UCLA Working Papers in Linguistics, Theories of Everything
Volume 17, Article 46: 411-419, 2012

Quantifiers in object position and transitive verb ellipsis: anaphora *vs.* binding

Anna Szabolcsi

1 The type-mismatch problem

Expressions like *some man* and *every book* serve as subjects and objects of verbs like *read*, much like *Mary* and *The New York Times* do, but they do not denote individuals. How is that possible? One might imagine that verbs directly take generalized quantifiers as arguments. and the resulting sentences are reduced to talking about individuals via meaning postulates, in the spirit of Montague (1974), minus intensionality. This is not the standard solution adopted in the semantics literature. Instead, verbs like *read* are given individual-denoting arguments, variables where necessary, and quantificational expressions are linked to those variables by rules such as Quantifying-In, Quantifier Raising (QR), Argument Raising, or equivalent type-logical moves. Heim & Kratzer (1998) present the QR of non-subject quantifiers to the closest available node of type *t* as being forced by type-mismatch. That endows the local QR of non-subject quantifiers with a privileged status in theories that adopt some form of Fox's (1998) Scope Economy: whatever additional syntactic or semantic benefits such QR has can be freely enjoyed.

Keenan (1987, 1989) proposed a different way to combine quantifiers and verbs. The idea was that quantifier phrases are arity-reducers. They apply to an n-place function and return an (n-1)-place function, and they do so in all their grammatical occurrences, not only when they apply to a one-place function and return a sentence. Keenan called the approach Semantic Case Theory, because the pertinent versions of quantifiers can be seen as nominative, accusative, etc. extensions of their basic generalized quantifier denotations. For example, one of the types of the phrase *every book* enables it to apply to a transitive verb and return an intransitive verb phrase. With a simple example:

(1) *every*, accusative: $\lambda P \lambda R \lambda z \forall y[P(y) \rightarrow R(y)(z)]$
every book: $\lambda R \lambda z \forall y[\mathbf{book}(y) \rightarrow R(y)(z)]$
read every book: $\lambda z \forall y[\mathbf{book}(y) \rightarrow \mathbf{read}(y)(z)]$
Some man read every book: $\lambda P \exists x[\mathbf{man}(x) \wedge P(x)](\lambda z \forall y[\mathbf{book}(y) \rightarrow \mathbf{read}(y)(z)])$
$= \exists x[\mathbf{man}(x) \wedge \forall y[\mathbf{book}(y) \rightarrow \mathbf{read}(y)(x)]]$

Keenan (2005) came back to this idea, stated it in a more general form, and made the point that the solution eliminates the type-mismatch problem. That observation raises an interesting question. What can we say about the cases where QR to the closest available node of type *t* (the vP node) has been claimed to have beneficial effects, in contrast to QR to a higher node, or no QR in the presence of an individual expression? Assuming that *ex nihilo nihil fit*, there are two logical possibilities. One is that the beneficial effects are illusory. The other is that the effects are real, but QR is not their true source, or at least not their sole source.

2 A processing argument in favor of QR

Hackl, Koster-Hale, & Varvoutis (2012) present a new and interesting argument to bolster the case for QR, and contrast it with the predictions of Keenan's proposal, which they dub the type-shifting theory. The argument comes from experimental evidence obtained from the processing of sentences with so-called Antecedent Contained Deletion (ACD), such as (2) and (3). The name reflects the view that such sentences involve an elided verb phrase that is anteceded by the matrix verb phrase that it is contained in.

(2) John talked to {every / the} student that Mary did.
(3) John was willing to talk to {every / the} student that Mary was.

Hackl and colleagues adopt a particular account of ACD that is well-established in the literature and makes the following central assumptions:

(4) Assumptions of the type-mismatch/infinite regress theory
  (i) ACD runs into infinite regress, unless *{every/the} student that Mary did/was* is removed from its antecedent verb phrase by QR;
  (ii) Quantifier phrases such as *every student*, but not definite descriptions, such as *the student*, give rise to a type-mismatch when they occur in non-subject position;
  (iii) Type-mismatch is resolved by Quantifier Raising (QR);
  (iv) Economy (Shortest move) requires QR to adjoin the quantifier phrase to the closest suitable landing site, here, the vP of the same clause.

