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SPEECH ACT THEORY AND PRAGMATICS

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ROLAND R. HAUSSER

SURFACE COMPOSITIONALITY AND THE
SEMANTICS OF MOOD

0. INTRODUCTORY REMARKS

The goal of the present paper is to extend the principles of truth-conditional semantics to non-declarative sentence moods.¹ My basic hypothesis is that the different syntactic moods should be characterized semantically in terms of their characteristic kind of possible denotation. In the same way as the declarative mood is characterized semantically by the fact that declaratives denote propositions (i.e., functions from points of reference into truth values), I want to characterize the imperative and the interrogative mood by assigning suitable and natural kinds of possible denotations, which are a strictly compositional result of the characteristic syntax defining each mood.

In order to motivate my hypothesis I will outline a syntactico-semantic analysis of the English declarative, imperative, and various kinds of interrogatives in the style of a canonical extension of the grammar defined in Montague's PTQ (Montague 1974, chapter 8). This mode of presentation makes it possible to formulate the specifics of my analysis in brief, yet formally precise terms.

I will rely in particular on the intensional logic of PTQ, which is a type system with λ -calculus, and on the categorial surface syntax of PTQ, which characterizes the meaning of English surface expressions indirectly by systematic translation into formulas of intensional logic. These semantic representations are interpretable in explicit model-theoretic terms according to the truth-conditions of intensional logic as stated in PTQ. In order to handle certain phenomena of context-dependency arising with the imperative and with the interpretation of 'non-redundant answers', I will also refer to the system of a context-dependent intensional logic based on context-variables presented in Hausser (1979).

Unfortunately, in PTQ a declarative sentence is defined as denoting a truth-value rather than a proposition (i.e., a function from points of reference to truth-values). I agree with Tichy (1971) and Maderna (1974), who have criticized such "relics of extensionalism" in Montague's semantics. Rather than redefining PTQ in this respect (which would be space consuming, but

technically routine), I will gratuitously intensionalize translation-formulas where it is semantically relevant.²

1. SYNTACTIC MOOD VERSUS SPEECH ACTS

When we talk about syntactic moods we are talking about formal properties of linguistic surface expressions. These are to be kept clearly distinct from (the properties of) the speech acts in which a linguistic expression may function. For example,

- (1) Could you pass the salt?

is by virtue of its form an expression of the interrogative mood. If we use (1) at the dinner table we are normally performing a speech act of a request. But we may use (1) also as a question, for example when we use (1) to ask a disabled person about his physical abilities. The difference between these two types of speech acts may be characterized in terms of different appropriate responses: if (1) is used as a request, the appropriate response would be passing the salt; if (1) is used as a question about the hearers state of recovery, on the other hand, a simple 'yes' or 'no' would be an appropriate response. The crucial point is, however, that the literal meaning of (1) is exactly the same in the two different speech-acts indicated.

In the same sense as a linguistic expression like (1) may be used in different types of speech-acts, different linguistic expressions may be used to perform the same type of speech act. Consider for example (2) and (3):

- (2) You know where the can opener is. (declarative)
 (3) Get the can opener! (imperative)

I take it that the locutionary acts indicated in (4) and (5)

- (4) John says to Mary at 10.45: "You know where the can-opener is."
 (5) John says to Mary at 10.45: "Get the can-opener!"

may constitute the same illocutionary act, namely (6):

- (6) John requests from Mary at 10.45 to give him the can opener.

In other words, (2) and (3) may be used in locutionary acts which are *equivalent on the illocutionary level*, despite the fact that (2) and (3) are syntactically of different mood and denote semantically different things: while (2) denotes a proposition, (3) does not.

There is a certain feeling that declarative sentences are used primarily or predominantly as statements, while imperatives and interrogative sentences are used mostly as requests or questions, respectively. The above examples demonstrate clearly, however, that the syntactic mood does not determine the speech act. Rather, syntactic mood *participates* with all the other linguistic properties of a given surface expression ϕ in delimiting the set of use-conditions of ϕ . Since there is no one to one relation between syntactic moods and speech acts, it would be a mistake to implement speech act properties in the semantic characterization of syntactic mood.

This conclusion stands in contrast to the practice of Austin (1959), Lewis (1972), and many others, who proceed in their analyses on the assumption that examples like (7) and (8) are *semantically equivalent*.

- | | | |
|-----|-----------------------|---------------|
| (7) | I order you to leave. | (declarative) |
| (8) | Leave! | (imperative) |

Before we scrutinize this assumption, let us note that (7) and (8) are of quite different syntactic structures. Comparison of (7) and (9), furthermore,

- (9) You ordered me to leave.

shows clearly that (7) and (9) are in the same syntactic paradigm.

It is curious that Austin and Lewis draw quite contrary conclusions from the presumed equivalence. Lewis recognizes that (7) is a declarative sentence and therefore wants to treat it semantically as a proposition. The presumption of semantic equivalence between (7) and (8), however, leads him to the counterintuitive consequence that (8) likewise denotes a proposition. Austin, on the other hand, notes correctly that (8) does not denote a proposition. The presumption of semantic equivalence between (7) and (8), however, leads Austin to the counterintuitive conclusion (and contrary to Lewis) that (7) does *not* denote a proposition, which means breaking the linguistic paradigm (according to Austin, (9) denotes a proposition while (7) does not).

Austin and Lewis agree that (7) and (8) are semantically equivalent and disagree about whether (7) (the explicit performative sentence) should denote a truth value or not. I take the position that (7) is a normal declarative sentence and denotes a proposition, while (8) is an imperative and does not denote a proposition. Consequently, (7) and (8) cannot be semantically equivalent in the sense that they have the same denotation at any given point

of reference: if (7) and (8) have different types of possible denotations they cannot be semantically equivalent.

