The contribution of linguistics to language understanding

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THE PROBLEM

In each of the several disciplines loosely collected under the heading "cognitive science," there are researchers hard at work trying to understand the mysterious process by which people communicate with each other in their languages. An open question in such efforts is whether linguistics has anything to contribute to this project. To put it differently, in studying language-understanding, we find ourselves asking the paradoxical question of whether it helps to know anything about language itself. The question that gets asked is:

- in understanding a piece of language,
- to what extent do interpreters make use of what they know about language as such,
- in contrast with such things as
- their experiences with the physical and institutional world surrounding them, and
- common-sense reasoning founded on such experience?

In the opinion of some workers in language-oriented artificial intelligence, the actual linguistic material in a text does no more than pick out those facts or properties of the world on the basis of which language-independent inferencing processes do their work. The usual locution is that the word "accesses" knowledge structures associated with things and event types in our experience. The "labels" provided by the words in our language guide us to our memories of the "things" in our world, and from there we rely on various sorts of inference strategies to figure out what people are trying to tell us when they talk.

In a famous debate with Ivan Sag, Roger Schank once estimated the role of syntax in language understanding to be roughly one percent of the whole. The syntactic structuring of the words in a sentence, a caricature of Schank would say, might reveal certain gross relationships among the words in the sentence—at the level of helping us figure out such things as who did what and to whom—but in a great many cases we could get along perfectly well without such information. By far the greatest part of understanding a sentence, this argument would go, consists of doing commonsense reasoning based on our knowledge of the things and situations we have just been reminded of, and on our assumptions about why the creator of the message we have just encountered might want us to do or to believe.
One of my purposes today is to give evidence that the contribution of purely linguistic knowledge might be more than one percent.¹ I want to do this by displaying a range of language-interpretation phenomena which cannot be derived from anything other than the conventions of language, and which clearly participate in the activities of language understanding.

In taking this position, I am not merely being loyal to my guild. There are a great many professional linguists who would be quite content for linguistics as a pure science to have nothing at all to say about how language texts are understood by people. Whatever this latter inquiry is, it should probably be dealt with by the "applied" branch of some stepchild of linguistics, such as pragmatics or discourse analysis, or by the natural-language division of artificial intelligence. It seems to me, however, that a great many of the lexical and grammatical resources in a language are best described in terms of the manner in which they shape, in expression and comprehension, the conceptual structures that organize linguistic messages.

A Preliminary Example

I would like to precede the presentation of my evidence by conceding that the linguistic structure of a sentence does indeed "vastly underdetermines" (as the phrase goes) its creator's intended message. I will do this by following you through a normal interpretation of a single short sentence in English. As we work through this first example, it will become clear that, while the contribution of pure linguistics is surely more than one percent, it is certainly not close to 100 percent.

I ask you to imagine that you have overheard a particular English sentence, and that you have decided to treat this sentence as a kind of problem to be solved. The job you have taken on, as a linguistic detective, is to trace out the reasoning you go through in order to acquire an understanding of 1) the situation represented by the sentence and 2) the situation which gave rise to somebody producing the sentence. The sentence you overheard is this one:

The defendant had indeed forged the will.

To give me the advantage of being able to refer to the speaker and the interpreter of the sentence as "I" and "you", and thus to avoid familiar and troublesome problems associated with English third-person pronouns, let us accept the conceit that I am the one who produced the sentence. Let us assume, furthermore, that you know nothing about the context in which my sentence was produced, and that you have forgotten anything you might have noticed about prosodic aspects of its delivery: your detective work has to depend entirely on what you know about these particular words and anything you can figure out about the grammatical structures in which they participate.

In carrying out this exercise, you will need to bring together several different kinds of

¹Schank spoke only of syntax in the discussion just mentioned, but the tone of the argument could easily be taken as covering linguistic knowledge in general.
knowledge. The results of your work will be a set of beliefs about what had to be true of the world represented by the text, along with certain suspicions about what might have been true, together with some assumptions about the setting within which I produced the sentence. Let us refer to the situation description that results from such an exercise as your “envisionment” of the text—some coherent “image” of, or set of possible descriptions of, some state of affairs which is compatible with the language of the text.

With a sentence as short as this, such an envisionment can be achieved without too much difficulty. With any normal long text, however, the appropriate envisionment would have to have a “dynamic” or “historical” aspect. That is, a complete interpretation of a large text cannot be simply a description of what has to exist in a world for which what the text says is true, but it has to include indicators of how an interpreter, experiencing the text in time, could be induced to engage particular expectations at particular points in the text, to have those expectations fulfilled or thwarted, to sense openings and closings of purposeful discourse activities represented by the text, and so on. Our sentence, however, is short and simple, and the task of constructing its envisionment will not present you with any such descriptive complexities.

You find in this sentence three content words: defendant, forge, and will. The envisionment that you ultimately derive from this sentence will depend a great deal on what you already know about the meanings and uses of these three words.

**Defendant.** The word defendant names a person who occupies a particular role in a criminal proceeding. He—or she— is the person who has been officially charged with a crime, and who can be referred to with this label only in connection with such a charge. To have a deep understanding of this word, you have to know about court trials, you have to be able to imagine the expectations and interests of a person accused of a crime in a court trial, and, more generally, you have to possess at some level an abstract schema of the workings of the criminal justice system in the culture of speakers of American English.

