ON THE INTERPRETATION OF UTTERANCES

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ABSTRACT

An analysis of the problem of the interpretation of utterances is presented from the point of view of Descriptive Psychology. The problem is stated basically as the problem of accounting for the hearer's differentiation among actions of the speaker. Such differentiation is accounted for by reference to the parameters of Intentional Action. It is pointed out that the hearer's knowledge is observational, not inferential. The requirement that the hearer's knowledge be coherent is discussed and related to the legitimate uses of inference in describing behavior. The locution is shown to involve the identification of concepts, which may include the concept of the speaker's own behavior and the concepts of relevant circumstances. Behaviors having the same locution as specification of the Performance parameter are differentiated by the other parameter values, and it is seen to be non-problematical that different actions involve the same locution. This analysis accounts for context, and suggests significant advances in problems such as automated language processing.

THE INTERPRETATION OF UTTERANCES

"Can you reach the salt?"

How is one to react to these words? By telling the speaker whether one can or cannot extend one's arm and grasp the container of salt? Or by passing the container of salt to the speaker?

Suppose that these words are uttered on two different occasions, and by two different speakers, as described in the following scenarios:

Scenario I: It is a cold winter day, and the streets and sidewalks are covered with ice. Inside a hardware store, a clerk leans against the checkout counter. He sees a boy standing in front of some shelves in the store. On the shelves above the boy's head are packages of rock salt. The clerk says to the boy, "Can you reach the salt?"

Scenario II: Several persons are seated at a table eating dinner. A woman tastes the meat on her plate, puts down her fork, and looks around the table. She sees the nearest salt shaker about six inches to the other side of the plate of the man next to her. She says to him, "Can you reach the salt?"

It seems clear that the appropriate reaction to the speaker in Scenario I is for the boy to tell the speaker whether he can grasp one of the packages of salt and lift it down. It likewise seems clear in Scenario II that the appropriate reaction is for the man to pass the salt to the woman.

The problem of interpretation of utterances illustrated here has been of great interest to linguists and philosophers in the late 1960s and throughout the 1970s; see, for example, the papers collected in Bar-Hillel (1971), Cole and Morgan (1975) and Cole (1978). The centrally influential approaches to this general problem have been those proposed by Grice (1957, 1975, 1978), Gordon and Lakoff (1975), Katz (1977), Sadock (1974) and Searle (1969, 1975). Despite the effort devoted to the study of this problem, however, there are conspicuous lacunae and there is a lack of tangible success in applying such work to the interpretation of utterances besides short, hypothetical locutions used as examples in illustrating theoretical points.

As an example of the lacunae, take context, the importance of which is illustrated by the scenarios given here. Context is mentioned in the writings of those cited above as interested in the interpretation of utterances; for example, suggested interpretations or generalizations are sometimes qualified by such expressions as "in the appropriate context," or "given shared background information," and Gordon and Lakoff define a conversational postulate as applying in a particular context (1975, p. 84).

Despite the acknowledged importance of context and its frequent mention, however, there has been very little consideration of context itself.

Even Katz, who has dealt most extensively with context, has said little by way of investigation or explication of context beyond such examples as "features of the physical environment, the knowledge of the speaker about the beliefs, attitudes, and so on of the audience, and other aspects of context" (1977, p. 15) or "the convention that requires the speaker or audience [involved in using such words as 'bunny' or 'doggie'] to be a child" (1977, p. 21).

It is only fair to make it clear that Katz does state pointedly that it is not his aim to provide an account of the interpretation of context. Yet it is surely a conspicuous omission that no one is so concerned.[1] It is true that virtually anyone can recognize the difference that context makes in most utterances. The fact that the average person can deal with context in this fashion does not justify a neglect of the formal study of context, however, any more than the fact that the average person can distinguish one word from another justifies a neglect of phonetics and morphology.

As an example of the lack of successful application, take the case of the work in Artificial Intelligence on the processing of natural language by computer. Surely if the theories and investigations of linguists and philosophers account satisfactorily for the understanding of language, then they should be applicable as the framework for successful automated language understanding. But even the most recent and most successful efforts in this area (e.g., DeJong, 1979; Schank and Abelson, 1977; Walker, 1978) show little, if any, evidence of having been influenced by the concerns and accounts of researchers in the mainstream of linguistic and philosophical approaches to the interpretation of utterances.

The time thus seems ripe for a fresh look at the whole problem of the interpretation of utterances. I shall take such a fresh look here, beginning with a restatement of the basic issue, and developing an analysis of the problem that offers a fully sufficient in-principle account of context and also promises to permit a successful attack upon the problems of automated language processing. This analysis will be carried out from the perspective of, and couched in the terms of, Descriptive Psychology (Ossorio, 1966, 1973, 1969/1978a, 1971/1978b, 1972/1978c, 1981a, 1969/1981b, 1970/1981c).

THE PROBLEM: A REFORMULATION

Recall the two scenarios, in each of which a speaker uttered the words, "Can you reach the salt?". It was clear from the scenarios that it was appropriate for the hearers to treat the speakers in the two scenarios differently. It was appropriate to treat them as having carried out different actions: in the one case, the action of requesting information; in the other case, the action of trying to acquire an object.

Thus, the basic problem may be stated as follows: The problem of the interpretation of utterances is the problem of the hearer's differentiation of the action carried out by a speaker in speaking. It is this differentiation of actions that must be accounted for.

