (6) a. John will deliver whatever you order him to.
 b. * **Who** will John deliver whatever you order e to?
 c. John is what you might call angry about something.
 d. **What** is John what you might call angry about e?

¹ There are two apparent exceptions on this rule: copulative or predicative constructions, in which the number of the predicate may decide on the number of the verb (*what you see is a beautiful girl* vs. *what you see are beautiful girls*), and cleft constructions (*Whatever (it is that) John calls pebbles are...*)

² Not to be confused with place adverbs, as in *On your desk, there is what you ordered*.

It can be observed that the number, definiteness and reference of the total transparent free relative is determined by the number, definiteness and reference of the right-peripheral XP in the transparent free relative, which we will pre-theoretically refer to as *content kernel*. For instance, *pebbles* and *a banjo* in (3b) are content kernels.

So far we have seen characteristics of transparent free relatives that differ from the characteristics of standard free relatives. When we take a closer look at constructions that showed these characteristics, we notice that they all have the following characteristics as well:

- whatever the nature of the content kernel, the relative can only be *what*; cf. (7a) to (7b):
- (7) a. ***What*** John might call *sweet children* are ruining my house.
 b. * ***Who*** John might call *sweet children* are ruining my house.
- The main verb requires a predicate; this can be seen as only constructions in which the verb requires a predicate can occur at indefinites-only positions:
- (8) a. There is *what* John might call *a banjo* on your desk.
 b. * There is *what* John painted *blue* on your desk.
- The content kernel can always replace the total transparent free relative.
- (9) a. There is *what* John might call *a banjo* on your desk.
 b. There is *a banjo* on your desk.
- (10)a. These are errors which John is *what* you might call *angry about*.
 b. These are errors which John is *angry about*.

It is clear that the content kernel plays a crucial role in a transparent free relative. The content kernel decides about number, definiteness and reference of the total construction; in fact it can always replace the total construction of. How is this possible? The next section discusses three analyses that have been offered in the literature.

3. Previous analyses of transparent free relatives

3.1 Wilder's analysis: parenthetical placement with backward deletion

Wilder (1999) proposes a parenthetical analysis for transparent free relatives in combination with deletion of one of two instances of the content kernel. Wilder's explanation consists of two steps: first, a complete relative clause (*what he took to be a banjo*) is parenthetically inserted into a matrix clause

(*John bought a banjo*), left adjacent to the element that it premodifies (*a banjo*). Next, the predicate in the relative clause (*a banjo*) is deleted under morpho-phonological identity with the right adjacent element(s) in the matrix clause. For this deletion Wilder uses a rule named Backward Deletion, which he developed in Wilder (1997) for Right Node Raising. This rule deletes one constituent under identity with a second one. Wilder's analysis looks as follows:

(11) John bought [_{par} what he took to be ~~a banjo~~] a banjo.

Wilder argues that the content kernel must be in the matrix clause, as this appears to be the most straightforward way to explain why this content kernel decides about number agreement and definiteness of the total construction. If the content kernel is in the main clause and the relative clause functions as a kind of premodifier to it, of course the number, definiteness and reference of the content kernel are decisive. However, this implies that the obligatory predicate role of the verb in the relative clause is either lacking or phonologically empty. In Wilder's view, it is phonologically deleted.

3.2 Van Riemsdijk's analysis: shared structures

In several papers (Van Riemsdijk 1998, 2000, 2001), Van Riemsdijk develops a notion of shared structures, in which constituents are shared by two different clauses. His examples include right node raising constructions, wh-prefixes and transparent free relatives. For these, Van Riemsdijk defends an analysis in which the content kernel is shared by the matrix clause and the relative clause, as exemplified below:

(12) John bought }
 what he took to be } a banjo

In the linearization of this structure the banjo has to be at one specific position only, but this one element is at two positions in the syntactic tree. This explains the behavior of transparent free relatives with respect to number, definiteness and island effects in the same way as Wilder defends it: by stating that the content kernel is in the main clause. The difference is in the explanation of the apparently empty predicate in the relative clause: whereas Wilder gives an analysis in which one instance of the content kernel, in the relative clause, gets deleted, Van Riemsdijk states that the same element is present in both clauses.³ Hence, in the present example *a banjo* is both the

³ One of Van Riemsdijk's arguments for this analysis is that it is also applicable to transparent free relatives that have the content kernel preceding the verb of the relative clause instead of being right peripheral to it. This variant does not exist in English, but it is present in Dutch and German, as exemplified below:

direct object of *bought* and the predicate of *took to be*, which implies that all argument roles are filled and that both clauses are syntactically correct.

3.3 Grosu's analysis: standard analysis

Grosu (2003) argues for the same analysis for standard and transparent free relatives. In his view, the word *what* is the head of the construction and the content kernel is in the relative clause, as illustrated below:

- (13)
- | | | |
|--|-----------------|--|
| | <i>features</i> | |
| | ┌───────────┐ | |
| | | |
| | └──────────┘ | |
- John bought [_{rel} what he took to be a banjo].

The fact that the total transparent free relative has the number characteristics and the syntactic category of the content kernel is the result of two characteristics of the word *what*: it is underspecified with respect to number and syntactic category and it is the head of a small clause (one of the definitional characteristics of transparent free relatives is that the main verb always takes a predicate). The word *what* originates in the small clause and receives its number and other features from the predicate under equation with it; it is then successively A-moved to the specifier position of the matrix clause. This explains the definitional characteristic of transparent free relatives that the relative always has to be *what*: other relatives are not underspecified for number or syntactic category and hence they cannot take the value of predicates in a small clause.

4. Discussion

4.1 Previous analyses

We will compare the previous analyses on the basis of the predictions they make with respect to the surface form and behavior of transparent free relatives. First, we consider the predictions with respect to island effects. It is widely accepted that a subordinate clause forms an island for extraction. This holds *a fortiori* for wh-clauses; however, extraction out of a content kernel seems possible, as evidenced by example (6), repeated here for convenience:

Hij is wat je mooi _____ noemt.
 He is what one beautiful calls
 'He is what one calls beautiful.'

In our view, these constructions are not comparable to the transparent free relatives we have described in section 1. These constructions can only be singular, do show island effects and behave exclusively nominally whereas we will see in section 4.2 that transparent free relatives show a wider distribution.

- (6) a. John will deliver whatever you order him to.
 b. * **Who** will John deliver whatever you order e to?
 c. John is what you might call *angry about something*.
 d. **What** is John what you might call angry about e?

The fact that extraction out of a content kernel is possible suggests that this kernel is not in the subordinate clause. This makes Grosu's standard analysis, in which the content kernel is in the subordinate clause, less attractive.

Next, we inspect the predictions with respect to the content kernel that the shared structure analysis and the backward deletion analysis make. A shared structure analysis assumes that the content kernel is acceptable in both the relative and the matrix clause; the backward deletion analysis is only applicable when there is morpho-phonological identity between the instances in the matrix clause and in the relative clause. Hence both theories imply that the phonological form of the content kernel should be acceptable for both the relative and the main clause. If there is a counter example, i.e. if there is a correct sentence with a content kernel that is only acceptable for either the main clause or the relative clause but not for both, these two analyses become less likely.

In fact, such a counterexample is found in the adjective in Dutch. Attributive adjectives in Dutch can be inflected depending on gender and number of the following noun, as illustrated in (14a). Predicative adjectives however, are never inflected, as is exemplified in (14b).

- (14)a. Dat is een mooig man.
 that is a beautiful man
 'He is a beautiful man.'
 b. wat je noemt mooi
 what one calls beautiful
 'what one calls beautiful'
 c. Dat is een wat je noemt mooig man.
 that is a what one calls beautiful man
 'He is what one calls a beautiful man.'

When we combine the main clause in (14a) with the relative clause in (14b), we obtain the transparent free relative construction in (14c). The adjective in the content kernel is inflected, which is ungrammatical in a predicative position, but the sentence is completely correct in Dutch. This cannot be explained by either the backward deletion analysis or the shared structure analysis.

4.2 An alternative analysis

In section 4.1 we have argued that the immunity of content kernels for island effects is a strong argument for an analysis in which the content kernel is in the matrix clause. The second argument for such an analysis is the fact that the

content kernel can be nominal, adjectival, adverbial, prepositional and in Dutch even verbal in nature and that the distribution of the total transparent free relative follows the distribution of the content kernel. Examples of the respective options are:

- (15)a. Er ligt wat John omschrijft als eenbanjo op mijnbureau.
 there lies what John describes as a banjo on my desk
 ‘There is what John describes as a banjo on my desk.’
- b. Die mannen zijn wat je noemt lelijk.
 these men are what one calls ugly
 ‘These men are what one calls ugly.’
- c. Jan heeft Piet wat CNN omschrijft als verpletterend verslagen.
 Jan has Piet what CNN describes as smashingly beaten
 ‘John beat Pete what CNN described as smashingly.’
- d. De overvaller schopte de winkelier wat de politie netjes omschreef als ‘tussen zijn benen.’
 the robber kicked the shopkeeper what the police decently described as between his legs
 ‘The robber kicked the shopkeeper what the police decently described as between his legs.’
- e. Nederland heeft Schotland wat je noemt verpletterd.
 Holland has Scotland what one calls smashed
 * ‘Holland what one calls crushed Scotland.’

This is unexpected under the standard analysis, which predicts that the transparent free relative only behaves nominally. It is fully understandable under the assumption that the content kernel is in the matrix clause, however.

We therefore propose to insert the transparent free relative, as it is, as a parenthetical clause into the matrix sentence:

- (16) John bought [_{par} what he took to be] a banjo.

There is no Backward deletion, hence no need for a morpho-phonological identity between a deleted element and the referent in the matrix clause. However, the parenthetical clause lacks a constituent that seems to be subcategorized by the verb.

This analysis raises two important questions: what is the function of the relative clause in the matrix clause and why is the predicate role in the relative clause empty? We will argue that the relative clause is parenthetically inserted into the main clause, for the following reasons:

- As Wilder noted, the relative clause seems to be premodifying the content kernel, but in both English and Dutch subordinate clauses can only be postmodifying. The only opportunity for finite clauses to be premodifying is when they are used parenthetically, cf. example (17):

- (17)a. * This is an, as clearly as mine is, stupid decision.
That was, as she thought, a stupid decision.
- The intonational structure of transparent free relatives roughly follows the intonational structure of other parenthetical clauses, as for example comment clauses. There seems to be an intonational break at the beginning of the parenthetical clause, and following the parenthetical clause the intonation of the matrix clause continues where it had stopped.
 - The part of the transparent free relative preceding the content kernel can be extraposed. This behavior is unexpected under a standard analysis, but it is in line with the behavior of other parenthetical clauses, cf. the transparent free relatives in (18a, b) with the comment clauses in (18c, d).
- (18)a. What John called a banjo is lying on my desk.
b. A banjo is lying on my desk, or (at least) what John called one.
c. That decision was, I think, a terrible mistake.
d. That decision was a terrible mistake, (or at least) I think (so).

The remaining question with our parenthetical analysis is why the predicate role can be empty. Whatever the answer to that, it should be noted that many other uncontroversial parentheticals share this characteristic:

- (19) “I don't think,” Jones said, “that this would be a good idea.”
(20) That's not what your father meant, I think, but you could ask him.
(21) There came you will never guess *how many people* to the party.

The reporting clause in example (19) seems to miss an obligatory direct object role⁴: usually people say *something*. The same goes for the comment clause in example (20). And the sluicing parenthetical in example (21) has the same problem as transparent free relatives: it is unclear to which clause the XP *how many people* belongs.

Apparently the parenthetical use of a finite clause is only possible by leaving an obligatory role empty. The empty direct object role in reporting clauses has been studied by Collins & Branigan (1997) for English and Schelfhout (2000) for Dutch; their conclusion is that the reporting clause is linked to the matrix clause by a pronominal operator: *so* in English and *zo* 'so' in Dutch. This operator may surface as the particle *so/zo*, which takes the first position in the reporting clause, but can remain phonologically empty as well. Apparently the existence of this operator is linked to the emptiness of the

⁴ This direct object cannot be the quote, as in Dutch reporting clauses can also contain verbs that do not take a direct object (*sneren* 'to sneer', *terugkrabbelen* 'to back out') or no verbs at all (*aldus de woordvoerder* 'according to the spokesman'). For a unified analysis the option that the quote is a direct object must be ruled out. For a more extensive analysis see Schelfhout (2000) and Collins & Branigan (1997).

obligatory direct object role of the verb. The same analysis is defended for finite comment clauses, as exemplified in (20), by Reis (1996) for German and by Schelfhout, Coppen & Oostdijk (to appear) for Dutch.

Can this operator *zo* 'so' also be used in this case? We think it can. If we right-dislocate a transparent free relative, the very same operator appears in Dutch:

- (22)a. Er ligt wat Jan noemt een unieke banjo op mijn desk.
 there lies what John calls a unique banjo on my bureau.
 'What John calls a unique banjo is lying on my desk.'
- b. Er ligt een unieke banjo op mijn bureau, of althans wat
 there lies a unique banjo on my desk or at-least what
 Jan **zo**/* \emptyset noemt.
 John so calls
 'A banjo is lying on my desk, or at least John called it that.'

As illustrated in (22b), in Dutch the operator *zo* is obligatory in the extraposed variant; in English the position of the predicate must be taken by a nominal element (*that* in 22b), but here too the position cannot remain empty.

As it seems that the parenthetical use of a finite clause gives rise to an obligatory argument role being empty, an empty predicate role in a transparent free relative is not surprising under a parenthetical analysis. Of course this mechanism needs further research; in particular it would be interesting to see whether the analysis that was developed for reporting clauses and comment clauses could be applied to transparent free relatives as well. But this is an issue for further research; for the present analysis it is sufficient to note that an empty predicate role in a transparent free relative is exactly what is expected under a parenthetical analysis, rather than an argument against it.

5. Conclusion

On the basis of the possibility to extract an element from the content kernel of a transparent free relative we have concluded that the content kernel must be in the matrix clause. This also offers a straightforward explanation for the number, definiteness, distribution and reference characteristics of transparent free relatives. The relative clause serves as a premodifier to the content kernel; we propose this premodifier is parenthetical in nature on the basis of its position and its prosodical characteristics. The analysis looks schematically as follows:

- (23) John bought [_{par} what he took to be] a banjo.

An apparent problem with this analysis seems why the predicate role of the relative clause can be phonologically empty. We suggested that this might be in line with other parenthetically used finite clauses, which all have an empty

argument role. This suggests that the lack of an obligatory role is not exclusive for transparent free relatives, but occurs with parenthetical constructions in general. Solving this puzzle will be topic of further research.

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Negating and Conjoining Imperatives

Magdalena Schwager

The paper discusses a surprisingly non-Boolean reading of German imperative conjunctions. I explore the conceptual and empirical disadvantages of a semantic analysis as given by Arthur Merin, and argue that a syntactic solution can do better, showing that the data in question can be captured as instances of Right Node Raising.

1. Introduction

Traditionally, conjunction and negation are assumed to operate on functions to truth values and thus together with the latter form a Boolean algebra (cf. Keenan & Faltz 1985).¹ Giving credit to the ubiquitous observation that there is no immediately straightforward way of connecting imperatives to truth values, Arthur Merin opts for an alternative non-Boolean semantics for the latter (Merin 2002a²,b).

He adduces a puzzle to be found in the interaction of negation with conjoined German imperatives as empirical evidence for his claim that imperatives belong to a special *language of desire* which is assumed not to be based on a Boolean algebra. For each language, this part of semantics is assumed to exist parallel to the ordinary, propositional and thus basically Boolean part needed for declaratives.

¹For those not familiar with algebraic structures it might be helpful to say that an algebra consists of a set of entities together with operations defined on that set, a familiar example being the integers together with the operation of addition. Different kinds of algebras are reflected in different properties of the respective operation(s). Since the final solution is a syntactic one, deeper insights into algebraic notions will not be crucial for understanding this paper though.

²Merin's original motivation is to provide insight into the nature of preferences, proving an argument by Aristotle which in Merin's reformulation says: *If A is the opposite of B, and C is the opposite of D, and A together with C is better than B together with D, then A is better than D, and C is better than B.* (Prior Analytics II.22 68a25-b7); Aristotle illustrates this with the example of the passionate lover: *If then every lover under the influence of his love would prefer his beloved to be disposed to gratify him (A) without doing so (C), rather than gratify him (D) without being inclined to do so (B), clearly A - that the beloved should be so inclined - is preferable to the act of gratification.* (68a39-b2).

In the following I will briefly present the data and how Merin's account can take care of them, but then argue that his account faces severe conceptual problems and in addition forbids a parallel treatment of closely related phenomena.

1.1. Merin's puzzle

If conjunction and negation truly were the operations of a Boolean algebra as they are traditionally conceived of, the laws of De Morgan would be expected to hold:

- (1) a. $\neg(A \wedge B) = \neg A \vee \neg B$
 b. $\neg(A \vee B) = \neg A \wedge \neg B$

On the other hand, if they were not, we would expect to find at least some examples that do not conform with De Morgan's laws. Merin shows that there is a reading for the German example in (2) which in fact violates the first law of De Morgan as given in (1a):

- (2) Geh und sprich nicht!
 walk.IMP and talk.IMP not

On one of its readings (cf. section 2 for a detailed discussion), this does in fact mean that the addressee should neither walk nor talk. Since this reading is highly unexpected under traditional assumptions concerning negation and conjunction, I will call it the *Fancy Reading* (**FR**) in the following. Even more surprisingly, (2) does not get the weaker reading predicted by De Morgan's law in (1a), namely that the addressee should not perform both activities together, while doing either of them by itself is not objectable.

1.2. An account within the language of desire

Under Merin's approach imperatives are assumed to correspond to non-propositional objects, viz. *prospects* which are best imagined as concepts of situations that can get instantiated in the actual world. An imperative like *Walk!* thus serves to demand an instance of the prospect of you walking. While propositions can be conjoined and negated according to the laws of Boolean algebra, prospects belong to a different algebraic structure. Merin assumes that conjunction and negation as defined for prospects form an abelian group.³ *Walk!* then denotes the atomic prospect *W* which opens up the subgroup of all those prospects being characterized by the addressee walking, neglecting all his other possible activities. This comprises the addressee walking (*W* itself), doing nothing (the neutral

³A familiar example for an abelian group are again the integers together with the operation of addition. In order to constitute an abelian group the set has to be non-empty, and the following properties have to hold (i) the operation is closed on the set, (ii) associativity, (iii) existence of a neutral element, (iv) existence of inverse elements for each set element, (v) commutativity.

element E), the addressee doing a double dose of walking (W+W), etc. So we end up with the subgroup {E, W, W+W, -W, ...}. The imperative now makes use of the natural ordering inherent to the group built up by recursive application of the additive operation and adding the inverse elements. This order has to be taken as isomorphic to the preference order. The imperative thus results in saying that everything above W is preferred, viz. 'The more walking you do the better!'

English imperative conjunction *and* and its German equivalent *und* denote precisely this amount enhancing additive operation. *Walk and walk!* denotes the element W+W (our familiar double dose of walking). Conjunction of two different imperatives opens up a larger subgroup, e.g. *Walk and talk!* giving rise to {E, W, T, W+T, -W-T, W+W+T, ...}.

Now there are two ways to conceive of negation, one being preference reversion, in the example case 'The less walking you do, the better!' (that's why the only possibility to conform with *Don't walk!* is simply E, doing nothing with respect to walking). This is the interpretation which Merin assigns to English *don't*. He calls it *denial*.

This would still not be sufficient for giving us the Anti-De Morgan reading of German (2); inverting the preferences would lead to everything below W+T being preferred, meaning that you could well do W (walking without talking) or T (talking without walking). In fact it turns out to be equivalent to what a truly Boolean treatment would have given us, thus doing well enough for English which in this respect is as unproblematic for De Morgan's laws as in declarative cases (cf. 2 for closer discussion).

Alternatively, German negation *nicht* is to be associated with the operation of *inverse-formation*. But what is the inverse of an activity? (Or, to put it differently, what is the meaning of -W, -W-T, ...?). Merin proposes that it means subtracting the relevant (amount of) activity from the addressee's aspirations. Subtracting a simple dose of walking (-W) from being about to do a simple dose of walking (W) leaves you with E, namely doing nothing (with respect to walking).

So, finally, the solution to the non-Boolean fancy reading of (2) stems from the fact that *nicht* is interpreted as inverse-formation (unlike English *don't*), subtracting walking and talking from what the addressee might have done, thus saying that doing nothing with respect to both walking and talking is preferred.⁴

The costs for this explanation lie not only in the highly non-standard semantics that has to be postulated for the *language of desire*, but also in making languages differ as to which operation negation denotes within the respective language of desire (German *nicht* denotes inverse-formation, English *don't* denotes denial).

⁴Merin (2002a) remains very implicit about this, but it seems to make the unwanted prediction that (2), *Geh und sprich nicht!* might not be sufficient to cancel a stronger, say W+W+T+T aspiration of the addressee, ending up with giving W+T as acceptable behaviour, instead of E.

2. *The data revisited*

As outlined so far, in contrast to English, German imperatives as in (3b) show non-Boolean interactions of negation and conjunctions which is just what would be expected under the non-standard semantics proposed by Merin (2002a;b). In the following, I will take a closer look at the possible readings for the constructions under discussion in order to then take into account the behaviour of related phenomena.

- (3) a. Don't drink and drive!
 b. Trink und fahr nicht!
 drink.IMP and drive.IMP not

Neither language allows for negation to outscope the imperative.⁵ (4) exemplifies this for English, but German behaves exactly analogously.

- (4) Ede told the graduate student: 'Don't drink and drive!'
 ≠ Ede didn't tell the graduate student to drink and drive.

Both languages allow for a reading under which the conjunction takes wide scope with respect to the negation (**WS**), thus resulting in a negative and a positive imperative. The semantic outcome depends trivially on the position of the negation. Prosodically, this reading is favoured by a short intonational break.

- (5) [IMP NOT drink] & [IMP drive]
 you shouldn't drink, you should drive (**WS**_{Engl})
 (6) [IMP trink-] & [IMP NOT fahr-]
 you should drink, you shouldn't drive (**WS**_{German})

The reading in question is the one most likely to arise where one has two options mutually excluding each other, as for instance if you came by car to a well-supplied party:

- (7) Q: What shall I do now?
 a. Don't drink and drive! (pro-car)
 b. Trink und fahr nicht! (pro-alcohol)
 drink.IMP and drive.IMP not

The preferred reading for the English example (3a) involves narrow scope of the conjunction with respect to the negation (**NS**). It conforms to the first law of De Morgan (cf. (1a)), meaning that the addressee shouldn't perform both activities in combination while there are no objections against either possibility taken on its own:

⁵Widest scope of negation with respect to the imperative would result in what Hamblin (1987) calls *type 5-negation*.

- (8) IMP NOT [drink & drive]
you may do either, but don't do both

This reading is unavailable for German (3b), which likewise has a preferred reading precluded for English (3a).⁶ In that case, each conjunct seems to be negated by itself (I have dubbed this the *Fancy Reading* in 1.1). As Merin observes this is

⁶I am indebted to Mark de Vos for having pointed out to me that this is maybe not so clear as presented in Merin (2002a). As by now well known, DP conjunction often does not correspond to the Boolean conjunction operation. Szabolcsi & Haddican (2003) discuss in detail instances of the following:

- (9) I didn't take hockey and algebra.

They note that with unstressed *and* this is only acceptable if the two conjuncts form a "normal" package in the respective context, and then (due to *homogeneity*, cf. Löbner (2000)) the sentence gets the non-Boolean interpretation *both not*. Only with a stressed *AND* do we get the truly Boolean *not both* interpretation, packaging being irrelevant in that case. Although Szabolcsi & Haddican explicitly step aside from talking about VP conjunction, it is obvious from the examples given here that VP conjunction behaves differently: all my examples involve unstressed *and* and yet at least favour the non-Boolean reading, if the other reading is available at all. Additionally, their acceptability does not seem to be subject to any packaging effect.

- (10) a. Don't drink and drive. [packaging; no FR]
 b. Don't swim and dance (in the hall). [no packaging; no FR]

My informants on English (one AE, one BE) did not get non-Boolean FR readings for sentences as in (10). It seems to get slightly better though, if a longer list of prohibited activities is given; *or* would still be preferred:

- (11) (doctor): Don't swim, dance, drink, eat and smoke. [??? FR]

A first google search on the strings *don't eat and*, *don't walk and*, *don't eat and drink* gave the following 3 non-Boolean examples as opposed to 14 truly Boolean ones (counting only imperative conjunction in the scope of negation and leaving aside explicitly modified examples with e.g. *at the same time*, *then*):

- (12) Set a good example: don't eat and drink in the lab.
http://www.cs.bris.ac.uk/Tools/Local/HandbookNext/proc_super.html
- (13) Please don't eat and drink in the labs. If you do, don't get caught!! If you do eat and/or drink in the labs and you don't get caught then, PLEASE, clean up after yourself!!
<http://ugweb.cs.ualberta.ca/cleanlabs.html>
- (14) Don't walk and cycle in the dark if possible or keep to well lit areas.
http://www.bbc.co.uk/health/fitness/life_young2.shtml

In all contexts these are opposed by lots of like instances of *Don't V₁ or V₂*. The *eat and drink* examples (12) and (13) might possibly be explained away as involving a package-reading, creating a context where cases in which only one of the activities is performed are taken to be completely irrelevant. Nevertheless, (14) can't be reasonably accounted for in that way. Especially if the latter is undisputedly good English something more substantial will have to be said about the English VP-conjunction as well.

unexpected according to the first law of De Morgan and thus provides evidence in favour of the non-Boolean proposal.

- (15) IMP [NOT drink & NOT drive]
neither drink nor drive

The non-truthconditional character of Merin's *language of desire* readily explains the data in (15). As shown in the following section, it faces various difficulties in other confronts though.

3. Problems for a semantic solution

While non-Boolean accounts for conjunction and disjunction have been put forth successfully in various areas (e.g. *free choice disjunction* (Zimmermann 2000, Aloni 2003, Geurts 2004, Merin 1992), conjunction (Krifka 1990, Merin 1992), and DP conjunction (Szabolcsi & Haddican 2003)), I don't consider it particularly helpful for the problem under discussion for the following reasons.

First, the non-Boolean reading does not arise with conjunctions of German infinitivals which can be used as substitutes for the morphologically marked imperative (cf. Wratil 2000). The constructions pattern exactly with English (3a), allowing for WS_{Engl} and NS, while excluding FR:

- (16) Nicht trinken und fahren!
 not drink.INF and drive.INF
- a. WS_{Engl} : [IMP NOT drink] & [IMP drive]
 'don't drink, but (then) drive'
 - b. NS: IMP NOT [drink & drive]
 'you may do either, but don't do both'

So from Merin's perspective it seems that the interpretation of German negation does not only vary with the type of language, but also (within the *language of desire*) with either the morphology or, more likely, the position of the verb. Merin himself notices this problem and reflects it in his distinction of sentence final vs. sentence initial negation, distinguishing within the German *language of desire* an English type denial negation (sentence initial) and inverse formation (sentence final). Only the latter gives rise to FR.

On the other hand, we also find non-Boolean readings in declarative contexts:

- (17) Das Kind ißt und trinkt nicht.
 the child eats and drinks not
 'The child neither eats nor drinks.' (non-Boolean FR)
 (additionally: 'The child is eating, but he is not drinking.', WS_{Germ})

So even if we wanted to appropriately restrict the non-Boolean interpretation of negation to a subpart of the *language of desire*, we would still have to come up

with an explanation for the strikingly parallel non-Boolean cases in the realm of declarative sentences.

I therefore conclude that Merin's proposal is unattractive for at least three reasons: (i) it crucially relies on the postulation of differences between the semantic algebras of German and English, (ii) the lexical semantic interpretation of German negation has to vary according to two parameters, namely +/- *language of desire*, +/- sentence-initial, and (iii) an independent explanation for the non-Boolean readings in declarative contexts still needs to be found.

Instead, I want to make use of the fact that the interpretation of German *nicht* 'not' ((3b) vs. (16)) varies according to morphosyntactic differences which analogously can be found between German and English imperative conjunctions ((3a) vs (3b)).

In the following, the difference between (3a) and (3b) will thus be related to differences in morphosyntactic makeup, not to differences in the semantic algebra in imperative contexts.

4. A syntactic solution

As to imperatives I will rely on standard assumptions as elaborated for example in Wratil (2000).

The imperative semantics depends on specific features which are situated in the C projection. So far, German and English differ in that overt movement of the morphologically marked imperative verb to C is triggered only in German. The English verb is allowed to stay in situ. I will assume that in the positive case a \emptyset -auxiliary is present, which has to be realized overtly in the case of emphasis or negation:⁷

- (18) a. Stop it!
 b. DO stop it!
 c. Don't stop it!

As for the interpretation, I will assume for the sake of simplicity that imperatives denote fulfillment conditions (cf. e.g. Lohnstein 2000). Matrix tense is conceived of as deictically denoting intervals and restricting them with respect to their location with respect to utterance time (cf. von Stechow 2002)⁸.

- (19) $\| \text{(you) P!} \|$ is fulfilled iff $[t_4 > t_o \ \& \ \exists e[\tau(e) \subseteq t_4 \ \& \ P(\text{ADR},e)]]$
 where t_o denotes the utterance time, t_4 is a free variable over intervals, e

⁷Nothing hinges on the exact technical implementation, as long as the S-structure positions of German and English imperatives with respect to negation are captured correctly. I completely abstract away from the analysis of the IP layer as irrelevant for the present purpose, thus leaving aside e.g. the problem of the overtly missing subject.

⁸In that respect, morphological present, past and future behave analogously to personal pronouns (e.g. *(s)he*) which restrict their possible referents to being male or female respectively.

a variable over events, $>$ temporal subsequence, τ a function from events to their running time, \subseteq a partial order on intervals

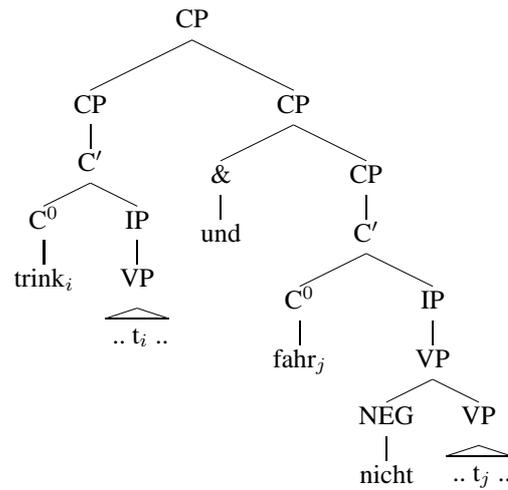
As expected, this permits a straightforward account of the Boolean cases exemplified by the WS and NS readings.

4.1. Conjunction scoping over Imperative (WS)

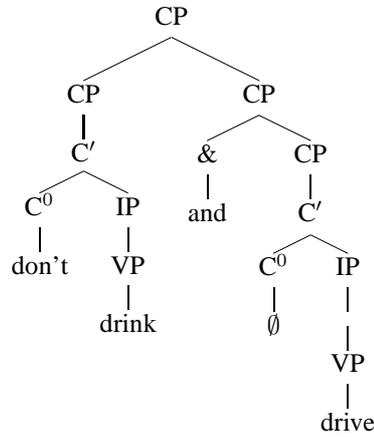
Syntactically I assume an adjunction analysis for coordination as argued for in Hartmann (2000), but nothing pertinent to the crucial data hinges on that particular analysis.

Since we have assumed that imperative morphology is dependent on features in C, conjunction of two imperatives is CP-conjunction. The negation stays low in the very conjunct where it surfaces. This gives rise to conjunction of a positive and a negative imperative in German (20), and a negative and a positive imperative in English (21):

(20)



(21)

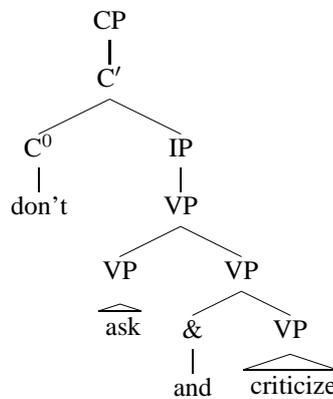


Semantically, the conjunction of two imperatives boils down to a sequence of two imperatives as elaborated in Krifka (2001).

4.2. *Narrow Scope of the conjunction with respect to negation (NS, English)*

Conjunction below negation can be assumed to be VP conjunction thus giving rise to a structure as in (22):

(22)



This is exactly the structure we would also get for the German infinitival conjunction (cf. (16)), apart from the fact that no overt auxiliary is required in the German case.

Semantically, due to the deictic interpretation of tense we get the correct interpretation that within the designated future interval the imperative is referring to, there is no interval comprising a complex event of the addressee containing a drinking and a driving part:

- (23) $\neg\exists t' \subseteq t_4: \exists e[\tau(e) \subseteq t': \exists e' \exists e'': e' \subseteq e'' \& e'' \subseteq e' \& \text{drink}(\text{ADR}, e') \& \text{drive}(\text{ADR}, e'')]$

4.3. Right Node Raising for the Fancy Reading

As Merin has observed, the traditional assumptions for imperatives and the logical connectives don't allow us to account for the German examples under their non-Boolean Fancy Reading:

- (24) Trink und fahr nicht!
 drink.IMP and drive.IMP not
 'you should neither drink nor drive'

Under that reading it is exactly similar to (25):

- (25) Trink nicht und fahr nicht!
 drink.IMP not and drive.IMP not

This exactly parallels cases of ellipsis on the right edge of the first conjunct known under the maybe misleading name of *right node raising* (RNR):

- (26) Walter liebt und Clarisse verachtet Wagner.
 Walter loves and Clarisse despises Wagner
 'Walter loves Wagner and Clarisse despises Wagner.'

Hartmann (2000) assumes that these constructions do not involve movement, but rather PF-deletion of the final material in the first conjunct, thus postulating only a PF-difference between (26) and (27) (and likewise (24) and (25)):

- (27) Walter liebt ~~Wagner~~ and Clarisse verachtet Wagner.
 Walter loves ~~Wagner~~ and Clarisse despises Wagner.

This PF-deletion is subject to two constraints, first, the deleted material has to be identical to overt material at the end of the second conjunct, and second, the information structure has to ensure that the elements preceding the deleted string and the overt identical material respectively contrast with each other, both being marked with a pitch accent (e.g. in (25) the verbs *liebt/loves* and *verachtet/despises*).

Hartmann (2000) argues at length that the process in question is in fact an instance of PF-deletion, the strongest evidence being perhaps that it can target also non-constituents:

- (28) Peter verspricht seiner Mutter in die Kirche zu gehen und Maria
 Peter promises his mother to the church to go and Maria
 verspricht ihrer Mutter in die Kirche zu gehen. [her (6a), p.57]
 promises her mother to the church to go

'Peter promises his mother to go to church, and Maria promises her mother to go to church.'

Furthermore it can be shown not to be subject to constraints familiar for movement, it does for instance not obey the Right Roof Constraint Hartmann (2000:60):

- (29) [_{CP}Hans erzählte uns, [_{CP} daß Anna nach Paris ~~gefahren ist~~] und
Hans told us that Anna to Paris ~~traveled is~~ and
[_{CP}Max erzählte uns, [_{CP} daß Ute nach Rom gefahren ist.]]]
Max told us that Ute to Rome traveled is
'Hans told us that Anna traveled to Paris and Max told us that Ute traveled to Rome.'

Furthermore, quantifiers are interpreted independently, as if there were truly two instances of the same QP:

- (30) a. Hans füttert und Peter jagt ein Rentier.
Hans feeds and Peter hunts a reindeer
'Hans is feeding a reindeer and Peter is hunting a reindeer.'
b. Hans füttert ein Rentier und Peter jagt ein Rentier.
Hans feeds a reindeer and Peter hunts a reindeer
'Hans is feeding a reindeer and Peter is hunting a reindeer.'

While the expected interpretation of one moved phrase would be that both events involve the very same animal, (30a) gets the same reading as (30b) thus indicating that they only differ at PF:

- (31) Hans füttert ~~ein Rentier~~ und Peter jagt ein Rentier.
Hans feeds ~~a reindeer~~ and Peter hunts a reindeer

Assuming that Hartmann (2000)'s PF-deletion account is on the right track German FR can be accounted for straightforwardly.⁹ The structure is exactly parallel

⁹In fact, my anonymous reviewer has pointed out that Hartmann (2000)'s arguments for PF-deletion being the only solution for RNR are maybe not absolutely compelling (e.g., RNR of non-constituents could maybe still be explained in an account involving multiple instances of movement). Nevertheless, (s)he agrees that PF-deletion correctly captures the data under discussion and cites additional examples for accurate predictions of the theory. One problematic example is given though:

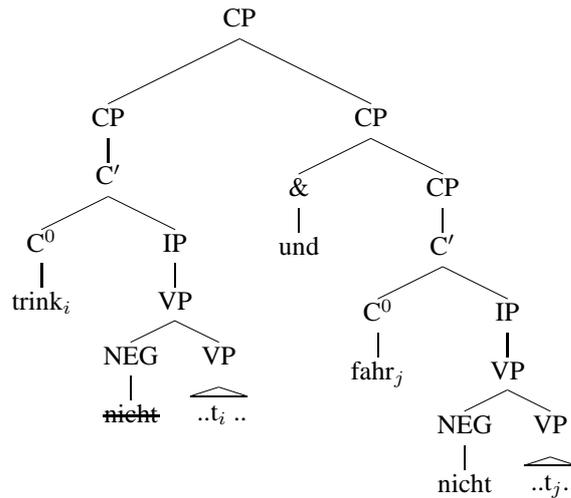
- (32) Maria sucht *einen Klempner* und Anna meidet einen Klempner.
Maria looks for a *plumber* and Anna avoids a plumber
'Maria is looking for a plumber and Anna avoids a plumber.'

Although the crucial reading is pretty hard to obtain, this might be a case where - contrary to the predictions of the PF-deletion account of RNR - the versions with and without deletion differ in what are possible readings (non-referential for the first indefinite, referential for the second: unobtainable if the indefinite is deleted, at least marginally possible if it is not). This, of course, requires a closer investigation of how indefinites behave in coordinations which would by far outreach the current undertaking. I hope to return to it elsewhere.

to the one assumed for the wide scope reading in (20) and involves PF-deletion at the right edge of the first conjunct:

(33) Trink ~~nicht~~ und fahr nicht!

(34)



While the first condition on RNR, namely that the material deleted at the right edge of the first conjunct has to be identical to the material at the right edge of the second conjunct, is clearly obeyed, this is maybe not so obvious for the second condition. Remember that RNR requires a contrast on the elements preceding respectively the gap and the overt material identical to it. I want to argue that the imperativized verbs in fact constitute the contrast required for RNR. Of course, phonologically this is hard to distinguish from the intonation contour triggered by the imperatives themselves. I think that it can nevertheless be shown, given that contrast minimally requires lexical diversity. So RNR and therefore FR should be excluded in cases in which we find two tokens of the same lexical verb (*go* in (35b)). This in fact seems to be born out:

- (35) a. Geh und (*nochmals) geh nicht!
 go.IMP and once-again go.IMP not
 b. Geh nicht und ^{???}(nochmals) geh nicht!
 go.IMP not and once-again go.IMP not

In fact, (35a) can only be understood as a contradictory utterance, but not as the (somewhat marginal) enforced negative imperative in (35b). (Therefore it does not allow the second instance to be modified with *nochmals* 'once again': the adverbial would require identity with the first imperative instead of opposition. On the other hand, conjoining two identical negative imperatives without *nochmals* seems extremely marginal, cf. (35b) for pragmatic reasons, I suppose.) So the lexical identity blocks an interpretation of (35a) along the lines of (36):

- (36) *Geh ~~nicht~~ und nochmals geh nicht.

Therefore, the availability of RNR and thus the FR seems in fact dependent on the lexical contrast given by the two verbs.

5. Independent evidence for RNR in similar constructions

Even if one could try to explain the simple cases like (3b) as non-Boolean VP conjunction, it is not clear how this could deal with verbs that take objects independently, but require the same particle:

- (37) Hör ihm und sieh ihr nicht zu!
 listen(-PRT).IMP him and look(-PRT).IMP her not PRT
 'Don't listen to him and don't look at her!
 (*'Listen to him and don't look at her!')

The only way for *hör* 'listen-PRT' to combine with the particle *zu* 'zu' which it obligatorily requires seems to be right node raising:

- (38) [_{CP}hör_i ihm_j ~~nicht~~ [_{VP}t_j [~~zu~~ t_i]]] und [_{CP} sieh_k
 [listen(-PRT).IMP him ~~not~~ [[PRT]]] and [look(-PRT).IMP
 ihr_m nicht [_{VP}t_m [~~zu~~ t_k]]]
 her not [[PRT]]
 'Don't listen to him and don't look at her!'

As predicted, the negation has to be copied along with the particle (the contrast being provided by the personal pronouns preceding the gap and the overt element respectively). Therefore, the reading conjoining a positive and a negative imperative is lost.

Likewise, it is correctly predicted that RNR and thus FR are blocked if what can be copied to the first conjunct is not final (in (39) only the negation could be copied, since the verb *schreib* 'write' can not be combined with the particle *zu* 'to')):

- (39) Schreib ihm und sieh ihr nicht zu!
 write.IMP him and look(-PRT).IMP her not PRT
 'Write him and don't look at her!
 (*'Don't write him and don't look at her!')

The readings for RNR-targeted quantifiers in object position conform to what is predicted by the deletion analysis:

- (40) Kauf dir und empfiehl Maria ein Buch!
 buy.IMP you.DAT and recommend.IMP Maria a book
 'Buy a book for yourself and recommend a book to Maria!'

(40) can indeed easily be understood as involving two different books.

A look at comparative data provides further evidence for the RNR analysis. French seems to mark the contrast between Boolean NS and putatively non-Boolean FR overtly (Caroline Féry, p.c.):

- (41) a. Ne bois et conduis pas!
 NEG_{cl} drink.IMP and drive.IMP NEG
 ‘Don’t both drink and drive!’ (= NS)
- b. Ne bois et ne conduis pas!
 NEG_{cl} drink.IMP and NEG_{cl} drive.IMP NEG
 ‘Don’t drink and don’t drive!’ (= FR)

Since, in French, negation is marked both pre- and postverbally, there remains an overt reflex of negation visible even where the postverbal marker *pas* has undergone RNR (viz. PF-deletion). Correspondingly, we get the FR for (41b), but not for (41a) which is an instance of true Boolean narrow scope conjunction.

Further evidence against explaining the FR in terms of the semantics of negation comes from the fact that non-logical adverbs can show the same ‘doubling’ behaviour:

- (42) Maria schläft und arbeitet viel.
 Maria sleeps and works much
 ‘Maria sleeps a lot and works a lot.’
 = Maria schläft viel und arbeitet viel.

The most natural reading for (42) is indeed that there are many events of Maria sleeping and many events of Maria working, and not, that Maria is a person who is involved in many events being characterized by her sleeping and working contemporaneously.

6. Conclusions

So after all, there doesn’t seem to be convincing evidence that the semantics of German negation should vary with distinctions in sentence mood. Nor need German and English opt for different interpretations of negation in their respective semantic algebras. It is rather the case that the morphosyntactic differences between English (3a) and German (3b) imperative conjunctions are not trivial, nor are those between German true imperatives (3b) and the suppletive infinitival constructions (16).

It could be shown that RNR conceived of as PF-deletion (for which independent evidence was cited) makes the correct predictions for the interpretation of negation and conjunction. Like and related constructions provided evidence against alternative accounts involving (sentence mood independent) non-Boolean

VP-conjunction which perhaps might have been a possible alternative for the simpler cases.

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Restructuring and the development of the Romance conditional verb forms.

Bianca Slobbe

In this paper, we present a generative morphosyntactic account of the development of the Romance conditional verb forms from the Latin periphrasis ‘infinitive + *habere*’. We reject the hypothesis of D’Hulst (2001) who claims that this development took place in three stages (biclausal --> monoclausal --> synthetic) and was the result of a process of gradually moving up temporal information from lower functional projections. Instead, we propose that the Romance conditional verb forms developed from a functional restructuring infinitive construction (cf. Wurmbrand 2001) and that this development was caused by changing properties of the auxiliary.

1. Introduction

It is generally accepted (cf. Bourciez 1967; Roberts 1992; Rohlfs 1968; Thielmann 1885) that the Romance conditional verb forms have developed from the Latin periphrasis ‘infinitive + *habere*’ (cf. examples (1) and (2)).¹

- | | | | |
|-----|------------------|------------------------|-------------------------------------------|
| (1) | cantare | habebam | --> chanterais (Fr.),
cantaría (O.It.) |
| | sing-INF.PR.ACT. | have-1SG.IND.IMPF.ACT. | |
| (2) | cantare | habui | --> canterei (O.It., It.) |
| | sing-INF.PR.ACT. | have-1SG.IND.PF.ACT. | |

Agreement has not been reached, however, on the questions *how* and *why* this development took place. In this paper, we will try to provide a satisfactory answer to these questions, based on an exhaustive corpus containing (almost) all occurrences of the Latin periphrasis ‘infinitive + *habere*’ as well as the earliest manifestations of the Romance conditional.

