The representation of focus and its implications: towards an alternative account of some ‘intervention effects’

Jean-Roger Vergnaud and Maria-Luisa Zubizarreta
U.S.C
vergnaud@usc.edu/zubizarr@usc.edu

1 Two types of questions

In the literature on the semantics of questions, there has been much discussion as to whether questions are ‘strongly’ exhaustive or not; cf. Karttunen (1977), Groenendijk and Stokhof (1984), Heim (1994), Rullman (1995), Beck and Rullman (1999). Heim (1994) argues that strong exhaustivity is not an inherent feature of questions. Beck and Rullman (1999) concurs and provides additional evidence that fronted wh-questions have non-exhaustive readings, at least in English and in German. A fact cited is the compatibility of such questions with the ‘marker of nonexhaustivity’ for example:

(1) Who for example was at the party last night?

Interestingly, there is a type of question in French which appears to resist such markers of nonexhaustivity. The facts are described below. Consider the wh-in-situ question in (2):

---

1 We are happy to dedicate this article to our long time colleague and friend Henk van Riemsdijk. During the year 1985-6, we were both invited to teach at Tilburg University. This period, spent working with Henk’s group and amidst the Dutch linguistic community, has remained one of the happiest and most productive in our professional lives. This essay is just a small token of our gratitude to him, and to them.

2 A question is deemed ‘strongly’ exhaustive if any answer to it must construed as definitively exhaustive.

3 The term in-situ refers to the surface linear arrangement of items. The analysis in this essay is agnostic as to whether this linear arrangement directly reflects the primordial c-command arrangement or arises as a consequence of remnant movement.
La jeune artiste a dansé avec qui?
‘The young artist danced with whom?’

There are two versions of that question form, with two distinct prosodies:

a. La jeune artiste a dansé avec qui?
b. La jeune artiste a dansé avec qui?

In the forms in (3), there is a correlation between the intonation of the wh-phrase and that of the preceding stressed item within the same utterance (artiste in (3a), dansé in (3b)): the two phrases have opposite contours, echoing each other (cf. Martin 1975). The actual intonation of the wh-phrase, whether falling or rising, is not crucial, however. The critical prosodic difference between the two utterances in (3) is analyzed in (4):

a. Each utterance is a sequence of two prosodic domains $P_1$, $P_2$ in that order, with $P_1$ subordinate to $P_2$.
b. The prosodic domains $P_1$ and $P_2$ have different contents in (3a) and (3b).

This analysis is displayed in (5), where # is the boundary between $P_1$ and $P_2$:

a. La jeune artiste # a dansé avec qui? (corresponding to (3a))
b. La jeune artiste a dansé # avec qui? (corresponding to (3b))

In each prosodic domain, the main stress is at the right boundary. The subordination of $P_1$ to $P_2$ means that the wh-phrase has main stress within the whole utterance. The pattern in (5a) is that of a regular assertion, with main stress located at the end of the predicate phrase and secondary stress located at the end of the subject phrase. The pattern in (5b) is that of a fronted wh-question, except for the surface position of the wh-phrase and,

---

4 We are using the forms with a falling contour on the wh-word to avoid confusion with the use of wh-in-situ questions as echo questions.
possibly, its relative prominence. In fact, the question form in (5b) appears to have all the semantic properties of a fronted wh-question. In particular, it is compatible with the ‘nonexhaustivity marker’ *par exemple* ‘for example’:

(6) a. Avec qui *par exemple* (est-ce que) la jeune artiste a dansé?  
    ‘With whom for example (did) the young artist dance?’

b. La jeune artiste a dansé *#* avec qui *par exemple*?  
    ‘The young artist danced *#* with whom for example?’

In that respect, the question form in (5b), and the fronted wh-questions, contrast with the question form in (5a). The utterance in (7) is distinctively odd:

(7) *La jeune artiste *#* a dansé avec qui *par exemple*?  
    ‘The young artist *#* danced with whom for example?’

This suggests that the question form in (5a) is strongly exhaustive. There is independent evidence to that effect. The question can be naturally answered with a cleft sentence like that in (8), whereas many speakers perceive that answer as providing information beyond what is requested by the fronted wh-counterpart to (5a):

(8) C’est avec Pierre que la jeune artiste a dansé  
    ‘It is with Pierre that the young artist danced.’

We shall call the question form in (5a) (=(3a)) a contrastive question (c-question), for reasons to be articulated below. There are a number of other differences between the two types of questions just identified. For instance, a wh-word in a c-question may be conjoined with a negative polarity item as illustrated in (9), a surprising property:

---

5 The subject in the question in (5ii) in the text carries a tertiary stress, with a falling intonation echoing the rising contour on *dansé*.

