Binding by Voice (Binding by theta heads)

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1. Introduction

- This is about a newly discovered regularity with psych-verbs undergoing Possessor-Argument Factoring Alternations as in (1).

(1) a. Jeder Artikel$_i$ beeindruckte ihn$_j$.
each paper impressed him
'Each paper$_i$ impressed him$_j$.'

b. Jeder Artikel$_i$ beeindruckte ihn$_j$ durch seinen$_{i/*j/*k}$ guten Stil.
each paper impressed him with its good style
'Each paper$_i$ impressed him$_j$ with its$_{i/*j/*k}$ good style.'

- At a more general level, this talk reviews the recurring binding requirement found with alternations of various kinds and implements it in the spirit of Kratzer (2009).

Roadmap:

§2 Descriptive generalizations: Stimulus binders in Possessor-Attribute Factoring Alternations
§3 Analysis
§4 Other constructions with the same overall structure
§5 The binding property is not trivial
§6 Ways of arriving at theta heads with bare indices right underneath
§7 Conclusions

2. Descriptive generalizations: Stimulus binders in Possessor-Attribute Factoring Alternations

(2) OBJECT EXPERIENCER VERB

a. (*The good style of*) *the paper impresses me*. (base alternant)

b. *The paper impresses me with its good style*. (alternant with attribute factored out; **factored alternant**)

(3) SUBJECT EXPERIENCER VERB

a. *He admires her* (*courage*). (base alternant)

b. *He admires her for her courage*. (**factored alternant**)

- Previous mention of "Possessor-Attribute Factoring Alternations" in Levin (1993: 72-78), Engelberg (2015, to appear).

- Verbs participating in this alternation:

  - **Object experiencer verbs** like *amuse*-type verbs: *beeindrucken* 'impress', *nerven* 'annoy', *faszinieren* 'fascinate', etc
  - **Subject experiencer verbs**, such as judgement verbs (*verurteilen* 'condemn' or *gratulieren* 'congratulate') and *admire*-type verbs (*bewundern* 'admire', *beneiden* 'envy'.

Grammatically induced possessor binding:
Object experiencer verbs require the possessors in the PP complements of factored alternants to be bound by the subject (4), while subject experiencer verbs require the binding of the possessor in the PP by the object (5).

- Note that probably the binding facts are only categorical on the stative readings of the sentences in (4) and (5); Temme (in prep.).

(4) **subject binder** with OBJECT EXPERIENCER VERBS
a. Jeder Artikel$_i$ beeindruckte ihn$_j$ durch seinen$_{i/*j/*k}$ guten Stil.
every paper impressed him with its good style
'Each paper$_i$ impressed him$_j$ with its$_{i/*j/*k}$ good style.'
b. Jeder$_i$ faszinierte Peter$_j$ mit seinen$_{i/*j/*k}$ Fragen.
everyone fascinated Peter$_{ACC}$ with his questions
'Everyone$_i$ fascinated Peter$_j$ with his$_{i/*j/*k}$ questions.'

(5) **object binder** with SUBJECT EXPERIENCER VERB
a. *Er*$_i$ *verachtete* *jeden*$_j$ *für seine*$_{*i/j/*k}$ *Lüge.*
he despised everyone for his lie
'He$_i$ despised everyone$_i$ for his$_{*i/j/*k}$ lie.'
b. *Er*$_i$ *bewundert* *jeden*$_j$ *für* *seinen*$_{*i/j/*k}$ *Mut.*
he admires everyone$_{ACC}$ for his courage
'He$_i$ admires everyone$_j$ for his$_{*i/j/*k}$ courage.'

Challenges:
(i) How to account for the obligatory possessor binding in (4) and (5)?
(ii) Can the phenomenon be reduced to something more general?

3. Analysis

- Implementation requirements:
  (i) syntactic and semantic licensing of an extra argument by suitable functional structure
  (ii) the binding requirement

- Implementation tools:
  theta-heads/verbal functional heads that simultaneously induce binding as envisaged by Kratzer (2009)

"[S]emantic binders (λ-operators represented as binder indices) are introduced by verbal functional heads, rather than by "antecedent" DPs, as assumed in Heim and Kratzer (1998), for example. Verbal functional heads, rather than DPs, are then the true syntactic antecedents for bound pronouns" (Kratzer 2009:193).

- This tool has been shown before to do the required work in similar domains (cf. section 4).