¹ Lanly (1973) claims that the conditional verb forms have developed from the Latin past subjunctive, augmented by an additional past morpheme (appella-res --> appella-re-bas --> appelle-rai). This hypothesis has effectively been refuted by Arnavielle (1995), Nocentini (2001) and Posner (1998). We will not discuss it in this paper.

- f) habeo in potestate cantare
 have-1SG.IND.PR.ACT. in power-ABL.SG.F. sing-INF.PR.ACT.
 ‘I have singing in my power’
- g) habeo ad cantare
 have-1SG.IND.PR.ACT. to sing-INF.PR.ACT.
 ‘I have to sing’

In construction (a), the infinitive is located in a subordinate CP, selected by *habere*. In construction (b), the infinitive is located in the matrix phrase. The exact status of the infinitive will be discussed in section 4.2. Construction (c) is similar to construction (b), be it that *habere* is directly preceded by the adverb *nesesse*, which has considerable syntactic consequences. Construction (d) has a completely different structure and interpretation: *habere*, which has the reading ‘regard as’, selects a Small Clause containing the nominalized infinitive and the adjective *satis*. In (e) and (f) the infinitive is the complement of the NP *potestatem* and the PP *in potestate* respectively. The last construction, (h), in which the infinitive is introduced by the infinitival marker *ad*, is comparable to the French *j’ai à chanter* and the Italian *ho da cantare*.

As we are looking for a construction in which the infinitive might move up to merge with *habere*, we will focus on examples (a), (b), and (g). In (c), the presence of *nesesse* prevents the infinitive from merging with *habere*. In (d), extraction of the infinitive from the Small Clause would result in movement to an A-bar position, rather than merging of the infinitive with *habere* in an A-position. Finally, in (e) and (f), extraction of the infinitive from the NP *potestatem* or the PP *in potestate* would violate the complex NP-constraint.

We have included examples that did not appear in the CLCLT, but were found in Latin sources not included in the CLCLT or quoted by other authors. If a phrase appeared several times (as a result of citation for example), we have only taken the original occurrence into account.

As we have found no regional differences in the development and use of the periphrasis, we have regarded all Latin examples as expressions of the same language.

2.2. The syntactic development of the periphrasis

The rise of the periphrasis has taken place in five stages. In the first century B.C., *habere* could only be combined with a transitive infinitive (examples (4) and (5)). From the third century A.D. onwards, the construction allows for intransitive and passive infinitives (examples (6) and (7) respectively). The earliest examples containing an overt embedded CP are found in the fourth century A.D. (example (8)). We have found only one example displaying an infinitival marker, which is dated in the eighth century A.D. (example (9)).

- (4) (Lucretius, *De Rerum Natura* 6, 711)
 In multis hoc rebus
 concerning many-ABL.PL.M. this-ACC.SG.M. thing-ABL.PL.M.
 dicere habemus
 say-INF.PR.ACT. have-1PL.IND.PR.ACT.
 ‘We can say this about many things.’
- (5) (Seneca, *Controversiae* 1,1,19)
 Quid habui facere ?
 what-ACC.SG.N. have-1SG.IND.PF.ACT. do-INF.PR.ACT.
 ‘What should / could I have done?’
- (6) (Tertullianus, *Adversus Marcionem* 3,11)
 ... post quem habebat
 after which-ACC.SG.M. have-3SG.IND.IMPF.ACT.
 evenire
 happen-INF.PR.ACT.
 ‘... after which it had to / would happen.’
- (7) (Tertullianus, *De Resurrectione Mortuorum* 40,47)
 ... ad futuram gloriam, quae
 for future-ACC.SG.F. glory-ACC.SG.F. which-NOM.SG.F.
 in nos habet revelari
 in we-ACC.PL.M. have-3SG.IND.PR.ACT. reveal-INF.PR.PASS.
 ‘For future glory, which has to / can / will be revealed in / to us.’
- (8) (Ambrosiaster, *Commentarius in Pauli Epistulas* 4,28)
 ... ut habeat unde tribuere
 so that have-3SG.SUB.PR.ACT. from where give-INF.PR.ACT.
 indigentibus
 needy-DAT.PL.M.
 Lit.: ‘... so that he may have from where give to the poor’
 --> ‘... so that he may have funds to give to the poor.’
- (9) (Pardessus 1843-1849: 330)
 ... per manus nostras
 through hand-ACC.PL.F. our-ACC.SG.F.
 recipimus vel ad recipere
 receive-1PL.IND.PR.ACT. or to receive-INF.PR.ACT.
 habemus
 have-1PL.IND.PR.ACT.
 ‘...we receive or have to / will receive through our hands’

Alongside the present infinitive, Latin had a perfective infinitive at its disposal: *canta-v-isse*. We have found one example of the periphrasis using a perfective infinitive (example (10)). Here, we are dealing with a defective verb: the perfective forms of *odisse* are interpreted as present tense forms.

- (10) (Tertullianus, *Apologeticum* 37,1)
 Si inimicos iubemur diligere,
 if enemy-ACC.PL.M. order-1PL.IND.PR.ACT. love-INF.PR.ACT.
 quem habemus odisse?
 who-ACC.SG.M. have-1PL.IND.PR.ACT. hate-INF.PF.ACT.
 ‘If we are ordered to love our enemies, who should / can we hate?’

2.3. The semantic development of the periphrasis

The earliest examples of the periphrasis are ambiguous between a possessive and a modal reading. This was already illustrated by example (5) above, repeated in (11). The first examples with a purely modal reading are found in the first century A.D. (example (12)). From the third century A.D. onwards, the periphrasis might have a future or future-in-the-past reading (examples (13) and (14) respectively). Finally, in the fourth century A.D., we find occurrences with an interpretation that resembles the reading of the modern Romance conditional verb forms (example (15)).

- (11) (Seneca, *Controversiae* 1,1,19)
 Quid habui facere ?
 what-ACC.SG.N. have-1SG.IND.PF.ACT. do-INF.PR.ACT.
 ‘What should / could I have done?’
- (12) (Ovidius, *Epistulae ex Ponto* 3,1)
 nec te si cupiat
 and not you-ACC.SG.M. if want-3SG.SUB.PR.ACT.
 laedere rumor habet
 harm-INF.PR.ACT. rumor-NOM.SG.F. have-3SG.IND.PR.ACT.
 ‘and the rumor cannot harm you even if it wants to.’
- (13) (Sacerdos, *Ars* cf. Pinkster 1987: 206)
 quidam tempus praesens esse
 some-NOM.PL.M. tense-NOM.SG.N. present-NOM.SG.N. be-INF.PR.ACT.
 negant, dicentes res aut
 deny-3PL.IND.PR.ACT. say-P.P.A.ACT. thing-ACC.PL.F. either
 factas esse aut habere
 do-P.P.P.-ACC.PL.F. be-INF.PR.ACT. or have-INF.PR.ACT.
 fieri.
 do-INF.PR.ACT.
 ‘Some deny that there is a present tense, saying that things either have been done or will be done.’

- (14) (Tertullianus, *Adversus Marcionem* 4,8)
 Nazareus vocari habebat
 nazareus-NOM.SG.M. call-INF.PR.PASS. have-3SG.IND.PR.ACT.
 secundum prophetiam
 according to prophecy-ACC.SG.F.
 ‘According to the prophecy he would be called Nazareus.’
- (15) (Arnobius Iunior, *Commentarii in Psalmos* 104,51)
 Nisi deus admonuisset me
 if not god-NOM.SG.M. warn-3SG.SUB.PLPF.ACT. I-ACC.SG.M.
 habueram peccare in te.
 have-1SG.IND.PLPF.ACT. sin-INF.PR.ACT. against you-ACC.SG.M.
 ‘If god had not warned me, I would have sinned against you.’

3. Previous hypothesis: D’Hulst (2001)

In this section, we will discuss the most recent generative syntactic analysis, proposed by D’Hulst (2001).

3.1. Semantic and syntactic frameworks

Concerning the semantic representation of tense, D’Hulst assumes a revised Reichenbachian framework as proposed by Hornstein (1990). Within this framework, it is assumed that the temporal interpretation of a verb is brought about by a double binary relationship between three temporal entities: S(peech time), R(eference time) and E(vent time). The relationship between S and R indicates whether an event takes place in the past (R precedes S: R_S), present (S and R coincide: S,R) or future (S precedes R: S_R). The relationship between R and E determines the verb has a perfective (E_R), neutral (E,R) or prospective (R_E) reading.

Concerning the syntactic realisation of these temporal relationships, D’Hulst follows Giorgi & Pianesi (1997) in assuming two tense projections: T1P and T2P. According to their hypothesis, T1P realises the relationship between S and R and T2P realises the relationship between R and E. Crucially, they claim that these projections are only present in the structure if the temporal entities they represent do not coincide.

3.2. The development of the Romance conditional verb forms

D’Hulst claims that the development of the Romance conditional verb forms from the Latin periphrasis ‘infinitive + *habere*’ took place in three stages. In stage 1, the periphrastic constructions *habebam cantare* and *habui cantare* reflect a biclausal structure as in (16). In stage 2, the infinitive moves up to the matrix clause and *habere* becomes an auxiliary as in (17). This stage is preceded by a Perfect-Shift, causing the perfectivity features to shift from T2P

to T1P. In stage 3, the infinitive moves up to T1 and merges with the auxiliary as in (18). This stage is preceded by a Future Shift, causing the prospective features to shift from T2P to T1P.

- (16) a) $[_{CP} [_{T1P} \text{habebam}_i \quad \quad \quad [_{VP} t_i [_{CP} [_{VP} \text{cantare}]]]]]]$
 b) $[_{CP} \quad \quad \quad [_{T2P} \text{habui}_i [_{VP} t_i [_{CP} [_{VP} \text{cantare}]]]]]]$
- (17) a) $[_{CP} [_{T1P} \text{habebam}_i \quad [_{VauxP} t_i [_{T2P} \text{cantare}_j \quad [_{VP} t_j]]]]]]$
 b) $[_{CP} [_{T1P} \text{habui}_i \quad [_{VauxP} t_i [_{T2P} \text{cantare}_j \quad [_{VP} t_j]]]]]]$
- (18) $[_{CP} [_{Agr1P} \text{chanterais} / \text{cantaria} / \text{canterei}_i [_{T1P} t_i [_{VP} t_i]]]]$

3.3. Remarks regarding the hypothesis of D'Hulst (2001).

A crucial assumption in the framework assumed by D'Hulst is that the syntactic structure does not contain neutral tense projections. This assumption has to be made in order to accommodate the infinitive in the matrix clause in structure (17). For if *habere*'s neutral relationship between R and E were to be realised in the structure, *habere* would leave a trace in T2, making it impossible for the infinitive to occupy that position. However, this assumption has a high price : it makes it impossible to distinguish between neutral and absent tense projections. Consequently, this framework does not make any syntactic distinction between present tense verb forms, which represent neutral relationships between S, R and E, and infinite verb forms, which are generally assumed to lack an S point (cf. Hornstein 1990).

Furthermore, to facilitate the transition from stage 1 to stage 2, D'Hulst has to assume the occurrence of a Perfect Shift as proposed by Giorgi & Pianesi (1997). Against this hypothesis several theoretical objections can be made : (i) the process tears apart bundles of features ; (ii) after the Perfect Shift, T1P checks two different types of features at the same time ; (iii) it is difficult to account for the fact that such a drastic change has only affected analytical verb forms, leaving synthetic verb forms unaltered.

Now let us turn to the data. D'Hulst hypothesis predicts that once *habere* becomes an auxiliary (stage 2), it should lose its lexical interpretation of possession. This entails that a past perfect form of *habere*, when combined with an infinitive, may only have a possessive reading, as only a biclausal structure has both a T1 and a T2 available for *habere*. (In a monoclausal structure, the T2 is occupied by the infinitive.) We have found four occurrences of the periphrasis displaying a past perfect form of *habere*, all of which have a purely modal reading (cf. example (15), repeated in (19)). Thus, the prediction made by D'Hulst's hypothesis proves incorrect.

- (19) (Arnobius Iunior, *Commentarii in Psalmos* 104,51)
 Nisi deus admonuisset me
 if not god-NOM.SG.M. warn-3SG.SUB.PLPF.ACT. I-ACC.SG.M.
 habueram peccare in te.
 have-1SG.IND.PLPF.ACT. sin-INF.PR.ACT. against you-ACC.SG.M.
 ‘If god had not warned me, I would have sinned against you.’

Furthermore, we have not found any evidence for the precedence of a biclausal stage ; on the contrary. First of all, the earliest occurrences of the periphrasis are ambiguous between a lexical and a modal reading, indicating a monoclausal structure. Second, the first examples with an overt embedded CP appear in the 4th century A.D. (example (8), repeated in (20)), i.e. nearly five centuries after the rise of the periphrasis.

- (20) (Ambrosiaster, *Commentarius in Pauli Epistulas* 4,28)
 ... ut habeat unde tribuere
 so that have-3SG.SUB.PR.ACT. from where give-INF.PR.ACT.
 indigentibus
 needy-DAT.PL.M.
 Lit.: ‘... so that he may have from where give the poor’
 --> ‘... so that he may have funds to give to the poor.’

To summarise : we have argued that the assumption that neutral projections are not realised in the syntactic structure should be rejected on theoretical grounds. Furthermore, we have shown that the Perfect Shift hypothesis as well as the assumption that the monoclausal stage was preceded by a biclausal one are contradicted by the data. Consequently, the analysis as proposed by D’Hulst should be rejected.

4. Alternative hypothesis

In this section, we will propose an alternative analysis, based on Wurmbrand’s (2001) categorisation of infinitival complements into four categories.

4.1. Wurmbrand (2001) : restructuring versus non-restructuring infinitives

Wurmbrand (2001) distinguishes four types of infinitival complements in German : lexical restructuring infinitives, functional restructuring infinitives, reduced non-restructuring infinitives and full non-restructuring infinitives. Table 1 below displays the four infinitival categories and their relevant syntactic properties as given by Wurmbrand (2001).

- (23) (Cassiodori Discipulus, *Comm. in Ep. S. Pauli ad Ephesos* 3,29)
 non habemus unde gloriari
 not have-1PL.IND.PR.ACT. from where honor-INF.PR.PASS.
 Lit. : ‘We do not have from where be honored.’
 --> ‘We do not have anything based on which we may be honored.’
- (24) (Augustinus, *Sermones* 335,9)
 ut habeamus unde
 so that have-1PL.SUB.PR.ACT. from where
 eleemosynam dare
 alms-ACC.SG.F. give-INF.PR.ACT.
 Lit. : ‘So that we would have from where give alms’
 --> ‘So that we would have something that would allow us to give alms.’

The construction *habeo cantare* has several properties in common with the construction *habeo unde cantare* : passivisation affects the infinitive (example (25)) and the infinitival complement contains an embedded structural case position (example (26)). Long object movement does not occur, but non-focus scrambling does (example (27)).⁵

- (25) (Irenaeus, *Adversus Haereses* 3,20,3)
 a Dei adiumento habuimus
 by God-GEN.SG.M. help-ABL.SG.N. have-1PL.IND.PF.ACT.
 salvari
 save-INF.PR.PASS.
 ‘We had to / could / would be saved with the help of God.’
- (26) (Tertullianus, *De Anima* 55,8)
 habes et regionem inferum
 have-2SG.IND.PR.ACT. and area-ACC.SG.F. dead-GEN.PL.M.
 subterraneam credere et illos
 subterraneous-ACC.SG.F. believe-INF.PR.ACT. and they-ACC.PL.M.
 cubito pellere qui ...
 bed-ABL.SG.M. chase away-INF.PR.ACT. who-NOM.PL.M.
 ‘You have to believe in a subterraneous area for the dead and chase away from your bed those who...’

⁵ The presence of an embedded structural case position and the possibility to have non-focus scrambling contradicts Chomsky’s claim that ‘Move α applies to an element α only if morphological properties of α itself are not otherwise satisfied.’ (Chomsky 1995:201). Based on these data, we are forced to conclude that this claim is incorrect. Additional counter evidence will be provided in section 5.

- (27) (Praedestinatus 1,60)
 ergo deus illas sordes
 therefore god-NOM.SG.M. that-ACC.PL.F. filthiness-ACC.PL.F.
 habuit sustinere
 have-3SG.IND.PF.ACT. endure-INF.PR.ACT.
 ‘Therefore god had to endure these obscenities.’

In this construction, *habere* never has a purely possessive reading: it is either ambiguous between a possessive and a modal reading or purely modal. If we analyse *habere* as a modal verb in this construction, we have to conclude it is a raising verb rather than a control verb, as modal verbs are generally assumed not to assign a subject theta role (cf. Bhatt 1998; Vanden Wyngaerd 1994; Wurmbrand 2001). This implies that there is no embedded PRO subject. We are thus led to the conclusion that *habeo cantare* is a functional restructuring infinitive construction.

As we only have one example of the construction *habeo ad cantare* (example (9), repeated in (28)), it is extremely difficult to determine the exact structure of the construction. Two things are clear, however: there is no overt embedded CP and *habere* does not seem to assign a subject theta role. This indicates that we are dealing with a restructuring infinitive construction. Whether it is a case of lexical or functional restructuring cannot be determined based on this example.⁶

- (28) (Pardessus 1943-1949 :200)
 ... per manus nostras
 through hand-ACC.PL.F. our-ACC.SG.F.
 recipimus vel ad recipere
 receive-1PL.IND.PR.ACT. or to receive-INF.PR.ACT.
 habemus
 have-1PL.IND.PR.ACT.
 ‘...we receive or have to / will receive through our hands’

4.3. The origin of the conditional verb forms

From the data presented above it seems most likely that the Romance synthetic conditional verb forms have developed from the functional restructuring infinitive construction *habeo cantare*. In that construction, the merging of infinitive and auxiliary is not hampered by the presence of a subordinate CP, an infinitival marker or the adverb *nesesse* as it is in the constructions *habeo unde cantare*, *habeo ad cantare* and *nesesse habeo cantare*. Evidence sustaining this conclusion will be presented in section 5.3.

⁶ In section 5.2 we will present Old Romanian data which suggest that *habeo ad cantare* is a lexical restructuring infinitive construction.

5. The cause of the development – evidence from Old Romanian

Now that we have established a possible origin of the Romance conditional verb forms, we need to determine what caused this development. There are two options : the development may have been triggered by changing properties of *habere* or by changing properties of the infinitive. In this section we will argue for the latter option, based on Old Romanian data.

5.1. Romanian ‘avea’

The Romanian verb *avea* ‘have’ has two different declensions : full forms, to be used as an independent, lexical verb (*am, ai, are, avem, aveți, au*) and reduced forms, to be used as an auxiliary (*am, ai, a, am, ați, au*). This will prove to be a useful source of data concerning the development of the Romance conditional verb forms.

5.2. Romanian ‘avea + infinitive’

All of the Latin ‘infinitive + *habere*’ constructions discussed in section 2 have survived in Old Romanian. We will discuss the three types selected in section 2.1.

The first construction to be discussed is *am unde cînta*, the successor of the Latin construction *habeo unde cantare*. As example (29) shows, this construction has an overt embedded CP and an embedded structural case position. The possessive reading of *avea* suggests that it assigns an agent theta-role, which entails that the embedded CP must contain a PRO subject. We therefore have to conclude that we are dealing with a full non-restructuring infinitive construction. As can be seen in example (30), this structure uses the full lexical forms of *avea*.

- (29) (v. Eeden 1997 :224)
 ai unde te duce ?
 have-2SG.IND.PR.ACT. where you-ACC.SG. bring-INF.ACT.
 Lit. : ‘Do you have where to bring yourself ?’
 --> ‘Do you have a place to go to?’

- (30) (v. Eeden 1997 :84)
 Ion nu are in cîne se
 Ion not have-3SG.IND.PR.ACT. to who himself-ACC.SG.
 încrede
 entrust-INF.ACT.
 Lit. : ‘Ion does not have to whom to entrust himself.’
 --> ‘Ion does not have anybody to rely on.’

The second construction is *am cînta*, the successor of the Latin construction *habeo cantare*. This construction lacks an overt embedded CP and allows

scrambling (example (31)). There is probably no embedded PRO subject, as *avea* has a modal or temporal reading. We have to conclude that this is a case of functional restructuring. Interestingly, this structure uses the reduced forms of *avea*.

- (31) (v. Eeden 1994 :258)
 Ne- am mai întoarce
 ourselves-ACC.PL. have-1PL.IND.PR.ACT. +/-again return-INF.ACT.
 odată acolo.
 someday there
 Lit. : ‘We have ourselves return there again someday.’
 --> ‘We would return there again someday.’

Finally, we would like to discuss the construction *am a cînta*, the successor of the Latin construction *habeo ad cantare*. This construction has no overt embedded CP and presumably no embedded PRO subject as *avea* has a modal or temporal reading (example (32)). We therefore have to conclude it is a restructuring infinitive construction.

- (32) (Iliescu 2000 :433)
 eu mult am a te
 I-NOM.SG. much have-1SG.IND.PR.ACT. to you-ACC.SG.
 sluji
 serve-INF.ACT.
 ‘I have to serve you much.’

Again, the syntactic properties of this example do not permit us to determine whether it is a functional or lexical restructuring infinitive construction: the fact that this example does not contain an element in an embedded structural case position does not mean that such a position was not available. However, the form of *avea* does allow us to determine the exact status of the infinitive. As example (33) shows, the construction *am a cînta* uses the full lexical forms of *avea*.

- (33) (Iliescu 2000 :433)
 are a vedea
 have-3SG.IND.PR.ACT. to see-INF.ACT.
 Lit. : ‘He has to see.’
 --> ‘He will see.’

The main difference in the properties of the verb ‘have’ in the different constructions is its status: in a non-restructuring structure and in a lexical restructuring structure, it is assumed to be a VP. In a functional restructuring structure it is assumed to be an FP. We propose that the difference in syntactic status is reflected in the appearance of Romanian *avea*: if it is a VP, the full lexical forms will be used (e.g. *are* in example (35)); if on the other hand it is an FP, the reduced forms will be used (e.g. *am* in example (36)). This

assumption leads us to conclude that in *am a cînta*, *avea* has the status of a VP, indicating a lexical restructuring structure.

5.3. The Old Romanian conditional

Although such a form did not survive in Modern Romanian,⁷ Old Romanian had developed a synthetic conditional verb form. As can be seen in example (34), this conditional used the reduced forms of *avea*, indicating that the conditional has indeed developed from the functional restructuring infinitive construction *am cînta* (*habeo cantare*).

- (34) (v. Eeden 1994 :253)
- | | | |
|--------------------------------|-------------------------|------|
| da-re-ar | Domn-ul | să |
| give-INF.ACT.-re-3SG.COND.ACT. | Lord-NOM.SG.M.-DEF.ART. | that |
| sosiți | teferi | |
| arrive-2PL.SUB.ACT. | safe-NOM.PL.M. | |
- ‘May the Lord grant that you arrive safely.’

Interestingly, the infinitive still displays the Latin ending *-re*. We may therefore conclude that the properties of *avea* changed before it merged with the infinitive, while the properties of the infinitive changed after it merged with the auxiliary. This indicates that the merging of infinitive and auxiliary took place in order to satisfy changing properties of the auxiliary, which lost its status as an independent verb and became an affix.⁸

6. The phrase structures of the Latin ‘infinitive + habere’ constructions

To conclude this exposition, we will present the phrase structures of the three ‘infinitive + *habere*’ constructions discussed in this paper.

Let us begin with the matrix phrase structure. An interesting fact is that the tense of the verb determines the position of the verb relative to the direct object. If the verb has simple past, simple future, past perfect or future perfect tense, it precedes the direct object. If, however, the verb has simple present or present perfect tense, it follows the direct object. There are two possible explanations for this difference in word order. One option is that the verb moves overtly to TP when it has a marked value (past / future) and covertly when it has a neutral value (present). Another option is that the direct object moves overtly to a position higher than the verb when the verb has present tense, but not when the verb has past or future tense. Although the first option might seem more logical, we are forced to argue for the latter based on the positions of subject and negation. Overt subjects usually precede the verb

⁷ For a discussion of the Modern Romanian tense system, see D’Hulst, Coene & Avram (to app.).

⁸ Again, this contradicts Chomsky’s statement that ‘The operation Move α cannot apply to α to enable some different element β to satisfy *its* properties.’ (Chomsky 1995:201): in this case, the infinitive has moved up to satisfy the changing properties of the auxiliary.

(unless the verb has been topicalised in SpecCP) but follow the conjunction. This could indicate that the subject is located in SpecTP and the verb in T°. However, sentential negation always intervenes between subject and verb. Within the Minimalist framework this forces us to conclude that NegP is located below TP, the subject occupies SpecTP and the verb does not raise overtly to T°. ⁹ We therefore have to conclude that movement of the object to a position higher than its base position – presumably SpecvP – is determined by the tense of the verb : the object only moves to SpecvP overtly if the verb has a neutral tense value (i.e. present). ¹⁰ These observations lead to the matrix phrase structure as given in (35).

- (35) Latin matrix phrase structure
[CP [TP [NegP [vP/AspP [VP]]]]]

In the biclausal construction *habeo unde cantare*, the matrix VP selects a CP, which contains the infinitive. The infinitival complement contains a structural case position, but lacks a TP as the infinitive lacks an S point. This results in structure (36a). In the construction *habeo cantare*, *habere* is the head of an FP, selecting the infinitive. Again, the infinitival complement does have a structural case position, but lacks a TP, NegP and CP. This yields the structure as given in (36b). Finally, in the construction *habeo ad cantare*, the infinitive has the status of a bare VP, introduced by the infinitival marker *ad* (structure (36c)). ¹¹

- (36) Phrase structures of the Latin ‘infinitive + *habere*’ constructions
a) *habeo unde cantare*
[CP [TP [NegP [vP/AspP [VP *habeo* [CP [vP/AspP [VP *cantare*]]]]]]]]]
b) *habeo cantare*
[CP [TP [NegP [AspP [FP *habeo* [vP/AspP [VP *cantare*]]]]]]]
c) *habeo ad cantare*.
[CP [TP [NegP [vP/AspP [VP *habeo* [XP *ad* [VP *cantare*]]]]]]]

7. Conclusion

To conclude, we have shown that there is no genealogical relationship between biclausal and monoclausal ‘infinitive + *habere*’ constructions in Latin ; they are complementary constructions with different underlying structures that have developed independently. Consequently, the hypothesis of D’Hulst (2001), which seemed difficult to maintain from a theoretic point of view, has to be rejected on empirical grounds. We have shown that Latin and Old Romanian

⁹ Within the framework proposed by Giorgi & Pianesi (1997) and adopted by D’Hulst (2001), this problem could be solved by postulating the existence of a NegP between AgrSP and T1P. We have chosen, however, to adopt the more economical Minimalist structures.

¹⁰ A detailed account of this phenomenon lies beyond the scope of this paper and will not be pursued here.

¹¹ The status of the infinitival marker *ad* remains to be determined. So far, we can only say that it is not a C°, nor a T° or v/Asp°.

data sustain Wurmbrand's (2001) analysis of infinitival complements into four categories and we have argued that the Romance synthetic conditional verb forms have developed from a functional restructuring infinitive construction. We have furthermore argued that the development of the synthetic verb forms was triggered by changing properties of the auxiliary. The data presented in this paper contradict Chomsky's (1995) claim that 'Move α applies to an element α only if morphological properties of α itself are not otherwise satisfied', as (i) movement of the infinitive takes place in order to satisfy morphological properties of the auxiliary and (ii) Latin allows non-focus scrambling of objects whose features are already satisfied.

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Computational complexity and the acquisition of the CP field in European Portuguese

Carla Soares

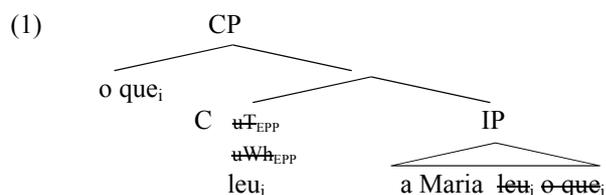
This paper investigates the production of root *wh*-questions, clefts, topics and embedded declaratives by three children acquiring European Portuguese as L1 from 1;2.0 to 4;5.19. I argue that the emergence order of these constructions in the child's speech is explained by the complexity of the syntactic computation. After reviewing the accounts that this notion has received in the literature, I present a characterization of syntactic complexity couched in the minimalist framework (Chomsky 1995, 2001).

1. Introduction

In European Portuguese (EP hereafter), there are several different syntactic constructions that require a visible constituent in the CP domain: *wh*-questions, topicalization constructions, clefts and embedded declaratives. This paper concentrates on the production of these sentences by three native Portuguese children from 1;2.0 to 4;5.19. It will be argued that CP is projected in an early stage of language development (Stromswold 1990, Hyams 1992, Verrips & Weissenborn 1992, Poeppel & Wexler 1993) and that the acquisition of the constructions involving the left periphery mentioned above is determined by the complexity of the syntactic computation. The paper is organized as follows: in the next section, I briefly refer to some relevant syntactic properties of the constructions involving the left periphery. Section 3 addresses the main conclusions of previous studies on the acquisition of the CP field. In section 4 I present a characterization of syntactic computational complexity after pointing out the accounts that this notion has received in the literature. Section 5 characterizes the corpus analyzed in this study. The results are presented and discussed in section 6, and final remarks are found in section 7.

2. *Some remarks on the constructions in focus*
 2.1. *Wh-questions*

In EP, root *wh*-questions present a fronted *wh*-phrase and subject/verb inversion. The fronting of the *wh*-phrase and verb raising to C are traditionally motivated by the need to satisfy the *Wh*-criterion (May 1985, Rizzi 1991) that regulates the formation of *wh*-structures. This criterion states that a *wh*-operator and a [wh] head must be in a spec-head configuration. A *wh*-feature hosted by the functional head C (Rizzi 1991, 1997) then triggers the movement of the *wh*-phrase to [Spec, CP]. However, it has been suggested that in languages like English and French, the *wh*-feature is hosted by the inflectional node I° (Rizzi 1991). This entails verb movement to C°. Under current minimalist assumptions, it is proposed that C bears an uninterpretable *wh*-feature (*uWh*) that has to be checked and deleted (Chomsky 2001, Pesetsky & Torrego 2001). The EPP property of this feature requires a *wh*-phrase in the specifier position of CP for deletion of the uninterpretable *wh*-feature, as argued by Pesetsky & Torrego. These authors also claim that T-to-C movement is required for checking reasons: C bears an uninterpretable T feature (*uT*) with the EPP property that may be deleted by a nominative *wh*-phrase or by the verb itself.



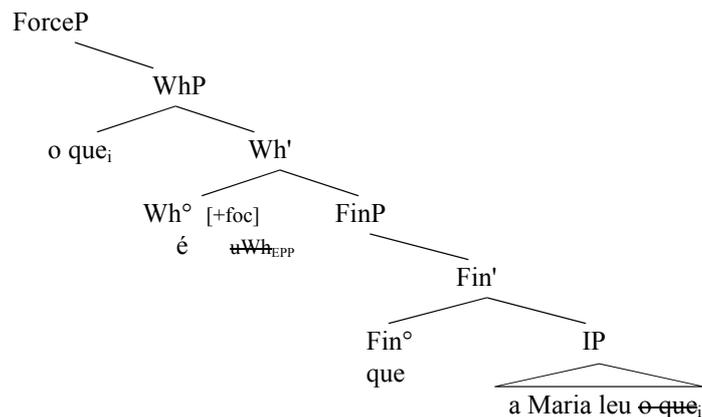
In EP, T-to-C movement is not manifested in all root *wh*-questions.

- (2) O que é que a Maria leu?
 What is that the Maria read
 'What did Maria read?'

In fact, the question in (2) illustrates a usual *wh*-question formation process in colloquial EP: the *wh*-phrase is fronted and it is followed by the 3rd person singular form of *ser* 'to be' in the present tense and by the complementizer *que* 'that'. Duarte (2000) proposes that (2) is a focalized *wh*-question and that the *é que* expression lexicalizes a [focus] feature of the C° head. Assuming the split CP hypothesis (Rizzi 1997), in Soares (2003) I have proposed that *é que* occupies two different head positions in the left periphery: Wh and Finiteness. I have further suggested that *ser* 'to be' lexicalizes a focus feature of the Wh head. Additionally, the complementizer, which is assumed to be in the Force

head in declarative sentences (Rizzi 1997), is in $\text{Fin}^{\circ 1}$ in interrogative sentences.

(3) *Focalized wh-questions*



Summarizing, in EP root *wh*-questions, an uninterpretable *wh*-feature with the EPP property attracts a *wh*-phrase to a specifier position of the CP field. T-to-C movement is motivated by the *uT* feature with the EPP property (Pesetsky & Torrego 2001). Furthermore, in focalized questions a [focus] feature is spelled out by the unmarked form of the copula and Fin° is lexicalized by a complementizer. An important issue is that operator movement and verb movement to the left periphery are independently motivated.

2.2. *Topicalization*

EP displays the construction usually known as topicalization (Chomsky 1977, Rivero 1980, Baltin 1982, among others, and Duarte 1987, 1996 for EP). In (i)-(viii) I list the basic properties of this construction in EP (from Duarte 1987, 1996).

- (i) The phrase that occupies the first position of the clause is linked to a position inside the sentence, an empty category.
- (ii) The topicalized constituent and the empty category display referential, case, categorial and thematic connectivity.
- (iii) It is not restricted to main clauses.
- (iv) It does not show sensitivity to *wh*-islands.
- (v) It is compatible with *wh*-movement.
- (vi) More than one topicalized constituent is allowed in the same clause.

¹ See Soares (2003) for further details of the proposal.

- (vii) Contrary to *wh*-questions with a fronted *wh*-constituent, topicalization construction does not display a clitic-verb order (see also Rouveret 1992).
- (viii) The fronted phrase represents old or 'given information'² (because it occurred in the preceding linguistic context or because it is prominent in the extralinguistic context). It may also introduce a new topic in discourse or contrast some part of old information with a new predication³.

It is a well-known fact that topicalization constructions obey strong island constraints (see Duarte 1987 on EP) and since Chomsky (1977), it is widely accepted that topicalization involves the movement of an XP from its base-generated position to the sentence-initial position⁴. Topics have been analyzed as occupying Top, a position external to CP, as in Chomsky (1977), as adjoining to S/IP (Baltin 1982; Lasnik & Uriagereka 1988; Lasnik & Saito 1992) or as occupying the specifier position of a functional projection (Rizzi 1997, Grohmann 2000, among others), Topic Phrase. Duarte (1996), observing that in EP several topics are allowed in the same clause, that they are compatible with *wh*-phrases in questions and that topicalized constructions do not display the clitic-verb order in EP, argues that topicalization is not an instance of *wh*-movement in EP. She claims that topicalization in EP is a scrambling construction and she assumes further that in EP it involves adjunction to IP or to CP. On the other hand, Rouveret (1992), in order to explain the contrasts between enclisis in matrix declaratives and proclisis in matrix or embedded *wh*-questions and in complement declarative clauses, argues for the existence of an autonomous functional head, W⁵, that may host clitics when it is projected. This head bears a [topic] feature that requires an XP in its specifier position. Moreover, Rouveret (1992) claims that topicalized constituents are adjoined to this projection or may occupy its specifier position. I will assume, following Rouveret (1992), that a feature in a functional head attracts topic phrases. I assume a topic-projection inside a more articulated CP domain (Rizzi 1997). This projection has the property of being recursive (cf. Rizzi 1997). I further suggest that the topic head bears a [topic] feature that has to be satisfied by the raising of an XP with the matching feature.

2.3. *Clefts and é que clefts in EP*

² It never introduces new information and consequently it may not be used for answering questions.

³ For a complete and detailed description of topicalization constructions in EP, see Duarte (1987, 1996).

⁴ Chomsky (1977) assumes that the topic is base generated in [Top, Sⁿ]. A null *wh*-operator is moved to C and deleted later.

⁵ W stands for Wackernagel.

In EP, clefting is a strategy to encode identificational focus (Kiss 1998). A usual distinction holds between clefts and pseudo-clefts/*wh*-clefts. In EP they have the form in (4) and (5):

(4) **Cleft**

copula + clefted constituent + cleft clause

- a. Foi a Maria que leu o livro.
 Be-PAST-sg the Maria that read-PAST the book
 'It was Mary who read the book.'
- b. Foram os meninos que leram o livro.
 Be-PAST-pl the boys that read-PAST-pl the book
 'It was the boys who read the book'.

(5) **Pseudo-cleft**

Cleft clause + copula + clefted constituent

- Quem leu o livro foi a Maria.
 Who read-PAST the book was the Maria
 'Who read the book was Mary'.

In clefts and in typical pseudo-clefts the clefted constituent follows the copula. However, the pseudo-cleft may also be inverted. Then (6) obtains.

(6) **Inverted pseudo-cleft**

- A Maria foi quem leu o livro.
 'Mary was who read the book.'

Another type of cleft in EP presents the invariable expression *é que* as a focalized *wh*-question. As we saw, *é* is the 3rd singular person form of *ser* ('to be') in the present tense and *que* is a complementizer. An important point to notice is that in this type of cleft the focalized constituent precedes the copula.

(7) **é que cleft**

clefted constituent + *é que* + cleft clause

- A Maria é que leu o livro.
 The Maria be-PRES that ate-PAST the book
 'It was Mary that read the book.'

For typical clefts and *é que* clefts in EP, Costa & Duarte (2001) have proposed that such clefts have very similar syntactic structures.

(8) **Clefts**

- a. [_{IP} ser [_{SC} [_{CP} OP que a Maria leu] [_{DP} o livro]]]
 a'. [_{IP} foi [_{SC} [_{DP} o livro]_i [_{SC} [_{CP} OP que a Maria leu] *t*_i]]]

For these authors in clefts the copula spells out the I° head and the focalized constituent is scrambled⁶, adjoining to the small clause. On the other hand, they assume that *é que* is a reanalyzed expression that lexicalizes the Inflection node in *é que* clefts. This would explain its lack of tense and agreement features. Furthermore, the focalized constituent is assumed to move to [Spec, IP].

(9) *é que clefts*

- a. [IP *é que* [SC [CP OP_i a Maria leu t_i] [DP o livro]]]
 a'. [IP [DP o livro]_i *é que* [SC [CP OP a Maria leu] t_i]]

However, assuming that *é que* spells out I° does not explain the availability of sentences like (10) in EP, where both *é que* and *ser* occur:

- (10) A Maria é que foi
 The Maria be-PRES that was-PAST
 quem leu o livro.
 who read-PAST the book
 ‘It’s Mary who read the book.’

If in (10) the inflected copula spells out I°, as proposed by Costa & Duarte (2001), then *é que* is rather in the left periphery of the clause, as in *wh*-focalized questions (cf. Soares 2003 for further details). If Costa & Duarte’s (2001) analysis is right and the syntactic structure of clefts and *é que* pseudo-clefts is similar, we should expect them to emerge around the same period in children’s data production. Nonetheless, we will see that this is not the case.

In our corpus, there is only one occurrence of a pseudo-cleft, at 3;10, and only one occurrence of an inverted pseudo-cleft such as the one in (6), at 4;4. This indicates that pseudo-clefts and inverted pseudo-clefts are acquired rather late. In this paper I will focus on typical clefts and on clefts presenting *é que*.

3. Previous research on the acquisition of CP

Over recent years, several conclusions have emerged from the investigations on the acquisition of the CP field. It has been shown that:

- a) Complementizers are not produced in the initial stages of language acquisition (Radford 1996, Meisel & Müller 1992).
- b) Children sometimes produce sentences without overt complementizers that may nevertheless be interpreted as subordinate clauses (Clahsen *et al.* 1996).
- c) Children omit auxiliaries or fail to invert the auxiliary in English *wh*-questions (Stromswold 1990, Guasti & Rizzi 1996, Radford 1996).

⁶ For arguments in favor of scrambling in EP see Costa (1998).

- d) Subject/verb inversion is not attested in the first stages of acquisition of French (Hulk 1996), for example.

The omission of auxiliaries in English root *wh*-questions has been important evidence taken to support the idea that the child's grammar lacks C°. Some authors have argued that *wh*-words are adjoined to VP or to IP in the early stages of language acquisition (cf. Guilfoyle & Noonan 1988, Radford 1996). The lack of embedded sentences in the child's speech has also been interpreted as resulting from a deficit in the child's functional structure (Guilfoyle & Noonan 1988, Radford 1996, Clahsen 1990, Meisel & Müller 1992, Penner 1992). This paper contributes to this discussion by showing that at an early stage of EP acquisition there is evidence for a CP layer in the child's grammar. Furthermore, I will argue that the acquisition of the left periphery is determined by the complexity of the syntactic computation.

4. Computational complexity

The notion of "syntactic complexity" has received different accounts in the literature. Jakubowicz & Nash (2001) and Jakubowicz (2002) propose, for the IP domain, that complexity may be characterized by the properties of functional categories: core functional categories (like I°) are easier to compute than additional functional categories that are merged to the obligatory functional skeleton of the clause (like Past°). The fact that the present tense is mastered earlier than the past tense in normal and impaired language acquisition is explained this way. Kampen (1997) argues that children begin with less complex structures, that is, with structures that require less movement. Other researchers account for complexity in terms of a slightly different view of economy: when the child has the choice between several structures allowed in the same semantic/pragmatic context, (s)he starts by choosing the most economical option, i.e., the one that involves least movement (Hulk & Zuckerman 2000, Zuckerman 2001).

I propose a notion of complexity couched in the minimalist framework (Chomsky 1995, 2001). I assume that the core syntactic operations are *Merge* and *Agree* and that the former is costless. Furthermore, *Move* is a compound operation, composed of *Agree* / *Pied-Piping* / *Merge*, which is consequently more costly. I characterize computational complexity as follows:

- (11) Syntactic computational complexity:
- a. The application of *Move* is more complex than the application of *Merge*.
 - b. Moving N constituents is less complex than moving N+1 constituents.

My working hypothesis is that - as far as the several constructions involving the left periphery are concerned - less complex structures emerge earlier in the child's speech.

5. The data

The corpus under study corresponds to the spontaneous speech production of three children acquiring European Portuguese (EP) as L1: Marta⁷ (1;2.0-2;2.17), Sandra (2;6.3-3;5.17) and Carlota (3;6.24-4;5.19). All three children were recorded monthly at home, in the presence of their mothers. All data consist of video-recordings that were fully transcribed and coded in Chat format and analyzed within the CHILDES system (MacWhinney 1991). Imitations or repetitions of adult's utterances were not taken into consideration.

6. Results and discussion

6.1. Simple extraction: the emergence of *wh*-questions and of topicalization constructions

6.1.1. *wh*-questions at an early stage

Wh-questions are the first constructions that present a constituent that has apparently been extracted from the clausal domain. In fact, even if in EP *wh*-phrases may also occur in situ, *wh*-in situ interrogatives are absent in the early child production. All the *wh*-questions found in the youngest child's files have a fronted *wh*-word, as in (12):

- | | | | |
|------|----|------------------------------|---------|
| (12) | a. | (O) que é? | (1;2.0) |
| | | What is | |
| | | 'What is it?' | |
| | b. | O(nde) (es)tá mé-méf? | (1;4.8) |
| | | Where is lamb | |
| | | 'Where is (the) lamb?' | |
| | c. | O(nde) (es)tá mão? | (1;4.8) |
| | | Where is hand | |
| | | 'Where is (the) hand?' | |
| | d. | Quem é? | (1;4.8) |

⁷ Marta was videotaped by Maria João Freitas in the framework of the Psycholinguistics Laboratory of the University of Lisbon project PCSH/LIN/524/93, directed by Isabel Hub Faria, whom I thank for making available to me Marta's videotapes (cf. Freitas 1997). I also thank Maria João Freitas for allowing me to use her phonetic transcriptions of Marta's utterances from which I did transcriptions in Chat format.

Who is
'Who is it?'

In Soares (2003) I argued that at this stage there is no conclusive evidence suggesting that the *wh*-constituent moved to a specifier position in the left periphery. The main problem is that all post-verbal subjects attested appear in constructions with copulas, as in (12b,c). In addition, subject questions like the one in (12d) are not evidence for a CP layer either.

Several authors analyze early *wh*-movement as an instance of adjunction to VP or IP (Guilfoyle and Noonan 1988, Radford 1990, 1996). The idea is that adjunction is available to the child earlier than the CP layer. However this proposal raises a learnability problem: if early *wh*-words are adjuncts, what motivates the change to a system where *wh*-words are moved to a specifier position, as in adult language? And when does that change occur?

6.1.2. Topics

The first topicalized constituents appear later than *wh*-questions, from 1;8.18, and they correspond to direct objects, as in (13):

- (13) a. Marta: N(ã)o (es)tão dodot.
'Dodots are not here'
Marta: **Dodot** não há!
Dodot not have
'There are no dodots'
%com:she is talking about a baby towel's empty box.
- b. Marta: Este!
'this one'
%com:she takes a part of a puzzle.
Mother: ah # ainda não é daqui.
'This one does not belong here'
Marta: **Este** pôr.
This put
'I am going to put this one here'

Topicalized direct objects are not a frequent construction in the corpus. Carrilho (1994), in her study of topicalization in the spontaneous speech production of two Portuguese children from 2;0.2 to 3;3.21 reached a similar conclusion. In tables 1, 2 and 3 we present the topicalized direct objects⁸ of the files:

⁸ Topics found in our *corpus* convey 'given information'. The topicalized constituent has already been mentioned by the child or by an adult or it is salient in the extralinguistic context (as in adult language). It is also used to introduce a new topic in discourse. Moreover, topicalized direct objects in tables 1-3 were found in declarative sentences and in yes-no questions.

