

Integrating Conversational Move Types in the Grammar of Conversation

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Abstract

Analyses of dialogue that incorporate the insights of speech act theory presuppose that an utterance gets associated with a conversational move type (CMT). Due to difficulties that beset attempts to integrate CMTs into grammar in early generative work, as well as the perceived problems concerning multifunctionality, CMT information is typically not included in most formal grammatical analyses. We provide arguments as to why CMT does need to be integrated in grammatical analysis of conversation. We offer a proposal for such an integration couched in Head Driven Phrase Structure Grammar (HPSG). We sketch explanations as to why our proposal does not run into the foundational and empirical pitfalls that have beset previous proposals.

1 Introduction

Categorizing utterances in terms of a notion of illocutionary force or conversational move type (CMT) is common in corpus-based work (for some recently proposed CMT taxonomies, see (Carletta et al., 1996), (Core & Allen, 1997)). Indeed any analysis of dialogue that incorporates the insights of speech act theory presupposes that an utterance ultimately gets associated with a CMT. Nonetheless, there exist few attempts to integrate such notions into contemporary formal grammatical work. In part, this is due to the fact that most grammatical formalisms to date have been designed with monologue or text in mind, where this issue is easier to put aside than in conversational settings. A more principled reason for this lacuna is perhaps the phenomenon of *multifunctionality* (see e.g. (Allwood, 1995)): it is often the case that a given utterance serves more than one purpose—an assertion can function also as an offer, a query as a suggestion etc. This has often led to the feeling that issues pertaining to CMT belong entirely to the realm of pragmatics. Although no worked out pragmatic theory as to how CMTs get assigned to utterances has emerged to date, the one influential series of attempts to subsume CMT into the grammar, based on the Performative Hypothesis (PH) is generally viewed to have been a resounding failure (see (Levinson, 1983), pp. 247-263).

In this paper we argue that CMT can and should be integrated in the semantic analyses provided by the grammar. That is, CMT is a parameter of meaning conventionally associated with certain words and classes of phrases. For instance, in hearing an utterance by A of a sentence such as (1a), we claim that a competent interlocuter B knows that its meaning is the template

schematically given as (1b), *not* simply the proposition (1c). That is, B knows that in order to ground A’s utterance she must try to instantiate the parameters A, t, l, P within the template given in (1b) in such a way as to satisfy the constraints provided by the grammar (e.g. A must be the speaker, t must be a time the day after utterance time, P ranges over a set that includes {assert, threaten, promise, ...}, but not over, for instance, {ask, exclaim, apologize, ...})¹

- (1) a. A: I will leave tomorrow.
 b. $P(A, B, \textit{leave}(\textit{leaver} : A, \textit{time} : t, \textit{location} : l))$
 c. $\textit{leave}(A, \textit{time} : t, \textit{location} : l))$

The paper is structured as follows: we start by providing a couple of concrete arguments as to why CMT does need to be integrated in grammatical analysis of conversation. We then offer a proposal for such an integration couched in Head Driven Phrase Structure Grammar (HPSG). We sketch explanations as to why our proposal does not run into the problems associated with the PH, or other foundational and empirical pitfalls.

2 Motivation for integrating CMT in grammatical analysis

Although there are a variety of versions of the PH, they essentially boil down to positing that all (English) matrix sentences have the form $I \textit{illoc-verb} S$, where I is the first person singular pronoun and $\textit{illoc-verb}$ is a verb from the class of performative verbs (e.g. *assert, ask, order, bet, ...*). For all matrix sentences which do not have this form overtly, the PH involves the assumption that the ‘illocutionary prefix’ $I \textit{illoc-verb}$ is not realized at the surface but is represented at some other syntactic level. In its formulations in the 1970s, at least, the PH ran into a variety of problems, the most serious of which revolved around the difficulty of maintaining a coherent definition of truth for declaratives. The difficulty arises from the parallelism that the PH enforces between sentences that lack an overt illocutionary prefix (e.g. (2a)) and explicit performatives (e.g. (2b)):

- (2) a. Snow is black.
 b. I claim that snow is black.

