JOURNAL OF VERBAL LEARNING AND VERBAL BEHAVIOR **14**, 56–72 (1975)

Understanding What Is Meant from What Is Said: A Study in Conversationally Conveyed Requests[1]

HERBERT H. CLARK AND PETER LUCY

Stanford University

For a sentence such as *Must you open the door*?, how does the listener come to construe it in its intended sense ("Please don't open the door") instead of its literal sense ("Is it necessary for you to open the door?")? It was proposed that the listener constructs the literal meaning, checks the context for its plausibility, and if it is implausible, applies a rule of conversation to derive the conveyed meaning. In a test of this theory 23 subjects were timed as they drew simple deductions from 10 different pairs of conversationally conveyed requests (for example, *Can you open the door*? and *Must you open the door*?). The first member of each pair conveyed a positive request, and the second, a negative one. Consistent with the theory, those sentences conveying positive requests behaved as if they were positive, even when they were negative in literal meaning (for example, *Why not open the door*?); those conveying negative requests behaved as if they were explicitly negative, even when they were positive in literal meaning (for example, *Why open the door*?). Some evidence was found for the notion that the listener constructs the literal meaning before the conveyed meaning.

In conversation people often mean something other than what they appear to be saying. The wife who says to her husband, "Would you mind opening the window, dear?" does not expect him to take this utterance as a question to be answered by yes or no. She expects him to understand it as a request to open the window. And the sergeant who says to a private, "Do you see that cigarette butt there, soldier?" does not normally want an answer to the explicit question. He wants obedience to the implied order. Nor is Bertie Wooster merely making an observation about the atmosphere in the room when he says to his servant, "It's stuffy in here, Jeeves." He means for Jeeves to do something about the condition, perhaps open the window. In each case the intelligent listener, when well informed about the circumstances surrounding them, will understand these sentences for what they are, implied or conveyed requests.

Requests such as these illustrate an extensive phenomenon in language that will be referred to here as "conversationally conveyed meaning" or, more simply, "conveyed meaning." In most circumstances the speaker has available to him a variety of literal devices in language to get across what he means. He can use declaratives to assert facts, interrogatives to ask questions, and imperatives to order or request things. He can promise, bet, accuse, christen, and perform other so-called illocutionary acts by using the "performative" constructions *I promise*, *I bet*, *I accuse*, *I christen*, and so on (Austin, 1962). Nevertheless, the speaker also has available other less direct means for getting across what he intends the listener to understand. He can use declaratives to request or promise things (for example, *I'd like you to open the window*; *I will be there by six*), interrogatives to assert facts (*Did you know that Max has the plague?*), imperatives to ask questions (*Tell me why you*

[1] The research reported herein was supported in part by Grant MH-20021 from the National Institute of Mental Health. We are indebted to Eve V. Clark, Susan E. Haviland, Lance J. Rips, and Edward E. Smith for their comments on the manuscript and to George Lakoff for suggestions on several aspects of this research.

love Jocasta, Oedipus?), as well as affirmations to make ironic denials (*Pete had the brilliant idea of sky diving without a parachute*), understatements (*Dodwell had a slight accident, he drove his car off the Golden Gate Bridge*), and the like. Each of these examples, uttered in the right context, yields a conveyed meaning that does not coincide with its literal meaning. Indeed, as Grice (1957, 1967, 1968), Searle (1965, 1969), and others have argued, it is the meaning intended by the speaker that the listener is normally concerned with, and this often differs considerably from the literal meaning. In these cases the listener must go beyond the literal meaning, so to speak, to discover the conversationally conveyed meaning. And to do this, he must assume that there are conventions the speaker has observed in uttering one form (say, a question) to convey quite a different meaning (say, a request), and he must make use of these conventions in his comprehension of such utterances.

For the psychologist, these observations raise important questions about the process of comprehension. How does the listener come to understand the intended meaning? How does he know when to take the literal meaning and when to go beyond it and construct a conveyed meaning? Up until now theories of comprehension appear to have been constructed to account solely for the comprehension of literal meaning (Bever, 1970; Bransford & Johnson, 1973; Clark, 1974; Clark & Chase, 1972; Collins & Quillian, 1969; Kintsch, 1972; Meyer, 1970; Rumelhart, Norman, & Lindsay, 1972; Trabasso, 1972; Wason & Johnson-Laird, 1972; Winograd, 1972), although there has been more and more emphasis on comprehension in context (for example, Bransford & Johnson, 1973; Clark & Haviland, 1974; Wason, 1965; Winograd, 1972). But if we take the arguments of Grice, Searle, and others seriously, these theories ought to be concentrating on how people arrive at the intended meaning of an utterance, since after all it is the intended, not the literal, meaning that is the essence of the speech act and its comprehension. In the present paper, we will therefore propose one possible theory for the comprehension of intended meaning, and we will examine some of its consequences in an experiment on the time it takes people to deal with conversationally conveyed requests.

This theory rests on the fundamental observation, made by a number of linguists, that conveyed requests, far from being haphazard in form, appear to conform to certain very general rules of conversation (Gordon & Lakoff, 1971; Green, 1972; Heringer, 1971; Morgan, 1972; Sadock, 1970, 1972). Of the schemes proposed to account for the regularity, we will rely for our basic conception on the one by Gordon and Lakoff. According to their scheme, the interpretation of conveyed requests arises from a recipe requiring three ingredients: (1) the literal meaning of the sentence, (2) the perceived context, and (3) a so-called conversational postulate. Consider *Would you mind opening the door?* spoken by S (the speaker) to A (the addressee). Its literal meaning, the first ingredient of the recipe, might be stated as follows: "S is asking A whether or not A would object to opening the door." A likely context, the second required ingredient, might be stated as follows: "S nevertheless believes that A would not object to opening the door." Since the perceived context is directly contradictory to the literal meaning (why should S inquire about something he already believes to be true?), the sentence must be taken in some other sense. Such a reinterpretation in turn requires the literal meaning to be considered in conjunction with an appropriate conversational postulate, namely, "If S questions A's willingness to do something when in fact A's willingness is not in doubt, then S is requesting A to do that something." By deduction this postulate leads to the correct conveyed interpretation: "S is requesting A to open the door." So by the combination of the literal meaning, its context, and an appropriate conversational postulate, the listener can deduce the meaning the speaker must have intended in that context.