Hackl and colleagues observe that these assumptions have the following consequences:

(5) Consequences of (4)
  (a) When a sentence is of the form (2) and the direct object with ACD is a quantifier phrase, then this direct object will automatically undergo QR in view of (ii)-(iv). This pre-empts infinite regress in view of (i), and so ACD imposes no new requirement on the derivation;
  (b) When the direct object is not a quantifier phrase, nothing forces QR, and so only ACD mandates it;
  (c) If the material that ACD needs to pick up spans two clauses, as in (3), then quantificational and non-quantificational direct objects are on equal footing. This is because ACD-related QR needs to adjoin the direct object to a higher vP than the instance of QR mandated by a type-mismatch does, cf. (i).

Hackl and colleagues point out processing predictions made by (5a-c). In view of (5a), the occurrence of *every* in (2) should facilitate the processing of downstream ACD in *Mary did*. In view of (5b), the occurrence of *the* in (2) should not facilitate the processing of downstream ACD in *Mary did*. In view of (5c), neither *every*, nor *the* in (3) should facilitate the processing of downstream ACD in *Mary was* (the bi-clausal example). They report that self-paced reading time experiments bear out the predictions, thus allowing them to draw a **positive conclusion** in connection with the theoretical assumptions in (4i-iv), with specific reference to QR as the main player.

Hackl and colleagues also consider another account of quantification and ACD, which they dub the Type Shifting + Functional Composition (TSh/FC) account, based on theories in Keenan (2005) and Jacobson (1992). Jacobson (1992) proposes that "Antecedent Contained Deletion" is a misnomer. Examples like (2) and (3) do not have a missing verb

phrase; they only have a missing transitive verb: the lexical verb *read* in (2), and a result of functional composition, *willing to read*, in (3). *Did* and *was* for their part function-compose with subject *Mary*; the result still has a direct object argument slot unfilled and will be bound by the relative pronoun. The relative pronoun is null in (2) and (3) and, for reasons that are not well-understood, ACD examples are a bit better with the complementizer *that* than with an overt relative pronoun such as *who* (compare *John talked to every student who Mary did* and *John was willing to talk to every student who Mary was*). In either case the claim is that the clause does contain the direct object. Hackl and colleagues call this the Functional Composition account.

Keenan's theory handles quantified direct objects without a type-mismatch, and Jacobson's theory handles ACD without the threat of infinite regress. This should be reason to celebrate. But, as Hackl and colleagues point out, a combination of these two theories lacks the critical ingredients that lead to the consequences in (5a-c). They draw the **negative conclusion** that TSh/FC theories cannot predict the processing effects they observed, and so the experimental results speak against TSh/FC.

3 Have all things been considered? How is ACD resolved?

I am happy to accept that the type-mismatch/infinite regress theory, involving QR and Economy, makes predictions that are fully consistent with Hackl and colleagues' experimental findings. I also agree that the exact shape of the TSh/FC theory that Hackl and colleagues consider fails to make those predictions. But this particular theory is not the only way to implement a combination of Keenan's and Jacobson's critical assumptions. I will point out that a modification of Hackl and colleagues' version of the TSh/FC theory has the potential to make very similar predictions as their own type mismatch/infinite regress theory. If so, then the processing effects are probably not specific for the theoretical devices that Hackl and colleagues take the experimental results to support.[1]

Before going into concrete details, let me give the gist of my argument. Observe that the way Hackl and colleagues derive their predictions makes no reference to how ACD is resolved. This should give us pause. Whether or not ACD faces the threat of infinite regress, the name of the game is to ensure that the elided material gets linked to the desired antecedent. To assume that the way in which ACD is resolved might be significant does not require a big stretch of imagination. Now, theories like Keenan's and Jacobson's fall within the rubric of "variable-free" or "combinatory" grammar. That kind of grammar may indeed involve type shifting and functional composition, but its main distinctive feature is how it deals with constructions that other theories interpret using variable-binding of some sort. Let us not ignore this distinctive feature. Below I review a particular way of resolving anaphora, ACD included, within variable-free, or combinatory, grammar, and show how it leads to similar conclusions as the theory that Hackl and colleagues support. I am relying on published literature, and so the summary below will be brief. I will not attempt to motivate and lay out the details.