Such a parallelism is untenable because it either conflates the truth conditions of quite contingent sentences such as (2a) with those of (2b), which, essentially, become true once they are uttered. Alternatively, the parallelism requires a mysterious filtering away of the semantic effect of the illocutionary prefix. Despite the difficulties for the PH, we argue that in fact there are good reasons for assuming that the contents specified by the grammar do contain CMTs as a constituent. Our first argument concerns the existence of words that actually carry their CMT on their sleeve. Examples of such words are given in (3):

- (3) a. [Context: A sees B as she enters a building] A: Hi.
 b. [Context: A enters train carriage, sees B leave] A: Bye.
 c. [Context: in a bus queue A slips and unintentionally pushes B] A: Sorry.
 d. [Context: B is a bus conductor who gives A a ticket.] A: Thanks.

A competent speaker of English might paraphrase each of these utterances as in (4):

¹How any of these values get instantiated, if indeed B manages to do so, can involve highly complex reasoning (involving e.g. domain-specific knowledge, reasoning about intentions etc) with which of course the grammar as such provides no assistance. However, the use of such reasoning to resolve the value of a constituent of content also affects constituents of content (e.g. tense and anaphora) that lie uncontroversially within the realm of semantics. Hence, this cannot be used as an argument against integrating CMT within grammatical analysis.

- (4) a. A *greeted* B.
 b. A *bid farewell* to B.
 c. A *apologized* to B (*for having pushed her*).
 d. A *thanked* B (*for giving her a ticket*).

This can be used as evidence that these words are associated with meanings schematized as in (5). In these representations, the main predicate constitutes the CMT associated with the utterance, whereas *m(es)s(a)g(e)-arg* indicates the semantic type of the propositional/descriptive content selected by the CMT. Note a contrast illustrated in (4): whereas both [the relations denoted by] *apologize* and *thank* select clausal complements (whose denotations) constitute the descriptive content, there is no such selection by *greet* and *bid-farewell*. This provides some of the motivation for assuming that these latter should not be specified for a *msg-arg*, in other words that such speech acts have no descriptive content.

- (5) a. Hi: **greet**(*speaker, addressee, msg-arg: none*)
 b. Bye: **bid-farewell**(*speaker, addressee, msg-arg: none*)
 c. Sorry: **apologize**(*speaker, addressee, msg-arg: event*)
 d. Thanks: **thank**(*speaker, addressee, msg-arg: event*)

If we assumed the existence of a ‘post-semantic module’ which associates CMTs with the (descriptive) contents provided by the grammar, we would run into significant problems. To get the right result for *hi*, we would need to assume that a null descriptive content however represented somehow gets associated with the CMT **greet**. But this would result in a problem with *bye*, utterances of which equally lack a descriptive content.² Assuming underspecification—e.g. null descriptive content associates with, say, **greet** ∨ **bid-farewell**—would lead to the unintuitive expectation that *hi* and *bye* potentially allow for multiple CMTs. Assuming that eventive descriptive contents are associated with the CMT of **apologize** or alternatively with **thank** or are underspecified between, say, **apology** and **thank**, would lead to similar problems *mutatis mutandis*. Thus, in their representation in the lexicon such words must have a CMT associated with them.

A second argument concerns reprise utterances. It has been argued (see e.g. (Ginzburg & Sag, 1999; Ginzburg & Cooper, 2001)) that utterances such as B’s in (6a,b) can be understood (on the ‘clausal’ reading, where the addressee verifies she has understood the content of the utterance correctly) as in the respective parenthesized paraphrases; whereas B’s utterance in (6c) unambiguously involves the adjacent parenthesized content:

- (6) a. A: Who left? B: Who left? (clausal reading: *Are you asking who left?*)
 b. A: Go home Billie. B: Go home? (clausal reading: *Are you ordering me, of all things, to go home?*)

²An anonymous reviewer for *BIDIALOG* expresses skepticism about this argument on the grounds that our assumption that *hi* and *bye* lack descriptive content is dubious. Before turning to consider this assumption, we should point out that our argument here is actually *independent* of this assumption, as it applies equally to pairs such as *sorry* and *thanks*, which clearly do possess a descriptive content. The reviewer questions our assumption that *hi* and *bye* lack descriptive content by pointing to the existence of expressions such as *good morning*, *good afternoon*, and *good night*. According to the reviewer ‘[these] all have the same CMT but a different content’. We agree with the reviewer that, at least to a first approximation, *hi*, *good morning*, and *good afternoon* all involve the same CMT, namely greeting (*good night* is actually akin to *bye*, as it is used to bid a nocturnal farewell by conversationalists who will not speak again before the morrow.). Where these words differ is in terms of their presuppositions—*good morning* presupposes that the utterance time is basically before noon, *good afternoon* that the utterance time is basically before sundown, whereas *hi* carries no temporal presupposition. Encoding these varying presuppositions does not require postulating a descriptive content for the act of greeting (see footnote 8 for exemplification.).

