Notions of Focus Anaphoricity

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This article reviews some of the theoretical notions and empirical phenomena which figure in current formal-semantic theories of focus. It also develops the connection between "alternative semantics" and "givenness" accounts of focus interpretation.

1 Introduction

The contemporary theoretical term *focus* originates in Halliday (1967), who said that the capitalized phrases in sentences (1)–(4) have a grammatical property which he called *information focus*.

(1)   (Who painted the shed yesterday?)
      JOHN painted the shed yesterday.

(2)   (When did John paint the shed?)
      John painted the shed YESTERDAY.

(3)   Mary always goes to TOWN on Saturdays.

(4)   Mary always goes to town on SATURDAYS.

In cases such as (1)–(2), the location of focus is conditioned by how the sentence containing the focus fits into its context, here the question. The examples illustrate that if the questioned element is changed, the locus of focus changes in parallel. Strikingly, in other cases focus has a truth-conditional semantic effect. If last year, Mary went to town on a Wednesday half a dozen times, then (4) is

false (as a generalization about this time period) but (3) may be true. If on half a dozen Saturdays she took a walk in the woods and avoided town, then (3) is false, but (4) may still be true.

2   Grammatical Representation of Focus

Focus is a grammatical property which has a phonology (some kind of prominence) and a semantics and/or pragmatics (a topic which will be discussed later). In this respect, it is like content words or features such as tense, which also have an influence on both sides of the form/meaning correspondence. To link the two, it is usually assumed that focus is represented syntactically, by means of a syntactic feature or other piece of syntactic representation. This move was made by Jackendoff (1972), who introduced a syntactic feature which is written F. The F feature marks the focused phrase, and a phrase which is not marked with F is unfocused. Thus the focus feature is simply a binary-valued syntactic feature. (5) and (6) correspond to (1) and (2).

(5) $[_S [_{NP} John]_F [_{VP}[_{VP}painted [_{NP}the shed]] [_{NP}yesterday]]]$

(6) $[_S [_{NP}John] [_{VP}[_{VP}painted [_{NP}the shed]] [_{NP} yesterday]_F]]$

The point of the F feature is to link the phonology of focus with the semantics and pragmatics of focus. This is done with independent phonological and semantic principles which refer to the F feature. (7) is the phonological principle from Jackendoff (1972). It says that F corresponds to stress prominence in a certain domain. Jackendoff's semantic principle was (8). It generates a semantic object which has variables in the position of focus phrases. The Presupposition corresponding to (5) is an open proposition 'y painted the shed yesterday', with a variable y in the position of the focused phrase.

(7)   If a phrase P is chosen as the focus of a sentence S, the highest stress in S will be on the syllable of P that is assigned highest stress by the regular

stress rules.

(8)   The semantic material associated with surface structure nodes dominated by F is the Focus of the sentence. To derive the Presupposition, substitute appropriate semantic variables for the focused material.

To avoid confusion with the standard notion of presupposition in natural language semantics, it is better to substitute another technical term for Jackendoff's Presupposition. Let's call this semantic object which has variables substituted for focused phrases the *focus skeleton*. As we will see, the focus skeleton is closely related to the constructs used in current semantic accounts of focus. A rough idea is that the focus skeleton functions as a schema which is matched to the discourse context, and which is referred to in the semantics of certain constructions.

3   Breadth of Focus

The F feature resolves representationally the question of what phrase or phrases are focused. In a given syntactic tree, the focused phrases are the phrases which bear the F feature. A focus on a relatively small phrase, such as a phrase with a single word as a terminal string, is said to be a "narrow" focus. (9) gives examples of narrow focus in a question context.

(9) a. (What did Mary do to Fluffy?)
        She fed$_F$ Fluffy.
    b. (What cats did Mary feed?)
        She fed Fluffy$_F$.

A focus on a relatively large phrase such as verb phrase containing several words is said to be a *broad* focus or *wide* focus. The terminology is natural, because the interval of words *fed Fluffy* is broader (or wider) then the interval of words *fed* and the interval of words *Fluffy*. (10) illustrates broad focus on VP

in a question context.

(10) (What did Mary do when she got home?)
      She [fed Fluffy]$_F$.

In both (9b) and in (10) the principal prominence falls on the first syllable of *Fluffy*, as is predicted by the phonological constraint (7). Jackendoff (1972) put forth the hypothesis that, fixing a phonological representation which has sentence stress on the first syllable of *Fluffy* in *she fed Fluffy*, syntactic F-marking could be either on the object [Fluffy], the VP [fed Fluffy], or indeed the entire sentence [she fed Fluffy]. So on this hypothesis, the breadth of focus is often ambiguous, if one pays attention only to a phonological representation.

However, breadth of focus can be constrained by phonological phrasing. In the narrow-focus example (11), it seems the major phrase break can follow either the subject *Magdalena*, or the verb *fed*.

(11) Which cats did your sister Magdalena feed?
      (MagdaLEna)(fed FLUFfy)
      (MagdaLEna fed)(FLUFfy)

If we switch focus to the VP as in (12), it seems that the pronunciation with the major phrase break after *fed* is impossible.

