

SOME PROBLEMS OF REFERENCE

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Brenda Johns has recently brought to my attention (personal communication) the fact that there is a perceptible and important distinction that can be made between two types of linguists in the United States, and their research. The distinction is a fuzzy one, and is not always appropriate, but it characterizes a fair amount of current linguistic research (and accounts for quite a lot of current misunderstanding). She notes that many linguists can be categorized as "Noun-Phrase" linguists, and many others as "Verb-Phrase" linguists.¹ The division roughly parallels that between ontology and epistemology, and is independent of theoretical affiliation; rather, it springs (to the extent it is valid) from deep and probably unconscious beliefs on the part of the linguists concerned regarding the respective centrality and importance of reference and predication in linguistic theory.

The ultimate validity and usefulness of this (admittedly subjective and inexact) distinction is not, however, the point of this discussion. I mention it here by way of introduction, so as to be able to identify myself as a clear example of a "Verb-Phrase" linguist. Almost all of my interests and investigations in linguistics have centered about such topics as complementation, modality, negation, aspect, speech acts, factivity, and grammatical relations, which are typical of a "Verb-Phrase" approach.

When I was asked, therefore, to contribute to this special number on Noun Phrases, it was with a certain degree of trepidation that I accepted. In the years since I last seriously investigated problems of reference (specifically, generic noun phrases and quantifiers; cf. Lawler (1973a, 1973b)), I have noted a number of irritating and fascinating phenomena, and have come to feel that it is time to deal with at least some of them from a less traditional perspective, in an attempt to integrate them into a more unified approach to human communicational interaction. Hence this paper, which should be viewed as a first attempt along these lines, necessarily sketchy and incomplete in places.

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Some of the phenomena to which I refer have had long and illustrious careers in linguistics and philosophy; some are relative newcomers to the field of vexing problems; but all are now common property of linguists, at least---so much so that their names are powerful codes that bring to mind many articles, analyses, and theories that have been composed in an attempt to explain their mysteries. Some of these, which I will discuss here in greater or lesser detail, are encoded in the following distinctions between types of NP:

- (1) referential opacity/referential transparency
- (2) attributive/referential
- (3) de re/de dicto
- (4) definite/indefinite
- (5) specific/non-specific
- (6) generic/non-generic

Naturally, in the space available to me here, I will not be able to say as much about any of these topics as needs to be said. Certainly I will not be able to give the vast discussion of their histories and prior treatments that would be appropriate to a larger work, or to one devoted to just one of these topics. What I propose to do, rather, is to look at each of these topics (and others that will suggest themselves) cursorily, with a brief description and a few examples of the phenomenon and its problems, without the necessity of dealing with all of the prior art, and without the theoretical framework(s) that have been constructed for them. Hopefully, this will allow some generalizations to emerge, and will then proceed naturally to a discussion of the function of these phenomena in human language, and suggestions as to how they should be analyzed differently.

As will soon become apparent, I find it useful to distinguish between linguistic form and linguistic function; I am neither unique nor original in this. I believe, however, that many of the previous attempts to maintain a consistent distinction along these lines have run afoul of some misunderstandings as to what constitutes "function" in linguistic terms. Most of the referential distinctions codified by the phenomena named above have to do with various aspects of "meaning"; and many linguists identify "meaning" with "function". I believe this is erroneous; while there is much that can be said about the relation of linguistic form to meaning, all prior attempts to relate the two concepts directly have failed. I suspect that the concept "meaning" has little place in

a functional syntax of any language---although this is nothing more than a suspicion at present. In any event, most of the problems attendant on the phenomena above seem to me to have their root in the poor match between the use of these referential types and current theories of meaning. Since the phenomena exist, it is the theories that must be called into question. I will suggest here (and amplify my suggestion below) that if reference is to be understood properly, it must be in terms of the actual processing strategies used by humans in understanding and producing utterances; and that any theory of meaning, if it is to be useful, must be made congruent with these strategies, as they manifest themselves in various languages.

This is an admirable goal, of course, but it is complicated by the fact that these cognitive mechanisms are largely mysteries to everyone, including psychologists, who ought to be in a better position to understand them than linguists. There is, however, a fair amount of knowledge about a number of topics, coming from several disciplines, which can shed some light on linguistic problems. In this paper I will attempt to present a first approximation of the kind of processing model that might serve in this capacity. In order to do this, some new terminology is in order.

The fundamental problem in reference of any kind is the communication of the identity of the referent to the addressee (hereafter simply 'A'). This can be done in a number of ways, depending on both psychological and linguistic factors (in fact, it becomes an interesting and open question just how much of the structure of language is determined by the processing capabilities of the human mind---or vice versa). The simple case is that in which the function of the utterance is the identification of a referent; in this category, the simplest subcase is that of deictic identification, which can take place with little or no strictly linguistic structure, often depending on gestures or other kinesthetic forms, as when the speaker (hereafter 'S') points to someone and says (∅) to A:

7 (∅) Bill Jones.

It is not enough, of course, to point out someone and identify him; there must be a reason for the utterance as well. (∅), for example, would be odd in a situation in which S and A did not know each other well, or in which there was no context for the identification; contrariwise, A has a right to expect that there is a context and a purpose, and will en-

From here on, → number examples 2 less. e.g. (a) → (7) etc.

deavor to find it. A may decide that S is identifying someone whom he has mentioned by name in a prior discourse with A, thus reopening that discourse; or, particularly if Bill Jones is within earshot, that S is introducing him to A; and so on. It is not my purpose here to deal extensively with the conversational implicatures^q of utterances, except as they impinge directly on reference, as they do in identificational utterances, particularly deictic ones, where the context carries a very heavy burden.

