

Focus, Ellipsis and the Semantics of Alternative Questions*

Maribel Romero

and

Chung-hye Han

University of Pennsylvania

Dept. of Linguistics

610 Williams Hall

Philadelphia, PA 19104 USA

romero@ling.upenn.edu

Simon Fraser University

Dept. of Linguistics

8888 University Dr.

Burnaby, BC V5A 1S6 Canada

chunghye@sfu.ca

* We would like to thank the audiences at the University of Tübingen and at CSSParis 2001 for their comments. We thank John Bell, Maciej Baranowski and, especially, Cassandre Creswell for their logistic assistance with the phonetic data. Han was partially supported by SFU President's Research Grant when this paper was written.

ABSTRACT. This paper argues that alternatives (alt-)questions involve ellipsis and provides a compositional semantics for the proposed structures. Two arguments for ellipsis are presented. First, alt-readings need a particular focus intonation pattern on the disjuncts, comparable to that in other elliptical constructions. Second, alt-readings are lost when we have inverted negation or an extra focus on the polarity; we derive this effect from the interaction of the licensing conditions of focus and ellipsis.

1 Introduction

In English, a non-*wh*-question like (1) has two possible readings: a *yes-no* (*yn*)-question reading, paraphrased as in (1a), and an alternative (alt-)question reading, disambiguated in (1b).

- (1) Did John drink coffee or tea?
- a. "Is it the case that John drank any of these two things, coffee or tea?"
 - b. "Which of these two things did John drink: coffee or tea?"

According to Larson (1985), both *yn*- and alt-questions have an (empty) question operator *Op*, which originates in a disjunction phrase and moves to [Spec,CP], marking the scope of that disjunction. Moreover, a *yn*-question may have an unpronounced disjunction phrase *or not*. If the empty operator originates from the *or not* phrase, the *yn*-reading is derived. If the empty operator originates from another kind of disjunction phrase (e.g., *coffee or tea*, *buy or sell*, etc.), then alt-reading is derived.

- (2) Did John drink coffee or tea?
- a. *yn*-question:
 $Op_i (e_i \text{ or not}) [\text{did John drink } Op_j [e_j \text{ coffee or tea}]]$
{John drank coffee or tea, John didn't drink coffee or tea}
 - b. alt-question:
 $Op_i [\text{did John drink } [e_i \text{ coffee or tea}]]$
{John drank coffee, John drank tea}

In this paper, we argue for a different LF syntactic analysis for alt-questions and we provide the corresponding compositional semantics for it. The main claim of the paper is that, besides Larson's operator movement, alt-questions involve ellipsis, and

consequently, Focus.¹ We propose the following LF syntactic representation for the alt-reading of (3) instead of Larson's (2b):²

- (3) Did John drink coffee or tea? (alt-question)
 a. $\text{Wh}_i \text{ Q } [t_i \text{ } [_{\text{IP1}} \text{ John drank coffee}] \text{ or } [_{\text{IP2}} \text{ John drank tea}]]$

We will present two pieces of evidence for the new approach: (i) alt-questions require a particular intonational pattern in the disjuncts, and (ii) alt-readings are unavailable in non-*wh*-questions with inverted negation. We will argue that these two facts follow from the licensing conditions of Focus in ellipsis. After introducing in section 2 the theory of Focus assumed here, we present our analysis of the intonational pattern in section 3 and the lack of alt-reading with inverted negation in section 4. We then conclude with a presentation of a compositional semantics for the proposed LF syntax for alt-questions in section 5. Section 6 summarizes the conclusions.

2 Background on Focus

According to Rooth (1985, 1992), besides its ordinary semantic value ($[[\cdot]]$), a sentence containing focused material has a Focus semantic value, also called Focus set of alternatives ($[[\cdot]]^F$). The Focus semantic value of a sentence is the set of alternative propositions construed by replacing the denotation of the focused expression with an object of the same semantic type. For example, the ordinary semantic value of (4) is the proposition in (5), whereas its Focus semantic value is a set of propositions as in (6).³

- (4) John likes CHRIS.
 (5) Semantic value: $[[\textit{John likes CHRIS}]]$
 $= \lambda w. \text{John likes Chris in } w = \text{"that John likes Chris"}$
 (6) Focus semantic value: $[[\textit{John likes [CHRIS]}_{\textit{Focus}}]]^F$
 $= \{\lambda w. \text{John likes } x \text{ in } w : x \in \text{De}\}$
 $= \{\text{"that John likes Chris"}, \text{"that John likes Pat"}, \text{"that John likes Eleonor"}, \dots\}$

¹In fact, the proposed approach analyzes alt-questions along the lines of Schwarz's (1999) ellipsis account of *either...or* construction while keeping some important insights from Larson's movement theory. In Han and Romero (in press), we show how certain asymmetries between *whether...or* and *either...or* are resolved by maintaining some amount of Op movement.

