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1

Comprehension and the Given–New Contract

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Conversations are a cooperative enterprise. A speaker cannot communicate effectively to his audience unless he adheres to certain conventions. At the very least he must speak a language known to his audience, comply with its phonological, syntactic, and semantic rules, and talk in an audible voice. But many of the conventions he follows have more to do with what he says than with how he says it. He must talk about topics he believes his audience can understand, make his part of the conversation coherent with the rest, and say something worthwhile. The important question, then, is, what precisely are the conventions people follow to ensure the smooth give and take of information?

Grice (1967), in an important work called *Logic and conversation*, has brought together under one theoretical umbrella the conventions he thinks are necessary for successful communication. The overriding convention, according to Grice, is what he calls the Cooperative Principle, which consists of the following simple precept to the speaker: "Be cooperative." But the speaker is expected to be cooperative in four general ways, which Grice represents as four maxims:

Quantity: Make your contribution no more and no less informative than is required.
Quality: Say only that which you both believe and have adequate evidence for.
Relation: Be relevant.

Manner: Make your contribution easy to understand; avoid ambiguity, obscurity, and prolixity.

The cooperative principle, together with these four maxims, constitutes a type of social contract. The speaker agrees to follow these maxims, and the listener agrees to assume they have been followed.

These four maxims are more than just guidelines for the well-mannered speaker. They influence the very interpretations the listener attaches to what the speaker has said. In Grice's scheme the maxims are normative rules and do not by themselves constitute the cooperative principle. Under special circumstances the speaker can violate a maxim without violating the cooperative principle. In these instances, however, the speaker must make his violation overt, make it appear intentional, so that the listener will realize he actually meant to violate the maxim. Imagine, for example, that someone has said *It's such a lovely day today* when it was clear to both speaker and listener that there was a terrible storm raging outside. Here the listener would assume the speaker was violating the maxim of quality intentionally, and he would draw what Grice calls a conversational implicature. He would assume the speaker is still being cooperative and therefore must have meant something by the explicit violation. The listener could then figure out just how the utterance was meant – in this case, it was meant to be taken as an ironic comment on the weather, not as a purely informative communication. On the other hand, a speaker can violate a maxim covertly or even unintentionally, and then accurate and effective communication with the listener will normally break down. Imagine, for example, that our speaker had said *It's such a lovely day today* when he knew about the storm raging outside, but the listener did not. Again, the listener would assume that the speaker was being cooperative, but this covert violation of the maxim of quality would lead the listener to believe that the weather was in fact fine, which is incorrect. If this violation was intentionally covert, the speaker would be lying; if it was unintentional, he would be misleading. In summary, intentional overt violations lead to coversational implicatures; intentional covert violations produce lies; and unintentional violations lead to less malevolent breakdowns in communication.

Grice's approach has far-reaching consequences for theories about the process of comprehension. Traditionally, such theories have stressed the syntactic and semantic aspects of utterances. Yet Grice's approach implies that the process must also reflect the cooperative principle, the four maxims, and the way they interact. For instance, a complete theory of the process must explain how *It's such a lovely day today* is taken as merely informative when the listener believes no maxims have been violated, but as ironic when he believes the maxim of quality has been violated. It must also explain, for example, how *I have four sisters* is in most contexts interpreted as "I have *only* four sisters." A speaker with more than four sisters would have been technically correct in uttering this

sentence, but he could not use it without violating the maxim of quantity. He would not have been as informative as required. So the listener infers that the speaker meant *I have exactly four sisters.* In general, a theory of comprehension must account for interpretations the listener comes to based on the assumption that the speaker is cooperating with him.

In this chapter we will be concerned with an agreement between the speaker and listener, which we will call the given–new contract, and we shall show how it plays a central role in the process of interpreting sentences in English. As part of the cooperative principle, speakers and listeners have an implicit agreement about how (a) information that is known to the listener, and (b) information that is novel to the listener are to appear in sentences. This is the given–new contract. On the basis of this contract, the listener makes use of a strategy we call the given–new strategy in comprehending the utterances he hears. This strategy, as it happens, leads him to understand some utterances quickly and others slowly, to judge some utterances as appropriate and others inappropriate in certain contexts, and to draw conversational implicatures for some utterances and not for others. We will then show how these and other predictions of the given–new contract are consistent with a variety of linguistic and psychological evidence now available. Finally, we will demonstrate how the given–new contract, like its parent cooperative principle, can be used for good or for ill. By adhering to the contract, the speaker can convey subtle pieces of information either directly or indirectly, and by violating the contract, he can deceive or mislead.

THE GIVEN–NEW CONTRACT

The given–new contract is concerned with a syntactic distinction the speaker is obliged to make between given information and new information. In all languages probably (Chafe, 1970), declarative sentences convey two kinds of information: (1) information the speaker considers given – information he believes the listener already knows and accepts as true; and (2) information the speaker considers new – information he believes the listener does not yet know. In English the distinction is obligatorily marked in what Halliday (1967) has called "information focus," a surface feature closely associated with the intonation contour of the sentence. Consider the sentence *It was Percival who piqued the professor,* which, with normal intonation, has its major stress on *Percival.* Its given information is that someone piqued the professor; its new information, which is conveyed by the constituent containing the strongest stress, is that that someone was Percival. The pattern of given and new in this sentence is inherent in its syntax and associated stress pattern – a topic we will return to later – and does not change with what is in fact known or unknown to the listener. Nevertheless, linguists have traditionally identified this distinction in terms of its

obvious function. Halliday (1967) used the terms "given" and "new," Chafe (1970) "old" and "new," and Akmajian (1973), Chomsky (1971), and Jackendoff (1972) "presupposition" and "focus."[1] For convenience we have adopted Halliday's terminology; "old" seems less descriptive than "given" (see Chafe, 1973, p. 112), and "presupposition" has several senses that are easily confused (see Jackendoff, 1972, p. 276).

The given–new distinction, this description suggests, is present in language to serve a specific function. To ensure reasonably efficient communication, the speaker and listener adhere to a convention regarding the use of this distinction in sentences. The speaker tries, to the best of his ability, to make the structure of his utterances congruent with his knowledge of the listener's mental world. He agrees to convey information he thinks the listener already knows as given information and to convey information he thinks the listener doesn't yet know as new information. The listener, for his part, agrees to interpret all utterances in the same light. The result is what we have called the given–new contract, which we view as one aspect of Grice's more general cooperative principle. Like the cooperative principle, the given–new contract consists of a normative maxim (a precept to the speaker as to what he should ideally do) and a set of requirements he may never violate without a breakdown in communication. By relying on the latter requirements the speaker can deliberately and overtly violate the maxim to convey various types of "implicatures" indirectly.

The heart of the given–new contract is the maxim of antecedence, a precept to the speaker that he make sure the listener actually knows the information being conveyed as given information. The precept can be stated this way:

> *Maxim of Antecedence:* Try to construct your utterance such that the listener has one and only direct antecedent for any given information and that it is the intended antecedent.

Consider again *It was Percival who piqued the professor.* For a speaker to utter this sentence, he must be confident that the listener already knows that someone piqued the professor. This knowledge on the listener's part is what we will call the antecedent to the given information of the sentence. Formally, it consists of a node in the listener's memory structure characterized as a nominal that has associated with it one or more propositions in which the nominal serves as an argument. For our example the antecedent is the node in the listener's memory corresponding to "the one who piqued the professor." This particular antecedent is said to be direct since it contains among its associated propositions ones that match the given information precisely. (We will consider indirect

[1] "Given" and "new" may also be equivalent to what Fillmore (1971) referred to as the "presuppositional" and "illocutionary" aspects or levels of the "speech communication situation."

antecedents later on.) Since the maxim of antecedence governs the manner in which the utterance is constructed, it can be considered as one specific part of Grice's maxim of manner.

Violations of the maxim of antecedence, like violations of others of Grice's maxims, have two distinct consequences. By violating the maxim deliberately and explicitly, the speaker can convey special types of information. The listener will assume he was meant to recognize such violations and to draw certain inferences. The speaker can exploit this process to convey information not directly contained in the literal meaning of the utterance. On the other hand, by violating the maxim of antecedence covertly or from negligence, the speaker can easily mislead the listener or cease to communicate anything coherent at all. Like other failures to cooperate, such breaches in the given–new contract will typically bring about a breakdown in communication.

From considerations like these, we have proposed elsewhere (Clark & Haviland, 1974; Haviland & Clark, 1974) that the listener makes use of a given–new strategy in understanding sentences. According to this model, the listener represents the content of conversations, as well as other knowledge, in a relatively permanent memory. This knowledge consists of a set of propositions interrelated by indices indicating which propositions are embedded in which, which entities are identical, and so on. This information structure includes not only those propositions underlying the sentences of a conversation – and perhaps not even all of these – but also propositions inferred from these sentences and from the extralinguistic context of the conversation. The given–new strategy is a three-step procedure for relating the current sentence to this knowledge base. At Step 1, the listener isolates the given and the new information in the current sentence. At Step 2, he searches memory for a direct antecedent, a structure containing propositions that match the given information precisely. Finally, at Step 3 the listener integrates the new information into the memory structure by attaching it to the antecedent found in Step 2.

The working of the strategy may become clearer with the concrete example outlined in Table 1. Assume that the listener in a conversation has encountered *It was Percival who piqued the professor.* Assume also that the listener has already stored in memory an interrelated set of propositions, represented here as $p_1, \ldots, p_n$, which includes the proposition E_{37} *piqued the professor* ("a particular individual E_{37} piqued the professor"). E_{37} is meant to represent a constant, a node that refers to a particular "entity" numbered, say, 37; it is to be distinguished from the variable X in the given information. In applying the given–new strategy to the current sentence, the listener first divides its propositional content into that which is given, *X piqued the professor,* and that which is new, X = *Percival.* Then he searches memory for a match with the given information (*X piqued the professor*), finds one (E_{37} *piqued the professor*), and assigns it the role of antecedent. Finally, he "attaches" the new information to

TABLE 1
The Given–New Strategy Applied to the Sentence
It was Percival who piqued the professor

A. Prior memory structure:

$p_1, \ldots, E_{37}$ *piqued the professor*, $\ldots, p_n$

B. Apply strategy to *It was Percival who piqued the professor:*

Step 1: Divide current sentence into given and new.

Given: *X piqued the professor*
New: *X = Percival*

Step 2: Search memory for a unique antecedent that matches the given information.

Antecedent: E_{37} *piqued the professor*

Step 3: Integrate new information into memory by replacing *X* by the appropriate index in the antecedent.

