

Adjuncts and the HPSG Binding Theory

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Introduction

- HPSG binding theory in Pollard and Sag (1994): o-command, based on the relative obliqueness of arguments
- Problem: Binding theoretic interaction between main clause and adjunct-internal elements
- Proposed revision:
 - Following Hukari and Levine (1995, 1996)
 - A configurational relation: v(alence-based)-c-command
 - Principle C involves vc-command in addition to o-command.
- New data

Outline

- 1 Problems with Pollard and Sag's (1994) binding theory
- 2 A valence-based binding theory
- 3 Further consequences of the revised binding theory
 - (Anti)reconstruction effects
 - Extraposition
 - VP topicalization
 - VP complements
- 4 Is Principle C pragmatic in nature?
- 5 Conclusion

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Binding theory in Pollard and Sag (1994)¹

- (1) A *synsem* object Y is **less oblique** than a *synsem* object Z just in case it precedes Z on the ARG-ST list of some lexical head.
- (2) Let Y and Z be *synsem* objects with distinct LOCAL values, Y referential. Then Y **locally o-commands** Z just in case either:
 - a. Y is less oblique than Z; or
 - b. Y locally o-commands some X that subcategorizes for Z.
- (3) Let Y and Z be *synsem* objects with distinct LOCAL values, Y referential. Then Y **o-commands** Z just in case either:
 - a. Y is less oblique than Z; or
 - b. Y o-commands some X that subcategorizes for Z; or
 - c. Y o-commands some X that is a projection of Z (i.e. the HEAD values of X and Z are token-identical).

¹Revised version of chapter 6.8.3.

- (4) Y **(locally) o-binds** Z just in case Y and Z are coindexed and Y (locally) o-commands Z.
If Z is not (locally) o-bound, then it is said to be **(locally) o-free**.
- (5) Binding Principles
- Principle A:** A locally o-commanded anaphor must be locally o-bound.
 - Principle B:** A personal pronoun must be locally o-free.
 - Principle C:** A nonpronoun must be o-free.

Problems with Pollard and Sag's (1994) binding theory

- No prediction of Principle C effects involving main clause and adjunct-internal elements
- Adjuncts do not appear on ARG-ST lists.
 - Adjuncts never (locally) o-commanded
 - No element within an adjunct can ever be o-bound by an element outside of the adjunct.
- However, such Principle C effects are found...

A nonpronominal NP within a relative clause cannot be coreferential with an argument preceding the NP containing the relative clause:

- (6) a. * She_i admires the people [who work with Lola_i].
 (Reinhart 1983: 102)
- b. * I sent her_i many gifts [that Mary_i didn't like] last year.
 (Culicover and Rochemont 1990: 29)
- c. * I told him_i about your new argument [that supports John's_i theory]. (Fox and Nissenbaum 2000: 5)

Nonpronominals inside *without*-adjuncts may not be coreferential with main clause subjects²:

- (7) a. * They_i went into the city [without anyone noticing the twins_i].
 b. * They_i went into the city [without the twins_i being noticed].

²Unless otherwise stated, the remaining data and discussion in this section are based on Hukari and Levine (1995, 1996).

Nonpronominals inside *without*-adjuncts may be coreferential with main clause objects:

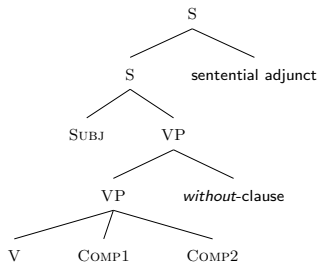
- (8) a. You can't say anything to them_i [without the twins_i being offended].
 b. I lectured her_i for an hour [without a single one of my points getting through to Terry_i].
- (9) a. I was able to criticize him_i [without anyone realizing that Robin_i was the object of my scorn].
 b. I was able to criticize her_i [without anyone realizing that I was talking about Robin_i].