DIFFERENTIATION OF ACTIONS

In Table 1 the two actions carried out by the two speakers in the scenarios are described and differentiated by reference to the parameters of intentional action, the IA parameters (Ossorio, 1966, 1973, 1969/1978a, 1981a, 1969/1981b, 1970/1981c). Such description is appropriate since verbal behaviors are distinguished by reference to these parameters just as nonverbal behaviors are (Ossorio, 1969/1978a, pp. 105–107). The only difference between verbal and nonverbal behaviors as such is that in the case of verbal behaviors the process aspect (Performance parameter) of the action involves the use of words.

Further details could be added to the specification of the parameters provided in the Table. For example, although the Performance parameter is specified there only by the words spoken, the paralinguistic features of the utterance are also part of the complete specification of the Performance parameter of a verbal behavior (cf. Ossorio, 1969/1978a, p. 105).

In addition, the Achievement parameter is specified there only by the state of affairs involving the words "Can you reach the salt?" having been successfully uttered. This is an appropriate specification as far as it goes,

Table 1.

	Requesting Information	*Seeking to Acquire Salt*
Know	The hearer might want salt Speaker doesn't know if hearer can reach salt	The speaker wants the salt The hearer can reach the salt
Want	To find out if hearer can reach salt	To have the salt
Know How	To make request by uttering words	To ask for salt by appropriate words
Performance	"Can you reach the salt?"	"Can you reach the salt?"
Achievement	Completion of performance	Completion of performance
Significance	Social practice of clerking in a hardware store	Social practice of dining
Personal Characteristics	Status as a clerk in a store	Speaker's trait of politeness

since the fact that the process aspect of the behavior has been completed is part of the terminal state of affairs bounding the action. In an actual, ongoing behavior, however, it would probably be possible to add details concerning whether the speaker succeeded in achieving what he or she wanted, e.g., knowledge of the addressee's capacity to grasp the salt, or acquisition of the salt.

Nevertheless, the specifications stated in Table 1 suffice to make it intelligible that the speakers in the two scenarios should be treated as having carried out different actions: All of the IA parameters are specified differently for the two actions except for the Performance and Achievement parameters.

In general the IA parameters, particularly as employed in the calculational system permitting various transformations and operations to be employed recursively and reflexively (Ossorio, 1973, 1970/1981c), are collectively sufficient to individuate any action whatsoever from any other action. This is so even though it is generally possible to elaborate on descriptions of behavior, just as it would be possible to add further details to the specifications provided in Table 1. Any further specifications are further elaborations of the values for the list of parameters already given in Descriptive Psychology, and do not require the addition of more parameters.

Two further questions suggest themselves at this point. First, what account can be given of the hearer's knowledge of the values for the parameters of the speaker's action? Second, what difference does it make in the differentiation of verbal behaviors that the locution—the specification of the Performance parameter—is the same for two behaviors? I shall consider these questions next.

KNOWLEDGE OF ACTIONS

The hearer's knowledge of the speaker's action is fundamentally and ordinarily observational. That is, the hearer knows the speaker's action without having to find out or recall something else first on that occasion.

Thus the hearer at once observes a speaker (Individual) carrying out an action which is the expression of taking some state of affairs to be *this* state of affairs and not some other (Know), and which is an attempt to attain some desired state of affairs (Want) as a part of some on-going pattern of behavior (Significance) and in expression of some characteristics of the speaker (Personal Characteristics). The action involves some process (Performance), the execution of which is a matter of the speaker's skill (Know How), and which is bounded and defined partly by a terminal state of affairs (Achievement).

Now to give a description of the differentiation between actions in

terms of the IA parameters is thus to provide a logical reconstruction, not a process model, of the hearer's knowledge of the action. There is no implication that the hearer literally goes through a sequential process of assigning values to the IA parameters.

Thus the description of the hearer's knowledge as observational contrasts sharply with the description generally offered by linguists and psychologists that such knowledge is inferential. Since the inferential point of view is central to all of the accounts of language understanding put forward in the mainstream of current linguistics, philosophy and psychology, it seems appropriate to consider here at some length the arguments against taking inference to be the basic mode of the hearer's understanding, and to explore the extent to which inferential accounts have a usefulness in describing the understanding of language.

Against Inference

First, consider that knowledge must start with observation. If all knowledge were inferential, i.e., required the knowledge of something else first, then one could never know anything because one would always have to know something else first. Thus to say that all knowledge is inferential is to set up a vicious infinite regress (cf. Ossorio, 1969/1978a, p. 32).

Of course, those who characterize the hearer's knowledge of a speaker's actions as inferential do not say that all of the hearer's knowledge of the action is inferential. They say that the hearer observes some aspects of the speaker's behavior, usually the locution and some contextual factors, and from these infers the speaker's intentions and motives.

Closer scrutiny reveals that this move is not an escape from the regress, however. The postulation of the locution as that which is observed is ad hoc and arbitrary. Following the logic of the inferential accounts one should say that the hearer observes different sounds and infers words from these sounds. But in that case, wouldn't it be still more reasonable to say that the hearer observes different pitches and tones from which he infers sounds from which he infers words from which he infers the utterance? But why not then say that the hearer observes varying waves of air, from which he infers pitches and tones, etc.? But then why not say that what the hearer observes is pressure on the ear, from which he infers waves of air, from which he infers pitches and tones, from which he infers sounds, from which he infers words, from which he infers an utterance, from which he infers an action? And so forth. And the same line of argumentation applies, *mutatis mutandis,* to the observation of contextual factors, however they may be defined.

