# Focus

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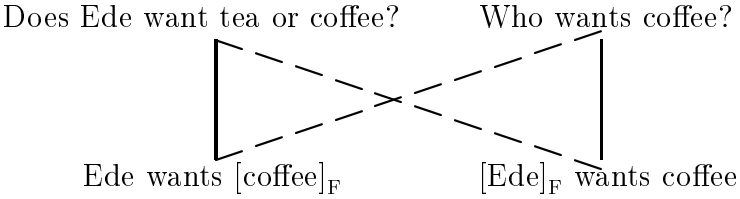
## 1 Phenomena

The term *focus* is used here to describe prosodic prominences serving pragmatic and semantic functions such as those surveyed below. Following Jackendoff (1972) and most studies on focus in generative grammar, I will assume that focus is marked as a feature on phrases in a syntactic description, a feature which is to have both a phonological/phonetic and a semantic/pragmatic interpretation.

### Question-answer congruence

The position of focus in an answer correlates with the questioned position in wh-questions, and the position of disjoined alternatives in alternative questions. In the following diagram, the solid lines link appropriate question-answer pairs; the diagonal pairings are inappropriate.

(1)




### Focusing adverbs

John introduced Bill and Tom to Sue, and there were no other introductions. In these circumstances, the first sentence below is false, and the second one true.

(2) a. John only introduced $[\text{Bill}]_{\text{F}}$ to Sue.
b. John only introduced Bill to $[\text{Sue}]_{\text{F}}$ .

Since the variants differ only in the location of focus, focus has a truth-conditional effect in the context of *only*. In a situation where John introduced Bill to Sue and Jane and there were no other introductions, the truth values are reversed, so that the first sentence is true, and the second false.

With other focusing adverbs, the effect is presuppositional. In the examples below, the focusing adverbs, in combination with the focus on $[_{\text{NP}}\text{Bill}]$, introduce a presupposition that a proposition of the form 'John introduced $x$ to Sue', where $x$ is not Bill, is true. Or equivalently, John introduced someone other than Bill to Sue.

(3) a. John also introduced $[\text{Bill}]_{\text{F}}$ to Sue.

b. John introduced $[\text{Bill}]_{\text{F}}$ to Sue, too.
c. John even introduced $[\text{Bill}]_{\text{F}}$ to Sue.

With *even*, there is an additional presupposition along the lines of John introducing Bill to Sue being less likely than his introducing other people to Sue.[1]

### Adverbs of quantification and modals

A bank clerk escorting a ballerina (in the Saint Petersburg of the relevant period) runs counter to the first generalization below, but not the second.

(4) a. In Saint Petersburg, $[\text{officers}]_{\text{F}}$ always escorted ballerinas.
b. In Saint Petersburg, officers always escorted $[\text{ballerinas}]_{\text{F}}$

Similarly, a bank clerk escorting a ballerina would violate the first rule of etiquette below, but not the second, and an officer escorting a journalist would violate the second rule but not the first.

(5) a. $\text{Officers}_{\text{F}}$ must escort ballerinas.
b. Officers must escort $\text{ballerinas}_{\text{F}}$ .

Along similar lines, Halliday (1967) noted the rather different impact of the following regulations imposed on passengers in the London underground:

(6) a. Shóes must be worn.
b. Dógs must be cárried.

If you bring along no dog at all, you obey the second regulation, but if you bring no shoes at all, you violate the first. If you carry one dog and bring another one on a leash, you violate the second regulation; but if you wear one pair of shoes and carry another pair in a shopping bag, you obey the first.

The proper assignment of focus features in Halliday's examples is not entirely clear; one idea is that (6b) has a focus on the verb phrase $[_{\text{VP}}\text{carried}]$, while (6a) has no focus at all, or focus on the entire clause inside the scope of the modal.

### Reasons and counterfactuals

In a modified version of a scenario from Dretske (1972), Clyde has been carrying on an intermittent affair with Bertha, an archeologist who is out of the country most of the time, something he is quite satisfied with. But since he finds out that he will inherit a lot of money if he weds before the age of 30, he arranges to marry her, with the view of carrying on their relations as before. Marrying someone else would have involved too much of a commitment. Under these circumstances, the sentences in (7) are true — or at at least might well be true. The sentences in (8) are false.

(7) a. The reason Clyde $[\text{married}]_{\text{F}}$ Bertha was to qualify for the inheritance.
b. The reason Clyde married $[\text{Bertha}]_{\text{F}}$ was to avoid making too much of a commitment.

[1] The lexical semantics of focusing adverbs is the subject of continued debate; see Horn (this handbook) for a discussion of *only*.

(8) a. The reason Clyde married $[\text{Bertha}]_{\text{F}}$ was to qualify for the inheritance.
b. The reason Clyde $[\text{married}]_{\text{F}}$ Bertha was to avoid making too much of a commitment.

Similarly, (9a) strikes me as false, while (9b) strikes me as true, though the intuition is a volatile one.

(9) a. If he hadn't married $[\text{Bertha}]_{\text{F}}$ , he would not have been eligible for the inheritance.
b. If he hadn't $[\text{married}]_{\text{F}}$ Bertha, he would not have been eligible for the inheritance.

Dretske discusses a number of other constructions, perhaps all involving underlying counterfactual reasoning.

### Conversational implicature

After my roomates Steve and Paul and I took a calculus quiz (which was graded on the spot), George asked me how it went. In answering with the first variant below, I suggested that I did no better than passing. In anwering with the second, I would have suggested that Steve and Paul did not pass.

(10)a. Well, I $[\text{passed}]_{\text{F}}$ .
b. Well, $[\text{I}]_{\text{F}}$ passed.

The focus-conditioned suggested inferences have the logic of Gricean quantity implicatures, so-called scalar implicatures: they are derived by comparing what I actually said to logically stronger things I might have said (that I did very well, or that Steve and I both passed). For instance, George's reasoning in (10a) would be that if Mats had done very well on the exam, he would have said so, and therefore he must have done no better than passing.

In a modified plot of the film *The Conversation* (Coppola 1973), a private investigator has been hired by a businessman to eavesdrop on his wife and a male friend. A conversation is recorded in a noisy park, and in the course of analyzing the recording, the detective uncovers the sentence:

(11) He'd kill us if he got the chance.

After delivering the recording to his employer, he becomes mortified at the prospect of being responsible for a murder of the young pair by the businessman. But instead, the businessman is killed. The detective subjects the recording to some further analysis, uncovering the prosody:

(12) $[\text{He}]_{\text{F}}$ 'd kill $[\text{us}]_{\text{F}}$ if he got the chance.

And so, the intonation suggests, the lovers are justified in killing the businessman. The focus either communicates a conversational implicature on the part of the speaker (though not a scalar one), or indicates discourse structure in a way which gives information about other parts of the conversation — parts the detective was not able to make intelligible.[2]

[2]The situation in the film is more subtle. The recorded utterance has a pitch accent on *kill*. Much of the film consists of the detective (played by Gene Hackman) listening to the recorded sentence. The final version on the soundtrack has an accent on *us* rather than *kill*; there seems to be no accent on the subject. This might reflect a focus with VP scope on the

# 2 Semantics

> "... contrastive differences ... however one may choose to classify them, are significantly involved in determining the meaning (hence, semantics) of a variety of larger expressions in which they are embedded. If $C(U)$ is a linguistic expression in which $U$ is embedded, and $U$ can be given different contrastive foci (say $U_1$ and $U_2$), then it often makes a difference to the meaning of C(U) whether we embed $U_1$ or $U_2$. Linguistically, this is important because it means that any adequate semantical theory, one that is capable of exhibiting the semantical differences between complex expressions, between $C(U_1)$ and $C(U_2)$, will have to be provided with resources for distinguishing between $U_1$ and $U_2$."
>
> — Dretske (1972)

This suggests the following project. We somehow modify our way of modeling the semantics of phrases so that phrases differing in the location of focus have different semantic values. We then state semantic and pragmatic rules for focus-sensitve constructions and discourse configurations in terms of such focus-influenced semantic values.