Subject/Object asymmetry in sentences with other types of adjunct clauses:

- (10) a. * She_i always gets angry [if/when Kim_i is criticized].
b. * He_i always stops [before Freddy_i says something stupid].
- (11) a. We always console her_i [when Kim_i is criticized].
b. Sara always stops him_i [before/when Freddy_i acts stupid].

- *without*-clause has the status of a VP-adjunct
- Constituency tests (coordination, substitution, and displacement)
- Structural difference between
 - *without*-clauses and complements
 - *without*-clauses and sentential adjuncts
- Reflected by contrasts in coreference possibilities

(12) Structural assumptions



Difference between *without*-clauses and complement clauses:

- (8) a. You can't say anything to them_i [without the twins_i being offended].
 b. I lectured her_i for an hour [without a single one of my points getting through to Terry_i].
- (13) a. * You can't tell them_i [that the twins_i are being offensive].
 b. * You can't tell them_i [that people are irritated at the twins_i].

Difference between *without*-clauses and sentential adjuncts:

- (14) * They_i could never do anything [without the twins_i; feeling insecure about it].
- (15) They_i hadn't been on the road for half an hour [when the twins_i; noticed that they had forgotten their money, passports and ID].

Subject/Object asymmetry with *without*-clauses:

(7a) *They_i went into the city [without anyone noticing the twins_i].

(8a) You can't say anything to them_i [without the twins_i being offended].

Solution 1:

Place VP-adjuncts (but not sentential adjuncts) between subjects and complements on the ARG-ST list.

Problem:

- Accessibility hierarchy (Keenan and Comrie 1977)
 - Linearization facts
- (16) a. Harry talked [to Margaret] [about the problem] [without paying attention to the time].
- b. * Harry talked [to Margaret] [without paying attention to the time] [about the problem].
- c. * Harry talked [without paying attention to the time] [to Margaret] [about the problem].
- "[A]djuncts are more oblique than complements" (Pollard and Sag 1987: 181).

Solution 2:

New relation based on configuration: $v(\text{alence-based})\text{-c-command}$

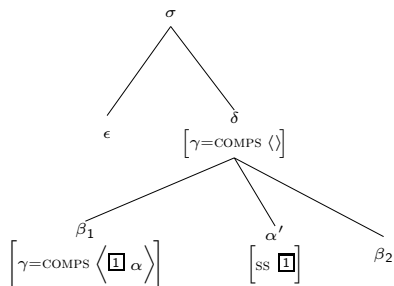
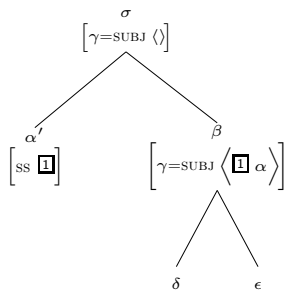
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A valence-based binding theory

(17) **v(alence-based) c-command (Hukari and Levine 1995):**

Let α be an element on a valence list γ and α' the DTRS element whose SYNSEM value is structure-shared with α . Then if the constituent that would be formed by α' and one or more elements β has a null list as its value for γ , α vc-commands β and all its descendants.



(18) **Principle C:**

A nonpronominal must neither be bound under o-command nor under a vc-command relation.

(19) **vc-command (revised):**

Let α , β , γ be *synsem* objects, and β' and γ' signs such that β' : [SYNSEM β] and γ' : [SYNSEM γ]. Then α vc-commands β iff

- a. γ' : [SS|LOC|CAT|VAL|SUBJ $\langle\alpha\rangle$] and γ' dominates β' , or
- b. α locally o-commands γ and γ' dominates β' .