Add: E_{37} *= Percival*

C. Resulting memory structure:

$p_1, \ldots, E_{37}$ *piqued the professor*, E_{37} *= Percival*, $\ldots, p_n$

the antecedent by replacing the *X* in the new information by the E_{37} of the antecedent. These steps result in a revised memory structure that now contains the proposition E_{37} *= Percival.*

The given–new strategy works perfectly so long as the speaker has successfully followed the maxim of antecedence and the listener can find an exact match for the given information. But suppose the speaker has violated the maxim and the speaker cannot find a direct antecedent. Then, we assume, the listener can turn to one of three procedures: bridging, addition, or restructuring. Bridging and addition are available when the speaker has violated the maxim explicitly and expects the listener to draw certain inferences. Restructuring, on the other hand, is available when the speaker has violated the maxim unintentionally or covertly, and the listener needs the procedure to make sense of the utterance.

1. *Bridging.* When the listener cannot find a direct antecedent, most commonly he will be able to form an *indirect* antecedent by building an inferential bridge from something he already knows. G. Lakoff (1971) provides us with an example where such bridging is required.

(1) John is a Democrat. Bill is honest too.

The second sentence in this sequence, when pronounced with heavy stress on *Bill* and *too*, has as given information that at least someone other than Bill is honest, and it has as new information that Bill is honest. Suppose that the listener's memory structure contains only the proposition *John is a Democrat.*

On applying Step 2 of the given–new strategy to *Bill is honest too*, he isn't able to find a direct antecedent that matches its given information *X is honest* ($X \neq$ *Bill*). To detour around this impasse the listener notes that he could construct a plausible, though indirect, antecedent if he assumed that the speaker, observing the maxim of relation, meant the given information to be provided indirectly by the previous sentence. The listener could then assume that the speaker believes (1) that all Democrats are honest and (2) that since John is a Democrat he too is honest. The inferred proposition *John is honest* can then serve as an antecedent to the given information *X is honest*, since it matches the given information as required. With that the listener can go on to Step 3 of the given–new strategy and integrate the new information successfully into memory.

In this example the listener has assumed that although the speaker has violated the maxim of antecedence, he has not breached the cooperative principle – here that part of the principle we have called the given–new contract. The listener assumes that since the speaker is still being cooperative, he means the listener to be able to find an antecedent but only indirectly. More specifically, the listener assumes that the violation of the maxim of antecedence is to be treated like violations of any other maxim: By violating the maxim the speaker meant him to draw certain inferences, or as Grice called them, implicatures. In this case the listener assumes he was supposed to infer that the speaker believes all Democrats are honest. It should be noted here that the information conveyed by such a sentence as *Bill is honest too* becomes part of the listener's model of the speaker's world and not necessarily part of the beliefs of the listener himself. It is possible for the listener to understand *Bill is honest too* without believing that all, or even any, Democrats are honest.

2. *Addition.* Sometimes it is impossible to find any way of bridging the gap between known information and the appropriate antecedent. Then the listener must add to memory, perhaps hypothetically, a new node (a nominal associated with one or more propositions) to serve as the antecedent to the given information. This often occurs, for example, at the beginning of stories, as with the sentence

(2) The old woman died.

The given information here is that there is a woman and she is old. But with no prior context, the listener knows of no such woman. He is forced to add a new node to memory corresponding to "the one that is a woman and that is old," use this as the antecedent for the given information in (2), and then proceed with Step 3 of the strategy.

Sentence (2) is a deliberate violation of the maxim of antecedence when it comes at the beginning of a story, yet it is not necessarily a breach of the given–new contract. By violating the maxim, the speaker can be indicating to the listener that there is an old woman whose existence ought to be known at

that point. So with this violation of the maxim the listener is again expected to draw an implicature, here that the existence of an old woman is something that shall have to be assumed. As we will discuss later, this implicature is often exploited as an important literary device.

3. *Restructuring.* When the speaker has violated the given–new contract altogether, there are some instances where the listener can still figure out what is being conveyed by restructuring what is given and what is new in the utterance. Consider the sequence in Sentence (3):

(3) Agnes saw somebody. It was Agnes who saw Maxine.

Assume that the listener knows only what has been conveyed by the first sentence, namely, *Agnes saw* E_{85} , and assume that he is attempting to understand the second sentence. Its given information, *X saw Maxine*, does not match any proposition in memory, hence there is no proper antecedent to which to attach the new information $X = Agnes$. In this instance, however, the listener can restructure the given and new information in the second sentence so that *Agnes saw X* is given and $X = Maxine$ is new. Now there *is* an antecedent in memory for the given information, and the listener can proceed to Step 3 of the given–new strategy and attach the reconstrued new information to the antecedent. Obviously, the listener can turn to the device of restructuring only when the utterance being comprehended has just the right content. It must convey as part of its new information material from which the listener can build the restructured given information. These cases should be relatively rare.

Bridging, addition, and restructuring are all detours around a blockage in the application of Step 2 in the given–new strategy, and as such, they should cause processing difficulty. For each detour the listener must do something extra, and this ought to lead to extra processing time or to a feeling that the sentence was difficult to understand. For example, the second sentence in (1) seems intuitively to require extra time to understand in the context of the first sentence, and Sentence (2) seems to require extra effort as the initial sentence of a story. Unlike bridging and addition, however, restructuring occurs only when the listener perceives that there has been a breach of the given–new contract, not merely a violation of the maxim of antecedence. As with other breaches of the cooperative principle, the listener does not draw any particular implicature, but instead simply fails to see why the speaker said what he said or fails to understand the utterance at all. Thus, the sequence in Sentence (3) seems hard to understand not simply because it requires more processing effort, as do Sentences (1) and (2), but because it is awkward and shouldn't have been put that way. We would accuse the speaker of (3) of having made things unnecessarily hard for us, a judgment we would not apply to the speaker of Sentences (1) and (2).

The given–new contract and its associated given–new strategy, then, have direct empirical consequences, as illustrated in Sentences (1), (2), and (3).

Specifically, they imply (a) some sentences should induce implicatures that others do not, (b) some sentences should be judged as awkward or inappropriate in context where others should not, and (c) some sentences should take longer to comprehend than others. We will take up evidence for these and other consequences of the given–new contract first from a linguistic standpoint and then from a psychological standpoint. Taken together, the facts we will review make an excellent case for the contract and its associated processing strategy.

Before turning to this evidence, however, let us return to the given–new contract and see how it can be formulated more precisely. Earlier we noted that this contract should be viewed as part of the cooperative principle. It therefore consists of a maxim, the maxim of antecedence, plus some notion of what it means for the speaker to be cooperative even when he is not adhering strictly to the maxim. We might formulate this notion of cooperativeness in this way:

Given–New Contract: Try to construct the given and the new information of each utterance in context (a) so that the listener is able to compute from memory the unique antecedent that was intended for the given information, and (b) so that he will not already have the new information attached to that antecedent.

This contract is fulfilled in the most direct possible way when the speaker has adhered to the maxim of antecedence and the listener has a direct antecedent in memory for the given information. But the speaker does not have to provide given information with a direct antecedent, and then we see the importance of the following three requirements in the given–new contract:

1. *Appropriateness.* The given part of the sentence ought to convey known, or knowable, information, and the new part unknown information. The given–new distinction ought to be appropriate to the circumstances. Breaches of this part of the given–new contract may sometimes be elementary enough that the listener can rectify them by the process we called restructuring. In many instances, however, the listener will not be able to compute the intended interpretation of the utterance as it was meant to refer to real world objects and events.

2. *Uniqueness.* The given information provided by the speaker must enable the listener to compute an antecedent that is unique. If the listener finds two or more possible antecedents, he will be unable to decide which of them is the intended antecedent and communication will break down. As with breaches in appropriateness, breaches in uniqueness lead to judgments of unacceptability of the utterance in context.

3. *Computability.* The most fundamental requirement of all is that the listener must be assumed to have sufficient knowledge and skill to be able to *compute* the intended antecedent. When the maxim of antecedence is fulfilled,

TABLE 2
Violable and Inviolable Requirements in the Given–New Contract and the Consequences of Their Violations by the Speaker

A. Maxim of antecedence
   1. Violation by speaker: Allowed under special circumstances.
   2. Strategy of listener encountering violation:
      a. Bridging
      b. Addition
   3. Consequence of violation: Listener draws an implicature.

B. Appropriateness
   1. Violation by speaker: Not allowed
   2. Strategy of listener encountering violation: Restructuring
   3. Consequence of violation: Listener judges sentence awkward in context.

C. Uniqueness
   1. Violation by speaker: Not allowed
   2. Strategy of listener encountering violation: None
   3. Consequence of violation: Listener judges sentence unacceptable in context.

D. Computability
   1. Violation by speaker: Not allowed
   2. Strategy of listener encountering violation: None
   3. Consequence of violation: Listener judges sentence unacceptable or incomprehensible in context.

the given information will match information in memory directly, and computation will normally be trivial. But when it is violated, and, say, bridging is required, the speaker must be confident that the listener has the information from which he can build a bridge to the intended antecedent and that he has the skill to do so. Whether the intended antecedent is computable or not will depend on all sorts of factors – the listener's beliefs, his sophistication in computing bridges (which children, for example, may lack), and the gap to be bridged – and these must all be judged by the speaker.

For convenience we have summarized our argument in Table 2. This table lists the maxim of antecedence and the three major requirements of the given–new contract, and for each it specifies: (1) whether the speaker is allowed to violate the requirement or not; (2) what strategy the listener turns to when he encounters such a violation; and (3) what consequences the violation has on the way the listener reacts to or perceives the sentence.

LINGUISTIC EVIDENCE

In English assertions, the patterning of information into given and new is closely associated with focal stress (see Akmajian, 1973, Chafe, 1970; Chomsky, 1971; Halliday, 1967; Jackendoff, 1972). Most simple sentences that are spoken

with normal intonation have their focal stress – their strongest stress and highest pitch – on the final word in the sentence. So in *Olivia kissed Oscar* the focal stress falls on *Oscar*. There are many other constructions, however, that allow the speaker to place focal stress on something besides the final word, the logical object. The cleft construction *It was Olivia who kissed Oscar* has the function of placing focal stress on *Olivia*; the pseudocleft construction *What Olivia did was kiss Oscar* separates out the whole constituent *kiss Oscar* for focal stress; and the passive construction *Oscar was kissed by Olivia* brings the agent *Olivia*, normally without stress at the beginning of the sentence, into the final position where it receives focal stress. In addition, English allows the speaker to place *contrastive stress* on almost any element in the sentence, as in *OLIVIA kissed Oscar* or *Olivia KISSED Oscar*, and the stressed element automatically becomes the point of focal stress.[2] In short, the speaker, by availing himself of these and other similar devices, can place focal stress on almost any semantic element he wants.