The assumption of semantic equivalence between, e.g., (7) and (8) must go. Instead the relation between (7) and (8) is one of overlapping use conditions, just as in the case of (2) and (3) above. Furthermore, it is easy to show that an explicit performative sentence like (7) denotes a proposition (pace Austin). Imagine a run-down Hobo who walks by the docked Q.E.II, throws an empty champagne bottle at her hulk and says:

(10) I hereby christen this ship the Q.E.II.

If we were to report this incident by saying (11),

(11) The Hobo christened this ship the Q.E.II.

(11) would be *false* under the indicated circumstances. Thus the so-called happiness conditions for an act of christening must be part of the truth conditions of the performative verb *christen*. (11) is false *because* the happiness conditions for christening are not satisfied in the 'ceremony' referred to. And (10) would be as false as (11). This truth value assignment reflects that in the indicated circumstances no christening has taken place in the moment of pronouncing (10).

The alleged semantic equivalence between, e.g., (12a) and (12b)

(12a) I order you to leave.

(12b) leave!

has served as the corner stone of the so-called performative analysis of non-declaratives. Lewis, for example, treats (13b), and (14b) as *paraphrases* of (13a), and (14a), respectively, and proposes to derive the latter from the former via meaning-preserving transformations.

(13a) I command that you are late. (13b) Be late!

(14a) I ask whether you are late. (14b) Are you late?

Lewis says:

I propose that these non-declaratives (i.e., (13b) and (14b), R.H.) ought to be treated as paraphrases of the corresponding performatives, having the same base structure, meaning, intension, and truthvalue at an index or an occasion. And I propose that there is no

difference in kind between the meanings of these performatives and non-declaratives and the meanings of the ordinary declarative sentences considered previously.

Lewis 1972, p. 208.

It seems to me however, that by deriving (13b) and (14b) from the indicated declaratives, Lewis relies not only on the unsubstantiated semantic equivalence discussed above, but also fails to respect the distinction between syntactic mood and speech acts. The problems resulting are easy to see: if the surface syntactic form of imperatives, and interrogatives is systematically related to the 'underlying' performative clauses 'I command', and 'I ask', respectively, then also examples like (15a, b) or (16a, b) are rendered as paraphrases:

- (15a) I command that you feel yourself at home.
- (15b) Feel yourself at home!
- (16a) I hereby ask you whether you could pass the salt.
- (16b) Could you pass the salt?

The desire to reduce different syntactic moods to the same kind of meaning is also apparent in the analysis of Stenius (1967), according to which examples like (12b), (13b) and (14b)

- (12b) You are late.
- (13b) Be late!
- (14b) Are you late?

share the same sentence radical (propositional content) and differ only in their underlying mood operators. However, as Lewis points out correctly, "it is hard to see how it (i.e., the method of sentence radicals, R.H.) could be applied to other sorts of questions . . ." (op. cit., p. 207). Compare for example (17) and (18):

- (17) Who came?
- (18) John came.

There is no complete propositional content which could serve as the basis of (17).

The only reason for the popularity of the performative approach and the sentence radical method I can see is that it derives different moods from the same kind of structure. This way one can continue to practice logic in the ways one has long been accustomed to and evades the task to provide the syntactic structure of each mood with its own characteristic semantics. While I believe that the principles of referential semantics should be rigorously

maintained, there is no reason why we shouldn't use these principles creatively. The performative approach and the sentence radical approach proceed as if *propositions* were the only interpretable expressions of logic, which is a completely unwarranted assumption.

Consider for example (19) and (20):

- (19) stop to kiss Mary
 (19') $\sim\text{stop}'(\text{kiss}' * (m))$
 (20) John stops to kiss Mary
 (20') $\sim\text{stop}'(\sim j, \hat{y} \text{kiss}'(\hat{y}, \hat{p}p \{ \sim m \}))$

The denotation of a complex IV-phrase like (19) can be interpreted in exactly the same compositional manner (relative to a model and a point of reference) as a complete declarative sentence like (20). The only difference is that (19) denotes a function from points of reference into functions from individuals into truthvalues, such as indicated in (a):

$$(a) \quad I \times J \rightarrow (A \rightarrow \{0,1\}).$$

while (20) denotes a function from points of reference into truth values, such as indicated in (b):

$$(b) \quad I \times J \rightarrow \{0,1\}.$$

The meaning of (19)/(19') is characterized in terms of the same kind of truth-conditions as the meaning of (20)/(20'). (It would perhaps be more appropriate to speak of denotation-conditions rather than truth-conditions, since the rules in question characterize the meaning of expressions of *any* semantic type in general model theoretic terms.)

Propositions are like other possible denotations in that they occur as the denotation of subordinate clauses. So why shouldn't other types of possible denotation be like propositions in that they may serve as the denotation of complete linguistic expressions? I will present a treatment of interrogatives (section 5), according to which (21) translates into (21')

- (21) Who talks?
 (21') $\sim\lambda P[P \sim\text{talks}'] \quad \in \text{ME}_{\langle s, f(t/T) \rangle}$

(where P is a variable of type $\langle s, f(T) \rangle$)

(21') is treated as a complete expression of intensional logic, denoting a function from points of reference into sets of term-denotations (*John'*, *Bill'*, *the man you saw yesterday'*, etc.). According to my view, this type of possible

denotation is as characteristic of the type of interrogative involved as propositions are the characteristic type of possible denotations for declaratives. As far as I can see, the indicated semantic characterization of the meaning of (21) does in no way exceed the basic principles of intensional logic.

The point I want to make here is that it is logically *conceivable* that possible denotations other than propositions may serve as denotation of *complete* linguistic expressions, such as, for example, interrogatives, or imperatives. Note in this connection that a type system (such as the one employed the intensional logic defined in PTQ) provides *infinitely many* different types of possible denotations (compare the recursive definition of types, p. 256, and the recursive definition of possible denotations, p. 258, in PTQ). Later (section 4, 5) I will discuss the further question of which types of possible denotations should be defined as characteristic of which kinds of syntactic mood. This decision will be motivated in linguistic terms, since we proceed on the hypothesis that different syntactic moods are different kinds of syntactico-semantic composition occurring in natural language.