- c. A: Did Belula resign? B: Did WHO resign? (unambiguously: *Who_i are you asking whether i resigned?*)

If such paraphrases are the correct basis for an analysis of such utterances, this indicates that in reprise utterances at least CMT (the CMT of the preceding utterance, to be precise) can become a constituent of the *descriptive* content of an utterance.³ In other words, CMT becomes a constituent of the content the grammar incontrovertibly needs to build up.

In fact, following (Ginzburg & Sag, 2000), we suggest that reprise utterances provide a probe that allows one to filter away the indirect force of an utterance and establish a single direct CMT with a given utterance.⁴ Consider (7), uttered outside a West End theater currently showing a best selling musical:

- (7) (1) Stina: I have a ticket for tonight's performance.
 (2) Padraig: You have a ticket for tonight's performance?
 (3) Stina: Yes.
- (8) a. I'm offering to sell a ticket for tonight's performance.
 b. Are you claiming that you have a ticket for tonight's performance?
 c. Are you saying that you wish to sell a ticket for tonight's performance?
 d. I'm claiming that I have a ticket for tonight's performance.
 e. I'm offering to sell a ticket for tonight's performance.

Stina's utterance (7[1]) could naturally be understood to convey (8a). However, Padraig's reprise—(7[2])—merely requests clarification of the claim Stina made; it can be understood solely as (8b), not as (8c). This can be further demonstrated by noting that *yes* in (7[3]) conveys (8d) in this context, but cannot convey (8e), despite the salience of the offer.⁵

Indeed, far from casting doubt on the assumption that grammatically associated CMTs exist, we believe that the phenomenon of multifunctionality *strengthens* the need for the assumption. In order to deal with indirectly conveyed messages such as (8a), one will need to state domain axioms whose antecedents will often involve a content with a grammatically associated CMT. For instance, If agent A states to B that he has a ticket, he might wish to sell it to B, rather than simply If agent A has a ticket, he might wish to sell it to B. Programming a robot with the latter axiom is a recipe for disaster, as the robot will hassle any approaching theatre-goer, rather than solely loudly declaiming touts.

³This claim was originally made, independently, by (Ginzburg, 1992) and (Jacobs, 1991).

⁴Using reprises as such a probe was first suggested to us by Richmond Thomason in an oral discussion that followed presentation of (Ginzburg & Sag, 1999).

⁵ Our discussion of these data is of necessity all too brief. As discussed in (Ginzburg & Cooper, 2001), reprises exemplify an additional reading dubbed the *constituent-reading*, which involves a request for reformulation of the import of the reprised (sub)-utterance. Thus, for an referential NP utterance, as in (i), this will be understood as a request for reference resolution:

- (i) Andie: Did Jo leave?
 Bo: Jo?
 Andie: Your cousin.

Given this, reprises such as (7[2]) will also yield readings paraphrasable as (ii), where the inferred component of content is *not* necessarily filtered away:

- (ii) Shi: What do you mean by saying *you have a ticket for tonight's performance?*
yes, however, is an inappropriate response to this reading.

3 Integrating CMT into a constraint-based grammar

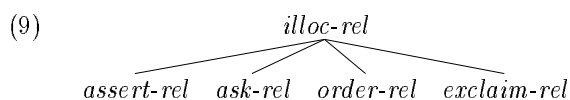
We adopt a version of HPSG developed in (Sag, 1997; Ginzburg & Sag, 2000). The content associated with signs, phrasal or lexical, is drawn from a situation theoretic ontology. The ontology distinguishes *inter alia* questions, propositions, facts, situations/events, and outcomes. Information about phrases is encoded by cross-classifying them in a multi-dimensional type hierarchy. Phrases are classified not only in terms of their phrase structure schema or X-bar type, but also with respect to a further informational dimension of CLAUSALITY. Clauses are divided into *inter alia* declarative clauses which denote propositions, interrogative clauses denoting questions, exclamative clauses denoting facts, and imperative clauses denoting outcomes. Each maximal phrasal type can inherit from both these dimensions. This classification allows a specification of systematic correlations between clausal construction types and types of semantic content.

