

Basic Notions of Information Structure*

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Abstract. This article takes stock about the basic notions of Information Structure (IS). It first provides a general characterization of IS following Chafe (1976) within a communicative model of Common Ground (CG), which distinguishes between CG content and CG management. According to this, IS concerns the local CG. It then defines and discusses the notions of Focus (as indicating alternatives) and its various uses, Givenness (as indicating that a denotation is already present in the CG), and Topic (as specifying what an statement is about). It also proposes a new notion, Delimitation, which comprises contrastive topics and frame setters, and indicates that the current conversational move does not satisfy the local communicative needs totally. It also points out that the rhetorical structuring partly belongs to IS.

Keywords: Information Structure, Focus, Topic, Givenness, Contrast

1 Introduction

The notions of Information Structure (IS), such as Focus, Topic and Givenness, are not simple empirical terms. As any theoretical notions, they are couched within theories, in this case, theories of how communication works. Hence this paper necessarily will make certain theoretical assumptions, without going into great details. I will motivate the selection of IS notions in the tradition of Chafe (1976) who talked about IS as phenomena of information packaging that responding to the immediate communicative needs of interlocutors. I do this within the model of communication as continuous change of the common

ground (CG), where it will be crucial to distinguish between CG content and what I will call CG management.

IS is a vast topic of research that has been pursued within different theoretical frameworks, and has produced numerous empirical insights. This short paper cannot conclusively argue for its choices in detail, in contrast to other theoretical options, or attempt to motivate them by considering phenomena in a wider range of languages. In spite of this, I hope that a coherent and attractive theoretical landscape emerges for research on IS.

2 Preliminaries

2.1 What is Information Structure?

In his seminal paper on notions of IS of 1976, Chafe introduced the notion of **packaging** of the information conveyed in an utterance that, to my mind, still provides useful guidance for our understanding of IS. Chafe wisely restricted his notion of IS to those aspects that respond to the **temporary** state of the addressee's mind, thus excluding several other aspects of messages, like reference to long-term background knowledge, choice of language or level of politeness that otherwise would fall under packaging as well.

One problem with Chafe's approach is that there are aspects of optimization of the message that respond to the temporary state of the addressee, but also affect the message itself, and hence cannot be treated as pure packaging phenomena. For example, Focus, as expressed by sentence accent in English, can be used for information-packaging reasons, as in answers to questions, cf. (1), but can also lead to truth-conditional differences, as when associated with focus-sensitive particles like *only*, cf. (2).

- (1) a. A: What did John show Mary?
B: John showed Mary [the PICTures]_F.

* Here comes the Acknowledgement. Many thanks to AA, BB, CC, DD, EE, FF, and GG for their valuable comments and discussion ... and so on.

- b. A: Who did John show the pictures?
 B: John showed [MARY]_F the pictures.
- (2) a. John only showed Mary [the PICTures]_F
 b. John only showed [MARY]_F the pictures.

The truth conditions of B's answers in (1) arguably are the same, whereas the truth conditions of (2) differ. One and the same linguistic device, sentence accent, can be used for packaging as well as for constructing the content. There are two possible ways of dealing with this polyvalent use of features such as accent: One is to assume that the two uses of the same feature are essentially unrelated, just as the uses of accent in English to express focus and to distinguish words such as *REcord* and *reCORD*. The other is to assume that the feature is to be interpreted in a particular way that makes sense both for the purposes of information packaging and for the purposes of building information content. For methodological reasons the second way appears to be more attractive, and I will follow it here: If it can be shown that one and the same interpretation of a feature has multiple uses, then this should be assumed in favor of multiple interpretations.

2.2 Common Ground: Content and Management

If we are to talk about communication as transfer of information and its optimization relative to the temporary needs of the interlocutors, it is useful to adopt a model of information exchange that makes use of the notion of **Common Ground**. The original notion of CG (cf. Stalnaker 1974, Karttunen 1974, Lewis #) saw it as a way to model the information that is mutually known to be shared and continuously modified in communication. This allowed for a promising way of modeling the distinction between **presuppositions**, as requirements for the input CG, and assertions or the **proffered content**, as the proposed change in the output CG. This distinction is relevant for information packaging, as the in-

put CG changes continuously. For example, it can be explained why (3.a) is fine but (b) is odd: In (a), the first clause introduces the information that the speaker has a cat, to which the presupposition of the second clause appeals. This contrasts with (3.b), as the second sentence introduces the information that the speaker has a cat which is already present in the input CG at this point.

- (3) a. I have a cat, and I had to bring my cat to the vet.
 b. #I had to bring my cat to the vet, and I have a cat.

Already when the notion of CG was introduced, it was pointed out that speakers could change CG by **accommodation** of presupposition. That is, uncontroversial facts could be added implicitly to the CG by requiring the input CG to be of a certain kind. This is why (4.a) is good but (b) is bad:

- (4) a. I had to bring my cat to the vet because it was sick.
 b. I had to bring my gorilla to the vet because it was sick.

The notion of CG had first been applied to factual information, but it soon got extended to discourse referents (in particular, by Kamp 1981 and Heim 1982). That is, CG does not only consist of a set of propositions that is presumed to be mutually accepted (or the conjunction of this set, one proposition), but also of a set of entities that had been introduced into the CG before. Such entities can be explicitly introduced, e.g. by an indefinite NP, or they can be accommodated, as in (4.a). They can be taken up by pronouns, as in the second clause of (4.a), or by definite NPs, which express requirements to the input CG. The choice of anaphoric expression depends on the recency of the antecedent, again a notion that falls squarely within Chafe's notion of packaging (see section # below).

The properties of CG mentioned so far all had to do with the truth-conditional information of the CG, and so we can subsume them under the head-

ing of **CG content**. But any ecologically valid notion of CG must also contain information about the manifest communicative interests and goals of the participants. For example, questions typically do not add factual information to the common ground, but indicate informational needs on the side of one participant that should be satisfied by a conversational move of the other. I propose to call this dimension of the common ground **CG management**, as it is concerned with the way how the CG content should develop. As with CG content, CG management is supposed to be shared, with the understanding that the responsibility for it may be asymmetrically distributed among participants. There is a wide variety of studies that can be captured under the notion of CG management, some formal such as Merin (1994) or Groenendijk (1999), some less formal such as Clark (1996) and studies of Conversational Analysis. The distinction is important for our purposes, as we can associate those aspects of IS that have truth-conditional impact with CG content, and those which relate to the pragmatic use of expressions with CG management.