In the 1980's this program, which amounts to a hypothesis of semantic mediation of focus effects, was developed in proposals which have come to be called the structured meaning semantics and the alternative semantics for focus. In the structured meaning approach, focus has the effect of structuring the propositions denoted by sentences: the focus-influenced semantic value of a clause with a single focus is a pair consisting of (i) a property obtained by abstracting the focused position, and (ii) the semantics of the focused phrase. The semantic values of (13a) and (13b) are (14a) and (14b) respectively.

(13)a. John introduced $[\text{Bill}]_{\text{F}}$ to Sue.
b. John introduced Bill to $[\text{Sue}]_{\text{F}}$ .

(14)a. $\langle \lambda x \left[ \mathbf{introduce}(\mathbf{j}, x, \mathbf{s}) \right], \mathbf{b} \rangle$
b. $\langle \lambda y \left[ \mathbf{introduce}(\mathbf{j}, \mathbf{b}, y) \right], \mathbf{s} \rangle$

The property in (14a) is the property of being introduced by John to Sue, and **b** is the individual denoted by *Bill*. The property in (14b) is the property of being a $y$ such that John introduced Bill to $y$, while **s** is the individual denoted by *Sue*.

In the tradition of generative grammar, structuring as a semantics for focus was first proposed in Jackendoff (1972:245), but it can be viewed as reconstruction of the notion that intonation can have the effect of dividing a sentence into a psychological predicate and psychological subject (Paul 1880, Wegener 1885) or a theme and rheme (e.g. Danes 1957).[3]

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NP *us*, expressing a contrast between killing the couple and killing the businessman being at issue. It is unclear whether we are to understand this version as representing the recording, or the detective's mental repetition of it as modified by his present understanding. Since the versions are acoustically distinct, the latter option seems more satisfactory.

[3]See Sgall and Hajičová and Panevová (1986:Ch 4) for discussion and further references.

The utility of structuring in stating semantic and pragmatic rules for focus-sensitive constructions was hinted at by Jackendoff and developed in much more detail in a number of semantically oriented studies, starting with Jacobs (1983) and von Stechow (1985/89). To illustrate how such rules are stated, let us consider the focusing adverb *only*. For simplicity, I will assume that when it is syntactically in auxiliary position, a focusing adverb combines with a structured meaning contributed by the rest of the sentence. Horn's (1969) semantics for *only* dictates the following rule:

(15) *only* combining with the structured meaning $\langle R, \alpha_1 ... \alpha_k \rangle$ yields the assertion $\forall x_1 ... \forall x_k \, [R(x_1 ... x_k) \rightarrow \langle x_1 ... x_k \rangle = \langle \alpha_1 ... \alpha_k \rangle]$ together with the presupposition $R(\alpha_1 ... \alpha_k)$.

Thus (13a) asserts that John introduced nobody other that Bill to Sue, and presupposes that John introduced Bill to Sue. In this case, there is just one focused phrase, and the left-hand part of the structured meaning is a one-place relation. But the rule is stated in terms of a general version of structured meanings which allows for more than one focused phrase: $\alpha_1 ... \alpha_k$ is a tuple of one or more semantic values of focused phrases, and $R$ is a relation with a corresponding number of arguments. This allows for several focused phrases associated with a single focusing adverb:

(16)a. John only introduced $\text{Bill}_{\text{F}}$ to $\text{Sue}_{\text{F}}$
b. $\langle \lambda x \lambda y \, [\mathbf{introduce}(\mathbf{j}, x, y)] \, , \mathbf{b}, \mathbf{s} \rangle$
c. $\forall x_1 \forall x_2 \, [\mathbf{introduce}(j, x_1, x_2) \rightarrow \langle x_1, x_2 \rangle = \langle \mathbf{b}, \mathbf{s} \rangle]$

A wealth of phenomena have been analyzed in the structured meaning framework; for discussion, see Jacobs (1988), von Stechow (1991), and Krifka (1991).

### Alternative semantics

The basic idea of alternative semantics can be illustrated with the question-answer paradigm. The question [does Ede want tea or coffee] determines the basic answers 'Ede wants tea' and 'Ede wants coffee'.[4] Similarly, focus in the answer [Ede wants $[\text{coffee}]_{\text{F}}$ ] indicates that propositions obtained by making substitutions in the position of the focused phrase — propositions of the form 'Ede wants $y$' — are alternatives to the actual anwer. Congruence is simply a matter of the question and answer characterizing the answer set consistently.

According to Rooth (1985), evoking alternatives is the general function of focus. Semantically, focus determines an additional focus semantic value, written $[\![.]\!]^{\text{f}}$.

$[\![\text{Ede wants } [\text{coffee}]_{\text{F}} \, ]\!]^{\text{f}}$ = the set of propositions of the form 'Ede wants $y$'
$[\![[\text{Ede}]_{\text{F}} \text{ wants coffee} \, ]\!]^{\text{f}}$ = the set of propositions of the form '$x$ wants coffee'

Ordinary semantic values are not directly affected by focus: the two variants contribute the same proposition as an ordinary semantic value $[\![.]\!]^{\text{o}}$. Here is a semantic rule for *only* stated in terms of alternative semantics:[5]

[4] On the analysis of alternative questions and the approach to question-answer congruence sketched here, see von Stechow (1985/1989), from whom I also borrowed example (1)

[5] The conjunct "$^{\vee}p$" is understood as meaning that $p$ is true; in Montague's intensional logic, "$^{\vee}$" evaluates a proposition at the current index.

*only* combining with a clause $\phi$ yields the assertion $\forall p \left[p \epsilon [\![p]\!]^f \wedge {}^\vee p \rightarrow p = [\![\phi]\!]^o\right]$ and the presupposition $p$.

The rule differs from the earlier one in that the quantification is at the level of propositions: no alternative to $[\![\phi]\!]^o$ is both distinct from $[\![\phi]\!]^o$ and true. As applied to the introduction scenario, the formulation explains why (2a) is false: given the described course of events, 'John introduced Tom to Sue' is a true proposition distinct from 'John introduced Bill to Sue'. Furthermore, it is an element of the focus semantic value of the argument of *only*, namely the set of propositons of the form 'John introduced $y$ to Sue'. On the other hand, (2b) is true, since there is no true proposition of the form 'John introduced Bill to $z$' except for 'John introduced Bill to Sue'.

# 3 A problem of restrictiveness

Structured meanings and alternative semantics are, minimally, tools for attacking the descriptive problem posed by focus-sensitive constructions and discourse configurations. They give us semantic objects in terms of which we can state rules, and thus define the contribution of focus to the semantics or pragmatics of a given construction. A theory of focus should do more, though: it should tell us what focus-sensitive constructions have in common, by characterizing a notion of possible focus-sensitive construction. As a consequence, it should tell us what pragmatic and semantic functions focus could not serve. An analysis which fails to address this requirement might be saying a lot about specific constructions, but it says nothing about focus in general. By omission, it maintains that there is no uniform semantic or pragmatic phenomenon of focus.