6 That is, it is odd with *par exemple* forming a single intonational group with the wh-word. If *par exemple* is detached as in (i) (the comma marks an intonational hiatus), the utterance is felicitous. In such a form, *par exemple* modifies the whole utterance, not the wh-word.

(i) Marie *#* a dansé avec qui, *par exemple*?

7 The property of ‘strong exhaustivity’ is then merely an avatar of the exclusive character of the presupposition of the question.
4. The representation of focus and its implications

(9) La jeune artiste a dansé avec qui et personne d’autre?
   ‘The young artist danced with whom and noone else?’

No such combination is possible in a wh-fronted question (or its in situ transform):

(10) *Avec qui et personne d’autre (est-ce que) la jeune artiste a dansé?
   ‘With whom and noone else (did) the young artist dance?’

(11) *La jeune artiste a dansé avec qui et personne d’autre?
   ‘The young artist danced with whom and noone else?’

Another characteristic property of c-questions is the unavailability of pair-list readings in structures where the wh-word cooccurs with a universal quantifier. We turn to a brief description of that property.

2 Pair-list readings

Consider the wh-fronted question in (12) and its c-counterpart in (13):

(12) Avec qui (est-ce-que) chaque artiste a dansé?
    ‘With whom (did) each artist dance?’

(13) Chaque artiste a dansé avec qui?
    ‘Each artist danced with whom?’

The LFs of these questions display an interaction between chaque ‘each’ and qu ‘wh.’ There are two logical possibilities: chaque ‘each’ may have wide scope over qu ‘wh’ or conversely, the pair-list reading being that in which chaque ‘each’ has wider scope. Both readings are available with the fronted wh-question in (12). However, the corresponding c-question in (13) lacks the pair-list reading, as was first uncovered by Vergnaud and Zubizarreta (2001, 2002, 2003). In those works, we showed that the general unavailability of pair-list readings in c-questions follows from a universal principle which bars the cooccurrence in a statement of independent contrasts or negations:8

---

8 The principle is formulated in terms of the notion ‘statement’, a notion itself defined in terms of the more primitive notion of point of view. For example, the sentence in (i) includes two points of view and, hence, two statements, that by the
A statement may contain at most one contrast or negation.

The demonstration will proceed as follows. First, we will establish the existence of two types of presuppositions and focus for utterances with explicit presuppositions, such as, e.g., the answers to the question in (15):

(15) Did John see Mary or Susan?

Adopting standard terminology, the two types of presupposition/focus will be called contrastive and inclusive/informational, respectively. We will then extend this result to utterances with implicit presuppositions, such as, e.g., the answers to the c-question in (5a). Finally, we will identify the two types of questions exhibited in sections 1 and 2 with the two types of presupposition/focus:

(16) A strongly exhaustive question is one with a contrastive presupposition. A question with an inclusive/informational presupposition is not strongly exhaustive.

In the course of our demonstration, we will generalize the analysis in Chomsky (1976) to both types of focus and we will revise the standard notion of focus, as well as the standard notion of LF. We will also reduce quantifiers to logical connectives, in the spirit of Skolem’s fundamental insight.

---

speaker, represented as \([\text{John said that}]\), and that attributed to John by the speaker, represented as \([\text{Mary was not fair}]\):

(i) John said that Mary was not fair.

9 What will not be explained is why the particular pairing between form and interpretation described in section 1 in the text obtains, and not the converse. There appears to be no language in which a \(wh\)-fronted question would have a strongly exhaustive construal while its in-situ counterpart would have an inclusive presupposition. See Vergnaud and Zubizarreta forthcoming for a proposal. Henceforth, by exhaustivity we mean ‘strong’ exhaustivity, unless otherwise stated.
6 The representation of focus and its implications

3 Two types of focus: contrastive vs. inclusive/informational focus.

The foundations of the theory of focus were laid out in Chomsky (1971), Jackendoff (1972), and Chomsky (1976). Chomsky (1976) shows that contrastive focus can be subsumed under quantification. This result can be generalized to the other type of focus, informational focus. We start by discussing the distinction between the two types of focus. Consider the question-answer pairs in (17)-(18):

(17) Did John see Mary or Susan?
    He saw Mary.

(18) Did John see Mary or Susan?
    He saw Mary.