Benefits of the revised formulation:

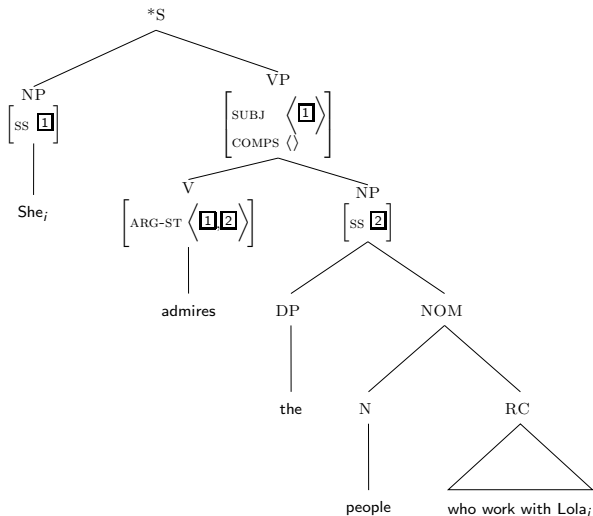
- No modality
- Formally and technically clean
- Emphasizes the primacy of the subject

- Vc-command exists between a subject and VP-adjuncts (including all descendants) but not between complements and VP-adjuncts.
- Vc-command exists between a subject or complement and any adjuncts within more oblique complements.

Pronoun vc-commands name within relative clause

(20) a. *She_i admires the people [who work with Lola_i].

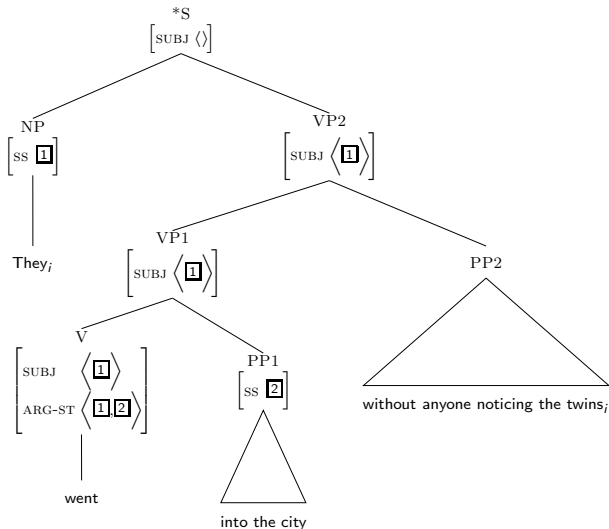
b.



Subject pronoun vc-commands nonpronominal inside *without*-adjunct

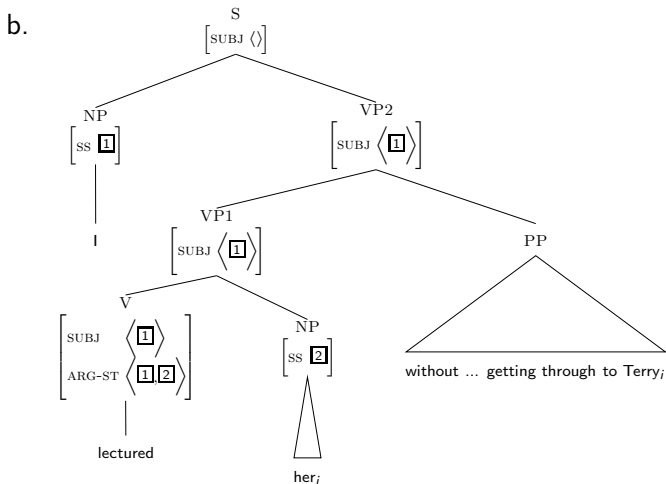
(21) a. * They_i went into the city [without anyone noticing the twins_i].

b.



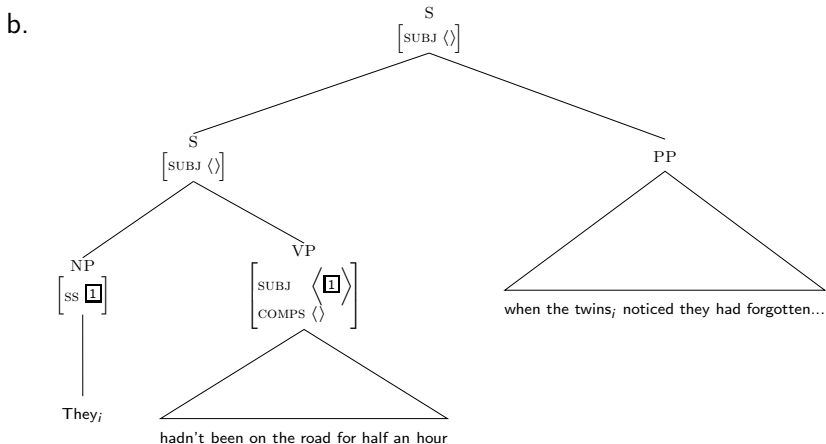
Object pronoun does not vc-command name inside *without*-adjunct

(22) a. I lectured her_i for an hour [without a single one of my points getting through to Terry $_i$].



