USING SUBSUMPTION RATHER THAN EQUALITY IN FUNCTIONAL CONTROL

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Proceedings of the LFG06 Conference

Universität Konstanz

Miriam Butt and Tracy Holloway King (Editors)

2006

CSLI Publications

http://csli-publications.stanford.edu/

Abstract

In this paper I consider the typology of forward and backward control and raising structures, and argue that structure-sharing based on the relation of subsumption rather than equality provides a stronger linguistic basis for the typology (cf. Zaenen and Kaplan (2002, 2003)). I also consider the points of contact and divergence between structure-sharing and the 'copy theory of movement' that is prevalent in current minimalist syntax.

1. Functional Control in LFG

Non-derivational syntactic theories such as LFG or HPSG traditionally analyze raising and control in terms of structure-sharing between (in the first instance) the subject of a predicate and the subject of a complement of that predicate, stated as properties of a lexical form. The same grammatical information simultaneously acts as the subject of the raising or control verb, and the subject within the infinitival complement.*

On the basis of this structure-sharing, such approaches would seem like prime candidates for extensions to insightful accounts of backward control and raising, phenomena that Polinsky and Potsdam (2002a, 2002b, 2006) (P&P) have brought squarely into theoretical discussions of control and raising in general. The structures corresponding to 'forward' and 'backward' are shown in (1), where Δ_i marks an empty subject position.

(1) Forward and Backward Control and Raising:

a. Kim$_i$ seems/hopes [Δ_i to be singing]. (forward)

b. Δ_i seems/hopes [Kim$_i$ to be singing]. (backward)

In the LFG analysis, e.g., Bresnan (1982), the fact that control and raising are 'forward' in English is because the structure-sharing lexical forms select for a VP complement, which has no place for a 'downstairs' subject position. If English had a control predicate which selected for an S as its complement, English could allow backward control. In other words, while the fundamental control or raising properties of predicates might be essentially universal, the syntactic manifestation of the shared argument is a more parochial fact about the phrase structure category of the complement. Whether the phenomena are forward or backward is only determined by constraints on phrase structure configuration. In this paper I will show that conditions on a construction being forward or backward should be accounted for in terms of lexical entries, involving LFG's f-structure information. Specifically, I argue that it is necessary to express structure-sharing not via equality, but via the relation of subsumption, introduced below.

LFG traditionally analyzes subject raising and control as structure-sharing between a subject and the subject of a complement Bresnan (1982). The two positions are set equal: in unification terms, they share all properties; exactly the same grammatical information flows to each shared position (see (2)).

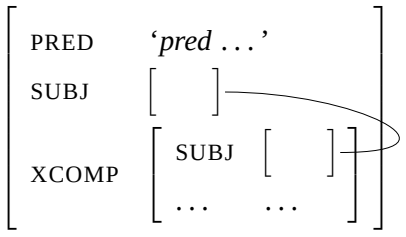
(2) Equality: SUBJ = XCOMP SUBJ (information flows between both positions)

Control and raising predicates in LFG are both subject to (2), and only differ in that the matrix subject is thematic in the case of control and non-thematic in the case of raising. The difference is represented in the lexical forms as shown in (3): thematic arguments appear within $\langle \quad \rangle$, non-thematic arguments appear outside. The f-structure in (3) is the same for both control and raising predicates.

*I am grateful to Masha Polinsky and Eric Potsdam for help with examples and access to materials, and to the audience at LFG-06 in Konstanz for useful comments, in particular Ash Asudeh and Jonas Kuhn. Eric also provided a useful commentary on the original version of section 4.2. Parts of this material was presented at the Daegu Catholic University, Daegu, Korea, in July 2006, and I am grateful to Stan Dubinsky for comments on that occasion, some of which are incorporated here.

(3) a. Control Predicate – thematic subject:
(↑ PRED) = '*c-pred* ⟨(↑ SUBJ), (↑ XCOMP)⟩'
(↑ SUBJ) = (↑ XCOMP SUBJ)

b. Raising Predicate – non-thematic subject:
(↑ PRED) = '*r-pred* ⟨(↑ XCOMP)⟩(↑ SUBJ)'
(↑ SUBJ) = (↑ XCOMP SUBJ)

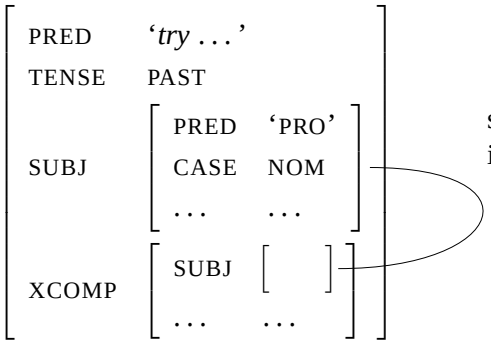


(4) gives the standard analysis of English *try*:

(4) a. She tried to leave.

try takes a VP complement in c-structure which corresponds to an XCOMP in f-structure.

b.

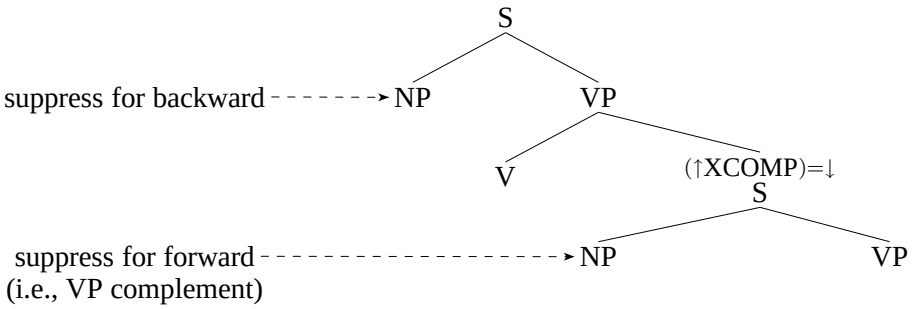


same information in both places

The LFG analysis effectively foreshadows the recent Minimalist-style analyses in which movement leaves a copy (an unpronounced copy – see Chomsky (1995)), in which both control and raising are analyzed via movement (e.g., Hornstein (1999), Polinsky and Potsdam (2002a)). There may be technical differences, depending on whether movement creates literal copies (giving type- but not token-identity, see e.g., Asudeh (2005)), or whether the same item is continuously 're-merged', as in Fox and Pesetsky (2005); see also section 4.2.