Jacobson's theory of verbal ellipsis has two pertinent components. One is the above-mentioned view that ACD is transitive verb ellipsis. The other is the view that the pro-verb *do*, whether it stands for a full verb phrase or just a transitive verb, is much like a free pronoun: it picks up a salient antecedent (here: a salient function) from discourse.

[1] I am not aware of experimental work that correlates categorial grammar derivations with behavioral measures, so the prediction is hypothetical. Also, I am not addressing any aspect of the processing assumptions that Hackl and colleagues make.

Pro-verbs are special in that they typically demand a linguistic antecedent; pure deixis is not enough. But that antecedent may come from another sentence, as in (6):

(6) Bagels I like. Donuts I don't.

Jacobson's position can be summarized by saying that pro-verbs are anaphoric to, but are not bound by, their antecedents. This analysis has no special consequences for types.

The view that the resolution of verbal ellipsis is always a matter of anaphora is not tenable; Charlow (2008) shows that some cases, such as (12) below, require binding. We have two questions now. One, how would binding work here? Two, what processing predictions would we make if ACD were resolved by binding, and not by anaphora?

As regards prototypical cases of binding, Keenan (1987, 1989) subsumed the reflexive pronoun *himself* under his arity-reducer proposal. At the same Sixth Amsterdam Colloquium, Szabolcsi (1987, 1989) presented a consonant but more elaborate theory of reflexives and bound pronouns in combinatory categorial grammar. Both Keenan and Szabolcsi treated accusative *himself* as a function whose type is the same as that of accusative *every book*; it is just a different function of that same arity-reducing type. The parallel between accusative *every book* and accusative *himself* is not a mere fact about these theories: both Keenan and Szabolcsi present their proposals in those terms.

(7) *himself*, accusative: $\lambda R \lambda x[Rxx]$
saw himself: $\lambda R \lambda x[Rxx](\mathbf{saw}) = \lambda x[\mathbf{saw}(x)(x)]$
John saw himself: $\lambda P[P\mathbf{j}](\lambda x[\mathbf{saw}(x)(x)]) = \mathbf{saw}(\mathbf{j})(\mathbf{j})$

The important feature of (7) is that *himself* is not a free variable that needs to get bound and ends up ungrammatical if it fails to get bound. *Himself* grabs the verb it is an argument of, and ensures that the next argument of that verb will bind it. Its semantic type entails that if it can be integrated into a syntactic derivation at all, it will never fail to be bound. In particular, *himself* as defined in (7) is the duplicator combinator (**W**) of Curry and Feys (1958). **W** is the bare-bones duplicator. Curry and Feys point out the usefulness of other combinators that likewise duplicate but in more complex ways, such as **S**, **Φ**, and **Ψ**.[2] Szabolcsi (1992) extended the duplicator account of reflexives and bound pronouns to VP-ellipsis, for example as in (8)-(9).

(8) John left before Mary did [leave].
(9) Which man did you mention before Mary did [mention that man]?

Details of implementation aside, the relevant segments of (8) are interpreted as follows.