The importance of focal stress is that it always falls on an element in the constituent that conveys new information. We can illustrate this rule with the sentence *It was Olivia who kissed Oscar.* Conceptually, the given information is found by replacing *Olivia*, the constituent containing the focal stress, by a variable *X*. This gives *X kissed Oscar.* The new information is then provided by the content of the replaced constituent *Olivia*, and that content is used to assign a value to the variable *X*. This gives *X = Olivia.* In this example the new information consisted of a single noun, but that needn't always be the case. The sentence *What Olivia did was kiss Oscar* has as new information a complete verb phase *X = kiss Oscar*; and the sentence *The BLOND woman kissed Oscar* has as new information only the modifier *X = blond.*

As a practical procedure, one can determine what is given and what is new for a particular assertion by finding the question it is an appropriate answer to.[3] *It was Olivia who kissed Oscar*, for example, is an appropriate answer to *Who kissed Oscar?* What is significant is that *Who kissed Oscar?*, the appropriate question, presupposes that someone kissed Oscar, *X kissed Oscar*, and that is the same as the given information in its proper answer. In effect, the question has as given *X kissed Oscar* and requests the listener to supply a value for that *X*. The answer has as given *X kissed Oscar* and supplies *X* with a value in the new information *X = Olivia.* In general, a question and its appropriate answer

[2] Contrastive stress differs from focal stress in its consequences on given and new. For one thing, the given information for contrastive stress carries with it a negative contrast not found in the given information for focal stress. For another, contrastive stress is usually accompanied by a secondary focal stress at the end of the sentence, and this in turn complicates the given–new structure (see Jackendoff, 1972, pp. 258–265). For present purposes we will ignore these complications, since they do not affect our basic argument.

[3] Hiż (1962) applied a similar procedure in his attempt to classify statements about knowledge. He asserted: "Knowledge can be classified according to what questions it answers." This may, however, be true only of the assertions used to convey such knowledge.

share given information, and the answer conveys new information in order to supply a value for the queried information.[4] In brief, to determine the given information for *It was Olivia who kissed Oscar,* replace the Wh- word in the question *Who kissed Oscar* with *X*; to determine the new information, find the value the answer assigns to that *X*.

By this procedure it is easy to see that some sentences divide into given and new in several alternative yet legitimate ways. The simple active sentence is perhaps the most flexible of all. *Olivia kissed Oscar,* pronounced with focal stress on *Oscar,* is an appropriate answer to (1) *Who did Olivia kiss?,* (2) *What did Olivia do?,* and (3) *What happened?* These three questions correspond to three different divisions of given and new: (1) *Olivia kissed X* and *X = Oscar*; (2) *Olivia did X* and *X = kiss Oscar*; (3) *X happened* and *X = Olivia kissed Oscar.* All three solutions, of course, are consistent with the idea that focal stress marks the constituent conveying the new information. The stressed word *Oscar* is simultaneously part of three different constituents: (1) the noun phrase *Oscar; (2) the* verb phrase *kissed Oscar*; and (3) the whole sentence *Olivia kissed Oscar.*

In most sentences definite noun phrases carry given information. In *The judge took a bribe,* it is given that there is an entity that is a judge and that is known to the listener. Such definite noun phrases may be modified by any number of adjectives or restrictive relative clauses, and these become part of the given information too. So in *The old judge that tried my brother George took a bribe,* it is given that the listener knows an entity that fits all the following characteristics: it is a judge, it is old for a judge, and it tried the speaker's brother George. When the listener searches for an antecedent to this noun phrase, he must find an entity that fits all of these characteristics simultaneously.

But this raises an apparent inconsistency in the definition of given and new. In earlier illustrations it appeared that definite noun phrases could occur as part of the new information, contrary to the fact that most definite noun phrases convey given information. Fortunately, this inconsistency is more apparent than real. Consider *It was the judge who took the bribe,* which was said to have the given information *X took the bribe* and the new information *X = the judge.* Here the new information appears to contain *the judge,* which should be given information. This, however, is not really the case. What is new in this sentence is not the judge himself, but the *identification* of the judge as the one taking the bribe. The new information is the relationship between the judge and the one taking the bribe, the equals sign in *X = the judge.* To be more precise, the given information should have been written as *X took the bribe and Y is the judge,* and the new information as *X = Y*. Nevertheless, we will continue to write given

[4] We are speaking here of direct, and not indirect, answers. For example, when asked "Who kissed Oscar?" one could say, "Well I just saw Olivia sneaking out of his room," conveying the answer indirectly (see R. Lakoff, 1973). Indirect answers like these, however, introduce information other than that which is called for in the question and are normally easy to distinguish from direct answers like "It was Olivia."

and new in the less precise form with the understanding that it can always be made precise.

Simple English sentences with normal intonation, as we said, have their focal stress at or near the end of the sentence. In general, therefore, given comes before new. Viewed according to the given–new strategy, this tendency in English makes good sense. Logically, Steps 1, 2, and 3 in the strategy must be carried out in this order. The listener has to identify the given information (Step 1) before he can find an antecedent for the given information (Step 2), and he must do this before he can attach the new information to the antecedent (Step 3). But the listener need not wait until the end of the sentence before identifying the given information (Step 1). As the sentence progresses, he can compute parts of the given information and begin searching for the intended antecedent. When given comes before new, therefore, he may have found the intended antecedent even before he hears the new information. When new comes before given, however, he has a problem. He must hold the new information in abeyance while he waits for the given information and searches for its antecedent. This increases the load on his memory and makes comprehension less than optimal. So the strategy applies most efficiently when given comes before new.

Because given generally comes before new, English sentences also tend to begin with definite noun phrases, delaying indefinite noun phrases until later in the sentence. It is easy to see why. An indefinite noun phrase, because it presupposes the listener does not yet know its referent, has to be part of the new information. So, for example, **It was Ned that a horse kicked* and **What a horse did was kick Ned* are unacceptable except perhaps as clarifications. Now consider simple active sentences with indefinite noun phrases. *Morris kissed a hussy,* with normal intonation, allows the new information to have narrow scope (*Who did Morris kiss?*), medium scope (*What did Morris do?*), or wide scope (*What happened?*). But *A hussy kissed Morris,* with the indefinite subject, allows only the wide scope (*What happened?*). The questions corresponding to the narrow scope (**Who did a hussy kiss?*) and medium scope (**What did a hussy do?*) reveal the impossibility of the two narrower interpretations. In passives, similarly, an initial indefinite noun phrase (*A hussy was kissed by Morris*) restricts the new information to wide scope (*What happened?*), and in passives, wide scope is particularly difficult to comprehend anyway. Thus sentences with indefinite subjects are particularly restricted in use and should not appear very often.

There is one final point to be raised. The given–new division in sentences appears to be a type of hierarchy, with given itself sometimes consisting of given′ + new′, given′ consisting of given″ + new″, and so on. The issue is complicated and not well understood, but we can provide a simple illustration of the phenomenon. Compare *The young woman who was beautiful left* and *The beautiful woman who was young left.* In both of these assertions it is given that there is a beautiful young woman, and it is new that she left. But when spoken normally, the two sentences appear to induce the listener to search for the

antecedent of the given information in two different ways. The first tells the listener that he should know of a set of beautiful women (given′) and that he should search this set for the one that is young (new′). The second, on the other hand, tells him that he should know of a set of young women (given′) and that he should search this set for the one that is beautiful (new′). It is as if the noun phrase *the young woman who was beautiful* itself has focal stress on the final word *beautiful* so that being beautiful is new′ relative to being young and being a woman. In this sense the noun phrase *the young woman who was beautiful* reflects its full sentence counterpart *The young woman was beautiful,* in which it is given that there is a young woman and it is new that she is beautiful, and does not reflect the noncorresponding sentence *The beautiful woman was young.* Such a hierarchy within the given information is most apparent in sentences with contrastive stress, where there are normally two identifiable points of stress in the sentence (see Jackendoff, 1972, p. 258). We conclude that the internal structure of the given information may lead the listener to search for its antecedent in one way and not another. This search strategy has an obvious analogy to the given–new strategy as a whole.[5]

Having outlined some of the principal properties of the linguistic distinction between given and new information, we now turn to three types of "linguistic" evidence for the given–new contract and its associated strategy – awkwardness, unacceptability, and implicature.

Awkwardness

As all good editors know, there are tight constraints on the sentences that can follow one another in good prose. An editor would observe, for example, that the sequence of two sentences in (3)

(3) Agnes saw somebody. It was Agnes who saw Maxine.

sounds awkward, inappropriate, wrong, and he would advise changing the second sentence to *It was Maxine that Agnes saw* or to something similar. Many judgments of awkwardness or inappropriateness follow directly from the given–new strategy. Such is the case with (3). In two-sentence sequences like this, the first sentence sets up a context, a set of propositions in memory. The second sentence is then interpreted relative to the first. It induces the listener to search for an antecedent to its given information in the propositions stored in memory from the first sentence. If the listener cannot find an appropriate antecedent without restructuring the second sentence, he will consider the speaker to have breached the given–new contract and judge the sequence to be awkward or

[5] New information may also consist hierarchically of given′ and new′ information. When asked *Who did you meet?* one could answer *I met a young woman who was beautiful* or *I met a beautiful woman who was young,* conveying two different patterns of new information to be stored. The difference between them is analogous to the difference between the corresponding sentences with definite noun phrases.

inappropriate. It should be noted that this judgment of (3) could not be made without Grice's maxim of relation. The listener expects each new sentence he hears to be relevant to what has come before. So because he cannot relate the two sentences in (3) without restructuring the second, he judges the sequence to be awkward.

The awkwardness of (3), therefore, is direct evidence for the given–new strategy. Indeed, it is easy to construct an indefinite number of awkward sequences along the same lines as (3). In (4) through (7), we have composed an *a* sequence that conforms to the given–new strategy and is therefore relatively good, and a *b* sequence that does not conform to the given–new strategy and is therefore relatively bad:

(4) a. Olivia kissed Oscar somehow. It was on the ear that Olivia kissed Oscar.
b. Someone kissed Oscar on the ear. It was on the ear that Olivia kissed Oscar.

(5) a. Olivia did something. What Olivia did was kiss Oscar.
b. Someone kissed Oscar. What Olivia did was kiss Oscar.

(6) a. Someone kissed Oscar. OLIVIA kissed Oscar.
b. Olivia kissed someone. OLIVIA kissed Oscar.

(7) a. Something happened. The mouse JUMPED.
b. Something jumped. The mouse JUMPED.

The *a* sequences are good because the first sentence provides a direct antecedent for the given information in the second. The *b* sequences are bad because the first sentence coincides partly with the given information and partly with the new information of the second.

We assume, more generally, that the listener applies the given–new strategy to every assertion he encounters. It follows that for every assertion with both given and new information – some sentences may convey only new information – we should be able to find a context in which it sounds good and at least one context in which it sounds awkward. Sequences (4) through (7) give evidence for four different constructions, and we claim that we could construct similar good and bad sequences for any other type of assertion.

The appropriateness of questions to their answers provides another sort of evidence for the given–new strategy. Consider the two question–answer sequences in (8):

(8) a. Who kissed Oscar? It was Olivia who kissed Oscar.
b. Whom did Olivia kiss? It was Olivia who kissed Oscar.