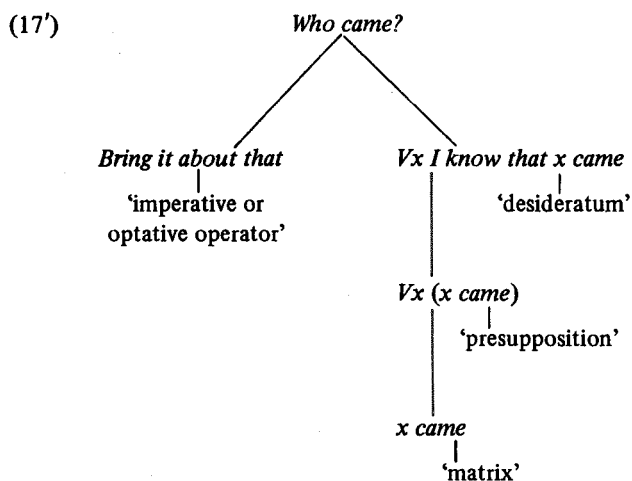
2. LINGUISTIC STANDARDS OF ANALYSIS (SURFACE COMPOSITIONALITY)

One reason why I have chosen to present my analysis of syntactic mood in form of an extension of PTQ is that PTQ is a *complete* grammar in the sense that the *generation and interpretation* of a fragment of English is *coordinated* in a rigorously formal generative system. Lewis (1972), on the other hand, is incomplete because the transformations which supposedly make an explicit performative categorial structure into a (non)-declarative surface structure are not spelled out. I take it however, that it would be a rather nasty job to explicitly define these transformations and give a 'reasonable' linguistic motivation for them.

As long as we don't coordinate the surface syntactic analysis with the semantic characterization of an expression in terms of a *complete, formal generative grammar* generating a fragment of a natural language, we can postulate any kind of logic for the characterization of syntactic mood – as witnessed also by Hintikka's (1976) analysis of questions. According to Hintikka, a direct interrogative such as (17)

(17) Who came?

is derived by means of the 'usual two-step transformation' (op. cit., p. 22) from the following 'semantic representation':³



Far from being complete (in the indicated technical sense), Hintikka's analysis is nevertheless much more detailed than Lewis (1972). It also contains a number of claims which are theoretical artefacts. Hintikka claims for example that interrogatives such as analyzed in (17') are systematically ambiguous between an 'existential' (e.g., (17')) and a 'universal' (e.g., (17'')) reading.

(17'') Bring it about that $\forall x$ I know that x came.

Or take the distinction between 'standard' and 'non-standard' questions. A standard question according to Hintikka is one in which the desideratum of the utterer can be truly stated in terms of *I know that*. . . . It follows that an examination question does not count as a 'standard' question because the interrogator presumably knows the answer to his question before he asks. In order to account for this 'observation', Hintikka proposes "that in examination questions we have a different imperative operator. Moreover, they obviously involve the second (grammatical) person instead of the first one" (op. cit., p. 45). In other words, if (17) is used as an examination question it would have to be derived from something like (22):

(22) Tell me whether $\{ \forall \atop \exists \}$ x such that *you* know that x came.

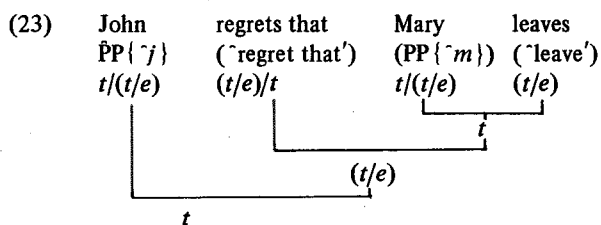
(different impera- (second
tive operator) person)

It seems to me that the four 'readings' of (17) (i.e., (17'), (17'') and (22)) are a straightforward result of confusing putative speech-act properties with semantic properties of linguistic expressions. In the treatment of interrogatives outlined in section 5, (17) is treated as a syntactically unambiguous expression.

I have discussed the analyses of non-declaratives by Lewis (1972) and Hintikka (1976) because they demonstrate the need for a rigorously *formal* and syntactico-semanticly *complete* analysis of mood. The confusion of semantic properties and speech act features shows, furthermore, that in addition to the *methodological standard* of completeness we need some kind of *linguistic standard* to guide our use of mathematical power to linguistically well-motivated analyses. But which standard of linguistic analysis should we adhere to?

The assumption that the semantics of natural languages works like the semantics of formal languages in that the meaning of complex expressions is the systematic result of the meaning of the basic parts (and the mode of syntactic combination) suggests a principle which I would like to call the principle of *surface compositionality*. According to this principle, the semantic representation of a linguistic expression should contain nothing that does not have concrete surface syntactic motivation. Furthermore, a surface compositional analysis must characterize explicitly how the meaning of a *complex surface* expression is composed from the meaning of its *basic surface* constituents. For example, an analysis which derives *passive* via transformation from the corresponding *active* violates the principle of surface compositionality though it might still be complete in the sense that the linguistic expressions investigated are systematically characterized in model-theoretic terms by means of formal translation into intensional logic (compare Partee (1975), Cooper (1975)).

Thanks to the presence of λ -calculus, the principle of surface compositionality⁴ can be easily accommodated in a PTQ-style grammar. Consider for example (23):



The semantic representation in (23) assigns standard logical translations to every surface constituent – apart from the unresolved analysis of *regret that*, which would require further attention. Since the surface syntax and the logical syntax are completely parallel in their respective function-argument structures, the composition of the meaning in the surface expressions is explicitly characterized. Yet our surface compositional analysis remains strictly within the realm of standard semantics. The formula in (23) reduces ‘automatically’ via λ -conversion into the equivalent formula (24):

$$(24) \quad \lambda j \lambda m \text{ 'regret that' } (j, \lambda m).$$

Neither Lewis (1972) nor Hintikka (1976) follow the principle of surface compositionality because their semantic representations contain a lot more than can be surface-syntactically motivated, and because the structure of the surface syntax is completely disregarded in their respective semantic analyses. The movement, deletion, and insertion transformations of transformational grammar in general run counter to the principle.

