

Session 5: GRAMMATICAL STUDIES

QUESTIONS AND DISCUSSION

LEHMAN: I would like to make some comments on Mr. Marchand's fine paper. The first comment is on your model of the German declarative clause. I make it not to indicate any objection to your analysis here but to point out some of the problems that linguists are faced with in machine translation analysis. Your categories 6 and 9, for example, are given as distinguished on the basis of word and phrase. Actually, this will not work for German because the distinction is made on the basis of the type of thing that we can call meaning; for example, both gestern and spät are individual words rather than phrases, but you would say gestern spät, er kam gestern spät and not the other way around. I think there would have to be a different basis of analysis for these two classes.

My second point which indicates the necessary complexity of linguistic analysis deals with your statement about da as a conjunction or adverb -- specifically, you state that da + ... + verb is a conjunction after a mark of punctuation. It is quite clear that this applies also after a non-element. You could have something like aber da er ankam, so you would have to revise this too.

The first class in your model of the declarative clause is a very important class for German. We call these things non-positionals, but you would tie these in some way with your punctuation. The same thing applies say in a less important way to your statement about der. If you had a set of words like die Frau, der Mann, und das Kind, you would have die Frau and then der Mann, and that der would be a definite article.

My last comment deals with the extended attribute construction. Here again, you probably have noted that the class you list is not limited solely to participles but may include also adjectives like selbständig. One of the things that we are interested in is whether you could set up two classes of adjectives, one of which could function in this position and one of which could not.

MARCHAND: I am glad to have all of these problems brought up, because they do allow me to say something that I was not able to say in the talk. First, consider the model of the German declarative clause--

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I refer to my original publication on German word order in which I treated this. The phrase "1-word adverb of time" is not really a good statement of the model, which takes quite awhile to be stated properly. In the original publication, I wrote "1-word adverb of time plus its attributes"; but this still does not handle a thing like spät gestern, which I suppose one would have to treat as an idiom. You are quite right that in a statement that allowed no exceptions at all you would have to provide for the occurrence of da after a mark in punctuation plus a non-element. In my original work I said that a non-element has nothing to do with any of the other positionings at all and therefore a non-element for all purposes of order or anything else would be excluded from consideration.

As to the point about der as a relative, you have put your finger on a problem. The problem of what to do with "comma der plus subject" is not very hard, because you have another comma immediately after it telling you that the construction is closed, and so there is no real problem. However, that is not stated in my paper, so you are quite right in taking exception to it. I call the things under section 4 "participials" and not "participles" because of that very reason. That is, I call "participials" all the things which can function as the fourth block in the extended attribute construction. There would have to be a dictionary listing of these participials, and this is what one has to do when one is teaching. I think for machine translation this would not be a difficult problem either, as one would just list all of them. Actually, one can recognize from the first two blocks that one has to deal with the extended attribute construction. Thus, if it is a matter of recognizing construction, there is no problem. The problem is to recognize the end of the construction. I do not handle the extended-attribute construction problem in this way, since I insist on going left (or right) straight through and not recasting the sentence as, for example, Pollard has done.

KIRSCH: Mr. Matthews, in describing what you call the specifiers of sentences, I believe I heard you speak of these specifiers as being the specifiers of particular sentences, though I think you would probably be more correct to speak of them as specifiers of derivations for sentences. Consequently, a sentence which is syntactically ambiguous would have several such specifier numbers, one corresponding to each interpretation.

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You have pointed out that there is a certain intrinsic virtue in a "Gödel numbering" of the sentences, not because it is not a one-one numeration, but because with it the sentences that have lower numbers would be simpler in a certain sense. I would like to ask whether you are willing to suggest that this numbering procedure would also account for a rather interesting phenomenon that we have noticed, for example, in patent office literature: that sentences which on careful inspection are syntactically ambiguous are nevertheless interpreted unambiguously in a real-time discourse. Might the specifier of such sentences--the lower numbered specifier of an ambiguous sentence--correspond to the derivation which is interpreted by the real-time speaker or listener of the language, and, consequently, would your enumeration procedure explain this rather interesting phenomenon?