As we noted before, the question *Who kissed Oscar?* has as given information itself that someone kissed Oscar and it requests the identity of that someone. In applying the given–new strategy to its answer, the listener searches for an antecedent to *X kissed Oscar,* finds one in the given information of the question,

and attaches the new information *X = Olivia* to it. This strategy fails in the second sequence, for the question does not contain information that matches the given information of the answer *X kissed Oscar.* The listener is forced to restructure the answer, so he judges the sequence as awkward, as a breach of the given–new contract. Just as there are indefinitely many appropriate and inappropriate context-assertion sequences as in Sequences (4) through (7), there are indefinitely many appropriate and inappropriate question–answer pairs as in (8). For every assertion conveying both given and new information, we claim, there will be at least one appropriate question and at least one inappropriate one. We have found no exceptions. So this too constitutes direct evidence for the given–new strategy.

Linguistic intuitions of acceptability and appropriateness have always been a legitimate source of evidence for theories of linguistic competence. But they are also a potentially important source of evidence for theories of language processing. People come to their judgments of acceptability and appropriateness through a mental process that is part of comprehension. It is quite natural, then, for theories of comprehension to predict which sentences are acceptable and which are not, which sequences are appropriate and which are not. The theory of interest here, the given–new strategy, happens to make such predictions, and so we have appealed, quite legitimately, to judgments of appropriateness. The point is, a judgment of appropriateness is just as much psychological evidence as it is linguistic evidence.

Unacceptability

The given–new contract, it will be recalled, has three main requirements: appropriateness, uniqueness, and computability. So far we have dealt only with appropriateness. Given the first sentence in each sequence, was the given–new structure of the second appropriate to what the listener did and didn't know? When appropriateness was violated, the contract was breached, and the sequences were judged to be awkward or inappropriate.

The speaker can also violate the requirement of uniqueness, and then the listener will judge the utterance to be totally unacceptable. Consider the sequence in (9):

(9) Two men were watching the dog. The one watching it laughed out loud.

The second sentence here has as given information that some one person was watching the dog. But the first sentence provides two possible antecedents, the man_1 that was watching the dog and the man_2 that was watching the dog, and there is no clue to determine which man was actually intended. The listener using the given–new strategy has no means to resolve the ambiguity, and so he judges the speaker as having breached the given–new contract and judges the sequence as unacceptable. As this sequence illustrates, violations of uniqueness

strike the listener quite differently from violations of appropriateness. When an utterance is inappropriate, the listener can restructure the sentence to get around the blockage at Step 2 in the strategy. But when an utterance violates uniqueness, he has no way to get around the blockage. He is stuck. So while he judges violations of appropriateness as merely awkward, he judged violations of uniqueness as downright unacceptable. For most violations of uniqueness, it takes very little for the speaker to put the sequence right. All he need do in (9), for example, is provide some indication of a difference between the two men, as in (10):

(10) Two men were watching the dog. The tall one watching it laughed out loud.

The addition of *tall* is just enough to enable the listener to find a unique antecedent, for of the two men, one must be tall relative to the other.

There are many ways of finding a unique antecedent, even when there appear to be several possible antecedents. Very often the listener can use syntactic information to eliminate unintended Antecedents. Consider (11):

(11) John and Bill looked at each other. Suddenly, John hit him.

Him is part of the given information in the second sentence and requires an antecedent. On syntactic grounds alone the antecedent could not be John, for if it were, the pronoun would have to be reflexive. By elimination, the antecedent must be Bill. (The process of elimination, however, requires processing time, as we will discover later.) Or the elimination can be based on semantic considerations. Consider the three sentences in (12):

(12) a. The car rolled toward the telephone pole, and it got damaged.
b. The car rolled toward the telephone pole, and it hit it.
c. The car rolled toward the telephone pole, and it stopped it.

The first uses of *it* in the second clauses of (12) each require an antecedent. In (12a) there are two possible antecedents, and the ambiguity cannot be resolved, leaving the sequence unacceptable.[6] In (12b), however, the first *it* must refer to something that is movable, and so the antecedent is taken to be the car, not the telephone pole. In (12c) the second *it* must refer to something that is movable, and so its antecedent is the car, and the antecedent to the first *it* is the telephone pole. Since the antecedents in (12b) and (12c) can be chosen uniquely, the sequences are acceptable, though they may take time to figure out.

Finally, sequences can be judged unacceptable because they violate the requirement of computability. These violations arise when the listener does not have the information necessary for computing the intended antecedent. For

[6] Many will find (12a) to be acceptable for a superficial syntactic reason. When there is no other way to discover the antecedent to a pronoun, listeners are very likely to pick out the superficial subject of the sentence.

instance, we find the sequence in (13) unacceptable because it lacks a unique antecedent for *he:*

(13) John and Bill entered the room. Suddenly he ran over to the plate on the floor and licked up all the dog food on it.

But if the speaker knew that the listener knew that John was a man and Bill was his dog, then he could be confident that the listener would be able to compute the intended Antecedent for *he,* namely, Bill. Other sequences are unacceptable because the listener cannot find a plausible bridge from the given information to the previous knowledge. Consider (14):

(14) There was a full moon again on March 15. This time it was Maxine that Max killed.

But if the speaker was certain the listener knew that Max was a werewolf and that werewolves always kill at full moons, then he could be confident that the listener would be able to build the intended bridge between the first and second sentences. At full moon werewolves always kill and it was Maxine that Max killed on this occasion. Note that the speaker can fulfill the given–new contract by relying on information known only to the listener and himself. It matters little whether or not people not part of the conversation can compute the intended antecedents.

Implicature

Perhaps the most significant, yet the most complicated, linguistic evidence for the given–new strategy is to be found in the implicatures the listener is induced to draw in comprehending certain sentences in context. Consider the cleft sentence *It was Olivia who kissed Oscar* in (15) and (16):

(15) Someone kissed Oscar. It was Olivia who kissed him.
(16) Oscar had lipstick on his cheek. It was Olivia who kissed him.

In (15) the first sentence (*someone kissed Oscar*) provides the listener with a direct antecedent for the given information of the second sentence (*someone kissed Oscar*). The speaker has adhered to the maxim of antecedence, and the given–new strategy applies without difficulty. In (16), however, the speaker has not adhered to the maxim of antecedence, and the listener is induced to draw an implicature. To apply the given–new strategy successfully, the listener must assume that Oscar had lipstick on his cheek *because someone kissed him* and that the speaker meant him to add this assumption. This assumption constitutes an implicature. The fact that we automatically draw this implicature is evidence that we are applying the given–new strategy in comprehending the second sentences in (15) and (16).

Every assertion with both given and new information, we claim, can be provided with a context in which the listener will be induced to draw an implicature. Since there are indefinitely many assertions, there are indefinitely many instances that support this claim. We will have to be satisfied with a few simple examples:

(17) a. George went to the party last night. It was Samantha who had invited him.
b. The rat died on the spot. What it had done was nibble on the rat poison.
c. Jake noticed two people. The woman was sitting.
d. I consulted my doctor the other day. She said I was fine.
e. The major of Deadeye is a Republican. Her HUSBAND is honest TOO.
f. Jake called Jess a Democrat. The insult made her bristle.
g. Jake called Jess a Democrat. Then SHE insulted HIM.

Most of the implicatures in these examples are obvious. In (17a) the implicature is that George went to the party because someone had invited him. In (17b) it is that the rat had done something that led to its demise. In (17c) it is that only one of the two people was a women – the other could have been a man, a child, or someone else not identifiable as "a woman." In (17d) one implicature is that the speaker's doctor is female. In (17e) the implicature is that the speaker believes all Republicans are honest. In (17f) and (17g) the prominent implicature is that the speaker considers being called a Democrat an insult. Examples (17e) and (17g) have been discussed extensively by G. Lakoff (1971).

As these examples suggest, implicatures are often the very stuff of the message. The reason is clear. In practice speakers do not always adhere to the maxim of antecedence. If they took the effort to spell out all direct antecedents, conversations would become a tedious business, and sentences would begin to sound very repetitious. More commonly, the speaker leaves gaping holes between his sentences that he expects the listener to fill in with the intended implicatures. Indeed, he can count on most listeners to do this swiftly and unerringly, so he can make his contribution brief and efficient. The holes he leaves, however, cannot be too large or he will be violating the computability requirement. It is difficult, for example, to imagine how the ordinary listener would build a bridge between the two sentences in (18):

(18) George Washington was the father of our country. It was Olivia who kissed Oscar.

What does someone's kissing Oscar have to do with George Washington being the father of our country? The unacceptability of this sequence, we argue, follows from the inability to build a bridge, to find an implicature that would connect the second sentence to the first.

The implicatures a listener may draw to connect an assertion with previous knowledge are in no way determinate. Different listeners will build different bridges. Consider the sequence in (19):

(19) Mavis liked Marvin very much. What he did was give her a diamond brooch.

The given information, that Marvin did something, may induce one of two implicatures – (1) that he did what he did *so that* she would like him or (2) that he did what he did *because* she liked him. Both implicatures make sense, and there may be other alternatives. The skillful speaker, of course, will avoid such ambiguities by anticipating the alternatives and finding some way of narrowing them down to one. Under the strictest interpretation of the computability requirement, the ambiguity in (19) is a breach of the given–new contract. The listener, with two plausible alternative implicatures, has no way of computing which one the speaker intended.

The bridges the listener *could* build to connect a sentence and its previous context are theoretically infinite in number. In (19), for example, one could draw the implicature that Marvin did what he did to please Mavis's mother, to infuriate Mavis's sister, to pay off Mavis's debts, or to effect something else, and it was that that made Mavis like him. There are endless ways of building bridges. Yet most listeners hearing a sequence of sentences will settle on one of a small number of possible bridges. If this were not so the speaker could never count on the listener drawing the implicature he intended, and implicatures would be of no use. What this suggests is that the listener goes about finding the intended bridge in an orderly way. He follows a set strategy he holds in common with other speakers of English. Our guess is that his main goal is to find the most direct bridge to the previous context, assuming no more than he need assume. Other than that, we have no firm suggestions as to how the listener selects one bridge over another. The question remains to be studied with more care.

PSYCHOLOGICAL EVIDENCE

As linguistic evidence for the given–new strategy, we have looked at the awkwardness of some sequences, the unacceptability of others, and the implicatures drawn in still others. The psychological evidence we now turn to comes mainly from measurements of processing time. For the most part we will be concerned with instances where people take longer to comprehend certain sequences than others. Reaction time is a very sensitive measure of processing difficulties, for it can detect mental operations that require only a few hundredths of a second to perform. For this reason we can use decision latencies to test rather subtle predictions of the given–new strategy.