Consider now a different line of argumentation. The understanding of

language does not seem to involve an inference. For example, when we are engaged in conversation we do not generally seem to ourselves to be engaged in inference, and we are not conscious of drawing conclusions from premises. Rather, we experience ourselves simply as understanding what the speaker is doing by saying whatever he says.

That the understanding of language does not seem to involve inference is a powerful consideration against the inferential position. To treat things as *not* what they seem without sufficient reason is to violate the maxim: Take it that things are as they seem unless you have sufficient reason to take them otherwise (see Ossorio, 1969/1981a, p. 28). To violate this maxim is at least implicitly to espouse a radical skepticism which furnishes no basis for further action and no basis for any knowledge whatever.

Finally, the explanation in terms of inference is more complicated than the explanation in terms of observation, and it requires a much more complex operation to be attributed to the hearer. This being the case, it is a violation of the principle of parsimony to postulate the inferential explanation unless the simpler observational explanation is clearly inadequate to account for the understanding of actions.

At this point the proponent of the inferential position might say that there is reason to take understanding as being other than what it seems, and that there is a deficiency in the observational account that must be remedied by the postulation of the inferential account. According to this argument, in deciding difficult cases involving disagreement between observers or in justifying the description of an action, we must explain our observations in inferential terms; hence, knowledge of actions fundamentally requires inference.

According to this argument, for example, we can only account for our understanding of the speaker's desires in Scenario II (the dinner party) by a process of inference from our prior knowledge about what the speaker knows about the addressee's physical capacities already. We can put the inferential steps somewhat as follows: (a) one cannot be said to want to learn something he already knows; (b) but in Scenario II the speaker already knows that the addressee has the capacity to reach the salt; (c) therefore the speaker cannot want to learn the facts about the physical capacity of the addressee to reach the salt. It is just this kind of inference that is proffered by Grice (1975, 1978) and Searle (1969, 1975) to account for the understanding by hearers of the actions of speakers.

It is true that the inference just stated describes a logical relationship that holds between the values of the parameters involved, in this case the Know and Want parameters. The inference is not, however, the only possible description of this relationship, and it is not necessary to suppose that any inference ordinarily occurs in the hearer's knowledge of the

speaker's actions. An examination of the logical relationships that must obtain between parameter values will help to make this clear.

Conceptual Coherence

It is a fundamental logical requirement that for any description to be accurate it must be coherent. That is, the elements of the description must go together in a pattern that is consistent with the concept of the object, process, event, or state of affairs offered as descriptive of what is observed.

This is so because a description indicates how the one who gives the description is prepared to treat that which is described: The description partially specifies the Know parameter of any behavior the describer undertakes toward that which is described. An incoherent description, however, cannot be acted upon: It would require inconsistent or contradictory actions to be undertaken toward that which is described.

Action descriptions must be coherent just like any other descriptions. The values specified for the IA parameters must go together recognizably as the analytic elements of the concept of the action in question. Ossorio illustrates this point when he says, "The combination of wanting fame, knowing that Peking is the capital of China, knowing how to ride a bicycle, sucking one's thumb, and causing an explosion do not constitute a case of [intentional action]" (Ossorio, 1969/1978a, p. 124).

There are various ways of expressing the relationships that must obtain among the elements of a description by virtue of this requirement of conceptual coherence. The basic way is simply to state the typical features of the concept as its typical features. Table 2 provides just such a statement of the concept of requesting information (recall that this con-

Table 2.   Parameter Specifications for the Action of
Requesting Information

Know	The speaker knows that he doesn't know something
	The speaker knows that he wants to know what he doesn't know
	The speaker knows that someone else at least possibly knows it
Want	The speaker wants to learn what he doesn't know
Know How	The speaker has the capacity reliably to carry out the performance of uttering words that conventionally signal the request for information
Performance	The speaker carries out a verbal process that recognizably counts as the process aspect of requesting information
Achievement	The speaker succeeds in carrying out the verbal performance
Significance	The ongoing behavior in which the speaker is engaged is a behavior in which requesting information is intelligible and a part of which can be asking the information
Personal Characteristics	Whatever characteristics might be expressed by requesting information, such as curiosity, caution, etc.

cept is instantiated by the action portrayed in Scenario I and described in Table 1).

The description presented in Table 2 provides logical limits on the values that can be specified for the IA parameters in describing an action and still have that action count as an instance of requesting information. For one thing, the value of the Know parameter must include the speaker's awareness that there is some item of information he does not already know and about which he wishes to become informed.

Consider, for example, the case in which the Know parameter of a speaker's behavior is partially specified by his awareness of the precise current outside temperature. In this case there is a clear restriction: He cannot coherently be said to want to learn what the precise current outside temperature is, and any behavior he carries out, the Know parameter of which is thus specified, cannot be an instance of requesting information about the precise current outside temperature.

Now, there are other ways besides a list of the type presented in Table 2 by which the logical restrictions on descriptions of any action may be represented. One way is to set up a series of conditions, each of which relates to one or more of the parameters of the action in question, e.g., requesting information. A way of generating statements of these conditions is to preface the specification of values for each of the parameters with the phrase, "If a person is requesting information, then the value of this particular parameter must be specified as . . . ."

For example, in the case of the Know parameter, one can say, "if an individual is requesting information, then the Know parameter of his action must be specified partially by his awareness that there is some information which he does not have, and it is about this information that he must make his request."

Thus it can be seen that the felicity conditions outlined by Searle (1969, 1975) represent a partial statement of the concept of the various actions he discusses, such as requesting, promising, and directing. This list he gives of the features of each of the concepts is partial, since only part of the full list of IA parameters is represented by his conditions: Performance, by the propositional content condition; Know, by the preparatory condition; Want, by the sincerity condition.

