SCOPE DISAMBIGUATION BY ELLIPSIS AND FOCUS WITHOUT SCOPE ECONOMY

MATS ROOTH

Linguistics and CIS
Cornell University
`rooth@cornell.edu`

This paper reconstructs the analysis in Danny Fox's *Economy and Semantic Interpretation* of ellipsis/focus scope disambiguation effects in a way which eliminates reference to scope economy, instead relying only on focus theory to constrain representations.

1. Introduction

In isolation, sentence (1) has a surface scope reading in which the existentially quantified subject [a boy] has scope over the quantified object [every teacher], and an inverted scope reading in which the quantified object has widest scope. Sag 1975 pointed out that verb phrase ellipsis disambiguates such sentences in the direction of surface scope. In (2), where there is verb phrase ellipsis in the second sentence, the first sentence has only surface scope.

(1)	A boy admires every teacher.	$(\exists > \forall)(\forall > \exists)$
(2)	A boy admires every teacher. Mary$_F$ does too.	$(\exists > \forall)$
(3)	A boy admires every teacher. Mary$_F$ admires every teacher too.	$(\exists > \forall)$

The same is observed in (3) where there is a focus on the subject *Mary*, with prosodic reduction of the verb phrase *admires every teacher*, but without ellipsis. The effect seems stronger with ellipsis, though.

Quantifier lowering constructions are a second context. In isolation, the existential quantifier contributed by *a Latvian* in the first sentence of (4) can have maximal scope, or scope under *certain*. The latter is the only reading of (5). Ellipsis and focus in the second sentence of (4) disambiguate the first sentence in the direction of surface scope. The same is seen with the stripping ellipsis in (6), though curiously, only if it is taken for granted that Paul is not a Latvian.

(4)	A Latvian is certain to be at the conference. Paul$_F$ is, too.	$(\exists > certain)$
(5)	There is certain to be a Latvian at the conference.	$(certain > \exists)$
(6)	A Latvian is certain to be at the conference, but not Paul.	

Hirschbühler 1982 pointed out examples where ellipsis fails to disambiguate scope. (7) has a reading where *every building* takes scope in the first conjunct

over the subject *a Canadian flag*, and in the second conjunct the universal quantifier (which is part of the elided VP) takes scope over *an American flag*. The data in (8) from Fox 1999 are similar. Unlike (2), (8) has a reading where *a boy* has minimal scope.

(7)   A Canadian flag is in front of every building, and an American flag is too.
(8)   A boy admires every teacher. A girl does too.

A further datum was pointed out in Fox 1995. In (9a), the subject in the antecedent sentence is non-quantified, while the subject in the ellipsis sentence is quantified, reversing the situation in (2). In this case, scope remains ambiguous in the ellipsis sentence: the ellipsis sentence can have the reading (9b). The same behavior is seen in quantifier-lowering versions (10).

(9)   a. Mary admires every teacher. A boy does, too.
      b. Every teacher has the property of being admired by a boy.
(10) a. Paul is certain to be at the conference, and a Latvian is, too.
      b. Paul is certain to be at the conference, as is a Latvian.
      c. Paul is certain to be at the conference, but not a Latvian.

2.   Assumptions

Fox suggested that constraints coming from intonational focus are responsible for the paradigm. Following Tancredi 1992 and Rooth 1992a, the grammatical representation for the ellipsis sentence includes a focus feature with scope over the ellipsis, with the antecedent for the focus being some clause containing the antecedent for the ellipsis. The motivation for this is independent, having to do with non-local cases of covariant/sloppy readings for pronouns (11).

(11) $John_F$ asked Mary to help him, and $Bill_F$ asked Sue_F too.
         Covariant: Bill asked Sue to help Bill.

In addition to contraints coming from focus, Fox appeals to a scope economy principle, according to which quantifier raising or lowering is blocked in cases where the operation has no semantic effects, as is true for instance for proper names. The project for the present paper is to show that, if one develops the consequences of focus semantics more thoroughly than Fox does, reliance on scope economy can be dropped.