Definite Descriptions

In a recent study (Haviland & Clark, 1974) we examined the time it took people to comprehend sentences containing definite noun phrases. Consider *The beer was warm*, which takes as given that there is a specific quantity of beer and requires the listener to find such a quantity before he can incorporate into memory the new information that that quantity of beer was warm. This sentence appears in the two sequences in (20), each consisting of a "context sentence" followed by a "target sentence":

(20) a. Horace got some beer out of the car. The beer was warm.
b. Horace got some picnic supplies out of the car. The beer was warm.

In (20a) the context sentence directly establishes the existence of a quantity of beer, so the listener has a direct antecedent for the given information of the target sentence. In Sequence (20b), on the other hand, there is no direct antecedent in the context sentence, and so the listener must build a bridge. He must draw the implicature that the picnic supplies contain a quantity of beer, and it is that quantity that is being referred to by the given information of the target sentence. Since drawing this implicature presumably takes time, the listener should take longer to comprehend the target sentence *The beer was warm* in Sequence (20b) than in Sequence (20a).

To test this prediction we constructed 68 context–target sequences on the pattern of Sequences (20a) and (20b). The sequences came in pairs such that the same target sentence occurred with one context sentence to form a direct antecedent sequence and with another context sentence to form an indrect antecedent sequence. The subjects saw one sequence per pair according to the following procedure. Upon pressing a button, the subject was presented with the context sentence in typed form in a tachistoscope. As soon as he felt he understood it, he pressed the button again, the context sentence disappeared, and the target sentence appeared. As soon as he felt he understood the target sentence, he pressed a second button and the target sentence disappeared. We recorded the time the subject spent looking at the target sentence, the time between the second and third button presses. We assumed that this measure of how long it took the subject to feel subjectively that he understood the target sentence would reflect not only the computation of the propositional content of the sentence, but also Steps 2 and 3 of the given–new strategy, the finding of an antecedent and the integration of the new information in memory. In a carefully counterbalanced design, each subject saw half direct antecedent sequences and half indirect antecedent sequences, but never the same target sentence twice.

The comprehension times, averaged over all 68 sequences and over 16 subjects, were as follows:

Direct antecedent condition:	835 msec
Indirect antecedent condition:	1016 msec

The times were clearly as predicted. The target sentences took around 180 msec longer to comprehend in the indirect antecedent sequences, where bridging was required, than in the direct antecedent sequences, where no bridging was required. This 180 msec difference was highly reliable by the appropriate statistical tests. It is important to note that both (20a) and (20b) are perfectly acceptable sequences, as were all of the direct and indirect antecedent sequences we constructed. The 180 msec difference between them, then, has to be attributed to the difference in normal processing required for the target sentence in these two types of sequences.

But we were not completely happy with this experiment. In the direct antecedent sequences, the word *beer* in the target sentence was preceded by the word *beer* in the context sentence, whereas in the indirect antecedent sequences, it was not. The direct antecedent sequences may have been easier simply because of the repetition of the word *beer*, perhaps making the second instance of *beer* easier to comprehend. To rule out a simple repetition explanation, we therefore constructed new indirect antecedent sequences as illustrated here in Sequence (21b):

(21) a. Horace got some beer out of the trunk. The beer was warm.
b. Horace was especially fond of beer. The beer was warm.

Now both the direct antecedent sequence (21a) and the new indirect antecedent sequence (21b) contain the critical word *beer* in the context sentence. But there is a critical difference between the two. In (21a), the context sentence posits the existence of an individual quantity of beer. In (21b), the context sentence does not, and because it does not, there is no immediate antecedent for *the beer* to be found in the context sentence. The reader attempting to comprehend the target sentence (21b) must therefore resort to bridging, and comprehension time for indirect antecedent sequences should still be longer than comprehension time for direct antecedent sequences. Indeed, in a repetition of the previous experiment using these new indirect antecedent sequences we found the following comprehension times for target sentences:

Direct antecedent sequence:	1031 msec
Indirect antecedent sequence:	1168 msec

The indirect antecedent condition took about 140 msec longer, supporting the given–new strategy and ruling out repetition as the sole explanation for the comprehension times observed in the first experiment.

The Adverbs *too, either, again,* and *still*

To demonstrate the generality of these findings, we performed a third experiment in which we constructed similar sequences for target sentences containing

the adverbs *too, either, again,* and *still.* Consider the following sentences:

(22) a. Elizabeth is here too.
b. Elizabeth isn't here either.
c. Elizabeth is here again.
d. Elizabeth is still here.

The first, Sentence (22a), presupposes that there is someone else who is here; (22b) presupposes that there is someone else who is not here; Sentence (22c) presupposes that Elizabeth was here before; and Sentence (22d) presupposes that Elizabeth has been here for a while. In given–new terms, these presuppositions constitute the given information, and the assertions, *sans* adverb, contain the new information. For each of the four adverbs, then, we constructed sequences such as (23):

(23) a. Last Christmas Larry became absolutely smashed. This Christmas he got drunk again.
b. Last Christmas Larry went to a lot of parties. This Christmas he got drunk again.
c. Last Christmas Larry couldn't stay sober. This Christmas he got drunk again.

The sequence (23a) is a direct antecedent sequence. An antecedent for the given information of the target sentence is provided directly by the context sentence. The sequence in (23b) is an indirect antecedent sequence, for it requires bridging from the context sentence to the intended antecedent. And (23c) is a new type of sequence, which we dubbed *negative antecedent.* These were constructed so that the context sentence contained the negative equivalent of the intended antecedent of the target sentence. The expression *couldn't stay sober* implies *got drunk.* To find an antecedent for the target sentence, therefore, the reader must make this inference, bridging the gap between the context sentence and the intended antecedent. This bridging should take time, making the target sentence take relatively longer to comprehend. In short, the reader should comprehend the target sentence in the direct antecedent sequence relatively quickly and the target sentences in the other two sequences more slowly, since the latter both require bridging.

We constructed a large number of sequences for each adverb, again designed so that each target sentence appeared once in each type of sequence, and we presented them to 27 subjects. The comprehension times were as follows:

Direct antecedent sequence:	1323 msec
Indirect antecedent sequence:	1397 msec
Negative antecedent sequence:	1388 msec

The difference between the first and the second two, though smaller than in the previous experiments, was highly reliable and consistent with our predictions. So again we find support for the given–new strategy.

Cleft and Pseudocleft Sentences

One piece of psychological evidence for the given–new contract is found in the recent work by Hornby (1974) on the verification of cleft and pseudocleft sentences. What he did was read his subjects a sentence and, one second later, present them with a very brief (50 msec) glimpse of a picture and ask them to say whether the sentence was true or false of the picture. The glimpse of the picture was so brief that subjects could not take in all the details of the picture and so they made errors in their verifications. Hornby centered his attention on those sentences that were "false" of the pictures (he had included both true and false sentences) and asked the following question: What is the given and new structure of the sentences that led to the most errors?

The given–new contract leads to straightforward predictions about the errors Hornby's subjects should make. Consider one of Hornby's sentences:

(24) It is the boy who is petting the cat.

According to the given–new contract, asking whether (24) is true or false is equivalent to asking whether or not the new information is veridical relative to the intended antecedent of the given information. The reason is this, the listener, believing that the speaker is adhering to the given–new contract, automatically assumes he can compute a unique antecedent to the given information. But there is nothing in the contract to lead him to any comparable assumptions about the veridicality of the new information. The speaker, for example, can provide false new information, violating the maxim of quality and inducing an implicature, still without breaching the cooperative principle. What the listener assumes is to be judged, then, is the new information: Is it veridical for the intended antecedent? In this respect verification is akin to questioning and negation (see Akmajian, 1973; Chomsky, 1971; Jackendoff, 1972). Judging Sentence (24) as true or false is equivalent to answering yes or no to the question *Is it the boy who is petting the cat?* Here the answer is expected to affirm or deny the new information relative to the intended antecedent. And judging Sentence (24) as false is equivalent to asserting the negative of (24). The speaker of the negative sentence *It isn't the boy who is petting the cat,* for example, is denying the new information relative to the intended antecedent of the given information and nothing else. Thus, like questioning and negation, verification leaves the given information of a sentence untouched.

Hornby used two types of "false" sentences, as illustrated in (25) for a picture of a girl petting a cat:

(25) a. It is the boy who is petting the cat.
b. It is the girl who is petting the dog.

Sentence (25a) is genuinely false in a cooperative context. The new information, that the entity petting the cat is the boy, is not correct. Sentence (25b), on the other hand, violates the terms of the given–new contract. The listener will not

be able to find an antecedent that fits the description *X is petting the dog.* We will therefore call (25a) a false sentence and (25b) an uncooperative one. Now subjects had to judge all sentences as true or false. But because they had only a limited time to examine the picture, they had to select which details they would look for and which details they would skip over. Assuming cooperation, they would be expected to check on the new information and ignore details concerning the exact veridicality of the given information. Hence they should be better at detecting the misrepresentation in the false sentences than in the uncooperative ones.

Hornby confirmed this prediction, which he too had made in a parallel line of reasoning. Using a balanced selection of cleft and pseudocleft sentences with both agents and objects in the clefted position, he found the following percentages of failures to detect the misrepresentation:

False sentences:	39%
Uncooperative sentences:	72%

So it was critical whether the misrepresentation in the sentence constituted falsity or uncooperativeness.

Technically speaking, Hornby stacked the cards against any other result by explicitly asking the subjects to judge the sentences as true or false. The false sentences naturally had the edge over the uncooperative sentences. But could Hornby have instructed his subjects to treat the misrepresentations of falsity and uncooperativeness equally? We doubt it. As Horn (1972) and others have argued, English has only very clumsy and indirect devices for qualifying presuppositions, although it has quite simple and direct devices for denying asserted information – new information. More than that, there is no easy way to explain the notion of an uncooperative misrepresentation to subjects, and even if there were, we doubt that they could resist the temptation to assume, as usual, that the speaker was adhering to the given–new contract. We guess that Hornby's findings would have arisen to some degree no matter how carefully the subjects were instructed about the two types of misrepresentations.

In a second experiment Hornby compared the six different types of sentences illustrated in (26):

(26) a. The girl is petting the cat.
b. The cat is being petted by the girl.
c. It is the girl who is petting the cat.
d. It is the girl whom the cat is being petted by.
e. The one who is petting the cat is the girl.
f. The one whom the cat is being petted by is the girl.

Hornby presented each sentence followed by a verifying or falsifying picture, just as in the previous experiment, but this time the "false" sentences were all of the uncooperative kind. He found that the six types of sentences varied in how

often subjects failed to detect the misrepresentations in them:

Active:	26%
Passive:	68%
Cleft active:	51%
Cleft passive:	80%
Pseudocleft active:	74%
Pseudocleft passive:	92%

Briefly, subjects were most accurate on the simple sentences, less accurate on the cleft constructions, and least accurate on the pseudocleft constructions; in addition, subjects were more accurate on active than passive constructions whether alone, in cleft constructions, or in pseudocleft constructions.