3.1 Kratzer (2009: 194) and Hole (2008, 2012, 2014) on reflexivity

(6) I [**Voice**$_{AGT}$ [**i** blame myself$_i$]] 'I blame myself.'

↓ ↓

λx . λe. x is the agent of e λx . λe. e is an event of blaming x (Predicate Abstraction)

↓ ↓

λx . λe. x is the agent of e & e is an event of blaming x (Predicate Conjunction)

- The reflexivization work in (6) is distributed across (i) Predicate Abstraction, which is triggered by the bare numerical index underneath Voice, and (ii) Predicate Modification

- Put differently, merging **Voice** and the **i**-triggered lambda-abstract yields a reflexivized predicate

3.2 Possessor-Attribute Factoring Alternations with experiencer object verbs

(7) a. (*The good style of*) *the article impressed Paul.* (base alternant)
b. *The article impressed Paul with its good style.* (factored alternant)

(8) a. BASE ALTERNANT/experiencer object

The article impressed Paul.

The article [**Voice**$_{STIM}$ [impressed Paul]] . 'The article impressed Paul.'

↓ ↓

λx . λs. x is the stimulus of s λx . λs. s is a state of impressing Paul

↓ ↓

λx . λs. x is the stimulus of s & s is a state of impressing Paul

b. FACTORED ALTERNANT/experiencer object
The article$_i$ impressed Paul with its$_i$ great style.

The article **Voice**$_{STIMGreat}$[**i** [**Stim** [impressed Paul]] [with its$_i$ great style]]

↓ ↓ ↓ ↓

↓ λx . λs. x is the stim- λs. s is a state a(i)'s great style

↓ ulus of s of impressing Paul

↓

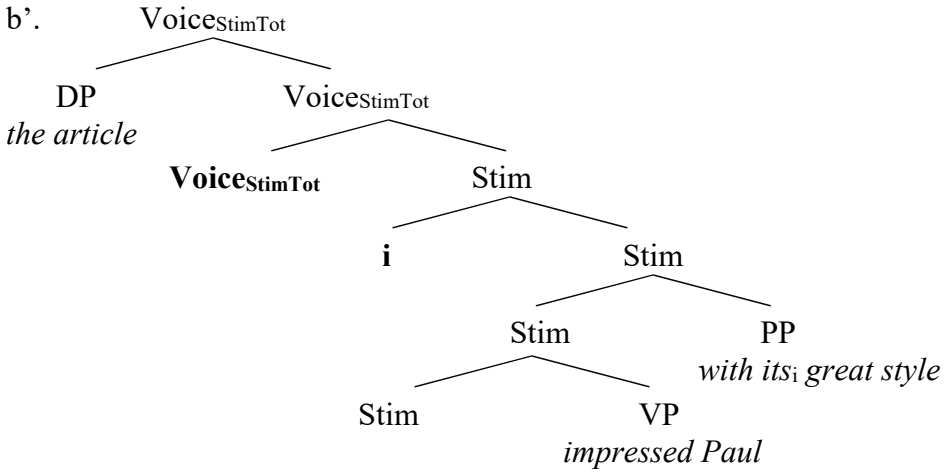
↓ λs. a(i)'s great style is the stimulus of s & s is a state of

↓ impressing Paul

↓

Predicate Abstraction: λx . λs. x's great style is the stimulus of s & s is a state of impressing Paul

λx . λs . x is the greater stimulus of s & x's great style is the stimulus of s & s is a state of impressing Paul



- The extension of the argument structure in the factored alternant is performed by a theta head that asserts the referent in its specifier to be the stimulus whole (of which the stimulus aspect further down must be a part/an aspect).

- The bare index introduced right underneath the highest theta head makes sure that the highest specifier binds the possessor variable inside the stimulus aspect PP.

- Like this, binding is tied to a "verbal functional head" in the sense of Kratzer (2009).

- In the base alternant, Voice$_{STIM}$ may either host referents that are stimulus aspects, or it may host referents that are stimulus wholes.

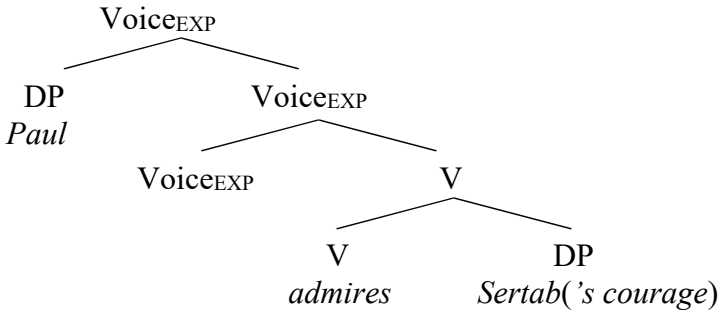
- Voice$_{STIMTOT}$ is very much like a high applicative head in the sense of Pylkkänen (2002), with the additional component of necessarily going along with the lambda-abstracting device underneath.