Identificational utterances are the exception, rather than the rule; however, non-deictic identifications are one of the more fruitful places to look for oddities of reference. The reason for this is that identification poses a real problem in perceptual terms: for identification to succeed, it is necessary to cause the addressee to associate some phrase that "identifies" sufficiently (most likely a name, which has identification as a sole function) with some information regarding the referent that is being identified. That is, A must have some knowledge of the referent being identified, S must know just what knowledge A has, A must lack some knowledge that would identify the referent, and S must supply that knowledge to A, with a way of associating it with the prior knowledge A already has about the referent. Put in this fashion, it becomes obvious that identification is a very difficult process indeed---the wonder is that we ever do it all. The linguistic mechanisms humans have developed for identifying (overtly or covertly) make interesting use of referential possibilities, as well as different ways of knowing. We find, in fact, that in a non-deictic identification, there is usually a noun phrase that does not identify a referent as such, coupled with one that does. It is the former NP to which we look to find strange reference. Consider (10)-(12):

- (10) Fred is the tall man.
 - (11) Fred is a tall man.
 - (12) Fred is the man we talked about.
- (10) and (12) are identificational sentences; (11) is not.

By uttering (10), S invites A to scan the surroundings and pick out some individual who is uniquely tall, and to associate with that image the name Fred, which must be a name that has been used by S in prior discourse with A, who does not know Fred. (12), on the other hand, invites A to search his memory for the information he has stored on an individual discussed in prior discourse (of whom S does not expect him to recall the name), and to associate this information with the

etc.
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name Fred, which is also present in context, perhaps as the name of an individual who has just been introduced to A; A's job then is to link the two previously separate chunks of information by noting that they refer to the same individual. (11), a predicational utterance, offers new information about an individual whom S expects A to have some information about already. We see, then, that the function of identification is one of linking one piece of information that A has with another he also has; the new information consists of the linkage between the two. It is, of course, possible to play games with this type of strategy, as when S utters (13) in a context in which he knows A is not aware that he has been nominated for office:

(13) "Fred is the man who nominated you.

thereby informing A indirectly that he has been nominated, but this should be treated as a form of deviance from the ideal. It is always possible to deviate for a number of reasons, and the fact of deviation is itself significant communicationally.⁵

It will be noted that the post-copula NPs in (10) and (12) are what have come to be called "definite" NPs. This terminology lends itself to confusion, since it has two meanings in standard linguistic parlance: on the one hand, it refers to the form of the phrase (it contains a so-called "definite article", the); on the other hand, it refers to the function of the NP and of the referent, since it signals that S expects A to have some information about the referent. These uses are often confused, and it is common to expect all definite articles to mark definite functions, or to expect definite articles in any definite NP. A linguist who operates on this naive assumption will shortly come to grief, since there are many other uses of the form, and many ways of expressing definite function. I propose hereinafter to use "definite" only to refer to the form, and to propose new terminology to refer to the function, which I believe is similar, if not identical, to many other types of reference.

The model I will be using here makes use of certain technical terms from computer science. These include "register", "pointer", "storage", and "scanning". These are also familiar in certain branches of psychology, but I do not claim to use them in accordance with standard psychological usage (nor, for that matter, are they necessarily the same as the computer science terms). Rather, they are to be considered terms in a linguistically-oriented model of communication and understanding. In this model, speech act participants (S and A) are said to have certain "active

registers" at any instant; these correspond to "attention", "consciousness", or "old information" in many regards, and may or may not be equivalent to what psychologists know as "short-term memory" (I suspect that much of the currency of the active registers consists of their contents' being constantly shifted from long-term to short-term memory and back again). For convenience, we will use the term "register" here only to refer to currently active memory chunks having to do with individual entities, so that we can discuss reference to these entities in processing terms; obviously, the concept is a very powerful one and can be used for many other purposes, with many other content types.⁶ In this model, all memory storage originates in the registers, which then transfer information to long-term storage, like the operation of the computer. Likewise, the registers are the interface for all sensory information, and any new information must go through them. We pass over in silence the actual details of how information is transferred from one part of the mind to another, and also the details of the "monitor program" that controls transfer. What we will be concerned with here is the linguistic processes that trigger certain shifts to or from registers, and the conditions they operate under; this will allow us to infer certain properties of information transfer in the mind, some of which may be experimentally determinable and measurable.

We will also operate under the assumption that storage and transfer are optimizable, and that the mechanisms built into language to trigger them work better when they are efficient; that is, the function of communication (transfer of information of all kinds from one individual to another) works best when the processing strategies internal to the participants are optimized. Strategies which are inferior would tend to be displaced by superior ones. This means that there are some overriding constraints on language that are determined by the structure and capabilities of the human mind (which, in turn, may have evolved to work better with the type of information presentable in linguistic terms). All this is not to say that there are no inefficient ways to communicate; it is perfectly possible to fail in a communicational task, just as it is in any human endeavor. It is a truism, however, that forms do not exist in a language for no reason, and that the possibility of certain types of reference entails some communicational function that they serve.

Storage in long-term memory is primarily associational in nature. We have all had the experience of pursuing a long train of thought,

with each step "reminding" us of the next, so that when we come to realize what we are thinking of, it is an effort to retrace the stages that led to the last step. In the model used here, this associational linkage is accomplished by the use of "pointers" on each chunk of memory; these "point to" another storage "location" (in a computer, it is an actual location, but here is it to be understood metaphorically---at least until neurolinguistics can chart the brain somewhat better) which contains information to be associated with the given chunk. There are usually multiple pointers in any location; thus a particular piece of information may be associated with a large number of other pieces. It may be that these pointers are labelled with the type of association that exists; but that is unimportant from our standpoint. The assignment of pointers is largely an unconscious process that takes place in the registers prior to storage; it may be consciously applied, however, resulting in the type of associative mnemonic that allows us to memorize large pieces of data for easy retrieval. I believe that the purpose of reference of all types, normal and abnormal, is to manipulate these pointers; and that different types of reference exist because there are different manipulations to be performed, and because there are different types of associative linkage to be found, and because there are different ways of knowing a particular fact or individual, which will determine how the pointers are set up.

To begin with the last topic, we need to ask just how we are said to know an individual entity (for convenience, we will confine ourselves to individual human beings, who are the most completely specified entities in our minds, and thus have the most complex memory structures). It is possible to "know" a person's appearance, his name, his reputation, his relationship to oneself, and any number of facts about him, including the fact that our conversational partner may have additional information about him. Most languages have various subtle ways of expressing the different types of knowing overtly; in English, one is said to "recognize" someone's appearance, "know" his name, "know of" his reputation, "be acquainted" with him personally if one has met him, and "know" facts "about" him. Clearly these distinctions are important, to be so carefully delimited in the lexicon. But these are overt descriptions of knowledge; reference is mostly covert. And it is certainly true that any person has at any moment in his mind a vast compendium of information relating to other individuals, of all of these types (and probably others that I have not mentioned), some associated with one another to form a more complete descrip-

tion, others isolated data that could be associated, but are not. The process of learning is one of progressive association of data, some old, some new; and language has mechanisms that can facilitate the process.