The question in (17) displays ‘contrastive stress’, with intonation rising to high pitch on Mary and then falling on Susan. The question in (18) is uttered with a simple rising intonation on the disjunction Mary or Susan and with higher stress on or than on did. The prosodic difference between the two questions correlates with a semantic one, reflected by the answers: the answer in (17) implies that John did not see Susan, but the answer in (18) has no such logical implication and, e.g., could be continued by And also Susan. In other words, the question in (17), but not that in (18), is (strongly) exhaustive. The semantic difference between the two question-answer pairs in (17)-(18) has obviously to do with the fact that the connective or is interpreted differently in the two questions:

10 The relative prominence of or vs. did is a critical feature. If did in the question in (18) in the text has more stress than or, then the question is interpreted as a yes-no question. In both cases, the question may be analyzed as the reduced form of a conjunction as shown in (i)-(ii). The same reduction analysis applies to the question in (17) in the text. In that form, the relative prominence of or and did does not affect the interpretation.

(i) [did he see Mary] or [did he see Susan]?
(ii) [did he see Mary] or [he see Susan]?

11 The logical connective or does not have scope over the question, which is not a proposition. It only has scope over the propositional subpart of the question. See (31) in the text.
The disjunction marked by or is exclusive in the question in (17), but inclusive in the question in (18).

The simplest account will assume that:

(20) a. The semantic difference between the two question-answer pairs in (17)-(18) is reducible to the logical distinction between exclusive and inclusive disjunction.

b. An answer \( A(Q) \) to a question \( Q \) reflects the logical properties of \( Q \).

We take (20a) to be self-evident. As for the hypothesis in (20b), it has to be qualified: it will only apply to the natural answers to \( Q \) in the sense of Chomsky (1971). To illustrate, consider the assertion in (21):

(21) John saw Mary and Susan

With neutral intonation, this assertion is a natural answer to the question in (18). With emphatic stress on and, it can be an answer to the question in (17), but with the implication that the presupposition of that question—that John could not have seen both Mary and Susan—is erroneous. In some sense, it is then a ‘second-order’ answer, not a ‘natural’ one. The law in (20b) means that the logical structure of a question \( Q \) turns up in the Logical Form (LF) of a natural answer to \( Q \). For example, the LF of a natural answer to the question in (17) or in (18) must include the disjunction in (22), where \( OR^\delta \) is defined as in (23):

(22) \( (\text{John Past see Mary}) \ OR^\delta (\text{John Past see Susan}), \delta = e, i \)

(23) a. \( OR^e = \text{‘exclusive or’} \)

b. \( OR^i = \text{‘inclusive or’} \)

Given a question \( Q \) and a natural answer \( A(Q) \) to \( Q \), the part of the LF of \( Q \) that turns up in the LF of \( A(Q) \) is called the presupposition of \( A(Q) \). Thus, the LF formula in (22) with \( \delta = e \) (resp. \( i \)) is the presupposition of the answer in (17) (resp. (18)). The law in (20b) is restated in (24) in terms of that notion:

---

12 This form is derived from [John saw Mary] and [John saw Susan] by Conjunction Reduction.
Let $Q$ be a question. A natural answer to $Q$ is one whose presupposition is the same as that of $Q$.

This is the law proposed in Chomsky (1971) and in Jackendoff (1972), where analogous notions of ‘presupposition’ are assumed. By this account, the nonasserted subpart of the LF of a sentence is unrealized at PF: the LF of an answer in (17)-(18) is the disjunction in (22), but only the first disjunct in it is pronounced. This is a significant departure from standard assumptions, according to which only copied occurrences of a structure may be elided. This essay may be viewed in part as a defense and illustration of this hypothesis. The subpart of the LF of a natural answer that has a PF representation is called the focus of that answer. For example, the focus of an answer in (17)-(18) is the LF disjunct in (25):

(25) [John Past see Mary]

The above description can be generalized, but a notion of ‘exclusive disjunction’ different from that of standard logic is called for. The required notion, call it contrastive disjunction, is defined in (26), where $\text{OR}_c$ denotes the corresponding connective:

(26) a. $\text{OR}_c$ is associative
   b. The formula $P_1 \text{OR}_c P_2 \text{OR}_c \ldots \text{OR}_c P_n$ is true just in case one and only one of the formulae $P_i$, $1 \leq i \leq n$, is true. It is false otherwise.

13 The assertion in (i) has the same LF as the answer in (17) (resp. in (18)) in the text. The assertion in (i) does not count as a felicitous answer to the question in (17) (resp. (18)), though, for reasons independent of the grammar (the answer is just uninformative).

(i) John saw Mary $\text{OR}_c$ (resp. $\text{OR}_i$) John saw Susan

The fact that the utterance in (21) in the text is a natural answer to the question in (18), but not to that in (17), can be accommodated by recognizing the connective and as a ‘subpart’ of $\text{OR}_i$. A plausible framework for this treatment of and in relation to $\text{OR}_i$ is the model theory of sentential reasoning developed by Johnson-Laird and his collaborators. See Vergnaud and Zubizarreta forthcoming, Johnson-Laird et al. 2000.

