Lexically modifying binding restrictions: The case for a variable-free binding theory

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The challenge: Lexical items modifying pronoun binding conditions. Russian has two anaphoric pronouns: an anaphor *sebja* and a pronominal *on*, cf. (1), (2). The binding domain (where it must be bound) for *sebja* is its finite clause, the binding domain for *on* (where it must be free) is its minimal clause (thus both are acceptable in infinitival clauses).

(1)	Petja$_i$	skazal,	čto	Vasja$_j$	uvidel	sebja$_{*i/j}$.
	Petja	told	that	Vasja	saw	sebja.ACC
(2)	Petja$_i$	skazal,	čto	Vasja$_j$	uvidel	ego$_{i/*j}$.
	Petja	told	that	Vasja	saw	on.ACC

However, when an intensifier *sam* is adjoined to them, both pronouns must be bound within their minimal clause, (1) vs. (3), (2) vs. (4). The binding domain of *sebja* 'himself' is narrowed, and, moreover, *on* 'he' in [*on* + *sam*] must be bound exactly within the domain in which the unmodified *on* cannot be bound: its finite clause. However, [*sebja* + *sam*] inherits subject orientation from *sebja*, and [*on* + *sam*] is anti-subject-oriented, as *on* is. Thus *sam* poses an additional restriction on binding, while preserving restrictions the pronoun already has. This additional restriction is the same for *sebja* 'himself' and *on* 'he'. In other words, *sam* modifies binding conditions of these pronouns compositionally.

(3) (a)	Anja$_i$	pokazala	Maše$_j$	[ejo	samu]$_{*i/j/*k}$	
	Anja.NOM	showed	Masha.DAT	on.FEM.ACC	self.FEM.ACC	
(b)	*Anja$_i$	poprosila	Mašu$_j$	nalit' čaju	[ej	samoj]$_{i/j/k}$
	Anja.NOM	asked	Masha.ACC	to pour tea	on.FEM.DAT	self.FEM.DAT

(4) (a)	Vasja$_i$	uvidel	[sebja	samogo]$_i$			
	Vasja.NOM	saw	sebja.ACC	self.ACC			
(b)	*Vasja$_i$	poprosil	Petju	nalit'	čaju	[sebje	samomu]$_i$
	Vasja	asked	Petja.ACC	to pour	tea	sebja.DAT	self.DAT

Is Russian *sam* an independent word, or just a morpheme? It is a word: *sam* carries an independent stress and is inflected. Moreover, it has specific information structure restrictions: *sam* is grammatical only when contrastively stressed. This kind of restrictions can hold for words (cf. *only* that must associate with focus), but not for morphemes. Thus [pronoun + *sam*] complexes are more similar to French *se … lui-même* or Dutch *zichzelf* than to English *himself*. However, neither French nor Dutch provide an opportunity to check if the binding domain is narrowing, so in this paper we concentrate on the Russian data (though cf. Rooryck & Wyngaend (1999), a.o., for interpretational effects of *lui-même* and *zelf*).

Our data challenges the standard B(inding) T(heory) (i.e., that of Chomsky 1981). The standard BT cannot allow a lexical item to modify binding conditions of another lexical item. Binding domains are directly assigned to pronouns, and there is no mechanism for their modification in the course of a derivation.

What will we need to account for the Russian data under the standard BT? The only option is to add entries [*sebja* + *sam*] and [*on* + *sam*] to our lexicon and to assign them their unique binding restrictions. It is essentially the same treatment as we have, f.i., for English *himself*. Thus we completely lose a distinction between true anaphors like *himself* and the Russian two-word complexes. Moreover, such an analysis is completely non-compositional, since it stipulates a specific lexical rule for the constituent [pronoun + *sam*] instead of processing it compositionally.

The proposal: A variable-free binding theory. We argue that in order to account for the Russian data we need to use a variable-free BT based on Jacobson 1999 proposal for binding instead of the standard BT. Jacobson argues if we change lambda-abstraction binding with a variable-free one, many binding phenomena receive a natural explanation (see Jacobson 1994 on "i-within-i" effects, Jacobson 1996 on binding into conjuncts, Breheny 2003 on implicit argument binding, a.m.o.). The main ingredients of

Jacobson's 1999 theory are the following: 1) pronouns denote functions of type <e,e> which are simple identity maps λx.(x); 2) any function that wants a <e> argument can be shifted via **g** rule into a new function that wants a <e,e> argument; 3) after **g** is applied, the **g**-ed expression compositionally combines with other expressions 'passing' the information that it has a pronoun which wants to be bound; 4) when a constituent containing a pronoun meets the binder, a shift named **z** rule which merges two argument slots (that of the binder and that of the bindee) is applied. There are no variables and lambda-abstraction in Jacobson's system. Binding is viewed as a relation between two argument slots.