(12) What did your sister Magdalena do when she got home?
      ?? (MagdaLEna fed)(FLUFfy)
      (MagdaLEna)(fed FLUFfy)

Selkirk (1984) introduced the hypothesis that F marking in examples like (10) is nested. Both verb *fed* and the nominal *Fluffy* are novel in the discourse, the reasoning goes, and so they are marked with F's. The correct representation for (10) on this account is (13).

(13) (What did Mary do when she got home?)

She [fed$_F$ Fluffy$_F$]$_F$

4   Scope of Focus

The phonological constraint (7) refers not just to a focus, but to the notion of a phrase being the focus of a sentence. Assuming that there is a focus on *John* in example (14), is *John* the focus of the embedded sentence [John was at the party], or of the containing sentence [that John was at the party is certain]? Just locating an F feature on *John* as in (15) does not resolve the question.

(14) Who was at the party?

   That JOHN was at the party // is CERtain.

(15) That John$_F$ was at the party is certain.

On phonological grounds, one can argue that the sentence S referred to in the constraint (7) must be the embedded sentence in this case. While *John* is more prominent than anything else in the embedded sentence, it is probably not more prominent than *certain*. Truckenbrodt (1995) discussed data like (16) where according to an analysis of Rooth (1992), there are F-features on *American* and *Canadian*. Truckenbrodt pointed out that while *American* is more prominent than *farmer*, arguably the most prominent syllable in the sentence as whole is *joke*. So if we want to maintain the constraint (7), we can not say that *American* is the focus of the whole sentence in (15), because that would require that *American* has highest stress prominence in the whole sentence. Note that in this case, there is no embedded sentence, so there is no choice of S for which the constraint (7) is observed. Truckenbrodt called the stretch of phonological material within which a focus is maximally prominent the *domain* of the focus, and suggested that the domain of the focus on *American* is *an American farmer* or *American farmer*.

(16) An American$_F$ farmer told a Canadian$_F$ farmer a joke.

There is also a semantic side to this argument. (17a) is the focus skeleton obtained from the embedded sentence in (15). It can be matched to the question context by matching the variable y to the wh-phrase. (We will see later how this matching process can be formalized.) On the other hand, (17b) is the focus skeleton obtained using the matrix sentence. This does not match the question context. So also on semantic grounds, there is reason to think that *John* is the focus of the embedded sentence.

(17)a.   Focus skeleton for embedded sentence in (14)

   'y was at the party'

   b.   Focus skeleton for matrix sentence in (14)

   'that y was at the party is certain'

The dimension of variation which is illustrated in (17) is called the *scope* of focus. In (16), the scope of the focus on *American* is the containing nominal [American farmer] or [an American farmer], not the whole sentence. And in (14), the scope of the focus on *John* is the embedded sentence, not the matrix.

While the notion of scope is in fact implicit in both the phonological constraint (7) and the semantic constraint (8), a syntactic representation of scope does not follow immediately from postulating an F feature. Rooth (1992) proposed that the scope of an F is fixed by a "focus interpretation" operator $\sim k$, which also specifies an antecedent k for the focus skeleton. Chomsky (1971) suggested that the scope of focus is marked representationally by covert movement.

Schwarzschild (1999) made a more parsimonious proposal: in trees with nested configurations of F marking, one F delimits the scope of another. A representation for (15) where the scope of the focus on *John* is the embedded clause is (18). Effectively, the maximal scope of an F on a node α is the maximal phrase β which dominates α and is not F-marked. Since in (18) the embedded

that-clause is F-marked but the embedded S is not, the scope is the embedded S.

(18) [[that [John$_F$ was at the party]]$_F$[is$_F$ certain$_F$]$_F$]

5   Focus Anaphoricity

Focus anaphoricity is the hypothesis that the semantics and pragmatics of focus involves a relation to context which is a kind of anaphora. Suppose we put (18) back into its context, and add an index which indicates that the "antecedent" for the focus on *John* is the question. Then we arrive at something along the lines of (19), which gives one option using the representation where the scope of F is delimited by F, and another option where the scope is delimited by ∼.

(19) [Who was at the party]$_6$
       [[That [John$_{F6}$ was at the party]]$_F$[is$_F$certain$_F$]$_F$]
       [[That [John$_F$ was at the party]∼ 6] [is certain]]

The rough idea is that the focus (or the focus interpretation operator) is allowed to be coindexed with the question (and thus to be licensed by it) because the focus skeleton (17a) matches the question. A couple of descriptive classes of matching can be identified. Sometimes the antecedent looks like the scope of the focus, but with something else of the same type substituted for the focused phrase. (20) is an example, where *John* in the antecedent substitutes for the F-marked *Mary*. Call this a substitution focus.

(20) [John wrote the report]$_4$.
       [No, [Mary$_{F4}$ wrote it]]$_F$.