MATTHEWS: I do not really think that there would be any relationship between which interpretation for ambiguous sentences people usually come to first and the number that I talk about. A great deal of the interpretation of ambiguous sentences depends upon sentences nearby, previous sentences, and subject matter. People usually pick the right interpretation and sometimes have a bit of a mental block toward any other interpretation. There has been some work done by Dr. Yngve on which interpretation usually comes first if there is no previous context; and this is tied closely with his work on the left-to-right type of grammar. Suppose we have the sentence, "The man saw the pig". In interpreting this sentence people apparently look at or perceive the first word, "the", and draw a line to whatever it can be connected with. The tendency in perceiving these sentences is to make the first connection possible, and "the man" is a reasonable sequence. "The man saw" is not a constituent in the sentence, so we go on. We hit "the", but "saw the" is not a constituent, so we move on again. "The pig" is a constituent; "saw the pig" is a constituent; and "the man saw the pig" is a constituent. This seems to be a way of accounting for how this sentence is interpreted. This sentence, of course, is not ambiguous; but you can see that if it were ambiguous, there would come one interpretation first; any other interpretation would come later.

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OETTINGER: There seem to be a number of ideas here that are converging in a very interesting, fruitful, and simple way. I would like to comment briefly, in terms of Chomsky's essentially synthetic procedure, on Mr. Kirsch's question, to show how the whole notion of predictive analysis ties in with the answer that Mr. Matthews gave. Consider the classical ambiguous Chomsky example, "They are flying planes". The ambiguity comes after "are". In the predictive analysis of this example, you will have just dealt with the verb "are"; and, at this time, in the prediction pool you will have something which will influence how you regard "flying". Depending on whether a prediction for an object or a prediction for a compound verb is at the top of the prediction push-down store, you will get either one interpretation first or the other. One can essentially guarantee that, even though things are iterative and on occasion one has to make guesses by juggling this parameter and certain others, the most probable structure of the sentence can be made to come out first, so that you will get the others on later passes. For example, suppose that after "are", on the basis of whatever information I have available to me by examination of text, I surmise that "are" is most likely to become a part of a compound and auxiliary verb. Then I will have at the top of the prediction pool something that would accept, let us say, a gerund form or a participle; and, therefore, I will first take "flying" and assimilate it to "are" as part of the verb. If, on the other hand, I have reasons to believe that "are" is most likely to be followed by an object rather than part of a compound verb, I can rig my prediction pool so that it will have the object prediction on top. It is not too unreasonable to surmise on the basis of some of Dr. Yngve's work that a similar phenomenon might be at play in our own decoding procedure, although I would not want to venture to prove this.

HAYES: Being quite naive with respect to linguistic analysis, and being essentially computer oriented, I find myself in sympathy with the approach described as the predictive approach. I suspect that machine-oriented people would tend to view this as the simpler way. My second comment, which also reflects my naivete, is that I am collecting examples of sentences which are ambiguous--merely because they are of intellectual interest and throw appropriate parties into gails of hilarity. So far, I have come up with an example having

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at least five separate meanings, each quite reasonable. It is, "The dog turns on the spit". I have five meanings for that. If you can come up with a sixth one or come up with a sentence which has six separate meanings, I would appreciate it.

A.F.R. BROWN: Mr. Matthews, it seems to me that the generative procedure can generate a sequence of sentence types or a sequence of sentences which is perhaps not infinite but unfeasible. This is not to condemn it; a generation scheme is wonderful; but I miss something. If you are confronted with a sentence and you want to find out which description in terms of x digits fits it, you cannot, as a practical matter, just start generating and keep matching. How do you get around this? Do you perhaps use heuristic programming, explore likely approaches from both ends and hope to meet in the middle, or what?

MATTHEWS: First of all, I would expect that there would be some sort of preliminary recognition routine, which would get some preliminary analysis for a sentence. The point I wanted to make was that if this preliminary analysis is expressed in terms of the specifiers that I outlined, the specifiers now represent not necessarily one sentence but a class of sentences. Then a generative type of grammar can be used to generate all the sentences of this class. But I think it is quite obvious that this class will always be finite, because we can count the number of words in a sentence and this gets us a finite class of sentences. Of course it is very large, but then our preliminary analysis routines can pinpoint a single sentence nearly every time. I was suggesting that with the addition of this generative grammar the analysis routine will pinpoint every time.