2.3 Expressions and what they stand for

Before we discuss specific notions of IS, I would like to point out a terminological problem. In the literature we often find that the distinction between an expression and what it stands for, its denotatum, is not made. For example, in a sentence like (5), we find that the expression *as for the beans*, or *the beans*, are called the ‘topic’ of the sentence, but also the beans referred to are called its ‘topic’.

(5) As for the beans, John ate them.

For some reason, this confusion of expression and meaning occurs particularly often for IS notions. For notions like ‘subject’, ‘predicate’ or ‘direct object’ it does not arise; no one would claim that John the person is the grammatical sub-

ject of (5), it is *John* the noun phrase. The confusion can be endured if one is aware of it. But in any instance in which it is relevant, it is important to make the intended interpretation clear. For example, we can speak of (*as for*) *the beans* as the ‘topic constituent’ of the sentence, or as a ‘topic expression’, and of the beans that it refers to, or of the discourse referents anchored to them, as the ‘topic referents’ or ‘topic denotation’.

3 Focus

3.1 What is Focus?

The most successful understanding of focus, to my mind, is the following, still rather informal definition:

- (6) **Focus indicates the presence of alternatives that are relevant for the interpretation of linguistic expressions.**

This is the central claim of Alternative Semantics (Rooth 1985, 1992).¹ The rather general definition does not say anything how focus is marked; in fact it is compatible with different markings. However, it says that we should use terms like “focus marking” or “focus construction” only to indicate that alternatives play a role in interpretation. It might well be that different ways of focus marking signal different ways of how alternatives are exploited; e.g. focus marking by cleft sentences often signals an exhaustive interpretation that in-situ focus lacks. We can then talk about subtypes of focus, such as cleft focus and in-situ focus, that may employ the alternatives in more specific ways. Also, (6) allows for languages to differ in the ways they mark focus and in the specific interpretational effects of focus. This is in no way different from other linguistic categories, such as Case, or Gender. But it seems reasonable, and consistent with

¹ But it is not necessarily tied to the precise representation of focus that this theory proposes.

current uses of the term, to use “Focus” exactly in those cases that satisfy (6). The following sections will show that all current uses of the term can be subsumed under (6).

3.2 Expression Focus and Denotation Focus

Definition (6) is silent about the nature of the alternatives that are relevant for interpretation. In fact, the alternatives may be alternatives of form or of denotation. This suggests the following way to make (6) more precise:

- (7) **A property F of an expression α is a Focus property iff F signals**
(a) that alternatives of (parts of) the expression α or
(b) alternatives of the denotation of (parts of) α
are relevant for the interpretation of α .

I call the first case, (a), **expression focus**. The expression alternatives can affect a variety of aspects, like choice of words and pronunciation, and they do not even have to involve constituents or meaningful units. Focus on expressions is typically used for corrections, and often but not necessarily come with a negation (cf. Horn 1985 on metalinguistic negation). Two examples:

- (8) Grandpa didn't [kick the BUCKet]_F, he [passed aWAY]_F.
 (9) A: They live in BERlin.
 B: They live in [BerLIN]_F!

In (8) the relevant alternatives of both foci are the expressions *{kick the bucket, pass away}*. It cannot be their denotations, as they are identical, the property DIE. The expressions differ among other things in their connotations, which is the feature in which they are contrasted here, so what is contrasted here is at least more than just the denotation. In (9) the relevant alternatives are the expressions

{BERlin, BerLIN} that just differ in their accent, and speaker B corrects speaker A by supplying the form that A thinks has the right accent structure.

Expression focus is typically marked in-situ, not by clefts or other types of movement. It can focus on constituents below the word level, and it can be deeply embedded within a sentence. This follows if we assume that expression focus affects surface representations of linguistic objects. The typical use of expression focus is that a string $[\alpha_1 \dots \alpha_{i,F} \dots \alpha_n]$ is rejected in favor of a string $[\alpha_1 \dots \alpha_{i,F'} \dots \alpha_n]$, where focus identifies the substring to be replaced and its replacement.

I will call the second case, (b), **denotation focus**. Here the relevant alternatives are constructed on the level of denotations, leading to alternative denotations of complex expressions. Denotation focus on an expression α with meaning $\|\alpha\|$ leads to the assumption of a set of alternative meanings that play a role in the interpretation of the constituent in which α occurs. The alternative denotations have to be comparable to the denotation of the expression in focus, that is, they have to be of the same type, and often also of the same ontological sort (e.g., persons or times), and they can be more narrowly restricted by the context of utterance.

In the following, I will concentrate on denotation focus, which is presumably more important in communication.

3.3 Semantic vs Pragmatic Uses of Focus: CG content vs. CG management

We now turn to the notion of interpretation of the linguistic expression α that figured in definition (7). It is useful to explicate this notion within the general theory of Common Ground (CG) introduced in section 2.2, where we introduced the distinction between CG content and CG management. This differentiation is useful to differentiate between two quite different uses of focus. So-called

pragmatic uses of focus relate to the public communicative goals of the participants, the CG management; so-called **semantic** uses of focus relate to the factual information, the CG content.

The pragmatic use of focus does not have an immediate influence on truth conditions, but it helps in guiding the direction into which communication should develop, and it also aids in building the cognitive representations that are to be constructed by the interlocutors. Failing to select the right focus typically results in incoherent communication. The semantic use of focus, on the other hand, affects the truth-conditional content of the CG. Failing to set focus right will result in transmitting unintended factual information. The two uses of focus cannot always be neatly separated, but there are prototypical cases that clearly belong to the one or to the other category, to which we now turn.

3.4 Pragmatic uses of focus

The classical pragmatic use of focus is to highlight the part of an answer that corresponds to the *wh*-part of a constituent question (Paul 1880). This can be captured in a straightforward way within our model of CG change.

A question changes the current CG in such a way as to indicate the communicative goal of the questioner. Following Hamblin (1973) we can model this effect by a set of propositions, each being the denotation of a congruent answer.