The linguistic literature of recent years has been quite concerned with ‘evaluation measures’, designed to help finding the ‘right’ grammar for a natural language (c.f. Chomsky (1965), Partee (1978)). It seems to me that the combination of

- (a) the principle of formal completeness (regarding the coordination of syntax and semantics), and
- (b) the principle of surface compositionality

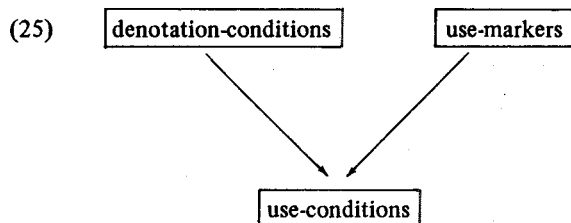
would result in a restriction on linguistic analysis of natural language which would induce the following desirable properties: an approach conforming to (a) and (b) would have to be such that (i) different ‘local’ analyses in the system must really be shown to be *compatible* with each other, and (ii) all aspects of linguistic analysis would have to be motivated over concrete surface properties (rather than putative speech act and/or paraphrase properties).

The combination of the requirements of formal completeness and surface compositionality results in a theoretical frame designed for the systematic analysis of surface expressions of natural language without leaving the principles of referential semantics. The larger the ‘fragment of natural language’ generated by a complete, surface compositional formal grammar, the more instances of *independent motivation* can be expected. By analyzing each surface constant according to category, type of possible denotation, subcategory, P-inducer properties, (c.f. Hausser 1976a), context-dependency aspects

(c.f. Hausser (1979)), etc., complex syntactic and semantic patterns may be explained as the systematic result of the formal nature of the basic words and the structure of their combination in the linguistic surface (e.g., the treatment of 'negation-any' versus 'intensional-any' in Hausser (1976b)).

3. DENOTATION CONDITIONS VERSUS USE-MARKERS

There is no question that the syntactic mood of an expression ϕ is relevant for the use-conditions of ϕ . However, since *all* properties of ϕ are relevant for the use-conditions of ϕ , this statement does not say anything about the nature of syntactic mood. The real question is whether syntactic mood is a syntactico-semantic phenomenon to be characterized in terms of the classical denotation-conditions (truth conditions) or whether syntactic mood should be treated as a use-marker. The interrelation between denotation-conditions, use-markers and use-conditions of an expression of natural language may be indicated as follows:



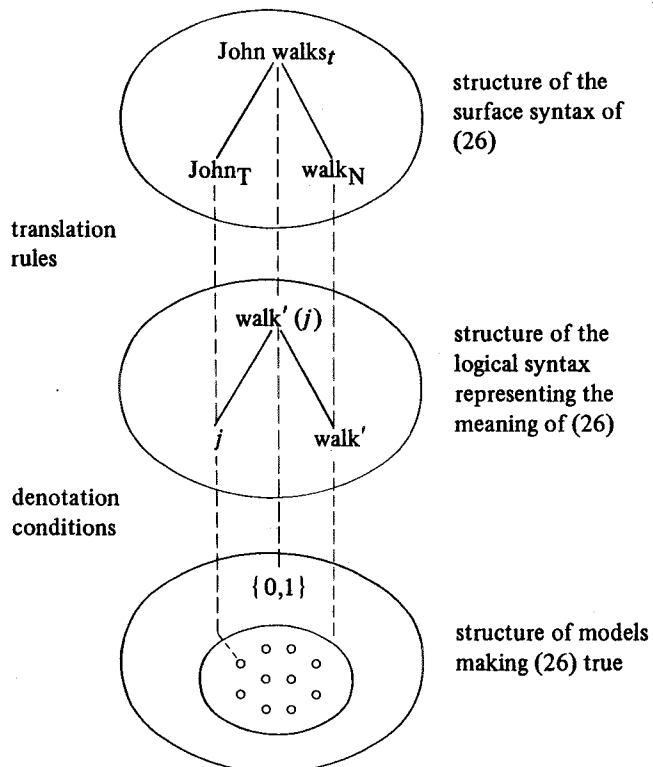
Since the question of whether syntactic mood should be treated semantically in terms of the general denotation conditions or pragmatically as a use-marker touches on some very basic issues concerning the relation between semantics and pragmatics, it might be appropriate to briefly elaborate the notions in question.

The denotation-conditions of an expression capture its literal meaning in general model theoretic terms. Take for example (26):

(26) John walks.

The logic characterizes the meaning of (26) as a function from the meaning of its parts by saying roughly that 'John walks' is true if the denotation of John is an element of the set of walkers. We may illustrate this basic idea in form of the following diagram (which represents an indirectly interpreting system such as PTQ):

(27)



What kinds of meaning may be characterized in a given system depends on the kind of logic employed. (27) represents an *extensional* characterization which is well suited for demonstrating the basic idea of referential semantics, but not sufficient for a general semantics of natural language. I don't want to go here into the many reasons showing that a typed higher order logic is overwhelmingly better qualified to account for the kinds of meaning found in natural language than first order predicate calculus.⁵ Let us just remember that the semantic characterization of meaning in model theoretic terms is a completely general theory which, based on a system of syntactic categories and corresponding types of possible denotations, characterizes the meaning of a complex expression as a systematic result of the structure of the expression and the meaning (denotation) of its basic parts.

We turn now to the *use-markers* in natural language. The expressions of a language like English may be divided into two classes:

- (28a) Expressions like *walk, kiss Mary, believe that the man left, etc.*, the meaning of which is defined in terms of denotation conditions.
- (28b) Expressions like *ah, oh, hurray, phew, yak, boo, etc.* which don't have a syntactic category and don't denote. Instead, these words are what I call use-markers: they directly influence the use-conditions of the expressions containing them (if they are contained).