As mentioned above, under the standard equality account, the fact that control and raising are 'forward' in a language like English is a fact about constituent structure. Structure-sharing lexical forms select a VP complement, which cannot host a downstairs subject; if English had a control predicate selecting an S complement, it could allow backward control. The standard approach has the property that while the fundamental control/raising properties of predicates might be essentially universal, the manifestation of the shared argument is a more parochial fact about phrase structure(s).

(5)



Whether the phenomena are forward or backward is determined only by c-structure. In English, the XCOMP complement is a VP, not an S, and hence control and raising are forward. If the matrix subject position could be suppressed, the constructions could in principle be backward. However, it is not clear that the theory can restrict control to only backward control. In the best case, that would be a language in which the matrix subject position in (5) could/should be empty but the embedded subject position must be filled, which seems

counterintuitive. And a c-structure solution would seem to face real difficulties in a language where some predicates are 'forward' and some are 'backward'; but such languages exist.

The paper is organized as follows. In section 2, I present the empirical observations that lead to the typology of control and raising constructions. In section 3, I review the proposals of Zaenen and Kaplan (2002, 2003) to incorporate subsumption into the grammar, and extend them to the data at hand. In section 4, I consider alternatives in terms of the copy theory of minimalist syntax, and a different LFG analysis which does not use subsumption.

2. Control and Raising, Forward and Backward

In a series of papers, Polinsky and Potsdam have demonstrated the existence of backward control and raising, in a variety of languages. I briefly survey the basic data here, illustrating with examples from Tsez, Malagasy and Circassian. All of the data in this section is taken from Polinsky and Potsdam's work.

2.1. **Tsez** (Forward Raising, Backward Control)

Polinsky and Potsdam (2002a) argue that the Tsez verbalizer *-oqa* ('begin') is ambiguous between a control and a raising use. In addition, as a control predicate it requires backward control, while as a raising predicate it is forward. Tsez is a verb-final language.

(6) *-oqa* ('begin') is forward if raising or backward if control:

a. kid [ziya b-išr-a] y-oq-si (forward raising)
girl.II.ABS [cow.III.ABS III-feed-INF] II-begin-PAST.EVID
'The girl began to feed the cow.'

b. [kid-bā ziya b-išr-a] y-oq-si (backward control)
[girl.II-ERG cow.III.ABS III-feed-INF] II-begin-PAST.EVID
'The girl began to feed the cow.'

The syntactic analyses are those shown in (7):

(7) a. kid_i [t_i ziya b-išr-a] y-oq-si (forward raising)
girl.II.ABS [cow.III.ABS III-feed-INF] II-begin-PAST.EVID
'The girl began to feed the cow.'

b. Δ_i [kid-$\bar{\text{ba}}_i$ ziya b-išr-a] y-oq-si (backward control)
[girl.II-ERG cow.III.ABS III-feed-INF] II-begin-PAST.EVID
'The girl began to feed the cow.'

The facts in (7)a are relatively straightforward: the raised argument passes the usual tests for being non-thematic with respect to the matrix predicate, and the verb agrees in noun class with it. Note that in the embedded clause the verb agrees in noun class with the absolutive argument, the typical agreement pattern.

The facts in (7)b are more unusual – the matrix verb apparently agrees with the embedded clause ergative subject. This would be the only instance of agreement with an ergative. Polinsky and Potsdam (2002a) argue that Δ_i in (7)b represents the thematic subject position of the control verb, and that the verb agrees with this position, maintaining the generalization that agreement is with an absolutive). So this is backward control – the matrix and embedded subject positions are shared, but the overt argument is in the lower position.

2.2. **Malagasy** (Forward and Backward Control)

Polinsky and Potsdam (2002b) present evidence for forward and backward control in Malagasy, a verb-initial language. Forward control obtains with a verb like *try*, which shows the two syntactic patterns in (8), with the analysis proposed by P&P indicated by the bracketing and with Δ_i indicating the empty position.

(8) a. m-an-andrana [m-i-tondra ny fiara Δ_i] Rabe$_i$ (forward control)
PRES-ACT-try [PRES-ACT-drive the car] Rabe
'Rabe is trying to drive the car.'

b. m-an-andrana Rabe$_i$ [m-i-tondra ny fiara Δ_i]
PRES-ACT-try Rabe [PRES-ACT-drive the car]
'Rabe is trying to drive the car.'

The order of constituents here varies, as the two matrix clause arguments of *try* may appear in either order. Other verbs, such as *begin*, only appear in the pattern of (8)a, which P&P analyze as due to backward control.

(9) a. m-an-omboka m-i-tondra ny fiara Rabe (backward control)
PRES-ACT-begin PRES-ACT-drive the car Rabe
'Rabe is beginning to drive the car.'

b. *m-an-omboka Rabe [m-i-tondra ny fiara]
PRES-ACT-begin Rabe [PRES-ACT-drive the car]
'Rabe is beginning to drive the car.'

To account for this difference, Polinsky and Potsdam (2002b) argue that the correct analysis of (9)a is as backward control, with the analysis in (10):

(10) m-an-omboka [m-i-tondra ny fiara Rabe$_i$] Δ_i
PRES-ACT-begin [PRES-ACT-drive the car Rabe]
'Rabe is beginning to drive the car.'

As *Rabe* is not a constituent in the matrix clause, and as there is only one overt matrix clause argument, the bracketed phrase, no reordering at the matrix clause level is possible (at least, visible).