The conversational postulate just illustrated, far from being a unique rule applicable only in this situation, appears to belong to a broad class of rules that derive from general conditions on sincere requests (Gordon & Lakoff, 1971; Heringer, 1971). As Austin (1962), Searle (1969), and others have pointed out, a request is sincere only when the person making it lives up to certain conditions. He must want the requested act carried out and believe that it has not yet been carried out, two "speaker-based" sincerity conditions. He must also assume that the addressee is able to carry out the act, is willing to do so, and would not necessarily do so otherwise, three "addressee-based" sincerity conditions. Furthermore, he must have a reason for maintaining each particular sincerity condition. According to Gordon and Lakoff, then, the speaker can convey a request indirectly by asserting a speaker-based sincerity condition (for example, *I would like you to open the door; I don't think you opened the door*), by questioning an addressee-based sincerity condition (*Can you open the door?; Would you be willing to open the door?; Will you open the door?*), or by questioning the justification for an act (*Why don't you open the door?*). As Gordon and Lakoff (1971) and Heringer (1971) have argued, the rules that lie behind such conveyed requests belong to a larger class of rules that cover conveyed assertions (for example, *Can you believe that Irv is bald?*), conveyed permissions (*Haven't I told you already that you may go?*), conveyed promises (*I want to promise you that I will never do it again*), and much more. Although there is still considerable disagreement among linguists about the exact formulation of such a proposal as Gordon and Lakoff's, two conclusions seem rather firm. First, there are general rules of conversation, and they appear necessary for the interpretation of sentences in natural settings (see also Grice, 1967; Geis & Zwicky, 1971). And second, at least some conveyed requests appear to require such rules.

Against this background we can now propose a tentative model for the process by which the listener arrives at the intended meaning of a sentence. The model goes as follows. First, the listener derives and represents the literal interpretation of the sentence. Second, he then tests this interpretation against the context to see whether it is plausible or not. If it seems appropriate to the context, then it is taken to be the intended meaning. If, however, it does not seem appropriate, either because it contradicts some obvious fact or because it violates a rule of conversation, it is rejected as the intended interpretation. Third, in the case of such a rejection, the literal interpretation is combined with an appropriate rule of conversation, and this leads, by deduction, to the appropriate intended meaning. In this process, then, the listener is assumed to go through the literal meaning of a sentence (with caveats to be discussed later) and is forced to some other interpretation only when the literal meaning is judged to be implausible or inappropriate in that context.

What are the consequences of this model for speed of comprehension? For present purposes there are three main predictions. *Prediction* 1: The listener should show evidence that he had come to the literal interpretation of a sentence before he had come to its conveyed interpretation. For example, if one sentence is positive and another negative and yet both have the same conveyed meaning, we might expect the negative to take longer to comprehend, since previous work on negatives indicates this should happen for literal meaning. *Prediction* 2: The listener should take longer whenever the intended meaning is different from the literal meaning, all other things being equal. This prediction is based on the assumption that deducing the conveyed meaning from the literal meaning takes time. Thus, *It's stuffy in here, Jeeves*, should take less time to comprehend, if all else is equal, when taken as a comment about stale air than when taken as a request to open the window. The stickler in Prediction 2 is the condition "all other things being equal." The listener attempting to understand *It's stuffy in here, Jeeves*, by our model, has to register the context, and by definition, the context will not be the same under the first and second interpretations. So there is always the possibility that the context takes longer to register in one case than in the other, thereby confounding the time difference of Prediction 2. Despite this difficulty, however, one can bring plausible, even if not conclusive, evidence to bear on Prediction 2. *Prediction* 3: The listener should show evidence that his final representation of a sentence is its intended meaning. So when the intended meaning differs from the literal meaning, as in conveyed requests, he should be using the conveyed meaning, not the literal meaning, in all further uses of the interpretation of the sentence.

To test these predictions and more generally to explore the comprehension of conveyed meaning, we examined the speed with which subjects were able to understand and draw simple deductions from conveyed requests. The requests we chose came in pairs. One request was positive in its conveyed force, as in *Why not open the door?*, whereas the second was negative, as in *Why open the door?* Note that the first constitutes a request to open the door, and the second, a request not to open the door. Pairs like these were chosen since much is already known about explicit positive and negative sentences in English. In particular, Clark and Chase (1972) and Trabasso, Rollins, and Shaughnessy (1971) have proposed models for the process of verifying positive and negative assertions against external information. It was therefore possible to use the Clark and Chase model as a tool to disclose how conveyed requests are ultimately represented and to indicate how they come to be represented that way.

According to the Clark and Chase model (see Chase & Clark, 1971, 1972; Clark, 1970, 1971, 1974; Clark and Chase, 1972, 1974), the subject verifying a sentence against a picture (1) represents the sentence in an abstract format, (2) represents the picture in the same format, (3) compares these two representations, and (4) responds with the correct answer. Given certain assumptions about the representations in (1) and (2), about the rules of comparison in (3), and about the additivity of the four stages, this model predicts a distinct pattern of latencies for positive and negative sentences, a pattern that has been found in a variety of experiments. The pattern predicted has three prominent features. (1) A sentence ultimately coded in a positive form at Stage 1 can be judged true faster than it can be judged false. (2) A sentence ultimately coded in a negative form evinces the opposite pattern: It can be judged false faster than it can be judged true, and by the same time increment. (3) A sentence coded in a positive form can be judged more quickly overall than its corresponding negative (even when sentence length is eliminated as a confounding factor). For convenience we will refer to this as the three-feature pattern, since it will arise again and again in the present study.

Given the Clark and Chase model, we can test, or attempt to test, Predictions 1 and 3 with our positive and negative conveyed requests. Consider the pair *Why not open the door?* and *Why open the door?* Prediction 3 asserts that *Why not?* should be coded ultimately at Stage 1 in a positive form, and *Why?* in a negative form. If so, the appropriate three-feature pattern should occur. If, however, they are represented according to their surface polarity, with *Why not?* negative and *Why?* positive, then quite a different three-feature pattern should arise. The model can therefore test Prediction 3 for all pairs of conveyed positive and negative requests. As for Prediction 1, consider the following two pairs of requests: *I'll be very happy if you open the door*, *I'll be very sad if you open the door; I'll be very sad unless you open the door*, and *I'll be very happy unless you open the door*. The second pair differs from the first only in that *if* has been replaced by *unless* (and, incidentally, *happy* and *sad* have been reversed). *Unless* is an inherently negative form of *if*, meaning "if not," and in line with previous research, the literal meaning of *unless* should take longer to code at Stage 1 than the literal meaning of *if*. Prediction 1, therefore, leads to the expectation that the pair with *if* should be faster overall than the pair with *unless*, since these two pairs differ in their literal meanings, but not in their conveyed meanings. Based on the model there are other interesting comparisons as well. Consider the following two pairs of requests: *You should open the door*, *You shouldn't open the door; Shouldn't you open the door?*, and *Should you open the door?* The conveyed meaning of the first and third is positive, and that of the second and fourth negative; in contrast, the surface polarity of the first and fourth is positive, and that of the second and third negative. Such a pattern allows us to examine the contribution of surface polarity independent of conveyed polarity. If surface polarity provides its own contribution, then the time difference between *Shouldn't you?* and *Should you?* ought to be less than the time difference between *You should* and *You shouldn't*.

METHOD

The subjects participating in this experiment were shown displays one at a time consisting of a sentence on the left (for example, *Can you color the circle blue?*) and a circle colored either pink or blue on the right. They were instructed to treat each such sentence as a request to color the circle a particular color and to consider the circle on the right as a response to that request. They were then to judge whether or not the circle appearing on the right had been colored according to the request and to indicate this judgment by pressing one of two buttons as quickly as possible. One button corresponded to "yes", the circle on the right had been colored as requested, and the other to "no", the circle had not been colored as requested; we will refer to these two responses as "true" and "false" in order to be consistent with previous discussions on negation. The judgment the subjects were asked to make was meant to simulate as closely as possible a decision they would make in real conversation, even though, of course, listeners are not normally *told* in conversations what is and what is not to be taken as a request.