Let us, then, look at some of the problematic kinds of reference with this schema in mind. We have mentioned definiteness briefly, and have eschewed the use of the term "definite" to refer to the communicational function that the term has come to have in linguistics; in order to understand this function and propose more useful terminology, it will be necessary to examine some more of the phenomena that have this function. The opaque/transparent, referential/attributive, and de re/de dicto distinctions all have to do with what are called "definite descriptions"; it is certainly the case that many of these types of reference contain formal marks of definiteness. Consider the following:

- (14)a Oedipus wanted to marry *his mother*. [opaque]
b Oedipus married *his mother*. [transparent]
- (15)a *Smith's murderer* is insane (and therefore has been committed to an asylum). [referential]
b *Smith's murderer* is insane (whoever he is, since only a maniac would have done such a thing). [attributive]
- (16)a *Homer* composed the Iliad. [de dicto]
b *Virgil* composed the Aeneid. [de re]

In each of the above, it is the italicized NP that we are concerned with. All of these are definite in form; in (14), they are possessed by a pronoun, in (15) by a proper noun, and in (16) they are proper nouns---all of these forms are definite in English.

A little discussion is in order of the differences among these phenomena. Opacity (the distinction in (14)a and b) produces some sentences that are ambiguous, like (14)a, and other sentences that are not, like (14)b. More strictly speaking, the term "opacity" is reserved for one of the readings of (14)a (the one on which Oedipus does not know that his intended bride is his mother); the other reading of (14)a, and the sole reading of (14)b, is said to be "transparent". I will use the term opacity here in a loose sense, to refer to the phenomenon generally, and the ambiguities it produces. (15) produces what many consider a different type of ambiguity (although Cole (1975) argues that it is equivalent to opacity); the NP *Smith's murderer* is said to be ambiguous between a reading (the "referential" reading in (15)a) on

which S "has an individual in mind" when he utters (15), as shown by the possible continuation in parentheses, and a reading (the "attributive" reading in (15)b) on which S refers to an unknown individual, whom he nevertheless has reason to believe exists (in this case, since Smith has been murdered). The predication in each of these sentences is that the individual is insane, although the grounds for believing and stating it are quite different in each case. It should be noted that the attributivity phenomenon (as I shall refer to it) always produces ambiguity in the interpretation of the NP in question, while opacity does not always give ambiguities, and (as we will see below) the de re/de dicto distinction never produces ambiguities. (16) is an interesting case, in that proper names are used to illustrate the phenomenon; it is rarely the case that any of these three phenomena can be found in a proper noun phrase. This can be readily seen if, for example, *Jocasta* is substituted for *his mother* in (14)a, and *Benjamin Disraeli* for *Smith's murderer* in (15)b. In these cases, there is no opacity in (14), and the attributive reading does not appear in (15)b, which is strange with the parenthetical continuation. (16)a, however, is unusual, since the proper name *Homer* is, unlike most proper names, defined "de dicto". That is, *Homer* is defined to be 'the person who composed the Iliad and the Odyssey', while it is a fact, but not a definitional character, of *Virgil* that it names an individual who composed the Aeneid. That this is so can be seen from the anecdote about the Classics scholar who devoted his life to proving that the Iliad and the Odyssey were not written by Homer, but by another Greek poet of the same name. This is mildly amusing, but it is not humorous, only dull, if the same anecdote is told of Virgil and the Aeneid. The reason is that Virgil is an attested historical personage, and there is more to know about him than a work that he composed; thus his name is definable "de re", like most proper names. It is not necessary, however, to use a proper name to illustrate de dicto (as I shall refer to the phenomenon here); (17) is an example of a NP used de dicto:

(17) *The pope* is the head of the Catholic church.

Note that if someone becomes the head of the Catholic church, he becomes the pope; in (18), however, this relationship does not hold:

(18) *The pope* is the vice-president of my chess club.

Whoever becomes vice-president of my chess club does not ipso facto become the pope.

We have, then, a plethora of referential distinctions and phenomena, which present some severe problems for a theory of reference based (as most of the current systems are) on logical principles. How does the processing model sketched above fare when confronted with these?

To begin with, it should be apparent that these distinctions, intuitively clear as they are when pointed out, lack very clear descriptions in ordinary language. Some may say that this is because the distinctions are only discussable in metalanguage (i.e, logic), rather like the situation in atomic and nuclear physics, where mathematics of a rather refined sort is claimed to be the only valid description of physical phenomena. I do not believe this. Unless we go to the trouble of learning quantum mechanics, we are in fact not able to apprehend the phenomena of atomic and subatomic interactions at all; this is not the case with these referential phenomena, which can be exemplified clearly to any native speaker of the language. In addition, those descriptions that do exist make implicit use of processing strategies and phenomena by saying that, e.g, the speaker of an utterance containing an attributive NP "has an individual in mind". Most of the confusion arising from discussion of these and other unusual types of reference comes, I believe, from the fallacy of considering the referent to be identified by the phrase, when in fact the referent is identified (if at all) by the addressee at the behest of the speaker, by virtue of S's uttering the phrase to A. This description is similar to (in fact, the same as) the distinction between a "semantic" and a "pragmatic" account of presupposition; on the former, one sentence is said to presuppose another, while on the latter, a person is said to presuppose a sentence. Using this terminology, then, the processing model is a pragmatic account of reference.