- (10) A: *Who stole the cookie?*
Hamblin meaning: $\{\text{STOLE}(\text{COOKIE})(x) \mid x \in \text{PERSON}\}$

The answer identifies one of these propositions and adds it to the CG content; this is the job of the “ordinary meaning” in Alternative Semantics. Focus induces alternatives that correspond to the Hamblin meaning of questions; in the theory of Rooth (1992), it is a superset of it:

- (11) B: $[\text{PEter}]_F$ *stole the cookie.*
Ordinary meaning of the answer: $\text{STOLE}(\text{COOKIE})(\text{PETER})$
Focus-induced alternatives: $\{\text{STOLE}(\text{COOKIE})(x) \mid x \in \text{ENTITY}\}$

The formation of the question, as well as the construction of the focus-induced alternatives of the answers, clearly belongs to CG management, not to CG content. The question specifies the general way in which the CG should develop in the immediate future; the answer relates an expression to the immediately preceding context. Obviously, focus in answers is an information-packaging device in the sense of Chafe, and the formation of questions can be seen as such as well if we generalize it to include the expression of the speaker’s own needs for information.

We might ask at this point why there is marking of question-answer congruence in the first place. Its *raison d’être* most likely is that it allows to accommodate the meaning of the questions that are not overtly expressed. That is, it allows to accommodate CG management. A variety of theories have assumed that coherent discourse is structured by such implicit questions, e.g. Klein & von Steutterheim 1987, van Kuppevelt 1994, Roberts 1995, Büring 2003), and focus on the answers to such explicit questions may well help the addressee to construct what the intended questions were.² Under this understanding, all cases of so-called “presentational” or “information” focus which claimed that focus expresses the most important part of the utterance, or what is new in the utterance, can be subsumed under the use of alternatives to indicate covert questions suggested by the context. The following examples suggest questions like *What*

² It should be stressed that we should not expect this use of focus to be universal; just as some languages use gender information to express pronoun binding and others don’t, the use of focus to mark Q/A-coherence may be restricted. Findings about languages such as Hausa (Hartmann & Zimmermann #) and Northern Sotho (Zerbian #) suggest that this is the case.

happened?, *What was there?* and *What did she do?*, which explains the types of foci suggested for the second clauses.

- (12) a. And then something strange happened. [A MEterorite fell down]_F.
 b. Once upon a time, there was [a PRINcess]_F
 b. Mary sat down at her desk. She [took out a pile of NOTes]_F.

Other pragmatic uses of focus is to **correct** and **confirm** information. In cases like (13.B,B') the focus alternatives must include a proposition that has been proposed in the immediate preceding CG. It is expressed that the ordinary meaning is the only one among the alternatives that holds. This leads to a corrective interpretation in case the context proposition differed, cf. (B), and to a confirmative interpretation in case the context proposition was the same, cf. (B'). In the latter case the wider CG must be such that other alternatives are under consideration as well, which are then excluded. Again, focus in this use restricts the possible contexts, and presumably aids interpretation.

- (13) A: Mary stole the cookie.
 B: (No,) [PEter]_F stole the cookie!
 B': Yes, [MAry]_F stole the cookie.

Another pragmatic use of focus is its use to highlight **parallels** in interpretations. This can affect whole clauses as in (14.a) or parts of clauses as in (b). As in the previous cases, focus creates alternatives, with the pragmatic requirement that some of these alternatives are also evoked in the immediately surrounding contexts. In addition, the parallel expressions are required to have the same set of alternatives. In the case of (14.a), both clauses evoke the set $\{\text{STOLE}(x)(y) \mid x,y \in \text{ENTITY}\}$. In the case of (b), the alternatives have to be constructed more locally, for which Rooth (1992) introduces an anaphoric operator *C*, here

presumably at the level of the NP or DP. The NP-level alternatives are $\{\text{P}(\text{FARMER}) \mid \text{P} \in \text{NATIONALITY}\}$, a set of predicates like *AMERICAN*(FARMER), *CANADIAN*(FARMER), etc.

- (14) a. *Mary stole the COOkie and PEter stole the CHOcolate.*
 b. *An AMERican farmer talked to a CaNAdian farmer, ...*

The use of focus to express parallel structures is perhaps one of the least understood aspects of focus. Focus appears to be less obligatory than in the other cases. Presumably focus assists in constructing mental models of the described scene by associating the contrasted meanings.

Yet another pragmatic use of focus is to make the addressee aware of a **delimitation** of the utterance to the constituent in focus. This use subsumes, in particular, cases of contrastive topics such as *John* in I will come back to this in section 6.2

(15.a), but also focus in frame setting expressions as in (b). I will come back to this in section 6.2

- (15) a. As for JOHN, he was seen in the KITchen.
 b. In MY opinion, JOHN stole the cookies.

With these types (answers, corrections, confirmations and delimitation) we have covered the main pragmatic uses of focus. We turn to those uses of focus that have an immediate truth-conditional effect, that is, that directly influence CG content.

3.5 Semantic Uses of Focus

We say that semantic operators whose interpretational effects depend on focus are **associated** with focus. The best-known cases are focus-sensitive particles like *only*, *also* and *even*. There exist a variety of theories for the meaning of such

particles, but they generally resort to the notion of alternatives, which was also central for the pragmatic uses of focus. In the case of exclusive particles like *only*, it is stated that the focus denotation is the only one among the alternatives that lead to a true assertion; additive particles like *also* express the presupposition that the assertion holds for other alternatives; and scalar particles like *even* presuppose that the denotation of the focus constituent is an extreme among the alternatives.

But do these particles indeed affect the truth-conditional meaning? It is interesting to note that the focus information of additive and scalar particles does not affect the output CG, but rather restricts the input CG, as the alternatives are used to impose presuppositions. In particular, additive particles are close to a use within CG management, as they indicate that a proposition with an alternative to the item in focus had been expressed before or is part of the CG.

- (16) [JOHN]_F stole a cookie, and [PEter]_F, TOO³, stole a cookie.

Negation has been analyzed as a focus-sensitive particle as well. Presumably these cases can be subsumed under corrections, and hence they might rather belong to CG management use of focus. In the following example, it is negated that Bill stole the cookie, with the contextual requirement that precisely this has been claimed or appears to be inferrable.

- (17) Not BILL_F stole the cookie, but JOHN_F.