14 Note that one will then have to distinguish a silent PF from the absence of PF altogether.

15 The standard exclusive $\text{or}$ is also associative, but does not have the property in
Then, an assertion \( A \) is defined as in (27), with the associated notions of ‘presupposition’ and ‘focus’ given in (28):

\[
(27) \quad A = \text{def} (\lambda, \phi, \pi)
\]

\( \lambda \) is a maximal disjunction of the form in (b):

\[
(28) \quad \text{The presupposition and the focus of } A \text{ in (27) are the forms } \lambda \text{ and } \phi, \text{ respectively.}^{17}
\]

The presupposition/focus (\( \Lambda/\Phi \)) structure \( (\lambda, \phi) \) in (27) constitutes the LF representation of the assertion \( (\lambda, \phi, \pi) \), whose PF representation is \( \pi \). The formula \( P_1 \text{ OR}^c P_2 \text{ OR}^c \ldots \text{ OR}^c P_n \) in (26b) in the text is defined recursively as follows:

\[
(26b) \quad (\Psi_l \text{ OR}^c (\Psi_{m+n}) = (\Psi_l \text{ OR}^c \Psi_m) \text{ OR}^c \Psi_n)
\]

\[
(27a) \quad \lambda \equiv P_1 \text{ OR}^\delta P_2 \text{ OR}^\delta \ldots \text{ OR}^\delta P_n, \delta = c, i^{16}
\]

\( \phi \) is the specification of a subpart of \( \lambda \):

\[
(28) \quad \phi \equiv A_{i_1} \text{ OR}^\delta A_{i_2} \text{ OR}^\delta \ldots \text{ OR}^\delta A_{i_p}, 1 \leq i_k \leq n, 1 \leq k \leq p
\]

\( \pi \) is the PF representation of \( \phi \):

\[
\pi = /A_{i_1} \text{ or } /A_{i_2} \text{ or } \ldots \text{ or } /A_{i_p}/PF
\]

\[
(26b) \quad \text{The formula } P_1 \text{ OR}^c P_2 \text{ OR}^c \ldots \text{ OR}^c P_n \text{ in (26b) in the text is defined recursively as follows:}
\]

\[
(26b) \quad (\Psi_l \text{ OR}^c (\Psi_{m+n}) = (\Psi_l \text{ OR}^c \Psi_m) \text{ OR}^c \Psi_n)
\]

\[
(27a) \quad \lambda \equiv P_1 \text{ OR}^\delta P_2 \text{ OR}^\delta \ldots \text{ OR}^\delta P_n, \delta = c, i^{16}
\]

\( \phi \) is the specification of a subpart of \( \lambda \):

\[
(28) \quad \phi \equiv A_{i_1} \text{ OR}^\delta A_{i_2} \text{ OR}^\delta \ldots \text{ OR}^\delta A_{i_p}, 1 \leq i_k \leq n, 1 \leq k \leq p
\]

\( \pi \) is the PF representation of \( \phi \):

\[
\pi = /A_{i_1} \text{ or } /A_{i_2} \text{ or } \ldots \text{ or } /A_{i_p}/PF
\]

\[
(26b) \quad \text{The formula } P_1 \text{ OR}^c P_2 \text{ OR}^c \ldots \text{ OR}^c P_n \text{ in (26b) in the text is defined recursively as follows:}
\]

\[
(26b) \quad (\Psi_l \text{ OR}^c (\Psi_{m+n}) = (\Psi_l \text{ OR}^c \Psi_m) \text{ OR}^c \Psi_n)
\]

\( \Psi \) is then defined as in (iii):

\[
(28) \quad \Psi_m \text{ OR}^c \Psi_n = \Psi_{m+n}
\]

\( \Psi \) is then defined as in (iii):

\[
(28) \quad \Psi_m \text{ OR}^c \Psi_n = \Psi_{m+n}
\]

Associativity follows:

\[
(26b) \quad (\Psi_l \text{ OR}^c \Psi_m) \text{ OR}^c \Psi_n = (\Psi_l \text{ OR}^c \Psi_m) \text{ OR}^c \Psi_n)
\]

We see that the definitions of \( \text{OR}^c \) and of standard exclusive \( \text{OR} \) coincide for \( n=2 \), but differ in all other cases.

\[
(26b) \quad (\Psi_l \text{ OR}^c \Psi_m) \text{ OR}^c \Psi_n = (\Psi_l \text{ OR}^c \Psi_m) \text{ OR}^c \Psi_n)
\]

\( \Psi \) is then defined as in (iii):

\[
(28) \quad \Psi_m \text{ OR}^c \Psi_n = \Psi_{m+n}
\]