We note two considerations that an account integrating CMT information into the grammar needs to heed:

- In order to avoid the problems associated with the PH, one has to ensure that the way in which CMT information enters into the content of a sign does not affect the assignment of (non-CMT) content. One must also ensure that a sign that has CMT information (of the current utterance) cannot be embedded as a daughter of another sign.
- In order to describe reprise utterances, one must have the means to let signs with CMT information be inputs to grammatical constraints, e.g. to build questions whose queried proposition contains CMT information.

We will satisfy these requirements by making a finer grained distinction than usually made with respect to “matrix” (non-embedded) signs. Whereas all signs that cannot be complements of an embedding predicate bear the specification I(NDEPENDENT)C(LAUSE):+, we will introduce a further partition among such signs, depending as to whether or not they can play a role in recursive operations of the grammar. Those that cannot will be designated as ROOT:+. Before we can illustrate how this actually works, we need to bring CMTs into the picture.

Our approach is consistent with various ontologies of CMTs. The *minimal* such ontology one could posit involves a 1–1 relationship between what is often called the CONTENT of a sign, i.e. entities of type *message* (*proposition*, *question*, *outcome*, *fact*, ...) and CMTs: propositions are associated with the CMT of asserting, questions with asking, outcomes with ordering, and facts with exclaiming. This involves positing a type *illoc(utionary)-rel* as the immediate supertype of these four CMTs:



Each of these types introduces its own constraint on the type of its MSG-ARG value:

- (10)
- $assert-rel \Rightarrow [MSG-ARG \textit{ proposition}]$
 - $ask-rel \Rightarrow [MSG-ARG \textit{ question}]$
 - $order-rel \Rightarrow [MSG-ARG \textit{ outcome}]$
 - $exclaim-rel \Rightarrow [MSG-ARG \textit{ fact}]$

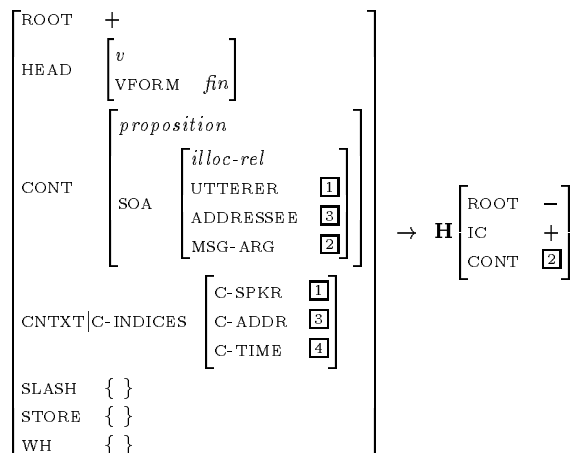
Arguably, such a relationship between message types and CMTs constitutes something like a default. But each of the afore-mentioned subtypes of *message* clearly does have other uses: questions can be used ‘rhetorically’ (also known as a *reassertion* of a resolved question), outcomes can be suggested, propositions can feature in threats and so on. Thus, an adequate view of

utterance content needs to allow for a richer ontology of CMTs and for the CMT associated with a given message-type to be underspecified. This refinement is easy to implement by (a) positing more maximal subtypes of *illoc-rel* (e.g. *threat-rel*, *promise-rel*, *reassert-rel* etc) and (b) positing types intermediate between *illoc-rel* and the leaves of the hierarchy in (9) (e.g. a type *prop-illoc-rel* which would subsume all propositional CMTs—*assert-rel*, *threat-rel*, *promise-rel* etc.). In this abstract, as in our implementation at present, we maintain the more simplistic view, enshrined in (9).

The final ingredient we need as far as phrases go is a constraint that determines the appropriate CONTENT value for utterances, i.e. for root clauses. We propose that the content of every root clause be a proposition whose SOA value is of type *illoc-rel*. This proposition represents the belief an agent forms about the (full, direct illocutionary) content of an utterance. More specifically, this is the content a speaker will assign to her utterance, as will an addressee in case communication is successful. Given (9), this will mean that a root clause will be resolved so as to have as its content a proposition whose SOA value is of one of the subtypes of *illoc-rel*.