But there are a number of clear cases in which alternatives are used for semantic purposes. For example, reason clauses as in (18), a variation of a coun-

³ As for a theory that explains accent on *too*, cf. Krifka (1999).

terfactual example of Dretske (1972), or operators like *fortunately*, necessarily contrast alternatives with each other.

- (18) $\left\{ \begin{array}{l} \text{Clyde had to marry [BERtha]}_F \\ \text{Clyde had to [MARry]}_F \text{ Bertha} \end{array} \right\}$ in order to be eligible
for the inheritance.

- (19) Fortunately, Bill spilled [WHITE]_F wine on the carpet.

For example, (19) says that among the two alternatives, JOHN SPILLED RED WINE and JOHN SPILLED WHITE WINE, the latter one was more fortunate (but of course that wine was spilled at all was still unfortunate).

Rooth (1985) has suggested that focus helps in determining the restrictor of quantifiers, in particular adverbial quantifiers, and then has truth-conditional impact as well. For example, focus has truth-conditional impact in (20); focus on *q* instead would result in the different, and false, reading that every *u* is followed by a *q*.

- (20) In English orthography, a [U]_F always follows a *q*.
'Whenever a *q* follows an {a, b, c, d, ... z}, then it follows a *u*.'

One important fact about focus-sensitive operators is that they have to be in a position in which they can have scope over their focus. For example, *only* in (21) could associate with *Mary*, with *Sue*, with *introduced* or with the whole VP, but not with *John* as it does not c-command *John* on any level of representation.

- (21) John only introduced Mary to Sue.

Yet it should be stressed that the notion of focus does not coincide with the one of scope. For example, while the focus of *only* in the following two examples is the same, their scopes differ, leading to distinct interpretations.

- (22) a. Mary only said that JOHN stole a cookie.
 ‘Mary didn’t say of anyone but John that he stole a cookie.’
 b. Mary said that only JOHN stole a cookie.
 ‘Mary said that nobody but John stole a cookie.’

It is possible that semantic uses of focus can be traced back to pragmatic uses in general. The underlying idea is as follows: The notion of alternatives to what is said was first introduced for pragmatic purposes, to convey additional meanings by making explicit that certain expressions were considered but not uttered, presumably because they were false or not informative enough. Once established, alternatives were used for operators that, due to their meaning, needed to refer to sets of denotations. In some cases, like additive particles and contrastive negation, this change from pragmatic exploitation of alternatives to semantic exploitation appears to be quite plausible; in other cases, as in (19) and (20), the details of such a development are considerably less clear.

It might be suggestive to distinguish between pragmatic and semantic focus by stating that the latter type of focus associates with an operator, while the former does not. But then we can assume illocutionary operators such as assertion or denial that make use of the alternatives introduced by focus, and we can say that focus is bound to such operators (cf. Jacobs 1984), hence this is not a valid criterion to distinguish between pragmatic and semantic uses.

3.6 Comparison with Alternative Notions of Focus

The notion of focus has been explicated in a variety of ways, in particular as “highlighting” the “most important” or “new” information in an utterance. While such explications are intuitively appealing and may apply to a majority of cases, I consider them unsatisfactory as definitions. The notion of highlighting is a particularly bland one that is hardly predictive as long as we do not have a worked-out theory what highlighting is. I am also not aware of any worked-out

theory of communication that has made clear what “importance” means, let alone has introduced a graded notion of importance. Even on an intuitive level, it is difficult to apply. In which sense is *John* the most important part in (23)? Isn’t it most important that someone else stole the cookie?

- (23) It wasn’t JOHN who stole the cookie.

As for the second, the notion of “newness” gives us wrong predictions. There are many cases in which a constituent that refers to something mentioned previously is in focus. One might say that what is new in (24) is not John, but that John satisfies the description *x stole the cookie*.

- (24) A: Who stole the cookie, John or Mary?
 B: JOHN stole the cookie.

It has also been suggested that focus expresses an existential presupposition (cf. Geurts & van der Sandt 2004). This reconstruction has the property of being precise and testable. Examples (23) and (24) clearly presuppose that someone stole the cookie, and in many other types of uses of focus we plausibly can assume existence presuppositions. But existence presuppositions do not always arise, as in the following example:

- (25) Not even MARY managed to solve the problem.

If focus indicates the presence of alternatives, as suggested here, we can see why the other explanations made sense to some degree. The focus denotation typically feels highlighted because it is contrasted with the other alternatives; the selection of this denotation over alternative ones is often felt to be the most important contribution in a sentence, and it is often also new (not mentioned previously). Also, in many cases it is already established in the CG content that

the proposition applies to one alternative, but it is still open to which one. But this does not mean that highlighting, importance, newness, or presupposition of existence should be figure in the definition of focus.

3.7 Further Focus Types

I have argued that focus in general indicates the presence of alternatives for interpretation. Subtypes of focus then all are variations of this underlying idea. We have distinguished between expression focus and denotation focus according to the nature of the items in focus, and we have distinguished between pragmatic focus and semantic focus according to the general ways in which focus-induced alternatives are used. There are a number of additional criteria that can be applied to classify either the kind of alternatives or their use.

Starting with the type of alternatives, we have seen that constituents of different sizes can be put into focus: whole sentences, subconstituents like VPs or DPs, parts of DPs like adjectives or demonstratives. Sometimes terms are used like **broad** and **narrow** focus (cf. Lambrecht 1994), but it should be clear that these are imprecise terms that can only be applied when different focus alternatives are under discussion. The position of the accent is determined by rules of accent percolation (also known as "focus projection"), which leads to well-known ambiguities of focus marking. For example, if a transitive VP is in focus, then accent is realized on the argument, which also would signal narrow focus on the argument. For denotation focus it holds that whatever is in focus must be a meaningful unit, as denotational focus contrasts different meanings. An extreme case is so-called **verum focus**, focus on the truth value of a sentence, which may be expressed by accenting an auxiliary (as in *She DOES like broccoli*). It is an interesting issue whether **parts of words** can be put in focus. Paul (1880) has proposed this for a word like *fährt* 'move in a land-bound vehicle', where according to him it is possible that only the manner component is in fo-

cus, which is phonologically indistinguishable from focus on the whole denotation. Cases like this do not force us to lexical decomposition, however; we can also assume that the alternatives are restricted to verbs of locomotion. Another type of sublexical focus is illustrated in *We only saw stalagMITes in the cave, no stalagTITes* where accent highlights a part does not carry meaning. As Artstein (2003) argues, this can be explained by a principle that accent creates a maximally distinct representation between the focus and its alternatives.