What Jacobson's original proposal lacks is the account for standard Principles A, B, and C. We propose an extension for Jacobson's system dealing with them. We build binding restrictions into pronoun lexical meanings: Standard pronoun meanings often pose restrictions of different kinds (male or female, singular or plural) on a referent of a pronoun, (5); we add to these relevant restrictions on binding too, (6).

(5) a. The standard view: $[[on]]_e$ = [x, if x is male; undefined otherwise].
b. Jacobson 1999: $[[on]]_{<e,e>}$ = λx. (x, if x is male; undefined otherwise).

(6) $[[on]]_{<e,e>}$ = λx.[x, if x is male and x ∉ **MinClauseSubject**; undefined otherwise]

Under this view, binding domains (i.e., **MinClause** in (6)) are no longer structural domains but sets of DRT-style discourse referents introduced in corresponding structural domains (and thus they are dynamically updated). Though this differs from the conventional wisdom very much, there is a nice pay-off for this change of the perspective: The standard BT must have something like Reinhart's Rule I to rule out coreference construals in cases where binding is not possible (i.e., to forbid "Max hit him" to be interpreted as *(Max hit x) & (x=Max)*). Under the coreference construal, a pronoun and its binder denote the same referent, but are not related to each other via syntactic binding. Oversimplifying, Rule I checks all possible construals of a sentence and if it finds a bad one among them, it rules out all of them. Thus, Rule I is essentially transderivational. Our restrictions on referents use identity of discourse referents instead of binding relations, so it does not matter whether we have bound or coreferent pronouns, and the need for transderivational computation is eliminated.

We propose *sam* has the same type <e,e> as pronouns have, and the similar meaning, (7). The derivation of [pronoun + *sam*] proceeds compositionally, as schematically shown in (8). (The rest of the derivation is handled by the original Jacobcon 1999 system.) The properties of the whole complex are analogous to one-word pronoun properties: a welcome result.

(7) $[[sam]]_{<e,e>}$ = λx.[x, if x ∈ **MinClause**; undefined otherwise]

(8) g(*sam*) = λf.[λx.[*sam*(f(x))]].
(g(*sam*))(*on*) = λf.[λx.[*sam*(f(x))]](*on*) = λx.[*sam*(*on*(x))] =
= λx.[x, if x is male and x ∉ **MinClauseSubject** and x ∈ **MinClause**; undefined otherwise].

Conclusion. The proposed variable-free BT: 1) inherits all advantages of Jacobson's system with respect to many natural language phenomena; 2) expands Jacobson's original system to account for the data traditionally dealt with by Principles A and B; 3) does not require any trans-derivational computation, unlike the standard BT with Rule I; 4) naturally accounts for the challenging Russian two-word pronoun-like complexes.

Chomsky, N. (1981). *Lectures on Binding and Government*, Foris, Dordrecht.

Breheny, R. (2003). "A Lexical Account of Implicit Bound Contextual Dependence", in *Proceedings of SALT 13*.

Jacobson, P. (1994). "i-within-i effects in a Variable-Free Semantics and a Categorial Syntax", in P. Dekker et al. (eds.), *Proceedings of the 9th Amsterdam Colloquium*. Amsterdam: ILLC, University of Amsterdam.

Jacobson, P. (1996). "The Locality of Interpretation: The Case of Binding and Coordination", *Proceedings of the 6th Converence on Semantics and Linguistic Theory*. Cornell: Cornell Working Papers.

Jacobson, P. (1999) "Towards a Variable-Free Semantics", *Linguistics and Philosophy 22*, 117-184.

Reinhart, T. (1983). *Anaphora and Semantic Interpretation*, Croom Helm, London.

Rooryck, J. and G.V. Wyngaerd (1999) *Simplex and complex anaphors in French and Dutch*, in *In Traiani Augusti vestigia pressa sequamur. Studia lingvistica in honorem Lilianae Tasmowski.* Padova: Unipress, 617-638.