Associativity follows:

\[
(26b) \quad (\Psi_l \text{ OR}^c \Psi_m) \text{ OR}^c \Psi_n = (\Psi_l \text{ OR}^c \Psi_m) \text{ OR}^c \Psi_n)
\]

We see that the definitions of \( \text{OR}^c \) and of standard exclusive \( \text{OR} \) coincide for \( n=2 \), but differ in all other cases.

\[16\] A disjunct \( P_i \) in the LF \( P_1 \text{ OR}^\delta P_2 \text{ OR}^\delta \ldots \text{ OR}^\delta P_n \) may not include disjunctions of the other type. See section 5.

\[17\] This is in essence the definition in Zubizarreta 1998.
item ‘=’ in the formula \( P_{ik} = A_{ik} \) in (27c) is the specificational verb be in the sense of Higgins (1973). The relation of \( A_{ik} \) to \( P_{ik} \) is the same as that of, e.g., [John saw Mary] to [John saw someone] in (29a) or to the formula [John saw x] in (29b):

(29) a. [John saw someone]: [John saw Mary]
    b. [John saw x]: [John saw Mary]

To illustrate, the following structure is an assertion:

(30) a. \( LF = \) Presupposition
    (John Past see someone) OR (John Past see a movie)
    b. Focus
    (John Past see Mary)
    c. PF
    /John Past see Mary/\( _{PF} \)

A characteristic feature of an assertion such the answers in (17)-(18) is that its focus is merely a subpart of its presupposition: \( A_{ik} \) is not distinct from \( P_{ik} \) in such an answer, because the disjunct \( P_{ik} \) only includes definite descriptions. This is not the most general situation, though, as we shall see in section 4. On the other hand, the focus of a question in general coincides with its presupposition: it is the whole logical structure of the question.\(^{18}\) To illustrate, the focus of the question in (17) is the disjunction in (22) with \( \delta = c.\)\(^{19}\) The LF representation of a question will also include an element which conveys the question force, identifying the utterance as a question.

---

\(^{18}\) For example, it seems that the question utterance in (i) could not have the presupposition in (ii). The question is why it should be so. See Vergnaud and Zubizarreta (forthcoming).

(i) Did John see Mary or Susan?
(ii) (John Past see Mary) OR\(^{\delta} \) (John Past see Susan) OR\(^{\delta} \) (John Past see Joan)

\(^{19}\) Recall that the definitions of \( OR^{c} \) and of standard exclusive or coincide for a formula like that in (17) in the text, which has only two elementary propositions.
The LF of a question in (17)-(18) then is as in (31), where $\Theta$ is the question force item:\(^{20}\)

\[
[\Theta, ((\text{John Past see Mary}) \lor \delta (\text{John Past see Susan})), \delta = c, i]
\]

Since there are two types of disjunctions, contrastive and inclusive, there are correspondingly two types of presuppositions and two types of focus:

\[
\text{(32) Let } A \text{ be some assertion. If the presupposition of } A \text{ is a contrastive disjunction, the presupposition/focus of } A \text{ is called } \text{contrastive}. \text{ If the presupposition of } A \text{ is an inclusive disjunction, the presupposition/focus of } A \text{ is called } \text{inclusive/informational}. \]

The induced categorization appears correct. To illustrate, consider the answers in (17)-(18) again. Their common focus is the disjunct in (25). However, that focus is contrastive in the case of the answer in (17), but inclusive/informational in the case of the answer in (18). As indicated in Chomsky (1971), Jackendoff (1972), and Rooth (1985), for example, the universe of assertions is never Hobsonian:\(^{21}\)

\[
\text{(33) A declarative sentence manifests a choice among explicit or implicit } \text{alternatives}. \]

This can be stated more precisely in terms of the notions of ‘focus’ and ‘presupposition’ introduced above:

\[
\text{(34) The focus of an assertion is a strict subpart of its presupposition.} \]

\(^{20}\) It is necessary to distinguish between the force of a question and its logical structure because of examples like that in (i). The possibility of a pair-list reading in (i) shows that the question quantifier must have narrow scope with respect to every, while the question force obviously has scope over the whole structure.

(i) What did everyone read?

\(^{21}\) Actually, in Rooth 1985 and, more generally, in the semantic literature on focus, alternatives are defined with respect to the statement expressed by the sentence. We depart from that view for both empirical and conceptual reasons. See Vergnaud and Zubizarreta forthcoming. We note that the notion of alternative assertion is used in Rooth 1985 to analyze ‘contrastive focus’. As argued in Zubizarreta 1998, it can be extended to all types of focus, the approach adopted in this essay.
This in turn implies that the presupposition of an assertion always contains more than one disjunct:

(35) The presupposition of an assertion is never degenerate.