(10) *before Mary did*: $\lambda P \lambda x[\mathbf{before}(P\mathbf{m})(Px)]$
left before Mary did: $\lambda P \lambda x[\mathbf{before}(P\mathbf{m})(Px)](\mathbf{left}) =$
$= \lambda x[\mathbf{before}(\mathbf{left}(\mathbf{m}))(\mathbf{left}(x))]$
John left before Mary did: $\lambda x[\mathbf{before}(\mathbf{left}(\mathbf{m}))(\mathbf{left}(x))](\mathbf{j}) =$
$= \mathbf{before}(\mathbf{left}(\mathbf{m}))(\mathbf{left}(\mathbf{j}))$

[2] These combinators do not have speaking names in Curry and Feys (1958); only the compositor **B**, the permutator **C**, the duplicator **W**, the identificator **I**, and the cancellator **K** do, being intuitively and technically basic. The **S** combinator, which Steedman (1987) shows derives parasitic gap structures, is defined as **B(B(BW)C)(BB)**. Jacobson's **z** that enables sentence-internal pronoun binding is **B(BW)B**.

Before Mary did is a duplicator like *himself*: its *P* argument appears twice in the description of the function value. Schematically: *λPλx[...P... Px]*. Unlike *himself*, it duplicates a function, not an entity. Due to the presence of wh-extraction, the derivation of (9) involves further composition steps. We need not illustrate them here, but it is useful to be aware that such more complex examples fit in seamlessly; they were in fact of central concern in Szabolcsi (1992). The abstract in (9) that must be derived before question-magic comes in is as below:

(11) $\lambda x[\mathbf{before}(\mathbf{mentioned}(x)(\mathbf{m}))(\mathbf{mentioned}(x)(\mathbf{you}))]$

Charlow (2008) develops a theory of pro-verbs that relies on two different ways of resolving ellipsis. One is Jacobson's (anaphora) and the other is Szabolcsi's (binding). In particular, Charlow argues that binding is needed for (12), from Kratzer (1991):

(12) I only went to TANGLEWOOD after you did.
`Tanglewood is the only place such that I went there after you went there'

It will be clear, even without technical details, that (12) is analogous to (9), with focus in the place of the question-word, cf.

(13) $\lambda x[\mathbf{after}(\mathbf{went\text{-}to}(x)(\mathbf{you}))(\mathbf{went\text{-}to}(x)(\mathbf{i}))]$

Charlow (2008) offers an empirically detailed and formally explicit theory of ellipsis that comprises both anaphoric and bound readings, and both verb phrase ellipsis and transitive verb ellipsis.

Charlow implements binding with Jacobson's **z** combinator. In the derivation of the transitive verb ellipsis example *read every book that Rori does* he applies **z** to *every*.[3] It is a design feature of **z** that it applies to the function one of whose arguments contains the element to be bound and thus, in linear terms, it "anticipates" the bound element. But there is no inherent need for the combinator that produces the bound ellipsis reading to apply as high as *every*. From our perspective it is relevant that the bound reading can be ensured in the derivation of the relative clause that contains the ellipsis site. To this end one may employ, instead of **z**, the duplicator **W** aided by a few applications of the compositor **B**, in the spirit of Szabolcsi (1992: 259-265); the gory details can be skipped. The result is equivalent to Charlow's. Below I use the linguistic example from Hackl et al. (2012).

(14) *every*, accusative: $\lambda P\lambda R\lambda z\forall y[P(y) \rightarrow R(y)(z)]$
that Mary did, bound ellipsis: $\lambda N\lambda D\lambda R'\lambda v[D(\lambda x[N(x) \wedge R'(x)(\mathbf{m})])(R')(v)]$
student that Mary did: $\lambda D\lambda R'\lambda v[D(\lambda x[\mathbf{student}(x) \wedge R'(x)(\mathbf{m})])(R')(v)]$
every student that Mary did:
$\lambda R'\lambda v\forall y[(\mathbf{student}(y) \wedge R'(y)(\mathbf{m})) \rightarrow R'(y)(v)]$
talk to every student that Mary did:
$\lambda v\forall y[(\mathbf{student}(y) \wedge \mathbf{talk\text{-}to}(y)(\mathbf{m})) \rightarrow \mathbf{talk\text{-}to}(y)(v)]$

[3] Charlow (2008: 205) uses the exact same version of *every* as (14). My derivation only differs from his in where and by what combinators binding is established. Charlow's **z**(*every*)(*book that Rori does*) yields $\lambda R\lambda y[\mathbf{every}(\lambda z[\mathbf{book}(z) \wedge R(z)(\mathbf{r})])(\lambda x[Rxy])]$. Applied to *read*, this produces the predicate meaning $\lambda y[\mathbf{every}(\lambda z[\mathbf{book}(z) \wedge \mathbf{read}(z)(\mathbf{r})])(\lambda x[\mathbf{read}(x)(y)])]$.