The status of Searle's essential condition is not clear. This condition, that the act "counts as an attempt to elicit this information [from the hearer]" (1969, p. 66), as he puts it in the case of the action of questioning, may be superfluous given the other IA parameters including those Searle does not otherwise mention. Or, this condition may refer to one of the acceptable versions of an action described in more significant terms than the specific process of actually uttering the words (cf. Ossorio, 1972/1978c, pp. 46–47).

Similarly, the conditions outlined by Gordon and Lakoff (1975) as sincerity and reasonableness conditions for the application of conversational postulates involve some of the IA parameters as applied to speaker and hearer, especially Know, Want, and Know How.

Conditions such as those stated by Searle and by Gordon and Lakoff make the sense that they do because they depend logically upon, or are one expression of, the logical relationships inherent in the concept as a whole. Furthermore, the dependence of the aspects of the concept one upon another is not temporally or logically sequential, i.e., none of the relationships among the parameters is prior to or more important than any of the others (contrary to the position taken by Searle, 1969, p. 63).

Usefulness of Inferential Explanations

There is a point to stating coherency constraints in terms of conditions. Such statements can, for example, facilitate explanation to persons who do not immediately understand the consistency or inconsistency of a description with a concept.

In the case of the action of requesting information, an individual who did not understand the interpretation of Scenario II (the dinner party) might be helped to understand it by presentation of the following line of reasoning: (a) if an action is the action of requesting information, then it must be the case that the speaker must know that she doesn't know something, and must want to learn what she doesn't know; (b) in Scenario II it is clear that the speaker knew that the man next to her was physically capable of reaching the salt shaker, since it was only six inches from his plate; (c) therefore the speaker's action cannot be a request for information about the addressee's physical capacity to reach the salt shaker.

This example illustrates that one can state coherency constraints in the form of a condition, as in step (a) above, as a tactic for getting another person to understand that fact first, from which the other person can then understand a logically related fact. But for a person to know one thing first, from which that person then knows another, is the general case of inference. Thus it clearly makes sense to use inferential explanations in describing and communicating the coherency constraints on particular concepts.

Similarly, there are times when a hearer can achieve understanding through the inferential process of examining items of information one at a time and exploring their logical relationships in that form. It is plausible, for example, that an individual might hear a speaker utter words which seem nonsensical; in that case, the hearer might ponder one by one the things he knows about the speaker and the situation in an effort to get it all straight.

Now to say that it is reasonable to use inferential explications in this fashion is not to say that the knowledge of the hearer is basically inferential. The order imposed upon the presentation of parameter values in an inferential explication is an order owing to a particular and special need of an individual first to understand one thing before he or she understands others. This ordering is not found in the logical structure of the concept: All parameters contribute simultaneously and coordinately to the concept of the action in question.

This last point may be clearer if one keeps in mind that the parameters are not synthetic elements that are put together to compose an action; they are analytic elements. They can be discussed and described separately, but always at least implicitly as components of the whole action. Therefore to specify one parameter, or to discuss it by itself, is to provide a partial description of the entire behavior of which that parameter is an analytic element (cf. Ossorio, 1966, Part I, Chapter III).

Furthermore, the knowledge required for the inference process cannot itself be inferential, because of the regress problem I mentioned earlier. Each of the items of information in the inferential statement outlined above could itself be explained in terms of an inference: Thus, one might offer an inferential account of the fact that the woman knew that the man sitting next to her had the physical capacity to reach the salt. And the knowledge involved in that understanding could similarly be described in terms of an inference. And so on, to the point where, if the regress is not infinite, it is so extended that it is implausible that a human being could ever work through so many inferences in the brief time it takes the hearer to understand the utterance in a setting such as that described in Scenario II.

Thus accounts of the interpretation of speakers' actions in terms of inference (e.g., Gordon and Lakoff, 1975; Grice, 1957, 1975, 1978; Searle, 1969, 1975) can be seen as mistaking a special tactic of communication or investigation, intelligible because of the logical relationships inherent in any concept, for the basic mode of understanding.

Summary

The hearer ordinarily observes immediately the action of the speaker. The hearer's understanding by observation is limited logically by the requirement of consistency with a concept: The hearer must understand the action as instantiating the coherent concept of some action. The requirement of consistency with a concept is demanded by the nature of the hearer's understanding as being itself a concept upon which the hearer must be able to act.

Accounts of the hearer's understanding in terms of inference can be

seen as secondary accounts. These inferential accounts derive their intelligibility from the non-sequential logical relationships of the elements of the concept, and have a use in special situations in which these logical relationships must be presented in sequential form, e.g., as when the hearer must understand one aspect of the action before another because of a difficulty in understanding the action as observed.

LOCUTIONS

Table 1 specified the Performance parameters of the action in Scenario I as being identical to the Performance parameter of the action in Scenario II: Both were specified by the locution "Can you reach the salt?". From the point of view of most conventional approaches to language this is a problem. These approaches all assume that the locution can determine an action so completely that the principal problem is one of accounting for instances in which the locution is not thus determinative.

What, then, is the status of the locution? As an ordinary matter can the locution be regarded as determinative of the entire action? Does a knowledge of the value for the Performance parameter for a verbal behavior enable one thereby to assign values for the other parameters?