Subject pronoun does not vc-command nonpronominal within sentential adjunct

(23) a. They_i hadn't been on the road for half an hour [when the twins_j noticed they had forgotten their money, passports and ID].



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(Anti)reconstruction effects³

- Complements and adjuncts within extracted arguments show different behavior with respect to Principle C:

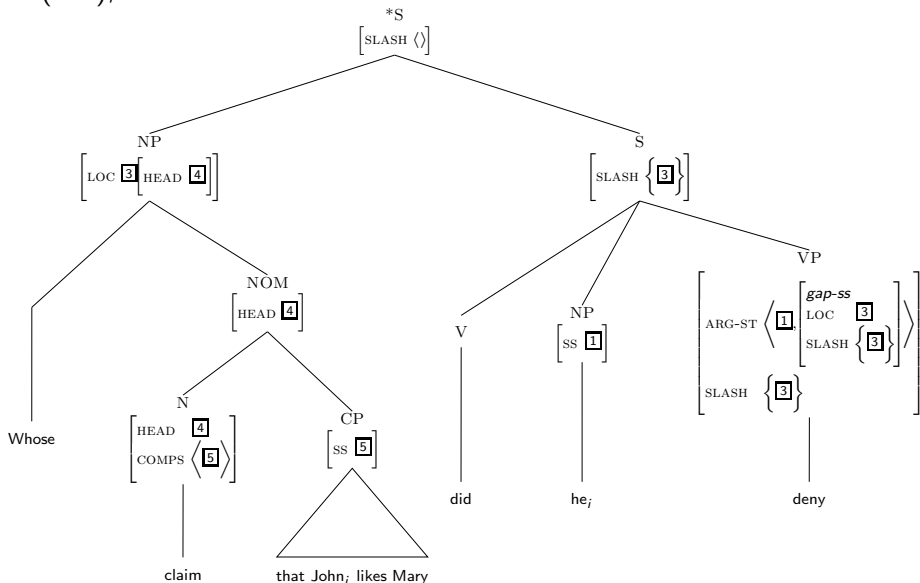
(24) a. * He_i denied the claim [that John_i likes Mary].
 b. * Whose claim [that John_i likes Mary] did he_i deny t?

(25) a. * He_i denied the claim [that John_i made].
 b. Which claim [that John_i made] did he_i later deny t?

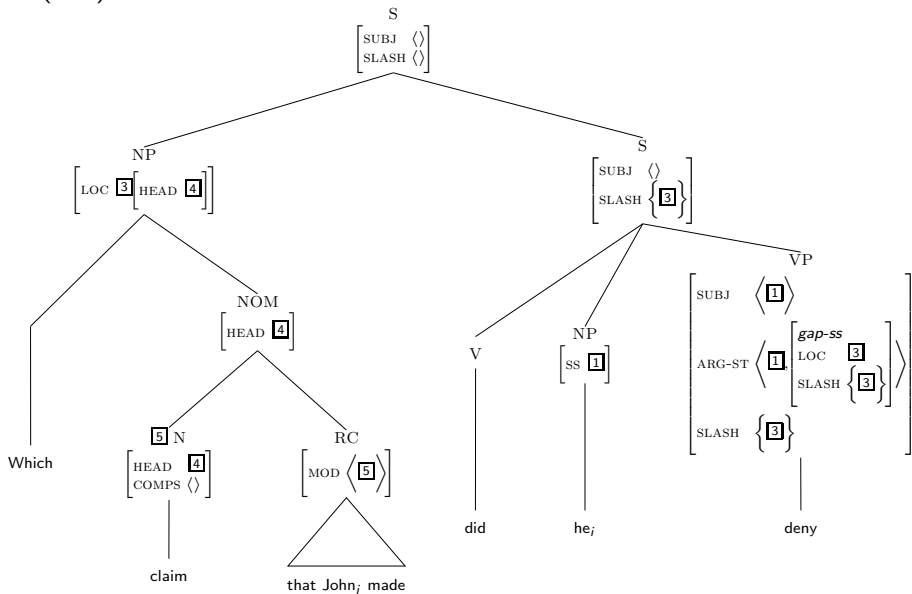
- First observed in van Riemsdijk and Williams (1981) and taken up in Lebeaux (1988)