The problem is severe for the structured meaning semantics, since it gives access to so much information. It seems only a slight exaggeration to say that it gives access to all the information which could possibly be relevant, namely the semantics of the focused phrase and the semantics of the rest of the sentence. Using this information, it is possible to define quite implausible operators. Consider the following paradigm, involving a hypothetical verb *tolfed*, a focus-sensitive version of *told*.

(17)a. I tolfed [that $[\text{he}]_F$ resembles her] $\equiv$ I told him that he resembles her.
b. I tolfed [that he resembles $[\text{her}]_F$ ] $\equiv$ I told her that he resembles her.
c. I tolfed [that $[\text{he}]_F$ resembles $[\text{her}]_F$ ] $\equiv$ I told him and her that he resembles her.

That is, *tolfed* $\phi$ amounts to *told the focus (or foci) of* $\phi$ *that* $\phi$. It is trivial to define *tolfed* as a focus-sensitive operator in the structured meaning semantics. If we use the structured meaning semantics as our theory of focus, and say no more, we are claiming that there could be such a lexical item.

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In the text, I use English phrases enclosed in single quotes, sometimes mixed with logical notation, as a deliberately informal way of naming propositions and other semantic objects. For a more formal development of alternative semantics, see the cited sources. Natural language syntactic objects are named with expressions enclosed in square brackets, without any additional quotational device, and isolated word forms are italicised.

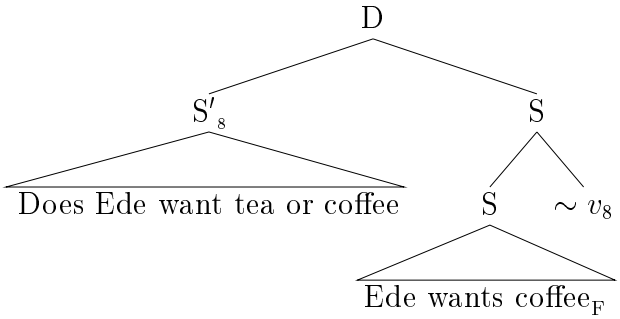
Alternative semantics may not be subject to the restrictiveness objection to the same extent. But if we maintain that grammars contain construction-specific rules stated in terms of alternative semantics, we are making a weak claim. A symptom of this is that one of the rules could be dropped, without affecting anything else. At an extreme of implausibility, by removing a pragmatic rule we could obtain a language with no phenomenon of question-answer congruence but otherwise just like English.

A hint to what is missing in alternative semantics is that, at least in some cases, it is clear that the alternative set has a different status from the ordinary semantic value, in that it has an independent semantic origin or pragmatic motivation. In question-answer congruence, the ultimate source of the alternative set is the semantics and/or pragmatics of questions: questions determine sets of possible answers. Focus seems to evoke this alternative set in a presuppositional way, indicating that it is present for independent reasons. In Rooth (1992) this idea is used to simplify the architecture of alternative semantics. The interface between focus-sensitive constructions and the focus feature is handled by a single operator which introduces a presupposed alternative set:

(18) Where $\phi$ is a syntactic phrase and $C$ is a syntactically covert semantic variable, $\phi \sim C$ introduces the presupposition that $C$ is a subset of $[\![\phi]\!]^{f}$ containing $[\![\phi]\!]^{o}$ and at least one other element.

The operator being defined is '$\sim$', the focus interpretation operator. In the question-answer paradigm, it would have scope over the answer:

(19)




The variable $C$ in the rule, or $v_8$ in the representation above, denotes an alternative set. Focus interpretation contributes a constraint on this variable, though it does not fix its reference uniquely. In each specific case, the variable is identified with some semantic or pragmatic object present for an independent reason. In the question-answer paradigm the antecedent for the variable introduced by focus interpretation can be taken to be the ordinary semantic value of the question itself, given an appropriate semantics for questions. In a semantics in the style of Hamblin (1973), the semantic value for a question is a set of propositions corresponding to potential answers, both true and false ones. In the present case, the ordinary semantic value of the question is a set containing just the propositions 'Ede wants tea' and 'Ede wants coffee'. The constraint introduced by $\sim$ in this case is that $v_8$ is a set of propositions of the form 'Ede wants $y$' containing 'Ede wants coffee' and something else. Thus the question and answer contribute consistent characterizations of the set of propositions $v_8$. If the answer instead had focus on $[_{\text{NP}}\text{Ede}]$, focus interpretation would dictate a set of propositions of the form '$x$ wants coffee', which would be inconsistent with the information contributed by the question, since

'Ede wants tea' is not of the required form.

This analysis of question-answer congruence in alternative semantics is due to von Stechow (1985/1989). The advantage of casting it in terms of the $\sim$ operator is that we do not need to state a rule or constraint specific to the question-answer configuration. Rather, focus interpretation introduces an variable which, like other free variables, needs to find an antecedent. Identifying the variable with the semantic value of the question is simply a matter of anaphora resolution.

To apply this analysis to focusing adverbs, we need to restate their lexical semantics in a way which does not refer directly to focus semantic values. We retain the idea that *only* quantifies propositions, but assume that the domain of quantification is an implicit free variable, the reference of which is to be fixed by context. Writing this variable over sets of propostions as $C$ in the notation *only(C)*, we can then assume the following representation:

(20) $[_{\mathrm{S}}\,\mathrm{only}(C)\,[_{\mathrm{S}}\,[_{\mathrm{S}}\,\mathrm{John\ introduced\ Bill}_{\mathrm{F}}\,\mathrm{to\ Sue}] \sim C]]$

Focus interpretation at the level of the syntactic argument of *only* contributes a constraint on $C$, the implicit domain of quantification for *only*.

The appropriate definition for the adverb is now the following, where to sidestep technical issues I have combined the assertion and presupposition.

(21) $\lambda C \lambda p \forall q\,[q \epsilon C \wedge {}^{\vee}p \leftrightarrow q = p]$

The implicit domain of quantification is $C$, $p$ is the proposition contributed by the overt argument of *only*, and $q$ is the universally quantified proposition variable. The effect of combining (18) with (21) in interpreting the representation (20) is as before, except that instead of identifying the domain of quantification with the focus semantic value of $[_{\mathrm{S}}\,\mathrm{John\ introduced\ Bill}_{\mathrm{F}}\,\mathrm{to\ Sue}]$, focus interpretation simply requires $C$ to be some subset of this focus semantic value. Furthermore, in the representation (20), $C$ remains a free variable. This is understood to mean that its reference is to be fixed pragmatically, subject to the constraint introduced by focus interpretation. This is a welcome change, since in the sentence below, the domain of quantification is understood as consisting of just three propositions, rather than the full set of propositions of the form 'John introduced $y$ to Sue'.

(22) John brought Tom, Bill, and Harry to the party, but he only introduced $\mathrm{Bill}_{\mathrm{F}}$ to Sue.

# 4 Compositional Issues

One might think that the theory just sketched (provided that it could be shown to be successful in a broad variety of empirical domains) would resolve the debate between structured meanings and alternative semantics in favor of an improved version of the latter. This is not completely true, though. While the structured meaning theory as construed above is an unacceptably weak theory of focusing operators, structured meanings — or something a lot like them — may be the right solution to another problem. So far, I have simply assumed that focus-sensitive operators have access to focus-determined semantic values

of their arguments, without saying where such focus-determined semantic objects come from. If focus is marked as a feature in syntactic trees, the problem is to formulate semantic and/or syntactic rules ensuring that the required semantic objects are available at the required syntactic level. In the example below, a structured semantic object or alternative set should be available at the S level, in order to interact with the semantics of *too*.