It is clear that the locution has a special character not shared by the process descriptions that can specify the Performance parameters of nonverbal behaviors. A locution identifies, and stands in a one-to-one relationship with, a conceptual distinction (Ossorio, 1969/1978a, esp. pp. 100–102).

Of course, there is a limit to the concepts that can be identified by the locution in any particular action. This limit is provided by the logical requirement that the locution can identify only a concept that the speaker is acting on, i.e., a concept that can be part of the specification of the Know parameter of the speaker's action (Ossorio, 1969/1978a, p. 105).

The concepts that can be identified by the locution in a particular action can conveniently be considered under two headings: (a) the concept of the action that the speaker is carrying out; and (b) circumstances that are relevant to the action that the speaker is carrying out.

The Concept of the Speaker's Action

Speaking is a behavior restricted to persons and human behavior is paradigmatically deliberate (Ossorio, 1969/1978a, p. 75 and p. 79). The value for the Know parameter of any deliberate action includes the action itself which is deliberately carried out (Ossorio, 1973); this action can be distinguished by the acting individual under a complete behavior descrip-

Table 3. Distinctions That Can be Marked by Locutions in Action of Requesting Information Exemplified in Scenario I.

Parameter	*Distinction*	*Locution*
Know	Whether the addressee can reach salt	"I don't know whether you can reach the salt"
Want	To learn whether addressee can reach salt	"I'd like to know if you can reach the salt."
Know How	Capability of uttering appropriate words or not	"I don't know how to say this . . . ."
Performance	Conventional question vs. statement	"Can you reach the salt?"
Achievement	Finding out or not finding out if addressee can reach the salt	"If I ask you, will you tell me whether or not you can reach the salt?"
Significance	Clerking in a store vs. other social practices	"I'm here to help you if you need it."
Personal Characteristics	Status of clerk vs. other statuses	"I am a clerk here, you know."

tion in which values are specified for all of the IA parameters. Therefore all of the parameters of the action deliberately carried out in speaking can specify the Know parameter of the deliberate action of speaking.

Accordingly, the locution can identify any of the distinctions marking values of the parameters of the verbal action deliberately carried out. Table 3 illustrates such distinctions, and some locutions identifying them, in the case of the action of requesting information exemplified in Scenario I (the hardware store).

As a general principle, then, it is logically possible for a locution to identify any of the analytic elements of the concept of the very action being carried out. This principle has not been recognized in the literature on the interpretation of utterances. It does, however, make intelligible in a general and systematic fashion the reasonableness of Searle's observation (1975, p. 72) that the words uttered by a speaker may concern any of the felicity conditions (subject to certain conventional limitations). It also makes intelligible similar suggestions by Gordon and Lakoff, e.g., that one can convey a request by asserting speaker-based sincerity conditions or questioning hearer-based sincerity conditions (1975, p. 86). (Recall that such conditions are one way of representing the analytic elements of a concept.)

The Circumstances

The Know parameter of the speaker's deliberate action of speaking is only partially specified by the concept of the action the speaker chooses to carry out; it is also specified by the relevant circumstances. Ossorio elaborates this point only to the extent of saying, "For example, the general circumstances in which the behavior occurs are usually 'understood' and do not appear in verbalization, though they do appear in K" (1969/1978a, pp. 105–106).

Now, although the locution is not usually used to identify the concepts of circumstantial factors, it can. Since the topic of consideration here is the range of concepts that can possibly be identified by the locution, the question of the circumstances deserves more detailed consideration here.

Consider the example of the situation which is partly described in Scenario I (the hardware store). It seems a simple task to identify the principal elements that can be taken as the relevant circumstances for the action described there: the fact that the locution is uttered in a store, on an icy day; and the fact that there are bags of salt on the shelf before which the customer is standing. All of these elements of the total situation have been selected for explicit mention in the scenario because they are relevant.

There are, however, a large number of distinguishable aspects of the total situation which do *not* seem to count as relevant circumstances, and which accordingly have not been mentioned in the scenario. For example, one would probably not count among the relevant circumstances the name of the store, the size of the store, the time of day, the number of other customers in the store, the age of the clerk, the price of the salt, the brands of salt that are available, the temperature in the store, the address of the store, the exact date of the utterance by the clerk, whether the customer had already picked out other items for purchase or not, the distance from other stores that carry the same kind of salt, and whether it was actually snowing at the time or there was just ice on the ground. And, of course, the list could be extended much further; the limits to which it could be extended are a function mainly of the ingenuity and assiduity of the one making the list.

The inclusion of some of the features of the total state of affairs, including the speaker and his action, and the exclusion of others from that which is regarded as comprising the relevant circumstances of the speaker's action can be accounted for straightforwardly and systematically. The relevant circumstances are those aspects of the total state of affairs that make a difference in the speaker's assessment of the state of affairs on which he or she acts. And it is by reference to the IA parameters that such a difference is intelligible.

For example, it makes a difference in the speaker's Know parameter whether or not he recognizes the situation as one in which the hearer wants to buy the salt. The fact that it is an icy day is relevant to the distinction between wanting and not wanting to buy salt: Since salt can be used to melt ice, it is more likely that the hearer would want salt on an icy day than on one that is simply cold. The speaker can identify this relevant circumstance by uttering a locution such as, "This is the kind of day when you really need to put salt on your sidewalk." This is an understandable performance for the action of requesting information about whether the addressee can reach the salt: The addressee can reply, "Yes, but I can't reach it," or some such locution that is responsive to the speaker's desire to learn whether the addressee can or cannot reach the salt.