This variation arose, according to Hornby, because some sentences mark given and new information "more strongly or clearly" than others.[7] In particular, new information is more strongly marked when it appears in passive *by*-phrases, when it appears near the end of the sentence, and when it appears to the right of a copula. These three factors place the six types of sentences in just the order Hornby found. But what does it mean to say that given or new information is more strongly or clearly marked in some sentences than in others? For any sentence on any one interpretation, one portion of the content is given and one portion is new, and there is no gradient possible in this dichotomy.

Hornby's findings, we argue, may reflect the following two factors: (1) the alternative given–new patterns permited for a particular sentence; and (2) the hierarchy of given′ and new′ found within the given information of the sentence. The first factor is straightforward. The simple sentences (26a) and (26b) each have three alternative given–new patterns; (26a), for example, answers the questions *What is the girl petting?*, *What is the girl doing?*, and *What is happening?* If subjects had formed the broadest of these patterns (the third one), they would have searched both the girl and the dog in the picture and would have been quite accurate in detecting the error. Indeed, the broad pattern is more probable for active than for passive constructions, implying that actives should be more accurate than passives. The cleft and pseudocleft sentences (26c) through (26f), on the other hand, allow only one rather narrow pattern of given

[7] Unfortunately, Hornby used all uncooperative and no false sentences in this second experiment, and this procedure clouds the interpretation of his results. It is well known that passive sentences, for example, are often more difficult to verify against pictures than actives (Gough, 1965, 1966; Slobin, 1966). If this is so for Hornby's sentences, (26b) may elicit more detection failures not because passives mark given and new information more strongly than actives, but because passives are generally more difficult than actives. It would have been more appropriate to compare each uncooperative sentence in (26) to a false sentence with the same syntactic structure. Then the strength of the given–new "marking" would be given by the difference between the paired uncooperative and false sentences. With this caution, however, we will assume with Hornby that the sentences are ordered for strength of marking just as he reported.

and new. That pattern would lead subjects in each instance to ignore the parts of the picture corresponding to the given information, hence they would have been less accurate in detecting the error. Hornby's data are in agreement with these predictions.

The second factor that may be involved is the hierarchy of given and new within each sentence. Consider (26c). Its given information is manifested on the surface as *that is petting the cat*, which has an internal intonation pattern with "secondary" focal stress on *cat*. Thus, *X = the cat* is new′ information relative to the given′ information that someone was petting something. By similar reasoning, the new′ information in (26d) is *X = petting*. Now if the listener were to check the new′ information in the picture before the given′ information, as he does new before given, he would be more likely to check for the cat given (26c), and more likely to check for the petting given (26d). As a consequence, he would detect the error actually there more often in (26c) than in (26d). The analogous argument can be made for the pseudocleft sentences (26e) and (26f). Hornby's findings are in agreement with these predictions as well.[8]

The two factors just noted provide an account not only for Hornby's data but also for the intuition that some sentences mark given and new information more "strongly" or "clearly" than others. According to our tentative account, this intuition comes about because some sentences have a structure that allows only narrow patterns of given and new and because some sentences have a well-defined secondary pattern of given′ and new′ within the given information. We stress, however, that this account is tentative. It needs much more investigation.

Personal Pronouns

The personal pronouns *he* and *she* almost always contain given information. On encountering such a pronoun the listener must compute its intended antecedent, and this normally requires a search through memory. In English, however, pronominalization is made even more complicated by the fact that the intended antecedent can sometimes follow the pronoun instead of preceding it. Step 2 in the given–new strategy, therefore, is a rather complicated process, and it is of interest to know exactly how it works. Frederick Springston, in his dissertation research at Stanford University, has examined just this problem, and his findings shed much light on the computation of antecedents in general. We will present one of his findings in detail, and then his general conclusions about the process.

Springston's technique for studying the computation of antecedents was as follows. His subjects were first presented with a sentence containing a pronoun. As soon as they understood it, they pressed a button, and this sentence was

[8] This analysis, it should be noted, also predicts that subjects are more likely to detect misrepresentation in the action – say, the girl was lifting, instead of petting, the cat – for (26d) than for (26c) and also more likely for (26f) than for (26e). Hornby did not include misrepresentations of this sort.

immediately replaced by a second sentence, and this second sentence was to be judged true or false as quickly as possible. A sample sequence is shown in (27):

(27) a. Bill said that Sally nominated him.
b. The person nominated was Sally.

In his experiments, Springston measured the time for the comprehension of the first and second sentences separately, but for purposes of analysis, he used the sum of these two latencies (for true instances only) as a measure of how difficult it was to compute the antecedent of *him*. Then, by comparing various types of pronominal constructions, he was able to make some inferences about the strategies subjects were using to determine antecedents.

Springston first showed that the reader is faster at computing the antecedents for reflexive pronouns (*himself, herself*) than for simple pronouns (*him, her*). Consider the following two sentences:

(28) a. John said that Bill shot himself.
b. John said that Bill shot him.

The reflexive *himself*, in Sentence (28a), can only have a noun phrase within the same clause as its antecedent, and so the listener can compute it immediately as *Bill*. But for the *him* in Sentence (28b), according to Springston's predictions, the reader will first try a noun in the same clause (*Bill*) as a possible antecedent, find it prohibited for syntactic reasons, and only then try a noun in the next higher sentence (*John*), which in this case can serve as the antecedent. Obviously, this extra processing should take longer, and Springston's data show that it does. According to Springston, the reader generally tries for antecedents in the same clause first and then moves backwards, even when syntactic constraints would seem to make a search of the same clause unnecessary, as in (28b).

To give this notion further support, Springston added gender to these sentences, as illustrated in (29) and (30):

(29) a. John said that Mary shot herself.
b. Sally said that Mary shot herself.
(30) a. John said that Mary shot him.
b. John said that Bill shot him.

If the reader searches for the antecedent from the current clause backward, then gender alone ought to help him rule out *Mary* as an antecedent for *him* in Sentence (30a), but it will not help him rule out *Bill* as an antecedent for *him* in Sentence (30b). In contrast, gender should make little or no difference to finding the antecedent for *herself* in (29), since the reader never searches for an antecedent outside of the same clause. Indeed, although Springston's subjects were a little faster on Sentence (29a) than on (29b), they were very much faster on Sentence (30a) than on (30b), where gender was predicted to make a

difference. So these results further confirm the notion that the search for antecedents of nonreflexive pronouns begins in the same clause and goes backwards.

Working from a large number of experiments such as these, Springston drew the following general conclusions. First, the reader (and presumably the listener too) searches for antecedents to reflexive pronouns in the same clause and terminates his search on finding the antecedent. To find the antecedent for *himself* in Sentence (28a), the listener need only search the clause *Bill shot himself* and stop on finding *Bill*. Second, the listener searches for possible antecedents for simple pronouns exhaustively, and he determines his choice of an antecedent by the process of elimination. In (28b) he checks both *Bill* and *John* as possible antecedents for *him* and eventually eliminates *Bill* on syntactic grounds. Third, in eliminating candidate antecedents, the listener examines them from the current clause backwards. In Sentence (28b) he checks *Bill* out first and then *John*. Fourth, the listener is able to eliminate candidate antecedents as impossible faster the more syntactic and semantic criteria he has for rejecting them. In (30a) the reader is able to eliminate *Mary* as an antecedent to *him* very quickly because *Mary* is impossible on grounds of *both* syntax *and* gender. Springston demonstrated this phenomenon for a variety of semantic criteria, some of them very subtle. And fifth, the reader has more difficulty finding the intended antecedent when it is in a clause that follows the pronoun or a clause that is dominated by the clause containing the pronoun. Thus it takes longer to find the antecedent to *him* in Sentence (31b) than in (31a):

(31) a. John said that Mary shot him.
b. Mary shot him is what John said.

And this difference in search time is over and above any difference that might be attributed to the fact that Sentence (31b) is more difficult to understand than (31a) even without pronouns.

Springston's study points to an important direction of investigation: How does the listener go about searching memory for the intended antecedents to given information? If Springston is right, the listener considers some candidate antecedents before others, eliminates them on syntactic and semantic grounds wherever possible, and settles on the candidate antecedent that cannot be eliminated. But this characterization is far from complete. It cannot handle antecedents not directly derivable from prior sentences, and it provides no rule to say when to search further for a direct antecedent or when to draw an implicature for an indirect antecedent. Furthermore, Chafe (1973, 1974) has recently argued that "consciousness" seems crucial to this process, for the speaker must assume that certain antecedents are in the listener's consciousness, not just his memory structure, at the time of utterance. The question of search strategies deserves further investigation.

Wh- Questions

The given–new strategy was designed to account for an important aspect of the comprehension of assertions. Primarily meant to inform, assertions contain given and new information, and the new information is meant to be integrated into memory. But what about other types of speech acts – questions, commands, promises, bets – that are not primarily meant to inform? To handle these, the strategy must be modified, but only slightly. We will examine how it might be changed to handle Wh- questions. How it might be modified to handle other speech acts should become obvious by this examination.

Whereas assertions add information to the listener's memory, questions are meant to elicit information from his memory. But just as assertions indicate the address where the new information is to be added, questions indicate the address from which the wanted information is to be extracted. So questions have given information, but in place of new information they have wanted information. *Who ate my cookies?* has as given that someone ate the speaker's cookies, and it indicates that the speaker wants to know who that someone is. For convenience, we can simply extend the term new information to cover this wanted information, and the resulting analysis is as follows:

(33) a. Who ate my cookies?
b. Given: X ate my (the speaker's) cookies.
c. New: X = Who?

By such an analysis there is in principle a way for Step 1 to divide each question into given and new information, as required. The Wh-word conveys the new information, and the rest of the sentence conveys the given information.

The heart of the revision of the given–new strategy for questions is in Step 3. At Step 1, the listener divides the sentence into given and new, as before. And at Step 2, the listener searches for and finds in memory an antecedent that matches the given information of the question. But at Step 3, the listener must inspect the information attached to the antecedent and use it as the basis for constructing an answer to the question. For *Who ate my cookies?*, the listener would find the antecedent proposition E_{19} *ate the speaker's cookies* in memory, determine that E_{19} was Elmer, and compose the appropriate answer, *The person who ate your cookies was Elmer, It was Elmer,* or, simply, *Elmer.* The point is, the given–new strategy is almost the same for questions as for assertions. It is Step 3 that appears to change with the speech act.

Characterized this way the given–new strategy leads to interesting predictions about the time it takes the listener to answer questions in various contexts. The psychological literature is full of studies in which people were timed as they answered questions. To illustrate how the given–new strategy would apply to them, we will present only one of these studies, Smith and McMahon (1970),

and that one only in simplified form. Essentially, what Smith and McMahon did was present their subjects with context–target pairs such as the following:

(33) a. John is preceding Dick. Who is ahead?
b. Dick is following John. Who is ahead?