(23) $[_{\mathrm{S}}$ John introduced $\mathrm{Bill}_{\mathrm{F}}$ to Sue], too.

In both the structured meaning semantics and non-restricted alternative semantics, *too* is treated a a focus-sensitive operator, the semantics of which is defined in terms of focus-determined semantic values, and these semantic objects have to be made available at the level of the adverb. In restricted alternative semantics, we employ the representation (24), where focus interpretation is handled by the operator $\sim$, and *too* has a covert domain-of-quantification variable $C$.

(24) $[_{\mathrm{S}}\,[_{\mathrm{S}}\,[_{\mathrm{S}}$ John introduced $\mathrm{Bill}_{\mathrm{F}}$ to Sue$]\sim C]$ too$(C)]$

In order to define the semantics of $\sim$, we need access to focus-determined semantic objects at the level of the minimal S node.

A straightforward approach to the compositional semantics of focus is suggested by the discussion in Chomsky (1976): focused phrases are assigned scope, as if they were quantifiers:[6]

(25) $[_{\mathrm{S}}\,[_{\mathrm{S}}\,\mathrm{Bill}_{\mathrm{F}}\ \lambda e_2[_{\mathrm{S}}$ John introduced $\mathrm{e}_2$ to Sue$]]$, too$]$

In the standard formulation of the semantics for quantifier scope, a variable in the surface position of the quantifier is bound by a lambda operator, as indicated in the representation above. If we treat the focus feature as the principal operator in this structure, taking the scoped phrase and the abstract as arguments, we can produce the required focus-determined semantic objects by choosing an appropriate semantics for the focus feature. The definition required for structured semantics is the trivial pair-forming operator $\lambda x\,[\lambda P\,[\langle P, x\rangle]]$. The semantics appropriate for alternative semantics is an operator which forms the set of propositions obtainable by applying the abstract to some individual matching the focused phrase in type. And in general, it seems that most any desired semantics for focus could be encoded by choosing an appropriate function as the semantics for the focus feature in the quantificational representation.

There is a close similarity between this approach to the logical form of focus and the structured meaning semantics for focus, since the scoped representation for focus could be considered a syntactic representation of a structured proposition. Indeed, von Stechow (1985/1989) introduced structured propositions in this way. But the criticism of the structured semantics discussed in the previous section — that it is not a sufficiently constrained theory of focus-sensitive operators — does not apply in the present context, since a solution to

[6]Though Chomsky did not employ a representation as abstract as this, his point was to argue that the logical form of focus involves a bound variable in the position of the focused phrase. Chomsky assumed that focus has the force of an equality expressed in terms of a definite description, e.g. "the $x$ such that John introduced $x$ to Sue is Bill". As argued below, this is probably too strong as a semantics for focus in English.

the compositional problem does not aim to provide a theory of focus-sensitive operators. In particular, if we adopt restrictive alternative semantics, we have a constrained theory of focus-sensitive operators and constructions, and there is no need to look for further constraints in the compositional mechanism.

### Recursive definition of focus

A competitor to scoping — and more generally, to compositional mechanisms involving variable binding — is the recursive definition of focus semantic values proposed in (Rooth 1985). The idea is that focus semantic values are present not only at the level where they are used by the semantic rule for a focus-sensitive operator, but also at more embedded levels. That is, in the representation (24) or (25), focus semantic values are present not only at the level of *too* or $\sim$, where they are used by semantic rules for these operators, but also at more embedded levels. Here are the focus semantic values in question:

(26)

| | |
|---|---|
| $[\![\text{Bill}]\!]^{\text{f}} =$ | $E$, the set of individuals |
| $[\![\text{John}]\!]^{\text{f}} =$ | $\{j\}$, the unit set $[\![\text{John}]\!]^{\text{o}}$ |
| $[\![\text{Sue}]\!]^{\text{f}} =$ | $\{s\}$, the unit set of $[\![\text{Sue}]\!]^{\text{o}}$ |
| $[\![\text{introduced}]\!]^{\text{f}} =$ | $\{\mathbf{introduce}\}$, |
| | the unit set of $[\![\text{introduced}]\!]^{\text{o}}$ |
| $[\![[_{\text{VP}}\text{introduced Bill}_{\text{F}}\text{ to Sue}]]\!]^{\text{f}} =$ | $\{\lambda x \mathbf{introduce}(x, y, \mathbf{s}) \mid y \epsilon E\}$ |
| | the set of properties of the form |
| | 'introducing $y$ to Sue' |
| $[\![[_{\text{S}}\text{ John introduced Bill}_{\text{F}}\text{ to Sue}]]\!]^{\text{f}} =$ | $\{\mathbf{introduce}(\mathbf{j}, y, s) \mid y \epsilon E\}$ |
| | the set of propositions of the form |
| | 'John introducing $y$ to Sue' |

The focus semantic values are derived compositionally by means of a definition along the following lines:[7]

(27)a. The focus semantic value of a focused phrase of semantic type $\tau$ is the set of possible denotations of type $\tau$.

b. The focus semantic value of a non-focused lexical item is the unit set of its ordinary semantic value.

c. Let $\alpha$ be a non-focused complex phrase with component phrases $\alpha_1, ..., \alpha_k$, and let $\Phi$ be the semantic rule for $\alpha$, e.g. function application. The focus semantic value of $\alpha$ is the set things obtainable as $\Phi(x_1, ..., x_k)$, where $x_1 \epsilon [\![\alpha_1]\!]^{\text{f}} \wedge ... \wedge x_k \epsilon [\![\alpha_k]\!]^{\text{f}}$.

In the following subsections, I will review several phenomena which bear on the compositional semantics of focus.

### Scope islands

A quantificational representation suggests the possibility of sensitivity to structural constraints on the scope of operators. Using the term "scope" as a partly theory-neutral term for the level at which focus is interpreted, we can ask whether there are any constraints on the scope of focus, and if so whether they

[7] Technical complexities arise in connection with the intension operator; see Rooth (1985) for a better definition.

are parallel to constraints on other linguistic elements for which a notion of scope can be defined, such as quantifiers and wh-phrases. Consider operators taking scope from the subject position of relative clauses. As exemplified in (28a,b), an occurrence of *only* outside the NP modified by the relative clause can readily associate with a focus in this position. This appears to distinguish focus from quantifiers, in that the quantifiers in (28c,d,e) cannot take scope outside their embedding noun phrases.

(28)a. Dr. Svenson only rejected the proposal that $[\text{John}]_F$ submitted.
b. Dr. Svenson rejected only the proposal that $[\text{John}]_F$ submitted.
c. Dr. Svenson rejected the proposal that no student submitted.
d. Dr. Svenson rejected the proposal that exactly one student submitted.
e. Dr. Svenson rejected the proposal that almost every student submitted.

A similar contrast can be observed for operators originating in adverbial clauses:

(29)a. Dr. Svenson will only complain if $[\text{Bill}]_F$ doesn't finish his job.
b. Dr. Svenson only complains when $[\text{Bill}]_F$ leaves the lights on.
c. Dr. Svenson will complain if exactly one lab assistant doesn't finish his job.
d. Dr. Svenson complains when almost every lab assistant leaves the light on.

Association with focus is possible into the *if*- and *when*-clauses, meaning that focus can (descriptively) take scope outside an adverbial clause. The corresponding scope for the quantifiers seems impossible.