For another example, the height of the shelf makes a difference in whether the speaker can be assumed to know that the hearer can reach the shelf. The speaker can explicitly identify this relevant circumstance by uttering some locution such as, "That shelf is pretty high," or, "You need a stepladder, I think." Such locutions are reasonable performances in the action of requesting information: To the former the hearer might, for example, reply, "Not too high," or "Yes it is, I can't reach it;" to the latter, the hearer might, for example, reply, "No, I don't, I can get it," or "I need something—I can't reach it by myself." Any of these responses would obviously be responsive to the speaker's desire to have information about the addressee's capacities.

Limits on Locutions

The number of possible distinctions that may be identified in connection with an action, and hence the number of locutions that may intelligibly specify the Performance parameter of that action, is hence quite large. It is not, however, unlimited.

Suppose that in Scenario I the words spoken by the clerk had been, "Did you see the Pittsburgh-Dallas game?" or "My mother broke her hip yesterday." Neither of these locutions can logically be understood as specifying the Performance parameter of the speaker's action of requesting information about whether the addressee can reach the salt. They cannot be so understood because they do not indicate a distinction that makes a difference in the IA parameters of the clerk's action such that the action is the action of requesting information about the addressee's capacity to reach the salt.

There are, then, limits on the distinctions that can be marked by a locution if that locution is to specify the Performance parameter of a given action. These limits are given by the requirement of relevance to the IA parameters of the action in question, and by the fundamental constraint

that the parameter values be consistent with the coherent concept of that action.

The Locution in Relation to Non-Performance Parameters

Consider the various locutions that can specify the Performance parameter of the action of requesting information, as I have suggested above. None of them necessarily specifies the Performance of *that* action. It is logically possible that each of them might specify the Performance of some other action; i.e., the values of the non-Performance parameters of a speaker's action are not logically determined by the value of the Performance parameter.

This point is easy to see. For example, the words "Can you reach the salt?" can specify the Performance of either the action of seeking information or the action of asking for the salt (or other actions, such as the action of giving examples in linguistic discussions). Similarly, any of the other locutions which, as suggested just above, can be used to specify the Performance of the action of requesting information can also be used to specify the Performance of other actions. For example, the words, "That shelf is pretty high," might be the value for the Performance parameter of the action of asserting an obvious fact in the course of the social practice of establishing social contact with another person.

The hearer's knowledge that a given locution is the process element (Performance) of this action, and not that one, can be understood by reference to the IA parameters: If two behaviors involve the same locution, it is by reference to the non-Performance parameters (and to paralinguistic features partially specifying the Performance parameter) that the behaviors can intelligibly be understood as instances of the same or of different actions (cf. Table 1).

Thus this analysis shows that the locution does not determine the value of the other parameters of the speaker's action. There is therefore no problem in principle as to why the same locution—e.g., "Can you reach the salt?"—can specify the Performance parameter of different actions.

Summary

The locution identifies a conceptual distinction. The distinction so identified partially specifies the Know parameter of the action the speaker carries out in speaking. The possible specifications of the speaker's Know parameter of the deliberate action of speaking, and hence the distinctions that can be identified by the locution, include (a) the action itself that the speaker is carrying out, and (b) the circumstances that are relevant to the action.

The distinctions marked by the locution can concern any or all of the IA

parameters differentiating the action itself that the speaker is carrying out. The relevance of circumstances is by reference to the IA parameters: A relevant circumstance is one that makes a difference in parameter values such that the action is this action rather than some other.

There is no special problem with having the same locution specify the Performance parameter of different actions, since the locution does not uniquely determine the values of the other parameters. If the locution is the same for two behaviors, it is by reference to the values of non-Performance parameters and of such aspects of the Performance as paralinguistic features that the behaviors are understood as instances of the same or of different actions.

CIRCUMSTANCES OBSERVED BY THE HEARER

The hearer's understanding that a given locution is the process element of this particular action rather than that one, an understanding describable by reference to the IA parameters as indicated above, is by observation of the speaker as an acting individual, engaged in an ongoing stream of behavior in some circumstances.

The circumstances and background in which the speaker is observed to act do make a difference, of course, in the hearer's understanding. The circumstances that the hearer observes to be relevant are those that make a difference in the IA parameter values such that the action is *this* action rather than some other one. This is the same account offered above with respect to the circumstances that can possibly be identified by the locution of a particular action: For both the speaker and the hearer it is by reference to the IA parameters, within the constraints of the requirement for conceptual coherence, that the inclusion of some aspects of the total situation as relevant to the action, and the exclusion of others as irrelevant, can be understood.

This is not to say that the hearer first observes the total state of affairs and then, by a process of elimination sequentially executed, considers each aspect of this total state of affairs to see whether or not it makes any difference in the action. This would be manifestly impossible: The number of distinguishable aspects of the total state of affairs is indefinitely large, and it would be a limitless task to examine them one by one and make a decision as to inclusion in, or exclusion from, the circumstances that are relevant to the action.

Neither is it to say that the hearer knows of those elements to be included in the circumstances, and their relation to the action, by a process of inference, in which the hearer might, for example, begin with some partial description of the behavior and then make a judgment as to whether any particular element was relevant to the parameters. Rather,

the hearer's knowledge of the act in the circumstances is observational and direct (although as usual inferential explications have usefulness for certain purposes).

The example of the circumstances that are relevant to the action of requesting information, developed above as a part of the discussion of the concepts that can be identified by a locution, is applicable here, too. Other examples can be developed, as well.