³Based on Hukari and Levine (1995).

In (24b), *he* o-commands *John*:



In (25b), *he* neither o-commands nor vc-commands *John*:



Crucial difference:

- o-command passed on from a gap to its filler (defined in terms of “projection of”, or shared HEAD features)
- vc-command breaks off at the gap site (defined in terms of domination)

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Extrapolation

Complement extrapolation does not circumvent a Principle C violation:

- (26) a. * I gave him_i a picture [of John's_i mother] yesterday.
b. ??/* I gave him_i a picture yesterday [of John's_i mother].

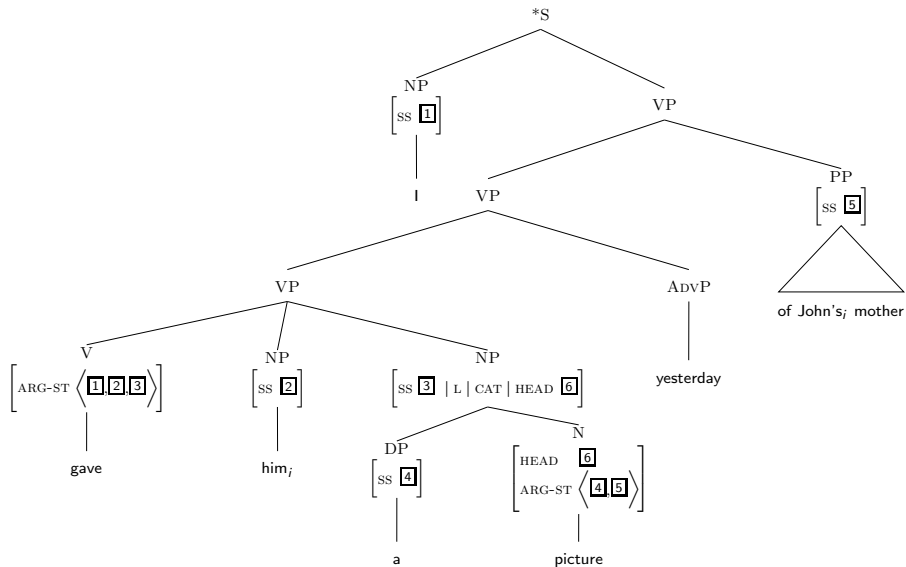
Adjunct extrapolation circumvents a Principle C violation:

- (27) a. ??/* I gave him_i a picture [from John's_i collection] yesterday.
b. I gave him_i a picture yesterday [from John's_i collection].