It sometimes happens that one operator makes use of a combination of foci, resulting in **complex focus**:

(26) John only introduced BILL to SUE.

This says: The only pair $\langle x, y \rangle$ such that John introduced x to y is $\langle \text{BILL}, \text{SUE} \rangle$. It cannot be reduced to single foci; in particular, the sentence means something different from the following:

(27) *John only introduced BILL only to SUE.*

(27) is a case of **multiple focus** in which in one and the same sentence, one expression introduces alternatives that are exploited in one way, and another expression introduces alternatives that are exploited in a different way. (27) can be paraphrased as: The only x such that Bill introduced x to Sue and no one else is $x = \text{Bill}$. The first *only* scopes over the second, and this is reflected by focus marking: Accent on *Bill* is stronger than accent on *Sue*, in contrast to the complex focus case of (26), where both accents are felt to be equally strong.

Another distinction relating to types of alternatives concerns the issue of the size of the alternative set. Sometimes this set is limited to a few items, perhaps down to the minimal number of two, the item in focus and one alternative. This is often the case in corrections or contrasts, in polarity questions that expect

a positive or a negative answer, or in answers to alternative questions or restricted constituent questions such as the following:

- (28) A: *What do you want to drink, tea or coffee?*
 B: *I want [TEA]_F.*

At other times the alternative set is unrestricted, satisfying just the general condition that all the alternatives must be compatible with the focus in their semantic type. It is tempting to call focus with a limited set of alternatives **contrastive** (as suggested by Chafe 1976), but (28.B) doesn't seem to be more contrastive than an answer to the non-restricted question *What do you want to drink?* I would rather suggest to distinguish between closed alternatives and open alternatives, and talk about **closed vs. open focus**, when necessary.

The notion of **contrastive** focus I would like to restrict to focus used for contrastive purposes, which presupposes that the CG content contains a proposition with which the current utterance can be constructed, or that such a proposition can be accommodated (cf. Jacobs 1988). In (28), it is CG management, not CG content that contains such a proposition. The typical use of contrastive focus is corrective, but it can also be additive, as in A: *John wants coffee*. B: *MARy wants coffee, TOO*. There is evidence for particular marking strategies for contrastive focus, like the use of particular syntactic positions or of special prosodic patterns, see e.g. Selkirk (2002), Molnár (2002), Gussenhoven (2004).

Another type of focus that refers to the specific way of how the contribution by the alternatives is interpreted is **exhaustive** focus. It indicates that the focus denotation is the only one that leads to a true proposition, or rather more general: that the focus denotation is the logically strongest that does so. É. Kiss (1998) has pointed out that focus movement in Hungarian triggers this specific meaning, and it appears that cleft constructions in English trigger it as well:

- (29) It's [JOHN and BILL]_F that stole a cookie.

This example says that nobody else stole a cookie but John and Bill. Consequently, exhaustive focus is not compatible with additive particles, like *too*. I don't see a good reason to introduce, in addition to exhaustive focus, the notion of identification focus that expresses an identity statement, as in 'The ones who stole a cookie are John and Bill'

As a final focus type I would like to mention **scalar focus**. In it, the alternatives are ordered, and the focus denotation often is the least or greatest element. Scalar particles like *even* or *at least* require scalar focus, as well as strong polarity items such as in [*Wild HORses*]_F *wouldn't drag me there*.

3.8 Representation Formats for Focus

There are a number of ways in which the alternatives introduced by focus can be represented within a formal framework of semantic interpretation. These representations are not independent of the possible meaning of focus, and hence should be discussed here.

Alternative Semantics (Rooth 1985, 1992) assumes two levels of interpretations, the ordinary level and the level of alternatives. They are construed in parallel, and operators that exploit focus refer to both the ordinary meaning and the alternatives. The construction mechanism is particularly simple and incorporates the idea of focus introducing alternatives in a natural way, in the sense that it could not even represent anything besides alternatives. It also predicts that focus-sensitive operators have to be in a position in which they can have scope over their focus. However, Alternative Semantics has only limited means to express that two foci belong together, as in the case of complex focus, and it is insufficient in certain cases of multiple focus (cf. von Stechow 1990, Kratzer 1994, Krifka 2001). The reason is that in Alternative Semantics the focus deno-

tations are not directly accessible to focus-sensitive operators; the operators only can see the effects that focus alternatives had on the meanings of expressions. The set of alternatives of the following example with a complex focus is a set of propositions:

- (30) [John introduced $BILL_F$ to SUE_F]
 Meaning: $INTRODUCED(BILL)(SUE)(JOHN)$
 Alternatives: $\{INTRODUCED(x)(y)(JOHN) \mid x, y \in D\}$

The Structured Meaning approach to focus (von Stechow 1990, Krifka 1992) assumes that focusing leads to a partition of meanings into a focus part and a **background** part that, when applied to the focus denotation, yields the ordinary interpretation. Example (30) would get the following representation, where background and focus are represented by a pair, $\langle B, F \rangle$.

- (31) $\langle \lambda \langle x, y \rangle [INTRODUCED(x)(y)(JOHN)], \langle BILL, SUE \rangle \rangle$

The notion of background corresponds to the one of **presupposition skeleton** of Jackendoff (1972); notice that there is no corresponding notion within Alternative Semantics. The structuring can be triggered by syntactic movement of the focus item, as overtly done in focus movement, or by some equivalent operation. The Structured Meaning representation can express multiple focus and complex focus, but the representation format is not particularly tied to the notion of alternatives. It has to be stipulated that focus-sensitive operators are only allowed to express operations that relate a focus denotation to its alternatives (cf. Rooth 1995, who discusses this problem with a hypothetical verbal predicate, *toIfed*).

There is another framework of focus representation, In-Situ Binding Semantic, as developed in Wold (1996), whose representational complexity lies in between Alternative Semantics and Structured Meanings. It does not allow di-

rect access to the focus denotation, but has a notion of background that allows to refer to the position in which foci are interpreted, and hence is able to express dependencies between foci.