The question *Who is ahead?* has as given information *X is ahead of Y* and as new information *X = who?* At Step 2, therefore, the listener has to search for an antecedent to *X is ahead of Y.* The context sentence of (33a) does not convey such information directly, but it does so indirectly. *John is preceding Dick* itself implies the proposition *John is ahead of Dick,* and once drawn, this implication can serve as a direct antecedent for the given information of the question. The context sentence of (33b), however, does not directly imply the right proposition. *Dick is following John* implies *Dick is behind John,* not *John is ahead of Dick.* So to find a matching antecedent for *Who is ahead?,* the listener must draw the further inference that in this context *Dick is behind John* itself implies *John is ahead of Dick.* Such an extra inference should of course take extra time. So questions in sequences like (33b) should take longer to answer than those in sequences like (33a).

Smith and McMahon's answer latencies bear out these predictions. Subjects were able to answer *Who is ahead?* faster than *Who is behind?* for the following context sentences, all of which directly imply *John is ahead of Dick:*

(34) a. John is preceding Dick.
b. John is leading Dick.
c. Dick is preceded by John.
d. Dick is led by John.

Yet they were able to answer *Who is behind?* faster than *Who is ahead?* for the following sentences, all of which directly imply *Dick is behind John:*

(35) a. Dick is following John.
b. Dick is trailing John.
c. John is followed by Dick.
d. John is trailed by Dick.

The difference between the two questions averaged about 300 msec.

In other experiments, psychologists have used questions that contained comparatives, such as *Which is taller/shorter/deeper/shallower?* (Clark, Carpenter, & Just, 1973); superlatives such as *Who is best/worst?* (Clark, 1969); actives and passives, such as *Who did John hit?* and *Who was hit by John?* (Olson, 1972; Wright, 1969); temporals, such as *What happened first/second?* (Smith & McMahon, 1970); and locatives, such as *Where is John?* (Clark, 1972). In each case, the results fit the predictions of the given–new strategy very nicely (see Clark, 1974).

VIOLATIONS OF THE MAXIM AND BREACHES OF THE CONTRACT

As all this evidence demonstrates, the listener relies heavily on the speaker's adherence to the given–new contract. Nevertheless, both the maxim of antecedence and the contract itself are often broken, and, depending on the circumstances, these violations have different consequences. We will distinguish three classes of violation – negligent, covert, and explicit. *Negligent violations* arise from unwitting negligence or misjudgment on the part of the speaker. He constructs sentences without proper regard for what he believes the listener does and does not know, or else he simply misjudges what the listener does and does not know. *Covert violations* are deliberate distortions of given and new for the purpose of deception. Here the speaker realizes he is violating the contract and does not want the listener to realize he is doing so. *Explicit violations* again are deliberate, but they are meant to be noted by the listener as an integral part of his interpretation of the sentence. We noted earlier that explicit violations will always be of the maxim of antecedence, never of the requirements of appropriateness, uniqueness, or computability. On the other hand, negligent and covert violations can be of any aspect of the given–new contract. Explicit violations will be used by the listener in arriving at the intended interpretation of the sentence; negligent and covert violations will normally result in a breakdown in communication. We will examine the consequences of negligent, covert, and explicit violations in turn.

Negligent Violations

As ought to be expected, negligent violations result in comprehension difficulties. Through no fault of his own, the listener has trouble finding the intended antecedent, or even any antecedent, and so he is slowed down in comprehension. Often he finds the wrong antecedent and completely misinterprets the sentence, a fact he discovers only later when his interpretation breaks down. Sometimes he finds more than one antecedent with no way of deciding among them. Or he may have to restructure what is given and what is new before he can find a place for the information in memory. Indeed, these consequences are among those we have examined in the sections on linguistic and psychological evidence.

The negligence of the speaker can be, simply, in not informing the listener about the topic of conversation. This is illustrated by a paragraph used by Bransford and Johnson (1973) in a study of comprehension and memory. They presented their subjects with the following paragraph:

> The procedure is actually quite simple. First you arrange things into different groups. Of course, one pile may be sufficient depending on how much there is to do. If you have to go somewhere else due to lack of facilities, that is the next step, otherwise you are pretty well set. It is important not to overdo things. That is, it is better to do too few things at once than too many. In the short run this may not seem important but complications can easily arise. A mistake can be expensive as well. At first the whole procedure will seem complicated. Soon, however, it will become just another facet of life. It is difficult to foresee any end to the necessity for this task in the immediate future, but then one can never tell. After the procedure is completed one arranges the materials into different groups again. Then they can be put into their proper places. Eventually they will be used once more and the whole cycle will then have to be repeated. However, that is a part of life. (p. 400)

As presented here, this paragraph is almost impossible to understand, and Bransford and Johnson's subjects judged it to be hard to understand and had great difficulty in remembering it. The reason is, of course, that there is no clue as to what the paragraph is about. But everything falls neatly into place for the reader told ahead of time that the paragraph is about washing clothes. When Bransford and Johnson's subjects were given this topic beforehand, they rated the paragraph as quite comprehensible, as we would expect, and they could remember significantly more of it.

But why is the topic so important? Apparently, it is the topic that enables the listener to compute the intended antecedents of each sentence in the paragraph. In the first sentence it is given that there is a procedure of some kind. But without knowing that the paragraph is about washing clothes, the reader has no way of computing what kind of procedure was intended. By the process of addition, he merely adds an antecedent reading "there is a procedure," which is not very helpful. Likewise, he needs to know in the second sentence what things are to be arranged, and in the third, what one pile is sufficient for and how much of *what* there is to do. Yet without the topic, he has no means for computing the intended antecedents.

The same point is illustrated in a memory study reported by Bransford and McCarrell (1975). They gave their subjects sentences and, later, gave them the first noun phrase in each sentence as a prompt for them to recall the rest of the sentence. The sentences were of two kinds, as illustrated here:

(36) a. The office was cool because the windows were closed.
b. The haystack was important because the cloth ripped.

The first was considered easy, since it was easy to understand. The second was considered hard, since it didn't make much sense by itself. To no one's surprise, when given the prompt *the office*, the subjects had little difficulty recalling Sentence (36a), but when given the prompt *the haystack*, they had great difficulty recalling Sentence (36b). But there was an added touch. Some subjects were provided with a different one-word prompt at both the time of presentation and the time of recall, a word that was meant to place the sentence in context. For Sentence (36a) the prompt was *air-conditioning*, and for Sentence (36b) the prompt was *parachutist*. Under these circumstances, the easy and hard sentences were equally easy to recall.

What is going on here? Sentence (36a), it could be argued, is easy because the listener can compute the intended antecedents for the given information in that sentence. *The office* refers to a specific office, and *the windows*, to the windows of that office. Given these antecedents, it is easy to make sense of the two propositions and their relation, especially as we know that offices usually have air-conditioning and that air-conditioning works most efficiently with the windows closed. Sentence (36b) is quite another matter. It is highly unlikely that anyone would figure out from the sentence alone that the appropriate antecedent for *the cloth* was the canopy of a parachute. For this reason it is difficult to make sense of the two propositions and their relation. Once the intended antecedent is made clear by the prompt word *parachutist* then Sentence (36b) becomes as easy to understand as Sentence (36a). The problem with sentences like (36b) only arises because the listener does not have enough information to compute the intended antecedents. Indeed, this seems to be one of the commonest forms of negligent violation. The speaker assumes the listener can bridge certain gaps when in actuality the listener lacks the information that would enable him to do so.

Covert Violations

Covert violations of the given–new contract are meant to deceive. For example, the speaker may construct sentences in which the given information contains something that is not actually true. He knows that the listener must set up in memory an antecedent for this given information and, in so doing, add false information to his set of facts. This way the speaker may communicate false information without asserting it, and the listener may not realize exactly what's happening. Consider the two questions in (37):

(37) a. Did you write this letter?
b. Do you admit to writing this letter?

The first question merely asks whether the addressee wrote the letter. The second, however, is a leading question. It has as additional given information the notion that writing the letter was bad. If the addressee answers "Yes," meaning "Yes, I wrote the letter," then he has been tricked into acknowledging the truth of the given information as well. If the addressee says "No," he is only denying the new information, and he is still in agreement with the idea that writing the letter was bad. This may be enough of a deception to serve the speaker's ends. If the addressee happens to have written the letter but wants to correct the given information, he is forced into a complex answer, something like "Sure I wrote it. What's wrong with that?" At the very least, any person listening to this interchange will have accepted for one short moment at least the fact that writing the letter was bad, and this may influence his later acceptance of corrective information. Covert violations like this, therefore, can be used to add

new but false information, relabel already known information, plant the germ of an alternative explanation for a fact, or build up prior resistance to a fact. In the hands of a clever pratitioner, such covert violations can be very effective.

A recent study by Loftus and Zanni (1975) demonstrates just how easy it is to use this device for deception.What they did was show subjects a short movie of a car accident and then ask the subjects a variety of questions about the accident. Among these questions were several that violated the given–new contract. For example, half the subjects were asked (38a) and half (38b):

(38) a. Did you see a broken headlight?
b. Did you see the broken headlight?

In truth, the movie showed no broken headlight, and so (38b) violates the given–new contract (as well as the maxim of quality) since the given information is that there was a broken headlight. The subjects were required to choose one of three answers: "yes," "no," and "I don't know."

What should happen here? The subjects responding to (38a) must implicitly ask themselves two questions: (a) was there a broken headlight? and (b) if there was, did I see it? Only if they can answer "yes" to Question (a) can they ask themselves Question (b), and once asked Question (b), they should be fairly certain of their answer. But the accident happened so fast that these subjects could not even be certain of Question (a), and so they should respond "I don't know" a good proportion of the time. In fact, they responded "I don't know" 38% of the time. In contrast, the subjects responding to (38b) do not have to answer Question (a), since for them the answer is "yes." The given information in (38b) forced them to assume that there was a broken headlight, and they have already set up in memory an antecedent corresponding to this fact. so these subjects are only concerned with question (b), and can be fairly certain about their answer. As expected, these subjects responded "I don't know" only 12% of the time (compared to 38% of the time for the other subjects). Further, if they were committed to its existence, they should be more likely to think they saw the broken headlight, for after all, it was there. And there were in fact more "yes" responses for (38b) than for (38a), 17% as compared with 7%. By a covert violation of the given–new contract, these subjects were essentially tricked into committing themselves to the existence of a broken headlight. This in turn changed their criterion for how much objective evidence they needed to say "yes," "no," and "I don't know."

Explicit Violations

In Grice's scheme, explicit violations of the maxims within the cooperative principle are designed to induce the listener to draw implicatures. Earlier we noted that someone might say *It's such a lovely day today* even though he knew his audience was aware of the fact that there was a violent storm raging

outside. In violating the maxim of quality explicitly, he meant to inform his audience not about the weather itself – the literal interpretation of what he said – but rather about how he felt about the known weather. Explicit violations of other maxims induce other implicatures. We have noted in particular that the speaker can violate the maxim of antecedence and, by so doing, convey something in addition to what the sentence says literally.