In order to ensure that root clauses have contents in which CMT information is represented, we posit a type *root-cl* and propose a constructional treatment of root utterances in terms of a non-branching phrasal type (*hd-only-ph*) that embeds message-denoting sentences as arguments of an *illoc-rel*. The constraints idiosyncratic to this construction, akin to a ‘start’ symbol in a context free grammar, are illustrated in (11):⁶

(11) *root-cl*:



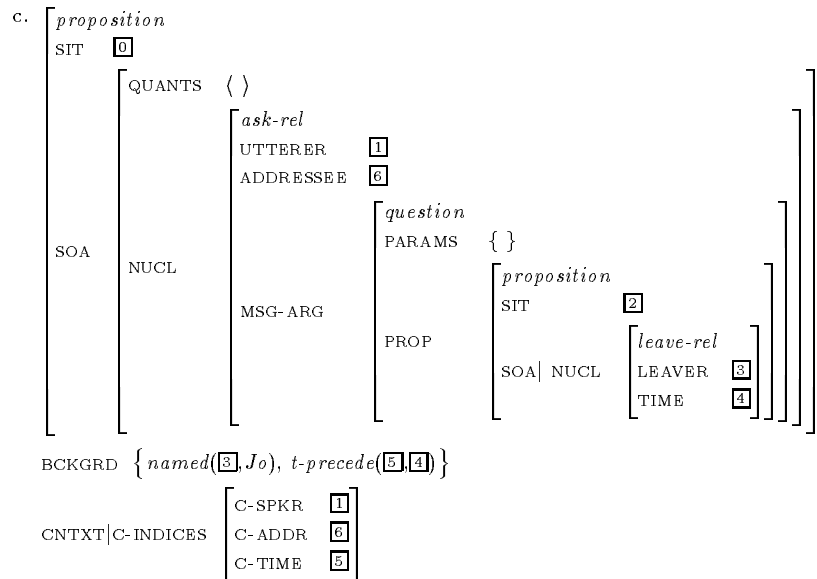
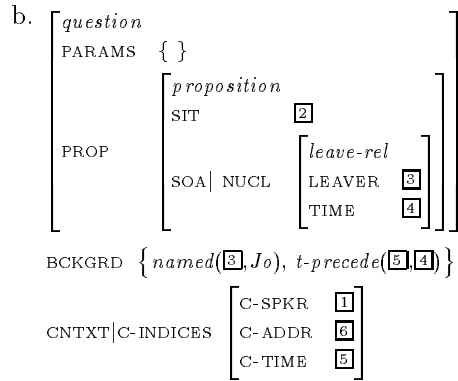
Note that the arguments of the *illoc-rel* are identified with the appropriate individuals in the context of utterance. As mentioned above, we now distinguish root clauses from other independent clauses in terms of positive versus negative specifications for the feature ROOT.⁷

Let us illustrate the effects of the constraint in (11). (12a) has an analysis as a polar question in which it expresses the question in (12b). Therefore, given (10) and (11), the content such a clause gets as a root utterance (ignoring tense) is (12c):

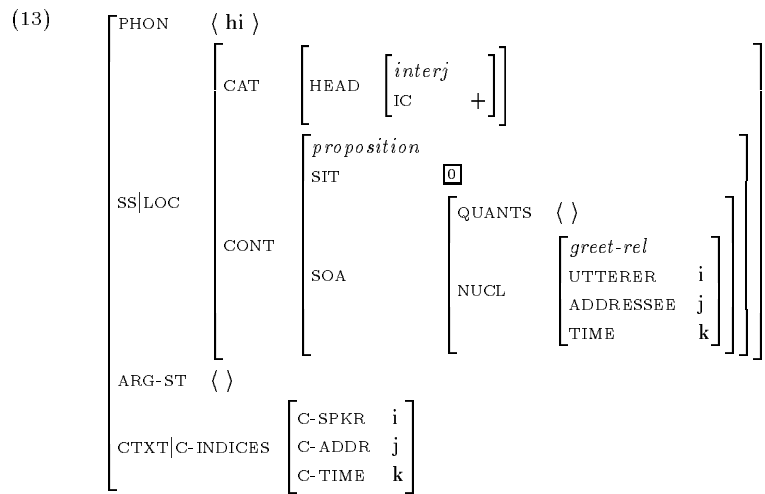
⁶The constraint here relates the mother to its (sole) daughter, denoted with a large bold faced **H**.