I'll assume the notation of Rooth 1992b, which represents antecedents for focus with indexing:

(12) $[Franklin \ wrote \ it_s]_1$ No, $[Jefferson_F \ wrote \ it_s] {\sim} 1$

The operator ~ 1 marks the scope of the focus, and an antecedent. Semantically, this enforces a constraint among the proposition denoted by $[Jefferson_F \ wrote \ it_s]$, the

focus alternative set for that constituent (which relative to an assignment g is a set of propositions of the form 'y wrote $g(5)$') and the proposition denoted by [Franklin wrote it$_5$]. Different formulations of this constraint have been given (Rooth 1992b, Rooth 1996, Schwarzschild 1999). Here I will assume Schwartzschild's version, which is that the antecedent entails the union of the focus alternative set.[1] Assuming that Franklin is one of the alternatives to Jefferson, this focus constraint is satisfied in (12).[2] According to the hypothesis of focus licensing of ellipsis, the compositional representation in an ellipsis version is the same, with a focus feature having scope over the ellipsis site, and the antecedent for focus having scope over the ellipsis antecedent.

Finally, we require mechanisms for ellipsis and quantifier scope which in interaction do not constrain scope too much. For instance, we do not want the ellipsis mechanism to enforce identity of first-order properties, because this would always produce maximal scope for the subject of the ellipsis property. Fox proceeds structurally, with tree transformations of quantifier raising and lowering feeding semantic interpretation and the grammar of focus. It is not completely clear to me, though, how the tree transformations interact with the grammar of ellipsis and focus. As a clean baseline theory, I will assume that VPs such as *certain to be at the conference* denote higher-order properties such as (13a). If the higher order property combines directly with a generalized quantifier (13b), narrow scope for the quantifier results. To obtain wide scope for the quantifier, the predicate is first modified with the operator (13c), which turns the higher-order property into a first-order one. The advantage of this setup is that (13c) can be assumed to be optionally present outside the VP in the antecedent and ellipsis clauses, producing any of four combinations of scopes while using a single compositional semantics for the VP.

(13) a. $\lambda \mathcal{P} \mathbf{certain}(\mathcal{P}(\mathbf{atconference}))$
  b. $\lambda Q \exists y\, [\mathbf{Latvian}(y) \wedge Q(y)]$
  c. $\mathrm{Op} = \lambda \Phi \lambda x \Phi(\lambda P P(x))$

Examples like (2) will be treated similarly, using a VP denoting a higher-order property.

3.   Analysis in Focus theory

(14a,b) gives two representations for the antecedent sentence in (4) on these assumptions, and (14c) is the representation of the ellipsis sentence. In the latter, Op is required to lower the higher-order property to a first-order property which can combine with the type e subject [Paul$_\mathrm{F}$].

---

[1] The reason is that I need to license the representation (14b,c).

[2] Schwarzschild does not use an indexing notation, instead stating a constraint that some antecedent must be present. He proposes that all non F-marked nodes have antecedents, so that in (12), *it$_5$*, *wrote*, and *wrote it$_5$* have antecedents.

(14) a. [[a Latvian] is [certain to be at the coference]]$_1$ *certain* $> \exists$
    b. [[a Latvian] Op is [certain to be at the coference]]$_1$ $\exists >$ *certain*
    c. [Paul$_F$ Op [certain to be at the coference]]$\sim$1

As required by focus licensing of ellipsis, the first sentence (either (14a) or (14b)) is the antecedent for the focus in the ellipsis sentence. This is indicated by indexing using index 1. To check whether the representations satisfy the focus constraint, we compute the focus alternative set for the argument of $\sim$. Allowing all persons as substitutes for Paul, this is (15a). The union of this set is (15b), the proposition 'someone has the property of being certain to be at the conference'. Since this is entailed by 'some Latvian has the property of being certain to be at the conference but not 'it is certain that there will be some Latvian at the conference', the discourse (14b,c) but not the discourse (14a,c) is licensed by focus theory. So as desired, an application of focus theory predicts disambiguation in the direction of surface scope.