It might well be that we need more than one representation formats to cover different aspects of focus. In particular, we might argue that focus marked by overt movement into a cleft position or dedicated focus position should be captured by Structured Meanings as this mimicks the syntactic structures involved there and predicts certain syntactic island restrictions. It is an open debate whether cases of in-situ focus should to be modelled by covert movement on LF, as the Structured Meaning approach would have. On the one hand, it was pointed out early on that syntactic island restrictions in association with focus phenomena appear to be lacking (cf. Jackendoff 1972); on the other hand, it has been argued that they are in fact present (Drubig 1994). The discussion revolves around examples of the following kind:

- (32) John didn't introduced Bill to [the woman he met at SUE's party]
 (but *MARY's / the woman he met at MARY's party).

It appears that the negation associates with focus on *Sue*, violating island restrictions. But then the *but*-phrase has to take up the whole constituent, not just the focus. This has been taken as evidence that negation associates with the whole bracketed NP, not with *Sue*. We can distinguish between a **focus phrase** (here, *the woman he met at SUE's_F party*) that contains a focus, which in turn determines the alternatives to the focus phrase. In the majority of cases, focus and focus phrase coincide, but not always, as (32) illustrates. As the focus can be deeply embedded within the focus phrase, this suggests a hybrid representation of focus: The relation between focus and focus phrase is mediated by the mechanisms of Alternative Semantics, and the relation between focus phrase

and focus-sensitive operator is mediated by Structured Meanings (cf. Krifka 2006).

4 Givenness

4.1 What is Givenness?

We now turn to the second important category of IS, the indication that the denotation of an expression is present in the immediate CG content. Givenness was prominently treated by Chafe (1976), and there is ample evidence that human languages have devices with which speakers can make addressees aware that something that is present in the immediate linguistic context is taken up again.

A definition of Givenness must be such that it allows to say that an expression is given to a particular degree, e.g. whether it is maximally salient in the immediate CG or just given there, or whether it is given in the general CG or not given at all. The following attempt at a general definition takes care of that.

- (33) **A feature X of an expression α is a Givenness feature iff X indicates whether the denotation of α is present in the CG or not, and/or indicates the degree to which it is present in the immediate CG.**

With Focus we distinguished between expression focus and denotation focus. We do not have to make this distinction here, as Givenness always refers to denotations, never to expressions. There are two groups of phenomena that refer to Givenness, namely specific anaphoric expressions that have givenness features as part of their lexical specification, and other grammatical devices such as deaccentuation, ordering and deletion that can mark arbitrary constituents as given. I will deal with them in turn.

4.2 Anaphoric Expressions

These are specific linguistic forms that indicate the givenness status of their denotations, including personal pronouns, clitics and person inflection, demonstratives, definite articles, but also indefinite articles that indicate that their referent is not given. Definite articles can be used to indicate whether a denotation is given in a CG in general, whereas clitics and pronouns typically indicate that their denotations are given in the immediate CG.

There is a large literature on anaphoric devices, which I cannot even start to do justice here. But I want to point out that speakers typically have a hierarchy of distinct linguistic means at their disposal (as zero forms, clitics, pronouns, demonstratives...), and that denotations in the immediate CG are ranked with respect to their givenness status such that simpler anaphoric expressions are used to refer to more salient denotations (cf. Prince 1981, Gundel e.a. 1993). This insight has been implemented within Centering Theory, which has developed formal means to model the dynamic change of the saliency of discourse referents in communication (cf. papers in Walker e.a. 1998).

4.3 Deaccentuation, Deletion and Word Order

There are three other ways to indicate Givenness: Deaccentuation, the reduction of the prosodic realization of expressions that are given in the immediate context; deletion, which can be seen as an extreme form of deletion; and a realization of an expression in a non-canonical position, typically before this position. This is illustrated in the following examples:

- (34) a. Ten years after John inherited an old farm, he SOLD [the shed]_{Given}.
 b. Bill went to Greenland, and Mary did _ too.
 c. Bill showed the boy a girl.
 *Bill showed a boy the girl.
 Bill showed the girl to a boy.

In the first example, which corresponds to examples used by Umbach (2003), *the shed* is deaccented, and has to be understood as referring to the farm mentioned before. If it were not deaccented, it would mean to something different, like the shed that came with the farm. Example (b) illustrates VP ellipsis, which refers back to a VP meaning. The examples (c) show that in the double object construction, given constituents precede constituents that are new. This is a rule with high functional load in so-called free word order languages, an insight that goes back to Weil (1844).

As focus constituents typically are not given, and are realized with greater prosodic prominence, it has been proposed that focus is a complementary notion to givenness that can ultimately be eliminated from theoretical terminology (cf. Daneš 1970, Sgall e.a. 1986). But given constituents can be in focus, and then bear accent. For example, it is possible to focus on pronouns, as in *Mary only saw HIM_F*. Schwarzschild (1999) develops a more refined theory of interaction of givenness and focusation, which checks givenness recursively and states that constituents not in focus must be given, and that focus has to be applied only when necessary, that is, to prevent that a constituent is given. But the notion of focus cannot be eliminated in Schwarzschild's theory.

We have to assume both focus, the indication of alternatives, which is expressed by accentuation, and rules of marking given constituents, e.g. by deaccentuation. As the case of accented pronouns shows, focus accentuation overrides deaccentuation of given constituents, in the sense that focus has to be expressed by accent. However, if a larger constituent is focused, then givenness can influence the accent rules: The constituent that normally would bear accent can be deaccented, and accent can be realized on some other constituent within the focus expression (cf. Féry & Samek-Lodovici 2006). For example, while in VP focus the accent is normally realized on the argument, it is realized on the head when the argument is given:

- (35) A: I know that John stole a cookie. What did he do then?
 B: He [reTURNed [the cookie]_{Given}]_F

This suggests an explanation why accent is normally realized on the argument in cases of broad focus. It is the arguments, not the heads, that are referential, and therefore the need to express whether they refer to something given is more pressing. If the normal accentuation rules state that accent is realized on the argument, then givenness of arguments can be expressed by deaccenting the argument and accenting the head instead.

5 Topics

5.1 What is Topic?

The terms “topic” and “comment” are used most frequently to refer to what has been introduced into linguistic thinking as “psychological subject” and “psychological predicate” by von der Gabelentz (1869), who used the first one to refer to the object which the speaker is thinking about, and the second to what the speaker is thinking about it. In terms related more closely to communication, topic is the entity that a speaker identifies about which then information, the comment, is given. This presupposes that information in human communication and memory is organized in a way that it can be said to be “about” something. This does not follow from a general definition of information. For example, relational databases or sets of possible worlds, both models for information, do not presuppose any relation of aboutness.