⁷On this view, signs are [ROOT -] by default. Since this is the case, we will suppress [ROOT -] specifications on all phrases other than instances of the type *root-cl*.

(12) a. A: Did Jo leave?



So far we have focussed on phrases. However, one can within this approach equally describe words such as those discussed in (3)–(5). For instance, the word *hi* can be described as follows:⁸



⁸ A lexical entry for e.g. *good morning* would involve adding the assumption in BCKGRD that the time *k* is located before noon.

Note that *hi* is specified as IC:+, which means that it cannot be embedded. However, it is underspecified for ROOT. This means, as we will soon see, that this entry can be the head-daughter of a reprise construction (reflecting cases such as [Context: A is a crusty brigadier, B a raw recruit] B: Hi. A (growls): Hi? (= Are you greeting me)).^{9,10}

Finally, we explain briefly how the CMT of the previous utterance enters as a constituent of the content of certain reprise utterances. We assume the account developed in (Ginzburg & Cooper, 2001) of how clarifications arise during attempted integration of an utterance in a conversationalist's information state (IS). Simplifying somewhat, on this view a necessary condition for B to ground an utterance by A is that B manage to find values for the contextual parameters of the meaning of the utterance. What happens when B cannot or is at least uncertain as to how he should instantiate in his IS a contextual parameter *i*? In such a case B needs to do at least the following: (1) perform a partial update of the existing context with the successfully processed components of the utterance (2) pose a clarification question that involves reference to the sub-utterance u_i from which *i* emanates. Since the original speaker, A, can coherently integrate a clarification question once she hears it, it follows that, for a given utterance, there is a predictable range of < partial updates + consequent clarification questions >. These we take to be specified by a set of *coercion operations* on utterance representations.¹¹ Indeed we assume that a component of dialogue competence is knowledge of these *coercion operations*.

One such operation is dubbed *parameter focussing* by (Ginzburg & Cooper, 2001). This involves a (partially updated) context in which the issue under discussion is a question that arises by instantiating all contextual parameters except for *i* and abstracting over *i*. In such a context, one can *confirm* that *i* gets the value B suspects it has by uttering with rising intonation any apparently co-referential phrase whose syntactic category is identical to u_1 's (see (6a,b) above). One construction type appropriate for this context are reprise interrogative clauses (*repr-int-cl*). In the framework of (Ginzburg & Sag, 2000) they are described by means of the following schema:

$$(14) \left[\begin{array}{l} \text{repr-int-cl} \\ \text{CONT} \left[\begin{array}{l} \text{question} \\ \text{PARAMS} \left[\Sigma_3 \right] \\ \text{PROP} \left[\text{SOA|NUCL|MSG-ARG} \left[\text{2} \right] \right] \right] \\ \text{STORE} \left[\Sigma_1 \right] \\ \text{BCKGRND} \left\{ \text{prev-utt}(\text{0}), \text{cont}(\text{0}, \text{1}) \right\} \cup \Sigma_2 \end{array} \right] \end{array} \right] \rightarrow \mathbf{H} \left[\begin{array}{l} \text{CAT} \left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{IC +} \\ \text{VFORM fin} \end{array} \right] \end{array} \right] \\ \text{CONT} \left[\text{2} \right] \\ \text{STORE} \left(\Sigma_1 \cup \Sigma_3 \right) \\ \text{BCKGRND} \left[\Sigma_2 \right] \end{array} \right]$$

To illustrate this: a reprise of (12a) can be performed using (15a). This can be assigned the content in (15b) on the basis of the schema in (14).¹²

⁹As with all CE utterances, this one can be understood in a number of ways. In this case, the constituent reading alluded to in footnote 5 is possibly even more prominent. It would yield a reading paraphrasable as *what do you mean by saying hi to me*.