The 80 displays used were constructed from the 20 basic sentences shown in Table 1.[2] This was accomplished by inserting in the sentences either the word *blue* or the word *pink* and by pairing them with either a blue circle or a pink circle (to form true and false displays for each sentence). The sentences themselves were chosen so as to represent a number of the categories laid out by Gordon and Lakoff (1971). They consisted of direct requests (such as *Please color the circle blue*), conveyed requests derived from speaker-based sincerity conditions (such as *I would love to see the circle colored blue*), conveyed requests derived from addressee-based sincerity conditions (such as *Can you color the circle blue?*), and conveyed requests derived from addressee-based reasonableness conditions (such as *Why not color the circle blue?*). Another reason for including this variety of sentences was to eliminate special strategies subjects might develop for dealing with any one type of sentence. Each subject was given a practice session of 20 trials, which consisted of 20 displays randomly selected from the 80 displays. This was followed by two blocks of 80 trials, each block of which consisted of the 80 displays in an individually rando-

[2] Throughout the paper we will use the following abbreviations for the 20 conveyed requests found in Table 1: *Please do, Please don't; Can you?, Must you?; Why not?; Why?; I would love, I would hate; You should, You shouldn't; Shouldn't you?, Should you?; It needs, It doesn't need; Doesn't it need?; Does it need?; I'll be happy if, I'll be sad if; I'll be sad unless, I'll be happy unless.*

TABLE 1

BASIC SENTENCES LISTED BY PAIRS

Pairs	Basic sentences	Polarity of conveyed meaning
1	Please color the circle blue	Positive
	Please don't color the circle blue	Negative
2	Can you make the circle blue?	Positive
	Must you make the circle blue?	Negative
3	Why not color the circle blue?	Positive
	Why color the circle blue?	Negative
4	I would love to see the circle colored blue	Positive
	I would hate to see the circle colored blue	Negative
5	You should color the circle blue	Positive
	You shouldn't color the circle blue	Negative
6	Shouldn't you color the circle blue?	Positive
	Should you color the circle blue?	Negative
7	The circle really needs to be painted blue	Positive
	The circle doesn't really need to be painted blue	Negative
8	Doesn't the circle really need to be painted blue?	Positive
	Does the circle really need to be painted blue?	Negative
9	I'll be very happy if you make the circle blue	Positive
	I'll be very sad if you make the circle blue	Negative
10	I'll be very sad unless you make the circle blue	Positive
	I'll be very happy unless you make the circle blue	Negative

mized order. Each display was typed in elite type with a .5 cm diameter colored circle from 1 to 5 cm to the right of the sentence, but always 2 cm from the right-hand edge of the display.

The subject viewed the displays one by one in a modified Siliconix tachistoscope with the displays centered in a 13 × 7 cm window at a distance of 51 cm. He was instructed to read the sentence, then look at the circle on the right, and then decide whether the colored circle was the one called for by the request. He began each trial by pressing a "ready" button located midway between the "yes" and "no" buttons in a hand held response panel operated by the two thumbs. One second later he was presented with the display. He was timed in msec from the onset of the display to the instant he pressed the "yes" or "no" response button. The assignment of "yes" and "no" to the left and right thumbs was counterbalanced across subjects (with a slight imbalance because of the odd number of subjects). It was stressed to each subject that he should try to respond as quickly as possible and still maintain a high degree of accuracy. The experimental session lasted about 45 min. The 23 subjects were all Stanford University undergraduates fulfilling a course requirement.

RESULTS

Generally speaking, the results give rather strong evidence for the present model of comprehending conveyed requests, and they hint at other interesting properties of conveyed meaning. The results of interest are the mean latencies for the 20 basic sentences when true and when false. These 40 means were computed by averaging over the four or fewer correct responses for each subject on each of the 40 different sentences (ignoring color) and by collapsing across subjects. There was, however, one complication. Some subjects consistently gave at least one sentence an interpretation opposite to the one we had assumed for it. In particular, seven subjects made more than 50% errors on *Should you*?, the one really serious misinterpretation, but one each also did so on *Must you*?, *Why*?, *Does it need*?, and *I'll be happy unless*. For the analyses of individual pairs of requests to be reported below, therefore, we excluded the erring subjects on the appropriate pairs only. For the overall analysis to which we now turn, however, we excluded only the seven subjects misinterpreting the request *Should you*?

Considered together, the 20 basic sentences yielded strong support for Prediction 3, which asserts that these requests should show the three-feature pattern of the Clark and Chase model as based on their *conveyed* polarity. Consider the three features of this pattern separately. First, true was 346 msec faster than false for the 10 positive requests averaged together. Second, false was 308 msec faster than true for the 10 negative requests averaged together. And third, the positive requests were 222 msec faster, overall, than the negative requests. That these three features were highly reliable is shown by an analysis of variance of the 40 means from each of the 16 remaining subjects, treating both subjects and pairs as random effects (Clark, 1973). As support for the first two features together, this analysis showed a significant Truth X Conveyed Polarity interaction $F'(1, 23) = 22.97$, $p < .001$. Indeed, these two features occurred for every one of the 10 pairs. Furthermore, the 346 msec difference for positives was not significantly different from the 308 msec difference for negatives, $F' < 1$, and this is also consistent with the Clark and Chase model. As for the third feature, the 222 msec superiority of positives over negatives was highly reliable, $F'(1, 17) = 19.53$, $p < .001$. There were, however, large and consistent variations from pair to pair not only in the overall means, $F(9, 135) = 25.77$, $p < .001$, but also in the sizes of the positive–negative differences, $F(9, 135) = 2.50$, $p < .025$, the true–false differences, $F(9, 135) = 2.52$, $p < .025$, and in the first two features of the three-feature pattern, $F(9, 135) = 2.80$, $p < .01$. To examine this variation we now turn to analyses of individual pairs of requests.

First, there are the explicit requests *Please do* and *Please don't*, whose mean latencies are shown in Table 2. As expected, this pair yielded the three-feature pattern predicted for positive and negative sentences. First, true was 397 msec faster than false for the positive request *Please do*. Second, false was 155 msec faster than true for the negative request *Please don't*. These two features together were highly reliable, $F(1, 22) = 41.44$, $p < .001$. Third, *Please do* was 311 msec faster than *Please don't*, $F(1, 22) = 62.64$, $p < .001$. One slight complication in this three-feature pattern was that the absolute true–false difference was reliably larger for *Please do* (397 msec) than for *Please don't* (155 msec), $F(1, 22) = 7.99$, $p < .01$, whereas the Clark and Chase model, without additional assumptions, predicts strict equality here. We will examine possible explanations for this slight complication later.