²In our LFs, the contribution of Larson's Op is split into two parts, in the spirit of Karttunen (1977): the moved wh_i per se and the question operator Q generated in C^0 . This choice is not crucial for this paper.

³We capitalize the focused syllable.

According to Rooth, for Focus stress to be felicitous, the generated set of alternatives has to be related to a denotation C in the near discourse through one of the following conditions:⁴ the subset condition (then focal stress is understood as, e.g., exhaustive Focus) and the membership condition (then we obtain contrastive Focus).

In exhaustive Focus⁵, focal stress signals that the uttered sentence is the only one that is true out of the set of Focus alternatives, e.g., in question/answer pairs like (7).

- (7) Q: Who does John like?
 A: John likes CHRIS. A': It's CHRIS (that John likes).

This is formally represented by adjoining to the focused sentence the squiggle operator \sim plus the metavariable C , which here stands for the denotation of the previous question, as illustrated in (8a,b). For question meanings, Rooth takes Karttunen (1977) /Hamblin (1973) style semantics: a question expresses a function that maps every possible world w in its domain to the set of possible answers to that question in w . The semantic computation for (7Q) is spelled out in (9). (9a) gives the semantics of IP.⁶ The meaning of the Q -morpheme in C^0 applies to it, yielding (9c). The index of movement in who_1 is then rebracketed as a sister of C' and it is interpreted as a λ -abstractor in (9d), following Heim-Kratzer (1998). Finally, $[[who]]$ applies to $[[I C']]$ in (9f):

- (8) a. $[[IP \text{ John likes CHRIS}]] \sim C$
 b. $C = [[Who \text{ does John like}]] = (9f)$
 c. Subset Condition: $[\alpha \sim C]$ is felicitous if $C \subseteq [[\alpha]]^F$
- (9) LF: $[[CP \text{ Who}_1 [C' Q [IP \text{ John likes } t_1]]]$
 a. $[[IP]] = \lambda w'. \text{ John likes } g(1) \text{ in } w'$
 b. $[[Q]] = \lambda q_{\langle st \rangle} \lambda w_s \lambda p_{\langle s, t \rangle}. p = q$
 c. $[[[C' Q IP]]] = \lambda w \lambda p. p = \lambda w'. \text{ John likes } g(1) \text{ in } w'$
 d. $[[[I C']]] = \lambda x \lambda w \lambda p. p = \lambda w'. \text{ John likes } x \text{ in } w'$
 e. $[[[who]]] = \lambda R_{\langle e \langle s, \langle st, t \rangle \rangle \rangle} \lambda w \lambda p. \exists y [p = R(y)(w)(p)]$
 f. $[[[who I C']]] = \lambda w \lambda p. \exists y [p = \lambda w'. \text{ John likes } y \text{ in } w']$
 $= \lambda w. \{ \text{"that John likes Chris"}, \text{"that John likes Pat"}, \text{"that John likes Eleonor"}, \dots \}$

⁴ If no such denotation C is provided by the discourse, then it needs to be accommodated.

⁵ The term 'exhaustive Focus' refers to the occurrences of Focus –as in (7A)-- licensed by Rooth's subset condition and not associated with a focus sensitive particle or adverb (e.g., *only*, *even*, *always*, etc.).

⁶ g is the contextual assignment function from indices to objects.

Once the question's semantics is computed, the subset condition requires the following: in order for the sequence $IP \sim C$ to be felicitous, C (i.e., $[[Who\ does\ John\ like?]](w)$) must be a subset of the Focus semantic value of the IP, as indicated in (8c).⁷

Let us now turn to contrastive Focus. Here, the stress signals that the focused sentence contrasts with a previously uttered member of the Focus set of alternatives, as is typical in ellipsis, e.g. in (10) (with multiple contrastive Foci). This is formalized in (11). The felicity condition for contrastive Focus is the membership condition in (11d).