Take the locution, "That shelf is pretty high, isn't it?" which I suggested above could, as a reference to circumstances bearing on the hearer's ability to reach what was on the shelf, specify the Performance parameter of the action of requesting information about whether the hearer could, as a matter of fact, reach what was on the shelf.

Now consider the locution as uttered in a different scenario. The situation is the same in some respects as in Scenario I: It is an icy winter day, and the utterance occurs in a hardware store. But this time the speaker is another boy, one slightly shorter than the addressee. The speaker has on a coat, and is walking down the aisle scanning the shelves as if looking for something. He sees the other boy looking up at the salt, and says, "That shelf is pretty high, isn't it?".

This new scenario clearly includes circumstances that make a difference in the action carried out by the speaker in uttering the locution. The speaker's Personal Characteristic of being short makes a difference in his potential ability to help the addressee reach the salt, and hence in the possible further end-in-view for the action. Furthermore, the speaker's age, apparel, and ongoing behavior make a difference in the Significance of his actions: He is not clerking in the store, but is engaged in shopping for himself, and the statement he makes is therefore not part of the social practice of clerking.

The circumstances have thus been selected for inclusion in the new scenario on the basis of their relevance to the IA parameters, because these circumstances make the difference in the action such that it can coherently be seen as one of stating an obvious fact as part of the social practice of making social contact with another person, as distinguished from the action of requesting information as part of the social practice of clerking in a store.

Once again, there are numerous aspects of the total situation that have not been included in the scenario because they are not relevant to the differentiation between actions. In this case factors such as the color of the coat the speaker is wearing, the fact that the speaker is looking for snow shovels rather than hammers, that the store is locally owned rather than part of a chain, that fact that it is afternoon instead of morning—all these are but a small sample of the indefinitely large number of factors that can be distinguished in the total situation but that are not included

among the relevant circumstances of the action because they do not make a difference between the action's being what it is and its being some other action.

Note that the inclusion or exclusion of the factors as relevant is not ad hoc or by rough-and-ready intuition. It is systematic, and exploits the resources of the IA parameters, which have furnished the framework for the identification of aspects of the total situation that are relevant. Note also that the explication above of the basis for including or excluding elements of the total situation from the scenario was stated in partially inferential form, thus illustrating one of the legitimate uses of inferential accounts without implying that the hearer's knowledge and understanding is inferential.

SCOPE AND IMPLICATIONS

The analysis presented here has at least one clear advantage over the accounts of the interpretation of utterances offered by such linguists and philosophers as Grice (1957, 1975, 1978), Gordon and Lakoff (1975), Katz (1977), Sadock (1974) and Searle (1969, 1975): it provides a systematic and explicit treatment of the factors usually collected under the term "context."

This term is generally used as a cover term to refer to all of the factors that are relevant to the interpretation of the action carried out by the speaker besides the words that the speaker utters. In this analysis I have shown that such factors may usefully be considered under two headings: (a) the values of the parameters of the speaker's own action besides the words the speaker utters; and (b) the relevant circumstances.

I have further pointed out that the inclusion or exclusion of elements of the total situation from the category of relevant circumstances is to be explained by reference to the IA parameters and the concept of the action in question: Those factors are part of the relevant circumstances that make a difference in the action's being what it is, by reference to the IA parameters within the constraints of the requirement of consistency with the concept of the action in question.

Thus the strategy suggested here is to account for what is usually termed context by the application of a general principle—what counts is what makes a difference in the action—within the general framework of the Descriptive-Psychology analysis regarding what makes a difference in actions: That which makes a difference in the values of the IA parameters makes a difference in the action.

This is an in-principle solution to the problem of context and circumstances: It does not state the relationship between any given concrete circumstance and any particular action. It does, however, provide an

entree to the handling of the problem of specific contexts and actions: Given the analysis presented here, the problem is a problem of data management, not a problem requiring any further theoretical or general conceptual elucidation.

This data management problem can be stated as follows: How can the manifold actions and circumstances, and their relationships to each other, be represented in a useful way that is technologically feasible? Previous work within the framework of Descriptive Psychology suggests a promising approach to this problem: For descriptions of actions and circumstances employ the appropriate schemata described by Ossorio (1972/1978c) for the representation of objects, processes, events, states of affairs and configurations; for descriptions of relations among actions and circumstances, employ the technology of multidimensional judgment spaces (Jeffrey, 1980; Ossorio, 1971/1978b).

The data to be thus represented are obtained in a straightforward fashion, by asking persons what the concepts and relationships are, in accord with a rule of thumb in Descriptive Psychology, "If you want to know something, ask someone who knows and who is willing to tell you."

If the problem of context and circumstances is one of data management, and this problem can be handled as just indicated, then one major stumbling block to the achievement of successful computer processing of natural language will have been overcome. Recent reports of work in this area (e.g., Walker, 1978; Woods, 1978) indicate that such systems continue to be severely limited as to context. Even the least limited of the computer systems for processing natural language, those developed by Schank and others working within the framework he originated, seem to have achieved their primary successes in the processing of straightforward narrative assertions and apparently have not demonstrated the capacity to deal effectively with interpretive problems of the sort discussed in this paper (see DeJong, 1979, p. 272 and Schank and Abelson, 1977, pp. 167–168).

This is not to say that the representation of contextual factors is the only obstacle to successful language processing by computer; there are other basic inadequacies in most current efforts. These inadequacies are also highlighted by the analysis presented here: For example, this analysis suggests that the fundamental conception of a computer program for processing natural language should be as a capability for differentiating and describing behavior rather than, as in most conventional conceptions, a capability for understanding the meaning of words. Previous work within the framework of Descriptive Psychology (e.g., Mitchell, 1969; Ossorio, 1971/1978b) suggests that the development of such a computer capability is feasible.