What is the nature of the implicatures induced by violations of the maxim of antecedence? Consider the sequence in (39):

(39) A friend of mine has met both Nixon and Agnew. I have met several crooks in my time too.

The speaker of (39), though he has not said so outright, has conveyed the additional information that he believes both Nixon and Agnew are crooks. In bridging from the first sentence to the second, the listener is led to draw this implicature. But the speaker has done more than that. He has, in effect, used the given–new contract to imply that he believes the listener also assumes that Nixon and Agnew are crooks. The given–new contract requires the speaker to be certain that the listener can compute the bridge from the first sentence to the second, and in this instance, it requires the listener to know that Nixon and Agnew are crooks. By pretending that the listener already knows this, the speaker implies that he and the listener hold this belief in common (though this may not be the case). So this implicature is quite unlike the informing assertion "Nixon and Agnew are crooks," but more akin to the force of "We agree, of course, that Nixon and Agnew are crooks." The implicature, then, can be much more effective than the bald assertion because it is not explicit and because it presupposes common belief. Its effect can also be one of surprise or humor when the implicature required is something unexpected.

A related violation is to introduce new information by means of definite noun phrases or restrictive relative clauses. Consider the following sentence:

(40) Bill slipped me a bottle of gin, but the idiot told my wife about it.

The phrase *the idiot* could just as well have been *he*, but by the additional content, it leads the listener to realize that the speaker believes Bill to be an idiot. The mechanism works in the same way as the hidden presupposition example in (39). The effect is again one of implying a common judgment.

There is one particular time when many modern writers explicitly violate the maxim of antecedence, and that is at the beginning of novels or stories. To adhere to the maxim, a writer should always posit the existence of a character, an object, or an event before he talks about it as if it were known to the reader. But modern writers often do not do this. It is instructive to compare, for example, the initial sentences from an old folk tale, *Die zwölf Brüder*, as set down by the Brothers Grimm early in the nineteenth century, with those from

William Faulkner's *The Sound and the Fury*, a twentieth-century novel:

(41) Es war einmal ein König und eine Königin, die lebten in Frieden miteinander und hatten zwölf Kinder, das waren aber lauter Buben. [Once upon a time there was a king and a queen. They lived together peacefully and had twelve children, all of whom were boys.]

(42) Through the fence, between the curling flower spaces, I can see them hitting. They were coming toward where the flag was and I went along the fence.

The purpose of (41) is obviously to introduce the characters that inhabit the story. It marks the beginning of the tale. The purpose of (42), in contrast, is to make the reader think he is stepping into an ongoing story, exactly the effect Faulkner managed to produce. To understand (42) the reader must set up antecedents for each piece of given information and then wait for more complete information. The effect is to make the reader ask, which fence? what spaces? who are "they"? what flag? and so on. The questions produce suspense and an impression of impending action. Stories that begin this way may be difficult to understand at first. Yet the clever writer can introduce just enough information to make the beginning comprehensible, while leaving out just enough to keep up the drama of ongoing tale. The device, nevertheless, is an explicit violation of the maxim of antecedence, since the writer and reader are both aware that the reader cannot really compute the intended antecedents.

The implicature the reader of (42) will draw, therefore, is this. Although he does not know the antecedents he is supposed to know yet, he must accept them as fact; and the reason he does not know them as fact is because he has stepped into the middle of the telling of a story. This type of implicature is not that uncommon. We go through similar reasoning whenever we overhear an utterance addressed to someone else. Since the speaker has not designed his utterance with us in mind, he may have provided given information for which we can compute no antecedents. As surreptitious listeners, we must be content with setting up antecedents by the Step 2 detour we called addition and hope that their true nature will become clear later. Indeed, this is just the class of situations writers exploit when they introduce the reader to the middle of a story. They begin as if the story were being told to someone else and the reader were merely an uninvolved onlooker.

CONCLUSIONS

What we have argued here is that certain processes in comprehension are a consequence of an implicit agreement we all have about conversations. We all assume people are cooperative in their conversations, and in particular we

assume they adhere to the given–new contract. By this agreement, speakers attempt to judge what their listeners do and do not know, and they construct their sentences accordingly. They do not deliberately try to deceive their listeners by violating the contract, though they may introduce specific violations of an aspect of it, the maxim of antecedence, in order to convey novel information in a novel way. Listeners rely on the given–new strategy to interpret sentences. When told something, they compute what is given and what is new in the utterance, search memory for an antecedent of the given information, and then add the new information to memory. By relying on this strategy, the listener will draw implicatures for certain sentences, judge others to be awkward or unacceptable in context, and take longer to comprehend those that induce implicatures. All the evidence available so far appears to support these notions.

But the approach taken here may have even broader implications for a theory of comprehension. As Grice (1957) and Searle (1970) have emphasized, a listener trying to understand a sentence does more than determine its propositional or locutionary content. His fundamental goal, rather, is to try to figure out what the speaker intended him to understand by the sentence, and this may require all sorts of inferences. The detailed strategies the listener applies to syntax, semantics, and even phonology may well be geared to these higher-level considerations of interpretation. These strategies should perhaps be thought of as devices in service of these higher goals, rather than as independent devices in their own right. In its essentials, that is the basic idea of the given–new strategy. It is a device that exists because the listener wants to integrate new information into what he already knows, and the device can work only because of an abstract agreement between speaker and listener, the given–new contract. But certainly much more of comprehension is in service of such higher-order goals.

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REFERENCES

Akmajian, A. The role of focus in the interpretation of anaphoric expressions. In S. R. Anderson & P. Kiparsky (Eds.), *A Festshrift for Morris Halle.* New York: Holt, Rinehart, & Winston, 1973.

Bransford, J. D., & Johnson, M. K. Considerations of some problems of comprehension. In W. G. Chase (Ed.), *Visual information processing.* New York: Academic Press, 1973.

Bransford, J. D., & McCarrell, N. S. A sketch of a cognitive approach to comprehension. In D. Palermo & W. Weimer (Eds.), *Cognition and the symbolic processes.* Washington, D.C.: Winston, 1975.

Chafe, W. L. *Meaning and the structure of language.* Chicago, Illinois: University of Chicago Press, 1970.

Chafe, W. L. Language and memory. *Language,* 1973, 49, 261–281.

Chafe, W. L. Language and consciousness. *Language,* 1974, 50, 111–133.

Chomsky, N. Deep structure, surface structure, and semantic interpretation. In L. A. Jakobovits & D. Steinberg (Eds.), *Semantics: An interdisciplinary reading in philosophy, psychology, linguistics, and anthropology.* Cambridge, England: Cambridge University Press, 1971.

Clark, H. H. Linguistic processes in dedutive reasoning. *Psychological Review,* 1969, 76, 387–404.

Clark, H. H., Difficulties people have in answering the question "Where is it?" *Journal of Verbal Learning and Verbal Behavior,* 1972, 11, 265–277.

Clark, H. H. Semantics and comprehension. In T. A. Sebeok (Ed.), *Current Trends in Linguistics.* Vol. 12: *Linguistics and Adjacent Arts and Sciences.* The Hague: Mouton, 1974.

Clark, H. H., Carpenter, P. A., & Just, M. A. On the meeting of semantics and perception. In W. G. Chase (Ed.), *Visual information processing.* New York: Academic Press, 1973.

Clark, H. H. & Haviland, S. E. Psychological processes as linguistic explanation. In D. Cohen (Ed.), *Explaining linguistic phenomena.* Washington, D.C.: Winston, 1974.

Fillmore, C. J. Verbs of judging: An exercise in semantic description. In C. J. Fillmore & D. T. Langendoen (Eds.), *Studies in Linguistic Semantics.* New York: Holt, Rinehart, & Winston, 1971.

Gough, P. B. Grammatical transformations and speed of understanding. *Journal of Verbal Learning and Verbal Behavior,* 1965, 5, 107–111.

Gough, P. B. The verification of sentences: the effects of delay of evidence and sentence length. *Journal of Verbal Learning and Verbal Behavior,* 1966, 5, 492–496.

Grice, H. P. Meaning. *Philosophical Review,* 1957, 64, 377–388.

Grice, H. P. Logic and conversation. William James Lectures, Harvard University, 1967, unpublished. Lecture 2 published in P. Cole & J. L. Morgan (Eds.), *Studies in syntax, Vol. III.* New York: Seminar Press, 1975.

Halliday, M. A. K. Notes on transitivity and theme in English: II. *Journal of Linguistics,* 1967, 3, 199–244.

Haviland, S. E., & Clark, H. H. What's new? Acquiring new information as a process in comprehension. *Journal of Verbal Learning and Verbal Behavior,* 1974, 13.

Hiż, H. Questions and answers. *Journal of Philosophy,* 1962, 59, 253–265.

Horn, L. *On the semantic properties of logical operators in English.* Unpublished doctoral dissertation, UCLA, 1972.

Hornby, P. A. Surface structure and presupposition. *Journal of Verbal Learning and Verbal Behavior,* 1974, 13, 530–538.

Jackendoff, R. S. *Semantic interpretation in generative grammar.* Cambridge, Massachusetts: MIT Press, 1972.

Lakoff, G. The role of deduction in grammar. In C. J. Fillmore & D. T. Langendoen (Eds.), *Studies in linguistic semantics.* New York: Holt, Rinehart, & Winston, 1971.

Lakoff, R. Questionable answers and answerable questions. In B. Kachru, R. B. Lees, Y. Malkiel, & S. Saporta (Eds.), *Papers in Linguistics in Honor of Henry and Renee Kahane.* Urbana, Illinois: University of Illinois Press, 1973.

Loftus, E. F., & Zanni, G. Eyewitness testimony: The influence of the wording of a question. *Bulletin of the Psychonomic Society*, 1975, 5, 86–88.

Olson, D. R. Language use for communicating, instructing, and thinking. In R. O. Freedle & J. B. Carroll (Eds.), *Language comprehension and the acquisition of knowledge*. Washington, D.C.: Winston, 1972.

Searle, J. R. *Speech acts: An essay in the philosophy of language*. Cambridge, England: Cambridge University Press, 1970.

Slobin, D. I. Grammatical transformations and sentence comprehension in childhood and adulthood. *Journal of Verbal Learning and Verbal Behavior*, 1966, 5, 219–227.

Smith, K. H., & McMahon, L. E. Understanding order information in sentences: Some recent work at Bell Laboratories. In G. Flores d'Arcais & W. J. M. Levelt (Eds.), *Advances in psycholinguistics*. Amsterdam: North-Holland, 1970.

Wright, P. Transformations and the understanding of sentences. *Language and Speech*, 1969, 12, 156–166.