	1;2.0	1;3.0	1;4.8	1;5.17	1;6.23	1;7.18	1;8.18	1;10.4	1;11.10	2;0.26	2;1.19	2;2.17	Total
Direct Objects	0	0	0	0	0	0	2	3	0	2	0	0	7

Table 1. Topicalized direct objects in Marta's files.

	2;6.3	2;6.29	2;7.26	2;8.22	2;9.22	2;11.24	3;0.21	3;1.11	3;2.11	3;3.17	3;4.20	3;5.17	Total
Direct Objects	2	0	0	1	0	3	2	3	2	1	3	2	19

Table 2. Topicalized direct objects in Sandra's files.

	3;6.24	3;6.30	3;8.0	3;8.28	3;10.4	3;11.1	3;11.29	4;0.26	4;1.24	4;2.13	4;3.18	4;4.15	4;5.19	Total
Direct Objects	0	2	6	2	1	0	2	2	0	1	0	1	1	18

Table 3. Topicalized direct objects in Carlota's files.

If the emergence of object topics activates a new projection in the left periphery, TopPhrase, which hosts the left-dislocated phrase, we can conclude that the first extractions to the left periphery accomplished by the child involve a single application of *Move*.

6.2. Double extraction: topics in *wh*-questions

By the age of 1;10.4, topics and *wh*-phrases start to appear simultaneously in the left periphery:

- (14) a. O gat(o) o(nde) (es)tá ? (1;10.4)
 the cat where is
 ‘Where is the cat?’
 b. (e)sta # o que tem ? (2;1.19)
 this what has
 ‘What does this one have?’
 c. este quem é ? (2;1.19)
 this who is
 ‘Who is this one?’

However, topicalized subjects⁹ in *wh*-questions (cf. 14) are rare, even in the oldest child's files:

	1;2.0	1;3.0	1;4.8	1;5.17	1;6.23	1;7.18	1;8.18	1;10.4	1;11.10	2;0.26	2;1.19	2;2.17	Total
Subjects	0	0	0	0	0	0	0	1	0	0	2	0	3

Table 4. Marta's topicalized subjects in *wh*-questions.

⁹ I found no examples of topicalized objects in *wh*-questions, although this is possible in the adult system. For a possible explanation for this fact see Soares (in progress).

	2;6.3	2;6.29	2;7.26	2;8.22	2;9.22	2;11.24	3;0.21	3;1.11	3;2.11	3;3.17	3;4.20	3;5.17	Total
Subjects	0	0	0	0	0	2	0	1	0	0	1	1	5

Table 5. Sandra's topicalized subjects in *wh*-questions.

	3;6.24	3;6.30	3;8.0	3;8.28	3;10.4	3;11.1	3;11.29	4;0.26	4;1.24	4;2.13	4;3.18	4;4.15	4;5.19	Total
Subjects	0	0	0	0	1	0	1	0	0	0	0	0	0	2

Table 6. Carlota's topicalized subjects in *wh*-questions.

Topicalized objects (tables 1-3) emerge before topicalized subjects (tables 4-6). Marta produces her first object topics at 1;8.18 and her first subject topic at 1;10.4. This is not very conclusive since both kind of topic appear nearly at the same period. However, when we look at Sandra's files the contrast is more striking: she starts producing object topics several months before producing subject topics in *wh*-questions. Furthermore, object topics are more frequent than subject topics in the files of all three children.

Carrilho (1994) claims that structures like those in (14) are ambiguous. Since EP is a null subject language, she argues that subject topics in *wh*-questions may also be interpreted as cases of Hanging Topic Left Dislocation¹⁰. She then concludes that topics in child *wh*-questions are base-generated in their surface position, as adjuncts. However, when the object is topicalized it is assumed that there is no ambiguity and only the topicalization analysis is possible. As we saw, topicalized objects emerge before topicalized subjects and this seems to indicate that when left-dislocated subjects emerge the child is able to analyze them as cases of topicalization. It is more difficult to maintain the idea that left-dislocated subjects are understood as HTLD knowing also that these constructions do not surface before 3;5 in the corpus under study (cf. Soares in progress). This suggests that the topicalized subjects in (14) are moved from an internal sentence position.

Furthermore, I argued in Soares (2003) that the *wh*-phrases in (14) can only be analyzed as occupying a specifier position of the left periphery. It follows from this that in (14), *Move* was applied to two different constituents. Under (11) this is more complex than the application of *Move* to a single constituent, explaining why topics in questions emerge later than topics in declarative sentences.

Summarizing, these results show that (i) fronted *wh*-words arise via *Move* at least from 1;10.4, (ii) the CP domain is available in the child grammar in an early stage (Stromswold 1990, Hyams 1992, Verris & Weissenborn 1992, Poeppel & Wexler 1993), (iii) the co-occurrence of a topic and of a fronted *wh*-phrase emerges later than the simple extraction of a topic.

Another phenomenon that shows that computational complexity determines the emergence of syntactic structures entailing the left periphery is the absence of V-to-C movement in child Portuguese, as we will see in the next section.

¹⁰ For Duarte (1987) and Carrilho (1994), the empty category in the subject position may be interpreted as a *pro* (and in that case we would have a case of HTLD) or as a variable (and we would have a case of topicalization).

6.3. *No V-to-C raising to the left periphery: a preference for Merge over Move*

In Soares (2003) I showed that in EP early acquisition data, V-to-C raising is not attested. The most important argument in favor of this claim is the absence of subject/verb inversion in *wh*-questions produced by children. In fact, children's questions that have a lexical subject are always focalized questions, as in (15), even at a late stage of language development:

- (15) a. Qual é qu(e) eu vou fazer ?
 Which is that I will do
 'Which is the one that I am going to do?'
 Sandra (3;3.17)
- b. O qu(e)é qu(e) a minha mãe descobriu?
 What *é que* the my mother discovered
 'What did my mother discover?'
 Carlota (3;6.30)

I argued that the absence of head movement to the CP domain is a result of a preference for *Merge* over *Move*: merging *é que* is more economical than verb movement (Soares 2003). Since *wh*-questions presenting V-to-C movement and focalized questions are allowed in the same context in EP the fact that children only produce focalized questions shows that they chose the option that involves least movement (cf. also Hulk & Zuckerman 2000, Zuckerman 2001).

6.4. *Some more complex constructions: clefts and embedded declaratives*

The oldest child was already producing clefts and *é que* clefts when I began to videotape her at 3;6.24 and the youngest child was not yet producing these kinds of structures. I thus focus on the production of Sandra (2;6.3-3;5.17). An important fact is that in Sandra's recordings, *é que* clefts appear from 2;7.26 (cf. (16a), before clefts, which are produced from 3;0.21 (cf. (16b)):

- (16) a. A minha mãe é que vem fazer um
 The my mother is that comes to do a
 ba(r)co pa(ra) mim. (Sandra 2;7.26)
 boat for me
 'It's my mother who comes to make a boat for me.'
- b. Sou eu que quero. (Sandra 3;0.21)
 Am I that want
 'It's me who wants.'

Another significant piece of evidence is that *é que* clefts are produced at a stage where focalized *wh*-questions are also produced:

	2;6.3	2;6.29	2;7.26	2;8.22	2;9.22	2;11.24	3;0.21	3;1.11	3;2.11	3;3.17	3;4.20	3;5.17	Total
<i>Wh</i> -focalized questions	4	0	3	2	1	1	2	0	1	2	24	56	96

Table 7. Focalized *wh*-questions in Sandra's files.

These facts suggest that there is a correlation between the emergence of focalized *wh*-questions on the one hand and the emergence of *é que* clefts, on the other. This also suggests that both constructions have a similar syntactic structure. Also, clefts and embedded sentences emerge later than *é que* clefts and at about the same period. The first embedded sentence with a lexical complementizer is produced at 2;9.22.

The late emergence of embedded declaratives calls for an explanation. We saw that there are strong arguments to say that the child's grammar does not lack CP; *wh*-questions that present a topicalized constituent (from 1;10.4) and focalized questions (from 2;6.3) are strong arguments in favor of this claim. Therefore, the absence of embedding before 2;9.22 may not correlate with a functional deficit in the child's grammar. Additionally, the child is able to produce declarative complementizers in answers to *wh*-questions, for instance, before producing embedded sentences:

- (17) ADU: O que é que disseste?
 'What did you say?'
 CHI: Que ab(r)i isto.
 That (I) openedthis (Sandra 2;6.3)

The example in (17) strongly suggests that the production of complementizers is dissociated from the emergence of embedding in EP.

The late emergence of clefts also needs to be explained. We saw in § 2.3. that clefting is a strategy to encode identificational focus in EP. However, I would like to argue that the unavailability of clefts in the early stages of language acquisition cannot be explained by the failure to encode identificational focus, which expresses exhaustive identification (E. Kiss 1998), by children. In fact, before producing clefts children know how to express exhaustive identification. An argument supporting this idea is the fact that children are able to produce *é que* clefts earlier (from 2;7.26). A second argument is that children also produce a structure very similar to clefts in a very early period of language acquisition: answers to *wh*-questions introduced by *ser* ('to be'), as in (18):

- (18) ADU: Quem é que te deu esta prenda?
 'Who gave you this gift?'
 CHI: Foi a João.

Be-PAST the João.

(Marta 2;1.19)

In fact, in EP two kinds of answers to *wh*-questions are possible:

- (19) A: Quem leu o livro?
 ‘Who read the book?’
 B: **A Maria.**
 ‘Mary.’
 B’: **Foi a Maria.**
 Be-PAST the Mary

However, the exhaustive reading is available only when the constituent in the answer is preceded by an inflected form of *ser* (‘be’). The point I wish to make is that children are aware of this contrast when they start to produce answers introduced by *ser* (‘to be’), from 2;1.19. Furthermore, at this period they have enough syntactic knowledge to encode identificational focus in answers to *wh*-questions. I suggest that in order to accomplish the derivation of embedded sentences and clefts children have to deal with a more significant level of complexity. Embedded declaratives and clefts clauses correspond to CP domains but are dependent CP domains, for instance, they are tense-dependent clauses. In root *wh*-questions and in *é que* clefts, we expect C° to contain specifications concerning the clausal type. In embedded declaratives and in cleft clauses, C° most likely contains specifications that account for its dependent nature. And this constitutes an additional source of complexity for the child.

7. Conclusions

In this paper I have argued that the emergence of different syntactic structures entailing the left periphery is determined by the complexity of the syntactic computation, which is essentially characterized in terms of the nature and number of operations involved in a derivation. An important finding is that the production of complementizers is dissociated from the emergence of embedding in EP. Furthermore, it was demonstrated that there is a correlation between the acquisition of focalized *wh*-questions and *é que* clefts. Additionally, it was argued that language acquisition data from EP do not support the standard syntactic analysis of Portuguese clefts and *é que* clefts (Costa & Duarte 2001).

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Semantics and pragmatics in the derivation of aspectual readings in Russian

Barbara Sonnenhauser

Natural language expressions are generally underspecified and need specification of different kinds to get a contextually relevant interpretation. One instance of underspecification is the imperfective aspect in Russian, which gives rise to a considerable variety of readings. This poses certain problems for an account in purely semantic terms: What is the common denominator of all these interpretations? Is there a systematic way to derive the different readings? To answer these and related questions, this paper proposes an account in more pragmatic terms based on a “selectional theory” of aspect.

1. General embedding of the problem

Information extraction is an increasingly significant research area within computational linguistics, developed primarily to cope with the growing amount of information provided by the internet. Temporal information is of special importance as regards applications like text summarization or question-answering systems, where the localization of events in time and the relations obtaining among them are of considerable importance. This information is partly lexically given, but to a certain degree also relies on non-linguistic sources.

Interesting in this respect are aspecto-temporal forms in Russian that are known for their highly underspecified nature. They allow for the induction of temporal and further, rather specific readings (cf. *table 1*), which are the result of an interplay of lexical semantic information provided by the predicate, markers of grammatical aspect (ipf.¹ selects phases, pf. boundaries), of local lexical as well as discourse level information and information induced by pragmatic principles. Accordingly, the main problem with grammatical aspect in Russian, in particular with the ipf. aspect, consists in finding some invariant meaning for the markers and deriving and computing the contextually relevant readings.

¹ ‘ipf.’ = imperfective aspect; ‘pf.’ = perfective aspect

This paper is organized as follows: Section 2 illustrates the variety of readings of the ipf. aspect and points out a possible system behind this diversity. The semantic framework for the characterization of aspect assumed in this paper – a ‘selectional’ theory of aspect – is illustrated in section 3. Section 4 sketches some general pragmatic principles and applies them to the derivation of aspectual readings, section 5 offers a short conclusion.

2. Aspectual readings in Russian

2.1 The problem

Facing the huge variety of aspectual readings in Russian, especially as regards the ipf. aspect, the following questions arise: What is the common denominator that justifies the subsumption of certain linguistic phenomena under the heading of “grammatical aspect”? Considering the multitude of readings, do we have to claim aspect to be grammatically polysemous or is there one invariant meaning behind those different uses – language internally as well as cross-linguistically? And, finally, are there any regularities in the derivation of those readings? The following examples illustrate the problem:

(1) *Actual-processual reading*

Šar medlenno podnimal'sja.
Balloon slowly ascend:PAST:ipf
'The balloon was ascending slowly.'

(2) *Inactual reading*

Ran'she on rabotal v universitete.
In the past he work:PAST:ipf at university:LOC.
'He used to work at university.' (= 'He was a teacher at university.')

(3) *General-factual reading*

Vot na ètoj stene visela kartina.
There at that wall:LOC hang:PAST:ipf painting.
'There was a painting hanging on that wall.'

(4) *Durative reading*

Ona dolgo smotrela na fotografii detej.
She for a long time look:PAST:ipf at photographs:ACC children:GEN
'She looked at the children's photos for a long time.'

(5) *Habitual reading*

Ja chorošo vspominajo o deduške: on guljal so
I well remember:PRES:1Sg:ipf grandpa he take a walk:PAST:ipf with
vnukami, s nimi igral v futbol, kuril trubku, ...
grandchildren with them play:PAST:ipf football smoke:PAST:ipf pipe ...

‘I remember grandpa very well: he used to go for a walk with the grandchildren, to play football with them, to smoke a pipe...’

(6) *Potential reading*

Chorošij byl slesar': ljubye zamki otkryval.
 Good PAST locksmith: every lock:PI open:PAST:ipf
 ‘He was a good locksmith: he could open every door.’

(7) *Atemporal reading*

Železo tonet v vode.
 Iron go down:PAST:ipf in water:LOC
 ‘Iron sinks in water.’

These examples show that lexical and grammatical information provide only part of the inputs required for interpretation and that, accordingly, a purely semantic account is not enough. What is needed is more pragmatics.

2.2 Towards a system behind the different readings

The readings in (1)-(7) are only some of the readings proposed for the ipf. aspect, often in an unsystematic way by merely listing them. This leads to a quite chaotic and confusing picture. Padučeva (1996) makes a first, very coarse classification into three groups, distinguished by their respective *točka oisčeta* (“point of view”; henceforth TO), an aspectual reference point that she claims to be similar to Reichenbach’s reference time. This TO may be synchronous (normal or overlong) or retrospective (cf. *table 1*) and is not to be understood as a point, as the term might suggest, but rather as an interval at which the validity of the event, or some relevant part of it (the part selected by the ‘topic time’, see below), respectively, is asserted.

Klein (1994, 1995) defines aspect in temporal-relational terms as the relation between a topic time TT – the time for which an assertion is made – and the situation time T-Sit. For the unmarked Russian ipf. Aspect, which is rather an ‘non-perfective’ aspect as it may express anything but the perfective value, there are three possibilities of that relation:

- (8) a. TT is included in T-Sit
 b. TT includes T-Sit
 c. TT is simultaneous with T-Sit

The relation between TT and T-Sit characterizes the properties the ipf. aspect may acquire in interpretation.² The function of aspect thus is to make

² That we have indeed to distinguish between these three possibilities is indicated by a look at Turkish, which has morphological means to express the respective relation, cf. Sonnenhauser 2003.

visible a certain part of the event, and that part is asserted to hold at a certain interval of time, namely TO. *Table 1* summarizes these assumptions:

	Reading of the ipf. Aspect	TO	Relation
I.	Actual-processual, iterative	synchronous, normal	TT included in T-Sit
II.	general-factual, durative, iterative	retrospective	TT includes T-Sit
III.	habitual, inactual/continuous, potential, permanent, atemporal	synchronous, overlong	TT simultaneous with T-Sit

Table 1: classification of the readings of Russian ipf. aspect

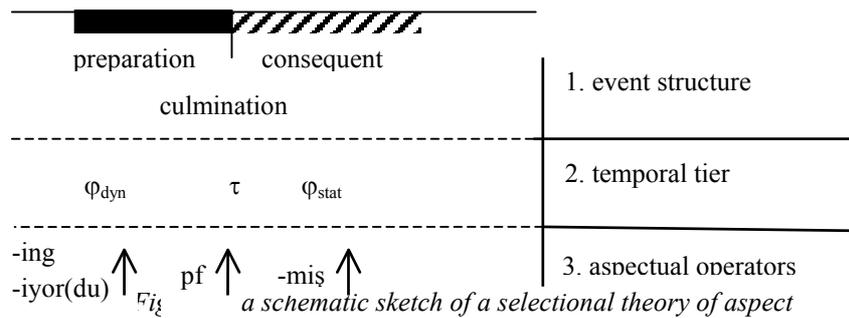
What becomes evident by Klein's definition of is that we can indeed posit one definite meaning for the ipf. aspect (the three relations), a fairly abstract one that has to be specified in the course of interpretation. This is one argument against treating the ipf. aspect as an instance of grammatical polysemy, and an argument in favor of regarding it as 'sense-general' in the sense of Atlas (1989). The utterance meaning of the respective sentences therefore remains underspecified and has to be enriched pragmatically (cf. Carston 2002).

3. A selectional theory of aspect

Before actually turning to the pragmatic processes, some remarks on the semantic framework have to be made. In this paper, a so-called 'selectional theory' of aspect is assumed (cf. Johanson 1971; Bickel 1996), where aspectual markers are understood as selectors of phases or boundaries, which constitute the decisive units for aspectual selection and are located on a special level of the predicate's semantic representation, at the "temporal tier" (Bickel 1996).³ As has been shown above, the value of the aspectual marker can be defined in a temporal-relational way, namely as the relation between the situation time T-Sit and the topic time TT, whereby the notion of situation time has to be refined in order to distinguish the differences between the various interpretations of the ipf. aspect. TT selects a certain part of the event, which prototypically constitutes a tripartite structure (Moens & Steedman 1988) of preparation phase (dynamic phase φ_{dyn}), culmination point (boundary τ) and consequent state (static phase φ_{stat}). Selection is to be understood as making the selected part of the event visible and thus accessible for truth-conditional evaluation at a certain interval of time, which corresponds to Padučeva's TO and may be located 'within' (synchronous) that selected part or not within it (retrospective). Selection does not mean cutting off the non-selected parts of the event; they are rather presupposed or left to implicatures. *Figure 1* summarizes these assumptions and shows some aspectual markers and the part of the event they

³ There are of course more elements that play specific roles in deriving verbal meanings, but as regards aspect, it's only phases and boundaries that are relevant.

explicitly select (as they are the marked members of the respective aspectual oppositions): the English progressive *-ing* and the Turkish *-iyor(du)* both select the dynamic phase, the Turkish *-miş* explicitly selects the static phase and the Russian pf. aspect is a selector of a boundary:



a schematic sketch of a selectional theory of aspect

Figure 1 shows only the marked members of the respective aspectual oppositions. This does not imply that the unmarked forms are semantically empty; they are rather sense-general (see section 2.2) and their meaning has to be specified, and can be specified, in the course of interpretation, e.g. by pragmatic means like Q-inferences (see below, section 4.2).

Such a selection theoretic approach to aspect has certain advantages. The classification of verbs in terms of combinations of phases and boundaries that may be part of the semantic representation of the verb, emerge as the result of VP-composition or may be pragmatically induced, makes the question of class-affiliation to one of the Vendler-classes irrelevant – at least as regards issues of grammatical aspect.⁴ Accordingly, ‘coercion’ or ‘recategorization’ phenomena can be captured by simple composition – semantically or pragmatically achieved. No combinations of verbal base and aspectual selector are excluded a priori, as appears to be the case with Vendlerian approaches that classify verbs according to their internal temporal properties and exclude, e.g., the application of the progressive marker to stative verbs, thereby disregarding the effect of pragmatic markedness, namely to trigger recategorization. Presuming cooperativity, hearers always try to make sense out of what speakers produce and therefore tend to accommodate the context accordingly. This can be captured by the semantic assumptions presented here, which also avoid the difficulty of how to classify verbs like *eat* and *eat a cake* (cf. Carlson 2000). The argument structure of a verb is not fixed before interpretation; the lexical entry is underspecified as regards verbal arguments (cf. Marten 2002). Furthermore, this approach captures the relevant factors for aspectual computation and interpretation at a fairly abstract level, thus allowing for cross-linguistic generalisation and comparison and capturing common cross-linguistic features of the grammatical category of aspect.

⁴ A classification in terms of Vendler's distinctions is problematic for some languages, e.g., for Turkish, as has been shown by Johanson 1971.

4. Pragmatics

Pragmatics here is to be understood as “taking context into account in a principled way” (Bunt 2000: 25). This definition of pragmatics raises several questions. First of all, what is context? The notion of context is used in a number of different ways,⁵ and it seems to be anything but clear what is to be understood by that term. Here, context means linguistic factors on different levels (the word level, sentence level and discourse level) as well as conceptual factors pertaining to common-sense knowledge – something that computational linguists attempt to minimize as much as possible and to reduce it to factors of local lexical information in order to provide well-defined input factors for the algorithms. Second, how is context to be taken into account? In computational linguistics, this is mainly achieved by certain algorithms that compute the relevant factors in specific mathematical ways (cf. the “context-scanning strategy” as implemented by Vazov & Lapalme 2000). And as to the principles involved, these are taken to be the heuristics proposed by Levinson (2000) which are based on the Gricean Maxims of Conversation and relevance-theoretic assumptions (Wilson & Sperber 1995; Carston 2002).

The main concern of this paper are the principles involved in computing aspectual readings and they will be introduced in more detail below, before actually applying them to the interpretation of aspectual forms. Although the two main directions within pragmatic theory mentioned above – Gricean/Neo-Gricean pragmatics and Relevance Theory – are commonly understood as standing in competition to one another, the most promising way is to combine them. If their different orientations (audience-related vs. speaker-related) are taken into account, it becomes obvious that both approaches rather complement one another (Saul 2002).

Levinson (2000) posits three heuristics – default rules for interpretation – that are based on Gricean Maxims of Conversation and are labelled after the maxim they are derived from: Q-inferences are based on the first quantity maxim (“make your statement as informative as possible”) and license inference to the negation or invalidity of a stronger interpretation, M-inferences stem from violations of the manner maxim (esp. “avoid obscurity of expression” and “avoid prolixity”), and license the inference from marked expressions to marked interpretations. I-inferences are based on the second quantity maxim (“do not say more than necessary”) and allow for inference to a stereotype.

What is not captured by this account is, that the principles at work apply at different levels, namely at the level of logical form (explicatures) and at the propositional level (implicatures) – a central assumption of relevance theory. I- and M-inferences could be said to be derived at the former level and thus to constitute instances of explicatures, whereas Q-inferences are candidates for

⁵ For an overview of the concept of context in various fields in AI see Akman & Surav 1996.

“true” implicatures in the Gricean sense insofar as they are meta-linguistic in that they rely on form alone without taking into account lexical semantics. The heuristics and their inferences can be distinguished according to the input they need to be derived. Q-inferences rely on formal expression alone (here: aspect marker), M-inferences take the form as well as the lexical semantics of the item they are applied to (here: aspect marker plus aspectual class of the verb) and I-inferences additionally require further local-linguistic information, information about the discourse mode and knowledge about stereotypes.

To obviate getting involved in the theoretical discussion concerning the debate on “what is said” vs. “what is implicated” and the like, I will henceforth speak of Q-, I- and M-*inferences*, thus abandoning the terminologically heavily loaded term “implicature”.⁶

In computing aspectual readings, different factors located at different levels have to be kept apart (cf. Nakhimovsky 1988: 33). Those levels provide the application domain for the different inferential mechanisms sketched above: the VP-level or level of aspectual class as the domain of M-inferences, the IP-level or level of grammatical aspect as the domain of Q-inferences and, finally, the level of aspectual perspective or discourse modes as the level of I-inferences. What is important to note here is that the order of the levels described does not implicate an order in derivation of inferences; they rather interact in mutual parallel adjustment. This interaction might be captured within the framework of bidirectional optimality theory (Blutner 2000; Dekker & van Rooy 2000) or game theory (Parikh 2000; 2001), but this is beyond the scope of this paper.

The application of these principles on the derivation of aspectual readings in Russian will be discussed in the following section.

4.1 Q-inferences: level of grammatical aspect

Q-inferences are involved in deriving the meaning of unmarked forms in giving rise to scalar implicatures. Levinson (2000: 82) defines scalar implicatures in terms of entailment, i.e. as expression alternates that are equally lexicalized items out of the same semantic field, whereby the stronger one unilaterally entails the weaker one. The notion of entailment is too strong and is neither a sufficient nor a necessary condition for scalar implicatures,⁷ and a definition of scales as ordered sets of semantic concepts, standing in a salient opposition, being lexicalized or grammaticalized to the same degree and having the same degree of currency or prolixity (Bickel 1996: 14) is more plausible.

The notion of “salient opposition” is difficult to capture, but what is basically understood by this term here is that the elements of such an

⁶ Furthermore, the pragmatic principles mentioned seem to contribute to the propositional meaning, and thus are rather close to explicatures in the relevance-theoretic sense.

⁷ See Hirschberg 1991 for a detailed analysis of scalar implicatures and the difficulty of finding an adequate definition for them, partly due to their context-dependency. What all classes of scalar implicatures share are the characteristics of the class of partial ordering relations, that might be subsumed under a general poset condition.

opposition are from the same semantic field – ‘perfectivity’ in our case – and that they differ from one another in only one feature parameter. This opens up the possibility of a twofold interpretation of scalar orderings: first, as one element unilaterally implying the other, and secondly, as one element having one feature more than the other. The second interpretation is the one that captures the relations of the Russian aspects: the pf. aspect has one feature more, namely the feature of explicit boundary-selection. Thus the scale for the perfectivity field in Russian is <pf, ipf>. If the speaker decides to use the weaker element of the scale, the hearer infers from that the invalidity of the stronger expression. Whereas the use of the pf. aspect explicitly marks the selection of a boundary, the use of the semantically weaker ipf. aspect does not exclude the selection of the boundary. As a consequence, the use of the ipf. aspect gives rise to the three relations mentioned above (8a-c). In interpreting utterances, obviously, it is important what has not been said and that the information about the possible alternates is common knowledge between speaker and hearer (cf. Parikh 2000).

In the case of Russian, the pf. aspect as the marked member of the aspectual opposition functions as an explicit selector of boundaries, whereas the unmarked ipf. aspect does not make any commitments in that respect thus giving rise to the possible relations mentioned in (8a-c). To illustrate this point, let’s have a look at the following examples:

- (9) a. On napisal nekotorye slova arabskimi bukvami.
 He write:PAST:pf some words Arabic:INSTR letters:INSTR
 ‘He wrote some words in Arabic letters.’
- b. On pisal nekotorye slova arabskimi bukvami
 He write:PAST:ipf some words Arabic:INSTR letters:INSTR.
 ‘He was writing/could write/usually wrote/wrote some words in Arabic letters.’

In (9a) the pf. aspect explicitly selects the boundary, a selection meaning focussing, foregrounding or explicitly asserting it. That is, the relation TT – T-Sit crucially has to include the “transition bounds” (Passonneau 1988), or the culmination point, respectively. The sentence (9a) thus receives a reading of totality or completedness and allows for the advancement of narration. Note that the ‘totality’ reading does not arise due to the aspectual marker alone, but rather as consequence of the interaction between verbal stem and prefix, and the contribution of the aspectual marker.

The ipf. aspect as the unmarked member of the opposition allows for any relation TT – T-Sit, as long as it does not contain a common subinterval with the consequent state, and is not constrained to the selection of the culmination point. Accordingly, the ipf. aspect may give rise to three possible relations, reflected in the different interpretations of (9b):

- (10)a. TT is included in T-Sit ('was writing')
 $\rightarrow TT \subset \varphi_{\text{dyn}}$
- b. TT includes T-Sit ('wrote')
 $\rightarrow TT \supset \varphi_{\text{dyn}} \tau \varphi_{\text{stat}}$
- c. T-Ast is simultaneous with T-Sit ('could write/usually wrote')
 $\rightarrow TT = \varphi_{\text{dyn}} \tau \varphi_{\text{stat}}$

This is the refined version of (8a-c) above, substituting the rather general term T-Sit for the respective parts of the event that are made visible by the aspectual marker. The first relation, where TT is included in T-Sit, gives rise to the reading "he was writing". If TT fully includes T-Sit, this yields the reading "he wrote" and whenever TT is simultaneous with T-Sit, one gets readings of non-actual reference like habitual or potential readings. Note that the inclusion of T-Sit in TT (10a) is different from the pf. aspect insofar as it does not make any explicit statement concerning the selection of boundaries and thus cannot be used for the advancement of narration.

4.2 M-inferences: Aspectual class

At the level of aspectual class, M-inferences come into play. In the aspectual domain they occur with mismatches between aspectual selector and verbal basis, i.e. with the application of a phase or boundary selector on a basis that does not provide the respective feature. This feature may be induced by semantic composition, or it may be induced pragmatically. This enrichment of logical structure is restricted by the conceptual knowledge about prototypical events that consist of a tripartite structure <preparation phase – culmination point – consequent state> (Moens&Steedman 1988; Passonneau 1988). The process of modification of the base eventuality can take place within these conceptual boundaries that provide the basis and frame for pragmatic inference processes. M-inferences can be systematically captured and formalized by 'coercion operators' as proposed by Pulman 1997. Insofar as the interpretation process here affords more efforts, such predicates can be said to be marked. Let's have a look at some examples to illustrate this point.

- (11)a. Ivan vyigral gonku.
 Ivan win:PAST:pf race:ACC
 'Ivan won the race.'

Here, the pf. aspect is applied to a verb that provides a boundary in its semantic representation, and therefore no interpretational rearrangements are necessary.⁸

⁸ This is in fact an "Aktionsart-verb" (understood in the Slavistic tradition, i.e. as modifier of the basic lexical meaning of the verb) derived from the simplex verb *igrat* 'to play'. As Aktionsart-verbs do not constitute aspectual partners of their ipf. base verb, but rather new lexical

- b. Ivan vyigryval gonku (četyre raza).
 Ivan win: PAST:ipf race:ACC four times.
 ‘Ivan won the race four times / was winning the race.’

The application of the ipf. aspect in (11b) requires the induction of a phase, but as the verb ‘vygrat’ (to win) does not provide one, it has to be induced by iteration or by ‘zooming in’ on the preparation phase. The coercion operators proposed by Pulman (1997) would be ‘*iterate/stretch: point → process*’.

- c. V vosem časov ona uže vyšla.
 At eight o'clock she already leave:PAST:pf
 ‘At eight o'clock, she had already left.’ (= she was gone)

For the consequent-state reading in (11c), a boundary has to be present or induced for the pf. aspect to apply and select that boundary. It is important to note that in Russian, the induction of a phase cannot be achieved by pragmatic means alone (Bickel 1996) but requires a prefix that creates the necessary semantic representation. So, first the prefix has to be added and only after that the pf. aspect can apply. The consequent-state reading arises due to the particle *uže* ‘already’. The coercion operator here is “*add-cstate: X → <X, state>*, where *X* is point or process”.

- d. On rešal zadaču.
 He resolve:PAST:ipf exercise:ACC
 ‘He was resolving / tried to resolve / resolved the exercise.’

Here, the ipf. aspect is applied to a simplex pf. verb, which requires the induction of a phase. If TO is retrospective, the event is stated as a fact and we get the general-factual reading (with explicit external bounds imposed by temporal adverbials, we would get the durative reading). If TO is synchronous, TT is placed within that phase, which would yield the actual-processual reading or conative reading.

So while the ipf. applied to a simplex pf. verb is marked morphologically, with suffixes like *-a-* as in *rešat* (‘solve’), derived from *rešit*; or *-yva-* as in *otkryvat* (‘open’), derived from pf. *otkryt*, as well as concerning interpretational effort, the unmarked semantic status of the ipf. aspect is not affected.

What is important to stress here is the interactive character of the interpretation of the complete verbal form: at the VP-level, the level of aspectual class, the input for the grammatical aspect is fixed, but when it does not meet the requirements of the selector located at the IP-level, compositional semantic or inferential pragmatic processes of eventuality-type modification

items that do not stand in a purely aspectual relationship to the verb they are derived from, *vyigrat* can be regarded as base verb from which an aspectual partner can be derived by means of secondary imperfectivization, cf. *vyigrivat* in (11b).

have to come into play. This is not incremental step-by-step reasoning, but rather constitutes an instance of what Wilson&Sperber (1998b) call a “process of parallel adjustment”.

4.3 I-inferences: enrichment of lexical meaning

As indicated above, TO is fixed at this level, whereby the possible readings are constrained to one of the three groups of *table 1*. But within these groups one can further distinguish more specific readings, that have to be derived mainly by recourse to conceptual knowledge that facilitates inferences to stereotypes. Lexical representations function as pointers to encyclopedic concepts that provide the basis as well as the frame for processes of lexical enrichments. As concepts encountered frequently are more likely to get activated, they can be understood as constituting the stereotypes to which I-inferences are drawn, all the more as their activation requires less efforts in deriving a contextually-relevant interpretation.

Glovinskaja (1982: 47-59), who is primarily concerned with the actual-processual, the habitual and the potential reading of the ipf. aspect, states that native speakers of Russian tend to rank these readings as follows: the preferred reading of an ipf. sentence⁹ is the actual-processual, followed by the habitual and the potential readings. This ordering is of course heavily context-dependent and can easily be overridden by conceptual knowledge, as illustrated by the following examples:

- (12)a. Moj otec govoril po-turecki.
My father speak:PAST:ipf Turkish
▪ possible readings: actual-processual, habitual and potential
▪ preferred ranking: potential > actual-processual > habitual
'My father could speak Turkish.'
- b. Perevodčik govoril po-turecki.
Translator speak:PAST:ipf Turkish
▪ possible readings: actual-processual, habitual and potential
▪ preferred ranking: actual-processual > habitual > potential
'The translator was speaking Turkish.'

The concept of speaking a language makes the assumption of “being able to speak a certain language” highly accessible, so this is the first interpretation to be reached by minimal interpretational efforts. As in (12a) this interpretation also meets the principle of relevance, all other possible interpretations are dismissed. This is quite different with (12b), where the potential reading would sound rather odd, somehow redundant, for the conceptual knowledge of “translators” strongly implies that they can speak a certain language – that’s simply their job. So the potential interpretation would not be relevant and other

⁹ presumably uttered out of the blue; otherwise all three readings would not be equally possible

interpretations are looked for. Here, the actual-processual one would be the next one to reach. Of course, the potential reading is not excluded; it just needs a context that would make it relevant:

- c. Perevodčik govovil i po-turecki.
 Translator speak:PAST:ipf also Turkish
 ‘The translator could also speak Turkish.’

Insertion of *i* ‘also’ marks the knowledge of Turkish as something additional to the presupposed abilities of the translator, who might be a translator for Russian and English, but also understands some Turkish. And this provides the adequate context for the potential reading.

5. Conclusion

In this paper I have tried to state the common denominator of ipf. aspect in Russian and to fix some of the relevant factors for deriving and computing aspectual readings in Russian. The former can be captured by the Q-inference derived from the scale <pf.; ipf.> (section 4.1). Among the input factors for applications are the following: verbs indexed for the phases and the boundaries they contain and lexical items indexed for whether they add phases (like temporal adverbials or adverbials indicating iteration) or boundaries (e.g. prefixes or certain direct objects). Aspectual selectors have to be indexed for what they select and for their status within the language-specific markedness relation within the relevant semantic field. That is how Q-inferences can be formally captured and computed. To constrain the interpretations of the unmarked aspectual partner, TO has to be fixed. This means that one has to search for lexical hints that serve to specify that TO and assign temporal values to them.

More difficult is the problem of how to specify verbs for the commonsense knowledge they provide access to, which is indispensable in order for I-inference to be drawn. One of the means to achieve this would be extensive corpus analysis to detect certain regularities and co-occurrences of lexical items that might hint at a conceptual connection.

It is also important to state the default combinations of base and selector and rules for resolving the mismatches. M-inferences then can be pinned down by coercion operators as proposed by Pulman (1997).

Generally, the selectional-theoretic assumptions and the pragmatic principles described are assumed to be cross-linguistically valid. Their concrete realization and contribution depends on language-specific grammatical and lexical features that have to be taken into account to systematically flesh out the semantic and pragmatic skeleton presented here. Languages differ in their respective contribution of semantics and pragmatics. Without a principled

account of pragmatic – i.e. inferential – principles, applications in natural language processing will necessarily fail.

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Distributivity and specific indefinites

Benjamin Spector

In this paper, I study the interactions between the semantics of specific indefinites and the mechanisms that achieve distributivity. I argue that by assuming i) that specific indefinites can be interpreted as denoting skolemized choice functions, ii) that there are two distributivity operators (one that applies to predicates and one that applies to individual denoting expressions) and iii) that Chomsky's (1995) extension condition holds, one can account for the distribution of *dependent readings* for specific indefinites and some of the differences between quantifiers regarding their ability to take "inverse-scope". I also account for some previously unnoticed differences between implicit variables and pronouns with respect to binding.

1. Introduction

A sentence such as (1) has a reading according to which Pierre and Jean may have read a different book each, without there being any book read by both Pierre and Jean:

- (1) Pierre et Jean ont lu un livre
Pierre and Jean have read a book

Beghelli & Stowell (1997) claim that this reading is compositionally derived from the presence of a covert floating quantifier; in their view, the semantic mechanism giving rise to that reading is the same as in (2):

- (2) Pierre et Jean ont chacun lu un livre
Pierre and Jean have each read a book

This view, however, cannot be correct, as shown by the following contrast:

- (3) Pierre et Jean ont lu un certain livre
Pierre and Jean have read a certain book
(a) available reading: a single book was read by the two
(b) *non-available reading: possibly a different book for each

- (4) Pierre et Jean ont lu chacun un certain livre
 Pierre and Jean have read each a certain book
 (a) available: a single book was read by the two
 (b) available: possibly a different book for each

(3) and (4) show that, contrary to Beghelli & Stowell's claim, the presence of a floating quantifier is not just a matter of phonetic realization, since it makes possible a reading ((4)b) not possible without it ((3)b)¹.

In this paper, I will account for this contrast and related data on the basis of an analysis of a) the semantics of specific indefinites (i.e. indefinite DPs of the form *un certain NP*) and b) the grammatical mechanisms that underlie distributivity. This analysis will turn out to make correct predictions with respect to the availability of inverse-scope readings and the interpretation of certain definite descriptions.

2. Specific indefinites as (skolemized) choice functions.

In the past years, several authors (Reinhart 1997, Winter 1997, Kratzer 1998, Mathewson 1998, Chierchia 2001) have suggested that specific indefinites denote *choice functions*. A choice function is a function which, when applied to a non-empty set, returns a member of that set.

This assumption enables us to predict that specific indefinites can take "long-distance" scope. For instance, (5) below has a reading which amounts to (5)a, in which the indefinite seems to scope over the if-clause, e.g. a scopal island. This reading is straightforwardly predicted by the choice-function account, which, at an informal level, gives us something like (5)b, paraphrased as (5)c.

- (5) If a certain professor is talking, Peter will go to the conference
 a. There is a professor such that, if he is talking, Peter will go to the conference
 b. If $f(\text{professor})$ is talking, Peter will go to the conference
 c. If the professor that is selected by the contextually determined choice-function f is talking, Peter will go to the conference²

The choice-function hypothesis, as such, can only predict readings in which the specific indefinite behaves as if it took maximal scope. Yet it has been

¹ Following standard practice, all the judgements given here are meant to be contrastive. Even though, for some speakers, the intended reading is not completely out for (3), it seems in any case to be much harder to get than it is with (4), and to require much more contextual clues.

² How the choice-function in question is in fact determined is far from clear. The function must in some sense depend on 'what the speaker has in mind' when using a specific indefinite. Everything I say in this paper is in fact compatible with an alternative analysis where the specific indefinite is a choice-function variable bound by an existential quantifier taking scope over the entire sentence, but with no possibility to bind it from an intermediate site, contrary to Reinhart (1997).

clearly established that specific indefinites can take “intermediate scope”, i.e. they sometimes escape a scopal island while remaining at the same time within the scope of some higher operator. Reinhart (1997) argued that in order to account for this type of reading, one has to treat specific indefinites as denoting *choice-function variables* that need to be bound by an existential quantifier which can be inserted at different sites, *not necessarily at top-most level*. (6) below illustrates the phenomenon of “intermediate scope”, with (6)a being the relevant reading, analysed by Reinhart as (6)b (existential closure above *every solution*, but below *every linguist*):

- (6) Every linguist studied every solution that could solve a certain problem
- a. For every linguist y , there is a certain problem z , such that if w is a potential solution for z , then y studied w
 - b. For every linguist y , there is a choice function f , such that if w is a potential solution to $f(\text{problem})$, then y studied w .

Other authors have suggested that instead of resorting to existential closure at an intermediate site, one should rather account for these readings by assuming that specific indefinites can also denote *skolemized choice-functions*. A *skolemized choice function* (cf. Kratzer 1998, Mathewson 1998, Chierchia 2001) is a function that applies to two arguments, a set and an individual, and which returns a member of the set –possibly a different one for different individuals. The individual argument can be a bound variable. On this account, (6), on the intended reading, has the following (informal) representation :

- (6) c. $\forall y (\text{linguist}(y) \rightarrow \forall w (w \text{ could solve } f(\text{problem}, y) \rightarrow y \text{ studied } w))$

Under this view, the reading in (6)a, where the problem varies with the linguists, is not accounted for in terms of the relative scope of the universal quantifier and an existential quantifier, but in terms of a hidden operator-variable dependency. The choice-function itself, like a definite description, is essentially scopeless. This assumption somehow amounts to viewing specific indefinites as *implicit definite descriptions that can contain a bound variable*, an idea that gains some initial plausibility from the following example by Hintikka (1986):

- (7) According to Freud, every man _{i} wants to marry a certain woman – his _{i} mother

Whether or not we want to allow intermediate existential closure of choice-function variables *à la* Reinhart,³ there exist readings that cannot be predicted by using only this mechanism. Consider indeed the following scenario:⁴ *John*,

³ Chierchia (2001) argues that both skolemized choice-functions and Reinhart’s intermediate existential closure are necessary in order to account for all the uses of specific indefinites.

⁴ Philippe Schlenker, p.c.

Peter and Mary are students about to take a syntax exam. John hasn't understood what wh-movement is; Peter is unfamiliar with WCO, and Mary with Principle C. In order for the exam to be a success, each of them should study the topic he is unfamiliar with. With this in mind, one could describe the situation as in (8)a, or more explicitly, as in (8)b:

- (8) a. If every student studies a certain topic, the exam will be a success
 b. If every student studies a certain topic --namely, the one he is unfamiliar with--, the exam will be a success

On the intended reading, topics vary with students, but not arbitrarily. For the exam to be a success, it is not sufficient that every student studies whatever topic he likes; rather, each student should study *the* topic *he* is unfamiliar with. In such cases, I will say that the specific indefinite is interpreted as *dependent* on the universal quantifier. Existential closure *à la* Reinhart below *every student* only gives us (8)c, which is equivalent to (8)d, and is therefore clearly too weak.

- (8) c. If for every student x , there is a choice-function f such that x studied $f(\text{topic})$, the exam will be a success.
 d. If for every student x , there is a topic y that x studied, the exam will be a success.

What needs to be captured is the fact that while topics vary with students, which topic each student should study *depends* on the student in a specific way. The intended reading is paraphrased in (8)e:

- (8) e. There is a way of associating each student S with a topic T_s such that if every student S studies T_s , then the exam will be a success.
 f. If every student S studies $f(\text{topic}, S)$, the exam will be a success.

(8)e is in fact what we get by analysing the specific indefinite as denoting a skolemized choice-function whose individual argument is a variable bound by the universal quantifier, as in (8)f. I am therefore going to assume that specific indefinites can always denote contextually determined skolemized choice-functions (as well as non-skolemized ones).

3. A second puzzle

An interesting observation, which is connected to the puzzle with which I started is that specific indefinites cannot be dependent on every quantifier.

- (9) If many students study a certain topic, the exam will be a success
 (a) There is a certain topic --for instance wh-movement- such that if many students study this very topic, the exam will be a success.