**The defendant.** As a general part of knowing English, you know that if a person is referred to by a definite noun phrase—notice the word the—whose head noun designates a “role”—as does our word defendant— it must be the case that in the foreground of the envisioned “world of the text” we have the kind of setting in which that role is defined, and we can assume that the person identified with the role name occupies that role within that setting. Thus you have the right to assume that when I spoke this sentence, my addressee and I were at that moment both thinking about a specific situation in which someone was officially accused of a crime.

By the time you reach the second word in our sentence you are already able to make a number of fairly detailed conclusions on the history of the situation which it depicts:

1. the person I referred to by the noun-phrase the defendant was accused of a crime,
2. the accusation has led to a criminal trial,
3. the trial was “a part of history” when I spoke the sentence: that is, it was in progress, or had at least been scheduled, or it may have already ended.

**Will.** The other noun in our sentence, will, belongs in a schema of estate inheritance, and that in turn links with what you know about death and about property ownership. A will is
a document which specifies the conditions under which a person's possessions will be distributed after that person's death. When a living person wants to decide who is to own his or her property after he or she dies, a will is the legal instrument by which, within a wider system of the operation of the law, such decisions can be put on record.

Since a will is an important document, and since it is possible that persons named in a will can receive benefit from its provisions, it is important to know whether a document that appears to be a will is authentic—that it is the actual will which was created for and signed by the owner of the property to be distributed, and hence that it faithfully represents that person's intentions. These considerations lead you naturally to a consideration of the third content word, the verb forge.

Forge. This word, in the sense it must have in this context, fits into the notion of authenticity, just mentioned. To understand it, you need to know the difference between reality and appearance, especially in connection with certain crafted objects, including legal documents. Forging, in this context, is a process by which something which is not authentic is made to appear authentic. Forging differs from, say, artistic re-creation, in the sense that the result of a forgery is intended to deceive.

A part of what you know about what the world is like is that false claims of authenticity often bring advantages to the person making such a claim. Forged currency can be spent, if the forgery is not detected; a successfully forged license allows privileges to accrue wrongly to its possessor. A forged will, if it is cleverly done, can bring undeserved wealth to its creator. A part of your understanding of forging a will is based on what you know about human nature: you can imagine the motives a person might have for attempting this kind of deception.

The sentence contains two noun-phrases, identifying two objects, and it has a verb which represents a relation between them. You know, as a part of knowing English, that forge is a transitive verb with the forger (the agent) represented as its subject and the artefact (the patient) represented as its object. It may not have been necessary for you to know those facts, however, since you also know, about the activity of forging, that people do the forging and that documents are among the things that can be forged. If the grammatical organization of the words in the sentence had not told you which was which, you could have figured it out anyway—this is the Schankian argument—as long as you were given the information that all of these elements were part of a single clause.

So far, in the envisionment of the scene you have been able to construct from my sentence, you find a person accused of a crime described as having falsified a will. All of this is justified by a superficial interpretation of the words of the sentence, and it is supported by the nature of the grammatical relations they hold with each other. Some natural, but not necessary, intrusions into your envisionment of this text might be the assumptions: that the defendant forged the will in such a way as to benefit himself; that the person whose property is the subject of the will is now dead; and that the act of forging the will was in fact the crime for which the defendant was involved in a legal proceeding. (By using the word himself, in creating the conclusions I imagine you to have made, I have allowed you—based on folk knowledge of crime statistics—to assume that the person I had in mind in my sentence was male.)
These most recent embellishments are not necessary parts of the envisionment of that particular text: the sentence could be literally true of a situation in which those details did not appear. But since no communicator has the time to give you all of the details of what you are intended to understand, you have formed the habit of adding such details freely: and so has everybody else.

Indeed. Our sentence was “The defendant had indeed forged the will.” It happens that there is nothing about the presence of the word indeed that has any effect on the envisionment you form of the situation represented by the sentence. But by the inclusion of that word my sentence has given you a reason to believe that at the point at which I spoke it there was some reason, on the part of my addressee, to doubt that the will in question had been forged by the defendant. One of my purposes in constructing the sentence in the way that I did was to impress upon my addressee that such doubts must be abandoned. The word indeed acknowledges, and proposes an end to, that assumed doubt.

This time you are not reasoning about the information that my sentence directly expressed, but about the function of a signal that I included in my sentence which made you wonder why I needed to be emphatic at this point in my discourse. The envisionment you are now constructing is that of a scene external to the text, a scene in which the text itself, and the individuals involved in its production, are among the elements.

The. Since both of the noun phrases in my sentence have definite articles, these facts about the text’s form require you to believe that the person and the object known as the defendant and the will had to be a part of the conversation participants’ current envisionment of the ongoing text, allowing each of the referents to be uniquely identified by this simple description. Their presence leads you to conclude that what we have here is a mid-text sentence. The discourse schema which provides for definiteness of noun phrases fits a text that is already in progress, and does not fit a situation in which the things being referred to are just now being introduced into the growing envisionment of the text.2 The sentence you overheard, in other words, could not represent the beginning of an interaction between me and my addressee.