(10) ANDrew likes SUE, and JOHN ~~likes~~ CHRIS.

- (11) a. $[[IP\ JOHN_F\ likes\ CHRIS_F]] \sim C$
 b. $C = [[ANDrew\ likes\ SUE]] = \lambda w. Andrew\ likes\ Sue\ in\ w$
 c. $[[IP\ JOHN\ likes\ CHRIS]]^F = \{“that\ John\ likes\ Chris”, “that\ John\ likes\ Sue”, “that\ Andrew\ likes\ Chris”, “that\ Andrew\ likes\ Sue”,\ etc.\}$
 d. Membership Condition: $[\alpha \sim C]$ is felicitous if $C \in [[\alpha]]^F$

3 The Intonational Pattern in Alt-question

As noted in Romero (1998), the disjunct associated with *whether/Q* bears Focus stress. A pitch accent on each NP within the disjunction is needed in order for alt-readings to obtain. For example, the alt-question in (12) has Focus pitch on each disjunct.

(12) Did John drink COFfee or TEA?

What is the function of this double Focus? We propose that this double Focus is the double Focus we encounter in elliptical constructions. That is, we propose that *whether/Q* disjunctive structures involve ellipsis, with the corresponding contrastive foci on the remnant and on the remnant's correlate in the antecedent clause. This is illustrated for bare argument ellipsis in (13) representing (12), and for gapping in (14).

(13) Did John drink COFfee or ~~did he drink~~ TEA?

- (14) a. Did JOHN drink COFfee or MARY TEA?
 b. Did JOHN drink COFfee or MARY ~~drink~~ TEA?

⁷ The exhaustivity effect is a Gricean implicature: since the answerer uttered proposition p and not any stronger member or conjunction of members from $[[IP]]^F$, only p must be true.

The LF and the licensing of the contrastive Foci in the alt-question in (12) are illustrated in (15) and (16) respectively.

(15) [Wh_n Q t_n [IP₁ John drank coffee_{F1}]~C2 or [IP₂ ~~John drank~~ tea_{F2}]~C1]

(16) a. C1 = [[[IP₁ John drank coffee]]]

C1 ∈ [[[IP₂ ~~John drank~~ tea_{F2}]]]^F

b. C2 = [[[IP₂ ~~John drank~~ tea]]]

C2 ∈ [[[IP₁ John drank coffee_{F1}]]]^F

4 The Unavailability of Alt-reading with Inverted Negation

4.1 Data

As we have seen in (1), affirmative non-*wh*-questions involving disjunction can have a *yn*-reading and an alt-reading, depending on focal intonation. Both readings are also available for examples with non-inverted negation, as in (17)-(18):

(17) *Yn*-question: Did John not drink coffee or tea?

Answers: Yes, John did not drink either of them.

No, he did drink coffee or tea.

(18) Alt-question: Did John not drink COFfee or TEA?

Answers: John did not drink coffee.

John did not drink tea.

But as soon as we turn to examples with inverted negation, as in (19)-(20), the alt-reading becomes unavailable (Han 1999): (19) has a *yn*-reading, but the double focus pronunciation in (20) is very odd and, hence, the corresponding alt-reading is missing.

(19) *Yn*-question: Didn't John drink coffee or tea?

Answers: No, John did not drink either of them.

Right, he did drink coffee or tea.

(20) *Alt-reading: * Didn't John drink COFfee or TEA?

Answers: John did not drink coffee.

John did not drink tea.

In the following subsection we address why there should be this asymmetry between non-inverted and inverted negation, and why inverted negation blocks the alt-reading. We will first consider two possible analyses, and point out their problems. These involve exploring the difference between constituent and sentential negation, and assigning scopal privilege to negation in C^0 . We will then show that what is relevant is Focus on the polarity.

4.2 Sentential vs. constituent negation will not do it.

One may think that inverted negation is sentential negation and uninverted negation is constituent negation negating the event contributed by the VP, and that this difference is responsible for the asymmetric availability of the alt-reading. But in (21), even though negation does not just negate the event contributed by the VP but it negates the entire modal proposition, the alt-reading is possible.

(21) Does John not have to eat chicken or beef? ($\neg\Box$)

One could say that negation in (21) is still constituent negation, though it negates a bigger constituent than VP. But, if we make this move, the distinction between constituent and sentential negation becomes murky.

