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Topic and Comment in Spoken Sentence Comprehension

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Chomsky (1965) has defined the Topic of a sentence as "the leftmost NP immediately dominated by S in the surface structure" and Comment as, quite simply, "the rest of the string". Others have either defined or used these two concepts to denote, among other things, the distinction between (1) "new" information and information that has already been conveyed (e.g., Clark & Haviland, 1977), (2) the notions of "psychological subject" and "psychological predicate" (e.g., Hornby, 1972), or (3) the "current" vs. "presupposed" information of a sentence (e.g., Halliday, 1967). Differing interpretations abound and, in the words of deBeaugrande (1980), "it has remained unclear precisely what phenomenon we are dealing with".

The purpose of this research was to investigate the roles of "topic" and "comment" in different semantic and syntactic contexts. To do this we used the gating paradigm, a procedure in which spoken sentences are repeatedly presented to subjects, the amount of spectral information from each constituent word being gradually increased with each successive repetition. In the first presentation of each sentence, the spectral gate size (i.e., duration from the onset) of each word was only 50 msecs. The remainder of each word was replaced with envelope-shaped noise, a procedure which eliminates the spectral information while preserving prosodic fluctuations in the intensity of the speech. Each target sentence was repeated 10 times, the gate sizes being increased in 50 msec increments across repetitions. Subjects were instructed to simply write down whatever they could understand after each presentation of the sentence. The dependent measure of interest was the amount of spectral information (i.e., the "gate size") necessary for comprehension of each word in the sentence.

This technique was applied to the current issue by transforming the syntax of simple, declarative sentences so as to vary the topicalization of subject and object nouns from one sentence version to the next. Our syntactic transformations, taken from a study by Hornby (1972) are shown below:

(1) The farmer plowed the field.
(2) The field was plowed by the farmer.
(3) It was the farmer who plowed the field.
(4) It was the field that the farmer plowed.
(5) The one who plowed the field was the farmer.
(6) What the farmer plowed was the field.

Hornby (1972) showed that agent of a sentence serves as the topic when presented in syntactic structures with a cleft object (sentence 4), pseudocleft object (6) or in active sentences (1) and as the comment when presented either in passive sentences (2) or in sentences with cleft (3) or pseudocleft (5) agents. The object takes on a complementary role, being part of the comment where the agent is topicalized, and vice versa. The topic of each of of each syntactic form has been underlined, above, according to this criterion. In this study we capitalized on this exchange of roles so that, when comparing the overall effects of topic vs. comment status, we would be comparing each word against different tokens of itself.

Armchair theorists have been asserting for some time now that the topic of a sentence (1) receives less intonational stress (i.e., lower amplitude and F0 and a shorter duration) in production and (2) is somehow prerequisite for correct interpretation of the comment. If this is true, then comprehension of any given word should require less spectral information when it functions as topic than when it is stretched out in time as part of the comment on what has been topicalized. Moreover, if the functionalist approach is correct, then there should be a well-ordered interaction between topicalization and syntax, with agents requiring a smaller minimal gate size in active sentences and sentences with cleft and pseudocleft objects, where they are topicalized, than in the remaining three syntactic forms, where they are part of the comment. And once again, the converse should obtain for the object of each sentence.

Neither of these predictions was supported by the results: The amount of spectral information necessary for word recognition did not decrease as a function of increasing topicalization. Moreover, there was a significant main effect of syntax $(F(5,270)=26.18)$, resulting from an increase in the amount of spectral information necessary for word recognition as the syntax of sentences became more complex.

These results should not be construed as evidence against the functionalist approach to sentence comprehension. Our sentences were presented out of context, in the absence of any larger text or dialogue framework. Thus, it is doubtful that the topicalized words in these stimuli really represented anything akin to "given" or "presupposed" information for the subjects. Nonetheless, these results do serve to constrain some of the notions that have been advanced about the nature of topic and comment in the processing and structure of language. They make if quite clear that "topic" and "comment" are textual, rather than syntactic or structuralist concepts. Thus, any effort to define these constructs without reference to intersentential relations simply misses the purpose of topicalization in real-time processing. However, the results also demonstrate that it is important not to lose sight of syntactic effects in text processing. The syntactic constraints of these sentences did much more than just control the focus of attention; they had profound, top-down effects on the overall speed of identification as well.

The current results are only the first in a series of experiments on this issue. In this talk, I will also discuss the effects of similar manipulations on materials presented in various textual frameworks.