In such an account, it is necessary to consider the participants in the speech act (S and A) and their respective states of knowledge about the individual to be referred to. In addition, it is necessary to consider their knowledge of their partner's knowledge; that is, what they each understand the other to know or believe about the individual to be referred to. For example, in an appropriate usage of (15)a, S knows at least three facts about the individual denoted as *Smith's murderer*: that he is insane, that he murdered Smith, and some other piece or pieces of information that would allow him to identify the individual in some way, e.g, his name and whereabouts. S believes A to know that someone murdered

Smith, not to know that that individual is insane, and does not care if A knows the identity of the individual---at least he need not believe that A does, and he may believe that A does not. The purpose of S's utterance is to communicate the fact that the individual is insane, which he believes to be unknown to A, and in order to do that, he must cause A to retrieve information regarding the individual and place it in a current register, and to add to that information the piece that he is communicating, i.e, to add a pointer to an additional proposition that he provides in the utterance. It is S's choice as to how the information should be indexed in order to make A's job of scanning and retrieval easier, and he chooses to identify the individual by a description which he is sure A will recognize and retrieve rapidly, rather than by some other description (say, a name, if he knows it) which might cause A some more difficulty in retrieval if A does not immediately recognize it. Just how the information is coded is in the last analysis irrelevant to S's ultimate purpose in this speech act---he is satisfied if A comes to understand the proposition he is presenting, and to predicate insanity of the right individual. It is quite possible to present several intersecting descriptions; in fact it is extremely common:

(19) *Smith's murderer*---you know, *Benjamin Disraeli*---is insane. In (19), S gives two references, which he believes will make A's retrieval task easier. He may incidentally inform A of the name of the murderer, or of the fact that Disraeli is a murderer, if A happens not to know one or the other fact; but this is not the purpose of the speech act, although it is (again) quite possible to play with this particular referential phenomenon to inform someone subliminally of a fact. If A does not know either fact, however---if he is unaware that Smith has been murdered, or that Disraeli is the murderer, he is likely to request more information, if he is interested; otherwise, he may create a new storage location with pointers to all the information produced by the utterance. The point is that the intention of the speech act and the knowledge that informs it reside with S, while the ultimate interpretation of the speech act reside with A. To the extent S gauges exactly A's state of knowledge and interest, these two are the same, and may be said to constitute the "meaning" of the utterance; to the extent S's estimate of A's knowledge or interest is wrong, however, there is some difference introduced, and one cannot speak of a "meaning" without identifying it as being S's or A's. 7

Likewise, the attributive usage of (15)b is generated by the fact that S does not know anything more about the individual than that he murdered Smith (he may in fact be incorrect even about this---Smith may not have a unique murderer, having been dispatched by a gang---but he is allowed the uniqueness by convention); in addition, S does not expect A to have any more information than S does regarding the individual, as shown by the fact that he is not inquiring about A's knowledge, but is instead attempting to inform A of some additional information. In this case, the only information at S's disposal is a description, and he expects this also to be the only information A has. Consequently, he has no other choice but to use the description (or another which denotes the same thing, like *the man who murdered Smith*---but see Reinhart (1975) for some discussion about the types of reference possible with different kinds of expressions). The general principle underlying both these two uses of *Smith's murderer* is that S, in each case, uses a phrase which he has reason to believe will be easiest for A to retrieve information about. This is, in fact, the general principle underlying all reference, or more precisely, underlying all the rules of correct reference, for it is possible to fail to refer in a number of different ways, each of which can be considered as complicating A's processing task too much.

Viewed in this light, it can be seen that the distinction between attributive and referential uses of a noun phrase is neither inherent in the referent of the noun phrase, nor in fact is it even a binary distinction. There are at any time a certain number of possible pieces of information at the disposal of S regarding the individual he wishes to refer to; any of these can be the basis of a description of some kind (including a name), and he chooses between and among them, making his choice on the basis of his beliefs about A's information and how A will retrieve it most efficiently. This means that there is in principle no way to state a given amount of information as being criterial for the referential reading, with anything less giving the attributive---in fact, the information at S's disposal constitutes a network; the clear cases of a one- or two-member network, and a very complex network having been given the names of "attributive" and "referential", respectively. Most cases are intermediate, and this has led to a great deal of confusion in treating the phenomenon. It may well be that, cognitively, a speaker has a certain threshold value of information criterial for identification of an individual; if his information network regarding that in-

dividual is above a certain level of complexity, he may feel that he has identified the individual, and this might be taken as the referential reading, while a reference to an individual whose informational network is below that level of complexity might lead to an attributive reading, since S will not feel that he can identify the individual in that case. This probably has some basis in fact, but the problem with this analysis is that the level will vary with circumstances; S may have different criteria for relatives, movie actors, friends, men, women, etc., and the circumstances of his relationship and conversation with A will probably affect these criteria, as well. In effect, the threshold is a variable which cannot be predicted, and which is in any event irrelevant to the reasons why S uses a particular NP to refer to a particular individual. It is rather a lexical and social problem; on the one hand, the criteria that are necessary for determining the meaning of the verb *know* (in English), and on the other, the social meaning of such a predication, and the manner in which it fits into the whole schema of interpersonal relationships. While these are interesting and worthwhile questions, we will have no more to say about them here.

We have seen, then, that the referential/attributive distinction is not one that has much to do with reference as such; rather, it is a superimposition of an independent distinction, identification, upon the normal workings of reference. It is worthwhile noting in this context that referentiality never has morphological or syntactic consequences; it is always ambiguous, in the sense that there is never any clue in the form of the NP that would signal to A one or the other reading. I take this to indicate that this is not information useful to A, and that the distinction is therefore functionally invisible. If the distinction had a processing function, there would be some trigger in the form that would signal the distinction to A.⁸

Opacity, on the other hand, does have some clues in the form of the utterance, although there are rarely any in the form of the NP itself. Opacity ambiguities can only occur "under the scope" of some "world-creating" predicate, such as *want*, which makes implicit reference to the mental state of its subject (or, in the case of adverbs, of its experiencer---which is the semantic role of the subject of such verbs, anyway. While it is not my purpose to discuss grammatical relations

here, it does seem obvious that the semantic relation of experiencer is the primary criterion in this case, regardless of the grammatical relation the experiencer NP bears to the predicate). When a description appears in this syntactic position, there is a potential ambiguity which can be stated as a decision for A to make: he must decide whose description it is. That is, he must decide whether the description is one which S is using to trigger his retrieval processes, or whether it is one which comes from S's beliefs about how the experiencer of the mental-state predicate would describe the individual. In the classical example, (14)a, a decision by A that this description as *his mother* is the responsibility of S produces the transparent reading, and represents the actual state of affairs, given the plot of Sophocles' drama; a decision by A that the description as *his mother* represents the viewpoint of the subject of *want*, that is, *Oedipus*, leads to an opaque reading, and does not represent the facts of the drama (although it may represent some higher truth).