4.3 Frozen scope in C^0 will not do it.

One could try to derive the difference between inverted and non-inverted negation within Larson's only-movement approach. Recall the LF he gives for the alt-reading:

(22) Did John not drink COFfee or TEA?
a. Op_i [did John not drink [e_i coffee or tea]]

Assuming this structure, one could stipulate: (i) the Op_i can move over non-inverted negation freely, hence generating the alt-reading; and (ii) the Op_i cannot move over inverted negation (in C^0) because operators in C^0 have frozen scope, that is, operators in C^0 at Spell-Out maintain their wide scope status over the rest of their clause throughout LF.

However, frozen scope in C^0 is not generally the case. In (23), *should* is in C^0 but still disjunction can have scope over the modal, generating the alt-reading.⁸

(23) Should I go to CHIna or to JaPAN for vacation? ($\vee \square$)

4.4 Focus on the polarity is relevant.

Interestingly, parallel effects to the ones associated with inverted negation can be reproduced in affirmative questions with focus on *DID*. The example (24) has a *yn*-reading, but the double focus on the disjuncts and the corresponding alt-reading are unavailable, as was with the example with inverted negation in (19)-(20), repeated here as (25). Recall from (1) that non-stressed auxiliary versions are not biased in this way.

(24) DID John drink coffee or tea? Yn-reading *Alt-reading

(25) Didn't John drink coffee or tea? Yn-reading *Alt-reading

In non-inverted negation examples, the inverted negation effects arise to some extent if we place Focus stress on *not* (and on nothing else): the alternative reading is marginal.

(26) Did John NOT drink coffee or tea? Yn-reading ??Alt-reading

This raises the question of whether the unavailability of the alt-reading is related to Focus. If so, we would expect our original sentences with inverted negation to involve focus-marking as well, inherently or phonetically expressed with focus intonation.

Preliminary evidence from naturally occurring data suggests that preposed negation does involve focal intonation. Compare the pitch track of the regular

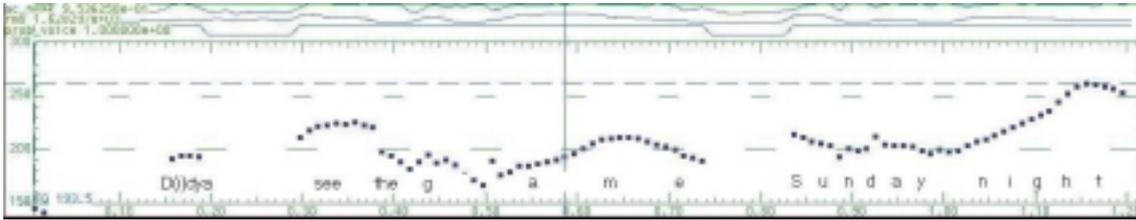
⁸ A third way to tackle the loss of alt-reading with inverted negation would be to assume that their underlying structure and compositional semantics is that of two independent questions conjoined by *or*. E.g., (i.a) would be analyzed as (i.b) and (ii.a) as (ii.b). Given that (ii.b) is deviant (the implicature that we expect a positive answer for *Didn't John drink coffee?* and for *Didn't John drink tea?* seems to be at odds with exclusive disjunction), (ii.a) lacks the alt-reading. (See Romero-Han 2001 on epistemic implicatures in negative *yn*-questions.)

- (i) a. Did John drink coffee or tea?
b. [_{CP} Did John drink coffee?] Or [_{CP} ~~did he drink~~ tea?]
- (ii) a. Didn't John drink coffee or tea? *Alt-reading
b. # [_{CP} Didn't John drink coffee?] Or [_{CP} ~~didn't he drink~~ tea?]

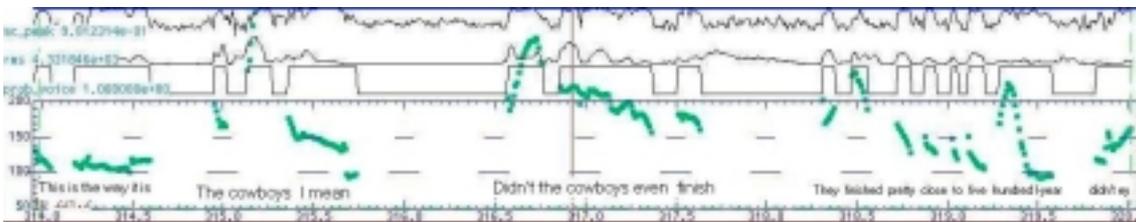
However, it seems unjustified to assume that the only underlying structure for an alt-question involves two independent CPs conjoined by *or*. If, as it is generally assumed, embedded alt-questions involve only one occurrence of *whether*, we need a second way to generate alt-questions in general that does not involve disjoining two CPs. Hence, the problem re-arises: why does inverted negation block this second way of generating alt-questions?

affirmative question in (27) (low pitch for **d(i)d** in boldface) with that of the proposed negation question in (28) (higher pitch for **didn't**).