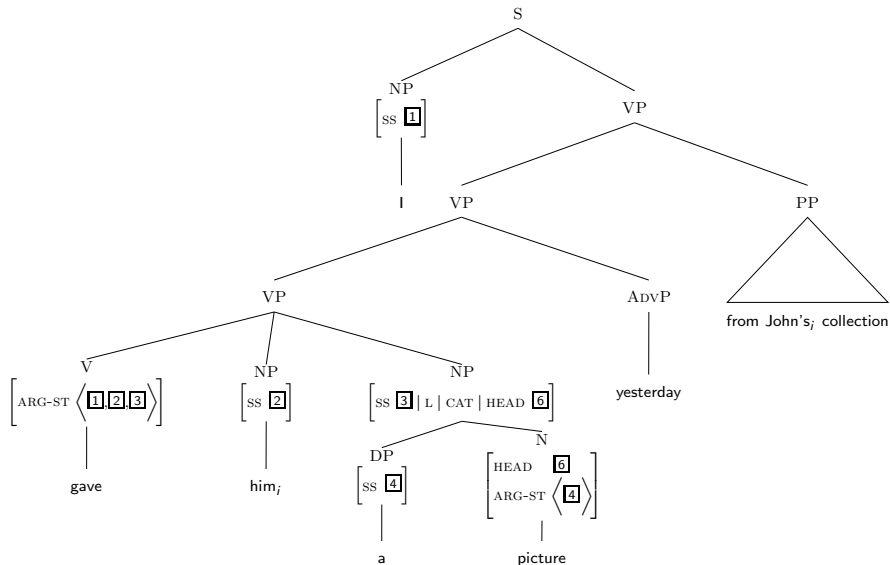
(Examples from Fox and Nissenbaum 1999: 139)

- Different approaches to extrapolation in HPSG
 - Nonlocal dependency, same kind of mechanism that accounts for extraction to the left (e.g., Keller 1994, Müller 1999)
 - Anaphoric approach for relative clause extrapolation, simple adjunction of the extrapolated adjuncts (Kiss 2005)
 - Combination of the two approaches for complement clause and relative clause extrapolation in German (Crysmann (to appear))
- The binding theory proposed here interacts with any of these analyses in the desired way.

In (26b), *him* o-commands *John*:



In (27b), *him* neither o-commands nor vc-commands *John*:



- When the coindexed pronoun is in subject position, adjunct extrapolation does not circumvent a Principle C violation:
(28) a. * She_i invited many people to the party [that Mary_i didn't know]. (Culicover and Rochemont 1990: 28)
b. * She_i told many people about the concert [who Mary_i made nervous]. (Guéron and May 1984: 10)
- Assumption: Constituent extraposed from object is adjoined to VP rather than S (Culicover and Rochemont 1990, 1997, among others)
- Correctly ruled out by vc-command

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VP topicalization⁴

- No antireconstruction effects

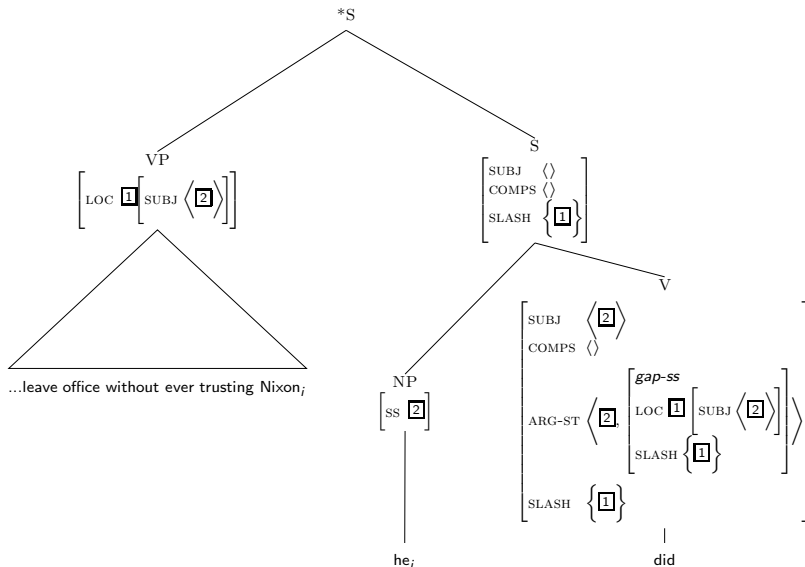
(29) a. * ... and [leave office [without anyone ever trusting Nixon;_i]]
he;_i did.

b. * ... and [gather injunctions [until Richardson;_i had every
crook behind bars]] he;_i knew he;_i would.