There are a number of possibilities inherent in this situation: the descriptions by the experiencer of the mental-state predicate (call him E) and S may be identical---the limiting case of this is when E and S are identical, as they are in the first person; they may be contradictory, or at least contrary, as in (14)a; or they may merely be different in some respect, which is the case we would expect to occur the most often, since there are so many more ways to be different than to be identical or opposite. This phenomenon is an inescapable artifact of two facts about language: (a) indirect discourse (including indirect description) is possible; and (b) reference is interpreted by A with respect to his understanding of the mental states of the person responsible for the referential phrase. Whenever some individual's mental states are made relevant to an utterance, there is a possibility that that individual may be the one responsible (at least in the view of S) for the description, and A must take this possibility into consideration in interpreting the reference.

Once again, the basic principle of cooperation and of optimization of retrieval is apparent; here, however, there is a loophole in the language, generated by the obvious benefits of having indirect discourse and description possible in other contexts. The intersection of these two independent processes---one basic to human cognition, the other a linguistic process with a useful function---produces some situations in which a speaker must exercise more than normal care if he is to avoid

producing the wrong impression in A. A, for his part, must exercise similar care in interpreting such expressions, and probably must draw on information regarding the speech habits and thought patterns of S that are not normally necessary.

Some evidence that this view is correct is shown by (20), which has a first-person subject; (20) is unambiguous, giving only the transparent reading.

(20) I want to marry my mother.

Clearly, the speaker of (20) is evidencing a desire to commit incest, ^{transparent} which is not present in the opaque reading of (14)a. There is a reading of (20) which McCawley (personal communication) claims is opaque, in which the speaker does not know (or care) who his mother is, individually, but rather expresses a desire to marry anyone who meets certain criterial requirements. This, however, is not opacity; note that this reading is possible also with (14)a, in addition to the opaque and transparent readings; it is in fact an attributive reading, rendered less likely by the fact that most people know their mothers well, and thus would be less likely to refer to them in this fashion. As we have seen, attributivity is irrelevant to reference, and this reading exists solely in S's mind; it does not aid A in retrieving information necessary to understand the utterance. It can, of course, be communicated, but this would require additional utterances, and probably quite different ones, and would be more difficult, since it would involve transmitting some information that would be contrary to A's normal expectations.

The signals of opacity, the presence of the NP in question in the scope of an appropriate predicate, trigger a high-level scanning procedure for A. He must rapidly retrieve information relevant to the situation, search his memory for incongruities (such as the plot of *Oedipus Rex*), and decide whether to deviate from the normal assumption that S is responsible for the description. Most probably, he will not trigger this scan until and unless he comes up with some incongruity in following the normal assumption--that is, unless he comes to have reason to believe that S is not responsible for the description. This would seem to be the most economical strategy. S, on the other hand, cognizant of this strategy, will often find it necessary to disassociate himself from the description if he is not responsible for it, by the use of such phrases as *so-called*, *unbeknownst to him*, etc. The fact that such idiomatic phrases exist in

the language strikes me as evidence that the problem of opacity is one with which the language has had to deal for some time, and for which it has found solutions. Contrariwise, it is possible for S to assert his responsibility for a description overtly in a context where A might otherwise have reason to believe the description is not his, by use of such phrases as *what I call*, etc. This, I believe, is evidence that the responsibility for descriptions is determined by A to a great extent by the structure of the utterance and the discourse, subject to correction because of contradictions, and that when there is no necessary contradiction that would trigger a switch from one mode to another for A, he interprets successive descriptions as the responsibility of the individual who was responsible for the last one. Again, this is an economical strategy, and makes the use of the high-level scan much less frequent. Finally, one of the best strategies that S can employ to obviate the difficulties inherent in opacity is to choose a description that is as close as possible to what he would use normally; this renders the two possibilities identical, and makes the normal strategy more effective.

Opacity, then, is relevant to reference, but language has devices to deal with problems that may arise from it. It remains, however, an area where care must be taken by the speaker; on the other hand, it lends itself to metaphorical usage rather well, and remains a distinction which can be utilized (like any distinction) to carry information, if done carefully. I suspect that a great deal of literature makes very clever use of some of the possibilities of opacity, and in so doing allows the reader to indulge in contemplation of unexpected relationships by conveying multiple meanings opaquely. I might add that any theory of psychotherapy which countenances diverse and somewhat independent parts of the psyche will find its evidence from data that show opacity in their reference. S, A, and E do not necessarily need to be external individuals; the processing strategies would work the same.

Last to be considered in detail among the three "definite description" phenomena is *de dicto*. Stated succinctly, my analysis of this phenomenon is that it is a lexical coding of an attributive definition. That is, whereas the NP *Smith's murderer* in (15) is clearly related to a sentence *X murdered Smith*, describing the variable *X* by the act he committed, the NPs *Homer* in (16)a and *the pope* in (17) do not relate overtly to a description that defines them in terms of their morphological and/or syntactic shape. Rather, the description is encoded in their

definitions, which are (speaking from a generative point of view) derivationally opaque; there are, after all, no possible sentences (in English, at least), (21)-(22):

(21) *No one person homered.

(22) *Pius V popped from 1566 to 1572.

meaning, respectively, (23) and (24):

(23) No one person composed the Iliad and the Odyssey.

(24) Pius V was head of the Catholic Church from 1566 to 1572.

even though both (23) and (24) are meaningful (and possibly true) sentences in English. It appears that English, in common with many languages, countenances NPs with unbound variables inherent in their definitions, which can be used only as NPs, and which bear no resemblance to the corresponding predicates used in their definitions. I would suggest that the de dicto/de re distinction is therefore an artifact of certain lexical facts about various languages. This is complicated by the fact that the epistemological evidence for uniqueness and identification is different in many of the cases where de dicto/de re is invoked.