(27) **D(i)d**ya see the game Sunday night?



(28) This is the way it is. The cowb, I mean...**Didn't** the cowboys even finish...? They finish pretty close to 500 last year, didn't ey?



In view of these data, we will assume that inverted negation bears Focus-marking too, and it does so necessarily. Non-inverted negation, instead, can -- but does not need to -- be focused.⁹ We will pursue the idea that, in all the cases above, the lack of alt-question reading is derived, directly or indirectly, from the presence of Focus on the polarity (Verum Focus as in Höhle (1992)). The next subsection develops our proposal.

4.5 Our proposal

We propose that inverted negation in *yn*-questions contributes focus-marking on the polarity and the alt-reading disappears because the extra polarity focus cannot be licensed due to ellipsis and to the licensing restrictions of polarity focus in C^0 . The key ingredients of our analysis are: (i) polarity focus in C^0 is always exhaustive, never contrastive, and (ii) Focus-marked constituents in the relevant domain cannot be elided (Heim 1997).

⁹A possible reason for why this difference exists between proposed and canonical negation is connected to the fact that languages in general associate a fixed discourse function with sentences with non-canonical syntax (Kiss 1981, Ward 1988, Prince 1998), while sentences with canonical order are more flexible and their discourse functions depend on the manipulation of optional focus stress. Similarly, when negation is inverted in *yn*-questions, it has a fixed discourse function of focus-marking the proposed element. But when negation occupies its canonical position, focus stress and the subsequent Focus-marking is optional.

The question thus is: what happens if, besides the focus on the disjuncts associated with *whether/Q*, there is another focus in the interrogative clause? We will consider two possible ways to license this focus: (i) as contrastive focus with the previous discourse, and (ii) as exhaustive focus within both disjuncts.

4.5.1 *As contrastive with the previous discourse.* We can try licensing the extra focus as signaling contrast between two questions: a previous question (involved by the preceding mini-discourse in the examples below), and a new question. This licensing is certainly possible when the extra focus falls on a Noun Phrase, e.g., *Lola* in (29).

(29) We know that Sue visited Martin and not Carlos. Now we need to know this:
Did LOla visit MARtin or CARlos?

This type of contrastive licensing is marginally possible for *NOT*. To the extent that *NOT* can be understood as contrasting with a previous question, its focus is licensed and the alt-reading is available.

(30) ?? I know that John drank whiskey and not vodka. Now I want to know this:
Did John NOT drink COFfee or TEA?

But contrastive licensing is impossible for *DIDN'T* and *DID* in C^0 :¹⁰

(31) # I know that John drank whiskey and not vodka. Now I want to know this:
DIDN'T John drink COFfee or TEA?

(32) # I know that John didn't drink whiskey. He drank vodka. Now I want to know this: DID John drink COFfee or TEA?

Interestingly, bare contrastive licensing is also impossible for polarity focus in C^0 in English and German *if*-clauses as well, as the stressed *IF* / *WENN* in (33)-(34) show:

- (33) If Kim does NOT drink, we'll go home.
a. ... If he DOES drink, we'll go to the bar.
b. #... IF he drinks, we'll go to the bar. (Ellen Prince, p.c.)

(34) Wenn Kim NICHT trinkt, gehen wir nach Hause.
if Kim not drinks, go we to home

¹⁰ # indicates that the discourse is infelicitous.

- a. ... Wenn er TRINKT, gehen wir in die Kneipe.
 If he drinks, go we to the bar
- b. # ... WENN er trink, gehen wir in die Kneipe.

From these data, we conclude that the polarity focus on *NOT* can (marginally) be contrastive, but the polarity focus on *DIDN'T* and *DID* in C^0 cannot be contrastive with a previous polarity.¹¹ Hence, when polarity focus falls in C^0 , we should try to license it as exhaustive. This attempt is pursued next.