If Pairs 2, 3, and 4 are understood as positive and negative conveyed requests, then they too should yield the three-feature pattern predicted by the Clark and Chase model. Indeed, they do, as is shown by the mean latencies in Table 2. First, true was faster than false for the positive requests *Can you*? (by 517 msec), *Why not*? (by 550 msec), and *I would love* (by 234 msec). Second, false was faster than true for the negative requests *Must you*? (by 272 msec), *Why*? (by 191 msec), and *I would hate* (by 236 msec). These two features together were highly reliable for each pair, $F(1, 21) = 54.04$, $F(1, 21) = 21.93$, and $F(1, 22) = 42.45$, respectively, with $p < .001$ in every case. Third, the positive requests were in each case faster than the negative requests: *Can you*? was 214 msec faster than *Must you*?; *Why not*? was 166 msec faster than *Why*?; and *I would love* was 242 msec faster than *I would hate*.

TABLE 2

MEAN LATENCIES AND PERCENT ERRORS[a] FOR PAIRS 1–4[b]

Pairs	Basic sentences	Response True	False	Mean
1	Please color the circle blue	1213 (0)	1610 (5)	1411
	Please don't color the circle blue	1799 (10)	1644 (12)	1722
2	Can you make the circle blue?	1473 (0)	1990 (1)	1731
	Must you make the circle blue?	2082 (16)	1810 (2)	1946
3	Why not color the circle blue?	1510 (1)	2060 (5)	1785
	Why color the circle blue?	2047 (11)	1856 (6)	1951
4	I would love to see the circle colored blue	1537 (0)	1771 (0)	1654
	I would hate to see the circle colored blue	2014 (5)	1778 (1)	1896

[a] In parentheses.
[b] Latencies are given in msec.

Each of these differences was highly reliable, $F(1, 21) = 9.99$, $p < .001$, $F(1, 21) = 8.10$, $p < .01$, and $F(1, 22) = 25.67$, $p < .001$, respectively. As with Pair 1, however, the true–false difference was larger for the positive request than for the negative request in Pair 2 (by 245 msec) and Pair 3 (by 359 msec), though not in Pair 4 (where it was almost exactly the same). Whereas the amount larger was not reliable for Pair 2, $F(1, 21) = 3.42$, n.s., it was for Pair 3, $F(1, 21) = 7.90$, $p < .01$. Thus, in their major properties, the conveyed requests in Pairs 2, 3, and 4 are difficult to distinguish from the explicit requests in Pair 1.

Pairs 5 and 6 were included in an attempt to separate out the relative contributions of surface and conveyed negatives to comprehension time, and so they will be analyzed as a quartet. And as a quartet, they yielded mean latencies, listed in Table 3, that again conform to the familiar three-feature pattern. First, true was faster than false by 50 and 232 msec for *You should* and *Shouldn't you*?, the two positive requests. Second, false was faster than true by 309 and 565 msec for *You shouldn't* and *Should you*?, the two negative requests. Taken together, these two features were highly reliable, $F(1, 16) = 22.82$, $p < .001$. As for the third feature, the two positive requests were 264 msec faster than the two negative requests, and this too was highly reliable, $F(1, 16) = 18.85$, $p < .01$. Unlike the previous pairs examined, however, the true–false difference was reliably *smaller* for the two positive requests than for the two negative requests, $F(1, 16) = 7.82$, $p < .025$. The amount smaller appears to arise mainly from the especially large superiority of false over true for *Should you*? (565 msec).

To test for the separate contributions of surface and conveyed negatives, we must compare Pair 5 against Pair 6. The logic goes as follows. If the surface negatives in Pairs 5 and 6 make no contribution to comprehension time, then the only reason *You should* should be faster than *You shouldn't*, and *Shouldn't you*? faster than *Should you*?, is because conveyed positives take less time than conveyed negatives. Indeed, to make the strongest assumption, we might expect the superiority of *You should* over *You shouldn't* to be equal to the superiority of *Shouldn't you*? over *Should you*?, since both pairs result in the same positive and negative conveyed interpretations. If, on the other hand, the surface negatives in Pairs 5 and 6 do contribute to the comprehension time, then the *You should*/*You shouldn't* difference should become larger, and the *Shouldn't you*?/*Should you*? difference smaller, resulting in the former

TABLE 3

MEAN LATENCIES AND PERCENT ERRORS[a] FOR PAIRS 5 AND 6

Pairs	Basic sentences	Response		
		True	False	Mean
5	You should color the circle blue	1613 (11)	1662 (3)	1637
	You shouldn't color the circle blue	1978 (3)	1669 (8)	1824
6	Shouldn't you color the circle blue?	1723 (2)	2047 (2)	1885
	Should you color the circle blue?	2510 (16)	1945 (16)	2228

[a] In parentheses.

difference being larger than the latter. Contrary to this prediction, however, the former difference (187 msec) was smaller, not larger, than the latter (343 msec), though not reliably so, $F(1, 16) = 1.44$, n.s.

There are at least two possible explanations for this problematic finding. First, it should be recalled that there were seven subjects who consistently "misinterpreted" *Should you color the circle blue?* as a positive request. This interpretation is possible if the listener does not presuppose that the addressee does not already intend to color the circle blue. The sentence can then be read as a gentle reminder that maybe the addressee should color the circle blue. If the sentence had contained *really*, making *Should you really color the circle blue?* this reading would probably have been eliminated since the *really* appears to force the presupposition that the addressee does intend to color the circle blue (see Pairs 7 and 8). In any case the ambiguity in *Should you?* could have led to increased comprehension time, resulting in the pattern found. Second, the strong assumption that the *You should*/*You shouldn't* difference should be equal to the *Shouldn't you?*/*Should you?* difference when there is no contribution from surface negatives is open to question. This assumption depends on the further supposition that the positive and negative conveyed interpretations are constructed with comparable speeds for Pairs 5 and 6. This supposition may be false, a point we will take up later.

In this comparison of Pairs 5 and 6, there were two remaining reliable findings. Pair 5, the two declarative requests, was 326 msec faster than Pair 6, the two interrogative requests, $F(1, 16) = 49.79$, $p < .001$, despite the fact that Pairs 5 and 6 are equal in physical length. Also, the average of the two absolute true–false differences was smaller for Pair 5 (180 msec) than for Pair 6 (399 msec). This may also have resulted from the ambiguity in *Should you?*, which yielded the largest such difference by far (565 msec).

Pairs 7 and 8, whose mean latencies are shown in Table 4, can be analyzed much like Pairs 5 and 6. As a quartet, they too fit the predicted three-feature pattern of the Clark and Chase model. First, true was faster than false by 372 and 275 msec for the positive requests *It needs* and *Doesn't it need?*, respectively. Second, false was faster than true by 34 and 164 msec for the negative requests *It doesn't need* and *Does it need?*, respectively. Taken together, these two features were highly reliable, $F(1, 21) = 22.62$, $p < .001$. Third, the two positive requests were 171 msec faster than the two negative requests, $F(1, 21) = 33.58$, $p < .001$. But as in Pairs 1, 2, and 4, the absolute true–false differences were reliably larger for the positive requests (324 msec) than for the negative requests (107 msec), $F(1, 21) = 6.35$, $p < .025$.