2.3. **Circassian** (Forward and Backward Raising)

Backward raising is illustrated in the Circassian data in (11) (from Polinsky and Potsdam (2006) and Polinsky (p.c.)); here the verb 'begin' only has raising uses:

(11) a. ŝalexe-r [pjəsme-r-q'əʁ zeč'e-m-jə atxənew] Ø-fjež'aʁe-x
boys-ABS letter-ABS-EMPH all-ERG-CONJ write-INF 3ABS-began-3ABS.PL
'The boys began to write the stupid letter all.' (forward raising)

b. [ŝalexe-m pjəsme-r-q'əʁ atxə-new] zeč'e-r-jə Ø-fjež'aʁe-x
boys-ERG letter-ABS-EMPH write-INF all-ABS-CONJ 3ABS-began-3ABS.PL
'The boys began to write the stupid letter all.' (backward raising)

(12) a. ṣ̂alexe$_i$-r [Δ_i pjəsme-r-q'əʁ zeč'e-m-jə atxənew] ∅-fjež'aʁe-x
boys$_i$-ABS [Δ_i letter-ABS-EMPH all-ERG-CONJ write-INF] 3ABS-began-3ABS.PL
'The boys began to write the stupid letter all.'

b. Δ_i [ṣ̂alexe$_i$-m pjəsme-r-q'əʁ atxə-new] zeč'e-r-jə ∅-fjež'aʁe-x
Δ_i [boys$_i$-ERG letter-ABS-EMPH write-INF] all-ABS-CONJ 3ABS-began-3ABS.PL
'The boys began to write the stupid letter all.'

The evidence that P&P present for true raising includes a variety of diagnostics which I do not review here; here we see their evidence involving a floated quantifier. Absolutive is the appropriate case for the subject of 'begin' while ergative is the appropriate case for the subject of 'write'. In (12)a, the lower subject position would be ergative (determined by 'write'), which floats an ergative quantifier in the lower clause, even though the matrix raised subject is absolutive, as dictated by 'begin'. In (12)b, we have the opposite situation: the lower ergative subject floats an absolutive quantifier in the matrix clause. This shows that although the overt NP is phonologically overt in the lower clause, it still has raised into the higher clause. P&P argue that the only viable Minimalist analysis of the full range of facts involves treating both construction types as movement, with different strategies of chain reduction – spell-out of either the head (forward) or tail (backward) of the chain.

The fact that the chain actually has two differing cases is a problem for all approaches which assume that what is shared is a feature structure larger than an INDEX (see e.g., the discussion in Potsdam (2006)).[1] I address these issues below in section 4.3. Zaenen and Kaplan (2002) note examples in German where case cannot be shared between two positions, and propose to restrict equality or subsumption by the Restriction Operator of Kaplan and Wedekind (1993). Of course, case is only a problem to the extent that there is a CASE attribute represented in f-structure: if case is constructive, as proposed by Nordlinger (1998), it is only concerned with GF information in f-structure. Ergative case could have the entry shown in (13):

(13) Ergative case:

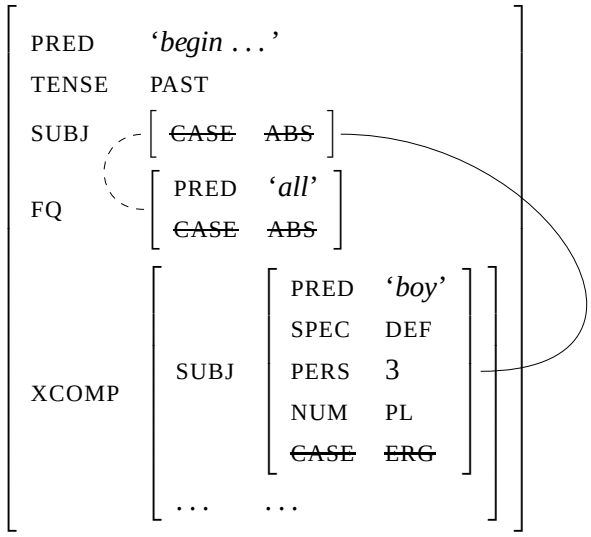
((SUBJ ↑) SUBJ) = ↓
((SUBJ ↑) OBJ)

It is in fact an open question as to whether a CASE feature is necessary in f-structure in LFG (see Spencer and Otoguro (2005) for relevant discussion).

In terms of an equality-based LFG analysis, we could assign (11)b the f-structure in (14), where the grammatical features of the embedded SUBJ are shared up to the matrix SUBJ, which can be associated with a Floated Quantifier at that level. To gloss over the problem of case for now, the strikethroughs in (14) indicate that the apparent case conflict is not considered a problem.

[1] Index-sharing for the analysis of control is standard in HPSG, e.g., Pollard and Sag (1994), which therefore has no problem with case.

(14) F-structure of (11)b, ignoring the case conflict:



As noted above, the fact that predicates can be forward or backward seems to be naturally analyzed within the LFG account of functional control based on equality – the relevant features of the subject are present in both matrix and embedded subject structures. For a languages like Circassian, we simply propose a solution which allows the matrix subject position in the c-structure to be absent.

However, Tsez is problematic under this view. In Tsez, the predicate 'begin' is forward if it is raising, and backward if it is control, so there cannot be any general requirement in the c-structure of the language one way or the other as to which subject positions are obligatorily filled or absent. The equality-based account will simply allow either possibility for either type of verb, incorrectly.

It is clear that the restrictions on forward or backward functional control need to be relativized to particular verb forms – they have to be encoded in the lexical entries of verbs. This means that the restrictions have to be stated at the functional level in LFG. In the following section, I introduce the mechanism to accomplish this.

3. Functional Control Based on Subsumption

These problems all find a simple solution if structure-sharing is asymmetric, as I will show below. The asymmetry comes from the use of the relation of subsumption rather than equality in the statement of structure-sharing.