Reinhart (1982) has integrated this notion of topic into a theory of communication that makes use of the notion of CG. According to her, new information is not just added to the CG content in form of unstructured propositions, but is rather associated with entities, just like information in a file card system is associated with file cards that bear a particular heading. For ex-

ample, while (36.a,b) express the same proposition, they structure it differently insofar as (a) should be stored as information about Aristotle Onassis, whereas (b) should be stored as information about Jacqueline Kennedy.

- (36) a. [Aristotle Onassis]_{Topic} [married Jacqueline Kennedy]_{Comment}·
 b. [Jacqueline Kennedy]_{Topic} [married Aristotle Onasses]_{Comment}·

This leads to the following definition, which presupposes a file-card like structure of information storage.

- (37) **The topic constituent identifies the entity or set of entities under which the information expressed in the comment constituent should be stored in the CG content.**

Just as with the notion of “focus”, the notion of “topic” has not been used in a terminologically clean way. Chafe (1976) called what is defined in (37) “subject”, a term that should be reserved for grammatical subjects to avoid confusion. In the Prague School, the notion is called “theme”, and conflated with the one of old information (e.g., Daneš 1970). We should refrain from this, even if in many cases, topic constituents are “old” in the sense of being inferrable from the context. But there are certainly cases of new topics. The following sentence introduces a new entity into discourse and, at the same time, uses it as the denotation of a topic constituent, which amounts to introducing a new file card in the CG content.

- (38) [A good friend of mine]_{Topic} [married Brittney Spears last year]_{Comment}·

The notions of Topic/Comment are sometimes mixed up with the notions of Background/Focus. However, as we will see in section 5.2, there are topics that contain a focus. And the Comment need not be identical to the focus either:

- (39) A: When did [Aristotle Onassis]_{Topic} marry Jacqueline Kennedy?
 B: [He]_{Topic} [married her [in 1968]_{Focus}]]_{Comment}

The definition in (37) includes the option that a comment is made about a set of entities. This takes care for the typical way how quantified sentences are interpreted, in which two sets are related by a quantifier that can be realized as a determiner or as an adverbial:

- (40) a. Every zebra in the zoo was sick.
 b. Most zebras in the zoo were sick.

- (41) Zebras in the zoo usually are sick.

The quantifier in such sentences express the extent to which the comment holds for the elements of the set. Assuming that sentences like (40), (41) are about zebras explains the fact why natural language quantifiers have the property of being conservative, that is, their truth value can be checked by looking solely at the restrictor set (the set of zebras). It is important to note that the restrictor of quantifiers is not always topical, but in the majority of cases it is, and the property of conservativity that is motivated in those cases is transferred to cases in which quantifiers are not topical.

Sentences typically have only one topic, which can be explained within Reinhart’s file-card metaphor: The simplest way to add information is to add it on one file card. But sentences with two or more topics are possible under certain circumstances in case a relation between two file cards is expressed, as in *As for Jack and Jill, they married last year*. A possible way to handle such cases is to introduce a new file card that contains information concerning both Jack and Jill. On the other hand, sentences may have no topic constituent at all, under which condition they are called **thetic**, following Marty (1884). But as already Marty had indicated, this does not mean that such sentences are about nothing.

While they lack a topic constituent, they do have a topic denotation, typically a situation that is given in the context, as in [*The HOUSE is on fire*]_{Comment}.

In addition to the notion topic/comment, some theories also assume a structuring into subject and predicate, or predication basis and predicate, cf. Sasse (1987), Jacobs (2001) and Kuroda (2005). I will not go into this distinction here in greater detail, but I doubt that it is a distinction that is to be explained as one of IS.

But then the question is whether topic and comment should be considered terms relating to IS to begin with. Without question, topic/ comment structure is a packaging phenomenon; (36.a) and (b) package the same information differently, so that it is entered on the file card for Aristoteles Onassis and for Jacqueline Kennedy, respectively. But section 2.1 stressed that the packaging must respond to the temporary (recent) common ground, and this restriction certainly is not always satisfied. Assume that two speakers A, B who both know John well meet, and A says to B: *Did you know? John has married last week.* This is an assertion about John; the information will be entered in the file card for John in the CG content of A and B. But this does not necessarily relate to the recent state of the CG content, it can also respond to the long-term state, e.g. a long established and known interest of B in John.

Yet we find that topic choice often does respond to properties of the temporary information state. There is a well-documented tendency to keep the topic constant over longer stretches of discourse (so-called **topic chains**, cf. Givón 1983). Hence, while the notions of topic and comment fail to be IS terms in the sense that they always relate to the temporary state of the CG, they quite often do relate to it, as the topic denotation in the preceding utterance is the first choice for the topic denotation of the current utterance.

5.2 Contrastive Topics

Contrastive topics are topics in which a focus within the topic signals the presence of alternative topics that play a role in pragmatic interpretation. Example:

- (42) A: What do your siblings do?
 B: [My [Sister]_{Focus}]_{Topic} [studies MEDicine]_{Focus},
 and [my [BROther]_{Focus}]_{Topic} is [working on a FREIGHT ship]_{Focus}.

In the first clause of B's response, focus on *sister* indicates an alternative to the topic 'my sister', namely, 'my brother'. The reason why the presence of an alternative is highlighted typically is to indicate that the current clause does not deliver all the information that is expected. This is why we often find contrastive topics to indicate a strategy of incremental answering in the CG management, as in our example in which an issue is split into subissues. This has been assumed to be the function of contrastive topics in Roberts (1996) and Büring (2003). It is pointed out in this literature that there are accommodation phenomena that affect what we call CG management. In the following case, contrastive topic accommodates a more general question, *Who was where?*

- (43) A: Where were you (at the time of the murder)?
 B: [[I]_{Focus}]_{Topic} [was [at HOME]_{Focus}]_{Comment}

However, it should be noted that we find contrastive topics also in cases in which the idea of a questioning strategy is not easily applicable. In example (44) the answer given does not satisfy the expectations expressed in the question, in combination with a rising intonation in the comment that indicates that the assertion, while the best one to be made, may not satisfy all needs.