Had forged. There is more to say about the “mid-text” character of my sentence. The verbal expression in it is the pluperfect form had forged, and that requires you to believe that my sentence was a part of a narrative in which a particular past time point had been established. At this point in the conversation I was trying to introduce something in the “history” of the narrative which preceded the “current” narrative time point. Put differently, with this sentence I was not “advancing the narrative”: instead I was asking my addressee to hold in mind a recently established temporal reference point, while introducing an event or situation which is anterior to that point.

The interpretations you are building up by taking these things into account involve connection between aspects of the world represented by the text and the world containing the text. “The world represented by the text” includes the defendant and the will and all the other people and props that had to be involved in the legal proceedings and their

2There are exceptions to the generalization given here about the definite article, e.g., the well-known cases of “the sun”, “the president”, “the flag”, etc.
history. The people in “the world containing the text” included me and whoever I was
talking to, and that world also contains my intentions and motives, my knowledge of what
my interlocutors already know or expect, and so on.

Now, how much of what you did involve knowledge of language? Once we agree that
words are sometimes simply pointers to situation types, or to elements seen as figuring in
situation types—that is, once we go along with the idea that words are names of frames
with “slots”, or are the names of fillers of frame slots—we can minimize the “linguistic”
importance of such words. A very large part of the envisionment you achieved followed
from very basic assumptions about how the named entities could coherently be part of a
single scene. The purely linguistic elements were the functions of 1) the definite article
and 2) the pluperfect tense—both of which are features of English discourse pragmatics;
and 3) the rhetorical effect of the word indeed. These were all contributions made by the
language, not derivable from knowledge about language-independent facts. But we might
easily be made to agree that, while these discourse-structuring aspects of communication
are important, an overwhelming case for the importance, in the process, of language
knowledge has not yet been made. I have not yet given you many reasons for increasing
language’s contribution to language comprehension much above Roger Schank’s one
percent.

And Now, “LANGUAGE”

Workers in artificial intelligence who appear to favor the elimination of linguistic
concerns in language-understanding research seem to have views that can be described in
the following way.

First, they assume 1) that the words in a language name concepts which are more
or less directly linked to “things” in the world—including objects and event
types, and objects seen as playing roles in particular event types—and 2) that to a
very large extent the process of understanding a text involves bringing into play
what we know about those things that are indicated by the words in the text. In our
recent example, we had the three content words, and for lots of purposes that
 seemed to be enough.

Second, they assume 1) that syntactic rules, and the principles of compositional
semantics based on structures built up on such rules, comprise the linguists’ main
independent contribution to theories of language understanding, and 2) that these
 contributions are of little value. In our case, we noted the transitivity of “forge”
and the compositional semantic instructions on how to match the grammatical
 elements in the sentence’s syntactic structure with the “slot-filling” elements of
the underlying schemata. In this particular case, as was pointed out, we might
indeed have solved our problem without that information.

A view which I hope to defend opposes these assumptions. Words are not just names of
concepts, and syntax is not just a set of rules. Words and grammatical patterns represent
combinations of syntactic, semantic, and pragmatic information, sometimes standing for
conceptual categories of considerable complexity, whose contributions to the-comprehension process is not a function of information we have about real-world objects.

I would now like to offer some examples of cases where knowledge about language, going beyond giving you the names of things, participates essentially in the interpretation process.

Lexical Examples

My first examples are lexical. I include these to make it obvious that words are not always names of things on the basis of knowledge about which reasoning can proceed. I will identify a number of words that bring along with them certain kinds of cognitive structuring or situating of the things that they "name". The examples are not new, but they present clearly the point I wish to make.

Coast, Shore. The English words coast and shore have in common the notion that they "name" a sort of border between land and water, but they do so in slightly different ways. The word coast names the border of a major land mass, whereas the word shore names the border area of a water mass. These understandings are not based on knowledge that we have about what it is like for water to meet land, but on the schematizations just stated. On the basis of such schematizations, we know that a sentence like "The trip took 3 hours from shore to shore" was a trip across water, and that a sentence like "The trip took 3 hours from coast to coast" was a trip across land. The point is that the interpretation we give is not based on knowledge of the things, but on schematizations accompanying their names.^[3]

Land, Ground, Earth. The next words—or rather phrases—come in pairs, each pair creating a paradigmatic opposition that is to be understood within a particular schematization of experience. The pairs are on land / at sea, on the ground / in the air, and on earth / in heaven. When any of these expressions is used, it communicates both the location designated and a denial of the paradigmatic opposite. Thus, a sentence like "Pat spent only a short time on land" is generally taken as referring to a brief period in Pat's life which constituted an interruption of a sea journey; when we hear a sentence like "Pat spent only a short time on the ground" we find it easy to believe that after this period Pat resumed flight, perhaps by re-boarding an airplane or balloon. And the sentence "Pat spent only a short time on earth" means that Pat died young. The interpretations we are forced by these examples to construct are dictated by the schematic background motivating the contrasting oppositions, not at all by what we know about the "facts" in question.

A Little Bit of Grammar

The linguist frequently notes relationships between meanings and the combinatorial


^[4]The facts are a bit more complicated than was suggested here, but the contrasting examples bear out the main point.
properties of words. I can illustrate this by referring to two senses of the English verb give and the meaning of the verb contribute.