- However, none of the binding predictions made by the theoretical tie-up between theta heads and bare indices are made by Pylkkänen (2002) or, as far as I can tell, other researchers in the applicative paradigm.

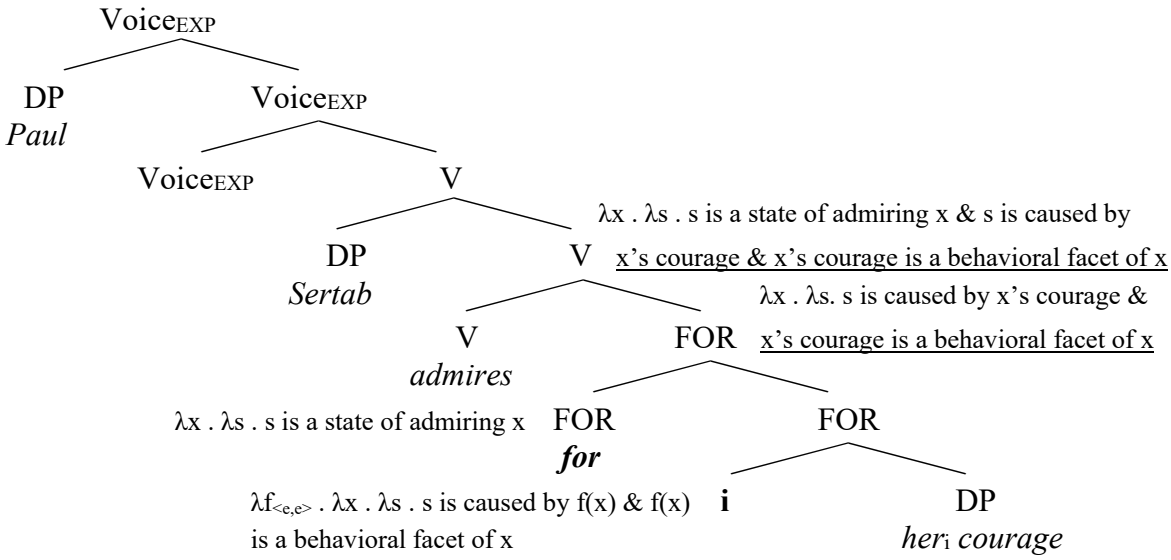
3.2 Possessor-Attribute Factoring Alternations with experiencer subject verbs

(9) a. *Paul admires Sertab*(*'s courage*). (base alternant)
b. *Paul admires Sertab for her courage.* (factored alternant

(10) a. BASE ALTERNANT/experiencer subject



b. FACTORED ALTERNANT/experiencer subject



- *For* in the factored alternant in (10b) implements the stative causation relation that holds between the (instantiation of) courage and the state of admiration.
- The Predicate Abstraction right underneath makes sure that the holder of the courage will, after further composition, be identical to the admiree.
- In the base alternant, the stimulus object may either be a whole (Sertab) or a behavioral facet (Sertab's courage).
- In (10b), the behavioral facet conjunct is asserted. Probably it should be implemented as a presupposition instead.
- *For* in (10b) has some similarities with a low applicative head in the sense of Pylkkänen (2002); cf., for instance, the fact that the direct object argument is not a straightforward argument of the verb alone.
- However, none of the binding predictions made by the theoretical tie-up between theta heads and bare indices are made by Pylkkänen (2002) or, as far as I can tell, other researchers in the applicative paradigm.

4. Other constructions with the same overall structure

4.1 English

(11) Locative *have*-Alternation
  a. *There is a nest in the tree.*
  b. *The tree$_i$ has a nest in it$_i$.*

b'. The tree **has$_{\text{Whole/Landmark}}$ i** a nest in it$_{i/*j}$.

(12) Location Subject Alternation (Levin 1993: 82)
a. *Five people sleep in each room.*
b. [*Each room*]$_i$ *sleeps five people* {*inside it*$_i$}.

b'. [Each room] **Whole/Landmark i** sleeps five people {inside it$_i$}.