Rooth (1992) analyzed configurations where the antecedent is a set of propositions. This includes the question configuration as in (19), on the hypothesis that the semantic value of a question is a set of propositions. In some cases

the set of propositions is implicit in a discourse representation. The pragmatic logic of the scalar quantity implicature example (21) refers to a set of alternative assertions, such as the assertion that Paul passed and the assertion that Steve passed, where Steve and Paul are two of the speaker's co-students. The index 2 can be taken to be the referential index of this set of propositions.

(21) How did the exam go?
       [Well [I$_{F2}$ passed]]$_F$

An F whose antecedent is a set of propositions is called an alternative-set focus. Another class of antecedents have an existentially quantified phrase replacing the focus in the antecedent. (22) is an example.

(22) [Mary spoke to someone about his problems]$_8$
       [Yeah, [she spoke to John$_{F8}$ about his problems]]$_F$

6   Focus Interpretation

Formal-semantic developments of focus anaphoricity state conditions on what can be an antecedent for a focus. For instance, we want to rule out the representation (23), which has an inappropriate correspondence between question and answer.

(23) [Who painted the shed yesterday]$_2$
       [John painted the shed [yesterday]$_{F2}$]

Rooth (1992) stated a constraint covering alternative-set focus which works as follows. One first generates a set X of propositions by making all possible substitutions for the variables in the focus skeleton. This object is called a focus semantic value. The constraint on the antecedent is that it be a subset of X containing the ordinary semantic value of the focused phrase and something else. In the answer of (23), the focus skeleton has a variable in the position of

yesterday, so the set X contains propositions like 'John painted the shed on Nov. 19th, 2006', 'John painted the shed on Nov. 20th, 2006', 'John painted the shed in 2005', and so forth, with various choices for the frame time adverb substituting for *yesterday*. The antecedent question, on a theory where questions denote sets of propositions, denotes a set Y containing propositions such as 'John painted the shed on Nov. 20th, 2006', 'Mary painted the shed on Nov. 20th, 2006', 'Bill painted the shed on Nov. 20th, 2006', assuming the yesterday to be determined by the time of utterance being Nov. 20th 2006. Since 'Mary painted the shed on Nov. 20th, 2006' is an element of Y but not of X, the constraint $Y \subseteq X$ is not satisfied, and the representation (23) is not licensed. This is what we want.

What about substitution focus? Rooth (1992) stated a second clause case which allows the antecedent to be an element of the focus semantic value rather than a subset of it. This is unattractive, because the definition is disjunctive. Schwarzschild (1999) solved this problem by giving a uniform constraint which covers alternative-set focus and substitution focus, and also covers existential antecedents as in (22). The new constraint checks entailment between a proposition a derived from the antecedent, and a proposition f derived from the focus skeleton. In f, focus variables are existentially quantified, and if the antecedent has propositional type, a is simply the proposition denoted by the antecedent. This already covers (22), because a is 'Mary spoke to some person x about x's problems', while f is 'Mary spoke to some entity x about x's problems'. Since a entails f, the representation (22) is licensed.

In alternative-set focus, the antecedent denotes a set of propositions, or in a functional type system, a characteristic function of a set of propositions. The corresponding type label is $(st)t$, where st is the type label for propositions. Schwarzschild's axiom concerning antecedents with functional types is that they are saturated to the type t by plugging in existentially quantified variables for the arguments. He uses Karttunen's semantics for questions, where in

a world w, a question denotes a set of propositions which are true in w (Karttunen 1977). Let's look at (24), which is the indexed representation for (9b). In a world w, the question denotes the characteristic function of the set of true propositions of the form $\textbf{feed}(\textbf{Mary}, y)$, where y is a cat in w. To existentially quantify the argument of this characteristic function is to require that there be some true proposition of the form $\textbf{feed}(\textbf{Mary}, y)$, i.e. to require that that Mary fed some cat. Skipping some details related to the possible-worlds framework, the result is that a is the proposition $\exists y[\textbf{cat}(y) \wedge \textbf{feed}(\textbf{Mary}, y)]$. f is the proposition $\exists y[\textbf{feed}(\textbf{Mary}, y)]$, so a entails f.

(24) [What cats did Mary$_3$ feed]$_4$
     [She$_3$ [fed [Fluffy]$_{F4}$]]

We can conjecture that entailment semantics properly generalizes the representations licensed in alternative semantics, so that specific analyses which use alternative semantics can be ported to entailment semantics without changing the representation of the antecedents or the indexing relations. Some additional issues remain. Schwarzschild (1999) proposed that the entailment constraint is applied at any non-F-marked node, not just the maximal scope of focus as defined above. In (24) the entailment constraint would be applied at the VP level [fed Fluffy$_F$], as well as the S level. In such cases f is generated by existentially quantifying arguments. In this case this produces $\exists x \exists y[\textbf{feed}(x, y)]$, which is entailed by the same antecedent a. In this version of entailment semantics (which is the official version of Schwarzschild's givenness semantics), one should not speak of the unique scope of a focus, but of the possibly multiple levels where the entailment constraint is applied. These are simply the non-F-marked phrases.

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