

Verb Clusters and the Semantics of Head Movement

Background: Bobaljik & Wurmbrand (2005) argue for an analysis of German long passives according to which the embedded object undergoes raising to the matrix clause to receive case from matrix T. The crucial piece of evidence in support of this view is the emergence of obligatory wide scope of the object in this configuration. Under B&W's analysis, the embedded clause in (1a) is a *v*P and the object receives accusative case inside it. It may hence have low scope with regard to the matrix verb. In the long passive in (1b), by contrast, the embedded clause is a VP and the object must move to the matrix clause to get case. B&W correlate this obligatory case-driven raising with wide scope.

- (1) a. weil **alle Fenster** zu öffnen vergessen wurde
since all windows.ACC to open forgotten was
'since it was forgotten to open all the windows' [forget >> V]
b. weil **alle Fenster** zu öffnen vergessen wurden
since all windows.NOM to open forgotten were
'since it was forgotten to open all the windows' [*forget >> V; V >> forget]

The pervasiveness of matrix scope: Closer scrutiny reveals that wide scope in long passives is much more widespread. The contrast in (2) demonstrates that the indirect object *allen Studenten* 'all students.DAT' can have low scope if the direct object receives accusative (in (2a)) but invariably takes scope over *vergessen* 'forget' if the direct object receives nominative (in (2b)).

- (2) a. weil den Fritz **allen Studenten** vorzustellen vergessen wurde
since the.NOM Fritz all.DAT students.DAT to.introduce forgotten was
'since it was forgotten to introduce Fritz to all students' [forget >> V]
b. weil der Fritz **allen Studenten** vorzustellen vergessen wurde
since the.NOM Fritz all.DAT students.DAT to.introduce forgotten was
'since it was forgotten to introduce Fritz to all students' [*forget >> V; V >> forget]

This pattern even generalizes to adjuncts. The scope of *in jedem Zimmer* 'in every room' correlates with the case of the embedded object (indicated by agreement):

- (3) a. weil **in jedem Zimmer** Äpfel zu essen vergessen wurde
since in every room apples.ACC to eat forgotten was
'since it was forgotten to eat apples in every room' [forget >> V]
b. weil **in jedem Zimmer** Äpfel zu essen vergessen wurden
since in every room apples.NOM to eat forgotten were
'since it was forgotten to eat apples in every room' [*forget >> V; V >> forget]

Thus, *every* element of the embedded clause takes wide scope in long passives. B&W's analysis is unable to capture the contrasts in (2) and (3) precisely because it attributes the wide scope in (1b) to case-driven raising. Neither the indirect object nor adjuncts depend on case-assignment from the matrix clause. We conclude that the wide scope in long passives is not due to case.

Adjacency and scope: Not all instances of long passives lead to wide scope of embedded quantifiers. In particular, it only does if the two main verbs are adjacent to each other, as they are in (1)–(3). If the infinitival verb is topicalized, low scope is possible. Extraposition patterns in the same way.

- (4) [Allen Studenten vorzustellen] wurde der Fritz schon wieder vergessen
all.DAT students to.introduce was the.NOM Fritz yet again forgotten
'it was yet again forgotten to introduce Fritz to all the students' [forget >> V]

All the data discussed so far can be summarized in terms of the generalization in (5).

(5) In long passives with adjacent main verbs, no element takes scope below the matrix verb.

Background: We follow Wurmbrand (2001) and B&W in assuming that the embedded clause in the (a) sentences in (1)–(3) contains a v head that assigns accusative case. This head is absent in the (b) sentences, which hence contain a VP embedded directly under another VP.

Verb unification: The generalization (5) is accounted for if the (b) sentences in (1)–(3) involve semantically contentful verb cluster formation. In particular, we propose that the embedded verb incorporates into the higher verb, a process we will call *verb unification* (VU). VU is strictly local and applies only if two verbs are in the same phase domain, i.e., if no phase head intervenes. We take this to follow from a general prohibition against two lexical heads within the same phase. In this configuration, the structure is rescued by creating a single, more complex head.