4.5.2 *As exhaustive focus within each disjunct.* In this case, the extra focus on the NP *LOLA* or on the polarity would stay inside each disjunct at LF, associated with the squiggle operators in $\sim C$ and $\sim C'$. The LFs are represented in (35a)-(36a) and the corresponding readings are paraphrased in (35b)-(36b). These readings are not available. Let us see why.

- (35) Did LOla visit MARTin or CARlos?
- a. *"Which of these is true: it was Lola that visited Martin or it was Lola that visited Carlos."
- b. [Wh_n Q t_n [IP₁ [Lola_F visited Martin_(F1)] ~ C] ~ C3 or [IP₂ [~~Lola_F~~ visited Carlos_(F2)] ~ C'] ~ C4]]
- (36) *DIDN'T you visit MARTin or CARlos?
- *Did you NOT visit MARTin or CARlos? (NOT with exhaustive focus)
- a. *"Which of these is true: it is false that you visited Martin or it is false that you visited Carlos."
- b. [wh_n Q t_n [IP₁ [you did not_F visit Martin_{F1}] ~ C] ~ C2 or [IP₂ [~~you did not_F~~ visit Carlos_{F2}] ~ C'] ~ C1]

This licensing possibility involves deleting a Focus marked constituent (*Lola_F* or the focused polarity) in the second disjunct. But note that, independently of our cases, focused material cannot be deleted without deleting its associated \sim as well. This Focus

¹¹ Although (32)-(34) suggest that polarity Focus in C^0 cannot contrast with a previous polarity, S. Tomioka (p.c.) pointed out to us that focus in C^0 can contrast with a previous modal (e.g. *can*) in a simple question, as in (i). To the extent that this contrastive licensing is still possible in (ii), we predict its alt-reading to be marginally acceptable (similar to (30)).

- (i) John can speak Russian. Now the question is: DOES he (speak Russian)?
- (ii) She asked whether John can speak GERman or FRENCH. But the question we really cared about is: DOES he speak GERman or FRENCH?

Deletion Constraint (FDC) is illustrated in (37) and enunciated in (38). (Cf. Heim 1997 for an application of this prohibition to VP-Ellipsis).

(37) *Mary only told John to eat FRUIT in the morning. Sue only [_{VP} told him to [_{VP} eat FRUIT in the morning]] ~ C, as well.

(38) Focus Deletion Constraint (FDC):
Constituents containing focus-marked material and excluding its associated squiggle operator cannot delete.

Hence, the extra focus on the polarity cannot be licensed as exhaustive Focus internal to each disjunct because it violates the independently motivated FDC.¹²

To summarize this subsection 4.5, inverted negation in a *yn*-question contributes an extra focus that cannot be licensed under the alt-question reading, neither as contrastive Focus (focus-marking in C⁰ is only exhaustive) nor as exhaustive Focus within both disjuncts (deleting this focus violates the FDC). That is why questions with inverted negation cannot have an alt-reading. The same reasoning applies to *DID* in C⁰ (in (24)), and to some degree to *NOT* (in (26)), the latter being marginally acceptable as contrastive Focus.

5 Semantics

We have argued that alt-questions involve ellipsis besides Larson's operator movement. In this section, we will sketch a possible implementation of the semantics of questions applied to the proposed LF representations. The implementation suggested here is an extension of analyses in the literature of discontinuous *wh*-phrases at LF, where the interrogative component (the *wh*-part and/or the *Q* morpheme in C⁰) has CP scope and the *wh*-phrase restrictor is left in situ. The schema for this type of interrogative structures is given in (39):

(39) Discontinuous LF *wh* structure: [CP wh₁ Q [IP ... [XP t₁ RESTRICTOR] ...]]

We will work out the semantics of the proposed LF-structures in three steps. First, we will see how the discontinuous LF *wh* structure is generally interpreted with the aid of

¹²A third logical possibility for licensing the extra focus is as exhaustive focus within only the first disjunct. This case is ruled out because it makes the two disjunctive IPs semantically unbalanced and,

choice functions (Reinhart 1992). Second, we will demonstrate how the choice function analysis can be applied to Larson's original LF structures without ellipsis. Finally, we will extend this method to the LF representations defended in this paper, where larger constituents are coordinated and partially elided.¹³

According to Reinhart (1992), some *which*-phrases that are interpreted with scope in the matrix CP have, nevertheless, their N' restrictor in situ at LF. This is exemplified in (40). Although the logical scope of *which of her philosophical rivals* can be the matrix CP, binding of the pronoun *her* requires that the *wh*-phrase's restrictor stay lower than the binder *which lady* at LF, as in (41).