3.1. Subsumption

Zaenen and Kaplan (2002, 2003) proposed to analyse some cases of structure-sharing in terms of the relation of subsumption, rather than equality. They anticipated the need to express restrictions on information flow in the lexical entries of verbs, and what I present here is an extension of their proposals. For subsumption, f_1 subsumes f_2 if the information associated with f_1 is a subset of that associated with f_2 – in other words, f_1 is more general than f_2. An example from Zaenen and Kaplan (2002) is shown in (15):

(15) Subsumption – the left subsumes (is more general than) the right

$$\begin{bmatrix} A & \begin{bmatrix} C & + \end{bmatrix} \end{bmatrix} \sqsubseteq \begin{bmatrix} A & \begin{bmatrix} C & + \\ D & - \end{bmatrix} \\ B & E \end{bmatrix}$$

(Equality is mutual subsumption.)

In many languages, the agreement information on a verb subsumes the information on the agreed-with subject; for example, the verb may inflect for person and number, while the subject may be coded for person, number and gender. Shieber (1992) discusses an application of subsumption to coordinations in the complement of English *be*. Blevins (2006) provides a fuller discussion of the linguistic relevance of subsumption, and motivations for its necessity in some analyses, though his particular approach to raising predicates differs from what I present below.

Zaenen and Kaplan apply their proposals to Partial VP Fronting in German and Stylistic Inversion in French. Their analyses entail for each language that some functional control relations are stated in terms of equality and some in terms of subsumption. Here I will focus on how a stronger theory of raising and control emerges if the only relation available is subsumption. To see how subsumption is relevant, let us consider the German raising and control examples in (16). All the German examples presented here are main V2 clauses, with an initial 'topic' preceding the finite verb.

(16) a. [Ein Aussenseiter] schien hier eigentlich nie [zu gewinnen]. (raising)
[An outsider] seemed here actually never [to win]
'An outsider never actually seemed to win here.'

b. [Ein Aussenseiter] versuchte hier noch nie [zu gewinnen]. (control)
[An outsider] tried here still never [to win]
'An outsider never tried to win here.'

These are straightforward examples in which the initial subject (bracketed) is also the subject of the embedded XCOMP (bracketed).

German exhibits a construction which looks like backward raising, in the famous case of Partial Fronting of a VP including a subject, over a raising verb, in (17)a, which contrasts with the control verb in (17)b:

(17) Fronted VP containing subject:

a. [[Ein Aussenseiter] zu gewinnen] schien hier eigentlich nie. (raising)
[[An outsider] to win] seemed here actually never
'An outsider never actually seemed to win here.'

b. *[[Ein Aussenseiter] zu gewinnen] versuchte hier noch nie. (control)
[[An outsider] to win] tried here still never
'An outsider never tried to win here.'

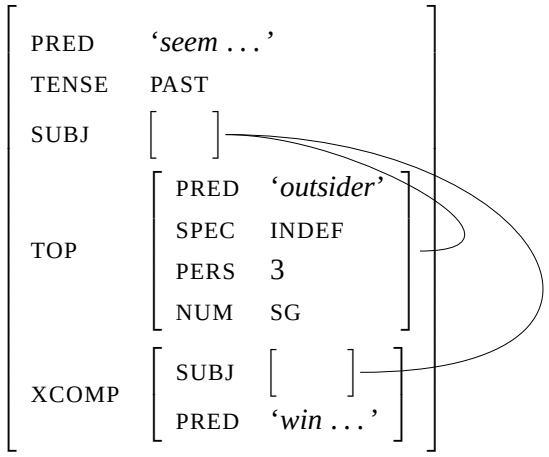
The initial topic is the XCOMP selected by the matrix predicate, and the effective grammatical subject of the clause seems to be the inner bracketed part of the topic *ein Aussenseiter*: the matrix verb shows agreement in present tense (examples in (18) from Haider (2002)), and this subject has nominative case.

(18) a. [Ein Wunder ereignet] hat sich hier noch nie.
[A(NOM) miracle occurred] have.3SG REFL here never ever
'A miracle has never ever occurred here.'

b. [Wunder ereignet] haben sich hier noch nie.
[miracles(NOM) occurred] have.3PL REFL here never ever
'Miracles have never ever occurred here.'

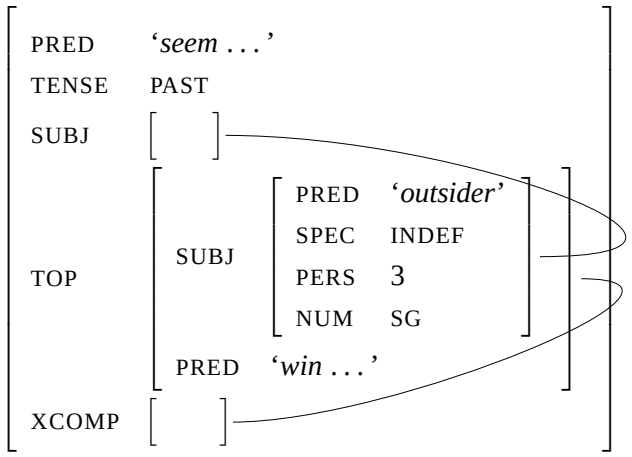
The regular 'forward raising' example with *ein Aussenseiter* alone in the initial position in (16)a has the f-structure in (19), and (17)a has the f-structure in (20).

(19)



The fronted constituent is TOPIC and SUBJ, and 'seem' dictates that SUBJ = XCOMP SUBJ.

(20)



The fronted constituent is TOPIC and XCOMP, and 'seem' dictates that SUBJ = XCOMP SUBJ.

Apart from what is topicalized (SUBJ or XCOMP), the f-structures are identical, and (20) looks like a case of backward raising, allowed as a possibility by the equality-based structure sharing equation SUBJ = XCOMP SUBJ. The non-derivational proposals of Hudson (1997) (Dependency Grammar) and Meurers and De Kuthy (2001) (HPSG) for the raising verbs are rather similar to that of Zaenen and Kaplan, in that they allow the embedded subject to act as the subject in matrix clause. I will show below that the assumption of full structure-sharing for raising verbs is incorrect.