These two verbs have very similar predicate argument structures, in the sense that they both are three-argument predicates in which the arguments sort themselves out as the Giver (Agent), the Gift (Patient or Theme), and the Receiver (Goal). The verb contribute, however, differs from give both semantically and in subtle properties of its "combinatorics." Semantically, it adds to the simple notion of ‘giving’ the idea that there are multiple givers for a single recipient. Syntactically, unlike give, it allows its non-Agent arguments to be omitted, with specific interpretations assigned to their omissibility.\(^5\)

In describing a situation involving a gift between lovers, we could hear "I gave a rose to my beloved", but neither "*I gave to my beloved" nor "*I gave a rose." But in describing a situation involving a contribution to a social service agency, we could hear any of these: "I contributed ten dollars to the Red Cross", "I contributed ten dollars", "I contributed to the Red Cross", or even "I contributed" (more naturally, something like "I already contributed"). For the contribute sentences, the omission of the Theme indicates only that the speaker has chosen to leave the nature or quantity of the gift unspecified; but omission of the Goal is possible only in a context in which the speaker takes it for granted that the addressee remembers, from the conversational context, what agency is the recipient of the gift.

The subtleties here include the fact that the mid-text character of a sentence with contribute is recognized by the absence of one (the Goal) of its two omissible arguments.

Now it happens that there is a metonymic use of give, i.e., a use where it can convey the meaning associated with contribute, and in that use, give shares the same omissibility properties of contribute. Thus we could hear "I gave ten dollars to the Red Cross", "I gave ten dollars", "I gave to the Red Cross", and "I gave" ("I already gave"), with exactly the same interpretations given to the omissions as before.

There is a generalization to notice here linking a semantic structure with a fairly subtle set of semantic notions, but it is not possible to see the interpreting native speakers automatically do, on hearing give with one or more of its arguments "missing", as inferable from what we know about acts of giving, but rather from the form/mapping associations just illustrated.

The Semantics of Prepositions

Sometimes we find that those paradigm cases of grammatical words called prepositions create particular image schemata which we have to co-interpret with the meanings of the words which accompany them, resulting in sometimes quite surprising combinations. A central meaning of over can be expressed as "in a position, or on a path, perpendicular to a salient surface of the landmark,"\(^6\) whereas above can be defined as "vertically higher than the landmark."


\(^6\)Following Ronald Langacker (1986), we refer to the object designated by the object of a locative preposition as "the landmark".
The meanings do not create different images when "the salient surface" is some portion of, or some object on, the earth's surface. "The helicopter hovered above the playground" and "The helicopter hovered over the playground" both express the same relationship between the helicopter and the playground. But in the following two sentences, we are asked to carry out quite different assignments: "Hang the poster over the spot on the wall" and "Hang the poster above the spot on the wall." When we carry out the second instruction, we do not cover the spot; in carrying out the first instruction, we might believe, in fact, that our assignment is specifically to conceal the spot on the wall.

In a quite informal experiment I once did, I asked students to assume that a sheet of paper was a mask. In response to the instruction "Hold the mask over your face" the mask was held vertically in front of the face. In response to "Hold the mask over your head" the mask was held flat on top of the head. In response to "Hold the mask above your head" the mask was held vertically (presumably with the "face" part facing forward) above the students' head. But students found the instructions "Hold the mask above your face" puzzling, and those who knew what to do tilted their heads back and held the mask, parallel to the newly oriented "face", above that face.

The activities on the part of the people carrying out these instructions were guided by the need to "unify" the meaning of the preposition with the particular semantic organization of the world by which a particular surface on the human body is described as a face. There is obviously no way in which we can account for the different responses to these different instructions as involving reasoning from what people know about masks and faces!

Tense and Time

There is a great deal to say about the compatibility of the tense and aspect features signalled by a simple or complex verbal form and temporal or aspectual adverbs. It seems to me that all judgments about such compatibility possibilities represent styles of reasoning that go clearly beyond "knowing about things."

While the Reichenbach analysis of English tense and aspect has a number of flaws, for our purposes we can use the three analytic notions he proposed for describing certain basic tense/aspect forms. Reichenbach distinguishes "E" as the time of an event ("Event Time"); "S" as the time of the utterance containing the expression ("Speech Time"); and "R" as a currently established temporal reference point ("Reference Time"). Using "=" to indicate that two of these time points are identical, and "<" to indicate that the former is anterior to the latter, we can define certain tense categories in English as follows:†

\[
\begin{align*}
\text{Present Tense} & \quad E = R = S \\
\text{Simple Past} & \quad E = R < S \\
\text{Pluperfect} & \quad E < R < S \\
\text{Present Perfect} & \quad E < R = S
\end{align*}
\]


†I am ignoring here some necessary qualifications about axtionsart differences and the interpretation of present tense, etc.
Now, by using these categories in our definitions of certain temporal adverbs, we can note the following:

- **today**: E, R, and S are included in a single calendar day
- **yesterday**: E and R are included in one calendar day, S in the next calendar day
- **N units ago**: E = R < S, and E and R are separated from S by N units
- **this morning**: E and R are contained in the morning of the day which contains S

Given these specifications, we can note that expressions with ago are only possible (in non-literary texts) with the simple past: “He was here three days ago”, but “*He has been here three days ago”, etc.