(b) (impossible reading) *There is a way of associating students with topics such that if there are many students who each study the topic associated to them, the exam will be a success

(10) If all the students study a certain topic the exam will be a success

(a) There is a certain topic –for instance wh-movement- such that if all the students study this very topic, the exam will be a success.

(b)*There is a way of associating students with topics such that if all the students study *their* topic, the exam will be a success

This contrast among quantifiers (every, each vs. many, all) is similar to the one exemplified by (11) and (12) below, which is itself reminiscent of our initial contrast between the two sentences in (3) and in (4) -- since in both cases, insertion of a floating quantifier makes available a reading in which the specific indefinite is somehow dependent on the quantifier.

(11) If Pierre and Jean have **each** read a certain book, the exam will be a success

(12) If Pierre and Jean have read a certain book, the exam will be a success

The following reading is available for (11) but not for (12): “There is a way of associating Pierre on the one hand, and Jean on the other hand, with a book (possibly different ones for each) such that if Pierre and Jean have each read the book associated with each of them, the exam will be a success”. From now on, I will say that in cases like (4) and (11), as opposed to (3) and (12), the subject is able to *distributively bind* the implicit variable of the specific indefinite.

4. Distributivity

4.1. Two distributive operators

We now need to understand how the semantic mechanisms that achieve distributivity, the semantics of quantifiers and that of specific indefinites conspire to yield the contrasts described above. In this section, I will posit two distributivity operators: one applies to predicates –e.g it turns a predicate into a distributive predicate-, while the other one applies to individual-denoting expressions and is spelt out as a floating quantifier, like *chacun* in French.

Sentences are interpreted with respect to a model whose domain is a *join semi-lattice*. Individuals in this domain are either *atomic* or *complex*. The *join* operation that yields a complex individual when applied to two individuals, atomic or complex, is denoted by the sign ‘+’. An *individual denoting expression*, typically a proper name or the conjunction of several proper names, is an expression of type *e*, e.g. whose denotation is a member of the domain, atomic or complex. The word *and*, when applied to two individual-denoting

expressions, creates an expression whose denotation is the sum of the denotations of each conjunct⁵: $\llbracket \text{Pierre et Jean} \rrbracket^M = \text{Pierre} + \text{Jean}$

I now turn to distributivity. (13) below has two readings, given in a. and b.

- (13) Pierre et Jean ont soulevé le piano
 Pierre and Jean have lifted the piano
 (a) collective reading: Pierre and Jean have lifted the piano together
 (b) distributive reading: Pierre lifted the piano on its own, and so did Jean

When the object contains an indefinite expression, as in (1), the distributive reading entails that the subject takes “distributive scope” over the indefinite – unless the indefinite scopes above the subject:

How is distributivity achieved? There are two theoretical options:

- A) A distributive operator turns the *VP* into a *distributive* predicate (Schwarzschild 1995, Lasersohn 1995, among many others)
 B) A distributive operator applies to the *subject* (Heim, Lasnik & May 1991, Landmann 1996, among others)

I will hereafter assume that we need both option A) and option B), but that option B) is overtly signalled by the presence of floating *chacun*: on the one hand, a silent distributive operator, call it $DIST_{pred}$ applies to predicates, and, on the other hand, an overt one, floating *chacun*, applies to individual-denoting expressions⁶. This hypothesis, combined with the skolemized choice-function approach of specific indefinites, is the key to my account of the puzzle illustrated by examples 1-4.

A) $\llbracket DIST_{pred} \rrbracket = \lambda P. \lambda \alpha. \text{for any atomic member } \beta \text{ of } \alpha, P(\beta)$

Applied to a predicate *P*, $DIST_{pred}$ returns a predicate that is true of a given individual *X* if and only if *P* is true of each atomic member of *X*. In the case of (1), where *un* is interpreted as normal existential quantification, we get the reading where the book read may be different for Pierre and for Jean as follows:

- (1') $\llbracket \text{Pierre et Jean ont lu un livre} \rrbracket = 1$
 a. $\llbracket \text{Pierre et Jean} \rrbracket. \llbracket Dist_{pred}(\text{lire un livre}) \rrbracket = 1$
 b. $(\llbracket Dist_{pred} \rrbracket. \llbracket \text{lire un livre} \rrbracket). (\text{Pierre} + \text{Jean}) = 1$

⁵ Hereafter, I will omit the superscript ‘M’. Furthermore, we assume that all expressions are interpreted with respect to a partial assignment function. When no assignment function appears as a superscript, the assignment function used is the empty one. Only expressions that contain no free variables can be interpreted with respect to the empty assignment function. Note also that proper names are used in the meta-language as names for the elements of the domain to which proper names, as linguistic expressions, refer.

⁶ As pointed out by a reviewer, I only consider here pure distributive and pure collective readings, ignoring the well-documented so-called intermediate readings (see, among others, Landmann 2000, Lasersohn 1995, Schwarzschild 1996). More work is needed in order to incorporate these readings into the present account.

- c. $((\lambda P.\lambda\alpha.\text{for any atomic member } \beta \text{ of } \alpha, P(\beta)).\llbracket \text{lire un livre} \rrbracket$
 $\cdot (\text{Pierre+Jean}))=1$
- d. $((\lambda P.\lambda\alpha.\text{for any atomic member } \beta \text{ of } \alpha, P(\beta)).(\lambda x. \exists y \text{ book}(y) \ \& \ x \text{ read } y)).(\text{Pierre+Jean}))=1$
- e. $(\lambda\alpha.\text{for any atomic member } \beta \text{ of } \alpha, \exists y, \text{ book}(y) \text{ and } \beta \text{ read } y).$
 $(\text{Pierre+Jean})=1$
- f. For any atomic member β of Pierre+Jean, $\exists y$, book (y) and β read y
- g. There is a book that Pierre read and there is a book that Jean read

B) $\llbracket \text{chacun} \rrbracket = \llbracket \text{DIST}_{\text{indiv}} \rrbracket = \lambda\alpha.\lambda P \text{ (for any atomic member } \beta \text{ of } \alpha, P(\beta))$

Applied to an individual X, $\text{DIST}_{\text{indiv}}$ yields a generalized quantifier denoting the set of predicates which are true of each atomic member of X. I assume, following Sportiche (1988), that *chacun* applies to the subject, with which it forms a single constituent at some level of representation. (2) is therefore interpreted as below:

- (2') $\llbracket \text{Pierre et Jean ont chacun lu un livre} \rrbracket = 1$
- a. $\llbracket \text{DIST}_{\text{indiv}}(\text{Pierre et Jean}) \rrbracket \cdot \llbracket \text{lire un livre} \rrbracket = 1$
- b. $((\lambda\alpha.\lambda P \text{ (for any atomic member } \beta \text{ of } \alpha, P(\beta)).(\text{Pierre+Jean})).(\lambda x. \exists y \text{ book}(y) \text{ and } x \text{ read } y)) = 1$
- c. $(\lambda P.\text{for any atomic member } \beta \text{ of Pierre+Jean, } P(\beta)).(\lambda x. \exists y \text{ book}(y) \text{ and } x \text{ read } y)) = 1$
- d. For any atomic member β of Pierre+Jean, $\exists y$ book (y) and β read y
- e. There is a book that Pierre read and there is a book that Jean read

If there is no floating quantifier, the only way to achieve distributivity is to use $\text{DIST}_{\text{pred}}$.

4.2. Distributivity and dependent specific indefinites

Let us now turn to (3) and (4), repeated below as (14) and (15) :

- (14) Pierre et Jean ont lu un certain livre
 Pierre and Jean have read a certain book
 (a) available reading: a single book was read by the two
 (b) *non available reading: possibly a different book for each
- (15) Pierre et Jean ont lu chacun un certain livre
 Pierre and Jean have read each a certain book
 (a) available: a single book was read by the two
 (b) available: possibly a different book for each

What we must explain is why the implicit variable of the specific indefinite can be “distributively bound” in (15), but not in (14). I am adopting Heim &

Kratzer's (1998) mechanism for variable binding (though I will amend it in section 6): variable binding is the result a movement operation (QR). For a subject to bind a variable x occurring within a predicate, the subject must move up and leave a trace, which is identified with x and is abstracted over by a lambda operator at the level of the landing site of the subject:

- (16) a. [Peter [thinks [he is intelligent]].
 b. [Peter [λ_i [t_i [thinks [he_i is intelligent]]]]]

- Rule of interpretation for λ : for any assignment function g^7 (possibly empty), any index i and any phrase XP , $\llbracket \lambda_i XP \rrbracket^g = \lambda x \llbracket XP \rrbracket^{g(i \rightarrow x)}$

In (14), the only way to get a dependent reading for the specific indefinite is to turn the VP into a distributive predicate thanks to $DIST_{pred}$ and ensure that its implicit variable is bound, as in (14'), where the index on *certain* represents the implicit variable:⁸

- (14') [Pierre et Jean [λ_n [t_n [$DIST_{pred}$ (ont lu un certain_n livre)]]]]]

But this cannot give us the reading in question, because the index of the specific indefinite remains, so to speak, unaffected by $DIST_{pred}$. *Un certain livre* ends up being interpreted as $f(\text{book}, \text{Pierre+Jean})$, which precludes co-variation:

- $\llbracket (14') \rrbracket = 1$ iff
- $\llbracket \text{Pierre et Jean} \rrbracket . \llbracket \lambda_n [t_n [DIST_{pred}(\text{ont lu un certain}_n \text{ livre})]] \rrbracket = 1$
 - $\llbracket \lambda_n [t_n [DIST_{pred}(\text{ont lu un certain}_n \text{ livre})]] \rrbracket (\text{Pierre+Jean}) = 1$
 - $\lambda x \llbracket [t_n [DIST_{pred}(\text{ont lu un certain}_n \text{ livre})]] \rrbracket^{(n \rightarrow x)} (\text{Pierre+Jean}) = 1$
 - $\lambda x (\llbracket [DIST_{pred}(\text{ont lu un certain}_n \text{ livre})]] \rrbracket^{(n \rightarrow x)} (x) (\text{Pierre+Jean}) = 1$
 - $\lambda x (\llbracket [DIST_{pred}]] \llbracket \text{ont lu un certain}_n \text{ livre} \rrbracket^{(n \rightarrow x)} (x) (\text{Pierre+Jean}) = 1$
 - $\lambda x (\llbracket [DIST_{pred}]] (\text{read } f(\text{book}, x)) (x) (\text{Pierre+Jean}) = 1$
 - $\lambda x ((\lambda \alpha . \text{for any atomic member } \beta \text{ of } \alpha, \beta \text{ read } f(\text{book}, x)) (x) (\text{Pierre+Jean})) = 1$
 - $\lambda x (\text{for any atomic member } \beta \text{ of } x, \beta \text{ read } f(\text{book}, x)) (\text{Pierre+Jean}) = 1$
 - For any atomic member β of Pierre+Jean, β read $f(\text{book}, \text{Pierre-et-Jean})$
 - Pierre read $f(\text{book}, \text{Pierre-and-Jean})$ and Jean read $f(\text{book}, \text{Pierre-and-Jean})$

(15) on the other hand can be interpreted as corresponding to the following structure:

⁷ I use Heim & Kratzer's (1998) notation. For any assignment function g , $g(i \rightarrow x)$ refers to the assignment function defined as follows: for any j distinct from i , $g(i \rightarrow x)(j) = g(j)$ (if defined), and $g(i \rightarrow x)(i) = x$. In particular, ' $(i \rightarrow x)$ ' denotes the assignment function identical to the empty one except over i , to which it associates x , i.e. ' $(i \rightarrow x)$ ' is defined only over i and $(i \rightarrow x)(i) = x$.

⁸ Another possibility exists, which will be ruled out below on principled grounds:

[Pierre et Jean [$DIST_{pred} [\lambda_n [t_n (\text{ont lu un certain}_n \text{ livre})]]]]]$

(15') [chacun (Pierre et Jean) [λ_n [t_n ont lu un certain_n livre]]]

The predicate “to be an x such that x has read $f(\text{book}, x)$ ” is combined not with *Pierre et Jean*, but with *chacun (Pierre et Jean)*, i.e. will be interpreted as being true of Pierre on the one hand and Jacques on the other hand, i.e. as meaning “Pierre is such that he read $f(\text{book}, \text{Pierre})$ and Jacques is such that he read $f(\text{book}, \text{Jacques})$ ”:

- [[(15')]]=1
- [[DIST_{indiv}(Pierre et Jean)].[[λ_n [t_n ont lu un certain_n livre]]]=1
 - (($\lambda\alpha.\lambda P(\text{for any atomic member } \beta \text{ of } \alpha, P(\beta)).(\text{Pierre}+\text{Jean})).\lambda x$ [[t_n [ont lu un certain_n livre]]]^($n \rightarrow x$))=1
 - (($\lambda\alpha.\lambda P(\text{for any atomic member } \beta \text{ of } \alpha, P(\beta)).(\text{Pierre}+\text{Jean})).\lambda x$ ([ont lu un certain_n livre]]^($n \rightarrow x$)(x))=1
 - (($\lambda\alpha.\lambda P(\text{for any atomic member } \beta \text{ of } \alpha, P(\beta)).(\text{Pierre}+\text{Jean})).(\lambda x. x \text{ read } f(\text{book}, x))=1$
 - ($\lambda P(\text{for any atomic member } \beta \text{ of Pierre}+\text{Jean}, P(\beta)).(\lambda x. x \text{ read } f(\text{book}, x))=1$
 - For any atomic member β of Pierre+Jean, ($\lambda x. x \text{ read } f(\text{book}, x))(\beta) = 1$
 - For any atomic member β of Pierre+Jean, $\beta \text{ read } f(\text{book}, \beta)$

4.3 Constraining the application of $DIST_{pred}$

My analysis relies on an implicit assumption that a predicate of the form (17) cannot be constructed.

(17) [DIST_{pred} [λ_n [t_n (ont lu un certain_n livre)]]]

If it could, we would have gotten the absent reading of (14) in the following manner:

- (18) [[[Pierre et Jean [DIST_{pred} [λ_n [t_n (ont lu un certain_n livre)]]]]]]
- ([[DIST_{pred}]]($\lambda x.x \text{ read } f(\text{book}, x)$)).(Pierre+Jean)
 - $\lambda\alpha(\text{for any atomic member } \beta \text{ of } \alpha, \beta \text{ read } f(\text{book}, \beta)).(\text{Pierre}+\text{Jean})$
 - For any atomic member β of Pierre-and-Jean, ($\text{read } f(\text{book}, \beta)$)(β)
 - Pierre read $f(\text{book}, \text{Pierre})$ and Jean read $f(\text{book}, \text{Jean})$

But predicates like (17), in which $DIST_{pred}$ is immediately followed by a λ -operator binding both a variable in subject position and a hidden variable inside the VP, can be blocked if we adopt the following assumption:

(19) Chomsky’s (1995) extension condition: Any operation (be it merge or move) must extend the structure, i.e. every new node is inserted above the structure already built.

(17) could only be constructed by inserting $DIST_{pred}$ between the moved subject and the trace it has left behind. Such an operation would violate the extension condition

5. Differences between Quantifiers and Inverse-Scope readings

In the introduction, I noticed that not all quantifiers are able to “distributively bind” the implicit variable of a specific indefinite:

- (20) a. Chaque étudiant a étudié un certain problème
 Each student has studied a certain problem
 b. Tous les étudiants ont étudié un certain problème
 All the students have studied a certain problem
 c. Plusieurs étudiants ont étudié un certain problème
 Several students have studied a certain problem
 d. Plusieurs étudiants ont chacun étudié un certain problème
 Several students have each studied a certain problem

(20)a can mean that for each student S there is a certain problem P_s such that each student S has studied P_s . Such a reading is not available with (20)b. Similarly, (20)c cannot mean that there is a group of students such that for each member S of this group, there is a problem P_s such that if each S has studied P_s . This reading becomes however available when a floating *chacun* is inserted as in (20)d. This set of facts can be accounted for by the following lexical entries for *chaque*, *tous les* and *plusieurs*:

- a) $\llbracket \text{chaque} \rrbracket = \lambda P. \lambda Q. \text{ for any atom } x \text{ such that } P \text{ is true of } x, Q \text{ is true of } x$

(20)a can correspond to the structure in (21), whose interpretation is given below:

- (21) $[\text{chaque étudiant } [\lambda_n [t_n \text{ a étudié un certain}_n \text{ problème}]]]$

$\llbracket (21) \rrbracket = 1$ iff for any atom A such that A is a student, $\llbracket [\lambda_n [t_n \text{ a étudié un certain}_n \text{ problème}]] \rrbracket (A) = 1$, i.e. iff for any atom A such that A is a student, A studied $f(\text{problem}, A)$.

- b) $\llbracket \text{tous les} \rrbracket = \lambda P. \lambda Q. \text{ the maximal individual } X \text{ such that } P \text{ holds of each atomic member of } X \text{ is such that } Q \text{ is true of } X.$

(20)b can correspond to the structure in (22), but the fact that $DIST_{pred}$ has been inserted is not enough to license the dependent reading:

- (22) $[\text{tous les étudiants } [\lambda_n [t_n \text{ } DIST_{pred} [\text{ont étudié un certain}_n \text{ problème}]]]]$

$\llbracket(22)\rrbracket = 1$ iff the sum of all the students, call it X, has the property denoted by “[$\lambda_n [t_n \text{ DIST}_{\text{pred}} [\text{ont étudié un certain}_n \text{ problème}]]]$ ”, i.e X is such that all the members of X have studied $f(\text{problem}, X)$.

c) $\llbracket\text{plusieurs}\rrbracket = \lambda P. \lambda Q.$ there is an individual X which is the sum of at least two atoms which have the property P and such that Q is true of X.

(20)c, even if analyzed as (23), can have no reading where the implicit variable of the specific indefinite is “distributively bound” by the subject:

(23) [plusieurs étudiants [$\lambda_n [t_n \text{ DIST}_{\text{pred}} [\text{ont étudié un certain}_n \text{ problème}]]]$]

$\llbracket(23)\rrbracket = 1$ iff there is an individual X which is the sum of at least two students and has the property denoted by “[$\lambda_n [t_n \text{ DIST}_{\text{pred}} [\text{ont étudié un certain}_n \text{ problème}]]]$ ” i.e. X is such that all the members of X have studied $f(\text{problem}, X)$

In (20)d, however, the presence of floating *chacun* allows the quantified subject to “distributively bind” the implicit variable of the specific indefinite. Assume indeed that (20)d. corresponds to a structure like (24):

(24) [plusieurs étudiants [$\lambda_n [[(\text{chacun } t_n)] [\lambda_m [t_m \text{ ont étudié un certain}_m \text{ problème}]]]]]$]⁹

(24) is then interpreted as follows:

$\llbracket(24)\rrbracket = 1$ iff there is an individual X which is the sum of at least two students and has the property “[$\lambda_n [[(\text{chacun } t_n)] [\lambda_m [t_m \text{ ont étudié un certain}_m \text{ problème}]]]]]$ ”, i.e. such that any atomic member x of X is such that x studied $f(\text{problem}, x)$

This set of assumptions has direct consequences with respect to so-called *inverse scope* readings, illustrated by (25):

(25) Un étudiant a lu chaque livre
 A student read each book
 Possible reading : for each book, a student read it

Inverse scope is not an option for all types of quantified objects. In fact, in French, it is restricted to DPs headed by *chaque* or *chacun*. It turns out, however, that even if we assume that all quantified objects can undergo *quantifier raising (QR)*, only inherently distributive quantifiers like *chaque-*

⁹ For this structure to be generated, one has to allow *chacun* and *plusieurs étudiants* to be base-generated together in the VP-internal subject position. [*chacun*[*plusieurs étudiants*]] is then adjoined to VP. Then *plusieurs étudiants* alone raises to a higher position.

DPs and *chacun*-DPs will be able to distribute over an indefinite subject. (25), after QR of *chaque livre*, will have the following representation:

(26) [chaque livre [λ_n [un étudiant a lu t_n]]]

The entry given above for *chaque* has the outcome that (26) is interpreted indeed as “for each book, a student read it”. On the other hand, QR alone is not able to yield such an inverse-scope reading for (27), even if supplemented by $DIST_{pred}$:

(27) Un étudiant a lu tous les livres
A student read all the books

LF of (25) after QR of the object, assuming $DIST_{pred}$ is present:

(28) [tous les livres [λ_n [un étudiant [$DIST_{pred}$ a lu t_n]]]]

The interpretation of (28) is: the individual X that includes all the books is such that there is a student s such that each atomic member of s read X. In order to get the inverse-scope reading, we should have inserted $DIST_{pred}$ between the moved QP and λ_n , thus violating the *extension condition*.

(29) * [tous les livres [$DIST_{pred}$ [λ_n [un étudiant a lu t_n]]]]

6. Binding, pronouns and implicit variables

The choice function analysis for specific indefinites can be seen as treating them as definite descriptions in disguise. A phrase like “a certain X” is then seen as indicating that the speaker would have been able to use a definite description instead if she had wanted to. The skolemized version of specific indefinites would be the counterpart of a definite description that would contain a bound pronoun.

I therefore predict that definite descriptions containing an overt pronoun should behave like specific indefinites containing a hidden variable, i.e. they should not be able to be interpreted as dependent on a quantified subject unless the subject is a *chaque/chacun DP* or floating *chacun* is present.

(30) [Pierre et Marie]_i ont pris leur_i cheval et sont partis
Pierre and Marie took their horse and left

(30) is predicted to presuppose that Pierre and Marie own a horse in common, and to assert that they collectively took it. It shouldn’t be able to describe a situation in which each of them took their own horse (“dependent reading”). That is because *leur_i cheval* is basically interpreted as a Skolem function that associates each individual with his horse. In fact, possessive

pronouns can be seen as denoting a particular skolemized choice function: the function which, when applied to an individual x and a set S , returns the unique member of S that x owns.

Most speakers find indeed the dependent reading a little bit unnatural; they seem to prefer the use of a dependent plural instead of a singular definite description, as in (31):

- (31) Pierre et Marie ont pris leurs chevaux et sont partis
 Pierre and Marie took their horses and left

Yet the dependent reading is in fact attested for (30), and is perfectly natural in many contexts, which is a problem for my analysis. In order to solve it, I am going to make use of an additional assumption, which seems *ad hoc* but hopefully will make additional and unexpected predictions: I need to assume that *pronouns* get bound not thanks to QR and λ -abstraction, but by a special *binding operator* β (cf. Büring 2004a, 2004b) that can be inserted without any movement operation, and that is defined as follows:

- (32) a. Rule of interpretation for β : If XP is of type $\langle e, X \rangle$ and i is an index, $\llbracket \beta_i XP \rrbracket^g = \lambda x (\llbracket XP \rrbracket^{g(i \rightarrow x)}(x))$

b. Condition on β -insertion : β_i can be inserted at any time in a derivation provided it c-commands an overt pronoun P bearing the index i and no other β_i c-commands P from a lower position.

The condition on β -insertion is equivalent to a requirement that β be not inserted vacuously, i.e. bind a pronoun. (30) then can be analysed as:

- (33) [[Pierre et Marie] [DIST_{pred} [β_i [ont pris leur_i cheval]]]]

- $\llbracket (33) \rrbracket^g = \llbracket \text{Pierre et Marie} \rrbracket . (\llbracket \text{DIST}_{\text{pred}} \rrbracket . (\llbracket \beta_i [\text{ont pris leur}_i \text{ cheval}] \rrbracket))$
 a. $(\llbracket \text{DIST}_{\text{pred}} \rrbracket . \lambda x (\llbracket \text{ont pris leur}_i \text{ cheval} \rrbracket^{g(i \rightarrow x)}(x))) . (\text{Pierre+Marie})$
 b. $(\llbracket \text{DIST}_{\text{pred}} \rrbracket . \lambda x ((\text{TOOK } x \text{'S HORSE})(x))) . (\text{Pierre+Marie})$
 c. $(\lambda \alpha . \text{ for any atomic member } y \text{ of } \alpha, (\lambda x . x \text{ TOOK } x \text{'S HORSE})(y)) . (\text{Pierre+Marie})$
 d. $(\lambda \alpha . \text{ for any atomic member } y \text{ of } \alpha, y \text{ TOOK } y \text{'S HORSE}) . (\text{Pierre+Marie})$
 e. For any atomic member y of Pierre+Marie, y TOOK y 'S HORSE
 f. Pierre took Pierre's horse and Marie took Marie's horse

(33) does not violate the extension condition : no movement occurred: at the time β_i is inserted, it is inserted at the top of the tree, and $\text{DIST}_{\text{pred}}$ is itself inserted at the top of the tree after β -insertion.

A tentative motivation for distinguishing between the mechanism of binding for pronouns and for other variables is the following: if “covert” variables¹⁰ cannot be bound by the β -operator, we predict dependent readings to be more restricted not only for specific indefinites, but also for other expressions that contain a hidden variable, such as certain **definite** descriptions. Imagine for instance the following scenario:

John and Peter live far from each other. There is a wild cat living in John’s neighbourhood, and another wild cat living in Peter’s neighbourhood.

Consider now the following pair:

- (34) a. John et Peter ont adopté le chat
 John and Peter have adopted the cat
 b. John et Peter ont chacun adopté le chat
 John and Peter have each adopted the cat

(34)a does not make clear sense in this context: which cat did they adopt? (34)b, on the other hand, can be interpreted as meaning that *they each adopted the cat that lives in their respective neighbourhood*. Let us assume definite descriptions come with an implicit restriction on the relevant domain of quantification. Then *the cat* denotes the unique cat in C , where C is the set of individuals that are contextually relevant. Assume further that this “implicit restriction” can be relativized to individuals, i.e. *the cat* denotes the unique cat in $C(x)$, where $C(x)$ is the set of individuals that are contextually relevant with respect to a certain individual x . Now x is an implicit variable that can be bound under exactly the same conditions as the implicit variable of a skolemized choice function. Assuming that we insert $DIST_{pred}$, (34)a will have the following logical form, which does not allow this implicit variable to be distributively bound by the subject:

(35) $[[\text{John et Peter}] [\lambda_n [t_n \text{DIST}_{pred} (\text{ont adopté} [\text{le chat } C(n)])]]]]$

(34)b will be represented as (36), which indeed corresponds to the dependent reading :

(36) $[\text{chacun} (\text{John et Peter}) [\lambda_n [t_n (\text{ont adopté} [\text{le chat } C(n)])]]]$

On the other hand, (37) is perfectly fine :

- (37) John et Peter ont adopté le chat qui vit à côté de leur maison
 John and Peter have adopted the cat that lives near to their house

¹⁰ « Covert variables », here, are meant to refer to anything that does not belong to the lexical category of pronouns. From this perspective, PRO and pro (in pro-drop languages) do not qualify as covert variables, while traces and contextual variables do. Büring (2004 a, 2004 b) implements another constraint on β -insertion, to the effect that a moved quantifier is unable to bind a pronoun by means of the β -operator, which accounts for WCO effects.

This is because the overt pronoun triggers β -insertion, which, when followed by the insertion of $DIST_{pred}$, generates the dependent reading without violating the extension condition.

A comparable example can be built with relational nouns, like *voisin*, *neighbour*. Assume that Pierre and Jacques are neighbours, and both have a (different) cat:

- (38) a. #Pierre et Jacques ont rencontré le chat du voisin
 Pierre and Jacques have met the neighbour's cat
 b. Pierre et Jacques ont chacun rencontré le chat du voisin
 Pierre and Jacques have each met the neighbour's cat

While (38)a is odd unless it is known that there is a third neighbour who has a cat, (38)b is natural and can be understood as meaning that Pierre met Jacques's cat and Jacques met Pierre's cat¹¹.

7. Conclusion

The analysis developed in this paper is based on three assumptions: a) specific indefinites denote choice-functions or skolemized choice-functions – an hypothesis that is independently motivated; b) there exist two distinct distributivity operators, a covert one which applies to predicates, and an overt one, realized as a floating quantifier, that applies to individual-denoting expressions in subject position; c) pronouns and implicit variables get bound by different mechanisms. Binding of implicit variables involves movement, while binding of pronouns does not.

These assumptions were embedded within a derivational model of syntax in which the *extension condition* holds, and were stated in terms of a theory of the syntax/semantics interface *à la* Heim & Kratzer (1998).

This approach was shown to account for the distribution of dependent readings for specific indefinites, for some of the differences between various quantifiers regarding the availability of inverse scope, and for the different behaviour of pronouns and implicit variables with respect to distributivity and binding.

¹¹ A reviewer finds the data in (38) objectionable, and furthermore notes that replacing *voisin* (neighbour) with *ami* (friend) or *frère* (brother), which are also relational nouns, makes both sentences (a) and (b) odd. I agree with the latter observation, but I don't think it undermines my point; for some unknown reason, not all relational nouns can be used without an explicit specification of their two arguments; my claim is only that for those which can, I expect a contrast similar to the one in (38). A genuine counterexample to this claim would be a pair in which the two sentences are appropriate, or in which the (a)-example is more appropriate than the (b)-example.

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The typology of multiple wh-questions and language variation

Marina Stoyanova

The aim of this paper is to review the typology of multiple wh-questions in order to describe and classify a language type that has been ignored in the discussion of multiple wh-questions. I argue that, due to specific morpho-syntactic properties, languages like Somali and Berber do not allow for multiple wh-questions. It is therefore reasonable to assume that there are primarily two language types with respect to the possibility of multiple wh-question formation. These are the languages which allow only for single wh-questions and those which allow for multiple wh-questions.

1. Introduction

1.1. The central problem

The paper focuses on the non-existing option of building multiple wh-questions, represented by some languages that do not belong to one and the same language family. The languages, which have been reported to exhibit this phenomenon, are Italian (Calabrese 1984, 1987, Rizzi 1982, 1997), Somali (Lecarme 1999, Svolacchia et al. 1995, Svolacchia & Puglielli 1999), Berber (Calabrese 1987), and Irish (Adams 1984; McCloskey 1979). The analysis I propose here is based on Somali and Berber but it is also compatible with Italian and Irish.

1.2. Some preliminaries to the grammar of Somali and Berber

Somali and Berber belong to the Afro-Asiatic phylum. Somali is assumed to be a discourse-configurational, polysynthetic SOV language of a particular subtype. Since it does not fit neatly Baker's (1996) polysynthesis parameter, Svolacchia & Puglielli (1999) refer to it as a 'clitic polysynthetic language' similar to the pronominal argument languages defined in Jelinek (1984). A basic feature of that language type is a pronominal argument structure. Pronominal clitics occur in the A-positions and are assigned theta-roles there. Full NPs appear in adjoined A'-positions associated with the IP-internal

pronominal positions that determine their interpretation. All clitic elements in Somali must precede the verb in a fixed linear order. The pronominal clitics are either enclitics or proclitics, depending on their lexical properties. Subject clitics are attached to the so-called focus markers. Object clitics are proclitics that are either adjacent to the verb or combined with right adjacent prepositions (cf. Lecarme 1999, Svolacchia et al. 1995 and Svolacchia & Puglielli 1999).

While Somali is a single member of the East Cushitic branch within the Afro-Asiatic languages, Berber constitutes a language family in itself. As it is not possible to consider all varieties for the current purposes of investigation, I will concentrate on the varieties of Tamazight and Tarifit¹. Common typological properties are the *pro*-drop feature and the VSO base word order (cf. Ouhalla 1993, among others).

1.3. The structure of the paper

The paper is organized as follows. I start with a brief outline of the current typology of multiple wh-questions (Section 2) A discussion of the basic properties of wh-question formation in Somali and Berber follows (Section 3). The following descriptive generalizations are made: first, due to their specific morphological properties, wh-phrases in Somali and Berber cannot occur *in situ*. They are forced to appear in the left periphery of the clause, left adjacent to a head element, i.e. a focus marker in Somali and a cleft marker in Berber. Second, wh-questions in these languages are instances of focus constructions. Finally, focus in Somali and Berber is licensed in a unique structural position. In order to illustrate this crucial property, I compare Somali and Berber with languages that allow for multiple wh-questions and also license wh-phrases in a structural focus position, such as Hungarian and Malagasy. On the basis of these three important observations I draw the conclusion that the licensing position of wh-phrases is also unique and multiple wh-questions can therefore not occur. With respect to the specific properties of wh-question formation, Somali and Berber constitute a separate language type. The last section contains a summary of the argumentation and a proposal for a revision of the typology of multiple wh-questions.

2. The typology of multiple wh-questions

According to the three major strategies of multiple wh-question formation languages have been divided into three types²:

¹ Since both varieties display an identical syntactic behaviour with respect to wh-question formation, I do not indicate the variety for every single example throughout the paper.

² Subtype internal differences are not relevant for the current proposal.

2.1. Multiple *wh*-fronting languages

Some languages make use of the so-called *ex-situ* strategy according to which all *wh*-phrases in a multiple *wh*-question form a sequence of adjacent elements which occupy a sentence initial position (cf. Rudin 1988, among others):

- (1) **Koj kakvo** kupi? (Bulgarian)
 who what bought
 ‘Who bought what?’

2.2. *Wh*-in situ languages

The *in situ* strategy defines a language type that does not exemplify any kind of movement of *wh*-elements. All *wh*-items in a multiple *wh*-question remain in their base positions (cf. Cheng 1997, among others):

- (2) Taroo-ga **dare-ni nani-o** ageta no? (Japanese)
 Taroo-NOM who-DAT what-ACC gave Q
 ‘Who did Taroo give what?’
 (Richards 1997:13)

2.3. The mixed language type

The third language type adopts a mixed version of the pure *ex situ* and *in situ* strategy. Multiple *wh*-questions show a surface structure like (3). One *wh*-phrase is realized sentence initially while other *wh*-elements appear *in-situ* (cf. Cheng 1997, among others):

- (3) **Wer** hat **was** gekauft? (German)
 who has what bought
 ‘Who bought what?’

2.4. The fourth language type

I claim that there is a fourth language type that does not use any of the three outlined strategies of multiple *wh*-question formation. Consider the following examples³:

³ The following abbreviations are used in the glosses of the examples: NOM = nominative case; ACC = accusative case; DAT = dative case; Q = interrogative morpheme / question (yes-no) particle; FM = focus marker; CM = cleft marker; SCL = subject clitic; 3FS = 3. person feminine singular; 3MS = 3. person masculine singular; PART = participle; AT = agent topic marker; TT = theme topic marker; PRT = verbal particle; PAST = past tense; PRES = present tense.

- (4) a. **Maxáy** sameeyeen? (Somali)
 what-FM-SCL did
 ‘What did they do?’
- b. ***yaa goormuu** yimid?
 who-FM time-which-FM-SCL came
 ‘Who came when?’
- c. ***yaa** yimid **goorma**?
 who-FM came time-which
 ‘Who came when?’
 (Svolacchia & Puglielli 1999)
- (5) a. **May** t-sghu terbatt? (Berber)
 what-CM 3FS-bought girl
 ‘What did the girl buy?’
 (Calabrese 1987)
- b. ***W manwn** i(g) yzwn
 whowhom CM kissed-PART
 ‘Who kissed whom?’
 (Noureddine Elouazizi, personal communication)
- c. ***Wiy** yzrin **may**?
 who-CM saw-PART what-CM
 ‘Who saw what?’
 (Cole & Tenny 1987)

The grammatical examples (4a) and (5a) show the only position in which wh- phrases in Somali and Berber are licensed properly. This is a position left adjacent to a focus marker in Somali (cf. 4a). In Berber the wh- item appears left adjacent to a cleft marker (cf. 5a). The ungrammatical examples (4b) and (5b) are evidence that multiple wh- fronting is not possible. The observation that a wh- phrase cannot be left *in situ* is represented in (4c) and (5c). Hence, the mixed strategy cannot be applied in Somali and Berber either.

3. The Somali-Berber language type

The central task of this paper is to determine the place of languages like Somali and Berber within the current language typology, based on the criterion of multiple wh-question formation. As the examples in (4) and (5) illustrate, all considerable strategies of deriving multiple wh-questions found across different language types give rise to ungrammaticality in Somali and Berber: the pure *in situ* strategy (the Japanese type) is excluded, because the canonical position of a wh- item is structurally marked: a position followed by a focus marker in Somali and a cleft site in Berber. Fronting of one wh- phrase and leaving another one *in situ* (the German Type) is not possible either. Multiple wh-fronting (the Bulgarian type) is not available either.

In what follows, I argue that due to the specific internal properties of these languages there is no syntactic mechanism for the derivation of multiple wh-questions. Therefore, languages like Somali and Berber constitute a separate type. The current typology of multiple wh-questions has to be revised in order to capture the observed language variation.

3.1. The morpho-syntactic properties of the wh- phrase position in Somali and Berber

The only grammatical examples (4a) and (5a) illustrate that wh- elements like *maxaa* ‘what’ in Somali and *may* ‘what’ in Berber can only occur in the left periphery of the clause. However, such elements are not bare wh- phrases but rather complexes of more than one different morphological item. I assume the following structural properties for the wh- position in Somali (cf. 6a) and Berber (cf. 6b):

- (6) a. [_{Spec} ma wax [_{Head} baa]...[_{VP}...]] contracted: maxaa (Somali)
 Q thing FM → ‘what’
 b. [_{Spec} m [_{Head} ay]...[_{VP}...]] contracted: may (Berber)
 Q CM → ‘what’

According to this descriptive generalization only one wh- phrase can appear in the left periphery of the interrogative clause followed by a right adjacent head element. I therefore conclude that this is a specific morpho-syntactic condition of licensing wh- items in languages that do not allow for multiple wh-interrogatives. I will refer to this language specific licensing mechanism as the Head-Adjacency Hypothesis.

(7) The Head-Adjacency Hypothesis

Languages that do not allow for multiple wh- questions can licence wh-phrases only through an overtly established spec-head relation with a functional head endowed with a [+Focus] feature.

Let us now turn to the [+Focus] feature and its relationship with the wh-phrases in Somali and Berber.

3.2. Wh- questions as instances of focus constructions

Traditionally, wh- phrases are treated as inherently focused elements. Therefore, wh- questions are closely related to the linguistic mechanisms for the expression of information focus (see e.g. Horvath 1986, among others). In the lines of this standard view, wh- questions in Somali exactly parallel NP-

focus constructions and *wh*- questions in Berber correspond to focus clefts^{4,5}. Several syntactic tests support the claim, but I will not discuss all these issues in detail⁶. What is important for the current argumentation is the fact that *wh*-questions and their answers show exactly the same structural properties. Hence, both are instances of one and the same construction. The only appropriate answer to a *wh*- question is a clause in which the constituent bearing the new information is focused⁷:

- (8) a. **Kuma** ayaa kalluunkii cunay? (Somali)

who FM fish-the ate
'Who ate the fish?'

- b. **Cali** baa kalluunkii cunay.

Ali FM fish-the ate
'ALI ate the fish.'

- c. #Kalluunkii baa **Cali** cunay.

fish-the FM Ali ate
'Ali ate THE FISH.'
(Saeed 1984:25)

- (9) a. **May** t-sghu terbatt? (Berber)

what-CM 3FS-bought girl
'What did the girl buy?'

- b. **Adil** ay t-sghu terbatt

grapes CM 3FS-buy girl
'It is grapes that the girl bought.'

- c. #Terbatt ay ysghin **adil**.

girl CM bought-PART grapes
'It is the girl that bought grapes.'
(Calabrese 1987)

⁴ Livnat (1984:111) points out that there are cases where the phonological structure of the interrogative word makes it difficult to decide whether the nominal focus marker *bàa* occurs or not. In contrast to that, the nominal focus marker *ayàa* with identical function does not undergo coalescence with the preceding *wh*- or focused element (Saeed 1999:38). Due to the strict analogy between *wh*- questions and their answers I assume that even *wh*- elements with unclear morpho-phonological structure like *yaa* 'who' bear a coalesced focus marker *bàa*.

⁵ I follow Choe (1987) in assuming that even in cases where the cleft marker is morphologically not recoverable, *wh*- questions in every Berber variety involve a combination of a *wh*- element and a cleft marker. Note further that morpho-phonological rules in Berber are very complex (see also Guerssel 1984).

⁶ To mention some of them, *wh*- questions and pure focus constructions in both languages behave identically with respect to extraction. They illustrate an absence of weak crossover effects. Long extraction as well as movement out of islands shows a similar behaviour. Finally, anti-agreement effects occur in both constructions (for definition and discussion of the anti-agreement effect see Ouhalla 1993).

⁷ The capitals in the translation are used to indicate the focused constituent whenever it is not expressed by a cleft sentence. '#' marks a pragmatically incompatible answer.

In Somali a *wh*- subject appears to the left of a focus marker (cf. 8a). In the appropriate answer the subject NP is focused (cf. 8b) and shows the same structure as the *wh*- interrogative. Focusing of the object (cf. 8c) is not a compatible answer in this context. The same rule holds for Berber. The *wh*-question (9a) and the correct answer (9b) are structurally identical. The *wh*-word and the corresponding NP in the answer are focused by means of a cleft construction. Clefting of the subject NP (cf. 9c) is, as expected, not a possible answer to (9a).

Since both *wh*- questions and focus constructions reveal one and the same syntactic property, I assume that both are subject to one and the same licensing requirement. In other words, the Head-Adjacency Hypothesis holds for both constructions. Since the formation of *wh*- questions in Somali and Berber is a derivation driven by the need to satisfy a [+Focus] feature, I will discuss the particular properties of the focusing strategies in both languages in the next subsection.

3.3. The uniqueness of the focus strategy in Somali and Berber

I have argued that the head-adjacency requirement (cf. 7) is as an obligatory distributional pattern for both *wh*- phrases and focused constituents in Somali and Berber. In what follows, I extend the licensing conditions of *wh*- phrases with a further rule. The focusing strategies in Somali and Berber are unique in that they can affect only one constituent per clause (for discussion of the term “uniqueness” see Rizzi 1997)⁸. I propose that this syntactic condition constitutes a special parametric property of the languages that do not allow for multiple *wh*- questions.

(10) The Uniqueness Hypothesis

Languages that do not allow for multiple *wh*- questions licence *wh*- phrases only in a unique structural focus position.

A closer look at the *wh*- and focus constructions in Somali and Berber will help to confirm the Uniqueness Hypothesis. I will compare Hungarian and Malagasy with Somali and Berber in order to draw an exact picture of the syntactic properties that exclude the possibility of deriving multiple *wh*- questions. In the following I address the question why *wh*- phrases cannot be licensed *in situ* (section 3.3.1). Next, I show that the appearance of a second focus marker causes ungrammaticality in Somali. I also provide evidence that it

⁸ Rizzi’s (1997) proposal for the fine structure of the left periphery deals exclusively with the representation of contrastive focus in Italian. Note that the focussing strategies in Somali and Berber are not restricted to the expression of contrastive focus. The *bàa/ayàa*-focus construction in Somali (cf. Saeed 2000) and the cleft focus construction in Berber (cf. Calabrese 1987) are used to mark new information in general. Depending on the context, a constituent bearing new information can be interpreted contrastively.

is not possible to cleft two constituents in one and the same clause in Berber (section 3.3.2). Finally, the option to realize focused elements in multiple specifiers of a head endowed with a [+Focus] feature (Richards 1997) or alternatively, to form a cluster of focused constituents (Sabel 2003) is not available in Somali and Berber (section 3.3.3).

3.3.1. *Wh- in situ and optional licensing of wh- phrases in a focus position*

Consider a *wh- in situ* language like Malagasy (cf. Sabel 2003). As the examples show, *wh-* phrases usually appear in their base position (cf. 11a), but the language has also an option to license *wh-* words in a focus position marked by a special focus particle: *no* (cf. 11b). Thus, a combination of both strategies results in a grammatical multiple *wh-* question (cf. 12a and b). For ease of representation I call this variant of multiple *wh-* question formation the “Malagasy strategy (I)”.

(11) a. Nividy **inona** Rabe? (Malagasy)

PAST-AT-buy what Rabe

b. **Inona** no novidin-d Rabe?

what FM PAST-TT-buy Rabe

‘What has Rabe bought?’

(12) a. **Iza**_i no nividy **inona** t_i?

who FM PAST-AT-buy what

b. **Inona**_i no novidin **iza** t_i?

what FM PAST-TT-buy who

‘Who bought what?’

A crucial prediction of the Clausal Typing Hypothesis is that a language that has yes-no particles is a *wh- in situ* language (Cheng 1997:16f)⁹. Somali and Berber have yes-no particles (cf. 13a for Somali and 14a for Berber), but nevertheless *wh-* phrases *in situ* are excluded (cf. 13b for Somali and 14b for Berber).

(13) a. **Muu** kúu dhiibay? (Somali)

Q-he you-to hand

‘Did he hand it to you?’

(Saeed 1999:197)

b. *Maryan baa **kuma** arkay?

Maryan FM who saw

‘Who did MARYAN see?’

(Cabdelqadir Ruumi, personal communication)

⁹ The Clausal Typing Hypothesis: Every clause needs to be typed. In the case of typing a *wh-* question, either a *wh-* particle in C° is used or else fronting of a *wh-* word to SpecCP is used, thereby typing a clause through C° by Spec-head agreement (Cheng 1997:22).