(40) Who remembers which lady₁ will be offended if we invite which of her₁ philosophical rivals?

ANSWER: **I** remember which lady will be offended if we invite **her**

Deconstructionist rival.

(41) [CP wh₂ wh₃ [C' Q [IP t₂ (person) remembers which lady₁ is upset if we invite t₃ philosophical rival of hers₁]]]

Reinhart (1992) interprets these structures using choice functions. She leaves the *wh*-phrase restrictor in situ and proposes that it introduces a choice function variable, which is later bound by the *Q* morpheme --or by the moved *wh*-part in our case.¹⁴ A choice function takes a set and returns a member of that set, as defined in (42). The interpretation of the in situ material is given in (43) --where *g*(3) provides the choice function-- and exemplified for various possible choice functions in (44).

(42) Choice function definition: A function *f* is a choice function (CH(*f*)) if, for every set *P* in its domain, *f*(*P*) is a member of *P*.

(43) [[[NP t₃ *phil. rival of hers₁*]]] (*w*) = *g*(3)_{<et,e>} (philosophical rival of *g*(1) in *w*)

(44) *f*(philosophical rival of *g*(1) in *w*) = *g*(1)'s empirist rival in *w*; e.g. Karl.

f'(philosophical rival of *g*(1) in *w*) = *g*(1)'s behaviorist rival in *w*

f''(philosophical rival of *g*(1) in *w*) = *g*(1)'s deconstructionist rival in *w*

hence, the membership condition is not met for the double Foci. See Han and Romero (2001) for a detailed consideration of this possibility.

¹³ For space and perspicuity reasons, the formulae below are somewhat simplified.

¹⁴ The interrogative component is *Q* in Reinhart (1992). However, her semantic algorithm can equally be implemented assuming that the interrogative component comes from a moved *wh*-part. Since Larson's

The choice function NP combines with the rest of the elements up to the matrix IP in (41) to yield the IP denotation in (45). Then, the Q morpheme --defined in (46)-- applies and the C' denotation obtains in (47). The index of movement in $[wh_3 C']$ is rebracketed as $[wh [3 C']]$ and interpreted as a λ -abstractor. Given that the index 3 has type $\langle et, e \rangle$ (choice function for individuals), $[3 C']$ has type $\langle \langle et, e \rangle, \langle s \langle st, t \rangle \rangle \rangle$, as in (48). Finally, with the addition of the *wh*-part's denotation in (49), we obtain the usual Karttunen (1977)/Hamblin (1973) style question denotation in (50): a function that assigns to each world the set of possible answers to the question in that world.

- (45) $[[IP]] = \lambda w'_s. [g(2)(\text{person}) \text{ remembers in } w' \text{ for which lady } x:$
 $(\text{we invite } g(3)(\text{ph-rival of } x)) \rightarrow (x \text{ is upset})]$
- (46) $[[Q]] = \lambda q_{\langle st \rangle} \lambda w_s \lambda p_{\langle s, t \rangle}. p = q$
- (47) $[[C']] = \lambda w \lambda p_{\langle s, t \rangle}. p = \lambda w'. [g(2)(\text{person}) \text{ rem. in } w' \text{ for which lady } x:$
 $(\text{we invite } g(3)(\text{ph-rival of } x)) \rightarrow (x \text{ is upset})]$
- (48) $[[3 C']] = \lambda f_3 \lambda w \lambda p_{\langle s, t \rangle}. p = \lambda w'. [g(2)(\text{person}) \text{ rem. in } w' \text{ for which lady } x:$
 $(\text{we invite } f_3(\text{ph-rival of } x)) \rightarrow (x \text{ is upset})]$
- (49) $[[wh-]] = \lambda R_{\langle \langle et, e \rangle, \langle s \langle st, t \rangle \rangle \rangle} \lambda w \lambda p. \exists f_{\langle et, e \rangle} [CH(f) \ \& \ R(f)(w)(p)]$
- (50) $[[CP]] = \lambda w \lambda p. \exists f_2 \exists f_3 [CH(f_2) \ \& \ CH(f_3) \ \& \ p =$
 $\lambda w'. [f_2(\text{person}) \text{ remembers in } w' \text{ for which lady } x:$
 $(\text{we invite } f_3(\text{ph-rival of } x)) \rightarrow (x \text{ is upset})]]$
 $= \lambda w. \{ \mathbf{I} \text{ remember which lady will be offended if we } \mathbf{invite her}$
 $\mathbf{Deconstructionist rival, Max} \text{ remembers which lady will be}$
 $\text{offended if we invite } \mathbf{her behaviorist rival, etc.} \}$