Expressions with **yesterday** are possible with simple past and pluperfect, but not present or present perfect, since **yesterday** requires E = R and R < S, while the present perfect requires R = S. “He was here yesterday”, “He had been here yesterday”, but not “*He has been here yesterday”, “*He is here yesterday”.

All tense possibilities are compatible with **today**. “He is here today”, “He has been here today”, “He was here today”, and “He had been here today” (more naturally, “He had been here earlier today”).

In the case of **this morning**, we find an interesting interpretational twist. There is a difference in how we interpret “He was here this morning” and “He has been here this morning” that can be accounted for by computing the combinatorial possibilities. Since **this morning** requires that R be included in the morning, and since the present perfect requires that R = S, the expression with the present perfect has to be spoken in the morning.

Again, we are dealing with interpretation phenomena that clearly depend on “computations” based on linguistic knowledge, since there is no other way to argue for such relationships.

**The Negative Quantifier**

If you are told that I have no chairs in my house, you would know that the number of chairs in my house is zero. And if you are told that I have no kitchen in my house, you would know that the number of kitchens in my house is also zero. It can be seen from these examples that a claim about the emptiness of a set of objects can be expressed equally well with a singular or a plural noun (no chair, no kitchen). But there is an interpretation to be given to this choice. I used the plural with chairs because a house ordinarily has more than one chair; I used the singular with kitchen because a house ordinarily has only one kitchen. Or suppose I draw three smiling face figures, one with mouth, nose and eyes, one with just mouth and eyes, one with just mouth and nose. You would describe these figures by saying “The first one is complete, the second one has no nose, the third one has no eyes.” You would not appropriately describe them by saying “This one has no noses, and that one has no eye”, even though each of these sentences should mean the same thing—namely, that the number of eyes, or the number of noses, is zero.
It appears that in these cases, the choice of singular or plural form of the noun depends on the number (one or more than one) of the members of the set that might be expected. If this is so, it should follow that if you hear me say, "The thing that really surprised me about the wogil was that it had no blurk", you will know nothing about what a wogil or a blurk is, but you will at least know that I was expecting to find the wogil equipped with only one blurk. The truth-conditional meaning of the sentence does not convey this information, but the grammar of negative-quantifier noun-phrases does.

Grammatical Patterns and their Meanings

Sometimes a grammatical pattern has a meaning of its own. It may be that this fact is not easily discovered, because usually the words that occupy the important positions in such a grammatical pattern themselves have meanings which fit the meaning of the grammatical pattern; but when we substitute a word from outside of that domain, we can discover the semantic contribution of the pattern itself. Much has been written about the Double Object Construction in English,9 supporting the idea that it is dedicated to conveying a meaning of the sort suggested by the equation "A verb B C" = 'A acts in such a way as to make C available to B'. ("A", "B" and "C" are all NPs.) Exactly fitting this pattern are such verbs as give, send, and show: "I gave you my last dollar", "She sent me a love-letter", "We showed them our passports." But in a sentence like "I slipped the officer a hundred-dollar bill" we construe the act of 'slipping something' as part of an act of 'giving something to someone', because of the occurrence of the verb slip in this context; and in a sentence like "She killed me a frog" you will receive the impression that I was planning to do something with the dead frog—perhaps cook it.

English, along with a number of other European languages having articles, has what Knud Lambrecht has called the Bare Binomial Construction10, a syntactic pattern in which two bare nouns (i.e., nouns which might ordinarily require an article appear alone) may be conjoined. A stereotyped example is hat and coat, as seen in the sentence "He picked up hat and coat and headed for the door." In this case the sentence is grammatical only because the two nouns are conjoined. With only one of them, the sentence could not exist. (""He picked up hat and headed for the door.""")

The interpretation of such constructions seems to be something like this: that if "A and B" is an instance of this construction, 'A' and 'B' designate objects that are joint participants in some culturally given or context-created scene. If we find bare noun conjunctions for which we are not already prepared with an interpretation, we find ourselves forced to create one. Thus, if we compare the following two sentences, we find that the first could merely describe a bit of bizarre behavior, whereas the second gives us the impression that the behavior is exactly appropriate. "He removed his hat and his belt and entered the temple." "He removed hat and belt and entered the temple."

10See Knud Lambrecht 1984.
Conditional Sentences

For my main example, I wish to show the tight connection between the meanings of English conditional sentences and features of its grammatical form. In the school of thought that I follow, a language is viewed as a repertory of lexical and grammatical resources for the expression and communication of thoughts, and the empirical study of a language is direct to the discovery of such resources.\(^1\)

There are numerous ways of expressing conditional sentences in English,\(^2\) but I will limit my attention to expressions which use the introducer *if*, and in which the *if*-marked, or subordinate, clause (the *antecedent*) precedes the main clause (the *consequent*).

One descriptive problem that generative grammarians have had to face in dealing with English conditional sentences involves the complex system of compatibility relations between the two parts of a conditional sentence. That is, certain verbal forms occurring in the antecedent clause of a conditional sentence are compatible only with certain other verbal forms in the consequent clause. Some examples of compatible combinations are these:

- If she opens it, they will escape.
- If she opened it, they would escape.
- If she had opened it, they would have escaped.
- If she opened it, they escaped.