Thus, the analysis presented here can be seen to supply that which is conspicuously missing from other, conventional accounts, viz., a systematic treatment of all those elements falling under the usual designation of "context." Furthermore, this analysis holds out promise for applicability to the important problem of computerized processing of natural language.

ACKNOWLEDGMENTS

NOTE

1. After submitting the completed manuscript for this chapter I became acquainted with the book by van Dijk, *Text and context* (London and New York: Longman, 1977). In the four full pages (191–195) of this book which he devotes to a direct consideration of context as such, van Dijk furnishes, in my estimation, a more sophisticated analysis of context than anyone else has previously. Nevertheless, I would take issue with some key aspects of his analysis, such as his consideration of context as a course of events (p. 192), i.e., as a process. Furthermore, I would argue that the analysis I present here furnishes a more powerful and parsimonious systematic foundation for dealing with context than does van Dijk's analysis.

REFERENCES

Bar-Hillel, Y. (Ed.). *Pragmatics of natural languages.* Dordrecht: Reidel, 1971.

Cole, P. (Ed.). *Syntax and semantics* (Vol. 9). New York: Academic Press, 1978.

Cole, P., & Morgan, J. L. (Eds.). *Syntax and semantics* (Vol. 3). New York: Academic Press, 1975.

DeJong, G. Prediction and substantiation: a new approach to natural language processing. *Cognitive Science,* 1979, **3,** 251–273.

Gordon, D., & Lakoff, G. Conversational postulates. In P. Cole & J. L. Morgan (Eds.), *Syntax and semantics* (Vol. 3). New York: Academic Press, 1975.

Grice, H. P. Meaning. *Philosophical Review,* 1957, *66,* 377–388.

Grice, H. P. Logic and Conversation. In P. Cole & J. L. Morgan (Eds.), *Syntax and semantics* (Vol. 3). New York: Academic Press, 1975.

Grice, H. P. Further notes on logic and conversation. In P. Cole (Ed.), *Syntax and semantics* (Vol. 9). New York: Academic Press, 1978.

Jeffrey, H. J. A new paradigm for artificial intelligence. In K. E. Davis (Ed.), *Advances in Descriptive Psychology* (Vol. 1). Greenwich, Conn.: JAI Press, 1981.

Katz, J. J. *Propositional structure and illocutionary force*. New York: Thomas Y. Crowell, 1977.

Mitchell, T. O. Observer's hostility as a factor in judgments of hostile behavior. (Doctoral dissertation, University of Colorado, 1969). *Dissertation Abstracts International, 1969, 30*, 811-a. (University Microfilms, 1969, No. 69–13, 422.)

Ossorio, P. G. *Persons* (LRI Report No. 3). Los Angeles and Boulder: Linguistic Research Institute, 1966.

Ossorio, P. G. Never smile as a crocodile. *Journal for the Theory of Social Behavior, 1973, 3*, 121–140.

Ossorio, P. G. *Meaning and symbolism* (LRI Report No. 15). Whittier and Boulder: Linguistic Research Institute, 1978. (a) (Originally published in 1969: Boulder, Author.)

Ossorio, P. G. *State of affairs systems* (LRI Report No. 14). Whittier and Boulder: Linguistic Research Institute, 1978. (b) (Originally published in 1971 as (RADC-TR-71-102) Rome Air Development Center, New York.)

Ossorio, P. G. *"What actually happens"*. Columbia, S. C.: University of South Carolina Press, 1978. (c) (Originally published in an earlier version in 1972, in *Descriptive Psychology Monographs* (Vol. 1). Whittier and Boulder: Linguistic Research Institute.)

Ossorio, P. G. Conceptual-notational devices. In K. E. Davis (Ed.), *Advances in Descriptive Psychology* (Vol. 1). Greenwich, Conn.: JAI Press, 1981. (a)

Ossorio, P. G. Notes on behavior description. In K. E. Davis (Ed.), *Advances in Descriptive Psychology* (Vol. 1). Greenwich, Conn.: JAI Press, 1981. (b) (Originally published in 1969 as LRI Report No. 4b. Los Angeles and Boulder: Linguistic Research Institute.)

Ossorio, P. G. Outline of Descriptive Psychology for personality theory and clinical applications. In K. E. Davis (Ed.), *Advances in Descriptive Psychology* (Vol. 1). Greenwich, Conn.: JAI Press, 1981. (c) (Originally published in 1970 as LRI Report No. 4d. Whittier and Boulder: Linguistic Research Institute.)

Sadock, J. M. *Toward a linguistic theory of speech acts*. New York: Academic Press, 1974.

Schank, R. C., & Abelson, R. P. *Scripts, plans, goals and understanding*. Hillsdale, N.J.: Lawrence Erlbaum Assoc., 1977.

Searle, J. R. *Speech acts*. Cambridge, England: Cambridge University Press, 1969.

Searle, J. R. Indirect speech acts. In P. Cole & J. L. Morgan (Eds.), *Syntax and semantics* (Vol. 3). New York: Academic Press, 1975.

Walker, D. E. (Ed.). *Understanding spoken language*. New York: North-Holland New York, 1978.

Woods, W. A. Semantics and quantification in natural language question answering. In Yovits, M. C. (Ed.), *Advances in computers* (Vol. 17). New York: Academic Press, 1978.