- (44) A: Does your sister speak Portuguese?
 B: [My [BROther]_{Focus}]_{Topic} [[DOES]_{Focus}]_{Comment}

It should be noted that focus within a topic is interpreted as usual: indicating the presence of alternatives, in this case, alternative topics. Focus is marked by (rising) accent, but it is not the main accent of the sentence, which is on a constituent of the comment.

6 Frame Setting and Delimitation

6.1 What is Frame Setting?

Frame setting, according to Jacobs (2001), is often not separated clearly from aboutness topic, and Chafe (1976), who stresses their difference, uses the term “topic” for precisely this function. What is it? Statements like (45) certainly should not be entered under a file card about the health situation, and the topic of (46) is Daimler-Chrysler, not Germany or America.

- (45) A: How is John?
 B: {Healthwise / As for his health}, he is [FINE]_F.
- (46) A: How is business going for Daimler-Chrysler?
 B: [In GERMANY]_{Frame} the prospects are [GOOD]_F,
 but [in AMERICA]_{Frame} they are [loosing MONEY]_F.

It is often said that adverbials like *healthwise* or *in Germany* are **frame setters** that set the frame in which the following expression should be interpreted; Chafe says that it is used “to limit the applicability of the main predication to a certain restricted domain”. It is still unclear how this should be understood more precisely. For cases like (45) which contain an evaluative predicate (*fine*) that is unspecified with respect to a dimension (financially, healthwise, spiritually etc.), this can be made precise by assuming that the frame-setting adverbial specifies that dimension. Similarly, (46) has a situation dimension that is specified by the frame setter. But we also have statements like *As for his health*

situation, he had a bypass operation recently, which cannot be explained in this way. It appears that a more general treatment would assume a classification of the type of information that can be given about an individual, and that frame-setting adverbials indicate this classification.

In any case, in exchanges like (45) alternative frames play a role, and hence we can assume that explicit frame setters always are focused in the sense of section 3.1. They choose one out of a set of frames and state that the proposition holds within this frame. If there is no alternative perspective to be considered, then there is no need for an explicit frame setter either. As explicit frame setters always indicate alternatives, they clearly belong to IS. More specifically, they relate to CD management, as they imply that there are other aspects for which other predications might hold. In this they are similar to contrastive topics (section 5.2), as they too split up a complex issue into subissues.

6.2 Delimitation

The similarity between contrastive topics and frame setters mentioned above is worth to be looked at more closely. What contrastive topics and frame setters have in common is that they express that, for the communicative needs at the current point of discourse, the current contribution only gives a limited or incomplete answer. With contrastive topics, the current CG management contains the expectation that information about a more comprehensive, or distinct, entity is given; contrastive topic indicates that the topic of the sentence diverges from this expectation. With frame setters, the current CG management contains the expectation that information of a different, e.g. more comprehensive, type is given, and the frame setter indicates that the information actually provided is restricted to the particular dimension specified by the frame setter. This more general view is suggested in Büring’s notion of contrastive topics, which actually do not have to be (aboutness) topics.

Büring develops a formal model of this notion within the representation framework of Alternative Semantics: Contrastive topic induces a set of alternatives over and above the set of alternatives that are introduced by the focus within the predication, ending up with sets of sets of alternatives.

- (47) A: Which subjects do your siblings study?
 B: [My SiSter]_{Contrastive Topic} [Comment studies [PoMOlogy]_{Focus}]]
 $\{\{x \text{ studies } y \mid y \in \{\text{POMOLGY, OLERICULTURE, ...}\}\}$
 $\mid x \in \{\text{MY SISTER, MY BROTHER, ...}\}\}$

This incorporates the important observation that contrastive topics always occur in expressions that have another focus outside of the contrastive topic, a rule that holds for frame setters as well. But one should distinguish the formal implementation of delimitation from its communicative purpose. The following is an attempt to characterize this in a most general way:

- (48) **A Delimitator α in an expression [... α ... β _{Focus}...] always comes with a focus *within* α that generates alternatives α' . It indicates that the current informational needs of the CG are not wholly satisfied by [... α ... β _{Focus}...], but would satisfy it by additional expressions of the general form [... α' ... β' _{Focus}...].**

In this definition no reference to (aboutness) topic or frame setting is made. This allows for cases like (49) that do not plausibly belong to either category:

- (49) [an [inGENious] mathematician]_{Delim} he is [NOT]_{Focus}.

The sentence suggests alternative statements like *he is a mediocre mathematician* hold. The definition (48) is also neutral as to the speech act type of the expression, which explains why delimitations occur in questions and commands as in (49):

- (50) And when did you read [DostoYEVsky]_{Delimit} in school?

Delimitation indicates that the current question does not express the full communicative needs as there are other questions at issue, such as *When did you read Shakespeare in school?*

If delimitations do what they are suggested to do here, then this explains why they often help to indicate a certain questioning strategy. If it is explicitly marked that an expression is suboptimal as far as the communicative needs of the moment are concerned, then one important reason for this is that the current communicative move only responds to a local need, and not yet to the global need of the CG. By this they help to structure CG management by distinguishing between local and more global communicative goals.

7 Cohesion and Rhetorical Structure

The notion of a structured set of questions under discussion has been developed by a variety of researchers, such as Klein & von Stutterheim (1987), van Kuppevelt (1994), Roberts (1996) and Büring (2003) leads to a richer understanding of CG management. We have seen that delimiters can create and respond to such structures.

I would like to point out that beyond the idea of question stacks and question trees, linguistic communication is built on a rich structure of discourse relations, as investigated in a number of theories such as in the study of cohesion in Hassan & Halliday (1976), and in Rhetorical Structure Theory (Mann & Thompson 1988). Structured Discourse Representation Theory, as developed in Asher & Lascarides (2004), shows that there is an interaction between discourse structure and possible anaphoric relations. CG management cannot be described without referring to the strategies how events are narrated or arguments are being made. For example, there are strategies that first lay out the premises and

then lead to a conclusion, and there are others that start with the conclusion and then motivate and elaborate it. This will result in locally distinct structures of the CG, and each individual sentence will respond to it. In this sense, the devices studied in these theories, like discourse particles and intonational meaning, squarely belong to Information Structure as envisioned by Chafe.

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