Given that a nondegenerate presupposition can always be expressed as a question, the law (34) can be rephrased as in (36) (see Zubizarreta, 1998, p.4):

(36) Every assertion is an answer to some actual or virtual question.

The notions above have been developed on the basis of examples with explicit presuppositions, such as the utterances in (17)-(18). The question arises whether these notions can be generalized to utterances with implicit presuppositions, such as in the question-answer pair in (37). In the next section, we turn to a discussion of such systems.

(37) Who did John see?  
John saw Mary

4 Utterances with implicit presuppositions

In every disjunction/conjunction, there is a minimal constituent that exhaustively dominates all the material which varies from disjunct/conjunct to disjunct/conjunct. To illustrate, that minimal constituent is TP in the disjunction in (38a), vP in the disjunction in (38b), and the DP object in the disjunction in (38c) (the presupposition of some utterance in (17)-(18)):

(38) a. (John Past see Mary) OR δ (Peter Past call Susan)  
b. (John Past see Mary) OR δ (John Past call Susan)  
c. (John Past see Mary) OR δ (John Past see Susan)

In general, Conjunction Reduction can apply to such complex formulae, factoring out the material which is constant across all disjuncts/conjuncts so that only the minimal variable constituent in the sense above remains within the scope of the connective. This is illustrated in (39) with the disjunction in (38b) (denoted by Λ):

(39) Λ ≡ <(John Past do something), (something = ((see Mary) OR δ (call Mary))))>
The pair of linked formulae on the right-hand side of the equivalence in (39) is called the reduced form of \( \Lambda \) and is denoted by \( \text{RED}(\Lambda) \).\(^{22}\) For example, the questions in (17)-(18) and the answer in (21) are reduced utterances in the sense above (cf. notes 10 and 12). The following notion will be useful:

\[
(40) \quad \text{The second component of } \text{RED}(\Lambda) \text{ is called the nucleus of } \Lambda.
\]

To illustrate, consider the answer in (18). The reduced form of its presupposition is the pair of linked propositions in (41):

\[
(41) \quad <(\text{John Past see someone}), (\text{someone} = (\text{Mary ORi Susan}))>
\]

The corresponding nucleus is the formula in (42):

\[
(42) \quad (\text{someone} = (\text{Mary ORi Susan}))
\]

By definition, a degenerate expression -one with a single disjunct/conjunct- has no reduced form or nucleus. For example, the focus of the answer in (18) cannot be directly mapped onto a reduced form. But it can be assigned a reduced form and a nucleus derivatively, by the rule in (43):

\[
(43) \quad \text{Let } A=(\lambda, \phi, \pi) \text{ be an assertion with presupposition/focus structure } (\lambda, \phi). \text{ The nucleus of } \phi \text{ is defined as the restriction to } \phi \text{ of the nucleus of } \lambda.
\]

Since a presupposition is never degenerate (see (33)-(35) in section 3), the notions above are always well defined. In particular, the focus of the answer in (18) has a reduced form and a nucleus, the pair in (44) and the formula in (45), respectively:

\[
(44) \quad <(\text{John Past see someone}), (\text{someone} = \text{Mary})>
(45) \quad (\text{someone} = \text{Mary})
\]

One notes that the LF fragment in (44) also underlies the sentence in (46):

\[
(46) \quad \text{Someone that John saw was Mary.}
\]

\(^{22}\) The correspondence \( \text{RED}(A) \Rightarrow \Lambda \) is QR.
The difference between the above sentence and that in (18) derives from the different PF manifestations of ‘=’, unpronounced in (18), surfacing as be in (46). In both cases, though, there are at least two occurrences of someone forming a chain.

Consider now the question *Who did John see?* in (37). It is natural to assume that the presupposition of that question, equal to its focus, is the disjunction in (47), where the value of \( \delta \) (c or i) is left open at this point:

\[
(47) \quad \text{(John Past see someone)} \text{ OR } \delta \text{(John Past see someone else)}, \quad \delta = c, i
\]

We postulate that Conjunction Reduction applies obligatorily at LF. Then, the LF of the question will also include the reduced form in (48):

\[
(48) \quad <\text{(John Past see someone)}, (\text{someone } = (\text{someone OR } \delta \text{ someone else})>\]

Crucially, the nucleus in (48) is a recursive formula, an instance of the identity in (49):

\[
(49) \quad \text{U } = \text{ U OR } \delta \text{ W}
\]

The nucleus in (48) then stands for an infinite family of identities of the form in (50), where \( n \) can be any number greater than 0:

\[
(50) \quad (\text{someone } = (\text{someone OR } \delta \text{ someone else})^n))
\]

Such unbounded formulae correspond to quantifiers. The general hypothesis is stated in (51):

\[
(51) \quad \text{A Human Language (HL) quantifier is a recursive identity of the form in (i), where } \text{♦} \text{ is a logical connective and } D \text{ a determiner:}
\]

\[
(\text{i}) \quad (\text{(D some one)} = ((\text{D some one}) \text{ ♦ (D some other)}))
\]

---

23 The identity follows from that in the nucleus in (48) in the text and from the associativity of the logical operations (disjunction and conjunction). Recall that both OR and OR\(^r\) are associative.