The distinction between denotation-conditional features and usemarkers applies to all levels of the linguistic surface. For example, in phonology we have denotation-relevant intonation (syntactic intonation) as illustrated by the comparison of (29a) and (29):

- (29a) John came.
 (29b) John came?

(29a) denotes a proposition, while (29b) does not. On the other hand, we also find intonation features which are relevant solely in terms of use, as exemplified by different ways to pronounce, e.g., (30):

- (30) It's nice to see you. (warmly, politely, routinely, etc.)

(See also example (46) in section 5 below).

In syntax, furthermore, the structural difference between (31a) and (31b)

- (31a) The man who arrived yesterday kissed every girl at the party.
 (31b) The man at the party kissed every girl who arrived yesterday.

is obviously denotation relevant (different truth-conditions), while the difference between (32a) and (32b)

- (32a) It is amazing that Mary left.
 (32b) That Mary left is amazing.

is relevant solely in terms of use.⁶

Let us return now to our question of whether syntactic mood should be treated in surface-compositional syntactico-semantic terms or as a use-marker. The latter position is quite clearly expressed in the following quotation from Lewis (1972):

Fundamentally, however, the entire apparatus of referential semantics (whether done on a categorial base, as I propose, or otherwise) pertains to sentence radicals and constituents thereof. The semantics of mood is something entirely different. It consists of rules

of language use. . . . In abstract semantics, as distinct from the theory of language use, a meaning for a sentence should simply be a *pair* of a mood and an S-meaning (mood being identified with some arbitrarily chosen entities).

Lewis (1972), p. 207.

Yet, there is no one to one relation between mood and use/speech-act (compare section 1). Furthermore, to identify mood with arbitrarily chosen entities violates the principle of surface compositionality (c.f. section 2). Finally, why should referential semantics be limited to sentence radicals? As Lewis points out himself, sentence radicals are a theoretical construct and do not normally appear on the linguistic surface.

4. A COMPOSITIONAL ANALYSIS OF IMPERATIVES

The crucial question for a surface compositional analysis of non-declarative sentence moods is: What do complete but non-declarative expressions denote? I take it that an *imperative* denotes a property (roughly that property which the speaker wants the hearer to acquire). This concept is formally captured in the semantic representation (33') of (33):

- (33) Leave! ϵ P_{IV}
 (33') $\lambda x[\Gamma_2\{x\} \sim \text{leave}'(x)]$ ϵ ME_{\langle s, f(\text{IV}) \rangle}

(33') denotes the property of being the hearer (Γ_2) and to be leaving. Γ_2 is a *context-variable* representing the property of being the hearer. For detailed definitions of the presumed treatment of context-dependency see Hausser (1979), where Γ_2 appears in the translation of second person pronouns such as *you* (ϵ BT), *your* (ϵ BT/CN), *yours* (ϵ BT), *our* (ϵ BT/CN), etc. Γ_2 is of type $\langle s, f(\text{CN}) \rangle$.

The indicated treatment of imperatives may be implemented into the PTQ-system by adding the following two rules:

- S20. If $\alpha \epsilon$ P_{IV}, then $F_{20}(\alpha) \epsilon$ P_{IV} and $F_{20}(\alpha)$ is α !.
 T20. If $\alpha \epsilon$ P_{IV} and α translates into α' , then $F_{20}(\alpha)$ translates into $\hat{x}[\Gamma_2\{x\} \sim \Gamma'(x)]$.

Thus, (33) and (33') are derived in our extension as follows:

- | | |
|--|--|
| <p>(34) leave! ϵ P_{IV}</p> <p style="text-align: center;"> </p> <p style="text-align: center;">S20</p> <p style="text-align: center;"> </p> <p>leave ϵ B_{IV}</p> | <p>(35) $\lambda x[\Gamma_2\{x\} \sim \text{leave}'(x)]$</p> <p style="text-align: center;"> </p> <p style="text-align: center;">T20</p> <p style="text-align: center;"> </p> <p>leave'</p> |
|--|--|

Our analysis may be motivated linguistically as follows:

It is a fact that imperatives in English do not have subjects. Therefore, it seemed best to avoid the postulation of an 'underlying' subject. Since the syntactic structure of English imperatives is identical to the structure of un-inflected IV-phrases, it suggests itself to take such IV-phrases as the point of departure for the derivation of imperatives. The presence of the context-variable Γ_2 in the semantic representation of imperatives is motivated over the universal fact that second person personal T-pronouns serving as the direct or indirect object of the main verb in an imperative must be *reflexive pronouns*. With regard to this important detail, our treatment of imperatives plugs in directly to the surface compositional treatment of pronouns presented in Hausser (1979) (for the analysis of reflexives see section 8). The context-variable Γ_2 is crucial, furthermore, for distinguishing imperatives semantically from the corresponding IV-phrases (which are not considered to be complete linguistic expressions). The 'propositional content' of imperatives, finally is captured in the semantic representation without the counterintuitive assumption that imperatives denote propositions and without invoking putative speech-act properties.

The *fulfillment-conditions* for imperatives used as requests may be roughly characterized as in (36):

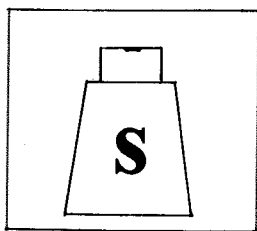
- (36) If the speaker s utters $f_{20}(\alpha)$ (where $\alpha \in \text{PIV}$) towards a hearer h at time j in order to make a request, then this utterance is a *fulfilled* request if and only if there is a time j' , $j' > j$, such that $[h=x \sim \alpha(x)]$ is true at j' .

Whether a certain imperative expression is used as a request or an order, etc. depends on pragmatic criteria concerning the status of the speaker (authority), his wishes (sincerity), etc. But assuming that an utterance of an imperative constitutes a request, (36) specifies the conditions under which this request would be fulfilled.