(15) a. $\{Op(\lambda \mathcal{P} \textbf{certain}(\mathcal{P}(\textbf{atconference})))(y)|\textbf{person}(y)\}$
    b. $\exists y\,[\textbf{person}(y) \wedge \textbf{certain}(\textbf{atconference}(y))]$

Fox's analysis proceeds as follows. Optional quantifier lowering generates a representation Ai with narrow scope for the subject in the antecedent, in addition to the surface scope representation As. Optional lowering of the subject in the ellipsis sentence produces a representation Ei, alongside the surface representation Es. This gives $2 \times 2 = 4$ combinations; a focus constraint and scope economy are checked in each of them, resulting in the table on the left in (16). Economy is satisfied in each of the surface representations, because there is no movement; it is satisfied in Ai, because quantifier lowering produces a different meaining; it is violated in Ei, because [$_{NP}$Paul] is scopeless, so lowering does not produce a new reading. Fox assumes that the effect of focus interpretation is to enforce isomorphic structural scope for the subject in the antecedent and the ellipsis clauses. This places stars in the lower left and upper right cells of the table, where structural scopes are non-isomorphic. Only the upper left cell has no violations. This is a cell with surface scope for the antecedent, so as desired the analysis predicts disambiguation in the direction of surface scope.

(16)

Fox		Es		Ei		Here		Es		Ei	
		A econ	ok	A econ	ok	As		focus	ok	focus	ok
	As	E econ	ok	E econ	*	Ai		focus	*	focus	*
		focus	ok	focus	*						
		A econ	ok	A econ	ok						
	Ai	E econ	ok	E econ	*						
		focus	*	focus	ok						

This part of Fox's analysis is isolated from research on focus interpretation, because it does not employ a semantics for focus. Focus semantics *can* result in isomorphic scope of quantifiers being imposed, but this is not the semantics of focus.

Morover, once the gap is corrected, scope economy proves to be redundant. The focus semantic value of both Es and Ei is (15b), so that if we apply focus semantics in Fox's syntactic representations, disambiguation works out exactly as in my representation (14). So, also on Fox's syntactic assumptions, scope economy can be dispensed with.

Let us turn to Fox's observation about the symmetric case, where the subject is non-quantified in the antecedent, but quantified in the ellipsis sentence. In (17), the intuition is that scope is ambiguous in the ellipsis sentence (17c). Fox suggested that, at least in the reading with narrow scope for the subject, the focused element is *Latvian*. This tends to be supported by the fact that the discourse context makes clear that Paul is a Finn. Further, the discourse as a whole seems to topicalize an opposition between a Finn being at the conference and a Latvian being there, or generalizing, to suggest a topic 'people of what nationalities will be at the conference?'.

(17) a. Will any Finns be there?
    b. Paul is certain to be at the conference.
    c. A Latvian$_F$ is, too.

(18b) is my canonical representation for the inverted scope reading of the ellipsis clause, and (18c) is my representation for the surface scope reading. (18a) is the antecedent sentence, which as before is treated as the antecedent for the focus. Concentrating on the inverted representation (18b), (19a) is the focus semantic value, where $A(Q, \textbf{Latvian})$ expresses 'Q is one of a set of contextually given alternatives to $\textbf{Latvian}$'. (19b) is the union of the focus semantic value or focus closure. On the assumption that $\textbf{Finn}$ is one of the alternatives to $\textbf{Latvian}$, the focus closure is entailed by the meaning of the antecedent (18a), together with the contextual assumption that Paul is a Finn (and still will be a Finn at the time of the conference). Therefore the focus constraint is satisfied in the discourse (18a,b).