- c. **Yaa** Maryan arkay?
 who-FM Maryan saw
 ‘Who saw Maryan?’
- d. ***yaa** yimid **goorma**?
 who-FM came time-which
 ‘Who came when?’
 (Svolacchia & Puglielli 1999)
- (14) a. **Is** y-sghu Mohand adlis? (Berber)
 Q 3MS-bought Mohand book
 ‘Did Mohand buy a book?’
 (Guerssel 1984)
- b. ***t-sga** tarbat **min**?
 3FS-bought girl what
 ‘What did the girl buy?’
- c. **W(g)i** yzwn Tifa?
 who-CM kissed-PART Tifa
 ‘Who kissed Tifa?’
- d. ***Manwan** i(g) ysgin **manyn**?
 who CM bought-PART what
 ‘Who is it that bought what?’
 (Noureddine Elouazizi, personal communication)

Since Somali and Berber do have question particles, *wh*- fronting can obviously not be applied for clausal typing purposes as generally assumed for languages like English, which type interrogative clauses through spec-head agreement by fronting of a *wh*- word to SpecCP. Note further that the Clausal Typing Hypothesis still holds, as the head elements, which enter into a spec-head relation with the *wh*- phrases in Somali and Berber, are different in nature from the question particles. Recall that both languages make use of specific focusing strategies for the representation of *wh*-items. *Wh*-phrases in Somali appear left adjacent to a focus marker and *wh*- words in Berber precede a cleft marker. It follows that the Head-Adjacency Hypothesis (cf. 7) as a language specific morpho-syntactic licensing requirement for *wh*- phrases is a condition fully independent of typing of the clause as interrogative by means of *wh*- fronting to SpecCP and establishing spec-head agreement with C°. I therefore propose that there is another rule that is crucial for the distribution of *wh*- phrases in Somali and Berber (cf.10). *Wh*- words cannot occur *in situ* because an interrogative *wh*- phrase has to be in a focus position in the overt syntax in order to be interpreted properly. This requirement is not necessary for *in situ* languages like Malagasy. Somali and Berber obligatorily license *wh*- phrases in a structurally marked focus position, while Malagasy optionally makes use of this possibility (cf. also the focus theory of Horvath 1986). The Malagasy strategy (I) for deriving multiple *wh*- questions is, as expected, not available in Somali and Berber (cf. 13d for Somali and 14d for Berber).

3.3.2. Multiple *wh*-questions as focus recursion

Consider now another way of deriving multiple *wh*- questions. As argued by É. Kiss (1998), Hungarian allows for a multiple focus construction in which more than one focus phrase of the same type, i.e. “more than one operator introducing a set and exhaustively identifying a proper subset of it” can appear in a single clause. Hungarian is therefore considered to be a language that allows for focus recursion (cf. 15a). The licensing head of focused elements in Hungarian is V. It licenses both items in (15a) through successive movement from the lower to the higher focus projection. This is a construction that syntactically corresponds to multiple *wh*- questions in Hungarian (cf. 15b).

- (15) a. $[_{\text{TopP}} \dots [_{\text{TopP}} \dots [_{\text{FocP}} [_{\text{Foc}^\circ} V_i] [_{\text{FocP}} [_{\text{Foc}^\circ} t_i] [_{\text{VP}} \dots t_i \dots]]]]]]$
 b. **Ki** vert meg **kit**?
 who beat PRT whom
 ‘Who beat somebody, and who was the person beaten by him?’

Compare now Hungarian with Somali and Berber. Recall that both languages exhibit overt focusing particles. Then, if focus recursion were possible, these special markings would be expected to appear attached to every focused element. The following ungrammatical examples show that it is impossible to have more than one focus phrase per clause in Somali (cf. 16b) and Berber (cf. 17b) as well as multiple *wh*-phrases (cf. 16a for Somali and 17a for Berber):

- (16) a. ***yaa** yimid **goorma** baa? (Somali)
 who-FM came time-which FM
 ‘Who came when?’
 b. ***Cali** baa yimid **shalay** baa.
 Ali FM came yesterday FM
 ‘ALI came YESTERDAY.’
 (Cabdellqadir Ruumi, personal communication)
- (17) a. ***W(gi)** yzwn **manwn** i? (Berber)
 who-CM kissed-PART whom CM
 ‘Who kissed whom?’
 b. ***Muhand** i(g) yzwn **Tifa** i.
 Muhand CM kissed-PART Tifa CM
 ‘MUHAND kissed TIFA.’
 (Noureddine Elouazizi, personal communication.)

Note that the possibility that the focus marker in Somali (cf. 13d) or the cleft marker in Berber (cf. 14d) moves upwards –just like the finite verb in Hungarian- is not available either. I conclude from these observations that focus recursion is a language-specific parameter that is negatively set in Somali and Berber. The focus position in these languages is unique. Considering the

fact that *wh*- phrases may only occur in a unique focus position in Somali and Berber, there is no other position in the clause capable of licensing *wh*- phrases. (cf. 16a for Somali and 17a for Berber) Hence, it is impossible to derive a multiple *wh*- question in the same way as in Hungarian.

3.3.3. Multiple *wh*- fronting as focus cluster

It has been argued in the minimalist literature that overt multiple *wh*- fronting languages like Bulgarian use a strategy that consists of moving a *wh*- cluster to SpecCP (cf. 1). The formation of a *wh*- cluster is motivated by the assumption that *wh*- elements can act as landing sites for *wh*- movement due to certain morphological properties. The clustering proceeds prior to *wh*- movement. (for details, cf. Grewendorf 2001 and Sabel 2001; for alternative analyses of multiple *wh*- fronting in Bulgarian see Richards 1997 and Bošković 2003).

Malagasy is considered to be an optional multiple *wh*- fronting language (cf. Sabel 2003). In order to distinguish the two options of multiple *wh*-question formation in Malagasy, I will call this strategy the “Malagasy strategy II”. In this case, Malagasy behaves like Bulgarian, a language that obligatorily fronts all *wh*- items.

- (18) a. **Aiza iza** no mividy ny vary? (Malagasy)
 where who FM PRES-AT-buy the rice
 ‘Where does who buy the rice?’
 b. **Aiza** (ny) **inona** no vidinao?
 where (the) what FM PRES-TT-buy
 ‘Where do you buy what?’
 (Sabel 2003)

The feature that triggers *wh*- displacement in Malagasy is the strong [+Focus] feature of the clause (cf. the Malagasy Strategy I discussed in 3.3.1.). The important idea of the analysis is that *wh*- phrases can also be endowed with a strong [+Focus] feature. Therefore, the strong [+Focus] feature of a *wh*- phrase can attract other *wh*- elements. In (18a) the strong [+Focus] feature of *iza* ‘who’ and in (18b) the strong [+Focus] feature of *inona* ‘what’ attracts the second *wh*- item. This intermediate derivational operation results in a cluster formation. Then the *wh*- cluster is attracted by the [+Focus] feature in C°. To sum, there are two focus features involved in the derivation of a multiple *wh*-question in Malagasy, i.e. the strong [+Focus] feature of the *wh*- phrase itself and the strong [+Focus] feature of the clause (for further details of the analysis see Sabel 2003; see also Richards 1997 for another possible analysis in terms of multiple specifiers).

The option of forming a *wh*- cluster prior to movement into a focus position –the canonical position of *wh*-phrases in Somali (cf. 19) and Berber (cf. 20)- is prohibited because of the uniqueness of the available focusing strategy. Since the Malagasy Strategy II cannot be applied in Somali and Berber, I conclude

that they obviously lack the morphological properties of Bulgarian- and Malagasy-like *wh*- elements.

- (19) ***yaa goormuu** yimid? (Somali)
 who time-which-FM-SCL came
 ‘Who came when?’
 (Svolacchia & Puglielli 1999)

- (20) ***W manwn** i(g) yzwn (Berber)
 who whom CM kissed-PART
 ‘Who kissed whom?’
 (Noureddine Elouazizi, personal communication)

4. The Typology of multiple *wh*- questions revisited

We have seen that Somali and Berber are languages that obligatorily license *wh*- phrases in a structurally marked (cf. 7), unique focus position (cf. 10). A *wh*- item occurs left adjacent to a focus marker in Somali, and appears left adjacent to a cleft marker in Berber. According to the Head-Adjacency Hypothesis as a licensing requirement for *wh*- phrases in Somali and Berber, *wh*- *in situ* is not allowed. Following the Uniqueness Hypothesis, focus recursion and focus clustering are also not possible. Multiple *wh*- questions are therefore excluded in Somali and Berber.

Thus, the language typology based on the criterion of multiple *wh*- question formation needs to be extended with an additional type. There are primarily two language types: languages that allow only for single *wh*- questions and languages that allow for multiple *wh*- questions. The group of languages with multiple *wh*- questions shows a great variety of subtypes: a) *ex situ*, b) *in situ*, and c) mixed type languages, as well as subtype specific variations¹⁰. The group of languages that do not allow for multiple *wh*- questions consists of members that license *wh*- phrases only in a unique focus position (cf. 10) in the left periphery of the clause through a spec-head relation (cf. 7). As far as I know, this language type consists only of overt *wh*- fronting languages. The analysis I have proposed makes the following correct prediction: there is no *wh*- *in situ* language that does not allow for multiple *wh*- questions. The question whether the languages without multiple *wh*- questions show a variety of subtypes and, if so, which subtypes can be distinguished, remains subject for future research.

¹⁰ I have not discussed the question what kind of features exactly, *wh*- or focus-features, drive the derivation of multiple *wh*-questions in every single subtype of the languages that allow for multiple *wh*-questions. (for a feature based typology of *wh*-questions see Sabel 2004)

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The marked status of ergativity

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Ergative patterns are encountered in only a quarter of the world's languages. Often, the absolutive-ergative pattern co-occurs with a nominative-accusative pattern. Moreover, ergativity is not deeply rooted in the syntax of most languages. In this paper, I develop a theory that explains why ergativity is a marked phenomenon. The main hypothesis is that argument structure has a universal nominative-accusative basis. Two sub-hypotheses, called the *Second Pattern Hypothesis* (SPH) and the *Ergative as Passive Hypothesis* (EPH), derive ergativity. Both of them treat the ergative NP as an adjunct that doubles a pronominal argument. The ergative case is lexical rather than structural.

1. Introduction

Every natural language distinguishes between intransitive and transitive clauses. There are two main patterns in distinguishing the arguments in these clauses. A nominative-accusative pattern treats the sole argument of an intransitive predicate (S) and the subject of a transitive predicate (A) similarly. The direct object of a transitive predicate (O) is treated differently. In Germanic, Romance and Slavic languages, for example, verbal marking generally refers to S and A in the same way; the corresponding noun phrases (henceforth: NPs) appear in the unmarked nominative case. A marked case, the accusative, is used for noun phrases in O-function. Absolutive-ergative patterns, on the other hand, treat S and O as the unmarked category (absolutive) and A as the marked one (ergative). Ergativity is estimated to play a role in approximately 25 percent of the world's languages (Dixon 1994:2). The sentences in (1) illustrate the absolutive-ergative pattern in the case system of Djaru:

- (1) Djaru (Australian, Pama-Nyungan (Tsunoda 1981:97)):
- a. mawun jan-an
 man.ABS go-PRES
 'A man goes.'

- b. mawun-du guɲar buɲ-an
 man-ERG dog.ABS hit-PRES
 ‘A man hits a dog.’

In (1b), *mawundu* ‘man’ is in the ergative case because it is the subject of a transitive sentence (A). In the intransitive (1a), we find *mawun*, which is the unmarked equivalent of ‘man’. The direct object in the b-sentence, *guo̯ar* ‘dog’, appears in its unmarked case as well, giving rise to an absolutive-ergative case pattern. In (1), the verb is not overtly marked for any of its arguments. However, bound pronouns appear when the sentence contains any argument other than third person singular:¹

(2) Djaru (Tsunoda 1981:201,103,194):

- a. ɲad^yu ɲa-ɲa jan-an
 1SG.ABS C-1SG.NOM go-PRES
 ‘I go.’
- b. ɲad^yu-ɲgu ɲa-ɲa-ɲgu ɲundu ɲaɲ-an
 1SG-ERG C-1SG.NOM-2SG.ACC 2SG.ABS see-PRES
 ‘I look at you.’
- c. ɲunuɲɲ-d^yu jambi-gu guɲar-u ɲa-ji bajan-i
 2SG.ABL1-ERG big-ERG dog-ERG C-1SG.ACC bite-PAST
 ‘Your big dog bit me.’

The intransitive subject S in (2a) is realized twice: by an independent pronoun (*Nad^yu* ‘1SG.ABS’) and by a bound pronoun (-ɲa ‘1SG.NOM’), which attaches to a catalyst (C), an otherwise meaningless morpheme hosting clitic elements. Neither of these pronouns is overtly marked for case. The transitive sentence in (2b) shows that the independent pronoun receives an ergative case-suffix when it is in A-function (*Nad^yuɲgu*), but the bound pronoun does not change accordingly. The c-sentence contains a first person singular direct object (O). The independent pronoun would appear in its base form again if it were present, which suggests that these elements pattern in an absolutive-ergative way, just like the nouns in (1). The bound pronoun, however, appears in a marked form, -*ji* ‘1SG.ACC’, suggesting a nominative-accusative pattern.^{2,3}

¹ The term ‘bound pronouns’ is commonly used in the descriptive literature; it refers to verbal markers that often behave like pronominal clitics.

² As I consider nominatives to be caseless, they will be left out of the glosses in the remainder of this paper. This idea draws back on Jakobson (1936) and has been used by people advocating a theory of head and dependent marking (cf. Nichols 1986, Bittner & Hale 1996, Neeleman & Weerman 1999). According to this theory, arguments are licensed either by marking of the head (agreement) or by marking of the dependent (case). This means that in an ergative pattern, absolutives are licensed by head marking since they are caseless. In the next sections, I will argue that this is true for some (but not all) ergative languages.

³ Although the morphological relation between the nominative and the accusative bound pronoun is not clear in this example, other members of the bound pronoun paradigm clearly show that accusative forms are derived from nominative forms, hence the accusative can be considered to be the marked form (Tsunoda 1981: 69-71).

Djaru turns out to be a so-called split ergative language: the absolutive-ergative distinction plays a role in only a part of the grammar, but a nominative-accusative pattern is found elsewhere. Ergativity in Djaru is restricted to case marking of independent pronouns and full NPs. Bound pronouns display a nominative-accusative pattern. A similar distribution of the two patterns is found in different geographic areas and language families and, in most cases, it is described as a split between case marking and agreement. An important generalization which has been made with respect to this particular kind of split ergativity is that there are no languages with an inverse distribution of the two patterns: an absolutive-ergative distinction in the bound forms and nominative-accusative case-marking of non-bound forms is not attested (Silverstein 1976:159; Blake 1977:7; 1987:186; Dixon 1994:95). The fact that in most of these languages, the independent pronouns and full NPs can be omitted but the bound pronouns cannot, provides strong evidence that the nominative-accusative pattern is more basic to natural language than the absolutive-ergative pattern.

In this paper, I will argue that the nominative-accusative pattern is basic to every natural language. Djaru (cf. (1) and (2)) will be analyzed along the lines of the Pronominal Argument Parameter (Jelinek 1984, 1993, 2001) which was primarily designed to account for Warlpiri. This analysis states that argument positions can only be filled by bound pronouns and that all other nominal constituents appear in adjunct positions in which they merely function as argument doubles. My *Second Pattern Hypothesis* (SPH), a sub-hypothesis that will be introduced in section 2, adopts this analysis in order to claim that absolutive-ergative case marking is only available for adjoined nominal constituents. It accounts for ergative languages with nominative-accusative verbal marking and it explains the absence of nominative-accusative case systems in combination with absolutive-ergative bound pronouns or agreement. In section 3, I will present a second sub-hypothesis in order to deal with languages with absolutive-ergative marking on the verb. These look like serious counterexamples to the claim that argument structure is always organized in a nominative-accusative pattern. The second sub-hypothesis, dubbed the *Ergative as Passive Hypothesis* (EPH), however, enables us to maintain the main hypothesis about argument structure. The ergative verbal markers are treated as a set of bound pronouns that only appear in transitive clauses, whereas the absolutive set is a real agreement paradigm. Section 4 concludes the paper and provides suggestions for future research.

2. Pronominal arguments

Jelinek (1984) develops a proposal in order to account for non-configurational languages like Warlpiri within Government & Binding-theory (Chomsky 1981). She takes issue with Hale (1983) who claims that Warlpiri is different from English because it has “free” constituent order, syntactically discontinuous expressions and “null anaphora”. Jelinek proposes that these characteristics follow from the fact that in this type of language, full NPs and independent pronouns are base-generated as adjuncts. Adjuncts order quite

freely and they can be omitted without rendering a sentence ungrammatical. The reason why these NPs may only appear in adjunct positions is that argument positions are obligatorily occupied by other material. Any Warlpiri sentence obligatorily contains pronominal clitics referring to the verbal arguments and Jelinek claims that these elements occupy the argument positions. This is clear in the case of first and second person: apart from independent pronouns, which are often omitted, these arguments are always referred to by bound pronouns (cf. the Djaru examples in (2)):

(3) Warlpiri (Australian, Pama-Nyungan (slightly adapted from Hale, Laughren & Simpson 1995:1430,1432)):

- a. *wangka-mi ka-rna*
 speak-NPST IMPF-1SG
 'I am speaking.'
- b. *ngaju ka-rna wangka-mi*
 1SG IMPF-1SG speak-NPST
 'I am speaking.'
- c. *nya-nyi ka-rna-ngku*
 see-NPST IMPF-1SG-2SG.ACC
 'I see you.'
- d. *ngajulu-rlu ka-rna-ngku nyuntu nya-nyi*
 1SG-ERG IMPF-1SG-2SG.ACC 2SG see-NPST
 'I see you.'

The sentences in (3a) and (3b) are equally grammatical, the independent pronoun *ngaju* '1SG' is an optional constituent that may be added for pragmatic reasons (3b). The same is true for (3c) and (3d), where absence (3c) or presence (3d) of the independent pronouns *ngajulurlu* '1SG-ERG' and *nyuntu* '2SG' does not change the grammaticality of the sentence.

Third person singular subjects and objects, however, are not realized by overt clitics. They may appear as independent pronouns or full noun phrases, but again these are easily omitted without changing the sentence:

(4) Warlpiri (slightly adapted from Jelinek (1984:40), citing Hale (1983:6,7)):

- a. *ngarrka-ngku ka wawirri panti-rni*
 man-ERG IMPF kangaroo spear-NPST
 'The man is spearing the kangaroo.'
- b. *panti-rni ka*
 spear-NPST IMPF
 '(s)he is spearing him/her/it.'

Hale (1983) claims that the arguments in (4a) can be definite or indefinite, but that sentences like (4b) can only have definite arguments. Jelinek concludes that these sentences contain empty, third person singular pronouns that occupy the argument positions. This accounts for the fact that the full noun phrases in (4a) are optionally present, just like first and second person independent pronouns: they are adjuncts. Jelinek's Pronominal Argument Hypothesis (PAH, 1993) states that languages like Warlpiri obligatorily generate every core

argument as an agreement affix or clitic pronoun. This hypothesis implies that non-clitic NPs order freely with respect to the predicate and that they can always be omitted.

The same analysis can be applied to Djaru. Leaving out the independent pronouns in (2), repeated below as (6), would not lead to ungrammaticality. Omission of the full NP *ounuNiød'u jambigu guøaru* 'your big dog' in the (c) sentence is also possible, suggesting that third person singular arguments are primarily realized by empty clitics. Remember that in (6), the bound pronouns cliticize to a morpheme which Tsunoda (1981) calls a "catalyst". In (1), repeated below as (5), there are no overt clitics at all, hence the catalyst is absent as well. However, Tsunoda explicitly refers to the Njininj dialect of Djaru where, even in this type of sentence, the catalyst is present (1981:126). Tsunoda takes this to be evidence that third person singular arguments trigger empty bound pronouns.⁴

(5) Djaru (cf. 1):

- a. mawun jan-an
man.ABS go-PRES
'A man goes.'
- b. mawun-du guɲar buɲ-an
man-ERG dog.ABS hit-PRES
'A man hits a dog.'

(6) Djaru (cf. 2):

- a. ɲad^yu ɲa-ɲa jan-an
1SG.ABS C-1SG.NOM go-PRES
'I go.'
- b. ɲad^yu-ɲgu ɲa-ɲa-ɲgu ɲundu ɲaɲ-an
1SG-ERG C-1SG.NOM-2SG.ACC 2SG.ABS see-PRES
'I look at you.'
- c. ɲunuɲɲ-d^yu jambi-gu guɲar-u ɲa-ji bajan-i
2SG.ABL1-ERG big-ERG dog-ERG C-1SG.ACC bite-PAST
'Your big dog bit me.'

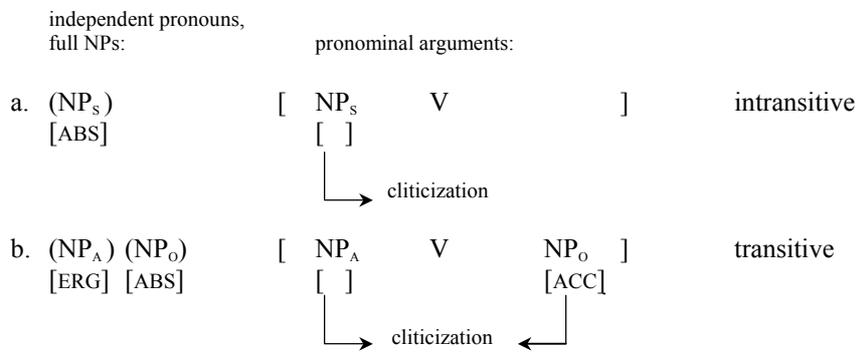
I conclude from this that, in Djaru, the verb and the clitic string function as a complete sentence. Independent pronouns and full NPs may be added but this is not required for grammaticality. I propose to analyze Djaru as a pronominal argument language in terms of Jelinek (1984). In this type of language, the pronominal arguments show a nominative-accusative pattern. It is striking that adjunct-NPs referring to the same arguments show absolutive-ergative case marking. Jelinek claims that pronominal argument languages are often split ergative. In the case of Warlpiri, nominative and accusative case (grammatical or G-cases) are assigned to elements in A-positions. NPs in \bar{A} -positions can

⁴ I am not giving the examples without full NPs because they are not provided by Tsunoda in his grammar. The texts contained in this work, though, show ample evidence that third person free pronouns and full noun phrases are often omitted, unlike bound pronouns. The latter are clearly required for the grammaticality of the sentence.

only bear lexical case (L-cases), ergative being an overt instance of this (Jelinek 1984). I would like to push this analysis somewhat further and claim that this is, in fact, the only configuration where absolutive-ergative case marking can occur. This boils down to the claim that the ergative pattern really is a second pattern for distinguishing core verbal arguments. That is, only if a language is of the pronominal argument-type may an ergative pattern occur. Schematically, the first part of my proposal looks as in (7):

(7) Second Pattern Hypothesis (SPH):

Absolutive-ergative case-patterns are only applied to adjunct-NPs in languages with pronominal arguments.



The sole argument of an intransitive verb, S, is obligatorily realized as an unmarked pronoun which cliticizes to the predicate. This argument may (but need not) be doubled by an NP in adjunct position that is in the unmarked (lexical) case.⁵ The subject of a transitive verb, A, and the object, O, are also realized as pronouns which cliticize. In most cases, A shares the unmarked form with S, whereas O appears in a marked form. This is because the verb assigns accusative case to its direct object. The pronominal arguments of a transitive clause may again be doubled by NP-adjuncts. In some pronominal argument languages, the lexical cases licensing these NPs show an ergative pattern, for instance if only the NP in A-function is overtly marked. The Second Pattern Hypothesis (SPH) assumes that the universal architecture of argument structure is nominative-accusative: only the object receives a case affix (accusative), all subjects appearing in the unmarked case (nominative). An absolutive-ergative system can only apply to argument-doubles in adjunct position, suggesting that ergative and absolutive are lexical cases. Jelinek's Pronominal Argument Hypothesis accounts for the case split in Warlpiri, but does not make any claim about ergativity in general. The SPH differs from that in assuming that this is actually the only configuration in which an ergative case system may occur.

The SPH is based on the assumption that in every natural language the internal role of a transitive verb is assigned to its complement and the external

⁵ Strictly speaking, the arguments in Warlpiri and Djaru do not attach to the main verb. In (5), cliticization takes place within VP but I assume it may also apply within TP, as seems to be the case in Warlpiri.

role to its specifier (contra Marantz 1984, but in accordance with more recent analyses of ergativity, i.e. Murasugi 1992, Bobaljik 1993, Ura 2000). If the subject and the object are to be morphologically distinguished from each other, the verb will always assign accusative case to its object and agree with its subject. This is the nominative-accusative pattern attested in the majority of the world's languages that have been described so far. Adjunct-NPs in pronominal argument languages are expected to be licensed via lexical cases that do not necessarily show the same nominative-accusative pattern. Total absence of any pattern, absolutive-ergative and tripartite patterns occur as well.

Cross-linguistically, pronominal argument languages with nominative-accusative marking on their adjunct-NPs do not seem to be numerous (Anna Siewierska, p.c.). This could be explained by the fact that these NPs will be realized more often by a full NP than by an independent pronoun. Often, the latter are only available for first and second person, and they will generally only be used to signal a contrastive focus or topic. Full NPs, however, are used whenever new referents are introduced or when a sentence needs disambiguation. Du Bois (1987) observes that new referents are typically introduced in S or O-function. This corresponds to the generalization that in transitive clauses, subjects tend to encode old information, whereas objects typically encode new information. Du Bois concludes that discourse is organized in an ergative way: S and O are treated alike and differently from A. Remember that one of the problems of non-configurational languages is their apparent free ordering of constituents. This freedom, however, is not totally unrestricted: the order of constituents is determined by discourse pragmatic factors. Hence, non-configurational languages are often called discourse configurational. Du Bois reports that in an experiment he carried out with native speakers of Sacapultec, a Mayan language, lexicalized arguments appear less frequently in A-function compared to S and O-functions. New mentions even never occur as A. This is compatible with an absolutive-ergative distinction, where the ergative is morphologically marked: absolutives are more often overtly realized than ergatives, hence it is economical to treat absolutives as the morphologically unmarked category. If a language has pronominal arguments, each argument is realized within the predicate. A second realization is not needed for syntactic reasons, so it may be totally dependent on pragmatic rules. This explains why the ergative pattern is likely to appear in pronominal argument languages as a second way of distinguishing between the arguments of the verb.

I expect the SPH to apply to many Australian languages (including Warlpiri and Djaru); Austronesian languages like Djinang (Waters 1989); Chukotko-Kamchatkan (Bobaljik 1998); Papuan languages like Yéli Dnye (Levinson 2003) and Tauya (MacDonald 1990); as well as Tibeto-Burman languages like Kham (Watters 2002). Note that the SPH excludes languages with absolutive-ergative verbal marking. To a certain extent, this is a desirable result. Various researchers have pointed out that there does not seem to be a single language with absolutive-ergative patterning clitics and nominative-accusative case-marking on full NPs (Silverstein 1976:159; Blake 1977:7; 1987:186; Dixon 1994:95). The SPH predicts why this should be the case: the universal pattern found in argument structure is nominative-accusative, absolutive-ergative only

appears as a second pattern. This is, to the best of my knowledge, a new idea that deserves to be explored more deeply in several languages. However, we should be aware of the fact that we do find languages with absolutive-ergative verbal marking, as will be illustrated in the next section.

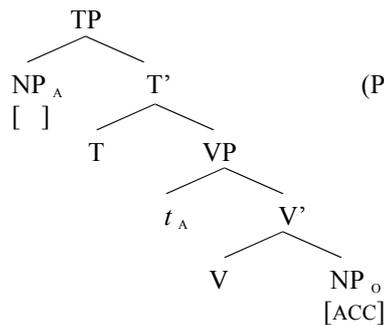
3. Ergative as Passive

Trask (1979) notes that in the past, linguists frequently analyzed ergative constructions as passive. Indeed, constructions like the Kurmanji example below thoroughly resemble passive sentences (8b):

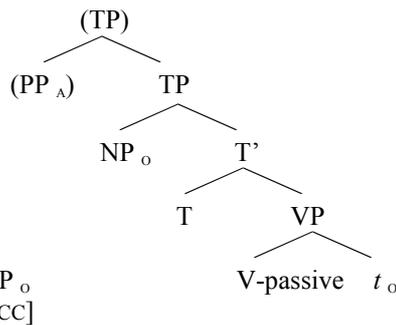
- (8) a. Kurmanji (Indo-European, Iranian, Kurdish (Subhî Ahmed, p.c.):
te em šû-št-in (ergative)
 2SG.ERG 1PL wash-PAST-PL
 ‘You washed us.’
 b. We were washed by you. (passive)

In both sentences, first person plural O (*em* ‘we’) is unmarked for case and triggers agreement on the verb, whereas second person singular A (*te* ‘(by) you’) is morphologically marked, in the ergative construction by marked case morphology and in the passive construction by a preposition. In nominative-accusative languages, the passive by-phrase is optionally present. Traditionally, this has been explained by assuming that the A-argument in passive constructions is realized as an adjunct. One way to obtain this result is to assume that the passive morphology turns a transitive verb into an intransitive one, demoting the external argument. The trees in (9) show what happens:

(9) a. active



b. passive



In active, transitive sentences, the verb assigns accusative case to O. A remains unmarked but raises to Spec TP in order to check the EPP-feature and its phi-features for agreement (9a). We call the latter nominative because in an intransitive sentence, S would receive the same treatment as A. The passive verb, on the other hand, is an intransitive predicate which does not take an external argument, so the internal argument with the same semantic role as the

direct object O is all there is. Intransitive verbs normally do not assign accusative case, so O stays unmarked and raises to Spec TP in order to become licensed. This triggers agreement with O. A is optionally added as an adjunct headed by the preposition *by* (9b). Even when it is not overtly realized, the existence of an agent is implied by the passive morphology, so in semantic terms the verb stays transitive.

I will propose an alternative analysis of the passive construction that allows the verb to stay transitive in syntactic terms as well, providing the key to understanding ergative constructions of the kind found in Kurmanji and Northwest Caucasian. The following data are from Abkhaz:

(10) Abkhaz (Northwest Caucasian, Khibla Amichba (p.c.)):

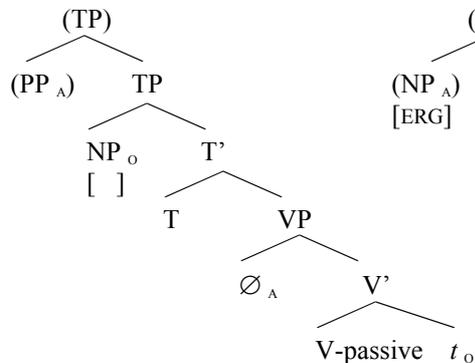
- a. *sara sy-cueit*
1SG 1SG-walk.PRES
'I am walking.'
- b. *uara uy-cueit*
2SG 2SG-walk.PRES
'You are walking.'
- c. *sara uara u-sy-dzvdzvoit*
1SG 2SG 2SG-1SG.ERG-wash.PRES
'I am washing you.'
- d. *uara sara s-u-dzvdzvoit*
2SG 1SG 1SG-2SG.ERG-wash.PRES
'You are washing me.'

In Abkhaz, the verb agrees with subjects and objects. The independent pronouns in (10), *sara* '1SG' and *uara* '2SG' can be omitted, suggesting that the personal prefixes attached to the verb are pronominal arguments. These prefixes show an absolutive-ergative pattern: the initial prefix refers to either S or O (the absolutive), whereas the A-prefix appears closer to the verb stem.⁶

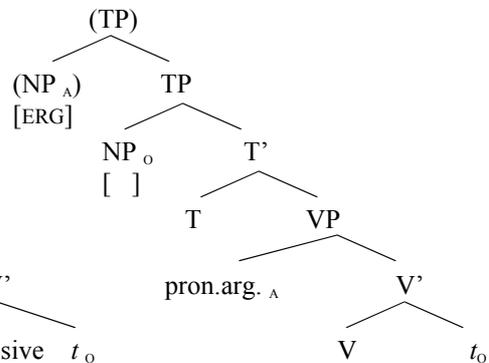
My treatment of passive constructions is based on Hoekstra (1986), Jaeggli (1986) and Baker, Johnson & Roberts (1989). Compare (11a) with (9b):

⁶ The verbal prefixes in (10) do not show any formal distinction between ergative and absolutive. As Abkhaz has a rich inventory of consonants and only a few vowels, 'y' often appears as a linking vowel. It may be combined with every possible personal prefix and, hence, does not make any distinction between syntactic functions. However, as I will show below, other members of the prefixal paradigms do formally distinguish between absolutive and ergative.

(11) a. Passive



b. Ergative



Suppose that passive verbs are transitive verbs that force A to be an empty argument by means of their passive morphology. By doing so, they morphologically distinguish A from O which might explain why accusative case is normally not assigned in these constructions.⁷ The unmarked object raises to Spec TP in order to check its phi-features and the EPP-feature of T. To this structure, a by-phrase may adjoin in order to provide a specification for the empty subject. Suppose further that the goal of forming passive constructions is to present an event from the object's point of view. Leaving A unexpressed and treating O as a syntactic subject is one way of realizing this: the sentence is mainly about what is happening to O, not about what A is doing. An alternative means of presenting an event in this way might be to realize A as a pronominal argument which cliticizes to the verb (11b).⁸ By doing so, A is automatically morphologically distinguished from O, which does not cliticize, so again there is no need to assign accusative case. As in canonical passive constructions, O raises to the TP-projection and a full NP or independent pronoun is optionally adjoined to the clause, doubling the cliticized A-pronoun. The adjunct NP may be licensed by a preposition or a case-particle, just like the by-phrase in canonical passive constructions. This preposition or case-particle will be perceived of as an instance of ergative case because it applies to transitive subjects. I will refer to this alternative account of ergativity with the term Ergative as Passive Hypothesis (EPH):

⁷ Baker, Johnson and Roberts (1989) assume that the passive morpheme (in languages like English) receives the external theta-role, prohibiting overt NPs to be base-generated as the subject. Due to the fact that theta-marked elements must be visible according to the Visibility Condition proposed by Chomsky (1981), the passive morpheme must receive case. This can only be the accusative case because the morpheme has been downgraded. Although different from the present proposal, this approach yields the same result, namely that the object has to move.

⁸ Baker, Johnson and Roberts (1989) argue that the passive morpheme in English is syntactically a clitic but phonologically an affix.

(12) Ergative as Passive Hypothesis (EPH):

Passive verbs are syntactically transitive, either by base-generating the transitive subject as an empty element (canonical passive) or as a pronominal argument (ergative as passive). If either of these operations is obligatory, the language shows absolutive-ergative marking on the verb.

	independent pronoun, full NP:	independent pronoun, full NP:	independent pronoun, full NP:				
a.	[NP _s	V]	intransitive		
		[]					
		pronominal argument:					
b.	(NP _A)	[NP _A	V	NP _o]	transitive
	[ERG]	[]			[]		
			└─→	cliticization			

The main difference with the SPH is that under the EPH, absolutives are caseless NPs which are licensed by agreement, rather than adjuncts licensed by lexical absolutive case.

According to the EPH, there are languages where the passive operation is obligatory: all transitive constructions surface as passives. These are called canonical if the verb agrees with absolutive arguments and the transitive subject does not trigger any marking, like in Kurmanji and related languages.⁹ In these languages, the argument position for A is occupied by an empty category. In other languages, however, a pronominal argument occupies this position. This appears to be the case in Northwest Caucasian. Abkhaz, for example, does not apply overt case marking. Each of S, A and O triggers verbal marking. Various researchers have shown that the Abkhaz verb uses one slot for marking S/O and another for marking A (Hewitt 1979, 1989; Chirikba 2003). The independent pronouns and the verbal markers, taken from Chirikba (2003:32,40), are given in (13):¹⁰

(13)	Abkhaz	verbal markers:		independent pronouns:
		S/O	A	S/A/O
				[] / [ERG]
SG	1 st	s(ə)-	s(ə)- /z(ə)	sa(rá)
	2 nd	w(ə)-	w(ə)-	wa(rá)
	2 nd .FEM.	b(ə)-	b(ə)-	ba(rá)
	3 rd .MASC.	d-	j(ə)-	ja(rá)
	3 rd .FEM	d-	l(ə)-	la(rá)

⁹ In Kurmanji, like in many Iranian languages, the ergative construction only appears in past tense clauses, implying that passivization is only obligatory in past tense contexts.

¹⁰ The spelling in (11) differs slightly from the examples in (8), because the latter were sent to me by an informant, whereas the former are from Chirikba (2003). The main difference is the spelling of the linking vowel (cf. footnote 6): in (8) it is represented by *y*, in (11) by *ə*.

	3 rd .NONHUM	<i>j(ə)-</i>	<i>(n)a-</i>	<i>ja(rá)</i>
PL	1 st	<i>h(a)-</i>	<i>h(a)- /aa-</i>	<i>ha(rá)</i>
	2 nd	<i>š^o(ə)-</i>	<i>š^o(ə)- / ž^o(ə)-</i>	<i>š^oa(rá)</i>
	3 rd	<i>j(ə)-</i>	<i>r(ə)- / d(ə)-</i>	<i>da(rá)</i>

The verbal markers for S and O belong to the same paradigm and they appear in the same position in the morphological template of the verb. The markers for A differ slightly from the S/O-paradigm and moreover they appear in a different position, closer to the verb-stem. This gives rise to a seemingly absolutive-ergative pattern. Notice, however, that the ‘ergative’ paradigm is more elaborate than the ‘absolutive’ one: there is a three-way gender distinction for third person singular, and there is also a separate third person plural form. The ‘absolutive’ paradigm only distinguishes between two genders with respect to third person and the plural form is homophonous to the form used for singular non-human. Above all, the forms that are present in the “ergative” paradigm but lacking in the “absolutive” one resemble the independent pronoun. These differences can be accounted for by the EPH: the “ergative” markers are cliticized pronouns, whereas the “absolutive” markers are agreement-affixes. Although the SPH cannot account for a language like Abkhaz, the EPH can.

In Abkhaz, as well as in the closely related Abaza, independent pronouns and full noun phrases are not marked for case. Hence, we need to assume that the ergative case is empty. However, the related Northwest Caucasian languages (Adyghe, Kabardian, Ubykh) do have overt instances of the ergative case (Smeets 1984). Moreover, they display a similar pattern of verbal marking as Abkhaz, although there are no gender distinctions. The verbal paradigms in Basque show similar evidence in favour of the EPH (Hualde & Ortiz de Urbina (2003). Gitksan, a Tsimshian (Penutian) language from North America, has person marking for A-arguments, whereas S/O-arguments can be shown to trigger number-agreement in independent clauses (Peterson 2003).

Remember that the SPH was developed in order to account for the generalization that there are no languages with absolutive-ergative agreement and nominative-accusative case marking. This was ruled out by the main hypothesis that argument structure has a universal nominative-accusative basis, and this basis is always visible in pronominal argument languages. Languages with ergative verbal marking, however, cannot be accounted for by the SPH. The EPH complements the SPH in this respect, and at the same time makes the same prediction: it still excludes languages combining absolutive-ergative verbal marking with nominative-accusative case marking. The only possibility with respect to case marking under the EPH is absolutive-ergative, which may appear as neutral when the ergative case is not overt (cf. Abkhaz/Abaza). By hypothesis, the fact that the verb agrees with absolutive arguments in these languages is explained by the fact that it does not assign accusative case to its complement, which means that only the NP doubling the A-clitic may be overtly case-marked.

4. Conclusions and perspectives

In this paper, I have presented an analysis of the main absolutive-ergative patterns we encounter in natural language. The proposal treats nominatives as caseless; absolutives are either lexical (SPH) or caseless (EPH); accusative is a marked structural case and ergative a marked lexical case. The proposed universal architecture of argument structure assumes that a transitive verb may only assign structural accusative case to its complement, which receives the internal theta-role. The external role is assigned to the argument in the specifier, which moves to a higher functional category (TP) in order to become licensed. This invokes verbal agreement. The sole argument of an intransitive verb behaves like the external argument of a transitive verb, yielding an argument structure which patterns nominative-accusatively. This is the main hypothesis, which I take to be a universal principle of natural language. Ergative case is considered to be a lexical case, licensing transitive subject-NPs in \bar{A} -position. Two complementary sub-hypotheses account for a typologically motivated range of ergative languages.

Firstly, the *Second Pattern Hypothesis* (SPH) predicts that languages with pronominal arguments are likely to use the ergative pattern as a second pattern of distinguishing between the core arguments. A nominative-accusative pattern is less likely. In SPH-languages, all verbal arguments are obligatorily realized by pronominal arguments showing a nominative-accusative pattern. All full NPs and independent pronouns are necessarily generated as adjuncts because they cannot appear in argument position. In some languages, no morphological distinction is made between these NP-adjuncts. Very few other languages mark the object, resulting in a (second) nominative-accusative pattern. Yet other languages mark transitive subjects in a way such that an absolutive-ergative system obtains. This system is motivated by the fact that the adjuncts are most often third person and the fact that their presence or absence is determined by pragmatic factors. The SPH is closely related to Jelinek's Pronominal Argument Hypothesis (1993) and is expected to account for every language that has a split between case marking and "agreement". Pama-Nyungan languages like Warlpiri and Djaru, Austronesian languages like Djinang, the Chukotko-Kamchatkan languages, Tibeto-Burman languages like Kham and Papuan languages like Yéli Dnye and Tauya illustrate such a split.

The second hypothesis, the *Ergative as Passive Hypothesis* (EPH), accounts for languages that apply an absolutive-ergative pattern in their verbal marking. The EPH states that for reasons underlying passive formation, languages cliticize the transitive subject to the verb, resulting in a "canonical" passive construction or in an "ergative" set of verbal markers. Objects and intransitive subjects may trigger overt agreement that we conceive of as an "absolutive" set of verbal markers. The difference with the SPH is that according to this hypothesis, only transitive subject-NPs are adjuncts, whereas objects and intransitive subjects originate in argument positions. If NP-adjuncts in \bar{A} -function are licensed by an overt case-particle, the absolutive-ergative distinction will also be visible in the case system. The EPH is based on an analysis of canonical passives that treats passive verbs as transitive predicates obligatorily taking an empty subject, instead of treating them as intransitive

predicates. This analysis accounts for ergative languages with absolutive agreement on the verb, like many Indo-Iranian languages and Northeast Caucasian. The non-canonical part of the EPH applies to languages like Northwest Caucasian, Basque and Gitksan where both subjects and objects are marked on the verb in an absolutive-ergative pattern.

Future research should provide more evidence in favour of these two sub-hypotheses. The literature on the Pronominal Argument Hypothesis and the closely related Polysynthesis Parameter (Baker 1996) predict that full NPs are necessarily referential whenever they function as a double of a pronominal argument. This can be explained by the fact that they are in a syntactic binding relation with their pronominal argument. Weak Crossover effects show that pronouns cannot receive a variable interpretation when they are bound from an \bar{A} -position (cf. Rizzi 1986). This implies that lexical quantifiers are absent from pronominal argument languages, because they would be able to render the NPs non-referential. In this respect, pronominal arguments and their doubles appear in constructions similar to clitic-left dislocation in Romance, Slavic and Greek. My proposal naturally predicts the same for SPH-languages, since they are a subclass of the pronominal argument languages. The EPH is less strict: lexical quantifiers could exist in the languages at stake but they should not be able to occur in transitive subject position. More detailed research on the languages discussed in this paper will be needed in order to see whether these predictions are borne out.

In general, more research in languages other than the ones cited here will be needed in order to support the idea that ergativity is universally derived in the ways sketched in this paper.

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Choose between metaphysical and epistemic alternatives

Evangelia Vlachou

This paper proposes a new way of analyzing a special kind of item, called Free Choice Items (FCIs). As the name reveals, these items express *freedom of choice* and are therefore grammatical in contexts which express variation among alternatives, such as in imperatives: *pick any card* (Vendler 1967). Until now, attention has been mostly given to the licensing conditions of these items and scholars have claimed that FCIs are grammatical in all contexts that presuppose alternatives. In this paper, based on novel English and Greek data, I argue that focus should also be given to the nature of the alternatives that FCIs denote. I pursue the hypothesis that FCIs are divided into two subclasses: FCIs that denote epistemic alternatives and FCIs that denote metaphysical alternatives.

1. Introduction

English, as all the world's languages, exhibits a special class of items that appear in contexts that denote *freedom of choice*. Vendler (1967) coined this term in his description of *any*: the item *any* combines *indetermination* with *generality* and expresses *freedom of choice* "so much that in situations that exclude such freedom, the use of *any* becomes nonsensical".

Based on this observation, Ladusaw (1979) coined the term Free Choice (FC) *any* as opposed to Polarity Sensitive (PS) *any*. The second term is primarily, but not exclusively, used when *any* appears in negative contexts (1) and is distinguished from the first in that it is primarily, but not exclusively, used when *any* appears in some types of modal contexts (2).¹

(1) I didn't see any girl

(2) You may take any flower

¹ For instance, the root modal *must* does not license *any*:

(i) *You must take any flower

In the recent literature, attempts have been made to provide a uniform analysis for PS and FC *any* (see Kadmon & Landman 1993; Horn & Lee 1994) leaving open some crucial questions concerning the semantic properties of *any* itself and of its counterparts in other languages. In this paper, I do not try to unify the two flavors of *any*. Far from that, I analyze the semantics of FCIs based on data from English and Greek. Due to space restrictions, a discussion on whether or not the hypothesis proposed here extends to PS items (PSIs) is beyond the scope of this paper.