For example, take the case of *the pope*. While there have been several periods of history during which there has been difference of opinion regarding which individual is being referred to by the NP *the pope*, all concerned would have agreed that there could be only one individual properly designatable in this fashion. Thus part of the definition of the NP *pope* must be that it have a unique referent at any given instant (although it can have no referent at certain times---say, when the conclave is meeting to select a new pope). On the other hand, it cannot be denied that there have been numerous individuals who have been properly referred to as *pope* throughout Christian history, and thus the NP *the popes* refers to a class of individuals, whose identities in some cases may be a point of dispute. The NP *Homer*, however, is unique temporally, and represents a lexical presupposition that there was at one time a unique individual who did a number of things; this may in fact be a false presupposition, but we go right on using the NP in this fashion, in exactly the same way we speak of the sun rising, even though we know that the Earth rotates. The important points to note here are the ones associated with triggers for information retrieval and labelling.

When S uses an NP which is defined de dicto, he may do so in a context in which the definition is relevant, such as (17), or (25):

(25) *The pope* can issue encyclicals.

or, less generically, (26):

(26) *The pope* has issued a new encyclical.

In this case, S means to convey to A the information that the head of the Catholic Church is being referred to, whoever he is, even though both S and A may have far more information regarding the referent of *the pope* than the definition of the term. This usage has the purpose of allowing A to retrieve information more easily. S may also use an NP defined de dicto to refer to the individual who currently meets the description inherent in the definition, instead of a more specific description, or a name, as in (18). The purpose of this usage is, again, to convey information more efficiently and succinctly; it is more efficient to refer to an individual this way than by (27):

(27) *Giovanni Montini* is the vice-president of my chess club.

since A may not know that *Giovanni Montini* is the name of the individual who is currently head of the Catholic Church, and part of the purpose of the uttering of (18) is to establish the predication that S is associated (however slightly) with someone famous. The context will guarantee that A does not draw the conclusion that there is a definitional relationship between being pope and being an officer of a chess club.

e De dicto, then, is similar to attributivity in that identification of an individual meeting the description is superimposed on the use of the description to allow A to retrieve information; in that respect, they are the same, and are equally irrelevant to reference as such. It is different from attributivity in that the de dicto NP is not obviously a description, but rather a NP which has a lexical definition containing a description. As such, it has possibilities of usage that are somewhat more free than attributive descriptions, since (e.g.) one may speak of *the popes* [de dicto] but not very easily *the heads of the Catholic Church* [attributive], since the latter phrase does not have the presupposition of sequential uniqueness that the former does.

Now that we have discussed three troublesome kinds of "definiteness", the time has come to talk of definite NPs as such. The phenomenon labelled "definiteness" has itself been extremely troublesome in linguistics and philosophy for some time, as noted above. I will sketch here how I think it should be handled in a processing model.

As we have seen, the cases above are all governed by the general constraint that S uses the NP that he thinks will produce the most efficient retrieval of information by A. This is the ideal case; it is

certainly possible (indeed, quite common) to deviate from this for a number of reasons. Nevertheless, the rules of communication require A to operate on the assumption that S is following this strategy unless A has reason to believe otherwise; therefore, this will be the primary interpretive strategy of A. In interpreting a definite NP, then, A will have a number of pieces of information available to him which are useful in conducting the retrieval scan: (a) S believes A to possess some information regarding the referent of the NP; (b) S believes A to be able to recognize the description offered by the NP used by S; (c) S believes A to be able to recognize and scan for this information optimally by using the description offered by S as a key for the scan. These conditions constitute the ground rules under which A sets up the scan and references his memory; should any of them be wrong, there are conversational procedures under which he can call for clarification in order to rescan successfully. These, then, are the characteristics of definite NPs, and the form they take in a language which marks them is a trigger that indicates them to A.

Indefiniteness, on the other hand, is a description of a number of linguistic forms which lack the criterial formal properties of a definite NP. English and many other languages have formal devices to indicate indefiniteness. Such devices (such as the "indefinite article" *a/an*) serve to warn A that the first of the three characteristics of definite NPs mentioned above does not obtain. In other words, if S uses an NP that is marked as being indefinite, he does not expect S to have information on the individual referred to by the NP. He does, however, expect A to be able to recognize the description in the NP. The instructions he is giving A about information storage and processing are quite different from those entailed by use of a definite NP.

The program suggested by use of a definite NP is, approximately: (a) parse and interpret description, (b) use description to set parameters for memory scan, (c) perform associative memory scan using current parameters, (d) return value(s) retrieved by scan to currently active register, (e) set any pointers necessary to retain currency and identify context. Any part of this (preliminary) schema can, of course, be elaborated, and often is. The program suggested by S's use of an indefinite NP is different: (a) parse and interpret description, (b) fill currently active register with description, (c) set any pointers

necessary to retain currency and identify context. It will be noted that the interpretation of an indefinite NP does not require a memory scan to identify the individual, since A is operating under the assumption that S will supply any information necessary for him to identify the individual---if S expected him to do the identification himself, he would have used a definite NP. Obviously, it is possible for S to make a mistake in evaluating A's informational resources, and it may be that there is a memory scan employed by A anyway, in order to see whether S is correct, and to retrieve any other information pointed to by the description. The first step in both of these programs is a complex one, which probably involves several different scanning procedures to produce semantically storable information; these procedures may produce in addition several possible referents, if storage is such that pointers to an individual identity nexus would be retrieved by such preliminary scans. In short, this programmatic model should not be believed literally. While it is certainly true that all these operations must be performed, it is quite possible that many of them may encode the same procedures or point to the same information. The only thing we can be sure of is that when an identification is made by A, it is stored in an active register (or, equivalently, the main storage location referenced by the scan is "activated" in some sense). Processing of the proposition in which the NP is used is then a case of setting pointers in the register in which the information carried by the NP is stored; these will be pointers to other registers in which the other information (old and new) contained in the proposition is currently stored.