(18) a. [Paul Op is [certain to be at the coference]]$_1$
    b. [[a Latvian$_F$] is [certain to be at the coference]]∼1   *certain* $> \exists$
    c. [[a Latvian$_F$] Op is [certain to be at the coference]]∼1 $\exists >$ *certain*
(19) a. $\{\textbf{certain}(\exists y\,[Q(y) \wedge \textbf{atconference}(y)]) | A(Q, \textbf{Latvian})\}$
    b. $\exists Q\,[A(Q, \textbf{Latvian}) \wedge \textbf{certain}(\exists y\,[Q(y) \wedge \textbf{atconference}(y)])]$

A similar derivation shows that the discourse (18a,c) also satisfies the focus constraint, because Paul being certain to be at the conference (together with the assumption that Paul is a Finn) entails there being a Finn who is certain to be at the conference, and this entails the focus closure of (18c), which is (20).

(20) $\exists Q\,[A(Q, \textbf{Latvian}) \wedge \exists y\,[Q(y) \wedge \textbf{certain}(\textbf{atconference}(y))]]]$

As before, the same focus alternative set and focus closure result if we assume a syntactic transformaton of quantifier lowering which feeds the determination of focus semantic values. So again, also on Fox's syntactic assumptions, focus filters

representations in the required way. An appeal to scope economy is redundant.

It is not difficult to see that a narrow-scope derivation for a case where both subjects are quantfied, such as the following version of (10a), works out similarly.

(21)   A Finn is certain to be at the conference, and a Latvian is, too.

The examples with a quantifier in the ellipsis VP, rather than a raising adverb, work out in a way parallel to the quantifier-lowering examples. In my canonical analysis, one assumes that the antecedent and ellipsis VPs denote higher-order properties, e.g. (22) in the case of (2). (23a,b) are representations of inverted and surface scope readings of the first sentence in (2). (23c) is the representation of the ellipsis sentence, including the focus interpretation operator, and (24) is the focus closure for this clause. Because 'some boy has the property of admiring every teacher', but not 'every teacher has the property of being admired by a boy' entails the focus closure, the discourse (23b,c) but not the discourse (23a,c) is licensed.

(22) $\lambda\mathcal{P}\forall y\,[\mathbf{teacher}(y) \rightarrow \mathcal{P}(\lambda x\mathbf{admire}(x,y))]$

(23) a. [[a boy] [admires every teacher]]$_1$ $(\forall > \exists)$

      b. [[a boy] Op [admires every teacher]]$_1$ $(\exists > \forall)$

      c. [Mary$_F$ Op [admires every teacher]]~ 1

(24)   Focus closure

    $\exists x\,[\forall y\,[\mathbf{teacher}(y) \rightarrow \mathbf{admire}(x,y)]]$

Bibliography

Fox, D.: 1995, Economy and scope, *Natural Language Semantics* 3(3), 283–341

Fox, D.: 1999, *Economy and Semantic Interpretation*, No. 35 in Linguistic Inquiry Monograph Series, MIT Press, Cambridge MA, Co-published with the MIT Working Papers in Linguistics

Hirschbühler, P.: 1982, VP deletion and across-the-board quantifier scope, in J. Pustejovsky and P. Sells (eds.), *Proceedings of the Twelfth Annual Meeting of the North Eastern Linguistic Society*, pp 132–139, U. Mass., Amherst, MA

Rooth, M.: 1992a, Ellipsis redundancy and reduction redundancy, in S. Berman and A. Hestvik (eds.), *Proceedings of the Stuttgart Ellipsis Workshop*, SFB 340, University of Stuttgart

Rooth, M.: 1992b, A theory of focus interpretation, *Natural Language Semantics* 1(1), 75–116

Rooth, M.: 1996, Focus, in S. Lappin (ed.), *Handbook of Contemporary Semantic Theory*, pp 271–297, Blackwell, Oxford

Sag, I.: 1975, *Deletion and Logical Form*, Ph.D. thesis, MIT

Schwarzschild, R.: 1999, Givenness, avoid f and other constraints on the placement of focus, *Natural Language Semantics* 7(2), 141–177

Tancredi, C.: 1992, *Deletion, Deaccenting and Presupposition*, Ph.D. thesis, MIT