On the surface, these data refute the scoping approach to the logical form of focus, since that approach requires logical forms where the focused phrase has been moved out of an island. In contrast, the recursive definition of alternatives allows us to assume non-scoped representations where the required information is available. In evaluating this argument, we have to keep in mind that there are quantifier scope mechanisms on the market which do not assume LF movement, such as quantifier storage (Cooper 1975) and type raising (Hendriks 1993). But these are a variant mechanisms for achieving the same semantic end — binding of a variable by lambda. In the context of such theories, we could continue to maintain that there is something essentially different about the semantics of focus which explains island insensitivity. In several respects, the recursive definition of alternatives seems to embody a weakened notion of variable. First, while it allows for variation in the position of the focused phrase, there is no provision for co-variation: there is no issue as to whether two focus features correspond to the same variable or different ones.[8] Second, no operation corresponding to substitution for a variable can be directly defined, at least directly.

Since the form of the recursive definition of alternatives appears to be more than accidentally related to the weakened notion of variable, there may be some truth to the notion that the recursive definition of alternatives derives the island-insensitivity of focus in an interesting and explanatory way. However,

[8]In this respect focus in natural language is similar to variables in simple string pattern matching languages with wildcard variables. In such languages, a pattern "a?c?" matches the string "abcd" as well as the string "abcb".

as an argument against a semantics for focus involving lambda binding, the scope-island argument ignores the fact that the island-sensitivity of scope-bearing operators is quite diverse. Similar insensitivity to scope islands can be observed for indefinites, and for in situ *wh*. (On the latter, see Huang (1982), and Lasnik and Saito (1992) for a more recent discussion. On the former, see Abusch (1994).). Island insensitivity is illustrated for relative clauses in (30). The generic indefinite *a student* has scope outside the containing noun phrase, at the level of the operator *usually*. Similarly, in (30b) the second occurrence of *who* is structurally the subject of the relative clause, but semantically has scope at the level of the wh-complement of *tell*.

(30)a. Dr. Svenson usually rejects the first three proposals that a student submits.
b. Tell me who rejected the proposal that who submitted.

The group of island-escaping operators does not appear to be an arbitrary one. As mentioned in section 2, there is a connection between the semantics of focus and the semantics of questions. Several existing theories of *wh* semantics (e.g Karttunen 1977) make a different connection with indefinites, in that *wh* phrases themselves (as opposed to the question clauses they are embedded in) are given an existential semantics. This semantic similarity, together with the common insensitivity to scope islands, suggest that we should not be satisfied with a theory which treats focus as sui generis. We would like to replace the focus-specific definition with a theory in which focus is one of a family of island-insensitive operators which, roughly, use restricted variables to name families of propositions, open propositions, and/or their existential closures. It is not at all clear to me how this should be done.[9]

The above discussion assumes that the superficial insensitivity of focus to scope islands is genuine. Steedman (1991) takes a different tack, proposing that the grammatical representation of such examples contains no operators escaping islands. Instead, nested focus is involved. This idea can be rendered in restricted alternative semantics by extending the semantic representation to include a representation of the alternatives to the focused element itself. That is, instead of considering anything of appropriate type an alternative, we include an explicit specification of alternatives. Let us understand $A$ in the notation $\alpha_{F(A\ldots)}$ as naming the set of alternatives to $[\![\alpha]\!]^o$. The notation is convenient, in that it allows understood restricted alternative sets to be annotated. A focused occurrence of *think* understood as contrasting with *know* would be written:

(31) I $\text{think}_{\text{F}(\{\textbf{think},\textbf{know}\},\ldots)}$ she has a chance.

To interpret these representations in a direct way, let us fold the meaning formerly assigned to $\sim$ into the semantics of the focus feature. We adopt a

[9] I will only point out that the definition (27) is not sufficient as it stands, since it provides no way of dealing with the content of the properties restricting an indefinite or a wh phrase, i.e. with the property denoted by *student* in (30). See Abusch (1994) for an argument that the restrictions of indefinites in such examples have wide semantic scope. Abusch reduces the island-insensitivity of indefinites to the hypothesis that they are quantified by external operators, rather than by an operator originating in the indefinite NP. While this is suggestively reminiscent of logical forms involving $\sim$, it is not clear to me whether this idea could be applied in the semantics of focus.

scoped logical form:

(32) $[_{\mathrm{S}}\ \mathrm{think}_{\mathrm{F}(\{\mathbf{think},\mathbf{know}\},C)}\ [_{\mathrm{S}}\ \lambda e_4\ [_{\mathrm{S}}\ \mathrm{I}\ \mathrm{e}_4\ \mathrm{she\ has\ a\ chance}]]]$

Th focus feature is the main function, and to give the right characterization of $C$, we define $F(A,C)(x)(P)$ as adding the presuppositon that $C$ is the set of propositions of the form $P(y)$, where $y$ is an element of $A$. The assertion of $F(A,C)(x)(P)$ is simply $P(x)$. In the case of (32), $A$ has just two elements, and $C$ consists of the the propositions 'I think she has a chance' and 'I know she has a chance'.

This definition has a curious consequence: the focus feature itself becomes a focus-sensitive operator in the sense of restricted alternative semantics, assuming that we allow nested focus structures. The reason is that an embedded focus can restrict the $A$ argument of a higher one. In (33b) below, the embedded focused phrase $[_{\mathrm{NP}}\ \mathrm{Bill}]_{\mathrm{F}}$ takes scope at the level of $[_{\mathrm{S}}\ \mathrm{e\ left}]_{\mathrm{F}}$ , which in turn takes scope at the maximal level.

(33)a. $[_{\mathrm{S}}\ \mathrm{I\ said}\ [_{\mathrm{S}}\ \mathrm{Bill}_{\mathrm{F}}\ \mathrm{left}]_{\mathrm{F}}\ ]$

b. $[_{\mathrm{S}}\ [_{\mathrm{S}}\ \ [_{\mathrm{S}}\ [_{\mathrm{NP}}\mathrm{Bill}_{\mathrm{F}(\{b,\,d,\,h\},\,D)}]\ [\lambda e_2\ [_{\mathrm{S}}\ \mathrm{e}_2\ \mathrm{left}]]]_{\mathrm{F}(D,\,C)}]\ [\lambda e_3\ [_{\mathrm{S}}\ \mathrm{I\ said\ e}_3]]\ ]$

We take $A$ to be a set of three elements $b$ (Bill), $d$ (Dick), and $h$ (Harry). The focus on *Bill* constrains $D$ to be the set containing the three propositions 'Bill left', 'Dick left', and 'Harry left'. This set is then used as an explicit set of alternatives to the other focused phrase, and $C$ is contrained to be the set of propositions obrtainable by substituting elements of $D$ into the frame 'Mats said $p$'. The resulting value for $C$ is the set containing the propositions 'Mats said Bill left', 'Mats said Dick left', and 'Mats said Harry left'. This is the same as the one obtained in the simpler non-nested structure below, which has just one focus and one focus interpretation operator.