Our semantic representation of the imperative (33) may seem rather parsimonious. Is (33') sufficient as the semantic representation of the literal meaning of (33)? And what is the literal meaning? In order to clarify my position regarding the relation of meaning and use, semantics and pragmatics, it might be helpful to consider a metaphor.

Imagine A and B sitting at the dinner table, B looks quietly at A and flashes the little card indicated in (37).

(37)



Wouldn't A quite normally understand the flashing of this card under the indicated circumstances as a request to pass the salt? No illocutionary force indicator is necessary to use the card in (37) for making a request. Furthermore, we could use the same card also in a descriptive function if the circumstances are of an appropriate nature. For example, (37) could serve as a label on a box containing little bags with salt (in distinction to another box containing little bags with pepper).

Now, does (37) have two or more meanings depending on how many different uses we can find for it? Or is (37) one sign with one meaning? Though (37) has an extremely rudimentary 'surface-syntax' and there is no special syntactic mood to speak of we may extend the performative approach to this example by postulating 'underlying' meanings.

If (37) is used as a request then it means 'I request from you that you pass the salt.'. But if (37) is used as a label then it means 'This container contains salt.'.

I would like to argue, on the other hand, that (37) has only one simple meaning, as represented in the picture of a salt-shaker. We may say that this picture denotes like the English word *salt-shaker* denotes.

It seems to me that the study of speech-acts makes sense only if we operate with concrete linguistic signs in their literal meaning. Only if we stick to the meaning concretely given in the sign can we study the use-conditions of this sign. By making explicit assumptions about the beliefs, intentions, emotions, and preferences of the speaker and other relevant features of the utterance situation, we can systematically deduce the intended use of the sign. The theory of pragmatics should be able to account for different uses of cards like (37) in the same way as it should account for the use of natural language signs.

In order to further motivate my surface compositional approach (with its consequences for syntax, semantics, and pragmatics), I will present below an

analysis of the interrogative mood which illustrates how 'literal' the translation of linguistic surface structures into the standard notation of intensional logic can be (though much could be improved in a more thorough and detailed analysis).

5. THE SYNTAX AND SEMANTICS OF INTERROGATIVES⁵

While the imperative mood in English is characterized by one basic type of surface syntactic construction, the interrogative mood exhibits a systematic variety which creates a whole spectrum of different surface syntactic constructions. For reasons which will become apparent shortly, we may distinguish between the following two basic types of interrogatives: *non-restricted* interrogatives and *restricted* interrogatives.

Examples of non-restricted interrogatives are (38–42):

- | | | |
|------|-------------------------------|----------------------------|
| (38) | Who came? | (John.) |
| (39) | Why did John come? | (Because he admires Mary.) |
| (40) | When did John arrive? | (Early.) |
| (41) | How often did John kiss Mary? | (A 103 times.) |

Examples of restricted interrogatives, on the other hand, are (43) and (44):

- | | | |
|------|------------------------------|-----------------------------|
| (43) | Did John kiss Mary? | (Yes./No.) |
| (44) | Does Mary love John or Bill? | (Yes./No.)
(John./Bill.) |

The expressions in brackets in the above examples are *compatible answer expressions*. In the same sense as we have to distinguish between an interrogative X and a speech act of asking which contains X as a token, we have to distinguish between 'answer-expressions' and the speech act of answering.⁸ Which kind of expressions may serve as answers to which kind of interrogatives? Consider the following example:

- | | | |
|------|----------------------------------|------------------------------|
| (45) | John asks Bill: "Who came?" | |
| | Bill answers: | |
| (a) | "Peter." | (non-redundant answer) |
| (b) | "Peter did." | (pseudo-redundant answer) |
| (c) | "Peter came." | (redundant answer) |
| (d) | "Peter, on Mary's bicycle." | (explicatory non-red.an.) |
| (e) | "Peter did, on Mary's bicycle." | (explicatory pseudo-red.an.) |
| (f) | "Peter came, on Mary's bicycle." | (explicatory red. answer) |

The non-redundant and pseudo-redundant answers (i.e., (45a), (45b), (45d),

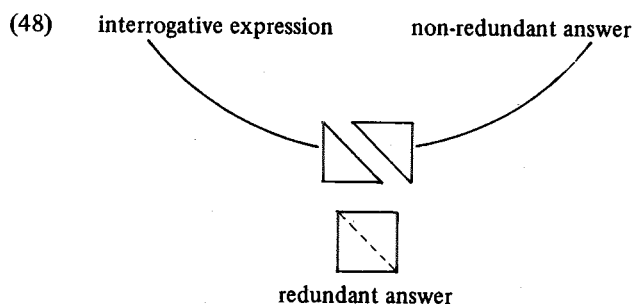
and (45e)) are special surface expressions which (i) are *not* a complete declarative expression, (ii) denote a truthvalue (proposition) if interpreted relative to a suitable interrogative, and (iii) exhibit highly specific structural properties which delimit the class of interrogatives they may function to answer. The redundant answers (i.e., (45c) and (45f), on the other hand, are complete and regular declarative expressions. Whether these declaratives are used as answers or not is solely a matter of the speech-act they are used in.

The answers indicated in (38–44) are all non-redundant answers. They demonstrate that a *non-redundant* answer-expression may be related only to two kinds of interrogative because it is structurally incompatible with all other kinds. The expression "John.", for example, is a possible answer only to (38) and (44), on the 'disjunctive reading' of (44). The declarative sentence (46),

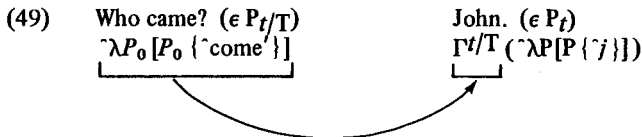
(46) John came early because he admires Mary.

on the other hand, may serve as an explicatory *redundant* answer to (38), (39), and (40). Which interrogative (46) is used to answer is indicated only in the intonation. Note that this specific intonation is a *use marker*: it has no influence on the denotation of the sentence.