The literature on FCIs has, for many years, shown that they constitute a homogeneous class whose salient distributional property is ungrammaticality in contexts that do not express variation. For this reason, FCIs have been analyzed as a subclass of PSIs whose distribution is restricted to a certain semantic property of the context in which they appear. In more concrete terms, FCIs are allergic to episodic contexts (3), which describe one and only one event that took place once in the past (4).

(3)*Yesterday, I saw anyone

(4)Episodicity (Giannakidou 1997a, 2001)

$\exists!e \phi(e)$

Therefore, as Giannakidou (2001) points out, “Free Choice Items are items which are not acceptable in episodic contexts, but they become licit if we insert an operator including plurality of events or situations”. As Giannakidou (1997b, following Dayal 1997) claims, modality is one of the good licensors of FCIs because “the FCI variable must be assigned distinct values in each world or situation we consider”. Therefore, she argues that FCIs are grammatical whenever variation among identity-alternatives (hereafter *i-alternatives*), as defined below, is contextually expressed.

(5)i-alternatives

A world w_1 is an *i-alternative* wrt a iff there exists some w_2 such that $[[a]]^{w_1} \neq [[a]]^{w_2}$

The term is synonymous to the term *counterpart* that Lewis (1968, 1986) introduced. He argued that it is possible for the same descriptions to apply to different individuals in different worlds. These individuals are called *counterparts*. The approaches that propose an analysis of FCIs in terms of variation use the term *alternative*. I also use this term throughout this paper.

Imperatives also constitute good FC contexts in which the existence of different alternatives can be contextually or pragmatically given.

(6)Take any card!

Moreover, according to these analyses, i-alternatives are epistemic alternatives and are therefore defined according to the speaker's epistemic state. The notion of epistemic i-alternatives has been used as the most salient semantic property of FCIs. This of course predicts correctly that FCIs are grammatical whenever they are used in a context that expresses variation (see Jayez & Tovenca to appear for a recent overview of the variation-based approaches).

The controversy evolved when cross-linguistic studies on the phenomenon of FCIs brought to the surface, some intriguing data for the analysis presented above. For instance, Lee (1999) published a paper on Korean FCIs in which he claimed that not all FCIs are anti-episodic. Lee's data are very interesting because they provide evidence that the class of FCIs is not homogeneous.

As far as the items themselves are concerned, all analyses of English FCIs have been based on the distributional properties of *any* without analyzing another candidate which has also the flavor of *freedom of choice*: the class of items like *whoever*, called hereafter *complex wh-items*. All non-English FCIs have been translated randomly either into the former or into the latter without making any distinction between these two items. This "new" class of FCIs is formed by a *wh*-item and the particle *ever*. Horn (2000) has argued that complex *wh*-items constitute the distributional twins of *any* items.

Indeed, complex *wh*-items, just like *any*, are grammatical when used in contexts that allow for some kind of variation. This is borne out by the example below.

(7)Whoever can solve this problem is intelligent

However, there are some other contexts in which the two series of items do not present the same grammaticality conditions.

(8)Whoever/(*anyone that) John chooses, there will be a loss of confidence²

Example (8) constitutes an instance of what has been analyzed in the literature as a special type of conditional, namely a Universal Concessive Conditional (UCC) (Koenig 1986; Gawron 2001). Gawron (2001) analyses these sentences as equivalent to alternative NPs and to concessive sentences introduced by *even if*. Clearly, (8) expresses variation among i-alternatives-candidates that John can choose. From the above analyses, we would predict that FCIs would be grammatical in this context. Surprisingly, as shown above, *any* is ungrammatical in this context.

From this demonstration, it becomes obvious that there are more than the one kind of FCI that has traditionally been recognized. The claim that the basic semantic property of FCIs is that they are licensed in contexts which express

² The topic-like character of complex *wh*-items *contra any* seems to indicate also another distinction between these two kinds of FCIs: complex *wh*- FCIs are definites and *any* items are indefinites (cf. Vlachou 2003b, 2004b, to appear b).

variation among *i*-alternatives is not a cure-all. It does not describe adequately the semantic properties of all FCIs.

In this paper, I propose that the above differences are due to the different nature of alternatives denoted by each particular FCI. More precisely, I pursue the hypothesis that complex *wh*-items denote epistemic alternatives whereas *any*-items denote metaphysical ones. Evidence is also given from Greek, a language that exhibits a morphologically rich paradigm of FCIs.

The paper is organized as follows. In section 2, I overview the paradigms of English FCIs formed by *any* and complex *wh*-items, and the Greek FCI *opjosdhipote* and their respective distributional properties. In section 3, I focus on UCCs, which are not good licensing contexts for FC *any*, and present their semantic properties. This will help us to better understand the differences between complex *wh*- and *any* items. In section 4, the main hypothesis of this paper is presented. FCIs are divided in two classes depending on the alternatives that they denote: a) FCIs that denote epistemic alternatives and b) FCIs that denote metaphysical alternatives. In section 5, the conclusions of this paper are given.

2. The paradigm of English and Greek FCIs

In this section, the paradigm of English FCIs and of the Greek FCI *opjosdhipote* is given in order for the reader to acquire a better understanding of the forms used throughout this paper.

2.1. English FCIs

As we saw above, English possesses two, morphologically distinct, classes of FCIs. Both of these types can be used either as adjectives or as pronouns.³

(9)English FCIs

Any: anyone, anybody, anything, anywhere, anyhow, anyway

Complex *wh*-items: whoever, wherever, whenever, whatever, however, whichever

³As claimed in (Hoeksema & Klein 1995; Vlachou 2003a, to appear a) the licensing conditions of FCIs vary depending on whether they are used as adjectives or as pronouns. In this paper, I am not concerned with this difference.

2.2 The Greek complex *wh*- FCIs

Greek is a very interesting language with respect to FCIs as it possesses five FCI-candidates.⁴ Giannakidou (1997a, 2001) has presented an extensive analysis of one of them: *opjosdhipote*. This FCI is formed by a *wh*-item, the emphatic particle *dhi* ‘indeed’ and the Greek particle *pote* ‘ever’ (Giannakidou 2001). For the purposes of the present paper, I will concentrate only on this one and will leave the others untouched (cf. Vlachou 2003c, 2003d for a complete overview of the other FC-classes).⁵

(10) Greek complex *wh*-FCIs (slightly modified from Giannakidou 2001)

(opjos/opja/opjo)dhipote:	FC-person;	anyone, anybody, whoever
otidhipote:	FC-thing;	anything, whatever
(osos/osi/oso)dhipote:	FC-quantity;	any quantity, as much as
opudhipote:	FC- place;	any place, wherever
opotedhipote:	FC-time;	any time, whenever
oposdhipote:	FC-way;	any way, at any rate, however

2.3. Their respective distributional properties

As we saw in the previous section, both types of English FCIs are grammatical in modal contexts, but they differ with respect to their grammaticality in episodic and UCC contexts. As far as the Greek paradigm is concerned, its distributional properties show that it is semantically closer to complex *wh*- than to *any* FCIs. Consider the following data. First, it is grammatical in modal contexts and ungrammatical in positive episodic contexts.

(11) Opjosdhipote bori na erthi sto parti⁶
 FCI. can.SUB come to the party
 ‘Anyone can come to the party’

⁴ 1) complex *wh*-items, 2) bare *wh*-items combined with the Greek concessive marker *and if*, 3) bare *wh*-items combined with the form *and SUB*, 4) complex *wh*-items combined with the Greek concessive marker *and if*, 5) complex *wh*-items combined with the form *and SUB*.

⁵ The results reported in this paper are part of a database project which aims to analyze the semantic properties of FCIs in English, Greek and French. Many data used throughout are extracted from this database. For the moment, the results I have come up with are not sufficient for an item-by-item analysis. For this reason, I leave the analysis of the semantic differences between the five Greek FCI-classes open for future research.

⁶ It should be made clear that English complex *wh*-items, unlike Greek *opjosdhipote* and *any*, always introduce Free Relative (FR) constructions. Exceptions constitute its indiscriminate uses:
 (ii) I will eat whatever

- (12) *Xthes idha opjondhipote
 Yesterday, saw FCI
 ‘*Yesterday, I saw anyone/whoever’

Second, as shown below, it is grammatical in negative episodic contexts and in UCCs.

- (13) Dhen milisa me (ton) opjondhipote—*(milisa me ton proedhro)⁷
 Not spoke with the FCI spoke with the president
 ‘I didn’t talk to *(just) anyone—I talked to the president’
- (14) Opjondhipote dhialekse o janis, tha iparksi elipsi ebistosinis.
 FCI chose the John will THERE.BE loss confidence
 ‘Whoever/*Anyone (that) John chose, there will be a loss of confidence’

These data are very interesting for the whole discussion on FCIs cross-linguistically and show that not all FCIs are ungrammatical in episodic contexts or, in other words, that not all are grammatical only in contexts which express variation.

Opjondhipote is grammatical in negative episodic contexts whereas FC *anyone* is not. The latter becomes immediately grammatical in negative, episodic contexts whenever preceded by *just* or, as we will see in a while, when transformed by intonational patterns. What do all these facts reveal about the semantic properties of FCIs? The answer to this question will be our main concern in the following section.

Let us summarize our discussion up to this point, before we go on to the analysis. FCIs have been long analyzed as a homogeneous class of items and as belonging to the general class of PIs. Novel data from Korean have shown that this class is not homogeneous. In the previous sections, we saw that English data point towards this hypothesis. The two morphologically distinct classes of FCIs that English possesses differ in their conditions of grammaticality in UCC contexts. This shows that FCIs form two semantically distinct classes. This hypothesis is also supported by Greek data: the Greek FCI *opjondhipote* is grammatical in negative episodic contexts and in UCCs.

I claim that grammaticality of some FCIs in episodic contexts and the ungrammaticality of others in contexts that denote variation do not question the analyses on FCIs presented in the introduction of this paper. Far from that, they verify it. I propose that importance should however be given to the nature of alternatives that these items denote.

In the remainder of this paper, I overview the semantic properties of UCCs and pin down the difference of grammaticality of FCIs in this context to the nature of the alternatives that they denote.

⁷ The definite article before *opjondhipote* is not obligatory.

3. Universal Concessive Conditionals

In this section, we go through the basic semantic properties of UCCs. This is very important for the reader in order to understand why ungrammaticality of *any* in these contexts is crucial for the whole analysis of FCIs.

Morphologically, UCCs are either clauses or NPs, and they are introduced either by an English complex *wh*-item or by some other form as shown below. They may be placed clause initially, but need not be.

(15) No matter what you do, he will kill me

(16) Whether John ate creampuffs or napoleons is not an issue

(17) John accepted whatever salary he has been offered (Gawron 2001)

Semantically, UCCs express independence between the protasis and the apodosis. They assert that, for all values of x , g is true. When the variable occurs both in the protasis and the apodosis, the UCC expresses (18). If not, the UCC expresses (19).

(18) $\forall x f(x) \Rightarrow g(x)$ ⁸

(19) $\forall x f(x) \Rightarrow g$

They differ from universal quantifiers in that the last ones become pragmatically odd in UCC contexts (20). As explained in Gawron (2001), this difference is due to the fact that UCCs invoke a pragmatic scale and denote an entity that takes a minimum on that scale. This scale is invoked through *ever*.

(20) *Everything (that) you do, he will kill me

Remember that all analyses of FCIs claim that they are grammatical in contexts that express variation (see Dayal 1997, Giannakidou 1997b). However, these analyses make the following wrong prediction: since UCCs are equivalent to alternative NPs (Gawron 2001), and therefore express variation, they must be good FC contexts. However, as shown in (21), this is only partially true since *any* is ungrammatical in such contexts (see also ex. 8 above).

(21) Whatever/*any dish John cooks, Mary is usually pleased

In order to understand the reason for which *any* is ungrammatical in such contexts, we need to understand the semantics of sentences such as (21). The

⁸ Whichever decision you take, I will approve *it*.

speaker predicts that there is a world in which John cooks and Mary is pleased. This world is not the actual world but is described according to what the speaker believes about what the world *could* be like. In other words, (21) is synonymous to *Mary must be pleased with the dishes that John cooks*.⁹ The speaker's beliefs are based on what she knows about the dishes that John cooks. In other words, the alternatives denoted are epistemically accessible to the speaker.

Such a context cannot license *any*. It seems that *any* is ungrammatical in contexts that require that the alternatives be epistemically accessible. This point is, moreover, supported by the fact that in negative episodic contexts, as in (22), FC *any* is grammatical if and only if it is preceded by a focus particle or transformed by intonational means. Such external devices make the nature of the alternatives denoted epistemically accessible to the speaker. If it is the case that *any* does not denote epistemically accessible alternatives, then the question is what is the nature of the alternatives that it denotes.

(22) John didn't talk to *(just) anyone/*ANYone—he talked to the president¹⁰

4. Epistemic versus metaphysical alternatives

In the previous section, it has been claimed that complex *wh*-items denote epistemically determined alternatives. The goals of the present section are the following. First, I show that, indeed, *any* FCIs, contrary to complex *wh*-items, do not denote epistemically accessible alternatives. Second, I propose that the alternatives denoted in the case of *any* are metaphysical. Third, I argue that the Greek FCI *opjodhipote* also denotes epistemically accessible alternatives.

Before doing so, however, let us consider the meaning of the terms “epistemic” and “metaphysical” alternatives. The alternatives are of different natures depending on whether we have an epistemic or metaphysical modal basis. The term *epistemic modality* has received many heterogeneous analyses. Basically, some scholars use it as contributing to the truth conditions of a sentence and others as expressing the speaker's attitude towards the content of the sentence (see Papafragou to appear for a summary of both approaches). In this paper, the term *epistemic* is used as synonymous to the second definition. The alternatives become available to the speaker through her epistemic state. It should be made clear that *epistemic* should not be confused with *true*. This term describes the nature of the alternatives denoted. No information is given about whether the sentence is true or not.

⁹ *Must* here should be understood as expressing possibility and not necessity.

¹⁰ As Horn (2000) points out, prosody or diacritics can accomplish the same effect as *just*:
 (iii) A: I am not supposed to be talking to anybody about this case
 B: First of all, I am not anyone. I'm a licensed dealer in celebrity collectibles.
 (from Horn 2000, Dialogue from episode of ABC television series “Murder One”, Dec. 1996)

On the other hand, metaphysical modality refers to non-actualized events which have been considered as possible before the utterance of a clause containing them (see Condoravdi 2001).

More precisely, in (23), the modality is epistemic or, as Condoravdi points out, “the possibility is in view of the epistemic state of the speaker”. In (24), the modality is metaphysical: “we are now located in a world whose past included the (unactualized) possibility of his winning the game”. Modality describes how the world would be if he won the game.

(23) He may/might have (already) won the game (# but he didn’t)

(24) At that point, he might still have won the game, but he didn’t in the end

After this brief overview of epistemic and metaphysical modalities, let us go back to our old friends. Remember that we said that complex *wh*-items denote epistemically accessible alternatives and are grammatical in contexts that describe a possibility-prediction based on the speaker’s epistemic state. This predicts that they are not grammatical in contexts that describe a world whose past included the unactualized possibility of an event to take place. On the other hand, *any* items are predicted to be grammatical in such contexts.

(25) *Last year, the law was that whoever submitted the assignment late failed but finally all students submitted their assignments in time

(26) Last year, the law was that anyone who submitted the assignment late failed but finally all students submitted their assignments in time¹¹

The data above show that sentences introduced by complex *wh*-items cannot give rise to metaphysical interpretations whereas the ones introduced by *any* can. The Greek FCI *opjosdhipote* seems to pattern with the first one¹²

(27) *Tin perasmeni xronia, o nomos itan oti opjosdhipote arghuse na paradhosi tin ergasia tu, kovotan, ala telika oli tin paedhosan stin ora tus
 ‘*Last year, the law was that whoever submitted the assignment late failed finally all students submitted their assignments in time’

A final indication which shows that the alternatives denoted by *any* are not epistemically accessible is given by the following example. Following Dayal

¹¹ This is also one of the major differences between *any* items and universal quantifiers:

(iv) *Last year, the law was that everyone who submitted the assignment late failed but finally no one did.

¹² This reminds us also of Jacobson’s (1995) analysis of FRs in terms of existential presupposition.

(1997), *whatever* expresses speaker's ignorance as the continuation *but I don't remember what it was* indicates. *Any* is ungrammatical in such context.

(28) I ate whatever dish John cooked, although I don't remember what it was

(29) *I ate any dish that John cooked, although I don't remember what it was

Up to this point, we saw that, contrary to Dayal (1997) and Giannakidou (1997b), not all FCIs denote epistemically accessible alternatives: *any* denotes metaphysically accessible alternatives whereas *complex wh*-items and the Greek FCI *opjodhipote* epistemically accessible ones. This is due to two different modal operators that these two types of FCIs contain. FC *any* contains a metaphysical modal operator whereas English and Greek complex *wh*-FCIs contain an epistemic one.

The idea that FCIs contain a modal operator is not new. To my knowledge, it has been first proposed by Dayal (1998). The main contribution of the present paper is that it proposes that the different properties of FCIs can be pinned down to the nature of the alternatives that they denote and not only to the modal operator that they contain.

This also explains why *any* is not grammatical in negative episodic contexts if not preceded by the focus particle *just*. As is well known, *just* refers to the least likely entities from a scale of alternatives. *Any* alone cannot.

The epistemic character of the alternatives that complex *wh*-items denote explains also their difference from universal quantifiers. Observe more closely the examples below from Gawron (2001).

- (30) a. #John would accept every salary they offered
 b. John would accept whatever salary they offered

The first is pragmatically odd (#) because it describes *John being offered an arbitrary number of salaries and accepting each*. This does not hold for the second example. In this example, *whatever* invokes a pragmatic scale and denotes an entity that takes the minimum on that scale. For this reason, Gawron (2001) claims that *whatever* is non-quantificational and proposes that (30b) should be represented as in (31) where $\{s,x\}$ indicate the variables that need to be universally quantified over by the conditional operator.

(31) $[\text{job}(s)(x) \Rightarrow_{\{s,x\}} \text{offer}(s)(\text{they},x) \wedge \text{accept}(s)(j,x)]$

As Gawron explains, quantificational readings as the ones we saw above arise by scalar implicature and this comes from *ever*. Therefore, the scale is an entailment ordering such that x is a minimum if and only if.

(32) $\forall y \in S \square [\text{OS}(x) \rightarrow \text{OS}(y)]$

The modality expresses that the scale measures a likelihood: in all likely worlds, the implication holds. (30b) denotes a minimum x and presupposes the above implication.

$$(33) \Pi (P, Q, x) \equiv \forall y \in P \square [Q(x) \rightarrow Q(y)]^{13}$$

Finally, the hypothesis that *any* contains a metaphysical modal operator is reminiscent of the following observation by Vendler (1967): “the *any*-proposition is an unrestricted warranty for conditional statements and forecasts and we may add, for contrary-to-fact conditionals. In other words, to draw an obvious conclusion, it is an open hypothetical, a law-like assertion”.

5. Conclusion

In this paper, I have shown that Free Choice Items do not constitute a homogeneous class but they are divided into two subclasses. Evidence is given from English and Greek data. I have shown that English and Greek complex *wh*- differ from *any* items in that the nature of the alternatives that they denote is different. *Any* denotes metaphysical alternatives and complex *wh*-items denote epistemic ones. The metaphysical nature of FC *any* accounts for its ungrammaticality in UCCs and in negative episodic contexts.

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¹³ Π is an operator that gives the pragmatic scale and holds of the domain set, the scaling property and the minimum of the scale (Gawron 2001).

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Asymmetries in the Syntax and Prosody of Verb-Initial Interpolated Clauses

Michael Wagner

The interpolation of verb-initial clauses in German has been analyzed as extraction of a constituent from the embedded clause to the matrix clause in most earlier generative analyses following Thiersch (1978). Reis (1995) argues for a parenthetical analysis instead, based on similarities between alleged matrix clauses and uncontroversial parentheticals. This paper presents new prosodic and syntactic evidence for an extraction account both for the interpolation of true matrix clauses and a newly identified set of verb-initial clauses that serve as evidential adverbials. Differences in prosody between the two types of clauses are linked to differences in their syntactic structure.

1. Introduction

German matrix clauses can be ‘interpolated’ into their complement clause by moving a constituent from the embedded clause to the first position of the matrix clause. Based on the prosody and syntax of these constructions, I argue for a transformational approach to clausal interpolation along the lines of Thiersch (1978), Tappe (1981), Grewendorf (1988), Haider (1993b), and against the base-generated parenthetical approach proposed in Reis (1995). I extend this analysis to clauses that follow apparent non-constituents, which are treated as base-generated parentheticals in most earlier treatments (but see Stowell (2002), Haider (2004)). This move is partly based on important insights from Reis (1995), who showed many parallels between the two types of constructions.

1.1. Clause Order and Prosody

Consider the following three words orders of a sequence of three clauses:¹

- (1) a. [Frída sagte,] [ÁAnna meine], [mórgen werde es régnen.]
 Frida said Anna thinks.subj, tomorrow will.subj it rain
- b. [Frída sagte,], [[mórgen werde es régnen] meine Anna.]
 Frida said tomorrow will.subj it rain thinks.subj Anna
- c. [[[Mórgen werde es régnen,] sagte Frida,] meine Anna.]
 tomorrow will.subj it rain said Frida thinks.subj Anna
 ‘Frida said Anna thinks.subj it will rain tomorrow.’

Each matrix clause forms an independent intonational phrase of its own when it precedes its complement (as in (1a)). A matrix clause is deaccented (or at least extremely reduced in pitch range) whenever its sentential complement or part of it precedes it (as in (1b,c)). This deaccentuation is indicated orthographically by underlining. The matrix clauses are ‘suffixed’ to the preceding intonational domain in those cases. This prosodic subordination between clauses is reminiscent of similar effects in predication structures. Predicates are subordinated exactly when they are preceded by their complement or an element from their complement domain. Consider:

- (2) ‘...weil er ihr...
 ‘...because he...
 a. [versprách] [zu versúchen] [zu schwéigen].
 b. [versprách] [[zu schwéigen] zu versuchen].
 c. [[[zu schwéigen] zu versuchen] versprach.]
 be silent to.try promised
 ‘...promised her to try to be silent.’

Example (2a) illustrates that when predicates take their complement to the right, equal prosodic domains are assigned; but when a predicate is preceded by its complement (e.g. the predicate ‘versuchen’ in (2b)), it is prosodically subordinated. The generalization about predicates can be stated as follows (Wagner 2004):

(3) Prosodic Asymmetry

- When a projecting element A *precedes* its complement B, sequence of two prosodic domains that are on a par: Á B. The last domain provides the ‘nuclear stress’.

¹Embedded V₂ is only possible in ‘bridge’-environments, e.g. after ‘say’, ‘claim’, but not verbs that involve a manner like ‘shout’ or downward entailing environments (‘not say’ or ‘doubt’). Embedded quotations have a different syntactic distribution and will not be discussed. A simple control against quotation readings is subjunctive tense (‘Konjunktiv I’), which disambiguates the sentences toward reported speech.

- When a projecting element *A* follows an element from the complement domain *B*, *A* is subordinated: $\acute{B} A$ (unless *A* is focused or *B* is old information)

The prosody of verb-initial clauses that serve as evidential adverbials, which will be discussed in the next section, differs from that of matrix clauses:

- (4) [Sie sagte dass er wohl,] [*glaube sie*, [nie wieder kommen werde.]
 she said that he particle, believed.subj she, never again come will.subj
 ‘He will never come again, she believed’.

The adverbial clause is separated from its host clause by comma intonation, reflected by a notable break at the position of the orthographic commas in (4). Comma intonation is henceforth coded by *italics*. I will argue that the difference between matrix clauses and adverbial clauses can be derived from syntactic differences, based on the generalization in (3).

1.2. Clause Order and Syntax

For the transformational analysis (Thiersch 1978, Tappe 1981, Grewendorf 1988, Haider 1993b), a sentence like (5b) involves movement of a constituent from the embedded clause to the specifier of *C* in the matrix clause:

- (5) a. [Frída sagte,] [mórgen werde es régnen.]
 Frida said tomorrow will.subj it rain
 b. [[Mórgen], sagte Frida,] [t werde es régnen.]
 Tomorrow said Frida will.subj it rain.
 ‘She said it will rain tomorrow.’

This view was recently challenged in Reis (1995), who argues for a parenthetical analysis of all verb-initial clauses that follow or are interpolated into their complement clause. In this analysis, parentheticals are base generated and adjoined in their surface position. Reis (1995) points out that the transformational analysis cannot straightforwardly account for cases where the interpolated clause follows a non-constituent. In (6), an *XP*, the finite verb, and a cliticized pronoun of the embedded clause together seem to have moved to the first position of the alleged matrix clause. Under standard assumptions, they do not form a constituent:

- (6) [Mórgen wérde es,] sagte Frida, [stárk régnen].
 tomorrow will.subj it said Frida strongly rain
 ‘Tomorrow it will rain again, said Frida.’

Tappe (1981), Haider (1993b) concluded that the interpolated clause in (6) must be a true parenthetical, and not a matrix clause. Reis extends this analysis to cases

like (5). But not all interpolated clauses can be parentheticals, as is also noted in Reis (1995). The following interpolated clause must be a matrix clause, since the host does not constitute a well-formed matrix clause:

- (7) Wo_i glaubt er, dass t_i sie jetzt wohne?
 where thinks he that she now lives
 ‘Where does he think does she live now?’

This paper gives arguments that the clause interpolations in (5) and (6) involve movement, just like (7).

2. Clause Interpolation and Matrix Clauses

This section shows that interpolated clauses can be matrix clauses, elaborating a well known argument from Tappe (1981:204). Some interpolated verb-initial clauses, however, are not matrix clauses, but function as evidential adverbials.

2.1. Interpolated Clauses can be Matrix Clauses

Sentence (8a) is unambiguously a question, sentence (8b) is unambiguously reported speech. If both involved parentheticals, both should be questions.

- (8) a. Wer glaubt Frida wohne in Berlin? (Question)
 who believed Frida lives.subj in Berlin
 ‘Who does Frida believe lives in Berlin?’
 b. Wer fragte Frida wohne in Berlin? (Declarative)
 who asked Frida lives.subj in Berlin
 ‘Frida asked who lives in Berlin.’

If the interpolated clause in (8a) is not a matrix clause, then why is it possible to insert it into a wh-question? ‘Believe’-type verbs are incompatible with question arguments, as (9a.i) illustrates. If it is the matrix clause, on the other hand, the problem disappears, the complement of ‘believe’ is in fact not a question, and the wh-word moves from the embedded clause to the left periphery of the matrix question.

Conversely, (8b) cannot be a matrix question, for the same reason that (9b.ii) is not grammatical. *Fragen* ‘ask’ selects a question or reported question (cf. Karttunen 1977, Lahiri 1991).

- (9) Selection of Embedded Questions/Declaratives
- | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>a. ‘believe’ and Selection</p> <p>i. *Frida glaubte ob es schneit.
Frida believed whether it snows</p> <p>ii. Frida glaubte dass es schneit.
Frida believed that it snows</p> | <p>b. ‘Ask’ and Selection</p> <p>i. Frida fragte ob es schneit.
Frida asked whether it snows</p> <p>ii. *Frida fragte, dass es schneit.
Frida asked that it snows</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

For (8b) to be a matrix question, the *wh*-word would have to be the *wh*-word of the embedded question and of the matrix question at the same time. This is impossible. The following sentence, although confusing at first sight, is ungrammatical, and illustrates the same point:

- (10) *Who did John ask is in London?

That the interpolated clause is part of the question in (8a) but not in (8b) can be further illustrated by the particle ‘*denn*’, a particle which is only licensed in questions. The presence of the question particle ‘*denn*’ in the interpolated clause (11a) clearly shows that the interpolated clause must be the matrix clause, otherwise it should be ungrammatical. Furthermore, if the interpolated clause is inserted into a matrix question, why is it does not permit ‘*denn*’? The example in (11b) illustrates that the pattern is reversed precisely when the matrix verb selects a question.²

- (11) a. Wer glaubt Frida (*denn*) wohne (**denn*) in Berlin?
 ‘Who does Frida believe lives.subj in Berlin?’
 b. Wer fragte Frida (**denn*) wohne (*denn*) in Berlin?
 ‘Frida asked who lives.subj in Berlin.’

Parentheticals do not change the illocutionary force of their host. Interpolated clauses can. Therefore, we can conclude that they can be true matrix clauses.³

2.2. *Interpolated Clauses can be Evidential Adverbials*

Reis (1995:56) raises a problem looking at interpolated clauses that follow a non-constituent. She assumes with Tappe (1981) and Haider (1993b) that these are not matrix clauses but parentheticals. And yet they are acceptable in questions:

²According to Reis (1995:63-64), ‘*denn*’ is licensed only in matrix clauses. But clearly ‘*denn*’ can occur in *wh*-questions and yes/no questions involving inversion, including embedded ones (at least with verbs like *fragen* ‘to ask’, but not with verbs that seem to embed questions but cannot be speech reports like *wissen* ‘to know’).

³Tappe (1981) argues that the following interpolated clauses are parentheticals, since they cannot change the illocutionary force, an argument adopted in subsequent studies (e.g. Haider (1993a), Haider (2004)):

- (1) a. *Wer *so glaubte* Frida wohnt in Berlin?
 who so believed Frida lives in Berlin
 b. Wer *so fragte* Frida wohnt in Berlin?
 who so asked Frida lives in Berlin

But ‘*so*’ may simply be a particle that is incompatible with questions, like various other particles:

- (2) Ist Maria ja in Berlin?
 Is Mary evidently in Berlin

Whether or not ‘*so*’-clauses are parentheticals can therefore not be established by looking at the paradigm in (1). They pattern with matrix clauses in most other respects, a fact also noted in Pittner (1995).

- (12) Was wird sie, *glaubt er*, jetzt tun?
 what will she believe he now do

This is unexpected unless these interpolated clauses are matrix wh-clauses, since the predicates involved cannot take questions as their arguments (cf. 9). But then (12) must involve moving a non-constituent (i.e. *Was wird sie* ‘what will she’) to the first position of the matrix clause. Reis concludes that these interpolated clauses are in fact parentheticals that behave like matrix clauses.

The example in (12) differs from the previous ones in the intonation of the interpolated clause. It involves comma intonation, i.e. a notable break where the orthographic commas are placed (comma intonation, as discussed in the introduction, is indicated by italics). It is not prosodically subordinated. Another difference to the previous examples is that the interpolated clause does not license subjunctive tense in the embedded clause:

- (13) ?? Was werde sie glaubt er tun?
 what will.subj she thinks he now do

The subjunctive in (13) makes sure that the embedded clause is really the complement of the matrix clause. I propose that the reason for the contrast in (12) vs. (13) is the following: the interpolated clause in (12) is in fact not a matrix clause, but fulfills the function of an evidential adverbial, and is thus similar in meaning and distribution to adverbials of the type ‘according to’:

- (14) a. Was wird sie, *laut Hans*, denn tun?
 what will she, according.to Hans, do
 b. Was wird sie denn tun, *laut Hans*?
 waht sill she do, according.to Hans
 ‘What is she going to do, according to Hans?’

Evidential adverbials show comma intonation, and not prosodic subordination, just like verb-initial adverbials. Furthermore, the two structures are similar in their word order options. Evidential adverbials are dispreferred preceding the finite verb, in contrast to matrix clauses such as (8a):

- (15) a. Evidential Aderbial
 ?? Was, *laut Hans*, wird sie denn tun?
 what, according.to Hans, will she do
 b. Matrix Clause
 Was, glaubt Hans, werde sie denn tun?
 what, believes Hans, will.subj she do

The sentence in (13) is incomplete since it requires the presence of a true matrix clause in order to license the subjunctive tense. Subjunctive is generally not licensed by evidential adverbials:

- (16) ?? Was werde sie, *laut Hans*, denn tun?
 what will she according.to Hans ques.part. do
 ‘What, according to Hans, is she going to do?’

A clear case of a verb-initial clause that cannot serve as a matrix clause is the following:

- (17) ?? Dass er wohl, glaubte sie, nie wieder kommen werde.
 that he particle, believed she, never again come will
 ‘He will never come again, she believed’.

The interpolated clause (17) cannot be a matrix clause, similar to (13), hence the sentence feels incomplete, like a fragment embedded clause. But note that (17) is perfectly grammatical when it is embedded under a matrix verb licensing the embedded clause. The interpolated clause inside of the embedded clause (*glaube sie* ‘she believes’), I propose, is used as an evidential adverbial:

- (18) Sie sagte, dass er wohl, *glaube sie*, nie wieder kommen werde.
 she said that he particle, believed.subj she, never again come will.subj
 ‘He will never come again, she believed’.

The incompleteness of the examples in (13) and (17) can be attributed to the lack of a true matrix clause that would license the embedded clause syntax (subjunctive/complementizer).⁴ Some verb-initial interpolated clauses are evidential adverbials, and cannot function as matrix clauses. They differ with respect to their word order options and their prosody from matrix clauses. They are arguably not true matrix clauses, just as was concluded in Tappe (1981) and Haider (1993b), but act as sentential adverbials (cf. Bresnan 1968).

⁴This argument presupposes that sentences with subjunctive are embedded clauses, that can only occur in isolation as fragments, just like sentences with complementizers. The following context licenses a fragment answer with an embedded clause in indicative. V_2 order is disallowed, since ‘doubt’ does not license embedded V_2 . Likewise, using the subjunctive with ‘doubt’ is at least marked:

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>(1) What bezweifelt Anna?
 what doubts Anna</p> <p>a. * Maria ist krank.
 Mary be.subj sick</p> <p>b. dass Maria krank ist.
 that Mary sick be</p> <p>c. ?dass Maria krank sei.
 that Mary sick be</p> | <p>(2) What hat Anna gesagt?
 what has Anna said</p> <p>a. Maria ist krank.
 Mary be.subj sick</p> <p>b. dass Maria krank ist.
 that Mary sick be</p> <p>c. dass Maria krank sei.
 that Mary sick be</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

If we replace ‘doubt’ with ‘said’, then both the use of subjunctive and the use of V_2 order in the fragment becomes grammatical. V_2 declaratives with subjunctive in isolation are often called reported speech matrix clauses, and isolated questions with verb-final order ‘musing questions’. They are used in free indirect style. I assume they are fragments, just like fragment answers that include only a DP with accusative case, which are only licensed in a context where an appropriate wh-question is at issue (Merchant 2003). ‘Free indirect Style’ can then be characterized as a sequence of fragments. This is further discussed in the next section.

2.3. Indirect Speech Reports

A second class of apparent matrix clauses following non-constituents occur in indirect speech reports. The following is a real-life example of a declarative sentence with an interpolated question-embedding matrix clause (19a), which remains grammatical when the matrix clause follows the finite verb (19b), just as expected under Reis's parenthetical approach:

- (19) a. Wer fragte er drohend, wolle sich dieser Vorstellung in einer Region widersetzen, in der die meisten Menschen bislang nichts ausser Tyrannei und Not erlebt haetten.
 'Who, he asked threateningly, wants to object against this idea in a region, in which most people so far have experienced nothing by tyranny and want.'
www.nahost-politik.de/irak/usa.htm
- b. Wer wolle sich, fragte er drohend, dieser Vorstellung in einer Region widersetzen, in der die meisten Menschen bislang nichts ausser Tyrannei und Not erlebt haetten.

An even more dramatic example of a non-constituent preceding an interpolated clause is the following:

- (20) Ob sie denn, fragte ein Kritiker, "eine Massenprügelei" riskieren wollten?
 whether they particle asked a critic a mass fight risk would
 'A critic asked whether they would risk a mass fight.'
free.pages.at/boonk/Berichte/92/231292taz.htm

An analogous case involving an embedded 'that'-clause:

- (21) Dass er wohl, fuhr sie fort, nie wieder kommen werde.
 that he particle, continued she on, never again come will
 'He will never come again, she continued'.

These examples illustrate that interpolated clauses following non-constituents seem to be able to function as matrix clauses. But these examples share a property: they involve verbs that are used to report speech. It is worth noting that indirect speech reports can be licensed just by context, in 'free indirect style'. This is essentially a sequence of fragment speech reports without matrix clauses. For example in a sequence of speech reports the following fragment would be possible:

- (22) Ob sie denn "eine Massenprügelei" riskieren wollten?
 whether they particle a mass fight risk would
 'Whether they would risk a mass fight.'

Interpolated clauses in reported speech (such as 'she continued') might actually be able to act as adverbials, indicating the source of information, similar to evidentials. But their subordinated prosody distinguishes them from the evidential parentheticals of the preceding section. Alternatively, matrix clauses in speech reports might simply differ from other matrix clauses in their word order options. A closer look at these constructions would be necessary.

3. Movement and C-Command

This section presents evidence that matrix clause interpolation involves movement and leaves c-command relations intact, pointing to a movement analysis that involves full reconstruction at LF. Evidence for movement and c-command is also presented for adverbial clauses, which differ from matrix clauses in not allowing variable binding into their complement clause.

3.1. Clause Interpolation involves Movement

Matrix clause interpolation involves movement of/from the complement of the embedding verb. The examples below involve matrix clauses with a propositional argument gap inside strong islands:

- (23)
- a. Relative Clause Island
 - * Frösche erzählte davon ein Biologe der glaubte t hätten eine Seele.
 frogs talked about.it a biologist who believed have a soul
 - b. Adjunct Island
 - * Frösche beharrte darauf Frida als sie erzählte t hätten eine Seele
 frogs insisted on.it Frida when she said have a soul
 - c. Complex DP-Island
 - * Frösche entlarvte das Marias Behauptung t sage Anna. hätten eine
 frogs revealed it Mary's claim that Anna said have a
 Seele
 soul

These sentences obey the restrictions on verb-initial parentheticals in Reis (1995): The linear order of the host clause is unaltered, and the interpolated clause is verb-initial; and yet they are ungrammatical. Corresponding matrix clauses without extraction are completely acceptable:

- (24)
- a. *Ein Biologe erzählte davon der glaubte* Frösche hätten eine Seele.
 'A biologist talked about it who believed frogs had a soul.'
 - b. *Frida beharrte darauf als sie erzählte* Frösche hätten eine Seele.
 'Frida insisted on it when she said that frogs have a soul.'
 - c. *Das entlarvte Marias Behauptung Anna sage* Frösche hätten eine Seele,
 'That was revealed by Mary's claim that Anna said frogs have a soul.'

It is not the case that the argument in the interpolated clause always has to originate in the highest clause. Longer extractions are possible, as long as they obey island constraints:

- (25) Frösche, glaubte Frida behaupten zu müssen, hätten eine Seele.
 frogs believed Frida claim to must, have.subj a soul
 'Frida believed to have to claim that frogs have a soul.'

The presence of movement does not rule out a parenthetical analysis, however. Similar strong island effects are shown for *as*-parentheticals in Potts (2002). Consider a German ‘*wie*’- and ‘*so*’-clauses (a,b), but also verb-initial interpolated clauses following non-constituents:

- (26) a. * Frösche haben eine Seele so erzählte davon ein Biologe der glaubte t.
 frogs have a soul so talked about.it a biologist who believed
- b. * Frösche haben eine Seele wie ein Biologe davon erzählte der glaubte t.
 frogs have a soul as a biologist about.it talked who believed
- c. * Frösche hätten erzählte davon ein Biologe der glaubte t eine Seele .
 frogs have talked about.it a biologist who believed a soul

Potts (2002) proposes a parenthetical analysis for *as*-clauses and explains strong island effects by zero-operator movement. The movement establishes a local relation with the antecedent, which is the constituent the parentheticals adjoin to, i.e. their sister. The placement of a parenthetical within the modifiee is derived by Heavy-XP-Shift. An alternative view would be to follow Ross (1973) in allowing for ‘slifting’, that is the promotion of an embedded clause to matrix clause status by movement. I will return to this discussion in the last section. For now, we can conclude that both interpolated matrix clauses and adverbial clauses show evidence for movement.

3.2. Interpolated Clauses C-command the Embedded Clause

If interpolated clauses are parentheticals inserted into a matrix clause in their surface position, they should not c-command the material in the host clause, especially the part that precedes them. This section summarizes evidence for c-command into the host clause, in support of the transformational analysis.

First, interpolated clauses are not c-commanded by their material preceding them, as is evidenced by scope facts, the absence of NPI licensing into the interpolated clause, and standard binding tests:⁵

- (27) a. Scope (some > almost everyone, * almost everyone > some)
 Fast jeder, (so) glaubten manche Studenten, habe gefuscht.
 almost everyone, so believed some students, has cheated
- b. NPI Licensing into parenthetical
 * Kein Student, (so) sagte je ein Mensch, habe gefuscht.
 no student, so said ever a human.being, has cheated
- c. Variable Binding into parenthetical
 * Jeder Student_i, (so) sagte er_i/seine_i Mutter, hat eine Chance.
 every student, so said he/his mother, has a chance

⁵I include the pattern for ‘*so*’-clauses, which are often taken to be clear cases of parentheticals Tappe (1981), Haider (1993a), Reis (1995), although they pattern mostly just like matrix clauses, as we will see.

- d. No Condition C effect into parenthetical
 Er_i habe, (so) sagte Paul_i leise, keine Ahnung.
 he has, so said Paul silently, no clue

The interpolated clause c-commands the material of the host:⁶

- (28) a. Condition C effect induced by Interpolated Clause
 * Paul_i, (so) glaubte er_i, habe keine Ahnung.
 Paul, so believed he has no clue
- b. Variable Binding from Interpolated Clause
 Seine_i Prüfung, (so) glaubte jeder Student_i sei schwierig gewesen.
 his exam so believed every student be difficult been
- Ihre_i Prüfung, (so) glaubten viele Studenten_i sei schwierig gewesen.
 his exam so believed every student be difficult been

A similar pattern holds for interpolated clauses preceded by non-constituents. Variable binding seems a bit harder in those cases:

- (29) a. Scope (some students > almost everyone, * almost everyone > some students)
 Fast jeder habe, (so) glaubten manche Studenten, gefuscht.
 almost everyone has, so believed some students, cheated
- b. Condition C effect induced by Interpolated Clause
 * Paul_i, habe, (so) sagte er_i leise keine Ahnung.
 Paul has, so said he silently, no clue
- c. Variable Binding from Interpolated Clause
 ? Seine_i Prüfung sei, (so) glaubte jeder Student, zu schwierig gewesen.
 his exam be believed every student too difficult been
- ? Ihre_i Prüfung sei, (so) glaubten viele Studenten, zu schwierig gewesen.
 his exam be so believed every student too difficult been

Interpolated matrix clauses c-command the material of the complement clause. The c-command facts point to an analysis that posits a movement for the interpolation of clauses. The movement step reconstructs obligatorily at LF.⁷ Interpolated adverbial clauses show a different pattern:

⁶ Since V_2 resists embedding under negation, NPI licensing from the interpolated clause into the embedded clause cannot be tested:

- (1) a. * *Frida sagte nicht*, morgen werde es regnen.
 Frida said not tomorrow will it rain
- b. * *Frida bezweifelte*, morgen werde es regnen.
 Frida doubted tomorrow will it rain

'Replacive' (Jacobs 1991) negation is possible in (a), and even focused negation allows embedded V_2 —only non-contrastive sentence negation is ruled out.

⁷ McCawley (1982) shows further evidence that parentheticals seem to take wide scope and attach higher in the structure than their surface position suggests.

- (30) a. Scope (some students > almost everyone, * almost everyone > some students)
- Fast jeder hat, wie manche Studenten glaubten, gefuscht.
almost everyone has, as some students believed, cheated
- b. Condition C effect induced by Interpolated Clause
- Paul_i/er_i hat, wie er_i/Paul_i selbst zugibt, keine Ahnung.
Paul has, as he himself admits, no clue
- c. Variable Binding from Interpolated Clause
- ?? Seine_i Prüfung sei, wie jeder Student zugab, zu schwierig gewesen.
his exam be as every student admitted too difficult been
- ?? Ihre_i Prüfung sei, wie viele Student zugaben, zu schwierig gewesen.
his exam be as every student admitted too difficult been

Cases of verb-initial interpolated adverbial clauses also differ from matrix clauses with respect to variable binding. While the matrix clause can variable-bind both into the embedded clause and its sentential adverbial, no variable binding is possible between the embedded clause and the adverbial:

- (31) a. Jede Tänzerin_i sagte dass ihr_i Lehrer,
every dancer said that her teacher,
meine zumindest ihr_i Partner, nicht sehr gut sei.
thinks at.least her partner, not very good be
- b. * Gesine glaubt dass jeder Tänzerin_i,
Gesine believes that every dancer,
meine zumindest ihr_i Partner, nicht sehr gut sei.
thinks at.least her partner, not very good be
- c. * Gesine glaubt dass ihr_i Partner,
Gesine believes that her partner,
meine zumindest jede Tänzerin_i, nicht sehr gut sei.
thinks at.least every dancer, not very good be

According to Reis (1995), all of these constructions should be analyzed as parentheticals. The differences between the interpolated clauses in (28) vs. (30) and (31) illustrate that a uniform analysis is unwarranted, and many constructions hitherto taken as uncontroversial parentheticals (e.g. ‘so’-parentheticals) patter just like matrix clauses. A similar conclusion is reached in Haider (2004).