(34) $[_{\mathrm{S}}\ [_{\mathrm{NP}}\mathrm{Bill}_{\mathrm{F}(\{b,\,d,\,h\},\,C)}]\ [\lambda e_2\ [_{\mathrm{S}}\ \mathrm{I\ said}\ [_{\mathrm{S}}\ \mathrm{e}_2\ \mathrm{left}]]]]$

While this example involves no scope island, a similar nested analysis of scope island examples might succeed in building a bridge to the island. Suppose that the scope of the focus on $[_{\mathrm{NP}}\mathrm{John}]$ in (28a) is the relative clause, and that the relative clause bears an additional focus feature. This would dictate the representation:

(35) $[_{\mathrm{S}}\ \mathrm{only}(C)\ [_{\mathrm{S}}\ [_{\mathrm{S}'}[_{\mathrm{S}'}[_{\mathrm{NP}}[_{\mathrm{NP}}\ \mathrm{John}]_{\mathrm{F}}(\mathrm{A,D})]\ [\lambda e_2\ [_{\mathrm{S}'}\mathrm{that\ e}_2\ \mathrm{submitted}]]]\ \mathrm{F}(D,C)]\ [\lambda e_3\ [_{\mathrm{S}}\ \mathrm{Dr\ Svensen\ rejected}\ [_{\mathrm{NP}}\ \mathrm{the\ proposal\ e}_3]]]]]$

Here $\mathrm{e}_2$ is the trace of the scoped relative clause, and $\mathrm{e}_3$ is the trace of $[_{\mathrm{NP}}\ \mathrm{John}]_{\mathrm{F}}$, which takes scope inside the relative clause. Just as above, we obtain equivalence with a simpler non-nested representation where $[_{\mathrm{NP}}\ \mathrm{John}]_{\mathrm{F}}$ has been moved out of the relative clause:

(36) $[_{\mathrm{S}}\ \mathrm{only}(C)\ [_{\mathrm{S}}\ [_{\mathrm{S}'}[_{\mathrm{S}'}[_{\mathrm{NP}}[_{\mathrm{NP}}\ \mathrm{John}]_{\mathrm{F}}(\mathrm{A,C})]\ [\lambda e_3\ [_{\mathrm{S}}\ \mathrm{Dr\ Svensen\ rejected}\ [_{\mathrm{NP}}\mathrm{the\ proposal}\ [_{\mathrm{S}'}\mathrm{that\ e}_3\ \mathrm{submitted}]]]]]]]$

Depending on one's theory of constraints on movement, (35) or a similar representation with nested focus and nested movement might successfully bridge the scope island.

**Multiple focus and multiple focus operators**

As mentioned above, two distinct foci may be associated with a single operator:

(37) John only introduced $[_{\text{NP}}\,\text{Bill}]_{\text{F}}$ to $[_{\text{NP}}\,\text{Sue}]_{\text{F}}$

Alternately, they may associate with distinct operators:

(38) John only introduced $[_{\text{NP}}\,\text{Bill}]_{\text{F}}$ to Mary.
He also only introduced $[_{\text{NP}}\,\text{Bill}]_{\text{F}}$ to $[_{\text{NP}}\,\text{Sue}]_{\text{F}}$

The adverb *also* has maximal scope, and the sentence may be read as presupposing that for some $z$ distinct from Sue, John introduced only Bill to $z$. Similarly, in (37), *Bill* can be associated with *only*, and the focus on *Sue* can be read as having a discourse function, for instance suggesting that the question "To whom did John introduce only Bill?" is being answered.

Depending on one's approach to the compositonal problem, representing these readings may or may not pose a problem. Krifka (1991) proposes a solution within the structured meaning framework, which in addition to possibilities such as those above, treats nested focus structures. Consider the reading of (39) which presupposes that there were past occasions when John only drank $x$, where $x$ is distinct from wine.

(39) Last month John only drank beer.
He has also only drunk WINE.

Krifka proposes a recursive focus structure $[_{\text{NP}}\,[_{\text{NP}}\,\text{wine}]_{\text{F}}]_{\text{F}}$, where the outer focus is associated with *only*, and the inner one with *also*. The rationale for this can be seen by considering a scoped representation:

(40) also $[_{\text{S}}\ [\text{wine}]_{\text{F}}\ \lambda e_1[_{\text{S}}$ John has also only $[_{\text{VP}}\ [\text{e}_1]_{\text{F}}\ \lambda e_2[_{\text{VP}}\text{drunk e}_2]]]]$

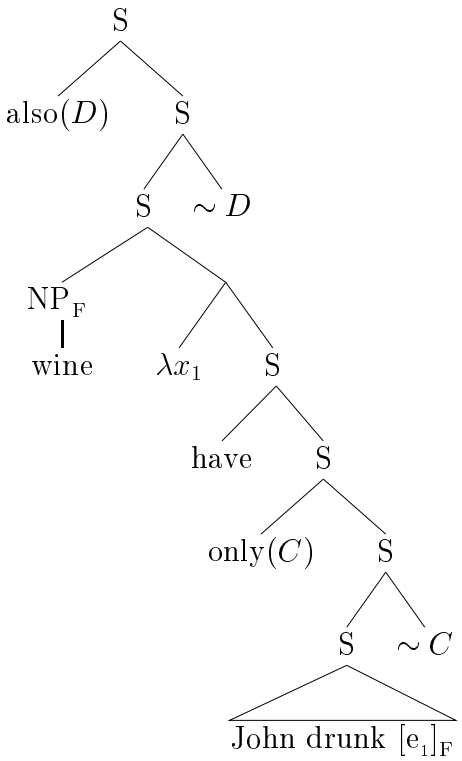
If one undoes the scoping (say working from the top to the bottom), one finds that the focus which is next to *also* ends up as the innermost focus. Krifka does not work with logical forms, but rather uses an extended type system to achieve similar ends within an in-situ interpretation strategy.

An approach to the compositional problem using the recursive definition of alternatives entails that all foci are bound by the first focus-interpretation operator they meet. This does not have an impact in simple examples, because of the possibility of scoping a focused phrase to a level where it escapes one focus operator, in order to be captured by the next. The logical form for (38) would be:

(41) $[_{\text{S}}\,\text{also}(D)\ [_{\text{S}}\,[_{\text{S}}\ [\text{Sue}]_{\text{F}}\ [_{\text{S}}\,\lambda x_1\ [_{\text{S}}\,\text{only}(C)\ [_{\text{S}}\,[_{\text{S}}\,\text{he introduced e}_1\text{ to }[_{\text{NP}}\,\text{Sue}]_{\text{F}}]$
$\sim C]]]]\sim D]]$

Examples such as (39) can be represented by means of Krifka's nested focus proposal, combined with scoping of the inside focus to a level outside the first focus-sensitive operator:

(42)




While there is an appearance of conflict between such logical forms and an in situ approach to focus interpretation, the opposite is true: once we have a theory which allows for scoping (which we do, motivated by quantifier scope), we would be hard put to keep focused phrases from being optionally assigned scope.

Genuine problem cases can be constructed by putting the focus which associates with the top focus-sensitive operator in an island, so that we would not expect that focus to be able to escape the lower operator by structural scoping.

(43) We only$_3$ recovered [$_{\text{NP}}$the diary entries [that Marylyn$_{\text{F3}}$ made about John]]
We also$_1$ only$_2$ recovered [$_{\text{NP}}$the diary entries [that Marylyn$_{\text{F2}}$ made about [Bobby]$_{\text{F1}}$]]

While the example is complex, I find it clear that *Bobby* can be read as associated with *also*, as informally indicated by the indexing. But in order to escape being bound by *only*, [Bobby]$_{\text{F1}}$ would have to scope outside the containing complex nominal.

Unless this example can be accounted for by something like a nested focus analysis, its theoretical impact is quite dramatic: the recursive definition of alternatives has no advantage over the scoping approach to the logical form of focus.

### Bound variables

Chomsky (1976) discussed a bound variable reading of (44), one which suggests an alternatives of the form '$x$ was betrayed by the woman $x$ loved'.