As in the analysis of Pairs 5 and 6, we can compare Pair 7 against 8 in an attempt to separate out the contributions of the surface

TABLE 4

MEAN LATENCIES AND PERCENT ERRORS[a] FOR PAIRS 7 AND 8

Pairs	Basic sentences	Response		
		True	False	Mean
7	The circle really needs to be painted blue	1544 (3)	1916 (5)	1730
	The circle doesn't really need to be painted blue	2156 (5)	2122 (2)	2139
8	Doesn't the circle really need to be painted blue?	2098 (5)	2373 (7)	2236
	Does the circle really need to be painted blue?	2251 (9)	2087 (6)	2169

[a] In parentheses.

and conveyed negatives. For this quartet, however, the analysis is confounded from the very beginning. Note that *It doesn't need* exceeds *It needs* in physical length by the two-syllable word *doesn't*, whereas *Doesn't it need*? exceeds *Does it need*? by only the one-syllable contraction *n't*. So even if the superiority of *It needs* over *It doesn't need* (409 msec) is reliably larger than the superiority of *Doesn't it need*? over *Does it need*? (−67 msec), which it is, $F(1, 21) = 37.61$, $p < .001$, we still cannot attribute the amount it is larger solely to the surface negative, since the additional syllable in *doesn't* may contribute to this amount. So we must look elsewhere for indirect evidence. Note that *Doesn't it need*? is actually slower overall than *Does it need*?, even though the former is a conveyed positive and the latter is a conveyed negative. If the surface negative had made no contribution to comprehension time for this pair, by the Clark and Chase model we should expect the former to be faster, not slower, than the latter. But if it is assumed instead that the surface negative did add its separate contribution, then we should expect what was actually found. That is, the small reversal (67 msec) could have resulted from a normal (say, 250 msec) contribution from the conveyed negative, added to a slightly larger (say, 317 msec) contribution from the surface negative in the opposite direction. Hence this result constitutes indirect evidence for separate contributions to comprehension time from the surface and conveyed negatives, at least for this pair.

There was one more reliable finding in the comparison of Pairs 7 and 8. The declarative requests of Pair 7 were 268 msec faster than the interrogative requests of Pair 8, and this was highly reliable $F(1, 21) = 33.58$, $p < .001$. This finding duplicates the advantage of declarative over interrogative constructions in Pairs 5 and 6.

As for the final quartet (Pairs 9 and 10),

TABLE 5

MEAN LATENCIES AND PERCENT ERRORS[a] FOR PAIRS 9 AND 10

Pairs	Basic sentences	Response		
		True	False	Mean
9	I'll be very happy if you make the circle blue	1779 (0)	2103 (3)	1941
	I'll be very sad if you make the circle blue	2363 (7)	1880 (2)	2122
10	I'll be very sad unless you make the circle blue	2357 (2)	2798 (10)	2577
	I'll be very happy unless you make the circle blue	2692 (11)	2322 (8)	2507

[a] In parentheses.

their mean latencies, shown in Table 5, are also consistent with the three-feature model, though with one minor complication. First, true was faster than false by 324 and 441 msec for *I'll be happy if* and *I'll be sad unless*, the two positive requests. Second, false was faster than true by 483 and 370 msec for *I'll be sad if* and *I'll be happy unless*, the two negative requests. As before, these two features taken together were highly reliable, $F(1, 22) = 80.36$, $p < .001$. Third, however, the two positive requests were only 55 msec faster than the two negative requests, and this difference was not reliable, $F(1, 22) = 1.03$. In the full analysis of Pairs 9 and 10, the only other reliable finding was that Pair 9, with *if*, was 511 msec faster than Pair 10, with *unless*, $F(1, 21) = 38.93$, $p < .001$. There was, however, a 125 msec advantage of *happy* over *sad*, and this approached conventional levels of reliability, $F(1, 22) = 3.99, p < .10$.

Why did this quartet fail to yield the third feature of the three-feature pattern predicted by the Clark and Chase model? The answer, we assume, lies in the Stage 1 times for encoding the four sentences. In his study of the comprehension on unmarked and marked adjectives like *happy* and *sad*, Sherman (1969) found, for example, that while *sad* took no longer than *happy* in positive environments such as *I think that Mary is happy/sad*, it did take longer in negative environments such as *I doubt that Mary is happy/sad.* That is, when two negatives occurred together, the amount they contributed to comprehension time was greater than the sum of the amounts they contributed separately. This "superadditivity" effect presumably arose during the stage in which the subjects were attempting to encode the sentences. In the above analysis of Pairs 9 and 10, however, it was implicitly assumed that the contributions of *bad* and *unless*, two "negatives" in this sense, were additive, not superadditive. If, as Sherman's results suggest, they were superadditive instead, then the positive request *I'll be sad unless* should have taken relatively too long. As a consequence, the superiority of the positive over the negative requests should have been diminished, as was actually found. For pair 10, which contained the double negative *sad unless*, the superiority actually reversed, in agreement with the superadditivity effect. Given this effect, therefore, Pairs 9 and 10 are actually consistent with the three-feature pattern, just as the other pairs were.

General Discussion

The listener, we have hypothesized, goes about comprehending the intended meaning of an utterance by (1) constructing a literal interpretation for the utterance, (2) checking its plausibility against the context, and (3), if there is a conflict, bringing to bear certain rules of conversation in order to deduce a conveyed interpretation. Accordingly, it is the conveyed interpretation, when it is constructed, that figures in all further uses of the sentence, as in drawing further deductions, carrying out requests, and the like. From this model we drew up three predictions. Prediction 1: There ought to be evidence that the listener, at some point, actually had constructed the literal meaning. Prediction 2: The listener should take longer, all other things being equal, when he is required to construct a conveyed meaning than when he is able to stick with the literal meaning. Prediction 3: Whenever the listener has constructed a conveyed meaning, he ought to show evidence of using that, rather than the literal meaning, for all further purposes to which the sentence is put. In the following discussion we will therefore examine the evidence for Predictions 1 and 3, discuss some caveats to the above model, and present other evidence to suggest how conveyed meaning may figure in other phenomena in the psychological literature as well.

Evidence for Comprehension of Conveyed Meaning

According to Prediction 3, the subjects in the present experiment should show evidence of having used the conveyed meaning in verifying the requests presented them. Indeed, they showed every evidence of having done so. First of all, they did not hesitate in taking all of the sentences in their conveyed sense. They found the task sensible and made very few errors (except on *Should you?* for which there were two possible conveyed interpretations). More quantitatively, all the sentences behaved according to their conveyed, not their literal, meaning. The three-feature pattern of the Clark and Chase model fit the 10 pairs of requests both individually and as a whole. True was faster than false for conveyed positives; false was faster than true for conveyed negatives; and conveyed positives were faster than conveyed negatives. Although there were individual deviations from this pattern, all appeared to have plausible explanations (see below). In short, the results are quite solid in the support of Prediction 3.