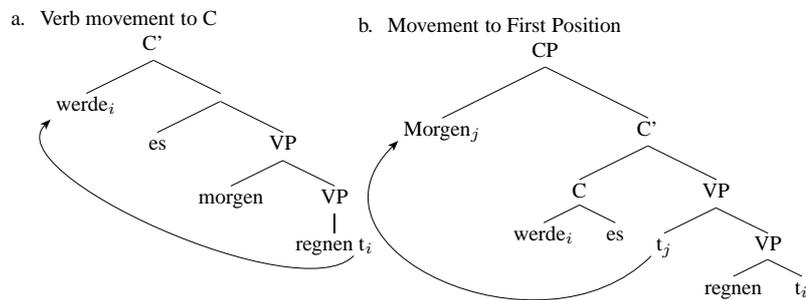
I will attribute the differences between matrix clauses and adverbial clauses to different derivations: Adverbial clauses start out as the matrix clause, and their complement moves and projects to become the new matrix clause, a case of slifting. The next section motivates this approach.⁸

⁸Assuming analysis parentheticals adopted in Potts (2002), many of the facts reported here are compatible with the parenthetical view. The next section briefly discusses the difference between the approaches.

4. Deriving the Surface Word Orders

I assume that in a German matrix clause, the finite verb raises to a higher functional projection, say C (32a). Declarative clauses require a syntactic constituent to precede the verb. This ‘first position requirement’ (maybe an EPP feature in C) is satisfied by moving the closest XP the specifier position (a case of ‘attract closest’). Pronouns can be skipped, since they can cliticize to the verb (32b):

(32)



Clausal interpolation can now be derived by successive cyclic movement to the first position of the matrix clause (cf. Thiersch 1978, Tappe 1981):

(33) [[Morgen] sagte sie] [werde es regnen]
 ‘Tomorrow it will rain, she said.’

The cases where the string that precedes the verb of the matrix clause is not a constituent require a different derivation:

(34) Morgen werde es, *glaubt sie*, stark regnen.
 tomorrow will it said she strongly rain
 ‘Tomorrow it will rain again, she said.’

I propose that the interpolated clause starts out as an argument-taking matrix clause. The linear position of the clause is derived by two independent movement steps, following a proposal in Potts (2002) for the placement of ‘as’-parentheticals: First, the complement moves to the first position of the matrix clause; second, Heavy-XP-Shift moves part of the embedded clause to the right.

Departing from Pott’s analysis, I propose that the first movement step is not empty-operator-movement but overt movement of the complement clause. This movement step goes along with promoting the embedded clause to be the new matrix clause, a case of slifting (Ross 1973).⁹

⁹Given the discussion of the previous section, it seems that movement of the entire complement clause as in (35) is only possible for evidential clauses and those denoting speech reports, i.e. those that function as adverbials rather than true matrix clauses, and in reported speech. Why these derivations are not possible for true matrix clauses does not follow from anything discussed here, and has to be left open at this point.

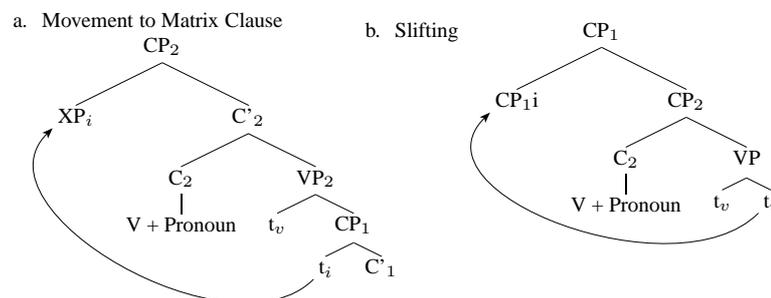
- (35) a. [glaubte sie] [Morgen werde es stark regnen]
 b. [[Morgen werde es stark regnen] glaubte sie]
 c. [[Morgen werde es] sagte sie] [stark regnen]
 ‘Tomorrow it will rain, she said.’

The analysis based on Heavy-Shift sits well with the intuition that the ‘extraposed’ part following an intraposed sentence should be ‘heavy’:

- (36) a. ? Morgen werde es, sagte sie leise, regnen.
 Tomorrow will it, said she silently, rain.
 b. Morgen werde es, sagte sie leise, stark regnen.
 Tomorrow will it, said she silently, rain hard.

The difference in prosody between matrix clauses and adverbial clauses is due to the difference in the projection line. An interpolated matrix clause projects. An interpolated adverbial starts out as the matrix clause, but then the embedded clause is raised and projects, creating an adjunction structure¹⁰:

(37)



The generalization about prosody can now be stated as follows: Within each maximal projection (CP, VP), the projecting element (in this case the verb in C) and the material attached to it (in this case the pronoun and adverbial) is prosodically subordinated and suffixed to a preceding non-projecting category (here, the XP in the first position), essentially the generalization observed for predicates in (3).

The analysis is compatible with the empty-operator approach for parentheticals proposed in Potts (2002), which essentially assumes a similar difference in projection between matrix clauses and parentheticals. One reason to prefer the slifting approach here is in the empty-operator analysis, it remains unclear why the parentheticals are verb-initial. It cannot be the empty operator that fills the first position of the parenthetical: verb-initial parentheticals are impossible in sentence initial position. The parentheticals are genuine V_2 clauses, that need an

¹⁰I assume, that slifting prevents reconstruction and is thus responsible for the impossibility of variable binding.

overt constituent in first position. The slifting derivation in (37) can simply treat the movement of the embedded clause as overt movement to first position.¹¹

This paper presented evidence that some, but not all verb-initial interpolated clauses are matrix clauses. Both matrix and adverbial clauses are ‘interpolated’ by movement. The prosody of interpolated matrix clauses and adverbial clauses was linked to a general prosodic asymmetry (3).

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¹¹Perhaps the strongest empirical evidence against slifting analysis of ‘as’-parentheticals in particular are cases where the antecedent for the zero-operator does not have the correct syntactic shape to be its actual argument (Potts 2002:658/659). I will not discuss this problem further in this paper.

Asymmetries in the Syntax and Prosody of Verb-Initial Interpolated Clauses

Michael Wagner

The interpolation of verb-initial clauses in German has been analyzed as extraction of a constituent from the embedded clause to the matrix clause in most earlier generative analyses following Thiersch (1978). Reis (1995) argues for a parenthetical analysis instead, based on similarities between alleged matrix clauses and uncontroversial parentheticals. This paper presents new prosodic and syntactic evidence for an extraction account both for the interpolation of true matrix clauses and a newly identified set of verb-initial clauses that serve as evidential adverbials. Differences in prosody between the two types of clauses are linked to differences in their syntactic structure.

1. Introduction

German matrix clauses can be ‘interpolated’ into their complement clause by moving a constituent from the embedded clause to the first position of the matrix clause. Based on the prosody and syntax of these constructions, I argue for a transformational approach to clausal interpolation along the lines of Thiersch (1978), Tappe (1981), Grewendorf (1988), Haider (1993b), and against the base-generated parenthetical approach proposed in Reis (1995). I extend this analysis to clauses that follow apparent non-constituents, which are treated as base-generated parentheticals in most earlier treatments (but see Stowell (2002), Haider (2004)). This move is partly based on important insights from Reis (1995), who showed many parallels between the two types of constructions.

1.1. Clause Order and Prosody

Consider the following three words orders of a sequence of three clauses:¹

- (1) a. [Frída sagte,] [ÁAnna meine], [mórgen werde es régnen.]
 Frida said Anna thinks.subj, tomorrow will.subj it rain
- b. [Frída sagte,], [[mórgen werde es régnen] meine Anna.]
 Frida said tomorrow will.subj it rain thinks.subj Anna
- c. [[[Mórgen werde es régnen,] sagte Frida,] meine Anna.]
 tomorrow will.subj it rain said Frida thinks.subj Anna
 ‘Frida said Anna thinks.subj it will rain tomorrow.’

Each matrix clause forms an independent intonational phrase of its own when it precedes its complement (as in (1a)). A matrix clause is deaccented (or at least extremely reduced in pitch range) whenever its sentential complement or part of it precedes it (as in (1b,c)). This deaccentuation is indicated orthographically by underlining. The matrix clauses are ‘suffixed’ to the preceding intonational domain in those cases. This prosodic subordination between clauses is reminiscent of similar effects in predication structures. Predicates are subordinated exactly when they are preceded by their complement or an element from their complement domain. Consider:

- (2) ‘...weil er ihr...
 ‘...because he...
 a. [versprách] [zu versúchen] [zu schwéigen].
 b. [versprách] [[zu schwéigen] zu versuchen].
 c. [[[zu schwéigen] zu versuchen] versprach.]
 be silent to.try promised
 ‘...promised her to try to be silent.’

Example (2a) illustrates that when predicates take their complement to the right, equal prosodic domains are assigned; but when a predicate is preceded by its complement (e.g. the predicate ‘versuchen’ in (2b)), it is prosodically subordinated. The generalization about predicates can be stated as follows (Wagner 2004):

(3) Prosodic Asymmetry

- When a projecting element A *precedes* its complement B, sequence of two prosodic domains that are on a par: Á B. The last domain provides the ‘nuclear stress’.

¹Embedded V₂ is only possible in ‘bridge’-environments, e.g. after ‘say’, ‘claim’, but not verbs that involve a manner like ‘shout’ or downward entailing environments (‘not say’ or ‘doubt’). Embedded quotations have a different syntactic distribution and will not be discussed. A simple control against quotation readings is subjunctive tense (‘Konjunktiv I’), which disambiguates the sentences toward reported speech.

- When a projecting element *A* follows an element from the complement domain *B*, *A* is subordinated: $\acute{B} A$ (unless *A* is focused or *B* is old information)

The prosody of verb-initial clauses that serve as evidential adverbials, which will be discussed in the next section, differs from that of matrix clauses:

- (4) [Sie sagte dass er wohl,] [*glaube sie*, [nie wieder kommen werde.]
 she said that he particle, believed.subj she, never again come will.subj
 ‘He will never come again, she believed’.

The adverbial clause is separated from its host clause by comma intonation, reflected by a notable break at the position of the orthographic commas in (4). Comma intonation is henceforth coded by *italics*. I will argue that the difference between matrix clauses and adverbial clauses can be derived from syntactic differences, based on the generalization in (3).

1.2. Clause Order and Syntax

For the transformational analysis (Thiersch 1978, Tappe 1981, Grewendorf 1988, Haider 1993b), a sentence like (5b) involves movement of a constituent from the embedded clause to the specifier of *C* in the matrix clause:

- (5) a. [Frída sagte,] [mórgen werde es régnen.]
 Frida said tomorrow will.subj it rain
 b. [[Mórgen], sagte Frida,] [t werde es régnen.]
 Tomorrow said Frida will.subj it rain.
 ‘She said it will rain tomorrow.’

This view was recently challenged in Reis (1995), who argues for a parenthetical analysis of all verb-initial clauses that follow or are interpolated into their complement clause. In this analysis, parentheticals are base generated and adjoined in their surface position. Reis (1995) points out that the transformational analysis cannot straightforwardly account for cases where the interpolated clause follows a non-constituent. In (6), an *XP*, the finite verb, and a cliticized pronoun of the embedded clause together seem to have moved to the first position of the alleged matrix clause. Under standard assumptions, they do not form a constituent:

- (6) [Mórgen wérde es,] sagte Frida, [stárk régnen].
 tomorrow will.subj it said Frida strongly rain
 ‘Tomorrow it will rain again, said Frida.’

Tappe (1981), Haider (1993b) concluded that the interpolated clause in (6) must be a true parenthetical, and not a matrix clause. Reis extends this analysis to cases

like (5). But not all interpolated clauses can be parentheticals, as is also noted in Reis (1995). The following interpolated clause must be a matrix clause, since the host does not constitute a well-formed matrix clause:

- (7) Wo_i glaubt er, dass t_i sie jetzt wohne?
 where thinks he that she now lives
 ‘Where does he think does she live now?’

This paper gives arguments that the clause interpolations in (5) and (6) involve movement, just like (7).

2. Clause Interpolation and Matrix Clauses

This section shows that interpolated clauses can be matrix clauses, elaborating a well known argument from Tappe (1981:204). Some interpolated verb-initial clauses, however, are not matrix clauses, but function as evidential adverbials.

2.1. Interpolated Clauses can be Matrix Clauses

Sentence (8a) is unambiguously a question, sentence (8b) is unambiguously reported speech. If both involved parentheticals, both should be questions.

- (8) a. Wer glaubt Frida wohne in Berlin? (Question)
 who believed Frida lives.subj in Berlin
 ‘Who does Frida believe lives in Berlin?’
 b. Wer fragte Frida wohne in Berlin? (Declarative)
 who asked Frida lives.subj in Berlin
 ‘Frida asked who lives in Berlin.’

If the interpolated clause in (8a) is not a matrix clause, then why is it possible to insert it into a wh-question? ‘Believe’-type verbs are incompatible with question arguments, as (9a.i) illustrates. If it is the matrix clause, on the other hand, the problem disappears, the complement of ‘believe’ is in fact not a question, and the wh-word moves from the embedded clause to the left periphery of the matrix question.

Conversely, (8b) cannot be a matrix question, for the same reason that (9b.ii) is not grammatical. *Fragen* ‘ask’ selects a question or reported question (cf. Karttunen 1977, Lahiri 1991).

- (9) Selection of Embedded Questions/Declaratives
- | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>a. ‘believe’ and Selection</p> <p>i. *Frida glaubte ob es schneit.
 Frida believed whether it snows</p> <p>ii. Frida glaubte dass es schneit.
 Frida believed that it snows</p> | <p>b. ‘Ask’ and Selection</p> <p>i. Frida fragte ob es schneit.
 Frida asked whether it snows</p> <p>ii. *Frida fragte, dass es schneit.
 Frida asked that it snows</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

For (8b) to be a matrix question, the *wh*-word would have to be the *wh*-word of the embedded question and of the matrix question at the same time. This is impossible. The following sentence, although confusing at first sight, is ungrammatical, and illustrates the same point:

- (10) *Who did John ask is in London?

That the interpolated clause is part of the question in (8a) but not in (8b) can be further illustrated by the particle ‘*denn*’, a particle which is only licensed in questions. The presence of the question particle ‘*denn*’ in the interpolated clause (11a) clearly shows that the interpolated clause must be the matrix clause, otherwise it should be ungrammatical. Furthermore, if the interpolated clause is inserted into a matrix question, why is it does not permit ‘*denn*’? The example in (11b) illustrates that the pattern is reversed precisely when the matrix verb selects a question.²

- (11) a. Wer glaubt Frida (*denn*) wohne (**denn*) in Berlin?
 ‘Who does Frida believe lives.subj in Berlin?’
 b. Wer fragte Frida (**denn*) wohne (*denn*) in Berlin?
 ‘Frida asked who lives.subj in Berlin.’

Parentheticals do not change the illocutionary force of their host. Interpolated clauses can. Therefore, we can conclude that they can be true matrix clauses.³

2.2. *Interpolated Clauses can be Evidential Adverbials*

Reis (1995:56) raises a problem looking at interpolated clauses that follow a non-constituent. She assumes with Tappe (1981) and Haider (1993b) that these are not matrix clauses but parentheticals. And yet they are acceptable in questions:

²According to Reis (1995:63-64), ‘*denn*’ is licensed only in matrix clauses. But clearly ‘*denn*’ can occur in *wh*-questions and yes/no questions involving inversion, including embedded ones (at least with verbs like *fragen* ‘to ask’, but not with verbs that seem to embed questions but cannot be speech reports like *wissen* ‘to know’).

³Tappe (1981) argues that the following interpolated clauses are parentheticals, since they cannot change the illocutionary force, an argument adopted in subsequent studies (e.g. Haider (1993a), Haider (2004)):

- (1) a. *Wer *so glaubte* Frida wohnt in Berlin?
 who so believed Frida lives in Berlin
 b. Wer *so fragte* Frida wohnt in Berlin?
 who so asked Frida lives in Berlin

But ‘*so*’ may simply be a particle that is incompatible with questions, like various other particles:

- (2) Ist Maria ja in Berlin?
 Is Mary evidently in Berlin

Whether or not ‘*so*’-clauses are parentheticals can therefore not be established by looking at the paradigm in (1). They pattern with matrix clauses in most other respects, a fact also noted in Pittner (1995).

- (12) Was wird sie, *glaubt er*, jetzt tun?
 what will she believe he now do

This is unexpected unless these interpolated clauses are matrix wh-clauses, since the predicates involved cannot take questions as their arguments (cf. 9). But then (12) must involve moving a non-constituent (i.e. *Was wird sie* ‘what will she’) to the first position of the matrix clause. Reis concludes that these interpolated clauses are in fact parentheticals that behave like matrix clauses.

The example in (12) differs from the previous ones in the intonation of the interpolated clause. It involves comma intonation, i.e. a notable break where the orthographic commas are placed (comma intonation, as discussed in the introduction, is indicated by italics). It is not prosodically subordinated. Another difference to the previous examples is that the interpolated clause does not license subjunctive tense in the embedded clause:

- (13) ?? Was werde sie glaubt er tun?
 what will.subj she thinks he now do

The subjunctive in (13) makes sure that the embedded clause is really the complement of the matrix clause. I propose that the reason for the contrast in (12) vs. (13) is the following: the interpolated clause in (12) is in fact not a matrix clause, but fulfills the function of an evidential adverbial, and is thus similar in meaning and distribution to adverbials of the type ‘according to’:

- (14) a. Was wird sie, *laut Hans*, denn tun?
 what will she, according.to Hans, do
 b. Was wird sie denn tun, *laut Hans*?
 waht sill she do, according.to Hans
 ‘What is she going to do, according to Hans?’

Evidential adverbials show comma intonation, and not prosodic subordination, just like verb-initial adverbials. Furthermore, the two structures are similar in their word order options. Evidential adverbials are dispreferred preceding the finite verb, in contrast to matrix clauses such as (8a):

- (15) a. Evidential Aderbial
 ?? Was, *laut Hans*, wird sie denn tun?
 what, according.to Hans, will she do
 b. Matrix Clause
 Was, glaubt Hans, werde sie denn tun?
 what, believes Hans, will.subj she do

The sentence in (13) is incomplete since it requires the presence of a true matrix clause in order to license the subjunctive tense. Subjunctive is generally not licensed by evidential adverbials:

- (16) ?? Was werde sie, *laut Hans*, denn tun?
 what will she according.to Hans ques.part. do
 ‘What, according to Hans, is she going to do?’

A clear case of a verb-initial clause that cannot serve as a matrix clause is the following:

- (17) ?? Dass er wohl, glaubte sie, nie wieder kommen werde.
 that he particle, believed she, never again come will
 ‘He will never come again, she believed’.

The interpolated clause (17) cannot be a matrix clause, similar to (13), hence the sentence feels incomplete, like a fragment embedded clause. But note that (17) is perfectly grammatical when it is embedded under a matrix verb licensing the embedded clause. The interpolated clause inside of the embedded clause (*glaube sie* ‘she believes’), I propose, is used as an evidential adverbial:

- (18) Sie sagte, dass er wohl, *glaube sie*, nie wieder kommen werde.
 she said that he particle, believed.subj she, never again come will.subj
 ‘He will never come again, she believed’.

The incompleteness of the examples in (13) and (17) can be attributed to the lack of a true matrix clause that would license the embedded clause syntax (subjunctive/complementizer).⁴ Some verb-initial interpolated clauses are evidential adverbials, and cannot function as matrix clauses. They differ with respect to their word order options and their prosody from matrix clauses. They are arguably not true matrix clauses, just as was concluded in Tappe (1981) and Haider (1993b), but act as sentential adverbials (cf. Bresnan 1968).

⁴This argument presupposes that sentences with subjunctive are embedded clauses, that can only occur in isolation as fragments, just like sentences with complementizers. The following context licenses a fragment answer with an embedded clause in indicative. V_2 order is disallowed, since ‘doubt’ does not license embedded V_2 . Likewise, using the subjunctive with ‘doubt’ is at least marked:

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>(1) What bezweifelt Anna?
 what doubts Anna</p> <p>a. * Maria ist krank.
 Mary be.subj sick</p> <p>b. dass Maria krank ist.
 that Mary sick be</p> <p>c. ?dass Maria krank sei.
 that Mary sick be</p> | <p>(2) What hat Anna gesagt?
 what has Anna said</p> <p>a. Maria ist krank.
 Mary be.subj sick</p> <p>b. dass Maria krank ist.
 that Mary sick be</p> <p>c. dass Maria krank sei.
 that Mary sick be</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

If we replace ‘doubt’ with ‘said’, then both the use of subjunctive and the use of V_2 order in the fragment becomes grammatical. V_2 declaratives with subjunctive in isolation are often called reported speech matrix clauses, and isolated questions with verb-final order ‘musing questions’. They are used in free indirect style. I assume they are fragments, just like fragment answers that include only a DP with accusative case, which are only licensed in a context where an appropriate wh-question is at issue (Merchant 2003). ‘Free indirect Style’ can then be characterized as a sequence of fragments. This is further discussed in the next section.

2.3. Indirect Speech Reports

A second class of apparent matrix clauses following non-constituents occur in indirect speech reports. The following is a real-life example of a declarative sentence with an interpolated question-embedding matrix clause (19a), which remains grammatical when the matrix clause follows the finite verb (19b), just as expected under Reis's parenthetical approach:

- (19) a. Wer fragte er drohend, wolle sich dieser Vorstellung in einer Region widersetzen, in der die meisten Menschen bislang nichts ausser Tyrannei und Not erlebt haetten.
 'Who, he asked threateningly, wants to object against this idea in a region, in which most people so far have experienced nothing by tyranny and want.'
www.nahost-politik.de/irak/usa.htm
- b. Wer wolle sich, fragte er drohend, dieser Vorstellung in einer Region widersetzen, in der die meisten Menschen bislang nichts ausser Tyrannei und Not erlebt haetten.

An even more dramatic example of a non-constituent preceding an interpolated clause is the following:

- (20) Ob sie denn, fragte ein Kritiker, "eine Massenprügelei" riskieren wollten?
 whether they particle asked a critic a mass fight risk would
 'A critic asked whether they would risk a mass fight.'
free.pages.at/boonk/Berichte/92/231292taz.htm

An analogous case involving an embedded 'that'-clause:

- (21) Dass er wohl, fuhr sie fort, nie wieder kommen werde.
 that he particle, continued she on, never again come will
 'He will never come again, she continued'.

These examples illustrate that interpolated clauses following non-constituents seem to be able to function as matrix clauses. But these examples share a property: they involve verbs that are used to report speech. It is worth noting that indirect speech reports can be licensed just by context, in 'free indirect style'. This is essentially a sequence of fragment speech reports without matrix clauses. For example in a sequence of speech reports the following fragment would be possible:

- (22) Ob sie denn "eine Massenprügelei" riskieren wollten?
 whether they particle a mass fight risk would
 'Whether they would risk a mass fight.'

Interpolated clauses in reported speech (such as 'she continued') might actually be able to act as adverbials, indicating the source of information, similar to evidentials. But their subordinated prosody distinguishes them from the evidential parentheticals of the preceding section. Alternatively, matrix clauses in speech reports might simply differ from other matrix clauses in their word order options. A closer look at these constructions would be necessary.

3. Movement and C-Command

This section presents evidence that matrix clause interpolation involves movement and leaves c-command relations intact, pointing to a movement analysis that involves full reconstruction at LF. Evidence for movement and c-command is also presented for adverbial clauses, which differ from matrix clauses in not allowing variable binding into their complement clause.

3.1. Clause Interpolation involves Movement

Matrix clause interpolation involves movement of/from the complement of the embedding verb. The examples below involve matrix clauses with a propositional argument gap inside strong islands:

- (23)
- a. Relative Clause Island
 - * Frösche erzählte davon ein Biologe der glaubte t hätten eine Seele.
 frogs talked about.it a biologist who believed have a soul
 - b. Adjunct Island
 - * Frösche beharrte darauf Frida als sie erzählte t hätten eine Seele
 frogs insisted on.it Frida when she said have a soul
 - c. Complex DP-Island
 - * Frösche entlarvte das Marias Behauptung t sage Anna. hätten eine
 frogs revealed it Mary's claim that Anna said have a
 Seele
 soul

These sentences obey the restrictions on verb-initial parentheticals in Reis (1995): The linear order of the host clause is unaltered, and the interpolated clause is verb-initial; and yet they are ungrammatical. Corresponding matrix clauses without extraction are completely acceptable:

- (24)
- a. *Ein Biologe erzählte davon der glaubte* Frösche hätten eine Seele.
 'A biologist talked about it who believed frogs had a soul.'
 - b. *Frida beharrte darauf als sie erzählte* Frösche hätten eine Seele.
 'Frida insisted on it when she said that frogs have a soul.'
 - c. *Das entlarvte Marias Behauptung Anna sage* Frösche hätten eine Seele,
 'That was revealed by Mary's claim that Anna said frogs have a soul.'

It is not the case that the argument in the interpolated clause always has to originate in the highest clause. Longer extractions are possible, as long as they obey island constraints:

- (25) Frösche, glaubte Frida behaupten zu müssen, hätten eine Seele.
 frogs believed Frida claim to must, have.subj a soul
 'Frida believed to have to claim that frogs have a soul.'

The presence of movement does not rule out a parenthetical analysis, however. Similar strong island effects are shown for *as*-parentheticals in Potts (2002). Consider a German ‘*wie*’- and ‘*so*’-clauses (a,b), but also verb-initial interpolated clauses following non-constituents:

- (26) a. * Frösche haben eine Seele so erzählte davon ein Biologe der glaubte t.
 frogs have a soul so talked about.it a biologist who believed
- b. * Frösche haben eine Seele wie ein Biologe davon erzählte der glaubte t.
 frogs have a soul as a biologist about.it talked who believed
- c. * Frösche hätten erzählte davon ein Biologe der glaubte t eine Seele .
 frogs have talked about.it a biologist who believed a soul

Potts (2002) proposes a parenthetical analysis for *as*-clauses and explains strong island effects by zero-operator movement. The movement establishes a local relation with the antecedent, which is the constituent the parentheticals adjoin to, i.e. their sister. The placement of a parenthetical within the modifiee is derived by Heavy-XP-Shift. An alternative view would be to follow Ross (1973) in allowing for ‘slifting’, that is the promotion of an embedded clause to matrix clause status by movement. I will return to this discussion in the last section. For now, we can conclude that both interpolated matrix clauses and adverbial clauses show evidence for movement.

3.2. Interpolated Clauses C-command the Embedded Clause

If interpolated clauses are parentheticals inserted into a matrix clause in their surface position, they should not c-command the material in the host clause, especially the part that precedes them. This section summarizes evidence for c-command into the host clause, in support of the transformational analysis.

First, interpolated clauses are not c-commanded by their material preceding them, as is evidenced by scope facts, the absence of NPI licensing into the interpolated clause, and standard binding tests:⁵

- (27) a. Scope (some > almost everyone, * almost everyone > some)
 Fast jeder, (so) glaubten manche Studenten, habe gefuscht.
 almost everyone, so believed some students, has cheated
- b. NPI Licensing into parenthetical
 * Kein Student, (so) sagte je ein Mensch, habe gefuscht.
 no student, so said ever a human.being, has cheated
- c. Variable Binding into parenthetical
 * Jeder Student_i, (so) sagte er_i/seine_i Mutter, hat eine Chance.
 every student, so said he/his mother, has a chance

⁵I include the pattern for ‘*so*’-clauses, which are often taken to be clear cases of parentheticals Tappe (1981), Haider (1993a), Reis (1995), although they pattern mostly just like matrix clauses, as we will see.

- d. No Condition C effect into parenthetical
 Er_i habe, (so) sagte Paul_i leise, keine Ahnung.
 he has, so said Paul silently, no clue

The interpolated clause c-commands the material of the host:⁶

- (28) a. Condition C effect induced by Interpolated Clause
 * Paul_i, (so) glaubte er_i, habe keine Ahnung.
 Paul, so believed he has no clue
- b. Variable Binding from Interpolated Clause
 Seine_i Prüfung, (so) glaubte jeder Student_i sei schwierig gewesen.
 his exam so believed every student be difficult been
- Ihre_i Prüfung, (so) glaubten viele Studenten_i sei schwierig gewesen.
 his exam so believed every student be difficult been

A similar pattern holds for interpolated clauses preceded by non-constituents. Variable binding seems a bit harder in those cases:

- (29) a. Scope (some students > almost everyone, * almost everyone > some students)
 Fast jeder habe, (so) glaubten manche Studenten, gefuscht.
 almost everyone has, so believed some students, cheated
- b. Condition C effect induced by Interpolated Clause
 * Paul_i, habe, (so) sagte er_i leise keine Ahnung.
 Paul has, so said he silently, no clue
- c. Variable Binding from Interpolated Clause
 ? Seine_i Prüfung sei, (so) glaubte jeder Student, zu schwierig gewesen.
 his exam be believed every student too difficult been
- ? Ihre_i Prüfung sei, (so) glaubten viele Studenten, zu schwierig gewesen.
 his exam be so believed every student too difficult been

Interpolated matrix clauses c-command the material of the complement clause. The c-command facts point to an analysis that posits a movement for the interpolation of clauses. The movement step reconstructs obligatorily at LF.⁷ Interpolated adverbial clauses show a different pattern:

⁶ Since V_2 resists embedding under negation, NPI licensing from the interpolated clause into the embedded clause cannot be tested:

- (1) a. * *Frida sagte nicht*, morgen werde es regnen.
 Frida said not tomorrow will it rain
- b. * *Frida bezweifelte*, morgen werde es regnen.
 Frida doubted tomorrow will it rain

'Replacive' (Jacobs 1991) negation is possible in (a), and even focused negation allows embedded V_2 —only non-contrastive sentence negation is ruled out.

⁷ McCawley (1982) shows further evidence that parentheticals seem to take wide scope and attach higher in the structure than their surface position suggests.

- (30) a. Scope (some students > almost everyone, * almost everyone > some students)
- Fast jeder hat, wie manche Studenten glaubten, gefuscht.
almost everyone has, as some students believed, cheated
- b. Condition C effect induced by Interpolated Clause
- Paul_i/er_i hat, wie er_i/Paul_i selbst zugibt, keine Ahnung.
Paul has, as he himself admits, no clue
- c. Variable Binding from Interpolated Clause
- ?? Seine_i Prüfung sei, wie jeder Student zugab, zu schwierig gewesen.
his exam be as every student admitted too difficult been
- ?? Ihre_i Prüfung sei, wie viele Student zugaben, zu schwierig gewesen.
his exam be as every student admitted too difficult been

Cases of verb-initial interpolated adverbial clauses also differ from matrix clauses with respect to variable binding. While the matrix clause can variable-bind both into the embedded clause and its sentential adverbial, no variable binding is possible between the embedded clause and the adverbial:

- (31) a. Jede Tänzerin_i sagte dass ihr_i Lehrer,
every dancer said that her teacher,
meine zumindest ihr_i Partner, nicht sehr gut sei.
thinks at.least her partner, not very good be
- b. * Gesine glaubt dass jeder Tänzerin_i,
Gesine believes that every dancer,
meine zumindest ihr_i Partner, nicht sehr gut sei.
thinks at.least her partner, not very good be
- c. * Gesine glaubt dass ihr_i Partner,
Gesine believes that her partner,
meine zumindest jede Tänzerin_i, nicht sehr gut sei.
thinks at.least every dancer, not very good be

According to Reis (1995), all of these constructions should be analyzed as parentheticals. The differences between the interpolated clauses in (28) vs. (30) and (31) illustrate that a uniform analysis is unwarranted, and many constructions hitherto taken as uncontroversial parentheticals (e.g. ‘so’-parentheticals) patter just like matrix clauses. A similar conclusion is reached in Haider (2004).

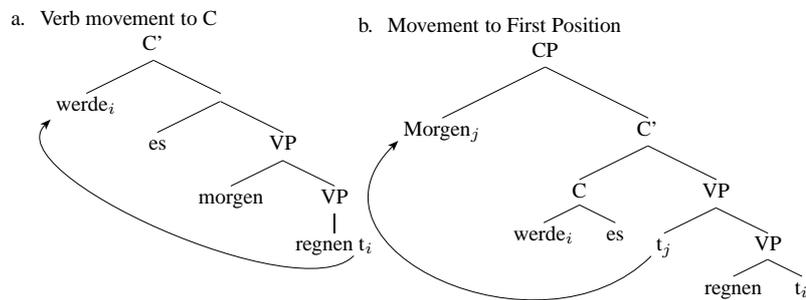
I will attribute the differences between matrix clauses and adverbial clauses to different derivations: Adverbial clauses start out as the matrix clause, and their complement moves and projects to become the new matrix clause, a case of slifting. The next section motives this approach.⁸

⁸Assuming analysis parentheticals adopted in Potts (2002), many of the facts reported here are compatible with the parenthetical view. The next section briefly discusses the difference between the approaches.

4. Deriving the Surface Word Orders

I assume that in a German matrix clause, the finite verb raises to a higher functional projection, say C (32a). Declarative clauses require a syntactic constituent to precede the verb. This ‘first position requirement’ (maybe an EPP feature in C) is satisfied by moving the closest XP the specifier position (a case of ‘attract closest’). Pronouns can be skipped, since they can cliticize to the verb (32b):

(32)



Clausal interpolation can now be derived by successive cyclic movement to the first position of the matrix clause (cf. Thiersch 1978, Tappe 1981):

(33) [[Morgen] sagte sie] [werde es regnen]
 ‘Tomorrow it will rain, she said.’

The cases where the string that precedes the verb of the matrix clause is not a constituent require a different derivation:

(34) Morgen werde es, glaubt sie, stark regnen.
 tomorrow will it said she strongly rain
 ‘Tomorrow it will rain again, she said.’

I propose that the interpolated clause starts out as an argument-taking matrix clause. The linear position of the clause is derived by two independent movement steps, following a proposal in Potts (2002) for the placement of ‘as’-parentheticals: First, the complement moves to the first position of the matrix clause; second, Heavy-XP-Shift moves part of the embedded clause to the right.

Departing from Pott’s analysis, I propose that the first movement step is not empty-operator-movement but overt movement of the complement clause. This movement step goes along with promoting the embedded clause to be the new matrix clause, a case of slifting (Ross 1973).⁹

⁹Given the discussion of the previous section, it seems that movement of the entire complement clause as in (35) is only possible for evidential clauses and those denoting speech reports, i.e. those that function as adverbials rather than true matrix clauses, and in reported speech. Why these derivations are not possible for true matrix clauses does not follow from anything discussed here, and has to be left open at this point.

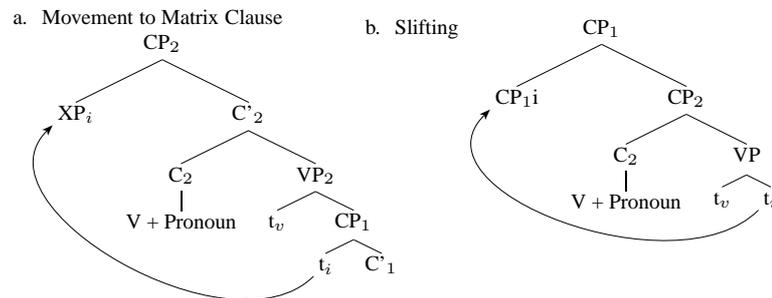
- (35) a. [glaubte sie] [Morgen werde es stark regnen]
 b. [[Morgen werde es stark regnen] glaubte sie]
 c. [[Morgen werde es] sagte sie] [stark regnen]
 ‘Tomorrow it will rain, she said.’

The analysis based on Heavy-Shift sits well with the intuition that the ‘extraposed’ part following an intraposed sentence should be ‘heavy’:

- (36) a. ? Morgen werde es, sagte sie leise, regnen.
 Tomorrow will it, said she silently, rain.
 b. Morgen werde es, sagte sie leise, stark regnen.
 Tomorrow will it, said she silently, rain hard.

The difference in prosody between matrix clauses and adverbial clauses is due to the difference in the projection line. An interpolated matrix clause projects. An interpolated adverbial starts out as the matrix clause, but then the embedded clause is raised and projects, creating an adjunction structure¹⁰:

(37)



The generalization about prosody can now be stated as follows: Within each maximal projection (CP, VP), the projecting element (in this case the verb in C) and the material attached to it (in this case the pronoun and adverbial) is prosodically subordinated and suffixed to a preceding non-projecting category (here, the XP in the first position), essentially the generalization observed for predicates in (3).

The analysis is compatible with the empty-operator approach for parentheticals proposed in Potts (2002), which essentially assumes a similar difference in projection between matrix clauses and parentheticals. One reason to prefer the slifting approach here is in the empty-operator analysis, it remains unclear why the parentheticals are verb-initial. It cannot be the empty operator that fills the first position of the parenthetical: verb-initial parentheticals are impossible in sentence initial position. The parentheticals are genuine V_2 clauses, that need an

¹⁰I assume, that slifting prevents reconstruction and is thus responsible for the impossibility of variable binding.

overt constituent in first position. The slifting derivation in (37) can simply treat the movement of the embedded clause as overt movement to first position.¹¹

This paper presented evidence that some, but not all verb-initial interpolated clauses are matrix clauses. Both matrix and adverbial clauses are ‘interpolated’ by movement. The prosody of interpolated matrix clauses and adverbial clauses was linked to a general prosodic asymmetry (3).

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¹¹Perhaps the strongest empirical evidence against slifting analysis of ‘as’-parentheticals in particular are cases where the antecedent for the zero-operator does not have the correct syntactic shape to be its actual argument (Potts 2002:658/659). I will not discuss this problem further in this paper.

**Morphological decomposability of concatenative and
non-concatenative word forms**
Evidence from slip experiments

Eva Waleschkowski

This paper deals with morphological exchanges in concatenative and non-concatenative polymorphemic words in Spoken German. Exchanges were elicited in a repeat-reverse paradigm. Concatenative morphemes were expected to be separated more easily than non-concatenative morphemes. In addition, it was assumed that morphological information (abstract vs. phonologically specified information) is processed on different levels. It turned out that both hypotheses can be verified.

1. Introduction

Recently, morphology has attracted a lot of research interest. Theoretical as well as psycholinguistic studies focus on morphological representation and morphological processing, respectively. In particular, theoretical models have been developed such as Distributed Morphology (henceforth DM, Halle & Marantz 1993), and Minimalist Morphology (Wunderlich & Fabri 1995). One of the recurrent issues in theoretical and psycholinguistic research concerns the decomposability of regular and irregular word forms. The controversy between single and dual-mechanism models is intended to be resolved by investigating the inflectional system of language. In dual-mechanism models two different representations of inflected word forms are assumed. (i) full form representations of inflected forms, and (ii) decomposed representations consisting of stems and affixes (Pinker & Prince 1994). In contrast, single mechanism models hypothesize that all inflected forms are stored in the lexicon as full forms, therefore decomposition processes are irrelevant.

Psycholinguistic approaches aim at finding evidence for various morphological processes by means of investigating spontaneous speech errors or carrying out several kinds of experiments, e.g. priming experiments or elicitation of slips of the tongue. Sonnenstuhl, Eisenbeiss, and Clahsen (1999) investigated regular and irregular forms of German participles and noun plurals by means of priming experiments. They obtained full priming for regular forms

but only partial priming for irregular forms. They concluded that regular forms are decomposable on-line whereas irregular stems and their respective inflected forms have separate representations, i.e. they are not decomposable. These findings were considered a confirmation for the dual-mechanism model.

Lately, some attempts have been taken to form a relationship between psycholinguistic and theoretical concepts. One of these efforts has been undertaken by Pfau (2000). He questions "how a particular formal grammar such as DM can be mapped onto a processing model". This analysis was based on an extensive set of speech error data. In particular morphological slips of the tongue can be explained in a straightforward manner by referring to DM.

In this paper, we want to combine psycholinguistic and theoretical approaches as well in order to explain parts of the inflectional system of Spoken German. We focus on morphological exchanges in concatenative and non-concatenative polymorphemic words. We will discuss our findings in the framework of DM which provides a reliable theoretical explanation for morphological decomposition processes.

2. Preliminary remarks

The results presented in this article have been obtained in the scope of a research project funded by the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG).¹ In the first place, our research was concerned with a comparison of German sign language (DGS) and Spoken German by means of investigating slips of the hand and slips of the tongue, respectively. Sign languages are processed in the visuo-gestural modality, spoken languages in the aural-oral modality. One of our essential objectives was to study the impact of modality on language production. To this end, we compiled and analyzed two extensive corpora of slips of the tongue and hand. We devised an elicitation task to hearing speakers as well as deaf signers. Subjects had to tell picture stories under various cognitive stress conditions while being audio-and/or videotaped. As a result, we obtained spontaneous, naturalistic spoken and signed utterances. The video and audio tapes were analyzed according to various psycholinguistic criteria such as slip category (e.g. anticipation, perseveration, exchange, substitution, blend, fusion), affected unit (e.g. phonological feature, segment, morpheme, word, phrase), and locus of repair (if the utterance was interrupted). For detailed information see Hohenberger et al. (2002), Leuninger et al. (to appear).

One of the most stunning –and unexpected– results was the almost complete absence of exchanges of any kind (word, morpheme, or segment). The lack of morphological exchanges, in particular, was deplorable as the most striking difference between Spoken and Sign languages concerns their morphological typology. According to Brentari (2002), sign languages are characterized by

¹ The precise title of the project was: 'Language production errors and their repairs in dependence on the modality. German sign language vs. Spoken German' (LE 596/61-3).

‘vertical processing’, i.e. linguistic information is predominantly organized in a fusional/simultaneous way with few big chunks carrying a lot of information. In contrast, spoken languages are characterized by ‘horizontal processing’, i.e. linguistic information is organized predominantly in a serial way with many small chunks carrying few information. Therefore we designed an experiment focusing on morphological exchanges in concatenative and non-concatenative polymorphemic signs and words in DGS and Spoken German. Morpheme errors can provide crucial evidence for morphological processing, in particular decomposition. In this article, however, we will focus on the experimental results of Spoken German. The findings can be considered independently from the results of German sign language providing interesting insights in morphological processes of Spoken German.

3. *Morpheme errors in Spoken German*

We base the analysis of our corpus on a strictly serial-modular model of language production in the sense of Levelt (1989, 1999, Levelt, Roelofs & Meyer 1999) which is based on the seminal work of Garrett (1975, 1980). In this model, linguistic information is processed top down on various levels each of which has its own representational form and computational vocabulary. Language production operates in a feed-forward fashion only, without any local feedback from the level of phonological encoding to the level of grammatical encoding. The production process starts out with the preverbal message, which has to be translated into articulated speech (or sign). This translation process passes through levels of lexical, morphological, and phonological planning. The processing of words and segments is definitely assigned to independent levels (lemma and form retrieval respectively). The level of morphological processing, however, is not yet completely determined. Only recently it has been attributed a level of its own, between the level of lexical and phonological processing (Levelt et al. 1999, Zwitserlood, Boelte & Dohmes 2000, 2002). To completely reveal the problem of morphological processing remains to be investigated.

The psychological reality of morphemes during language processing is evidenced by morphological speech errors. In order to occur as an error unit, morphemes must be accessible to the processor. Morphological errors show that morphological information can be accessed during processing and single morphemes can be detached and manipulated independently. Considering morphological error types in concatenative languages such as German it becomes obvious that in most cases morpheme boundaries coincide with points of fracture. Therefore, concatenatively ordered morphemes are likely to be separated more easily than non-concatenatively organized morphemes.

Specifically, structures involving sequences of lexical roots and derivational or inflectional affixes are separated frequently. In morphological “stranding” errors, for example, only lexical roots are exchanged, as in (1) and (2). This error type occurs at a point in production when lexical roots are inserted in a

previously established morpho-syntactic planning frame (Garrett 1980). The lexical roots of two derived or inflected polymorphemic words are exchanged leaving behind the grammatical affixes (which are features of the morpho-syntactic frame).

- (1) Ich pflanz-e die Topf-en um ← Ich topf-e die Pflanz-en um
 I plant_[1SG] the pot-s re
 'I repot the plants.'
 (Frankfurt slip corpus)²

- (2) I thought the park was truck-ed ← the truck was parked.
 (Garrett 1980, pp. 188)

Garrett (1980) distinguishes two types of stranding errors, those which are grammatically well-formed, i.e. accommodated as in (3) and those resulting in an ungrammatical string as in (4). In order to explain this variation Garrett assumes an additional level which is responsible for the grammatical accommodation process. Relating these types of morphological errors in (3) and (4) to DM appears to be a rather economical explanation (Pfau 2000). Instead of adding a further level, this difference can be explained by assuming that the errors take place on different levels.