(44) [$_{\text{NP}}$ John]$_{1,\text{F}}$ was betrayed by the woman he$_1$ loved.

This reading is predicted fairly immediately by a quantificational representation, since the lambda operator produced by scoping a quantifier has the opportunity of binding a pronoun. Chomsky further pointed out that the variant (45a) does not have the bound reading suggesting alternatives of the form 'the woman $x$ loved betrayed $x$'.

(45)a. The woman $\text{he}_1$ loved betrayed $[_{\text{NP}}$ John$]_{1,\text{F}}$.
b. Tell me who the woman $\text{he}_1$ loved betrayed.
c. The woman $\text{he}_1$ loved betrayed $[_{\text{NP}}$ at most one man$]_1$.

Since this is parallel to weak crossover effects for overt wh-movement (45b) and quantifiers (45c), a quantificational analysis of focus can reduce the crossover effect for focus to crossover effects for quantification. This argument is not as strong as one might think, though: it provides reason to assume that bound variable readings for pronouns with focused antecedents involved representations where the antecedent is scoped, but does not bear on the general interpretation strategy for focus. As shown in Rooth (1985:76), the most straightforward combination of the in-situ interpretation strategy with the standard semantics for variable binding entails that the logical form for a bound variable reading of (44) is (46a) rather than the non-scoped structure (46b).

(46)a. $[_{\text{S}}\,[_{\text{NP}}$ John$]_{1,\text{F}}\,[_{\text{S}}\,\text{e}_1$ was betrayed by the woman $\text{he}_1$ loved$]]$
b. $[_{\text{S}}\,[_{\text{NP}}$ John$]_{1,\text{F}}$ was betrayed by the woman $\text{he}_1$ loved$]$

(46b) is a representation of a distinct reading suggesting alternatives of the form '$x$ was betrayed by the woman John loved'.

Turning to the logical form of (45a), in order to generate a bound variable reading, the focused phrase would have to be scoped, and so parallism with quantifiers and in situ wh is accounted for.

According to this analysis, quantifier-type scoping of focused phrases is needed in order to generate bound variable readings for pronouns, but is not required in order to interpret focus. This makes an interesting prediction: configurations where focus descriptively takes scope through a scope island should not be consistent with a bound variable reading for a pronoun outside the island. For instance, (47a) should not have the reading 'John is the only $x$ such that we discussed the proposal $x$ made with $x$'s advisor.

(47)a. We only discussed the proposal $[_{\text{NP}}$ John$]_{1,\text{F}}$ made with $\text{his}_1$ advisor.
b. $[_{\text{S}}\,[_{\text{NP}}$ John$]_{\text{F}}\,[_{\text{S}}\ \lambda e_1\ [_{\text{S}}$ we only discussed the proposal $\text{e}_1$ made with $\text{his}_1$ advisor$]]]$

The prepositional phrase [with $\text{his}_1$ advisor] is outside the relative clause island. A bound variable reading requires scoping $[_{\text{NP}}$John] to the level where the resulting lambda operator can bind the pronoun $[_{\text{NP}}$his]. That is, it requires the representation (47b), where the focused phrase has scoped outside the island configuration. An in-situ representation would not preclude association of *only* with focus, but would not represent a bound variable reading. I think the prediction that (47a) does not have a bound variable reading might be right, though the intuition is quite delicate.

For further discussion of bound variable readings for pronouns with focused antecedents, see Kratzer (1991).

### Conclusion on compositional issues

Alternative semantics as originally conceived is a theory focus-sensitive operators which simultaneously explains the island-insensitivity of focus, based on the recursive definition of alternatives. While the arguments discussed here are not entirely conclusive, they justify scepticism about the second part of the package. Given standard assumptions about scope, the theory breaks down in configurations combining multiple focus operators with islands. This seems to show that, contrary to initial impressions, the recursive definition of alternatives has no advantage over the scoping approach to the syntax/semantics interface for focus. Independently, and in part undermining the first point, we should not necessarily expect focused phrases to be sensitive to islands if they were quantifier-like, since not all scope-bearing operators are island-sensitive.

I think we might as well adopt scoping or some other compositional mechanism with a semantics of lambda binding as our compositional semantics for focus. This leaves us without an explanation for island-insensitivity. But unless we are arguing in terms of a systematic account of why some scope-bearing operators are island sensitive and others not, this in not exactly a defect in the theory of focus, just a sub-case of a general problem. If focus were instead island-sensitive, we would be in an entirely equivalent position of needing to explain why.

## 5 Alternatives versus existential presupposition

In restricted alternative semantics, the focus interpretation operator introduces an alternative set characterized by a presuppositional constraint. It can be emphasized that this theory does not equate the semantics of focus with existential presupposition. That is, in the example below, focus does not introduce a presupposition that someone is going to dinner with the speaker.

(48) $\text{John}_{\text{F}}$ is going to dinner with the speaker.

Assuming that the focus is interpreted at the clause level, a set of alternatives of the form '$x$ is going to dinner with the speaker' is introduced. This is weaker than an existential presupposition in that such alternatives can be relevant without any of them necessarily being true.

In the above example, it is in fact hard to determine whether the weak semantics of introducing alternatives is to be preferred, since in many contexts an existential presupposition would be satisfied. For instance, in the question context below, the questioner might well be understood as taking for granted that someone is going to dinner with the speaker, so that an existential presupposition in the answer would be satisfied.

(49) A: Who is going to dinner with the speaker?
B: $\text{John}_{\text{F}}$ is going.

For comparison, consider an answer with a cleft instead of just intonational focus:

(50) It's John who is going.

The cleft sentence is an appropriate answer to A's question in (49). According to standard assumptions a cleft does introduce an existential presupposition (e.g. Karttunen and Peters 1979). So there would be no problem with assuming that the intonational focus in (49) introduced an existential presupposition, perhaps in addition to introducing alternatives.

A standard way of diagnosing the presence of presupposition is a projection test. According to most authors, the presupposition of the complement of *unlikely* projects to the global environment (e.g. Karttunen and Peters 1979:7). The clause (51a) carries a presupposition that Mary is away. In the syntactic context (51b), this presupposition is projected.

(51)a. John knows that Mary is away.
b. It's unlikely that John knows that Mary is away.

The pragmatic consequence is that someone using sentence (51b) will typically be perceived as taking for granted that Mary is away. This indeed seems correct; working backward, we can use our intuitions about the presupposition of the complex sentence (51b) as a diagnostic for determining the presupposition of (51a).

Let us apply this diagnostic to intonational focus and clefts. In my department, a football pool is held every week. Participants place bets by predicting the precise score of games. The contest is set up so that at most one person can win in a given week. If nobody makes a correct prediction, nobody wins, and the jackpot is carried over to the next week. Consider the following conversation:

(52) A: Did anyone win the football pool this week?
B: I doubt it, because it's unlikely that $\text{Mary}_{\text{F}}$ won it, and I know that nobody else did.

Suppose that B knew that Mary had made a silly bet, and so was unlikely to have won. He further knew that nobody else won, and therefore doubted that there was any winner at all.

I assume that in B's response, the focus on $[_{\text{NP}}\text{Mary}]$ has scope over the clause $[_{\text{S}}$ Mary won it]. That is, we have the following representation:

(53) it's unlikely that $[[\text{Mary}_{\text{F}}$ won it$]\sim C]$, and I know that nobody else did.