It was not a foregone conclusion that the results should have fit the three-feature pattern of the Clark and Chase model. The subjects, for example, could have "converted" each of the conveyed negative representations (roughly, "Don't color the circle blue") into a positive form (roughly, "Color the circle pink") before comparing it against the picture. Or they could have represented each conveyed negative (for example, *Must you color the circle blue?*) directly in a positive form, say "Color the circle pink." Both of these strategies were available since we used only two colors, pink and blue. As Clark (1970), Trabasso, Rollins, and Shaughnessy (1971), Wason and Jones (1963), and Young and Chase (1971) have noted, when there are just two values within such an experiment, subjects can, and often will, convert negatives like *not pink* into their equivalent positive forms, like *blue*. Conversions such as these in turn alter the predicted three-feature pattern quite radically. While the first and third features remain intact, the second does not. In such instances, true becomes faster than false for negatives as well as positives, since the negatives are actually coded in a positive form by the time they are compared against the picture. The present results showed little evidence for such conversion strategies, since false was faster than true for each of the 10 conveyed negative requests. Yet there was evidence that perhaps a minority of the subjects had used such strategies some of the time on Pairs 1, 2, 3, and 7. If there had been such subjects, the absolute true–false difference should have been less for the negatives than the positives. As noted in the results, this did in fact occur on these four pairs. Nevertheless, there must have been few subjects resorting to such strategies, for the absolute true–false differences were not reliably different for positives and negatives when all 10 pairs were considered together.

What is striking about these results is that the three-feature pattern of the Clark and Chase model followed the polarity of the conveyed interpretations even when this conflicted with the polarity of the surface structures or of the literal interpretations. *Why not?*, for example, comes out positive, and *Why?* negative, despite the obvious negative in *Why not?* and the lack of one in *Why?* The same is true for *Shouldn't you?*/*Should you?* and *Doesn't it need?*/*Does it need?* For the latter two pairs, however, there are linguistic reasons to think that their surface polarity may be opposite to their underlying, or literal, polarity. Stockwell, Schachter, and Partee (1973) have suggested that the surface polarity of such yes/no questions is related to the formation of tag questions. *Shouldn't you go?*, by their scheme, is derived linguistically from *You should go, shouldn't you?*, where the tag question automatically takes on a surface polarity opposite to that of the assertion to which it is attached (see also Brown & Hanlon, 1970; Fillenbaum, 1968). In other words, *Shouldn't you?* is derived from a positive structure, and *Should you?* from a negative. This, of course, would conform with the polarity of their conveyed meanings.

Such an argument, however, cannot be made for the pairs *Why not?/Why?* and *Can you?/ Must you? Why not open the door?* is a reduced form of *Why don't you open the door?* or *Why is it that you don't open the door?*, forms whose negatives must lie in underlying structure since they explicitly presuppose that "you don't intend to open the door." *Why?*, analogously, is derived from a positive structure. For the other pair, if *Must you?* is assumed to derive by the Stockwell *et al.* scheme from a negative structure (like *You musn't do that, must you?*), then *Can you?* must also be assumed to derive from a negative structure (like *You can't do that, can you?*), which conflicts in polarity with its conveyed interpretation. All this evidence leads to the conclusion that our subjects, in verifying the requests presented to them, did so on the basis of their conveyed interpretations, even though these interpretations often conflicted in polarity with the surface structures or literal interpretations of those requests.

The prediction perhaps most crucial to the present model, however, is Prediction 1, which asserts that subjects should show evidence they had at some point constructed the literal interpretation of the sentences. The main evidence for this prediction is found with *if* and *unless* in Pairs 9 and 10. The requests with *unless* (Pair 10) took much longer, over half a second longer, to verify than those with *if* (Pair 9). This difference cannot be attributed to differential "perceptual" difficulties in taking in Pairs 9 and 10, since they are identical in their surface structure. Nor can this difference be attributed to "reading" time, for although *unless* is one syllable longer than *if*, it could not have taken over a half second longer to read. Nor can the difference be attributed to conveyed meaning, since Pairs 9 and 10 are assigned the same pairs of conveyed interpretations. Apparently, the difference can only be attributed to a difference in their literal interpretations: *unless*, as an inherent negative meaning "if not," simply took much longer to encode than *if*. Similarly, the superadditivity effect of combining the two "negatives" *sad* and *unless* could only have arisen if the subjects were actually making use of the literal meanings of these words to construct a literal interpretation. This, therefore, is direct evidence for Prediction 1.

Other evidence consistent with Prediction 1 is that interrogative forms took consistently longer to verify than their corresponding declarative forms. This evidence, however, is consistent with other plausible explanations as well. (1) The interrogatives *Should you?/ Shouldn't you?* (Pair 6) took 326 msec longer than their related declaratives *You should/You shouldn't* (Pair 5). Although this difference may have been inflated by the ambiguity of *Should you?*, still the interrogative *Shouldn't you?* took longer than both *You should*, which corresponds to *Shouldn't you?* in literal meaning by the Stockwell et al. analysis, and *You shouldn't*, which corresponds to it in surface structure yet is negative in conveyed meaning. (2) The interrogatives *Doesn't it need?/Does it need?* (Pair 8) took 268 msec longer than the declaratives *It needs/It doesn't need* (Pair 7). Although the extra *does* in Pair 8 makes this overall comparison somewhat problematic, still both *Doesn't it need?* and *Does it need?* took longer than *It doesn't need*, despite the fact that *It doesn't need*, because it is a conveyed negative, should take longer than *Doesn't it need?* and, because it has an extra syllable, should take longer than *Does it need?* (3) The interrogatives *Can you?/Must you?* (Pair 2) and *Why not?/Why?* (Pair 3) took longer than the declaratives *I would love/I would hate* (Pair 4), despite the fact that Pairs 2 and 3 (with 7 and 7.5 syllables, respectively) were physically shorter than Pair 4 (with 11 syllables). This comparison, of course, is problematic because Pairs 2 and 3 differ from Pair 4 in other respects as well. Nevertheless, because Pairs 2, 3, and 4 have the same conveyed interpretations, the differences must arise elsewhere and go directly against predictions from physical length.

Why did the interrogatives take longer? Since all 10 pairs of requests presumably had the same interpretation by the moment in the process when they were compared against the picture, any differences among the pairs must have arisen prior to the construction of that final interpretation. Although many of these differences can be put down to differences in physical length, those we have just considered cannot. For them there appear to be four plausible explanations, three of which are consistent with the present model. First, interrogatives could take longer because their literal interpretations are more difficult to construct. This would be evidence for Prediction 1. Second, interrogatives could take longer because it is more difficult to deduce the conveyed meaning from the literal meaning and rules of conversation when given an interrogative form than when given a declarative form. This too would be consistent with the present model and indirect evidence for Prediction 2. Third, interrogatives could take longer simply because they are more difficult to take in "perceptually," in the sense of Bever (1970). The inverted word order in interrogatives, because it is an unusual order, could slow down the left-to-right perceptual parse of the sentence. This explanation would be independent of the present model. And fourth, interrogatives could take longer for a radically different reason. Consider the theory that the 10 pairs of sentences in the present study were each ambiguous in their literal meanings. *I would love*, for example, would have two *literal* meanings, one an assertion and the other a request. Under this theory interrogatives might take longer because the request reading is less accessible for interrogatives than for declaratives. Such an explanation would not be consistent with the present theory. So although there are several possible explanations for the superiority of declaratives over interrogatives, most of them are at least consistent with the present model.