How can the structural properties of interrogatives, answer-expressions, and the important property of compatibility observed in the above examples be formally characterized in a complete and surface compositional analysis? In the analysis presented in Hausser & Zaefferer (1977) and Hausser (1977, chapter 5), an interrogative is analyzed syntactico-semantically in such a way that it fits together with a compatible non-redundant answer and vice versa. Their combination results in a proposition which is semantically equivalent to the translation of the corresponding redundant answer:



Note that the interrogative elements *who*, *why*, *when*, and *how* in the non-restricted interrogatives (38–41) have the *same* syntactic category as the *constituents* of their respective non-redundant answers. This fact is taken into account in the analysis of the following example:



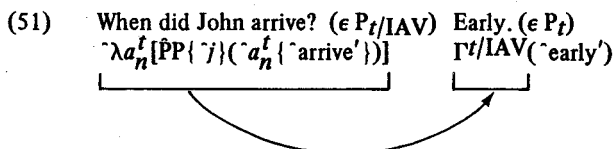
where P_0 is a variable of type $\langle s, f(T) \rangle$ ranging over term-denotations, while Γ^t/T is a context-variable of type $\langle s, f(t/T) \rangle$ ranging over translations of t/T -interrogatives provided by the context.

The non-redundant answer (49b) is interpreted with respect to the interrogative (49a) by replacing the context-variable by the translation of (49a). The result is (50a), which reduces via λ -conversion to (50b).

- (50a) $\lambda P_0 [P_0 \{ \text{'come'} \}] (\lambda P [P \{ \gamma \}])$.
 (50b) $\text{'come'}(\gamma)$.

(50b) is the translation of the corresponding redundant answer 'John came.', as desired. For the details of *contextual reconstruction* (i.e., replacement of a context-variable as indicated in (49)) see Hausser (1979).

According to the indicated treatment, an interrogative denotes a function from points of reference into *sets of corresponding non-redundant answer constituent denotations*. The category variation (type-variation) of different interrogatives (i.e., interrogatives with interrogative elements of different category) is crucial for the characterization of compatibility between an interrogative and its non-redundant answers. As an example of a t/IAV -interrogative consider (51):



The result of contextual reconstruction is:

$PP \gamma (\text{'early'}(\text{'arrive'}))$.

(The variable a_n^f is of type $\langle s, f(\text{IAV}) \rangle$, where $\text{IAV} = \text{IV}/\text{IV}$, ranging over the denotation of time-adverbs. In order to differentiate between different kinds of adverbs, I assume that the variables representing IAV-interrogative elements are sorted with respect to time, place, manner, etc.)

Comparison of (50) and (51) illustrates that the compatibility between an interrogative and a non-redundant answer expression (responsive) depends largely on the category correspondence between the interrogative and the context-variable in the answer (where the type of the context-variable must always be such that the answer denotes a proposition). Further restrictions are induced by sub-categories such as different kinds of adverbs:

(52) *Where did John go? Yesterday.

Where corresponds to an IAV-variable sorted with respect to places. Though the constituent in the answer-expression in (52) is of category IAV, it is not of the right subcategory.

Our semantic treatment covers also the multiple interrogatives (which are likewise non-restricted interrogatives). Consider (53):

(53) Who kissed whom where? ($\in P(((t/T)/T)/\text{IAV})$)
 $\lambda a_2^P \lambda P_1 \lambda P_0 [P_0(\sim a_1^P(\sim \text{see}'(P_1)))$
 John Mary in the kitchen. ($\in P_f$)
 $\Gamma t/T/T/\text{IAV}(\sim \text{'in the kitchen'}) (\dot{P}P\{\sim m\}) (\dot{P}P\{\sim j\})$
 $= \Gamma t/T/T/\text{IAV}(\dot{P}P\{\sim j\}, \dot{P}P\{\sim m\}, \sim \text{'in the kitchen'})$;

where a_2^P is a variable of type $\langle s, f(\text{IAV}) \rangle$ sorted with respect to places. P_0 and P_1 are variables of type $\langle s, f(T) \rangle$.

Contextual reconstruction renders again a formula which is equivalent to the translation of the corresponding redundant answer:

John kissed Mary in the kitchen.
 $\dot{P}P\{\sim j\}(\sim \text{'in the kitchen'}(\sim \text{kiss}(\dot{P}P\{\sim m\})))$.

(53) demonstrates that the category of interrogative elements as well as their number and relative order determine the category of the whole interrogative expression. Furthermore, the number of interrogative elements in a non-restricted interrogative is theoretically indefinitely large and restricted only by limitations of perception (a parallel case is the stacking of relative clauses). This means that there are indefinitely many kinds of non-restricted interrogatives, having different types of possible denotations and different types of

compatible non-redundant and pseudo-redundant answers. Semantically, we may motivate the postulated syntactico-semantic structure of interrogatives by saying that interrogatives denote *sets of their non-redundant answer constituent-denotations*.

We have thus captured the intuition underlying the hypothesis in Hamblin (1973) that interrogatives denotes *sets of possible answers*, though in a manner quite different from Hamblin's. Hamblin proceeds on the assumption that an answer must be a declarative sentence, which leads him to define interrogatives as uniformly denoting *sets of propositions*. He motivates this move by proposing to treat declaratives as denoting unit-sets of propositions. Thus imperatives and declaratives denote the same kind of function – though imperatives are apparently not included in this 'generalization'. Needless to say, the question of compatibility between interrogatives and suitable answer-expressions is not raised in his paper.

The basic principles of my approach to non-restricted interrogatives are suited also for a logically standard treatment of restricted interrogatives. Consider (54):

- (54) Did John leave?
 $\lambda r_n [r_n(\text{'leave'}(\text{'j})) \sim [(r_n = \hat{p}[\text{'p}]) \vee (r_n = \hat{p}[\text{'\sim p}])]]$

No.