Some examples of incompatible (or at least difficult-to-contextualize) combinations are the following:

- *If she'll open it, they had escaped.
- *If she were here, I'll be happy.
- *If she opens it, she had misunderstood my message.

What we need for this set of facts is some set of general principles according to which these acceptability judgments, and the accompanying interpretations, will be explained.

The concepts we need for stating these principles include the following: First, we need to have a vocabulary for describing the various verbal forms which enter into the compatibility relations just mentioned; second, we need to speak of something I will refer to as “epistemic stance”—the speaker’s stance on the reality of the proposition expressed in the antecedent clause; third, we will need to notice that some sentences give expression

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\(^2\)For example: "Do you like it? It's yours!" (If you like it, it's yours); "Come here and I'll give you a kiss" (If you come here, I'll give you a kiss); "Criticize him the slightest bit and he starts crying" (If you criticize him the slightest bit, he starts crying); "Get out of here or I'll call the police." (If you don't get out of here, I'll call the police); "Anyone who does that deserves to be punished." (If anyone does that, they deserve to be punished); "With his hat on he would look older." (If he had his hat on, he would look older); "Otherwise, I wouldn't be here." (If things were not the way they are, I wouldn't be here); "Unless you know Harry, you won't know what I mean." (Only if you know Harry will you know what I mean.)
to what we can call the "interlocutors' interest" — the speaker's view that of the alternatives recognized by a conditional sentence, one is looked on as matching the speaker's or the hearer's interest; and fourth, we will need to notice features of "polarity" — the difference between positive polarity and negative polarity.

**Verbal Forms**

The treatment of verbal forms is made complex by the facts that 1) the relevant categories are not identifiable with particular morphemes or particular individual grammatical categories, but with complexes of these. What this means is that we will have to give different names to forms that have the same superficial appearance — or, as it happens, almost the same superficial appearance. Furthermore, in discussing the categories we need, it is necessary to keep in mind the difference between "Time" (which we take as a semantic notion) and "Tense" (a grammatical notion). Since we will want to use the same words for both of these categories, we shall distinguish them by using small caps for the true temporal notions (PAST, PRESENT, FUTURE).

The verbal-form categories I will use are these:

**present** the form which, in the copula, results in is, am, are and in non-modals uses the sibilant suffix to express third-person-singular agreement.

**past** the form which, in the copula, results in was, were and otherwise, in the "regular" cases, the simple past-tense inflection.

**future** the expression of future meaning with the modal will followed by the unmarked infinitive.

**present subjunctive** this form is the same as the past-tense form, except that, in some dialects (perhaps especially in the U.S.) there is a single form for the copula: were.

**past subjunctive** this form is the same as the pluperfect form (had gone, etc.), except that in colloquial English we also find a more complex form (had've gone, etc.), and in colloquial American English we find a form identical to what I will call "conditional perfect": would have gone.

**conditional** this form is constructed with would or could plus the unmarked infinitive (would go, etc.)

**conditional perfect** this form is constructed with would or could plus the perfect infinitive (would have gone, etc.).

In general "perfect aspect" and "progressive aspect" can coexist with most of these forms and contribute their own meanings. In other words, in describing a conditional antecedent, the form "if he has seen her" will be simply classified as "present" for present purposes.
Epistemic Stance

For this discussion, I will be speaking of the two clauses found in certain complex sentences as "P" (the subordinate clause) and "Q" (the main clause). The immediately following discussion unites conditional sentences with sentences having a temporal subordinate clause.

I distinguish three sorts of epistemic stance — positive, neutral, and negative — which can be used when speaking of the speaker’s commitment to the actuality of the proposition expressed in a subordinate clause.

In the case of “positive epistemic stance”, the speaker accepts the truth of the proposition expressed in the subordinate clause: Thus, in “When Pat opened the door, the dog escaped”, the speaker accepts the idea that Pat did indeed open the door and asserts that at that time the dog escaped.

In the case of “neutral epistemic stance”, the speaker takes no stand on the truth of the proposition expressed by the subordinate clause. Thus in, “If Pat left the door open, the dog undoubtedly escaped”, the speaker does not know whether or not Pat left the door open, but asserts an unfortunate consequence of such a state of affairs.

And in the case of “negative epistemic stance”, the speaker assumes that “P” is not true, where “P” is a proposition derivable from (and preserving the polarity of) the form of the antecedent clause. Thus, in “If Pat had left the door open, the dog would have escaped”, we hear the sentence as revealing the speaker’s belief that Pat did not leave the door open.

In using the words “positive” and “negative” epistemic stance, rather than, say, “believes true” and “believes false”, I have in mind the fact that we may be dealing with conceits rather than beliefs. And in the case of future-time expressions, such as the difference between “If she invites them, they’ll go” and “If she invited them, they’d go”, we will interpret the latter sentence not as expressing the speaker’s belief that “they” will not get invited, but that —say— “other things being equal”, they are not likely to get invited.