However, the problem for the LFG analysis now is how to account for the forward-only restriction on *versuchen*. For the data in (17), Zaenen and Kaplan (2002, 2003) proposed to introduce subsumption, where information only flows one-way, only from the general position to the specific position. With SUBJ and XCOMP SUBJ, there are two options. (21)a defines a 'forward' predicate, (21)b a 'backward' predicate.

(21) Subsumption

a. SUBJ $\sqsubseteq$ XCOMP SUBJ (Information only flows down from SUBJ; whatever information the subject has in the matrix it has in the embedded constituent, but not vice versa)

b. XCOMP SUBJ $\sqsubseteq$ SUBJ (Information only flows up to SUBJ; whatever information the subject has in the embedded constituent it has in the matrix, but not vice versa)

For the data in (17), Zaenen and Kaplan propose to analyze *scheinen* with equality as in (2), but *versuchen* with subsumption as in (21)a. This has the effect of allowing the subject of the raising verb to be either in matrix or embedded subject position, as in the f-structures above, while the control verb must have its matrix subject position filled, as I show below in (23). In other words, German allows forward or backward raising, but only forward control. The f-structure for (17)b, which is ungrammatical, is shown in (23). The subsumption relation is shown by the directional arrow on the curved line in the f-structure representation. I assume that the finite verb determines agreement and case features of its subject, but nothing more.

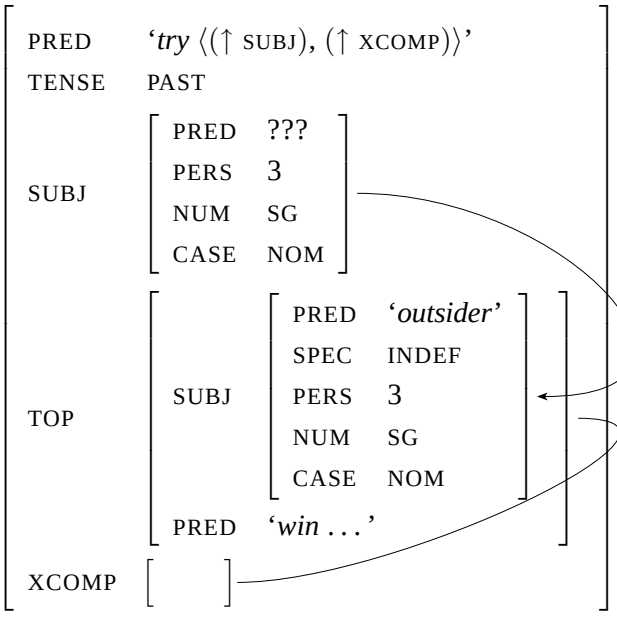
(22) German – Zaenen and Kaplan (2002):

a. Raising: SUBJ = XCOMP SUBJ
subject can be upstairs or downstairs
(as above in (19) and (20))

b. Control: SUBJ $\sqsubseteq$ XCOMP SUBJ
subject can only be upstairs
(see (23))

(17) b. *[[Ein Aussenseiter] zu gewinnen] versuchte hier noch nie.
[[An outsider] to win] tried here still never
'An outsider never tried to win here.'

(23)



This is ill-formed, as the matrix nucleus is INCOMPLETE: there is no PRED information about the thematic SUBJ of *try* (following (22)b).

The position which other constraints (in particular, COMPLETENESS) require to be filled must be the one to the left of the $\sqsubseteq$ symbol. (24) presents a fuller summary of the consequences of the subsumption approach:

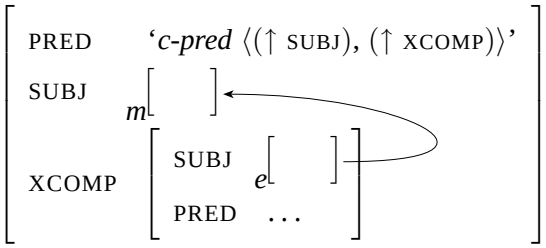
(24) Typology of Control and Raising: The position which other constraints (in particular, COMPLETENESS) require to be filled must be the one to the left of the $\sqsubseteq$ symbol.

a. SUBJ $\sqsubseteq$ XCOMP SUBJ: Control: forward only; Raising: forward, or backward
A control predicate has a thematic subject, so it requires a SUBJ with a PRED. As information only flows down to XCOMP SUBJ, it is SUBJ which must be expressed, or else it will have no information (see (23)). In this way, (24)a predicts forward control: SUBJ must be expressed, and XCOMP SUBJ cannot. A raising predicate does not require a thematic subject, and (24)a does not constrain its position.

b. XCOMP SUBJ $\sqsubseteq$ SUBJ: Control: backward only; Raising: backward only.
As information only flows upward, unless the XCOMP SUBJ is expressed overtly, the XCOMP will be incomplete (no information about the PRED of its SUBJ). So the XCOMP SUBJ must be expressed, and its information flows up to the matrix SUBJ, meaning that that position cannot be expressed overtly (by LFG's principle of Uniqueness). (24)b predicts that XCOMP SUBJ is expressed and that SUBJ is not.

What is important here is that subsumption directly determines the properties of $\frac{3}{4}$ of the space of the phenomena (see (24)); equality is merely compatible with the entire space. The specific prediction for backward control is shown in (25).

(25) Backward Control: (24)b
The matrix subject position contributes to *m*, the embedded subject position contributes to *e*. If only the matrix subject position is filled, *e* does not get a PRED value (at least), and the XCOMP is INCOMPLETE.