$\Gamma t/(t//t)(\hat{p}[\text{'\sim p}])$

(r_n is a variable of type $ME_f(t//t)$. I assume that *yes* and *no* ($\epsilon B_t//t$) translate into $\hat{p}[\text{'p}]$ and $\hat{p}[\text{'\sim p}]$, respectively. Contextual reconstruction renders an expression which is equivalent to the translation of the corresponding redundant answer 'John didn't leave', i.e., $\sim \text{'leave'}(\text{'j'})$.)

Yes/no-interrogatives like (54) are morphologically and semantically related to the so-called alternative interrogatives, such as (55),

- (55) Did John kiss Mary or Suzy?

which is ambiguous between the following two meanings:

- (55a) $\hat{r}_n [r_n(\text{kiss}'(\text{'j}, \hat{P}\{P\{\text{'m}\} \vee P\{\text{'s}\}\})]$ (yes/no-reading)
 (55b) $\hat{P}_n [\text{kiss}'(\text{'j}, P_n) [(P_n = \hat{P}P\{\text{'m}\}) \vee (P_n = \hat{P}P\{\text{'s}\})]]$ (term-reading)

Expressions like (54) or (55) are called restricted interrogatives because the possible values of the variables in their translation is restricted via explicit enumeration. Note that there are again indefinitely many kinds of restricted interrogatives, as shown by example (56):

- (56) Did John kiss Mary or Bill Suzy? ($\epsilon P_t/T/T$) John Mary.

The different readings (55a) and (55b) are marked on the surface in terms of different intonation. These intonation patterns constitute an instance of 'syntactic intonation' (are not a use-marker). The rules implementing the indicated syntactico-semantic treatment of restricted and non-restricted interrogatives, redundant and non-redundant answer-expressions as well as the so-called 'indirect questions' into a complete and canonical extension of PTQ are given in Hausser (1976c), and need not be repeated here.

6. CONCLUSIONS

Let us return now to our basic hypothesis according to which different moods should be characterized semantically in terms of their characteristic kind of possible denotation (induced by their characteristic syntax). We have seen that different moods arise in form of very clearly defined different kinds of surface structures. We argued that

- (a) declaratives denote propositions, i.e., they are expressions of type $\langle s, e \rangle$,
- (b) imperatives denote properties of individual concepts (restricted in the indicated way), i.e. they are expressions of type $\langle s, f(t/e) \rangle$,
- (c) interrogatives denote functions from s into sets of non-redundant answer constituent denotations, i.e., they are expressions of type $\langle s, \langle \langle s, \alpha \rangle, t \rangle \rangle$, where α is the type of the constituent of the respective compatible non-redundant answer expressions.

Thus there is no type-overlap between different syntactic moods. It seems to me that the kinds of possible denotations assigned to different moods are completely natural. To say that an imperative denotes properties of individual concepts (restricted to the hearer) is no less motivated than saying that an declarative denote propositions.

While the presented treatment of non-declaratives logically completely standard, it is linguistically close to the surface and maintains the original categories of the constituents. In line with the principle of surface compositionality, our semantic representations of different moods contain nothing that is not concretely reflected in the linguistic surface.

But don't we need at least some 'underlying' interrogative or imperative operators for the semantic characterization of *non-declarative* moods? The answer is *no* for the reasons given in sections 1, 2, and 3, which may be summarized as follows:

- (i) there are no features in the linguistic surface which could be consistently interpreted as mood-operators or mood-markers;
- (ii) there is no necessity for postulating operators or markers since different moods are sufficiently differentiated in terms of their surface syntax and the corresponding types of possible denotations.
- (iii) the use of such operators amounts to introducing speech act properties and would lead to the same problems in connection with 'indirect speech-acts' as Hintikka (1976) and Lewis (1972) encounter.

Our analysis of mood has shown that the principle of surface-compositionality leads not only to a highly restricted syntactico-semantic analysis of expressions of natural language, but is also of greatest consequence for the analysis of the use-conditions of these expressions. The systematic study of speech-acts cannot be successful as long as we don't proceed on the basis of concrete linguistic signs in their literal meaning.

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NOTES

¹ The term 'mood' can be used either in connection with *verbal mood*, such as indicative, subjunctive, optative, etc., or in connection with *syntactic mood*, such as declarative, imperative, or interrogative. The specifics of a certain mood may vary from language to language, and different languages may have different moods, as a comparison of the verbal moods of Greek vs. English demonstrates. The present paper will be concerned with syntactic mood only.

² Strictly intensional logics have been explicitly defined in Hausser 1978 and 1980.

³ As far as I can reconstruct.

⁴ For a more extensive discussion of the principle of surface compositionality see Hausser (1978).

⁵ For example, Hintikka (1976), who uses a semiformal first order predicate calculus as his semantic representation, cannot distinguish between *terms* (*John*, *the man who*

arrived yesterday, etc.) and *adverbs* (there, in the kitchen, etc.) in terms of category and type of possible denotation (op. cit., p. 29).

⁶ I treat topicalization as a syntactic use-marker. Pragmatically based alternations such as in (32) are in my opinion the only occasion in which the mechanism of a meaning preserving transformation could be appropriate. Furthermore, it could be argued that a pragmatically based movement transformation does not violate the syntactico-semantic principle of surface compositionality.

⁷ The discussion of interrogatives in the present section summarizes the main points of Hausser (1976c).

⁸ We use the terms 'statement', 'question' and 'request' to refer to *speech acts*, in contrast to the terms 'declarative', 'interrogative', and 'imperative', which refer to structural properties of surface *expressions*. In order to carry this terminological practice over to the class of answer expressions in (38–44) consider the distinction between the terms 'answer' (referring to a speech act) and 'responsive' (referring to surface expressions of a certain kind, such as 'John.', 'In the garden', etc., which are of category t). Thus 'Mary is in the garden.' and 'In the garden.' could both be *used* as an answer to the question using the interrogative 'Where is Mary?', but the former must be classified as a *declarative* and the latter as a *respondative*.

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