The Problem of Idioms

The present theory, obviously, hinges critically on the distinction between literal and conveyed meaning, an issue we have avoided up to now. Indeed, the distinction is not as clear cut as it might appear. There are essentially two tacks for approaching the two uses of, say, *Must you open the window*? The first is to treat it as an ambiguous sentence with two literal readings (one a question and the other a request), and the second is to do as we have been doing, to treat it as having one literal reading (a question) and another reading derived from the literal meaning (the request reading). The first tack implies that the two readings, like the two readings of *The shooting of the hunters was horrible*, are not systematically related, but just happen to have the same surface structure in English. This tack, then, would seem wrong for, say, *Must you open the window*? As a question, this sentence can be paraphrased as *Is it necessary for you to open the window*?, *Do you need to open the window*? and *Is it imperative that you open the window*?, yet each of these paraphrases has the same two readings as the original, one a question and the other a request. This evidence suggests that the question and request readings of *Must you open the window*? are not related by an accident of surface structure, but are systematically related in meaning (see Sadock, 1972). Furthermore, the first tack ignores the fact that the primary use of yes/no interrogatives in English is to ask questions. To treat both readings of *Must you open the window*? as equal in status, then, would be to contradict this *a priori* fact.

Some requests, nevertheless, may have to be treated as idioms with two literal meanings, rather than as nonidioms with one literal and one conveyed meaning. Consider the genuine idiom *kick the bucket*. It has an idiomatic reading ("die") that is perceived as being unrelated, except perhaps historically, to its literal reading ("strike a bucket with one's foot"). For this reason it seems highly unlikely that the listener in comprehending *kick the bucket* would first construct its literal meaning and then derive its idiomatic reading by rule. There is no general rule by which he could do this. Fortunately, idioms such as *kick the bucket* are distinguishable from nonidioms in a number of ways. Idioms are typically not as productive syntactically as nonidioms (one would not say *The bucket was kicked by three people yesterday*). Nor do idioms usually maintain their meaning under paraphrase of their literal meaning (*John struck the pail with his foot* does not mean "John died"). Such idioms must therefore be treated as if they were single ambiguous lexical items with at least two "literal" meanings.

On the basis of these and other criteria, several of the conveyed requests used in the present study may qualify as idioms (see Sadock, 1972). *Can you open the door?* is one. It does not seem to have the same request reading as *Are you able to open the door?*, which it should if it were not an idiom. And while *please* can be inserted medially and finally in the former (*Can you please open the door?* and *Can you open the door, please?*), it cannot be in the latter (*Are you please able to open the door?* and *Are you able to open the door, please?*). Similar arguments can be made for *Why not open the door?* and *Why open the door?* Note, for example, that *What is the reason you don't open the door?*, a literal paraphrase of *Why not open the door?*, does not seem to constitute a request in the same way as the latter. The remaining conveyed requests, however, all seem to be genuine nonidioms having a literal and a derivative conveyed meaning.

The evidence for the present theory, however, remains essentially unchanged even when *Can you?*, *Why not?*, and *Why?* are treated as idioms. Prediction 3 should hold no matter whether the requests used were idioms or not. And the critical evidence for Prediction 1 was from Pairs 9 and 10, with secondary evidence from Pairs 5, 6, 7, and 8, all of which appear to be nonidiomatic.

Importance of Conveyed Meaning

Conveyed meaning occurs so commonly that it is hard to imagine communication without it. Sarcasm, irony, understatement, overstatement, and a host of other rhetorical devices all require the listener to recognize the inappropriateness of literal meaning in context and to "compute" conveyed meaning based on implicit rules of conversation (see Grice, 1967). Expressions of politeness also rely heavily on conveyed meaning, and as R. Lakoff (1973) has argued, there appear to be rules of conversation governing their interpretations as well. Conveyed meaning, however, may also appear in less exotic circumstances, as in the psychological experiment. Here we take up two problematic examples of sentence interpretation that may well be explicable ultimately in terms of literal and conveyed meaning.

The first example is the conditional, say, *If you wash the windows I'll pay you a dollar.* As argued by Geis and Zwicky (1971) and demonstrated by Noordman (1972), Taplin (1971; Taplin & Staudenmayer, 1973), and others, such sentences are often construed as material equivalence (*if and only if*) and sometimes as material implication (simple *if*). The question is how to account for this variation. One possible solution goes as follows. The conditional sentence has only one literal interpretation, namely material implication (the simple *if*). In many contexts, however, people reject this interpretation as implausible and construct a conveyed meaning, namely material equivalence (Springston & Clark, 1973). For the above conditional, the literal meaning entails (*a*) that washing the windows necessarily leads to a dollar payment, but it does *not* entail (*b*) that not washing the windows necessarily leads to nonpayment of a dollar. But how could the sentence induce the listener to wash the windows without (*b*)? To be an effective inducement, the sentence must entail both (*a*) and (*b*) and this is material equivalence. In short, the interpretation of a conditional should vary with context. Whenever the literal interpretation is implausible in context, the listener should apply a conversational rule to derive a conveyed meaning.

The second example is the quantifier *some*, as in *Some of Max's friends are crooks. Some* is construed as "some and possibly all" in some contexts, but as "some but not all" in others. How are we to account for this variation? One solution, offered by Horn (1972), is to treat "some and possibly all" as the literal meaning, and "some but not all" as a conveyed meaning derived from a Gricean rule of conversation. Imagine that the speaker of *Some of Max's friends are crooks* actually knew that all of them were crooks. Although his sentence would be literally true, it would be misleading. One of Grice's (1967) maxims is that the speaker must make his contribution as informative as required, and in this circumstance he has not. If he had, he would have said *All of Max's friends are crooks.* So by saying only *Some of Max's friends are crooks,* he is implying, by means of this maxim, that not all of them are crooks, hence the conveyed meaning "some but not all." But if the speaker knew only some of Max's friends (and the listener knew that), the same sentence *Some of Max's friends are crooks* would not necessarily imply that not all of them were crooks, hence the literal meaning "some and possibly all" could stand. Our interpretation of *some* therefore relies on our judgment of whether the listener knows about all of the cases under discussion or only some of them. And which interpretation is chosen, and how easily, is critical to all of the studies on Aristotelian syllogisms (see, for example, Chapman & Chapman, 1959) as well as to those on quantified sentences (see, for example, Meyer, 1970; Rips, in press).

The solution to these and other problems of interpretation will not be easy for theories of comprehension. Such theories now have to contend not only with syntax and semantics, traditional concerns of such theories, but also with the listener's perception of the context, his acquaintance with the appropriate rules of conversation, and other such pragmatic matters. As yet, there is little known, and even less formalized, about these pragmatic factors, and until there is, there can be no proper formalization of theories of comprehension.

References

Austin, J. L. *How to do things with words.* Oxford: Oxford University Press, 1962.