- Observation by Chomsky, taken up in Huang (1993): VP-internal Subject Hypothesis

⁴Based on Hukari and Levine (1995).

In (29a), *he* *vc*-commands *Nixon*:



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VP complements

- A name in a relative clause within a VP complement may not be coreferential with a pronoun complement of the matrix verb.
- Ruled out by *vc*-command, but not by *o*-command

(30) * John seems [to her_i] [to have made a claim which Mary_i resented].

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Is Principle C pragmatic in nature?

- Assumption: Principle C effects are pragmatic in nature rather than syntactic (cf. Bolinger 1979, Bresnan 2001, Bouma et al. 2001, Kuno 1975, Bickerton 1975, McCray 1980, among others)
- Reinhart scrutinizes the evidence provided in favor of the functional approaches and observes that "[...] when there is a discrepancy between domain relations and functional relations coreference options follow the syntactic requirements [...]" (1983: 100).⁵

⁵I am grateful to an anonymous reviewer for drawing attention to Reinhart's observation.

- (31) He_i's impossible, when Ben_i gets one of his tantrums.
(Bolinger 1979: 302)
- (32) * He_i always gets angry when Sandy_i is criticized.
- (33) a. [_S [_S He_i's impossible] [when Ben_i gets one of his tantrums]].
b. [_S [When he_i gets one of his tantrums] [_S Ben_i is impossible]].⁶
- (34) * [_S He_i [_{VP} always [_{VP} gets angry [when Sandy_i is criticized]]]]

⁶Thanks to an anonymous reviewer for pointing out this symmetry of adjunct configurations.

Psycholinguistic evidence⁷

- Language development (Kazanina 2005)
 - Comprehension experiment with Russian-speaking children
 - Syntactic constraint, Principle C, respected at the age of 3
 - Russian-specific discourse constraint violated until the age of 5-6
- Real-time processing (Kazanina 2005, Kazanina et al. 2007)
 - Self-paced reading studies, off-line rating studies, off-line completion studies
 - Judgments of coreference degraded when a pronoun c-commands its antecedent
 - Backwards anaphora dependencies processed with a grammatically constrained active search mechanism

⁷I would like to thank an anonymous reviewer for drawing my attention to the psycholinguistic work by Kazanina et al.

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Conclusion

- Principle C effects between adjunct-internal and main clause elements
- Not predicted by Pollard and Sag's (1994) binding theory
- Hukari and Levine (1995, 1996):
 - vc-command, reformulation of Principle C
 - (Anti)reconstruction and VP topicalization effects
- Revision of Hukari and Levine's vc-command:
 - No modality
 - Formally and technically clean
 - Motivates the superior role of the subject in binding
- Crucially different interactions of the relations of o-command and vc-command with fillers (including extraposed constituents)
- New data (relative clauses, extraposition, VP complements) strongly support the proposed revision of the HPSG binding theory.
- Revised binding theory can account for the data provided in favor of a pragmatic approach.

Thank you!

References I

- Bickerton, Derek. 1975. Some assertions about presuppositions about pronominalization. In *Papers from the Parasession on Functionalism*. Chicago Linguistic Society, April 17, 1975, Robin E. Grossman, L. James San & Timothy J. Vance (eds), 24-35. Chicago: CLS.
- Bouma, Gosse, Malouf, Robert & Sag, Ivan A. 2001. Satisfying constraints on extraction and adjunction. *Natural Language and Linguistic Theory* 19(1): 1-65.
- Bolinger, Dwight. 1979. Pronouns in discourse. In *Syntax and Semantics, Volume 12: Discourse and Syntax*, Talmy Givón (ed), 289-309. New York: Academic Press.
- Bresnan, Joan. 2001. *Lexical-Functional Syntax*. Malden, Mass. & Oxford, UK: Blackwell.
- Crysmann, Berthold. To appear. On the locality of complement clause and relative clause extraposition. In *Rightward Movement in a Comparative Perspective*, Gert Webelhuth, Manfred Sailer & Heike Walker (eds). Amsterdam: John Benjamins.
- Culicover, Peter W. & Rochemont, Michael S. 1990. Extraposition and the complement principle. *Linguistic Inquiry* 21(1): 23-47.