4.2 German

(13) *Be*-locative alternation (Geist & Hole 2016)
a. *Paula hat Eigelb auf den Kuchen gestrichen.*
Paula has egg.yolk$_{ACC}$ on the cake smeared
'Paula spread egg yolk on the cake.'
b. *Paula hat* [*den Kuchen*] { *an seiner*$_i$ *Oberfläche*} *mit Eigelb* be-strichen.
Paula has the cake$_{ACC}$ at its surface with egg.yolk BE-smeared
'Paula coated the cake with egg yolk.'

b'. Paula hat [den Kuchen] **Whole/Landmark i** {an seiner$_i$ Oberfläche}mit Eig. be-strichen

(14) Stative Locative Alternation (Hole 2016; Bücking & Buscher 2015)
a. *Kartons stehen im Gang.* (Hoekstra & Mulder 1990)
carboard.boxes stand in.the hallway
b. *Der Gang*$_i$ *steht* {*am*$_i$ *Boden*} *voll mit Kartons.*
the hallway stands on.the ground full with cardboard.boxes
'The hallway is [standing] full of cardboard boxes.'

b'. Der Gang$_i$ **Whole/Landmark i** steht {am$_i$ Boden} voll mit Kartons

(15) Landmark/Experiencer-*have* structure (Hole 2002)
a. *Der Arm ist verbunden.*
the arm is bandaged
'The arm is bandaged.'
b. *Paul*$_i$ *hat den*$_i$ *Arm verbunden.*
Paul has the arm bandaged.
'Paul has a bandaged arm.'/lit.: 'Paul has the/his arm bandaged.'

c. Paul **hat$_{Exp/Landmark}$ i** den$_i$ Arm verbunden

(16) Predicative Alternation (Geist submitted)
a. *Leas Beruf ist Schauspielerin.*
Lea's profession is actor
'Lea's profession is to act.'
b. *Lea*$_i$ *ist Schauspielerin* {*von* (*ihrem*$_i$) *Beruf* (*her*)}
Lea is actor by her profession PART
'Lea is an actor by profession.'

b'. Lea ist **Total$_{SocialIndividual}$ i** Schauspielerin {von (ihrem$_i$) Beruf (her)}

(17) Free Dative Alternation (Lee-Schoenfeld 2005, 2006, Hole 2006, 2012, 2014)
a. *Paul ist auf Emils Fuß getreten.*
Paul is on Emil's foot stepped

'Paul stepped on Emil's foot.'

b. *Paul ist Emil*$_{DAT}$ *auf den*$_i$*/seinen*$_i$ *Fuß getreten.*
Paul is Emil.DAT on the/his foot stepped
'Paul stepped on Emil's foot.'/lit.: 'Paul stepped Emil on the/his foot.'

b'. Paul ist Emil$_{DAT}$ **ExpLandmark i** auf den$_i$/seinen$_i$ Fuß getreten

5. The binding property is not trivial

- Recall that in each of the patterns reviewed above binding is obligatory. (18)-(21) is a reminder of this.

(18) **subject binder** with OBJECT EXPERIENCER VERBS
Jeder Artikel$_i$ beeindruckte ihn$_j$ durch seinen$_{i/*j/*k}$ guten Stil.
every paper impressed me with its good style
'Each paper$_i$ impressed me$_j$ with its$_{i/*j/*k}$ good style.'

(19) **object binder** with SUBJECT EXPERIENCER VERB
Er$_i$ *verachtete jeden*$_j$ *für seine*$_{*i/j/*k}$ *Lüge.*
he despised everyone for his lie
'He$_i$ despised everyone$_i$ for his$_{*i/j/*k}$ lie.'

(20) Locative *have*-Alternation
a. *There is a nest in the tree.*
b. *The tree*$_i$ *has a nest in it*$_{i/*j}$.

(21) Predicative Alternation
a. *Leas Beruf ist Schauspielerin.*
Lea's profession is actor
'Lea's profession is to act.'
b. *Lea*$_i$ *ist Schauspielerin {von (ihrem*$_{i/*j}$*) Beruf (her)}*
Lea is actor by her profession PART
'Lea is an actor by profession.'

(22) Free Dative Alternation
Der Udo$_i$ *trat jedem*$_j$ *gegen sein* $_{*i/j/*k}$ *Schienbein.*
the Udo kicked everyone$_{DAT}$ against his shin
'Udo kicked everyone in the shin.'

- No such requirement exists with ditransitives or verbs of putting.