It seems to me that there are three basic types of conditional sentences, from the point of view of Epistemic Stance. I can refer to these as Generic (in which the speaker accepts the existence of instances of P but is presenting the “conditional” as a general principle), Neutral (in which the speaker makes no commitment about the actuality of P), and Negative (in which the speaker doubts the actuality of P). The following tables will show the relationships between Epistemic Stance, “Time”, and Verbal Form. Each cell in these tables names the form of the verbal expression that expresses the Epistemic Stance (the table), the Time (the column), and appearance as Antecedent or Consequence (the row). Any conditional sentence can be formed by choosing, from one of the tables, one cell from the upper column and one cell from the lower column. (There are some other constraints, to be noted below.)

<table>
<thead>
<tr>
<th>Generic</th>
<th>“P”</th>
<th>“Q”</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>present</td>
<td>present</td>
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</table>
Neutral Epistemic Stance

<table>
<thead>
<tr>
<th></th>
<th>PAST</th>
<th>PRESENT</th>
<th>FUTURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;P&quot;</td>
<td>past</td>
<td>present</td>
<td>present</td>
</tr>
<tr>
<td>&quot;Q&quot;</td>
<td>past</td>
<td>present</td>
<td>future</td>
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</table>

Negative Epistemic Stance

<table>
<thead>
<tr>
<th></th>
<th>PAST</th>
<th>PRESENT</th>
<th>FUTURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;P&quot;</td>
<td>past-subjunctive</td>
<td>present-subjunctive</td>
<td>present-subjunctive</td>
</tr>
<tr>
<td>&quot;Q&quot;</td>
<td>conditional perfect</td>
<td>conditional</td>
<td>conditional</td>
</tr>
</tbody>
</table>

Examples of Neutral-ES and Negative-ES conditionals, illustrating each formal possibility, follow:

Neutral Epistemic Stance

Neutral-ES: 1

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</table>
If he went to Harvard, he studied Latin.

Neutral-ES: 2

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</table>
If the rope is strong, I'm safe.

Neutral-ES: 3

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</table>
If the rope breaks we'll fall.

Neutral-ES: 4

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</table>
If she studied Latin, she can read this sign.

Neutral-ES: 5

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</tbody>
</table>
If I bought the winning ticket, I'll be rich.
Neutral-ES: 6

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</table>
| If you're smart, you'll marry Louise.

Neutral-ES: 7

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</table>
| If the streets are wet, it rained last night.

Neutral-ES: 8

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</thead>
</table>
| If he dies tomorrow, I gave him the wrong medicine.

Neutral-ES: 9

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<th>0</th>
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</thead>
</table>
| If the light goes on, she's back home.

It should be noticed that there are different pragmatic purposes to conditional sentences, which we can think of as causative versus inferential. 13 Those in which the time of the antecedent follows the time of the consequent are necessarily of the inferential type.

Negative Epistemic Stance

Negative-ES: 1

<table>
<thead>
<tr>
<th>0</th>
<th>0</th>
</tr>
</thead>
</table>
| If you had eaten it, you would have died.

Negative-ES: 2

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<thead>
<tr>
<th>0</th>
<th>0</th>
</tr>
</thead>
</table>
| If she were with me, I would be happy.

Negative-ES: 3

<table>
<thead>
<tr>
<th>0</th>
<th>0</th>
</tr>
</thead>
</table>
| If she invited me, I would accept.

13 For a more careful analysis of the relationships between the form and the pragmatic setting of conditional sentences, see Eve Sweetser 1990.
The upper left ("past subjunctive") corner of the Negative-ES diagram has a special status, in that there is a variety of forms that can express it. The standard form is identical to the pluperfect: "If I hadn't opened it." But there is a general colloquial form "If I hadn't've opened it" and there is a special American colloquial form "If I wouldn't have opened it." Thus:

if I hadn't opened it
if I hadn't've opened it
if I wouldn't have opened it

A very important fact to notice about this collection of alternatives, and their evaluations, is that it characterizes not only the past Neg-ES forms of conditional antecedents, but also other contexts with Neg-ES meanings.

One such context is as the complement of the verb wish. Wish is the only verb in English which accepts these forms in its complement. We find (with the same acceptability judgments):

I wish I hadn't said that.
I wish I hadn't've said that.
I wish I wouldn't've said that.

The verb wish is used not only for expressing past counterfactual wishes, but also for expressing present and future wishes. In the case of present-time wishes, we find the sentential complements of wish taking the same present-subjunctive form we found with present Neg-ES antecedents. Thus, in "I wish you lived closer to Berkeley", the past-tense

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14 These examples are negative because it is my impression that dialects which welcome the "had've" form are more likely to do so when the clause is negative.
form is used to express a wish about a present-time situation, and in "I wish she were here", the special form "were" (rather than "was") can be used.

There is one observation that keeps us from concluding that the complements of wish are simply identical, in their formal requirements, with Neg-ES antecedents, and that has to do with the future form. The future Neg-ES antecedent form is the same as the past tense, but in the case of wish, we do not get "I wish you introduced me to Louise tomorrow", but "I wish you would introduce me to Louise tomorrow". How are we going to account for the obligatory "would" in this clause?