3.2. Thematic Positions and Apparent Backward Constructions

Viewed in the typology developed by P&P, German raising turns out to show only consistent 'forward' properties, and applying equality as in (2) to it makes incorrect predictions. To see this, it is necessary to consider what P&P call 'false backward raising', illustrated by the Greek data in (26), from Polinsky and Potsdam (2005):

(26) a. i dhaskoli stamatisan/*stamatise [na malonun tus mathites]
the teacher.PL stop.3PL/*stop.3SG [COMP scold.3PL the students]
'The teachers stopped scolding the students.' (forward raising)

b. stamatisan/*stamatise [na malonun i dhaskoli tus mathites]
stop.3PL/*stop.3SG [COMP scold.3PL the teacher.PL the students]
'The teachers stopped scolding the students.' (false backward raising)

While the matrix predicate in (26)b agrees with the embedded subject 'teachers', Polinsky and Potsdam (2006) show that there is no evidence of full syntactic presence of that subject in matrix clause, in contrast to the evidence from Tsez, Malagasy and Circassian presented in section 2. P&P call this 'false backward raising', where the only evidence for the subject being in the matrix clause is agreement and case, properties which are determined by matrix predicate. P&P analyze this in Minimalist terms as long-distance Agree from the matrix Tense to the embedded subject, where this operation of Agree is also enough to satisfy the matrix EPP.

Returning to German, the crucial example (17)a also shows no clear evidence of a syntactic subject in the matrix clause – it is well-known that a subject inside the fronted VP only shows embedded and/or narrow scope behavior (see e.g., Netter (1991), Meurers and De Kuthy (2001)).

(17) a. [[Ein Aussenseiter] zu gewinnen] schien hier eigentlich nie.
[[An outsider] to win] seemed here actually never
'An outsider never actually seemed to win here.'

Under VP fronting, the embedded subject cannot be the antecedent of an anaphor (see (27)), nor can it float a quantifier (see (28)), in the matrix clause:

(27) *[Ein Aussenseiter$_i$ zu gewinnen] scheint [seiner$_i$ Mutter] hier nie.
an outsider(NOM) to win seem.3SG [his(DAT) mother] here never
'No outsider seems to his mother to win here ever.'

(28) a. [Ein Fehler unterlaufen] ist meinem Lehrer noch nie.
a mistake(NOM) happened be.3SG my(DAT) teacher still never
'So far my teacher has never made a mistake.'

b. [Fehler unterlaufen] sind meinem Lehrer nicht viele.
mistakes(NOM) happened be.3PL my(DAT) teacher not many
'My teacher has not made many mistakes.'

c. ?*[Fehler unterlaufen] sind viele meinem Lehrer nicht.

d. ?*[Fehler unterlaufen] sind meinem Lehrer viele nicht.

While (28)a may look like an example of a floated quantifier, the fact that other positions of *viele* are ungrammatical suggests otherwise. It seems that either *viele* or *nicht viele* ('not many') is extraposed in the first example, and hence is forced into a clause-final position. The examples do not involve true quantifier float from the matrix subject. In other words, all of the properties of the embedded subject are not shared up to the matrix subject, in contrast to what the equality-based account of German raising ((22)a) predicts.

This leads to the conclusion that (17)a is an example of false backward raising. In other words, German does not have equality in raising (does not have (2)), but only has forward subsumption as in (21)a. Let us see how (17)a is well-formed. Berman (2003) proposed an LFG analysis of German clause structure in which the 'subject condition' (like the 'EPP' in Minimalist syntax) can satisfied by agreement features alone. This is possible just in case the matrix predicate has a non-thematic subject, as with a raising predicate, or some other kind of impersonal predicate. Berman (2003, 58) restricts this possibility to 3rd singular subjects, via the following constraint on f-structures:

(29) All f-structures must have a PRED-feature, unless they are specified for third person singular.
$(\forall f)[\neg(f\ \textsc{pred}) \Rightarrow [(f\ \textsc{num}) = \textsc{sg}, (f\ \textsc{pers}) = 3]]$

This restriction is to explain why the impersonal clause in (30)a in German is well-formed, but not that in (30)b:

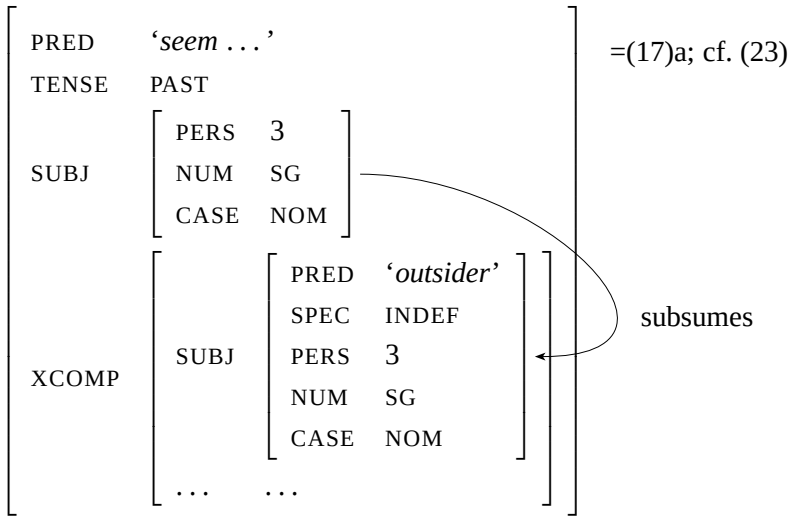
(30) a. ... weil getanzt wird. (3sg subject)
because dance.PASS be.PRES
'... because there is dancing'

b. * . . . weil getanzt werden. (1pl/3pl subject)
because dance.PASS be.PRES

However, to cover the false backward raising structures discussed in this paper, we need to allow for PRED-less f-structures that are 3rd plural as well as 3rd singular, as in (28)a/b. I propose that the f-structure of (30)b is not well-formed because of the fact that the singular morphology does not disambiguate 1st and 3rd persons. There is no evidence in (30)b as to whether the subject's person is 1 or 3. However, in the examples in (28), the f-structure for each is unambiguously 3rd person, due to the presence of the noun *Fehler*. Hence, I propose that the condition in (29) be revised to apply to all unambiguously-marked 3rd person f-structures, with no restriction on number.

The assumption that no PRED is necessary in the matrix clause allows us to analyze (17)a via subsumption (forward raising); the example is grammatical as the agreement features of the matrix subject are shared down to the embedded subject, with the subject further specified by its overt form in the embedded constituent, consistent with (21)a.