Let us now apply the choice function analysis to Larson's LF structures. Take example (51a) and its Larsonian alt-question LF in (51b). The semantic computation proceeds as in the previous case, except for one fact: alt-questions carry the presupposition that exactly one of the options given in the disjunctive phrase yields a true answer in the evaluation world. This presupposition is incorporated to $[[wh\text{-alt}]]$.

LFs make capital use of this *wh*-part movement and we maintain this assumption, we will change Reinhart's in this respect.

6 Conclusions

This paper has provided two arguments that alt-questions involve ellipsis. First, we noted that alt-readings require focus on each disjunct, a pattern that is typically found on remnants and their correlate expressions in ellipsis. Second, we argued that inverted negation contributes focus marking on the polarity, and that it is this extra focus – comparable to the polarity focus on *DID* in C^0 and, to some extent, on *NOT*—that blocks the alt-readings in *whether/Q...or* questions. We have proposed that, unless this extra focus can be understood as contrastive with the previous discourse, it cannot be licensed due to the Focus Deletion Constraint, thus blocking the alt-reading. In order to interpret the resulting LF structures, which retain Larson's operator movement and add ellipsis, a compositional semantics has been sketched.

Selected References

- HAN, C.-H. 1999. *The Structure and Interpretation of Imperatives: Mood and Force in Universal Grammar*. University of Pennsylvania, Ph.D. Dissertation.
- HAN, C.-H. and M. ROMERO (2001). Negation, Focus and Alternative Questions. In K. Megerdooian and L.A. Bar-el, *Proceedings of the West Coast Conference in Formal Linguistics XX*. Somerville, MA: Cascadilla Press. Pp. 262-275.
- HAN, C.-H. and M. ROMERO (in press). Ellipsis and Movement in the Syntax of *Whether/Q...or* Questions. To appear in *Proceedings of the NELS 32*.
- HEIM, I 1997. Predicates or Formulas? Evidence from ellipsis. *Proceedings of SALT 7*.
- HEIM, I. and A. KRATZER (1998). *Semantics in Generative Grammar*. Blackwell.
- HÖHLE, T. 1992. Über Verum Fokus in Deutschen. *Linguistische Berichte*.
- KARTTUNEN, L. 1977. Syntax and Semantics of Questions. *Linguistics and Philosophy* 1, 3-44.
- LARSON, R. 1985. On the syntax of disjunction scope. *Natural Language and Linguistic Theory* 3, 217-264.
- PARTEE, B. 1987. Noun Phrase interpretation and type-shifting principles. In Groenendijk, J et al (eds.), *Studies in Discourse Representation Theory and the Theory of Generalized Quantifiers*, GRASS 8. Dordrecht: Foris.
- PRINCE, E. 1998. On the limits of syntax, with reference to Topicalization and Left-Dislocation. *The limits of Syntax*, ed. by P. Culicover and L. McNally. New York: Academic Press. Pp. 281-302.
- REINHART, T. 1992. Wh-in-situ: An apparent paradox. *Proceedings of the Amsterdam Colloquium*.
- ROMERO, M. 1998. *Focus and Reconstruction Effects in Wh-Phrases*. University of Massachusetts at Amherst, Ph.D. Dissertation.
- ROMERO, M. and C.-H. HAN. 2001. On Certain Epistemic Implicatures in Yes/No Questions. *Proceedings of the Thirteenth Amsterdam Colloquium*, ed. By Robert van Rooy. Amsterdam: ILLC/Department of Philosophy, University of Amsterdam. Pp.168-173.
- ROOTH, M. 1985. *Association with Focus*. Univ. Massachusetts at Amherst, Ph.D. Diss.
- ROOTH, M. 1992. A theory of focus interpretation. *Natural Language Semantics* 1, 75-116.
- SCHWARZ, B. 1999. On the Syntax of *either...or*. *Natural Language and Linguistic Theory* 17:2, 339-370.
- WARD, G. 1998. *The semantics and pragmatics of preposing*. New York, London: Garland.