(23) 'show'
Der Udo$_i$ *zeigte jedem*$_j$ *sein* $_{i/j/k}$ *Schienbein.*
the Udo showed everyone$_{DAT}$ his shin
'Udo showed everyone his shin.'

(24) 'give'
Karl$_i$ *gab jedem*$_j$ *seinen*$_{i/j/k}$ *Kuchen.*
Karl gave everyone his cake
'Karl gave everyone his cake.'

(25) subjects of verbs of change of possession
Er$_{i}$ *warf* *den* *Brief* *in* *seinen*$_{i/j}$ *Briefkasten*
he threw the letter into his mailbox
'He put the letter in his mailbox.'

(26) objects of verbs of posture(!!!)
Peter$_{i}$ *stellte* [*das* Kind]$_{j}$ *auf* *seine*$_{i/j/k}$ *Füße.*
Peter stood the child on(to) his feet
'Peter$_{i}$ stood [the child]$_{j}$ on his$_{i/j/k}$ feet.'

- So far, our implementation simply has theta heads and indices next to each other in the structure.

- The reason why they should couple up like this, or be forced to couple up like this, has not been asked yet. Section 6 will look into this problem.

6. Ways of arriving at theta heads with bare indices right underneath

- How to arrive at **[θ [i [XP]]]** ?

- Kratzer (2009) is silent on this, and maybe for a reason. Bare indices trigger Predicate Abstraction in the right tree-geometrical configuration (Heim & Kratzer 1998: 186), but they are probably ill-defined elements of lexical arrays.

- An index denotes a natural number, nothing else.

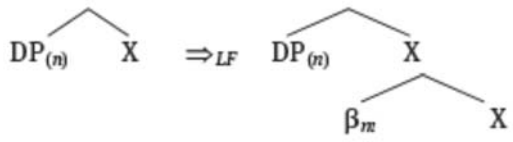
- As such, it has no defined merging properties in Natural languages. (|N is not a logical type that any formalism makes use of as arguments of functions in natural language.)

- In Heim & Kratzer (1998), bare indices enter the structure as a result of movement.

- As said above, in Kratzer (2009) they are simply there.

- Büring (2005) introduces his counterparts of naked indices – his binder prefixes – by way of a structure-expanding LF rule.

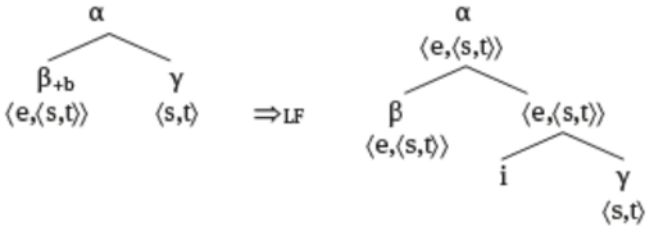
(27) Büring's Binder Rule (Büring 2005: 109)



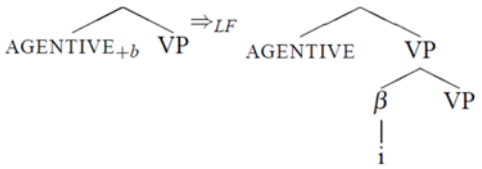
- This rule doesn't respect inclusiveness, and it requires a variant of Predicate Abstraction to take off.

- Hole (2008, 2012, 2014) proposes another rule. It doesn't respect inclusiveness either, but it only requires standard machinery for interpretation. It is given in (28). (29) is the instantiation needed for reflexivization.

(28) Hole's Generalized Binder Rule



(29)



- (28) and (29) are rules that introduce bare indices into the structure iff the theta head right above bears a [+b] binder feature.
- This binder feature gets deleted as the structure expansion takes place.
- This implements the tie-up that Kratzer observes.

"[S]emantic binders (λ-operators represented as binder indices) are introduced by verbal functional heads, rather than by "antecedent" DPs, as assumed in Heim and Kratzer (1998), for example. Verbal functional heads, rather than DPs, are then the true syntactic antecedents for bound pronouns" (Kratzer 2009:193).

7. Conclusions

- Possessor Attribute Factoring Alternations involve obligatory binding
- They share this non-trivial property with many other alternations.
- Kratzer (2009) provided us with a method to represent and compute such theta-related binding structures.
- The generation of these theta-related binding structures is more of a problem.
- LF rules like those proposed by Büring or Hole may in principle solve the problem. Their status in the theory is a bit unresolved, though.

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