Bever, T. G. The cognitive basis for linguistic structures. In Hayes, J. R. (Ed.), *Cognition and the development of language.* New York: Wiley, 1970.

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.

Brown, R., & Hanlon, C. Derivational complexity and order of acquisition in child speech. In J. R. Hayes (Ed.), *Cognition and the development of language.* New York: Wiley, 1970.

Chapman, L. J., & Chapman, J. P. Atmosphere effect re-examined. *Journal of Experimental Psychology,* 1959, **58**, 220–226.

Chase, W. G., & Clark, H. H. Semantics in the perception of verticality. *British Journal of Psychology,* 1971, **62**, 311–326.

Clark, H. H. How we understand negation. Paper presented at COBRE Workshop on Cognitive Organization and Psychological Processes. Huntington Beach, California, August 19, 1970.

Clark, H. H. The chronometric study of meaning components. Paper presented at Colloque International: Problems Actuels en Psycholinguistique, Paris, December 1971. In J. Mehler (Ed.), *Current problems in psycholinguistics.* Paris: Centre National de la Recherche Scientifique, in press.

Clark, H. H. The language-as-fixed-effect fallacy: A critique of language statistics in psychological research. *Journal of Verbal Learning and Verbal Behavior,* 1973, **12**, 335–339.

Clark, H. H. Semantics and comprehension. In Sebeok, T. A. (Ed.), *Current trends in linguistics, Vol.* 12: *Linguistics and adjacent arts and sciences.* The Hague: Mouton, 1974.

Clark, H. H., & Chase, W. G. On the process of comparing sentences against pictures. *Cognitive Psychology,* 1972, **3**, 472–517.

Clark, H. H., & Chase, W. G. Perceptual coding strategies in the formation and verification of descriptions. *Memory & Cognition,* 1974, **2**, 101–111.

CLARK, H. H., & HAVILAND, S. E. Psychological processes as linguistic explanation. In D. Cohen (Ed.), *Explaining lingustic phenomena.* Washington: Hemisphere Publishing Corp., 1974.

COLLINS, A. M., & QUILLIAN, M. R. Retrieval time from semantic memory. *Journal of Verbal Learning and Verbal Behavior,* 1969, **8**, 240–247.

FILLENBAUM, S. Recall for answers to "conducive" questions. *Language and Speech,* 1968, **11**, 46–53.

GEIS, M. L., & ZWICKY, A. M. On invited inferences. *Linguistic Inquiry,* 1971, **2**, 561–566.

GORDON, D., & LAKOFF, G. Conversational postulates. *Papers from the Seventh Regional Meeting, Chicago Linguistic Society,* 1971.

GREEN, G. M. How to get people to do things with words: The question of whimperatives. Unpublished paper, University of Illinois, 1972.

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

GRICE, H. P. The logic of conversation. William James Lectures, Harvard University, 1967.

GRICE, H. P. Utterer's meaning, sentence-meaning, and word-meaning. *Foundations of Language,* 1968, **4**, 1–18.

HERINGER, J. T. *Some grammatical correlates of felicity conditions and presuppositions.* Unpublished Ph.D. Dissertation, Ohio State University, 1971.

HORN, L. *On the semantic properties of logical operators in English.* Unpublished Ph.D. Dissertation, UCLA. 1972.

KINTSCH, W. Notes on the structure of semantic memory. In E. Tulving & W. Donaldson (Eds.), *Organization of memory.* New York: Academic Press, 1972.

LAKOFF, R. The logic of politeness; or, minding your p's and q's. *Papers from the Ninth Regional Meeting, Chicago Linguistic Society,* 1973.

MEYER, D. E. On the representation and retrieval of stored semantic information. *Cognitive Psychology,* 1970, **1**, 242–300.

MORGAN, J. L. Syntactic form and conversational import—some interactions. In D. Cohen (Ed.), *Limiting the domain of linguistics.* Milwaukee: University of Wisconsin–Milwaukee Press, 1972.

NOORDMAN, L. G. M. On the interpretation of conditional sentences. *Heymans Bulletins,* 1972, NR: HB-72-118 EX, Psychologische Instituten, Groningen University, Groningen, The Netherlands.

RIPS, L. J. Quantification and semantic memory. *Cognitive Psychology,* in press.

RUMELHART, D. E., LINDSAY, P. H., & NORMAN, D. A. A process model for longterm memory. In E. Tulving & W. Donaldson (Eds.), *Organization of memory.* New York: Academic Press, 1972.

SADOCK, J. M. Whimperatives. In J. Sadock & A. Vanek (Eds.), *Studies presented to Robert B. Lees by his students.* Champaign: Linguistic Research, Inc., 1970.

SADOCK, J. M. Speech act idioms. *Papers from the Eighth Regional Meeting, Chicago Linguistic Society,* 1972.

SEARLE, J. R. What is a speech act? In M. Black (Ed.), *Philosophy in America.* London: Allen and Unwin, 1965.

SEARLE, J. R. *Speech acts: An essay in the philosophy of language.* Cambridge: Cambridge University Press, 1969.

SHERMAN, M. *Some effects of negation and adjectival marking on sentence comprehension.* Unpublished Ph.D. Dissertation, Harvard University, 1969.

SPRINGSTON, F. J., & CLARK, H. H. *And* and *or*, or the comprehension of pseudo-imperatives. *Journal of Verbal Learning and Verbal Behavior,* 1973, **12**, 258–272.

STOCKWELL, R. P., SCHACHTER, P., & PARTEE, B. H. *The major syntactic structures of English.* New York: Holt, Rinehart, and Winston, 1973.

TAPLIN, J. E. Reasoning with conditional sentences. *Journal of Verbal Learning and Verbal Behavior,* 1971, **10**, 219–225.

TAPLIN, J. E., & STAUDENMAYER, H. Interpretation of conditional sentences in deductive reasoning. *Journal of Verbal Learning and Verbal Behavior,* 1973, **12**, 530–542.

TRABASSO, T. Mental operations in language comprehension. In J. B. Carroll & R. O. Freedle (Eds.), *Language comprehension and the acquisition of knowledge.* Washington: V. H. Winston & Sons, 1972.

TRABASSO, T., ROLLINS, H., & SHAUGHNESSY, E. Storage and verification stages in processing concepts. *Cognitive Psychology,* 1971, **2**, 239–289.

WASON, P. C. The contexts of plausible denial. *Journal of Verbal Learning and Verbal Behavior,* 1965, **4**, 7–11.

WASON, P. C., & JOHNSON-LAIRD, P. N. *Psychology of reasoning: Structure and content.* London: Batsford, 1972.

WASON, P. C., & JONES, S. Negatives: Denotation and connotation. *British Journal of Psychology,* 1963, **54**, 299–307.

WINOGRAD, T. *Understanding natural language.* New York: Academic Press, 1972.

YOUNG, R., & CHASE, W. G. Additive stages in the comparison of sentences and pictures. Paper presented at Midwestern Psychological Association Meeting, Chicago, Illinois, April 1971.

(Received July 18, 1974)