(6) **Verb unification**

$$[_{\text{phase}} \dots V_1 V_2] \Rightarrow [_{\text{phase}} \dots t_1 [_v V_1 V_2]]$$

By hypothesis, VU applies at LF. It may hence be bled by syntactic movement. If the embedded verb is topicalized, as in (4), the two verbs are separated by the matrix v and C phase boundaries and VU is blocked. The same holds for the (a) sentences in (1)–(3), where the embedded v intervenes. In all of these cases, low scope is possible because VU does not take place.

The semantics of VU: The denotation of complex heads results from combining the denotations of its members via *function composition* (Jacobson 1990, see also *c-locality* in Lidz & Williams 2002). As has been frequently noted, head movement does not extend the phrase marker. We adopt the movement analysis of Heim & Kratzer (1998), according to which a λ -operator binding a variable in the launching site is generated immediately below the landing site of movement. In the case of head movement, this has a surprising effect. The only viable place for inserting the operator is right below the complex head. As a consequence, *the entire complex head will be interpreted in the launching site*. Metaphorically speaking, raising of one verb to another pulls both of them down semantically. As a consequence of this, everything projected above the lower verb will semantically take scope over the higher verb as well. This is schematized in (7):

$$(7) [X^\circ [_{\text{YP}} \dots Y^\circ]] \Rightarrow [[X^\circ Y^\circ \circ X^\circ] \lambda Q [_{\text{YP}} \dots Q]]$$

Application: Consider the structure of (2b). Here the lower clause consists of a VP and an ApplP introducing the indirect object but no v P. VU unifies both lexical verbs and must also include Appl because of the Head Movement Constraint. The result is the complex head $[_v [_{\text{Appl}} \text{introduce Appl}] \text{forget}]$. This head and its parts are interpreted as in (8):

$$(8) \begin{aligned} \text{a. } & \llbracket \text{introduce} \rrbracket = \lambda x_{\langle e \rangle} \lambda e_{\langle s \rangle} [\text{introduce}'(e) \wedge \text{theme}'(e) = x] \\ \text{b. } & \llbracket \text{Appl} \rrbracket = \lambda P_{\langle st \rangle} \lambda y_{\langle e \rangle} \lambda e_{\langle s \rangle} [P(e) \wedge \text{goal}'(e) = y] \\ \text{c. } & \llbracket \text{forget} \rrbracket = \lambda P_{\langle st \rangle} \lambda e_{\langle s \rangle} [\text{forget}'(e) \wedge \text{theme}'(e) = P] \\ \text{d. } & \llbracket \text{Appl} \rrbracket \circ \llbracket \text{introduce} \rrbracket = \lambda x \lambda y \lambda e [\text{introduce}'(e) \wedge \text{theme}'(e) = x \wedge \text{goal}'(e) = y] \\ \text{e. } & \llbracket \text{forget} \rrbracket \circ \llbracket \text{Appl} \rrbracket \circ \llbracket \text{introduce} \rrbracket = \\ & \lambda x \lambda y \lambda e [\text{forget}'(e) \wedge \text{theme}'(e) = \lambda e' [\text{introduce}'(e') \wedge \text{theme}'(e') = x \wedge \text{goal}'(e') = y]] \end{aligned}$$

(‘ \circ ’ is generalized function composition allowing both for $(B \rightarrow C) \circ (A \rightarrow B) = (A \rightarrow C)$ and $(C \rightarrow D) \circ (A \rightarrow (B \rightarrow C)) = (A \rightarrow (B \rightarrow D))$)

By (7), (8e) will combine with the rest of the tree in the base generation site of *introduce*. It follows that every quantifier in the embedded clause (and outside of it) will have scope over it and its parts including *forget*. This derives the otherwise mysterious wide scope in (b) of (1)–(3).

Consequences: Our account provides evidence that head movement is not always semantically inert (also see Lechner 2007): it is semantically contentful when it involves combination of more than one lexical item as in VU. The result follows from standard assumptions about movement and the curious non-extension property of head movement.