What if the example had *the*? Because of ACD (bound ellipsis), *the student that Mary did* would have a parallel interpretation to that of *every student that Mary did* in (14), which then would have to be built using a version of *the* that parallels *every* in (14):

(15) *the*, accusative: $\lambda P \lambda R \lambda z[R(\iota y[Py])(z)]$
that Mary did, bound ellipsis: $\lambda N \lambda D \lambda R' \lambda v[D(\lambda x[N(x) \wedge R'(x)(\mathbf{m})])(R')(v)]$
student that Mary did: $\lambda D \lambda R' \lambda v[D(\lambda x[\mathbf{student}(x) \wedge R'(x)(\mathbf{m})])(R')(v)]$
the student that Mary did: $\lambda R' \lambda v[R'(\iota y[\mathbf{student}(y) \wedge R'(y)(\mathbf{m})])(v)]$
talk to the student that Mary did:
$\lambda v[\mathbf{talk\text{-}to}(\iota y[\underline{\mathbf{student}(y) \wedge \mathbf{talk\text{-}to}(y)(\mathbf{m})}])(v)]$

But there is one crucial difference. The version of *every* in (14) is identical to Keenan's accusative *every*, see (1). This is the version of *every* that enables the quantifier *every book* to serve as the direct object of a transitive verb without QR or any of its relatives. Does the version of *the* used, and needed, in (15) have the same status? What is the type of a direct object definite description, e.g. *the book*, without ACD? The definite description is capable of having the same type as quantifiers, afforded by the logic and empirically supported by the fact that it can coordinate with quantifiers, see (16), and coordination requires like categories. But it does not have to be of the same type as quantifiers as per logical necessity, precisely because it can denote an individual, and probably is not always of the same type, in view of non-c-command anaphora facts, see (17).

(16) the book and every magazine
(17) I bought <u>the book</u>, and Mary stole <u>it</u> from me.
*I bought <u>every book</u>, and Mary stole <u>it</u> from me.

The default interpretation of *the book* is $\iota y[\mathbf{book}(y)]$, of type e. This is precisely the reason why, in terms of Heim & Kratzer, it does not produce a type-mismatch in non-subject position and does not have to undergo QR.

The generalization is this:

(18) On the Jacobson—Szabolcsi—Charlow theory of ACD, a direct object *DET student that Mary did* on the bound ellipsis reading has the format $\lambda R \lambda y[\ldots R \ldots \lambda x[Rxy]]$, i.e. it is of type <<e,<e,t>>,<e,t>>.
If *DET* is *every*, it uses its usual VP-internal type, as per Keenan.
If *DET* is individual-forming *the*, its usual type and its ACD-supporting type diverge.

4 Bound vs. anaphoric transitive verb ellipsis, and processing predictions

We may now return to (2),

(2) John talked to {every / the} student that Mary did.

What we saw in section 3 is that, as long as ellipsis is resolved by binding, not just anaphora to a contextually salient function as in Jacobson (1992), our theory reproduces the same contrasts for (2) as the theory espoused by Hackl and colleagues does. With *every*, (2) uses the usual interpretation of the determiner, and the job of creating a bound reading for transitive verb ellipsis is performed close to the ellipsis site. With *the*, the

usual individual-forming interpretation will not work and the processor is in for a surprise when it encounters the ellipsis site. It has to reprocess the preceding material using the arity-reducer version of *the*. This predicts the same effect that Hackl and colleagues observed: a significant slow-down at the ACD site in the case of *the*, but not in the case of *every*. This prediction is made straightforwardly, without a type-mismatch, without the threat of infinite regress, without the operation QR, and without the assumptions of Scope Economy. The essential component of the prediction is the manner in which ACD is resolved, namely, the assumption that here, *that Mary did* has the same duplicator kind of semantics as reflexives.