(31)



Such an f-structure is not possible for 'try' (see (23)), as any predicate with a thematic subject requires a PRED value for that subject.

False backward raising is possible in a language which has only forward raising but which, like German, allows the Subject Condition to be satisfied by only agreement features.

4. Further Thoughts

4.1. Subsumption

Blevins (2006) writes: "A standard model of LFG can, for example, be modified to run in 'subsumption mode' by replacing all identity relations between attributes by appropriate subsumption relations". However, my argument here is that moving to subsumption does in fact have important analytic consequences. Equality as in (2) is too permissive, and might even be removed from the options in Universal Grammar, keeping (21) instead, with languages or predicates being classified as forward (like German; (21)a), backward ((21)b), or both. Fang (2006) presents an account of Chinese VP structure which crucially relies on the notion of subsumption, and for which equality would not work, as there is an asymmetry in the structures so related.

4.2. Equality, Subsumption, and the Copy Theory of Movement

Does equality or subsumption correspond to the copy theory of movement, especially the one with 're-merge', as in Zhang (2004), Fox and Pesetsky (2005) and Hornstein et al. (2006)? On the face of it, the description of 'remerge' is that the same information is simultaneously present in several places at once, so this looks like equality.

Subsumption can be backward (upward) or forward (downward), but movement is only upwards. In the most recent versions of Minimalism, feature valuation happens from a probe, downwards via Agree to a goal in a lower position. Feature valuation itself adds information, but then some valued features are checked off and disappear. If features are "checked off" as movement operates upwards, then the higher copy actually is informationally less specific than the lower copy, though it may be that the correct notion here is one of being 'informationally most complete': an element having all of its relevant features checked (in the sense of being licensed), without them necessarily having disappeared from the structure altogether.

Potsdam (2006) presents the most complete discussion of the consequences for Spell-Out of backward control and raising. He follows the Chain Reduction Principles of Nunes (2004): only one copy can be pronounced, and the pronounced copy is the one with the fewest unchecked features. With the backward structures considered here, the case feature of the relevant argument can be checked in the lower clause, and can be checked again in the higher clause. As a consequence, the case feature is as equally checked in the lower or the higher clause, and so in principle Spell-Out could apply optionally to either copy (cf. (11)b/(14)). Potsdam proposes that the case feature can be assigned a value multiple times, with each successive valuation overwriting the previous one.

Without further elaboration, such a system predicts optional forward or backward control or raising, but it cannot force only backward structures. Forward-only structures are straightforward: the argument is assumed not to be able to get case in the lower clause, as in English. Moreover, it does not seem to tie the Spell-Out of case to the position of the argument – e.g., Ergative in the lower clause and Absolutive in the higher clause for (11)b/(14). As the chain is formed, the argument picks up Ergative in the lower clause and Absolutive in the higher clause. If Absolutive overwrites Ergative, then strictly speaking, the chain only has Absolutive for a case value, and it is not clear how Ergative could ever Spell-Out. If the chain has both values, it somehow has to 'know' that Ergative Spells-Out on the downstairs copy and Absolutive on the upstairs copy.

Now, the obvious solution to this dilemma is to have cyclic Spell-Out: the Ergative Spells-Out in the lower clause before the chain into the upper clause is even formed. And if Spell-Out does not take place, the chain is formed by movement into the upper clause, the case value gets rewritten as Absolutive and that is what Spells-Out. However, this now divorces Spell-Out from the predicate that governs it: an argument would be Spelled-Out overtly in a lower clause without having any access to the predicate/construction type of the upper clause, which is precisely the locus of whether the construction should be forward or backward. As far as I can see, it is the properties of the upper clause (e.g., properties of the governing predicate) which determine whether a construction is forward or backward. The Spell-Out mechanisms of the Minimalist Program currently do not seem to have any means for encoding this, as Spell-Out is not relativized to properties of the complements of verbal heads.

Eric Potsdam (p.c.) presents two interesting avenues for lines of development of these ideas. One is that, if two copies in a chain are equally informationally specific, but independent principles of PF only allow one to Spell-Out, then there should be two outputs – an upstairs Spell-Out, and a downstairs Spell-Out. However, there could be other and independent principles which further restrict the options: for example, some other property of the language that disfavors Spell-Out in the matrix clause would therefore bias towards a backward construction with Spell-Out in the embedded clause. In this form, such an approach would not be suitable for a language in which specific predicates are forward and others are backward, for it presumes language-wide conditions interacting with Spell-Out.

The other idea would be to let predicates determine the category of their overall complement, in a way that interacts with phases or domains of Spell-Out. For example, a forward control predicate would take a complement αP such that the subject within it is not Spelled-Out (αP would not be a Spell-Out domain, while a vP within αP may be such a domain). A backward control predicate would take a complement βP bigger than αP, such all the elements within βP need to Spell Out. This then relativizes Spell-Out to properties of the governing predicate, through its complement selection.

Putting these observations back in the context of LFG, the position of the overt argument is determined at f-structure, as I have stressed in this paper – the f-structure information in the selecting head controls the c-structure appearance of arguments. In constrast, I think it would be odd in any theory to directly relativize phrase structure configuration to a particular head: for example, a language in which one verb requires a preceding NP but the next verb requires a following NP. It seems to me that a need for such a description would be highly unexpected, and it would amount to direct access from heads to c-structure positions of arguments. It is in fact much more natural that the conditions on forward and backward structures come from f-structure, rather than c-structure.

Multiple case is only an issue if there is a case feature with a value; this is not a necessary part of the LFG analysis, for case could be given a solely constructive role (e.g., as in (13)). In fact, there could be a nice prediction following on from the ideas developed by Spencer and Otoguro (2005): it would be that backward constructions are possible in languages where case has only a GF-constructive role, but not possible in languages where a CASE attribute is present inside the GF, with a variety of values (say, for the purposes of case agreement).

4.3. 'Backward Subsumption' or Backward Obligatory Anaphoric Control?