24 We are assuming that *some* is not a quantifier, which goes against much standard treatments. However, it is consistent with the treatment in, e.g., Heim 1982 or within dynamic semantics.
The determiner $D$ in (51) may be empty or not. If it is, the equation in (51) gives rise to that in (50), with other realized as else. The combination $(D=\emptyset, \bullet=\text{OR}^\delta)$ in (51) defines the quantifier any in English, which we assume is a component of every wh-word:25

\begin{equation}
\text{LF}(\text{any}) =_{\text{def}} (\text{someone} = (\text{someone OR}^\delta \text{someone else}))
\end{equation}

The assertion John saw Mary, with the presupposition/focus $(\Lambda/\Phi)$ structure in (53), is a natural answer to Who did John see? (again, with unspecified $\delta$).

\begin{equation}
\begin{align*}
\text{a. Presupposition} \\
(\text{John Past see someone}) \text{ OR}^\delta (\text{John Past see someone else}), \delta = c, i \\
\text{b. Focus} \\
(\text{John Past see Mary})
\end{align*}
\end{equation}

The reduced form of the $\Lambda/\Phi$ structure in (53) is as in (54):

\begin{equation}
\begin{align*}
\text{a. Presupposition} \\
<\text{(John Past see someone)}, \text{(someone} = \text{(someone OR}^\delta \text{someone else)}>) \\
\text{b. Focus} \\
<\text{(John Past see someone)}, \text{(someone = Mary})>
\end{align*}
\end{equation}

Thus, an account of utterances with implicit presuppositions is available within the proposed framework. One question is whether this account can be extended to other types of quantifiers, e.g., to every and to each in English. Consider the sentence in (55):

\begin{equation}
\text{Everyone saw Mary.}
\end{equation}

25 Thus, any is assumed to be ambiguous, having either an ‘inclusive’ or a ‘contrastive’ interpretation. See section 5 and Vergnaud and Zubizarreta forthcoming. The feature wh (qu in French) may just be the overt manifestation of the iterated connective embedded in the quantifier, which must be pronounced at the edge of a phase.
We are trying to determine the LF representation of the quantifier *every*, as separate from the $\Lambda/\Phi$ structure of the utterance. A natural hypothesis is that *every* is the conjunctive counterpart to the disjunctive *any* in (52):

\[(56) \quad \text{LF}(\text{every}) =_{\text{def}} (\text{someone} = (\text{someone AND someone else}))\]

Abstracting away from the $\Lambda/\Phi$ structure, the LF representation of the sentence in (55) is then analyzed as including the reduced component in (57), as well as its expansion in (58):

\[(57) \quad <(\text{someone Past see Mary}), (\text{someone} = (\text{someone AND someone else})>\]

\[(58) \quad (\text{someone Past see Mary}) \text{ AND } (\text{someone else Past see Mary})\]

That description assumes that [plural] is not a semantic feature, but an LF uninterpretable morphosyntactic feature. Semantic ‘plurality’ is taken to arise from the adjunction of a mass classifier to an inherent count classifier, a process independent of quantification.\(^{26}\) Similarly, the English quantifier *each* is analyzed as in (59):

\[(59) \quad \text{LF}(\text{each}) =_{\text{def}} (\text{the one} = (\text{the one AND the other one}))\]

Accordingly, and abstracting away again from the $\Lambda/\Phi$ structure, the LF representation of the sentence in (60) is analyzed as including the reduced component in (61a), as well as its expansion in (61b).

\[(60) \quad \text{Each one saw Mary.}\]

\[(61) \quad \text{a. } <(\text{the one Past see Mary}), (\text{the one } = (\text{the one AND the other one})>\]

\[\quad \text{b. } (\text{the one Past see Mary}) \text{ AND } (\text{the other one Past see Mary})\]

One notes that the trace of the quantifier *each* in the left member of the reduced form in (61a) is the definite determiner *the*, not *someone* as in the case of a quantification by *every* or by *any*. The reason is that the definiteness of the arguments of AND in (59) and (61a) is a separate property from the quantificational force carried by AND. If one adopts a

\(^{26}\) Following Chomsky (1974), we analyze English *all* as an intensifier of the (semantically) plural version of *the*, which may cooccur or not with AND quantification.
Russellian theory of definiteness, it will be of course necessary to compound the each quantification in (61a) with the the quantification; see Vergnaud and Zubizarreta forthcoming.