References II

- Culicover, Peter W. & Rochemont, Michael S. 1997. Deriving dependent right adjuncts in English. In *Rightward Movement, Proceedings of the Tilburg Conference on Rightward Movement, Oct. 6-10, 1994*, Henk van Riemsdijk, David LeBlanc & Dorothee Beermann (eds), 279-300. Amsterdam: John Benjamins.
- Fox, Danny & Nissenbaum, Jon. 1999. Extraposition and scope: a case for overt QR. In *Proceedings of the 18th West Coast Conference on Formal Linguistics*, Sonya Bird, Andrew Carnie, Jason D. Haugen & Peter Norquest (eds), 132-144. Somerville, MA: Cascadilla Press.
- Fox, Danny & Nissenbaum, Jon. 2000. Extraposition and covert movement. Unpublished manuscript, New York University.
- Guéron, Jacqueline & May, Robert. 1984. Extraposition and logical form. *Linguistic Inquiry* 15(1), 1-31.
- Huang, C.-T. James. 1993. Reconstruction and the structure of VP: some theoretical consequences. *Linguistic Inquiry* 24(1): 103-138.
- Hukari, Thomas E. & Levine, Robert D. 1995. On SLASH termination and valence-based binding theory. Paper presented at the Linguistics Society of America meeting, January 1995, New Orleans.

References III

- Hukari, Thomas E. & Levine, Robert D. 1996. Phrase structure grammar: the next generation. *Journal of Linguistics* 32(2): 465-496.
- Kazanina, Nina. 2005. The Acquisition and Processing of Backwards Anaphora. PhD dissertation, University of Maryland, College Park.
<<http://hdl.handle.net/1903/2927>> (16 August 2011).
- Kazanina, Nina, Lau, Ellen F., Lieberman, Moti, Yoshida, Masaya & Phillips, Colin. 2007. The effect of syntactic constraints on the processing of backwards anaphora. *Journal of Memory and Language* 56: 384-409.
- Keenan, Edward L. & Comrie, Bernard. 1977. Noun phrase accessibility and universal grammar. *Linguistic Inquiry* 8(1): 63-99.
- Keller, Frank. 1994. *Extrapolation in HPSG*. Verbmobil Report 30, IBM Germany, Institute for Logic and Linguistics, Heidelberg.
- Kiss Tibor. 2005. Semantic constraints on relative clause extraposition. *Natural Language and Linguistic Theory* 23(2): 281-334.

References IV

- Kuno, Susumu. 1975. Three perspectives in the functional approach to syntax. In *Papers from the Parasession on Functionalism. Chicago Linguistic Society, April 17, 1975*, Robin E. Grossman, L. James San & Timothy J. Vance (eds), 276-336. Chicago: CLS.
- Lebeaux, David. 1988. *Language Acquisition and the Form of the Grammar*. PhD dissertation, University of Massachusetts, Amherst.
- McCray, Alexa T. 1980. The semantics of backward anaphora. *Cahiers Linguistique d'Ottawa* 9: 329-343.
- Müller, Stefan. 1999. *Deutsche Syntax deklarativ. Head-Driven Phrase Structure Grammar für das Deutsche* [Linguistische Arbeiten 394]. Tübingen: Max Niemeyer Verlag.
- Pollard, Carl J. & Sag, Ivan A. 1987. *Information-based Syntax and Semantics, Vol. 1* [CSLI Lecture Notes 13]. Stanford University: CSLI Publications. Distributed by University of Chicago Press.
- Pollard, Carl J. & Sag, Ivan A. 1994. *Head-Driven Phrase Structure Grammar*. Chicago: University of Chicago Press.
- Reinhart, Tanya. 1983. *Anaphora and Semantic Interpretation*. London: Croom Helm.

References V

van Riemsdijk, Henk & Williams, Edwin. 1981. NP-structure. *The Linguistic Review* 1(2): 171-217.