I mentioned above that I would use the term "definite" to indicate the form of an NP, and would suggest different terminology for the function. This terminology, suggested by the analysis above, should make use of the actual processing strategy given by S's use of the form. I believe that the most useful terminology should make reference to the distinction inherent in S's expectation of identification (or, more properly, individuation) on the part of A. Thus, the functional counterpart of definiteness is expectability. The well-known "presupposition of existence and uniqueness" associated with definite NPs derives from this expectation. Definite NPs, whether opaque, transparent, attributive, referential, de re, or de dicto, are expectable, and the definite form is (in languages which mark it and in those constructions where the marking is found) a perceptual flag produced for the use of the addressee, to

optimize his retrieval of the information necessary to understand the utterance.

To be sure, this is not the only kind of flag that can be set by S to tell his expectations. Word order, grammatical relations, thematization, focussing, and topicalization, to name but a few processes, also exist largely to serve this function, or similar ones.

Unexpectedability has some ramifications that deserve comment here. Peterson (1974) has distinguished the "specific" and "non-specific" indefinite NPs, following a long tradition in philosophy and linguistics. The former is exemplified in (28), the latter in (29):

(28) I'm looking for *a policeman*, but I can't find him.

(29) I'm looking for *a policeman*, but I can't find one.

Note the personal pronoun in (28) and the indefinite pronoun in (29); these provide information regarding S's state of information that is not provided by the first part of the sentences---if the comma were a period, there would be no way for A to distinguish the two senses of the sentence. In (28), S signals with the indefinite NP that he does not expect A to be able to identify an individual, but then signals with the personal pronoun that he (S) can identify the individual; in (29), he makes the same signal regarding A's mental state, but adds that he shares this lack of identifiability---indeed, the sense of (29) is essentially that of "any individual who meets the description inherent in the definition of *policeman*". This usage begins to resemble that of the attributive sense of a definite description, and of generic NPs.

It is at this juncture that it becomes necessary to introduce some new concepts. While it is true that practically any piece of information can help A retrieve information in the case of a definite NP, there are different kinds of information that conceivably could be coded in storage and could be indexed with pointers. Among these are (at least) what I will call "instantiatory", "lexical", and "definitional". The first consists of pointers to instantiations; that is, in the case of the noun *politician*, for example, there may be pointers to Jimmy Carter, Hua Kuo-Feng, Leonid Brezhnev, etc., as instantiations of the term. Each of these instantiations, in turn, will have pointers which index particular characteristics, as well as deictic pointers that link reference to them with circumstances surrounding A's acquisition of the information concerned ("I read it in the *Times*", "Bill told me about that", etc.).

Most of the information indexed in this way will have little or nothing to do with the term *politician*, although A is free to draw his own conclusions as to the connotations of that term, and will certainly do so based on his experience with the instantiations it points to. It is these locations that S attempts to get A to retrieve with most definite NPs, and it is these locations that S attempts to add to with specific indefinites like (28), by indicating that S has instantiatory information that he does not expect A to have. With a non-specific indefinite, however, the picture changes. In using one of these, S signals A that he is not suggesting a scan of instantiations, nor is he giving information that A should ultimately store as an instantiation. Instead, he is referring lexically. This means that he is using an unbound variable, capable of referring to any individual who meets the lexical description of the NP being used. The processing outcome of this type of usage is that A retrieves only those characteristics that are immediately pointed to by the interpretation of the NP, without (many of) the characteristics pointed to secondarily by the instantiations of the NP. A may know many policemen who are tall, for example, but unless he has reanalyzed *tall* as a characteristic of policemen (as he well may have), he will not include this characteristic in the information retrieved in response to a non-specific indefinite like (29). Finally, definitional information is a subcase of lexical information, consisting of the minimal concatenation of characteristics that it sufficient to trigger an appropriate description by a given NP; that is, in Aristotelian terms, definitional information would consist of the genus and specific difference(s), while lexical information would consist of definitional information plus all properties proceeding from it, plus any accidents that have been included as connotative properties. Definitional information encodes denotation, while lexical information encodes connotation, and the latter includes the former. †

While lexical information is constantly undergoing change, due to the large number of words in a language, some of which are always less well known by an individual than others, definitional information, being less complex, more central, and more specific, is less likely to change. This statement is merely a description of the well-known linguistic fact that the "core" meaning of a word changes only slightly, while its more metaphoric and more contextually adapted senses tend to change much more rapidly and with less predictability, both diachronically and ontogeneti-

cally.

Lexical and definitional information is what is referred to by non-specific indefinites. In cases of overt definition, in fact, the definitum is typically expressed as a non-specific indefinite (which I referred to in Lawler (1973b) as an "indefinite generic"), as in (30):

(30) *A madrigal* is polyphonic.

Note that for (30) to be true, it must be the case that polyphonicity is a defining characteristic of *madrigal*. It is false, and therefore unacceptable in this context, to state that popularity is a characteristic of madrigals, although this can be done with what I have called a "definite generic":

(31) **A madrigal* is popular.

(32) *The madrigal* is popular.

I believe that (30) and (31) contain, as I have mentioned, non-specific indefinites (which are, of course, indistinguishable formally from specific indefinites---the distinction is one triggered contextually), and that (32) contains an ordinary definite NP which, however, can be interpreted like an NP defined de dicto, referring to lexical information, without the necessity of individuation. This interpretation is signalled to A by the lack of additional necessary information in the NP; the sentence does not provide enough information to allow A to scan for an individual madrigal in most contexts. If (32) did occur in a context in which there were sufficient pointers present to allow A to retrieve an individual madrigal as being what S meant to refer to, he would do so, and the sentence would be ambiguous from the outside observer's point of view.

I would, then, claim that the generic uses of definite and indefinite NPs are not special formal uses, but rather are additional functions that are made possible by the retrieval processes inherent in the normal interpretation of these forms in context. Nunberg and Pan (1975), among others, have shown that the interpretations of generic NPs are various and unpredictable on formal grounds, and that they are strongly influenced by context and expectations of speakers and listeners---I view the present analysis as entirely consonant with their views.