The alternative set $C$ consists of propositions of the form '$x$ won the football pool', where $x$ ranges over the people in the department who participate: 'Mary won the football pool', 'Sue won the football pool', and so forth. The question we want to consider is whether it would be possible to assume that the focus interpretation operator contributes, in combination with a characterization of the alternative set, a presupposition that some alternative is true. In this case, this would amount to the presupposition that someone won the pool this week. It is clear that this existential presupposition would be unwelcome: it would project to the global context, and at this level it would be incompatible with the rest of what B was saying. Under normal circumstances, B could not be assuming that someone had won at the same time as he was saying that he doubted that anyone had won.

For comparison, consider a cleft variant:

(54) A: Did anyone win the football pool this week?
B: I doubt it, because it's unlikely that it's $\text{Mary}_{\text{F}}$ who won it, and I know that nobody else did.

Again, I am assuming that clefts do introduce an existential presupposition. This presuppositon is expected to project, resulting in a conflict between the projected presuppositon that someone won, and the rest of what B said. Indeed, this cleft version of B's response seems quite incoherent and contradictory. This tends to confirm the conclusion that if focus in (52) introduced an existential presupposition, the presupposition would project, resulting in perceptible contradiction or incoherence.

I conclude that we should not give focus a semantics of existential presupposition. Assuming that we settle on the weaker semantics of evoking alternatives, there is some work to do in explaining how the alternatives '$x$ won the football pool' are licensed by the discourse context (52). Since A asked a yes-no question rather than a wh-question, we can not directly identify $C$ with the semantic value of the question. The same problem arises in simpler dialogues, where both the yes-no question (55a) and the wh-question (55b) license an answer with a focus appropriate for the the wh-question.

(55)a. Did anyone win the football pool this week?
b. Who won the football pool this week?
c. $\text{Mary}_{\text{F}}$ won it.

For present purposes, it is sufficient to observe that the pragmatics of questions and answers is complicated, involving such things as implicated questions and over-informative answers. An account of the pragmatics of evoked alternatives in question-answer dialogues will have to take this into account.

## Association with negation

Jackendoff (1972) treated negation as an operator associating with focus. Naively, the focus effect can be described in the following way. In saying the sentence (56), I am not using the negation to deny the content of the whole sentence. Instead, the negation has a more limited scope — only the *car* part is negated; the remainder of the sentence is not negated, in the sense that I am granting that I took something of yours.

(56) I didn't take your $[\text{car}]_{\text{F}}$

For somebody familiar with the Boolean semantics for negation, this sounds like a confused way of talking. But this simply means that we have to modify this semantics. A rule quite similar to the one for *also* can be given in alternative semantics:

> When combined with the clause $\phi$, *not* yields the assertion that the proposition $[\![\phi]\!]^{\text{o}}$ is false, and the futher assertion or presupposiiton that some proposition in $[\![\phi]\!]^{\text{f}}$ is true.

That is, $\phi$ is false but some alternative (in the example above, something of the form 'I took your $Q$') is true.

In restricted alternative semantics, we would assume logical forms with the following geometry:

(57) [not(C)[ [ .... $[...]_F$ ... ] $\sim C$] ]

Just as with focusing adverbs, *not* has an implicit argument $C$, interpreted as a set of alternatives to its overt argument. The semantics of *not* would entail that some alternative is true.

Since such an analysis simply puts *not* into the class of focusing adverbs, it is innocuous from the point of view of the general theory of focus. I think putting this much into the semantics of *not* is misconceived, though, because the effect disappears in certain contexts. In the discourse below, speaker B is certainly not using focus to convey an assertion or presupposition that someone is going to dinner with the speaker, since this is inconsistent with the first thing he said.

(58) A: Is anyone going to dinner with the colloquium speaker?
B: I don't know. $I_F$ 'm not going

Just as in in the conditional (52) above, focus is presumably being used to evoke the alternatives, without any commitment to any alternative being true. Adapting the logical form for the conditional, this suggests a representation in which negation has scope over the focus interpretation operator:

(59) [not [ $I_F$ 'm going ] $\sim C$]

Given this representation, the discourse context should license a set of alternatives of the form '$x$ is going'. Details aside, this is plausible. Another possibility, suggested to me by Regine Eckhard, is that the context licenses negative alternatives in addition to positive ones. In this case, we can assume the opposite scope:

(60) [ [not [$I_F$ 'm going ]] $\sim C$]

In either case, we are dealing not with association of negation with focus, but with ordinary boolean negation, combined with a focus with a discourse motivation.

Once we acknowledge that representations of this kind are required, assuming in addition a special lexical negation with an argument position for implicit alternatives becomes dubious. In contexts where we propose a logical form involving the focus-sensitive negation, another representation along the lines of (59) or (60) would also be possible, since these representations have the effect of weakening the constraints on context. So while there is no formal objection to focus-sensitive negation, it is redundant. This presumably makes it unlearnable for a language-learner who has mastered the general semantics of focus.

Further, if in the face of this objection we propose a lexical focus-sensitive negation, we are on a slippery slope. Intuitions of existential presupposition appear to be comparable for a variety of propositional operators, such as modals and sentence adverbs, and for sentence-embedding verbs:

(61)a. $John_F$ might be going.
b. $John_F$ is probably doing it.
c. Mary said that [$John_F$ is going]

At the limit, we would have distinct lexical focus-sensitive versions of all words of the language, surely an absurd conclusion.

Jackendoff (1972) realized that existential presupposition was too strong as a semantics for focus-sensitive negation. He proposed a weaker semantics rather similar to the notion of alternatives being relevant in the discourse. Translating this into my notation, we assume (57) as a logical form for focus-sensitive negation, but drop the assumption that the semantics of *not* adds a presupposition that some element of $C$ is true. We replace the existential presupposition with something along the lines of the alternatives in $C$ being relevant in the discourse. In other words, the semantics of focus-sensitive negation is: "the overt argument is false, and elements of $C$ are relevant", rather than "the overt argument is false, and some element of $C$ is true". This is so weak that there is no reason to adopt a logical form where the negation has access to $C$ as an argument. Instead, we can assume an LF with the geometry of (59), where focus is interpreted at the same level as in (57), but does not interact with the negation.

# 6 Focus in general

I have claimed that intonational focus in English has a weak semantics of evoking alternatives. This conclusion has no immediate bearing on the semantics of other constructions in English and other languages which we choose to describe as focusing constructions. For instance, a cleft has a strengthened semantics of existential presupposition and exhaustive listing. According to the analysis of of Szabolsci (1981), the semantics of focus movement in Hungarian is similar to this cleft semantics, or perhaps even stronger.

Does it follow that we should drop any broad notion of focus from our informal vocabulary, replacing a discussion of the semantics of focus with e.g. "the semantics of the prominence feature in English" and "the semantics of such-and-such movement in Hungarian"? In the medium term, I think this might be a good idea. The right kind of question to ask at this point is not "is construction X in language Y a focusing construction", but rather "what is the semantics of X in Y, and how does this explain the properties of X in Y". In pursuing the second question, it is a handy research strategy to check whether the analogues of English prominence-feature-sensitive constructions are X-sensitive in language Y. This does not mean that we are using these constructions as diagnostics for an abstract formative with a universal semantics.

Still, it would be surprising if at least many of the things in the world's languages that we call focus did not turn out to have a common semantic core. Until we have done more work, we have little basis for speculating about this. Conceivably, though, the common core might turn out to be the weak semantics of the prominence feature in English, with some constructions and morphemes expressing additional semantic content — such as existential presupposition or exhaustive listing — in addition to and in terms of the basic semantics.

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