I would claim that clausal complements of wish and the antecedents of Neg-ES conditionals are indeed constructed in accordance with the same principles, but so far we have left out one set of facts. When such a clause expresses the Interlocutors' Interest (or that of some other discourse-relevant individual), the future-time version is formed with the modal would. Since wish necessarily expresses the speaker's interests, the construction with would is obligatory in that case.

This means that we should be able to find cases of would in Neg-ES antecedents, and that such clauses should be taken as expressing one or both of the conversation participants' interests.

Consider first a comparison of cases where we learn from the consequent whether or not the speaker has a positive interest in the outcome.

If you spoke to my father about that, we'd get in serious trouble.
If you spoke to my father about that, I might get permission to go.

Both of these sentences are acceptable. We can infer from the first one that the speaker wants the addressee not to have this conversation, and from the second one that the conversation with the father is desired. But the grammatical form of the sentence does not express these judgments. But now let us look at the same sentences with would:

?If you would speak to my father about that, we'd get in serious trouble.
If you would speak to my father about that, I might get permission to go.

The oddity of the first of these sentences is that the consequent seems to contradict the assumption suggested by the verb form in the antecedent, assuming that the speaker of the sentence does not want trouble.

Having seen that there is a separate form for Neg-ES future antecedents revealing participant interests, we can now ask whether such a possibility also exists for Neutral-ES sentences. It appears there is, namely in the form of the modal will. We noted earlier that future Neutral-ES antecedents use the simple present tense form, instead of the expected will-future; but we can find will in sentences exhibiting the participants' positive interests. Compare:

If the sun'll shine, we'll be able to have our picnic.
?If it'll rain, we'll have to cancel the picnic.
If you break another dish, I'll give you a spanking.
?If you'll break another dish, I'll give you a spanking.
The questioned sentences in the preceding set are all odd, since they suggest that the speaker wants it to rain, or wants the addressee to break a dish.

In earlier work I suggested that the will...will form of a conditional sentence was dedicated to “negotiations” or “negotiated offers”, supported by sentences like “If you’ll wash the dishes, I’ll dry” and “If it’ll make you feel any better, I’ll stay another day or two.” But I think now that the explanation of these forms is more general, and that the “negotiation” aspect of the interpretation of these sentences is merely a by-product of the sentences’ ability to express both participants’ interests.

There is a generalization to be captured here. We are now free to say that in future-time antecedents, the modal will is used, and that this form has its present-tense form will in the Neutral-ES case, the past-tense form would in the Negative-ES case. Hence:

<table>
<thead>
<tr>
<th>Neut</th>
<th>Neg</th>
</tr>
</thead>
<tbody>
<tr>
<td>pres</td>
<td>past</td>
</tr>
</tbody>
</table>

In the cases where the future antecedent expresses the interlocutors’ interests, the form will is used, in each case:

<table>
<thead>
<tr>
<th>Neut</th>
<th>Neg</th>
</tr>
</thead>
<tbody>
<tr>
<td>will</td>
<td>would</td>
</tr>
</tbody>
</table>

It is well known that the antecedents of conditional sentences are—or are capable of being—“negative polarity contexts”, but this is only when the sentence does not express the interlocutors’ interest. Some linguistic forms are generally welcome in only positive (or “positive interest”) sentences, e.g., a little. Other expressions, e.g., any (in the relevant meaning), are generally welcome only in sentences expressing uncertainty or negative interest. Compare the following:

If you come a little closer, you’ll be able to see better.
If you come any closer, I’ll call the police.

In the former case, I invite you to come closer, and propose a reason why you should be interested in doing so. In the latter case, I discourage you from coming closer, and propose a reason for you to want to do otherwise.

If we were to examine the compatibility problems for antecedent and consequent verbal forms in English conditional sentences, mentioned at the beginning of this section, we will find that the ones which are possible are those that “fall out from” the combined principles governing tenses, epistemic stance, and interlocutor interests, and that the ones which are impossible cannot be derived from the patterns that such principles create. The contributions of these formal properties to sentence interpretation are

considerable, and they are subtle, but in no case could we say that the reasoning we carry out in achieving the understandings we achieve are based on information that is available to us by anything other than pure linguistic means. Nor can we say that any of it has to do with "natural" inferences related to "conditionality". A great deal of research has been done on conditional sentences in Japanese, and from this work it is clear that almost none of the semantic properties associated with English conditional sentences play a role in the structuring of the nearest equivalent in Japanese, and vice versa. Every aspect of this is based on language-specific linguistic conventions.

CONCLUSIONS

My purpose in this paper was a humble one — to suggest that the role of linguistics in, and the knowledge that linguistics can contribute to, a program of research dedicated to understanding the mysteries of human linguistic communication, should be seen as greater than one hundredth of the whole. That humility was insincere. Since, as I believe, almost every step of the process of understanding language texts must build on structures that exist by virtue of the lexical and grammatical resources of individual languages, and since whatever inferencing strategies get called on must produce conceptual structures that need to be integrated with those that are created by the linguistic properties of the text, I actually believe that the participation of linguistics in the final work is absolutely essential. Words, grammatical categories, and complex grammatical constructions, bring with them information needed for creating and packaging the conceptual structures that make up our understanding of language, and while much of this is motivated by or anchored in beliefs and institutions that exist independently of language, almost all of it is intimately tied to language itself as a system of conventions.

REFERENCES