Rather than moving on directly to (3), let us examine the bound vs. anaphoric readings of transitive verb ellipsis in more detail. Previous literature has investigated bagels/ donuts-style anaphoric readings; but it is also possible for the elided transitive verb to pick up its antecedent from the linguistic context in examples that are string-identical to the classical ACD ones. Consider the following text, as spoken by a single speaker.

(19) Helmut admired Greta, and John admired Mary.
Helmut saw every film that Greta recommended.
John read every book that Mary did [recommend].

Here the resolution of *did* to *recommended* can only be Jacobsonian, via anaphora to a salient antecedent and not via binding. Therefore, it has no type consequences. What happens if the determiner is *the*, not *every*?

(20) Helmut followed Greta's lead, and John followed Mary's.
Helmut saw the film that Greta recommended.
John read the book that Mary did [recommend].

Not having performed any experiments, I cannot say if there is a measurable processing difference between these non-binding contexts of transitive verb ellipsis resolution and the binding ("ACD") versions that Hackl and colleagues studied. We know however that speakers impressionistically prefer *every* to *the* in ACD examples like (2). More precisely, many speakers of English report that, unless the ACD sentence with the definite contains *the same* in the place of plain *the*, it is degraded as compared to the ACD sentence with *every*.[4] But several speakers I have consulted also report that in the anaphoric ellipsis examples (19) and (20), they are equally happy with *every* and with plain *the*.

These judgments do not distinguish my proposal from that of Hackl and colleagues; on their account, (19)-(20) involve VP-ellipsis but no antecedent containment. But they indicate that my proposal potentially makes further correct, and convergent, predictions.

One might even elicit two different ways of resolving ellipsis to *read* in *John read {every / the } book that Mary did*, by presenting it out of the blue, as in (21), versus presenting it in an extended linguistic context, as in (22).

(21) **Out of the blue**: John read {every / the} book that Mary did [read].

(22) The editor wanted to double-check Greta's and Mary's judgments about books. Following his instructions,
Helmut read {every / the} book that Greta read, and
John read {every / the} book that Mary did [read].

[4] The addition of *same* would make a difference for interpretation and type, as compared with plain *the*; see Barker (2007).

If, as Jacobson (1992) assumes, verbal ellipsis is invariably resolved by picking up a salient function from context, then there should be no acceptability or processing difference between these presentations. My assumption is that purely sentence-internal ellipsis resolution in (21) involves binding, as outlined in section 3, but ellipsis resolution in (22) involves anaphora. If so, then *the* is predicted to be degraded or more difficult in (21) than it is in (22). If indeed significant differences are found in acceptability and/or in processing time along these lines, that would support the assumption that these two ways of resolving ellipsis in *John read DET book that Mary did* must be distinguished. It would also confirm the significance of binding in the behavioral results.

Hackl and colleagues conducted a second experiment that pertains to bi-clausal ACD, cf. example (3) and the relevant consequence (5c). Their observation is that in (3), *every* vs. *the* does not make a difference. Both incur a slow-down at the ACD site:

(3) John was willing to talk to {every / the} student that Mary was.

What does the variable-free theory have to say here? Fairly theory-neutral reasoning will suffice. Consider *John was willing to talk to every student that Mary* ... . Up to this point the sentence is ambiguous: the next word could be *invited*, and then *every student that Mary invited* could scope either in the complement or in the matrix. In fact, native speakers report a preference for the complement scope. As soon as *was* comes up, this reading has to be abandoned, and the sentence has to be re-computed with *every student that Mary was* scoping into the matrix, i.e. taking *willing to talk to* as its argument. This is much the same thing that happens if the sentence contains *the student that Mary was.* So an increased processing cost at the ACD site is predicted, irrespective of the determiner.