- (3) da war der Bruch ge-bannt-t ← der Bann ge-broch-en
 there was the break spell-PART ← the spell break-PART
 'the ice had broken at last.'
 (Pfau 2000, pp. 185)

- (4) der Mann hat mich Straf-en ge-lüg-t ← Lüg-en ge-straft-t
 the man has me punish-PL lie-PART
 'the man has given the lie to me.'
 (Pfau 2000, pp. 185)

In example (3) two morphemes [brech] and [bann] are exchanged. Note that the exchanged elements are correctly accommodated to their new syntactic environment. The processor has properly adjusted the past stem *-broch* 'broke' to the nominal stem *Bruch* and selected the correct participle suffix *-t* for the resulting participle *ge-bannt-t*. In contrast, in (4) the exchanged elements are not accommodated. The participle *ge-lüg-t* is morphologically ill-formed, it should be *ge-log-en*.

In DM, morphological information is not stored in a lexicon in the traditional sense but rather distributed over three lists. List 1, the lexicon, contains only abstract features relevant for syntactic processes, list 2, the vocabulary, contains the word forms, i.e. the phonological information, list 3,

² This error stems from Helen Leuninger's Frankfurt slip corpus which is a collection of spontaneous German slips of the tongue at the University of Frankfurt. It comprises ca. 6,000 slips.

the encyclopedia, comprises the idiomatic meaning of the lexical entries. The error in (3) must have occurred while accessing list 1. The selected roots are inserted in the wrong position. After being selected from list 1 and after syntactic operations such as movement and merger have been applied on the level of the computational system, items pass through the level of morphological structure (MS) where morphological operations such as merger, fusion, adjunction of agreement nodes, and readjustment rules take place. It is exactly on the level of MS where accommodation happens. Whereas Garrett interprets accommodation as a second step after the error as a first step, accommodation in DM is an operation “implemented” on the level of MS applying freely to errors as well as to any other morphological item. Note that at MS the processor is not able to distinguish between correctly or incorrectly selected roots. The error in (4) must have occurred while retrieving items from list 2 and being processed on the level of Phonological Form (PF). Understanding DM as a processing model operating strictly top down one can conclude that MS precedes PF. Therefore, no accommodation process can take place on PF any more so that the utterance results in an ungrammatical string.

In the DFG-corpus for Spoken German, morphemes are affected in 174 cases (18%). Morphological errors rank behind lexical errors (35%) and phonological errors (30%) in frequency. Affected morphemes comprise root (content) morphemes, and functional/grammatical morphemes, i.e. derivational and inflection such as tense marking, agreement of subject and verb. As opposed to the homogeneous set of word and phonological errors, the set of morphological errors is heterogeneous. There are three classes of syntagmatic morphological errors that can be distinguished, namely lexical content morphemes (5), abstract grammatical morphemes (6), and morpho-phonological morphemes (7) (see also Hohenberger & Waleschkowski to appear).

(5) Lexical morpheme error (anticipation)

Sonnen-stühle// Liege-stühle und einen Sonnen-schirm
 sun-chairs// deck-chairs and a sun-shade

In (5), the affected morpheme *Sonnen-* is a content morpheme within the compound noun *Sonnen-stühle* ‘sun-chairs’. Although *Sonnen-stühle* is a single concept, two lemmas, the specifier *Sonnen* and the head *-stühle*, are components of the compound. During lexical access, the concept activates both lemma nodes. In this process, the content morpheme *Sonnen* was anticipated and substituted for the correct morpheme *Liege*.

(6) Abstract grammatical morpheme error (perseveration)

die Gäste-PL für die Partie-s-PL
 the guest-s-PL for the partie-s-PL

In (6), the plural morpheme of *Gäst-e* ‘guest-s’ was perseverated and affixed onto the following noun *Party* ‘party’, resulting in the slip *Partie-s* ‘partie-s’. In this case, it must have been the abstract plural morpheme that was

perseverated because *Gäste* and *Party* have different plural allomorphs, namely *-e* and *-s*, respectively.³ According to DM, this perseveration must have been taken place at a fairly early level of processing where only abstract features are computed but not yet their concrete morpho-phonological form.

(7) Morpho-phonological error (anticipation)

ein Bild-er-PL, zwei Bild-er ← ein Bild-SG
 one picture-s-PL, two picture-s ← one picture-SG

In (3), it is also a plural morpheme that is affected. The concrete *-er* suffix of *zwei Bilder* ‘two pictures’ was anticipated, resulting in an ungrammatical string. Note that there is no correct number agreement in the DP *ein Bilder* ‘one picture-s’ between the quantifier *ein* (Sg) and the noun *Bild-er* (Pl). Therefore, we assume that this error has taken place later in processing, when the morpho-phonological form is retrieved. At this point in time the processor is no longer able to match both features as this would require backtracking to an earlier level of processing.

The different patterns of morphological errors show that the retrieval of morphological information is distributed over time. Errors as in (6) indicate that there is a point in time when abstract feature bundles are computed, which are not yet phonologically specified. On the level of phonological encoding the anticipated abstract plural feature is spelled out in its correct plural form. In contrast, errors as in (7) show that also fully specified morphemes can be manipulated, often resulting in an ungrammatical string. As soon as the morpho-phonological form is retrieved, the abstract grammatical information is not accessible any more. Hence, the grammatical form cannot be accommodated any more. Particularly, these types of errors provide strong evidence for a strict top-down processor. On the basis of the different types of morphological errors it seems reasonable to suppose that it is a matter of timing when a certain kind of morphological information is available. To sum up: morphological retrieval is a two-staged process. Abstract grammatical features are computed earlier than their morpho-phonological form. While the former can only be manipulated during the first retrieval step when the phonological form is not at issue, phonologically specified morphemes can be manipulated during the second retrieval step when the processor plans the morpho-phonological form of the word.

The structure of morphological errors mirrors the morphological design of Spoken German. The processor is forced to operate in the confines imposed by the format of the grammar. The different types of morpheme errors show that abstract and phonologically specified morphological information is processed on independent levels. The accessibility of morphemes is determined by the morphological type of the respective language to a high degree. Languages of a concatenative morphological type such as Spoken German tend to show a

³ In German, there are up to nine plural allomorphs. For further information the reader is referred to Wegener (1994, 1995).

higher rate of morphological errors than languages of a fusional-simultaneous type such as German sign language. As opposed to Spoken German, in DGS morphemes are clearly less affected (18% vs. 6%). These findings are attributed to the typological differences between Spoken German and DGS. Thus, simultaneity appears to inhibit decomposition during language processing whereas concatenative structures are more susceptible to separation (at least in the second step).

4. Experiment

In the present study, we focus on morphological exchanges in concatenative and non-concatenative polymorphemic words in Spoken German. As already mentioned, we did not find any “stranding” error in Spoken German. In many cross-linguistic paper-and-pencil corpora, however, this error type is well documented (Poulisse 1999). These divergent results may be attributed to the different fashion in which the corpora are compiled. Compared to traditional corpora, which contain a huge set of spontaneous data collected by multiple contributors and produced by multiple subjects, our data set is elicited by means of a more restricted experimental method (see section 4.1). It cannot be excluded that the frequency distribution of errors in spontaneous corpora is rather a result of observer or collecting biases than a reliable representation of the actual occurrence of slip categories (Cutler 1982).

As morphological exchanges do occur in German - though to a lower degree as assumed so far, we devised an experiment in order to elicit this particular slip category. Especially by means of elicitation techniques, specific hypotheses can be tested. The experimental design restricts the possible reactions (dependent variable) of the subjects by way of controlling the conditions (independent variables). We assume that typological differences account for the occurrence of morphological exchanges once a suited experimental technique has been found that can elicit them. As already pointed out, languages with a concatenative typology such as Spoken German tend to show more morpheme errors than non-concatenative languages such as DGS. Morphological root exchanges are characteristic of languages in which morphemes are arranged in a linear fashion. At this point, the question arises to what extent non-concatenative morphemes are decomposable in on-line processing.

Though Spoken German is concatenative to a high degree it displays some non-concatenative properties regarding grammatical information, i.e. some grammatical features are expressed simultaneously. There is a subgroup of non-linear morphemes occurring in irregular word forms with umlauts and ablauts (vowel gradation), e.g. in noun plurals as in *Vater-V[æ]ter* (father-fathers), which can be used to test our hypotheses.

The hypotheses are as follows.

H1: Morpheme types

Concatenative morphemes should detach more easily than non-concatenative ones, and therefore produce more root exchanges.

H2: Levels of processing

Morphological information can be processed on different levels. On the first level, abstract morphological information is processed; on the second level the morphological form. Non-concatenative morphemes can only be manipulated on the former level, concatenative morphemes on both.

4.1 Method

We devised an experimental task in order to investigate morphological processing in Spoken German. Subjects were required to exchange polymorphemic spoken words. The morphological exchanges in concatenative and non-concatenative polymorphemic words were elicited in a repeat-reverse paradigm (Baars 1992, Humphreys 2002). Two short phrases, which had to be learnt by heart, were followed by a list of two pairs of phrases priming root exchanges and one distractor pair. After being exposed to the priming list the subjects were asked to reverse or to repeat the critical polymorphemic items from the target pair. (Participants were instructed to shadow the list silently.) In the repeat condition (control condition) the target pair simply had to be repeated. The ordering reverse/repeat condition was presented at random.

The experiment was organized as a semi-self-paced procedure. The 28 target pairs were presented on a SONY Vaio PCG-SR1K notebook in form of audio sequences. The subjects were allowed to listen to the target pairs as often as they needed to memorize them. The priming list, however, was directly followed by the request to repeat/reverse the critical items. At this point, subjects could not control the course of the experiment but had to answer immediately. The duration of the experiments amounted to 60 minutes on average. The subjects were 26 undergraduate students of the University of Frankfurt. All of them were native speakers of German.

The experimental setting is sketched in the following.

Target pair:

das Auto _[SG] reparieren;	die Lok-s _[PL] reinigen
to repair the car-SG;	to clean the locomotive-s-PL

distractor phrase:

die Geschwister versorgen
to look after siblings

Priming list:

die Oma-SG fragen;	die Opas-PL einladen
to ask the grandmother-SG;	to invite the grandfathers-PL

das Dia-SG zeigen;	die Fotos-PL entwickeln
to show the slide-SG;	to develop the photo-s-PL

distractor phrase:

die Milch kochen
to boil the milk

Critical Condition: Swap

Was reparieren?	to repair what?
Answer of the subject: _____	
Was reinigen?	to clean what?
Answer of the subject: _____	

Apart from root exchanges in which we were primarily interested there are several other possible outputs such as whole word and affix exchanges. Note that the priming phrases were structurally equivalent to the target phrases. It is crucial that the ordering of affixes remains the same as in the target input pair in order to enhance the probability of root exchanges.

The German regular *-s* plural exemplifies a concatenative morpheme in Spoken German for the reverse condition. All possible outputs are listed below.

target phrase

das Auto-SG reparieren;	die Lok-s-PL reinigen
to repair the car-SG	to clean the locomotive-s-PL

output: root exchange

die Lok-SG reparieren;	die Auto-s-PL reinigen
to repair the locomotive-SG	to clean the car-s-PL

output: word exchange

die Lok-s-PL reparieren;	das Auto-SG reinigen
to repair the locomotive-s-PL	to clean the car-SG

output: affix exchange

die Auto-s -PL reparieren;	die Lok-SG reinigen
to repair the car-s-PL	to clean the locomotive-SG

The experimental material comprises different morphological types such as inflection (e.g. tense, number), derivation (e.g. diminutive, nominalization, aspect), and compounds in order to obtain an overall insight into decomposition processes. We had no specific hypotheses as to the different susceptibility of the various morphological processes (derivation, inflection, compounding) to decomposition.

4.2 Results

The results confirm the appropriateness of the reverse/repeat paradigm for the elicitation of morphological errors.

In the reverse condition, most of the errors are word exchanges (67.2%). As expected the reverse condition elicits more root exchanges than affix exchanges since the priming sentences were designed to elicit more root exchanges. In all, we obtained 119 root exchanges, which are 10 % of all cases and 31 affix exchanges, which are 2.6% of all cases. In 113 cases the condition was not met.⁴

In the repeat condition, most cases are word repetitions - as expected. Interestingly, this condition caused more affix exchanges than root exchanges. We obtained 32 root exchanges and more than twice as many affix exchanges (n=76). Adding up the root and affix exchanges for both conditions, the mean percentage value amounts to 9% for the repeat condition and to 13% for the reverse condition.

Condition	Reverse		Repeat	
	n	%	n	%
word repetition	113	9.4	981	82
word exchange	804	67.2	26	2.2
root exchange	119	10	32	2.7
affix exchange	31	2.6	76	6.4
Other	87	7.3	66	5.5
Omission	42	3.5	15	1.2
Sum	1196	100	1196	100

Table 1.: Distribution of error types under the repeat-reverse condition

Table 2 shows an overview of the ranking of morpheme types in Spoken German that are decomposable during morphological processing. As hypothesized most cases show root exchanges in serial morphemes. The ranking is headed by the diminutive *Bäumchen/Blümchen* (19 cases), followed by the nominal derivation (12 cases) and the regular *-s* plural inflection (11 cases). In the middle field, there are 4 serial morpheme types, which occur eight times in each case. These types cannot be assigned to one particular morpheme type, as they comprise semi-regular plural inflection, adjective derivation, nominal composition, and regular participle inflection. Likewise, the non-concatenative target pairs such as the irregular tense inflection and the irregular plural inflection can be separated though less often than the concatenative morphemes. Strikingly, there is only a small difference between the exchange occurrence between the concatenative regular tense inflection (6) and the non-concatenative irregular tense inflection (5).

⁴ In such cases, subjects repeated the target pair instead of exchanging the critical elements.

Morphological type/process	Example	n
concatenative diminutive, derivation	Bäum-chen/Blüm-chen tree-DIM/flower-DIM	19
concatenative nominal derivation	Kompens-ierung/Neutralisa-tion Compensation/neutralization	12
concatenative regular plural inflection	das Auto-ø/die Lok-s the car-ø /the locomotive-s	11
concatenative semi-regular plural inflection	die Bluse- ø/die Hose-n the blouse-ø/trousers	8
concatenative adjective derivation	Unüberwind-bar/unverletz-lich Insuperable/unviolable	8
concatenative nominal composition	Koch-topf/Suppen-löffel sauce-pan/soup-spoon	8
concatenative regular participle inflection	mal-end/ge-zeich-net painting/drawn	8
concatenative regular tense inflection	er lach-t/sie brüll-te he laugh-s/he shout-ed	6
non-concatenative irregular tense inflection	Er läuf-t/sie sprang He walk-s/she sprang	5
non-concatenative irregular plural inflection	Vater/Mütter father/mother-s	5

Table 2: Decomposition during processing: ranking of morpheme types

4.3 Evaluation of hypotheses

Our results verify that concatenative morphemes are separated most frequently. With the experimental technique applied, we are able to get direct insights into decomposition processes. By doing so we can show that even non-concatenative morphemes can be separated.

The second hypothesis, which predicts that abstract and phonologically specified information are processed on different levels, can also be verified. The results have shown that irregular non-concatenative forms are processed on a separate level, prior to the retrieval of the phonological form. In German, irregular, non-concatenative forms are phonologically characterized by umlauts or ablauts. Root exchanges requiring a vowel gradation must have been processed on a level where abstract morphological information rather than phonological information is processed. Otherwise an exchange such as

den Vater-SG ehren, die Mütter-PL lieben (target pair)
to honour the father, to love the mothers

die Mutter-SG ehren, die Väter-PL lieben (output: root exchange)
to honour the mother, to love the fathers

could not have taken place. The change of the phonological form necessitates an exchange of the abstract roots not yet being phonologically specified. In this case, the abstract root of *Mutter*, but not the phonologically specified form *Mütter* must have been exchanged.

On which processing level regular roots are exchanges cannot be completely determined. On the basis of our experimental results it is not possible to ascertain on which level the respective exchange has occurred. (An answer to this question could only be given in a priming experiment by manipulating the SOAs (stimulus onset asynchronies) of the morphological distractors.)

5. Discussion

The main goal of this study was to investigate the decomposability of concatenative and non-concatenative polymorphemic word forms in Spoken German. In German, most irregular forms are non-concatenative, whereas regular forms tend to be concatenative.⁵ The experiment revealed that both forms can be separated though to different extents. As expected, non-concatenative irregular forms turned out to be detached less frequently than concatenative regular forms. These results verify our first hypothesis, namely that concatenative morphemes are separated more easily than non-concatenative ones. The fact that simultaneous forms can be manipulated refers to our second hypothesis, namely that abstract and phonologically specified morphological information is processed on different levels.

First, let us discuss the frequency distribution of the different morphological types being affected during the reverse condition (see table 2). The ranking is headed by the diminutive (19 cases). This frequent occurrence calls for some explanation. The reason for this result may be attributed to the phonological and semantic similarity of the target pair *Blümchen* 'flower'/'*Bäumchen* 'tree'. Additionally, the derivation suffixes *-chen* and *-lein* do not differ in their meaning. Since it is likely that the memorizing of the target pairs is based on the meaning of the single expressions, the subjects may not be able to remember the precise difference between *Blümchen* and *Bäumchen* when they are asked to exchange the critical elements. As a consequence, *Blüm* and *Bäum* interact more frequently. Another prominent target pair is the nominal derivation *Kompens-ierung* and *Neutralisa-tion* (12 cases). Apart from phonological similarity, this target pair is comparable to the diminutive with respect to the semantic relationship. The suffixes *-ierung* and *-tion* also do not considerably differ in their meaning. Therefore, a root exchange does not change the meaning of the target pair expressions in a significant way. On the basis of these observations one can conclude that decomposability is not only a matter of concatenativity but also a matter of the meaning of the roots and

⁵ Tense information in irregular forms is expressed in terms of stem alternation, e.g. the past tense form of 'lauf-' (walk) is 'lief-' ('walked' first and third person singular).

affixes. Affixes not differing in their meaning are more likely to remain in their original position, leading to more root exchanges. Affixes differing in their meaning are supposed to be strongly connected to their root morpheme leading to more word exchanges.⁶

The stimulus pairs also differed in their degree of imaginability. Thus, subjects frequently reported that they had pictures of the target pairs in their mind (note that this was a memory task). In this case, morphological decomposing was not an issue at all: pictorial representations will not be decomposed morphologically. This might have fostered the degree of whole-word exchanges instead of partial exchanges.

Furthermore, there is a surprising discrepancy between affixes being affected in the repeat condition and the reverse condition, respectively. As for the repeat condition, affixes are affected more than twice as often than roots. As for the reverse condition, affixes turned out to be affected to a considerably less degree. Maybe the two conditions – to repeat and to swap – differently highlight the content and form, respectively. It could be that under the repeat condition subjects might be more likely to focus on the “same word” in the sense of “same meaning” (thus concentrating on the content morpheme while possibly mixing up the affixes). However, in the swap condition, subjects might be focussed more on “different word” in the sense of “different form” (thus equally paying attention to the roots and the affixes. In this case, root exchanges will always be fostered, as roots are the more mobile parts that are inserted into a pre-established fixed morphological frame).

Now let us consider cases of tense and plural inflection. These morphological types are relevant for a comparison of the decomposability of concatenative and non-concatenative forms. It came as a surprise that there is no significant difference between regular (concatenative) and irregular (non-concatenative) tense inflection (6 vs. 5). According to our hypotheses, the regular tense inflection was expected to yield more root exchanges than the irregular inflection. On the basis of the results so far, it is not possible to explain the slight difference between these inflection types. In order to draw reliable conclusions it is necessary to devise a further repeat/reverse experiment that focuses on regular and irregular tense inflection more extensively.

The results obtained from regular and irregular plural inflection on the other hand provide stronger evidence for differing decomposition processes. The regular plural inflection is affected twice as often than the irregular plural inflection (11 vs. 5). In German, the regular –s plural is considered the default plural form.⁷ As a consequence, this plural form is expected to be affected more frequently than other plural forms.

⁶ The difference of the affixes concerning meaning can be illustrated by means of the following example: ‘Was für ein herr-licher König’ (‘what a wonderful king’)/ ‘was für ein kind-isches Wesen’ (‘what a childish character’). The critical items are ‘herr-lich’ and ‘kind-isch’. A root exchange results in ‘was für ein kindlicher König’ (‘what a childlike king’) and ‘was für ein herrisches Wesen’ (‘what a domineering character’).

⁷ Despite its low frequency, the –s plural is very productive in German. Marcus et al. (1995) have shown that the application of this form is hardly restricted. The –s plural is attached to neolo-

As far as the rate of occurrence is concerned, frequency should not be the only evaluative factor. A prime issue in our findings is that irregular forms can be separated, indeed. One of the advantages of the reverse-repeat paradigm is that one can elicit data that allows for conclusions on the processing of regular and irregular forms. Whereas longer reaction times obtained in priming experiments only indirectly bear on the issue of decomposability of irregular forms, our method directly requires decomposition.

The decomposition revealed in the repeat/reverse experiment can provide instructive information on morphological processing in general. In DM, as outlined in section 3, abstract information and phonologically specified information are processed on independent levels. Our results indicate that irregular forms, e.g. tense, are processed in the computational system or on the level of morphological structure where only abstract information is available. Only if this is the case the correct phonological string can be inserted by means of readjustment rules on a later level. Otherwise irregular/non-concatenative forms as illustrated in the target pair *sie läuft* 'she walks', *er sprang* 'he sprang' could not turn into *sie springt* 'she springs', *er lief* 'he walked'. It is still an open question, however, on which level regular forms are processed. The results do not provide any information if regular forms are processed in the computational system, on the level of morphological form, or on the level phonological form. In particular, the decomposition of irregular forms provides strong indication for the processing of abstract roots (instead of their lexical form) which is one of the basic assumptions of DM.

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Two Ways of Expressing Negation

Hedde H. Zeijlstra

In this paper I will show that whenever a language has a negative marker that is a syntactic head, this language exhibits Negative Concord (NC); languages that only exhibit Double Negation lack a negative head. I will argue that this is a major argument in favour of an analysis of NC in terms of syntactic agreement, since it proves that only NC languages have a syntactic category Neg. Moreover, I argue that this implies that n-words in Negative Concord languages cannot be regarded as semantically negative and that not in every language the negative marker itself is the phonological realization of a negative operator.

1. Introduction

Negative Concord (NC) has been a problem for compositionality for a long time. In this paper I will show that the solution for NC can be found in the syntactic status of negative markers that participate in NC relations. The analysis of the status of negative markers provides a framework in which NC naturally falls out as a form of syntactic agreement. I will also argue that n-words in NC languages are semantically non-negative, and the combination of these two assumptions predicts the correct readings of multiple negative expressions, including those that raised problems for previous analyses of NC.

In section 2 I will discuss four different instances of Negative Concord, and I will argue that one particular instance (Emphatic Negation) does not count as Negative Concord proper.

In section 3, I will discuss the correspondence between Negative Concord and the syntactic status based on cross-linguistic variation. I will argue that Jespersen's (1917) original bidirectional generalization should be replaced by a unidirectional one.

In 4.1 I will present a syntactic analysis for negative markers and argue that only negative heads require the presence of a functional projection NegP, whereas negative adverbs are base-generated in a lower position in the clause and do not necessarily require the presence of such a NegP. The result of this analysis is that it is possible to connect NC to the presence of a NegP. In 4.2 I will argue that n-words are semantically non-negative, but that they are

semantically marked for negation and that this may also hold for negative markers in several NC languages. In 4.3 I will show that NC can be analyzed as multiple agreement between a negative operator and negative elements that are only marked for negation in the syntax.

2. Negative Concord

In this section I will introduce one of the two topics in this study of negation: Negative Concord. Negative Concord (NC) is the name for the phenomenon whereby multiple negative elements in the morpho-syntax only yield one negation in the semantics¹. Although many different subclasses of Negative Concord have been defined in the literature (cf. Den Besten 1989, Van der Wouden 1994, Giannakidou 2000 a .o.) I will restrict myself to four different instances of NC.

- (1) a. **Strict Negative Concord**: N-words are not allowed to occur by themselves, but have to be accompanied by a single negative marker.
- b. **Non-Strict Negative Concord (NSNC)**: N-words are not allowed to occur by themselves, but should be accompanied by a single negative marker, except when the n-word is in preverbal position. Then it never co-occurs with a negative marker.
- c. **Paratactic Negation (PN)**: a verb or preposition with a negative connotation in a main clause selects an n-word in its complement (clause), that does not contribute any negation of its own.
- d. **Emphatic Negation (EN)**: One negative element enforces another negative element.

Whereby the following definitions hold:

- (2) a. **Negative markers**: elements that denote that a sentence (or constituent) is under the scope of negation. Examples are French *ne* and *pas*², Italian *non*, Czech *ne-* and Dutch *niet*.
- b. **N-words**: elements that only under well-defined conditions are equivalent to a negative quantifier. Examples are French *rien* or *personne*, Italian *nessuno* or Czech *nikoho* (after Laka 1990).
- c. **Negative elements**: the set of negative markers, n-words and negative quantifiers

Examples of these four instances in (1) are in (3)-(6).

¹ Cf Van der Wouden (1994) and Giannakidou (1997, 2000) for definitions that are only slightly different.

² According to this definition *pas* is not an n-word, contrary to what is sometimes suggested. The reason for this is that *pas* only binds an event variable, and not variables that are introduced by indefinite expressions (cf. Zeijlstra 2004).

- (3) a. Milan *nikomu nevolá*.³ Czech
 Milan n-body neg-call
 NC: 'Milan doesn't call anybody'
- b. Dnes *nevolá nikdo*.
 Today neg-calls n-body
 NC: 'Today nobody is calling'
- c. Dnes *nikdo nevolá*.
 Today n-body neg-calls
 Strict NC: 'Today nobody is calling'
- (4) a. Gianni **(non) ha telefonato a nessuno* Italian
 Gianni neg has called to n-body
 NC: 'Gianni didn't call anybody'
- b. **(Non) ha telefonato nessuno*
 Neg has called n-body
 NC: 'Nobody called'
- c. *Nessuno (*non) ha telefonato*
 N-body neg has called
 Non-Strict NC: 'Nobody called'
- (5) a. J'ai *peur qu'il ne vient* French
 I am afraid that he neg comes
 PN: 'I am afraid that he comes'
- b. Il vient *sans personne*
 He comes without n-body
 PN: 'He comes without anybody'
- (6) a. Hij heeft nergens geen zin in Coll. Dutch⁴
 He has n-where no lust in
 'He doesn't feel like anything at all'
- b. Hij gaat nooit niet naar school
 He goes n-ever neg to school
 'He never ever goes to school'

In (3) we see that the negative marker *ne* is prefixed to the finite verb in all examples. In (4) the negative marker (which is not a prefix but a separate word), is only allowed in negative sentences, if it is not preceded by an *n*-word in subject position. Given that the negative marker can co-occur with a negative subject in a lower position, it is not due to the fact that the *nessuno* is a subject, but due to the position of *nessuno* in the clause in (4) that the inclusion of the negative marker is forbidden.

Whereas (3) and (4) are examples that denote the traditional notion of Negative Concord, the phenomenon in (5) is different, because the concord

³ For typographic reasons diacritics have been left out in all Czech examples.

⁴ EN is only available in informal and colloquial registers of Dutch. Standard Dutch only exhibits Double Negation readings.

NC.⁶ In the rest of this paper I will provide an analysis that accounts for Strict and Non-Strict Negative Concorde and for Paratactic Negation. I argue that Emphatic Negation constructions should be treated as idiomatic expressions that are lexically stored.

3. The syntactic status of Negative Markers

Languages vary diachronically with respect to the way they express sentential negation. In section 3.1, I describe this development that is known as Jespersen's Cycle (1917). Jespersen has already connected the phase of a particular language in this cycle to the occurrence of NC in this language and he formulated his observations in a bidirectional generalization. In section 3.2, I evaluate this generalization on the basis of a set of 30 languages. I show that Jespersen's generalization relation should be replaced by a unidirectional one.

3.1 Diachronic variation

Jespersen (1917) describes the development of negation as follows:

The history of negative expressions in various languages makes us witness the following curious fluctuation; the original negative adverb is first weakened, then found insufficient and therefore strengthened, generally through some additional word, and in its turn may be felt as the negative proper and may then in course of time be subject to the same development as the original word. [Jespersen 1917]

This development has been known as 'the Jespersen Cycle' and can be formalized as in (10). In (10) the diachronic development of the negation is described as a process, which takes place in several phases. Dutch negation underwent the Jespersen Cycle starting from Phase I or II (given the small amount of fragments of Old Dutch this is hard to say) until Phase V, which is the way in which Standard Dutch expresses sentential negation.

(10) *The Jespersen Cycle*

PHASE I	Negation is only expressed by an obligatory negative marker attached to V_{fin} .
PHASE II	Negation is expressed by an obligatory negative marker attached to V_{fin} and an optional negative adverb.
PHASE III	Negation is obligatorily expressed by both a negative adverb and a negative marker attached to V_{fin} .
PHASE IV	Negation is obligatorily expressed by a negative adverb and an optional extra negative marker attached to V_{fin} .

⁶ Emphatic Negation is also widely spread under English varieties. However, their distribution is freer and its occurrence is more frequent. I will take English as a language that substandardly allows for Negative Concord.

- PHASE V Negation is only expressed by an obligatorily negative adverb.
- PHASE VI The negative adverb becomes also available as a negative marker attached to V_{fin} . Negation is expressed by either one of them.
- PHASE VII=I Negation is only expressed by an obligatory negative marker attached to V_{fin} .

Jespersen argued that languages with negative markers that are attached on V_{fin} are NC languages, whereas languages that express sentential negation by means of a negative adverb exhibit Double Negation. Languages with both kind of negative markers exhibit both NC and Double Negation. This generalization has been adopted by Zanuttini (2001) and Rowlett (1998). However it turns out that not every language that has only a negative adverb also exhibits NC.

3.2 Cross-linguistic variation

The distinction between the different Jespersen Phases forms a proper tool to classify languages with respect to their way of expressing negation. This makes it possible to evaluate Jespersen's generalization for languages that can be classified in different Phases of the Jespersen Cycle. The following table shows the relation between the Jespersen Phase of language and the question whether the language exhibits NC, Double Negation (DN), or both.

(11) Jespersen Cycle, Negative Concord and Double Negation

<i>Variety/language</i>	<i>Jespersen Phase</i>	<i>NC</i>	<i>DN</i>
Italian	I	+	-
Spanish	I	+	-
Portuguese	I	+	-
Romanian	I	+	-
Polish	I	+	-
Czech	I	+	-
Slovenian	I	+	-
Bulgarian	I	+	-
Russian	I	+	-
Serbo-Croatian	I	+	-
Greek	I	+	-
Hungarian	I	+	-
Hebrew	I	+	-
Turkish	I	+	-
Berber	I	+	-
Catalan	II	+	-
Standard French	III	+	+
West Flemish	IV	+	+
Colloquial French	IV	+	+
Quebecois	V	+	?

- (14)a. Gianni *li* vuole vedere
 John him wants see
 'John wants to see him'
 b. *Gianni *li* vuole *non* vedere
 John him wants neg see
 'John wants not to see him'
- Italian

Another argument is presented by Merchant (2001), who shows that negative heads cannot form adjunctions with XP's like *why*.

- (15)a. *Giati dhen?
 b. *Perque non?
 c. *Pochemune?
 'Why neg'
- Greek⁸
 Italian
 Russian

The application of these tests to the negative markers that are attached to V_{fin} proves that all these markers are syntactic heads. Likewise, negative markers that do not block movement of other heads and that allow for *why* adjunction are not X° and therefore should be XP's. This is the case for all negative adverbs:

- (16)a. dat Jan *niet* naar huis gaat
 that John neg to home goes
 'that John doesn't go home'
 b. Jan gaat *niet* naar huis
 John goes neg to home
 'John doesn't go home'
- Dutch
- (17)a. om Jan *inte* köpte boken
 that John neg bought books
 'that John didn't buy books'
 b. Jan köpte *inte* boken
 John bought neg books
 'John didn't buy books'
- Swedish
- (18)a. Why *not*?
 b. Waarom *niet*?
 c. Hvervor *inte*?
 d. Pourquoi *pas*?
 'Why neg'
- English
 Dutch
 Swedish
 French

Now the new generalization can be reformulated in syntactic terms:

⁸ This test and these data are from Merchant (2001). The test shows that whenever the word for 'no' (as opposed to yes) is phonologically distinct from the negative marker, the 'why not' test distinguishes X° markers from XP markers. The XP may adjoin to another XP, not to an X° . The way of saying 'why not' in languages with a negative head marker is by using the respective word for 'no' (as in yes/no).

- (22) a. En lugar de intentar *nada* Spanish⁹
 Instead of trying n-thing
 'Instead of trying anything'
 b. Prohibieron que saliera *nadie*
 Forbade that went.out n-body
 'They forbade that anybody went out'

Examples like these, and the fact that even under polyadic quantification the loss of negation has not been explained from a compositional point of view, led to another approach that takes n-words to be non-negative NPI's that are licensed by some abstract negation that is triggered by their own presence (Laka 1990, Ladusaw 1992, Giannakidou 1997, 2000). However such an analysis fails to account for the occurrence of fragmentary answers, which are allowed for n-words, but are not allowed for NPI's 0. Moreover, n-words cannot be licensed by a negation in a higher clause, whereas NPI's can be licensed across clause boundary 0. Finally, n-words are allowed to occur in preverbal subject position, whereas this is not allowed for NPI's 0.

- (23) A quién viste? A *nadie* / *A un alma Spanish
 To whom saw? To n-body / to a single soul (NPI)
 'Who did you see? Nobody / a single soul'
- (24) *Dhen* lipame [_{CP} pu piglosa **KANENAN*/*kanenan*] Greek
 Neg regret that hurt.1SG n-body / anybody
 'I don't regret that I hurt anybody'
- (25)a. *Nikdo* *neprisel* na vecirek Czech
 N-body neg-came to party
 'Nobody came to the party'
 b. **Petnik* by za to nebyl dan
 A.nickel.NPI would for it neg.be given
 'A nickel wouldn't be paid for it'

The dichotomy between inherently negative and NPI-like non-negative n-words seems too strong and the relation between the syntactic status of the negative marker and NC points in the direction of a treatment of NC in terms of syntactic agreement. Therefore, I argue that n-words are semantically non-negative, but syntactically negative. This means that n-words can be seen as semantically non-negative Heimian indefinites (cf. Heim 1982) that carry an uninterpretable [*u*NEG] feature that has to be eliminated in the course of the derivation (26) (cf. Ladusaw 1992, Giannakidou 1997 for similar proposals) by means of feature checking against an operator carrying an interpretable [*i*NEG] feature.

$$(26) \text{fn-P}_n = \lambda Q. [\mathbf{P}'(x) \ \& \ \mathbf{Q}(x)]_{[i\text{NEG}]}$$

⁹ Data from Herburger 2001

One question remains open: what is the semantic status of negative markers? Are they also non-negative markers of negation, or are they the phonological realization of negative operators? Given that all operators have to roof n-words, I argue that in languages in which n-words cannot precede the negative marker, the negative marker is the negative operator. These languages are the so-called Non-Strict NC languages, like Italian. In languages like Czech, in which n-words are allowed to occur in a position in front of the negative marker, the negative marker cannot be the negative operator itself and has to be semantically non-negative. The negative marker in these languages is nothing but the phonological realization of the [*u*NEG] feature.

4.3. Interpreting negative structures

Now we can explain NC from a syntactic point of view: NC is a form of agreement between a negative operator and non-negative elements such as n-words and in strict NC languages also negative markers. This checking of [*u*NEG] features can only take place if a NegP is present that contains a negative operator carrying [*i*NEG]. In those languages that lack NC, there are no n-words, but only true negative quantifiers, and since in those languages that negative marker is never roofed by an n-word (since n-words only exist in NC languages) the negative marker in a DN language is a negative operator itself. Since there are no [*u*NEG] features to eliminate, there is no NegP required to do so. Therefore NegP does not exist in DN languages. This explains why all languages with a negative head Neg^o are NC languages.

Hence there are two ways of expressing negation in natural language: semantic negation, whereby all negative elements are semantically negative; or syntactic negation, whereby negative elements are syntactically marked for negation, and these elements all check their [*u*NEG] feature against a single negative (c)overt operator.

Now I will explain how this analysis predicts correctly the readings of negative sentences in the different languages. As all negative elements are [*u*NEG] in Czech, negation is realized by a covert negative operator *Op*¬, hosted in Spec,NegP (27a). All negative elements check their [*u*NEG] feature against this operator that has an interpretable [*i*NEG] feature (27b). In case of n-words in preverbal subject position, *Op*¬ forms a compound with the n-word and this compound is a negative quantifier (27c).

- (27) a. Milan *nevidi* Czech
 Milan neg-sees
 'Milan does not see'
 [_{NegP} *Op*¬ Neg^o [_{vP} Milan *nevidi*_[uNEG]]]
- b. Milan *nevidi nikoho*
 Milan not-sees n-body
 'Milan does not see anyone'
 [_{NegP} *Op*¬ Neg^o [_{vP} Milan *nikoho*_[uNEG] *nevidi*_[uNEG]]]

- c. *Nikdo neprišel na vecirek*
 N-body neg-came to party
 ‘Nobody came to the party’
 $[\text{NegP } [Op_{\neg} + \text{Nikdo}_{[i\text{NEG}]}] \text{ ne}_{[u\text{NEG}]} \text{ prišel na vecirek}]$

In Italian, all n-words are licensed by the $[i\text{NEG}]$ of *non*, which is the negative operator (28a-b). In the case of movement of an n-word to a subject position, *non* can no longer license these n-words. Therefore an abstract operator is introduced that forms a compound with the highest n-word. Obviously, *non* cannot be included in this sentence, since then the sentence would contain two negative operators (28c).

- (28) a. Gianni *non* ha telefonato Italian
 G. neg has called
 ‘G. has not called’
 $[\text{Neg}^{\circ} \text{ non}_{[i\text{NEG}]} [\text{VP Gianni ha telefonato}]]$
 b. Gianni *non* telefonato a *nessuno*
 G. neg calls with nobody
 ‘G. doesn’t call with anybody’
 $[\text{Neg}^{\circ} \text{ non}_{[i\text{NEG}]} [\text{VP a nessuno}_{[u\text{NEG}]} \text{ Gianni telefonato}]]$
 c. *Nessuno* (**non*) ha telefonato a *nessuno*
 N-body has called to n-body
 ‘Nobody called anybody’
 $[\text{NegP } [Op_{\neg} + \text{Nessuno}_{[u\text{NEG}]}] [\text{VP ha telefonato a nessuno}_{[u\text{NEG}]}]]$

French expresses negation by means of an $[i\text{NEG}]$, phonologically realized by *pas*, that raises to SpecNegP, from which it takes scope (29a). In the case that another n-word is involved the negation comes from an abstract operator that forms a compound with the raised n-word (29b). However, if *pas* and *rien* co-occur in the sentence, the trace of *pas* precedes *rien* and therefore blocks the agreement relation between NegP and *rien*. Hence a second operator is needed to eliminate *rien*’s $[u\text{NEG}]$ feature and a DN reading is yielded (29c).

- (29) a. Jean *ne* mange *pas* French
 John neg eats neg
 ‘John doesn’t eat’
 $[\text{NegP } \text{pas}_{[i\text{NEG}]} \text{ Neg}^{\circ} [\text{VP } t_i \text{ Jean ne-mange}_{[u\text{NEG}]}]]$
 b. Jean *ne* mange *rien*
 John neg eats nothing
 ‘John doesn’t eat anything’
 $[\text{NegP } [Op_{\neg} + \text{rien}_{[u\text{NEG}]}] \text{ Neg}^{\circ} [\text{VP } t_i \text{ Jean ne-mange}_{[u\text{NEG}]} t_i]]$
 c. Jean *ne* mange *pas rien*
 John neg eats neg nothing
 ‘John doesn’t eat nothing’ = ‘John eats something’
 $[\text{NegP } \text{pas}_{[i\text{NEG}]} \text{ Neg}^{\circ} [\text{VP } t_i \text{ Jean ne-mange}_{[u\text{NEG}]} [\text{NegP } Op_{\neg} \text{ Neg}^{\circ} [\text{VP } \text{rien}_{[u\text{NEG}]}]]]]$

West Flemish is similar to French, except that the negative marker *nie* is [*u*NEG]. Hence negation is expressed by an abstract negative operator, that checks all [*u*NEG] features (30a-b). However, if *nie* intervenes between NegP and an n-word, locality constrictions (Chomsky 1999) block the NC relation between the negative operator and the n-word (30c). The only way to escape this is to move over *nie* to a position that falls within the same phase. Then the NC relation is allowed (30d).

- (30) a. (da) Valère *nie en-* eet West Flemish
 (that) V. neg neg-eats
 ‘(that) V. doesn't eat’
 [_{NegP} Op₋ Neg^o [_{VP} nie_[uNEG] Valère en-eet_[uNEG]]]
- b. (da) Valère niets en- eet
 (that) V. n-thing neg-eats
 ‘(that) V. doesn't eat anything’
 [_{NegP} Op₋ Neg^o [_{VP} niets_[uNEG] Valère en-eet_[uNEG]]]
- c. (da) Valère *nie niets en-* eet
 (that) V. neg n-thing neg-eats
 ‘(that) V. doesn't eat nothing’
 [_{NegP} Op₋ Neg^o [_{VP} nie_[uNEG] Valère [_{NegP} Op₋ Neg^o [_{VP} niets_[uNEG] en-eet_[uNEG]]]]]
- d. (da) Valère niets *nie en-* eet
 (that) V. n-thing neg neg-eats
 ‘(that) V. doesn't eat anything’
 [_{NegP} Op₋ Neg^o [_{VP} niets_[uNEG] nie_[uNEG] Valère en-eet_[uNEG]]]

In Bavarian, negation is also expressed by means of an abstract negative operator and all negative elements have a [*u*NEG] feature. Therefore all negative elements have to stand in a checking relation with NegP. In this respect Bavarian is similar to West Flemish (the only difference is that Bavarian lacks an optional negative head marker.)

- (31) a. S' Maral woid an Hans ned hairadn Bavarian
 The'Mary wanted the Hans neg marry
 ‘Mary didn't want to marry Hans’
 [_{NegP} Op₋ woid [an Hans [_{VP} ned_[uNEG] S'Maral hairadn]]]
- b. daß' ma koana ned furtgehd
 that me n-body neg leaves
 ‘that nobody is leaving’
 [_{NegP} Op₋ koana_[uNEG] ma [_{VP} ned_[uNEG] furtgehd]]]

Finally, in Dutch there is no NegP and negation is expressed semantically: every negative element corresponds to a negation in the semantics and in the case of two negative elements a DN reading is yielded.

- (32) a. (dat) Jan *niet* eet
 (that) John neg eats
 ‘(that) John doesn’t eat’
 [Jan [_{VP} niet_[iNEG] eet]]
 \neg eat(**j**)
- b. (dat) Jan *niets* eet
 (that) John not eats
 ‘(that) John eats nothing’
 [Jan [_{VP} [_{QP} niets_[iNEG]] eet]]
 $\neg \exists x. [\text{eat}(\mathbf{j}, x)]$
- c. (dat) Jan *niet niets* eet
 (that) John neg nothing eats
 ‘(that) John doesn’t eat nothing’
 [Jan [_{VP} niet_[iNEG] [_{QP} niets_[iNEG]] eet]]
 $\neg \neg \exists x. [\text{eat}(\mathbf{j}, x)] \leftrightarrow \exists x. [\text{eat}(\mathbf{j}, x)]$

Apart from these correct predictions, this analysis also accounts for the problems which have risen with respect to the other approaches of NC 0-0. Paratactic Negation can be analyzed as feature checking against a negative operator that is lexically decomposed into a negative operator (carrying [*i*NEG]) and a positive counterpart.

- (33) *Prohibieron que saliera nadie* Spanish
 Forbade that went.out n-body
 ‘They forbade that anybody went out’
 [_{VP} prohibieron_[iNEG] [_{CP} C^o_[uNEG] [_{VP} nadie_[uNEG]]]]]

Fragmentarian answers are accounted for by PF movement of the n-word after ellipsis of the entire sentence, containing a negation that checks the n-words [*u*NEG] feature. Since NPI’s have to be licensed at surface structure, PF movement of NPI’s is not allowed (cf. also Giannakidou 2000).

- (34) A quién viste? A *nadie* Spanish
 To whom saw-you? To n-body
 ‘Who did you see? Nobody’
 [_{FocP} nadie_[uNEG] [_{NegP} <no_[iNEG] ~~vió a t_i~~>]]

Finally, the fact that NPI’s can be licensed by a negation in a higher clause and n-words cannot follow immediately from the clause-bounded conditions on feature checking (C counts as a phase boundary, cf. Chomsky (1999)), as the following example from Greek shows (taken from Giannakidou (2000)).

- (35) *_{[NegP} Op_{neg} Dhen_[uNEG] lipame [_{VP} [_{CP} pu piglosa KANENAN_[uNEG]]]]]
 neg regret that hurt n-body

5. Conclusions

This analysis correctly predicts the interpretation of negative sentences in a large set of languages. Moreover it solves several problems which have been risen with respect to the former approaches of Negative Concord and it accounts for the differences between Strict and Non-Strict NC languages. The relation between the syntactic status of negative markers and the occurrence of NC is explained, and replaces the incorrect bidirectional relation that has been proposed by Jespersen (1917) and adopted by Haegeman & Zanuttini (1996) and Rowlett (1998).

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