The alternative to subsumption is to treat control and raising as always involving a coindexed PRED 'PRO' in f-structure, to prevent overt expression of the argument (cf. the analysis of control in HPSG, e.g., Sag and Pollard (1991)). All we have to do is specify obligatory anaphoric control, sharing of INDEX as in line (i) in (32), and then make sure that a PRED 'PRO' is somewhere in f-structure, in shown in lines (ii) or (iii):

(32) Control Predicate – thematic subject:
($\uparrow$ PRED) = '*c-pred* $\langle$($\uparrow$ SUBJ), ($\uparrow$ XCOMP)$\rangle$'

Raising Predicate – non-thematic subject:
($\uparrow$ PRED) = '*r-pred* $\langle$($\uparrow$ XCOMP)$\rangle$($\uparrow$ SUBJ)'

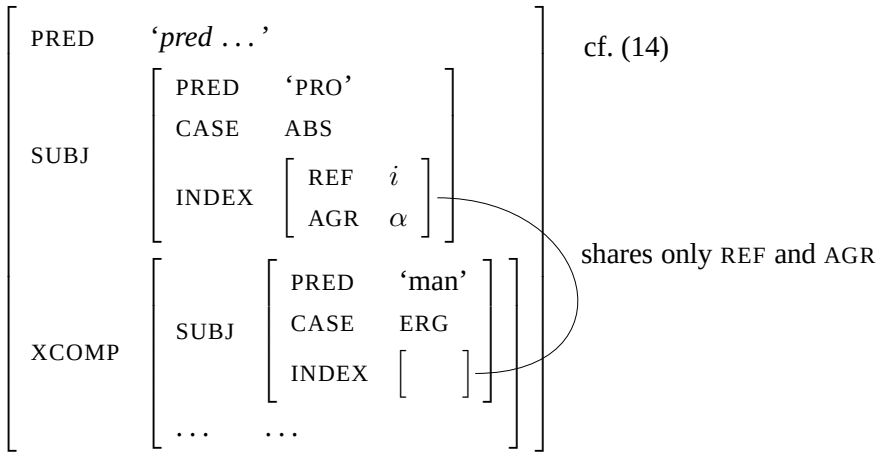
(i) ($\uparrow$ SUBJ INDEX) = ($\uparrow$ XCOMP SUBJ INDEX) (obligatory anaphoric control)
(ii) { ($\uparrow$ XCOMP SUBJ PRED) = 'PRO' (forward; lower position unavailable)
(iii) | ($\uparrow$ SUBJ PRED) = 'PRO' } (backward; higher position unavailable)

This is perfectly viable solution, subject to two provisions: raising is effectively treated as always being 'Copy Raising' (see e.g., Asudeh (2002, 2004)), and the backward cases have to be treated as in line (iii) of (32), with a higher pronoun.[2]

Now, further assume that INDEX has two parts, REF and AGR (cf. Bresnan (2001)), as in (33). This 'PRO' analysis explains which position is empty (by positing a 'PRO' there), and has no problem with different cases upstairs and downstairs, for case is not part of what is shared, only REF and AGR are:

[2]Polinsky and Potsdam (2006) and Potsdam (2006) have argued that this kind of analysis is not appropriate for some instances of backward control and raising.

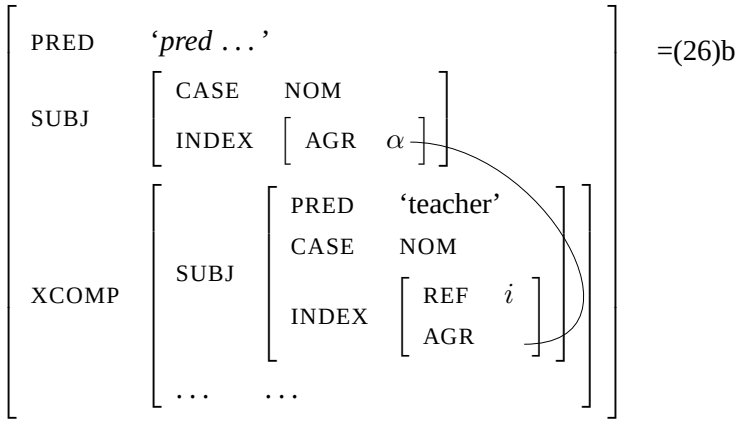
(33)



However, this analysis creates apparent violations of Principle C of the Binding Theory, and requires expletive subjects of raising predicates to be PRED ‘PRO’, rather than to be lack a PRED value altogether (because what is shared is only INDEX, in a structure that also is specified for case). In addition, it does not seem to have the right properties to account for false backward raising, which would have the account sketched in (34); in this situation, all that is shared is the AGR part of INDEX:

(34) False backward raising:

(↑ SUBJ INDEX AGR) = (↑ XCOMP SUBJ INDEX AGR)
(cf. ‘long-distance agreement’ in Minimalist accounts)



To see what the consequences of this kind of analysis are, we have to look at the overall space of control and raising types. (35) shows this for a subsumption-only account and (36) shows it for an equality-only account:

(35) Subsumption-only mode

a. Forward subsumption for forward control and raising; which also allows false backward raising in a language in which AGR alone can satisfy the Subject Condition; or

b. Backward subsumption for backward control and raising.

(36) Equality-only mode

a. Equality of INDEX plus downstairs PRED ‘PRO’ for forward control and raising; or

b. Equality of INDEX plus upstairs PRED ‘PRO’ for backward control and raising; or

c. Equality of AGR for false backward raising in a language in which AGR alone can satisfy the Subject Condition.

The crucial difference is that false backward raising cannot be a special case of one of the other types, as the informational unit that is shared is different (INDEX or AGR). So on this approach, false backward raising does not fall out as a special property of forward raising (why are (36)a and (36)c related?), though it does with subsumption (both are part of (35)a).

Now we know that German cannot have traditional equality across the board, due to the ungrammaticality of *(17)b. We also know that German does not have equality of INDEX: the expletive subject in false backward raising has no referential index, on Berman’s analysis. Hence German requires the option in (36)c, equality of AGR; and this must only be used for cases of false backward raising.

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