To be more precise, in the combinatory grammar it is not the direct object whose interpretation and type is affected in (3). The difference concerns whether *willing to talk to* is composed into one big function, as is needed when ACD has to be resolved to this function, or *willing* simply braces to apply to the control complement *to talk to* ... as its argument. Functional composition by itself is not dispreferred or costly, but the unexpected necessity to compose probably is.

Again, a very similar prediction is made as by the theory Hackl and colleagues support, without reference to Economy as a regulator of QR. Probably, many other theories will make the same prediction, irrespective of how they fare in connection with the *every* vs. *the* contrast in the first experiment.

To summarize, I have argued that the theory that Hackl and colleagues constructed and dismissed, based on Keenan's approach to quantification and Jacobson's construal of ACD as transitive verb ellipsis, can make very similar predictions as their own, if we add the assumption that the purely sentence-internal resolution of transitive verb ellipsis proceeds via binding.[5]

References

Barker, Chris 2007, `Parasitic scope'. *Linguistics and Philosophy* 30: 407-444.

Charlow, Simon 2008, `Free and bound pro-verbs: a unified treatment of anaphora'. In Tova Friedman and Satoshi Ito (eds.), *Proceedings of SALT 18*, pp. 194-211. Available at http://elanguage.net/journals/salt/issue/view/281 .

[5] I thank the semanticists in my department, especially Jeremy Kuhn, for discussion.

Curry, Haskell B. and Richard Feys 1958, *Combinatory Logic I*. Amsterdam: North-Holland.

Fox, Danny 1999, *Economy and Semantic Interpretation*. Cambridge: The MIT Press.

Hackl, Martin, Jorie Koster-Hale, and Jason Varvoutis 2012, `Quantification and ACD: evidence from real-time sentence processing'. *Journal of Semantics* 29: 145-207.

Heim, Irene and Angelika Kratzer 1998. *Semantics in Generative Grammar*. Oxford: Blackwell.

Jacobson, Pauline 1992, `Antecedent contained deletion in a variable-free semantics'. In Chris Barker and David Dowty (eds.), *Proceedings of SALT 2*. pp. 193-213. OSU.

Keenan, Edward L. 1987/1989, `Semantic case theory'. In *Proceedings of the Sixth Amsterdam Colloquium*. Reprinted in R. Bartsch, J. van Benthem and P. van Emde Boas (eds.), *Semantics and Contextual Expression*, pp. 33-57. Dordrecht: Foris.

Keenan, Edward L. 2005, `In situ interpretation without type mismatches'. Ms., UCLA. Available at http://www.linguistics.ucla.edu/people/keenan/papers/in%20situ%20interpretation%20without%20type%20mismatches.pdf .

Kratzer, Angelika 1991, `The representation of focus'. In A. von Stechow and D. Wunderlich (eds.), *Semantics: An International Handbook of Contemporary Research*, pp. 825-832. Berlin: de Gruyter.

Montague, Richard 1974, The proper treatment of quantification in ordinary English. In R. Thomason (ed.), *Formal Philosophy*, pp. 247-271. Yale UP.

Steedman, Mark 1987, `Combinatory grammars and parasitic gaps'. *Natural Language and Linguistic Theory* 5: 403-439.

Szabolcsi, Anna 1987/1989, `Bound variables in syntax: are there any?' In *Proceedings of the Sixth Amsterdam Colloquium*. Available at http://semanticsarchive.net/Archive/GQyODUwZ/ . Reprinted in R. Bartsch, J. van Benthem and P. van Emde Boas (eds.), *Semantics and Contextual Expression*, pp. 295-318. Dordrecht: Foris.

Szabolcsi, Anna 1992, `Combinatory grammar and projection from the lexicon'. In I. A. Sag and A. Szabolcsi (eds.), *Lexical Matters*, pp. 241-269. Stanford: CSLI Publications.

Affiliation

Anna Szabolcsi
Department of Linguistics
New York University
as109@nyu.edu