We now return to the formalization of the exhaustivity property and to its relevance for an account of the absence of pair-list readings in the contrastive French wh-in-situ questions.

5 Questions and pair-list readings revisited

It appears that the salient interpretive properties of exhaustive and nonexhaustive questions can be derived from the identification in (62) (see (16) in section 2):

\[
\begin{align*}
\text{(62) a. exhaustive question} & \leftrightarrow \text{contrastive presupposition} \\
\text{b. nonexhaustive question} & \leftrightarrow \text{inclusive/informational presupposition}
\end{align*}
\]

The identification is immediate in the case of questions with explicit presuppositions (see section 3). It was shown in section 4 that the case of questions with implicit presuppositions reduces to that of questions with explicit presuppositions. Consider the fronted wh-question in (63) and its c-counterpart in (64):

\[
\begin{align*}
(63) & \quad \text{'With whom (did) Marie dance?'} \\
(64) & \quad \text{'Marie danced with whom?'}
\end{align*}
\]

The presupposition of the question in (63) is the disjunction in (65), while the disjunction in (66) is the presupposition of the question in (64) (modulo translation):\textsuperscript{27}

\[
\begin{align*}
(65) & \quad (\text{corresponding to (63)}) \\
& \quad (\text{Marie Past dance with someone}) \text{ OR}^{i} (\text{Marie Past dance with someone else})
\end{align*}
\]

\textsuperscript{27} The quantificational content of the wh-word in the forms in (63) and in (64) in the text arises from the application of Conjunction Reduction to the corresponding presuppositions in (65) and (66), respectively.
The representation of focus and its implications

(66) (corresponding to (64))
(Marie Past dance with someone) ORc (Marie Past dance with someone else)

Consider now the questions with universal quantification in (67) and in (68):

(67) Avec qui est-ce-que chaque artiste a dansé?
‘With whom (did) each artist danse?’

(68) Chaque artiste # a dansé avec qui?
‘Each artist # danced with whom?’

The LF of each question displays an interaction between the quantifications defined by *chaque* and by the presupposition. Specifically, there are two possible logical structures, depending on whether AND has wide scope over ORδ or conversely. The two possible presuppositions are given in (70) and (71) (modulo translation), with the notation defined in (69):

(69) a. [X, Y] =def [X Past dance with Y]
   b. D =def the artist
   c. D’ =def the other artist
   d. SO =def someone
   e. SO’ =def someone else

(70) ([D, SO] ORδ [D, SO’]) AND ([D’, SO] ORδ [D’, SO’]), δ = c, i

(71) ([D, SO] AND [D’, SO]) ORδ ([D, SO’] AND [D’, SO’]), δ = c, i

The logical structure in (70) describes the *pair-list* reading, while that in (71) describes the *single answer* reading. Both readings are available in the case of the *wh* fronted question in (67), but the pair-list reading is absent in the case of the corresponding *c*-question. In past work, we have argued that this gap was not an intervention effect, but rather the consequence of a general principle barring multiple contrasts in a statement (see (14) in section 2):

(72) A statement may contain at most one contrast or negation.
The principle in (72) effectively excludes the pair-list construal of the c-question in (68), since the LF structure of that construal would be a conjunction of independent contrastive disjunctions, as shown in (73) (with the notation defined in (69)):  

\[(73) \quad ([D, SO] \lorC [D', SO']) \land ([D', SO] \lorC [D', SO'])\]

The principle in (72) implies that contrastive foci are obligatorily absorbed in a statement. The same principle presumably accounts for the unfelicitousness of double negation. The principle could be formulated as in (74):  

\[(74) \quad \text{A connective} \lorC \text{must have widest scope within the minimal statement containing it.}\]

5 Conclusion

In this essay, we have argued that the absence of pair-list readings in strongly exhaustive question, which would appear to come under an account in terms of intervention effects, actually has a completely different explanation. When the theory of focus is properly revised, this phenomenon reduces to the universal principle in (72). This principle accounts for the so-called intervention effect discussed in Boeckx (1999, 2000), Vergnaud and Zubizarreta (2001, 2002, 2003).

References


---

28 Clearly, the principle in (72) in the text must be governed by some ‘locality’ condition within the hierarchy of statements; see note 8. For example, the sentence in (i) is both felicitous and easily interpretable. Similarly, the sentence in (ii) is acceptable with contrastive or (the pair-list reading remaining unavailable).

(i) John did not say that Mary was not fair.
(ii) Each judge argued that the motion should be rejected or ignored.


Chomsky, N.1974. [Amherst Lectures].