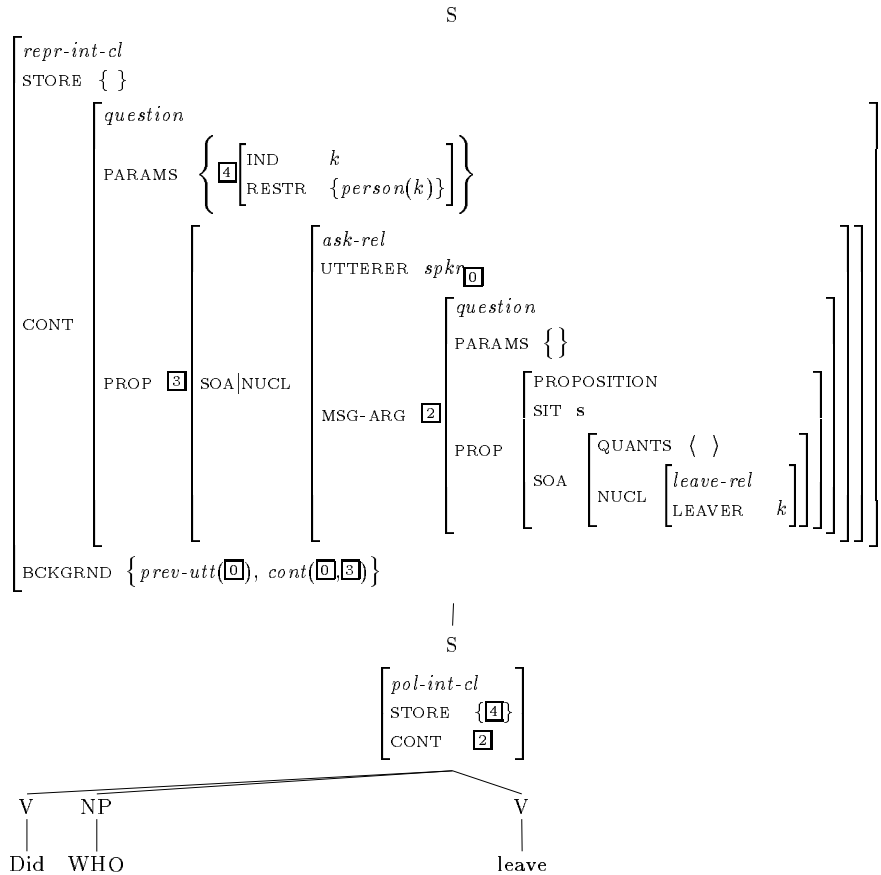
¹⁰Underspecifying *hi* for ROOT might suggest that it could function as the head daughter in (11), thereby yielding an unwanted reading *I assert that I greet you*. However, in the framework of (Ginzburg & Sag, 2000) all headed phrases are subject to the Generalized Head Feature Principle (GHFP), which involves the SYNSEM value of the mother of a headed phrase and that of its head daughter being identical by default. This means that the head daughter of a *root-cl* is specified to be CAT|HEAD:v[fin]; *hi* (as its relatives *bye*, *sorry*, *thanks* etc) is specified as CAT|HEAD: *interj*, and hence cannot serve as the head daughter of a *root-cl*.

¹¹The term *coercion operation* is inspired by work on utterance representation within a type theoretic framework reported in (Cooper, 1998).

¹²Note that the previous utterance identified the utterer of the *ask-rel* with the speaker of that utterance (this is ensured by the constraint in (11) on the type *root*). Hence, the utterer of the *ask-rel* in the content of the reprise must also be that individual, indicated as *spkr*₀ in (15).

(15)

Did WHO leave?



wh-less reprises, as in (6a,b), are accommodated as a special case of no parameters being abstracted over. Reprise uses of *hi* can be similarly analyzed, using an instantiation of (13) with *ROOT*:-.

4 Conclusions and Future Work

In this paper, we have presented a number of arguments that indicate the need to integrate CMT information in grammars intended to analyze conversational interaction. One such argument concerns the proper analysis of words such as *hi*, *thanks*, *sorry* which can stand alone as complete utterances. Another arguent derives from the consideration of reprise utterances. We have sketched briefly the basics of an HPSG in which CMT information is integrated. This grammar has been implemented as part of the SHARDS system (Ginzburg, Gregory, & Lappin, 2001). In future work we hope to show how grammars of this type can, when integrated with domain knowledge, offer insightful solutions to the many puzzles posed by multifunctionality.

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