To sum up the various points and analyses presented here, the following resumé may be helpful:

A. English marks separately "definite" and "indefinite" NPs. The former signals information that the speaker expects the addressee to have, and can reference this information through instan-

tiatory or lexical processes; the latter signals information that the speaker does not expect the addressee to have, although he does expect the addressee to recognize it, since it signals this information through lexical or definitional processes. Schematically:

NP Type Used		Addressee's Information Type Addressed	
definite	instantiatory	lexical	-
indefinite	-	lexical	definitional

The use of an NP by a speaker can have a number of interpretations, depending on whether the addressee retrieves or creates an instantiatory piece of information, or treats the NP as referring only lexically or definitionally. The normal case, and the one which is most likely to be followed, is to retrieve (in the case of a definite NP) or create (in the case of an indefinite NP), such a piece of information. Thus, if the speaker is to refer successfully to lexical or definitional information, he must make use of contextual clues (or, often, lack of clues) which will cause the addressee to vary from his normal strategy.

B. The problematic cases of reference that we have discussed are of different types. Opacity is an ordinary case of instantiatory reference by use of a definite NP, but the additional problem of who is responsible for the (normally lexical) description causes potential ambiguity. De dicto is also instantiatory, but here the particular lexical items used (and their construction) causes several alternative pointers to an instantiation, some of which are variables. The use of the variables is determined by context: when the variables are relevant, they are used; otherwise, not. Attributivity is not strictly speaking a referential problem, since it has no bearing on use or interpretation of a definite NP, but rather on additional information that the speaker may have about the referent of the NP; essentially, an "attributive" use of a definite NP is one in which the speaker's instantiatory information and his lexical information regarding the referent are identical. Since the lexical information is what is encoded in the NP, the state of the speakers's instantiatory information is moot. Finally, generics (definite and indefinite) are special uses of NPs without instantiatory intent; they are made possible by signalling the addressee not to proceed from lexical to instantiatory scan (for definites) or not to proceed from

diagrammatically / semantically
definitional to lexical to create an instantiatory nexus (for indefinites); it is interesting to note that each makes use of the rightmost (and most central) information type that it can address (see diagram on previous page). The indefinite generic is a special case of the non-specific generic, which refers only to lexical information, and does not attempt to signal the addressee to create an instantiatory nexus.

C. Many of the reference types fall together in this scheme. For instance, de dicto is the same as non-specificity; the only difference is that de dicto is definite, while non-specifics are indefinite. It may be that more useful terminology could be devised. Similarly, generics are extreme cases of de dicto and non-specificity.

All of my examples have been from English, which has explicit markers for definite and indefinite NPs. Many languages do not have such markings on NPs, although there is usually a clue to the expectability of various NPs in other parts of the sentence. The analysis I present here is easier to see in a language which marks definiteness and indefiniteness, but I have intended it to be language-independent functionally, since the expectability of information is one of the most important things necessary to interpret a sentence in any language. There are, however, some cases in which a language-specific feature may invalidate some parts of the analysis, at least from a universal point of view. It is reported (R. Tomlin, personal communication) that there exist languages without indirect discourse; in such a case, it is possible that opacity might not exist, since it derives its existence from the possibility of indirect description. Also, it is conceivable that a category like attributive/referential might be signalled overtly, to help the addressee retrieve information and prepare for his next utterance, and to inform him more fully about the speaker's instantiatory information. In fact, there is no reason why many other categories might not be signalled overtly, as long as the system in any given language contains enough clues to facilitate information retrieval and accumulation. As we know, all languages can do this; otherwise, they would not be communicative.

NOTES

0. I am more than usually indebted to various colleagues in Linguistics and other disciplines for aid vouchsafed; this paper represents an attempt on my part to gain a new perspective on reference, and (to mix metaphors brutally) it is much easier to see the whole forest, and not just the trees, when one stands on the shoulders of those who have gone before. I would like to thank, among others, George Lakoff, Jerry Morgan, Charlie Pyle, Peter Cole, James McCawley, Frederick Lupke, Jeff Dreyfuss, Matthew Dryer, Deborah Keller-Cohen, David Peterson, Russ Tomlin, and Pete Becker, for helpful instruction, discussion, suggestions, and criticism at various times and on various topics. None of these people should be held accountable for my lapses in this paper. I am especially grateful for technical assistance from Bill Crawford in getting the work done, and most especially to Elizabeth Loftus for introducing me to the field of information processing and to Loftus and Loftus (1976), from which I have appropriated shamelessly (and probably incorrectly) numerous facts and concepts; I trust that my wholesale enthusiasm will cause the authors of this useful work no additional distress. Whatever value this paper has can be credited largely to those mentioned here; its defects are my own exclusively.
1. Much falls between the two stools, of course, but some paradigm examples are: work on quantifiers by McCawley (1968), Carden (1970), and G. Lakoff (1970) has been largely "Noun Phrase" linguistics, while most of Fillmore's work on case and related phenomena (1968, 1971, 1972) has been "Verb Phrase" linguistics, even though much of it has dealt with noun phrases. "Noun Phrase" linguistics tends to be formal and inclines to rigor; "Verb Phrase" linguistics shuns formalism wherever possible and uses a more intuitive sense of semantics.
2. On these and other topics, see Lawler (1975) for a full bibliography on semantic topics; I mention here only Donnellan (1972), Quine (1960), Lewis (1972), and Grice (1967).
3. A good example of this is the recent history of the school of thought called "Generative Semantics". This theory attempted to link meaning with form directly by means of syntactic derivations. It has fallen upon evil times and is currently accorded only lip service, if any, by most of its prior adherents (of which the author is one).
4. See Grice (1967) and the papers in Cole and Morgan (197) for further discussion of this term and other related topics.
5. Cf. Pyle (1975a, 1975b) and Loftus (1976) for discussion of such deviation and deviousness.
6. Cf. Loftus & Loftus (1976:123) for the concept of "activation": it may be that what I call a "register" can be considered an activated location, and that there can be many kinds of such locations (or registers). These distinctions are irrelevant for our purposes here.
7. In fact, there will almost never exist anything that could be identified with a clear conscience as the "meaning" of any sentence, since there must always exist some (possibly minute) differences between the speaker's guess as to the addressee's state of mind and the actual state of mind of the addressee. So much for autonomous semantics.

8. It is, of course, possible for this distinction to be signalled overtly (see below); but this means that S has some reason to indicate his state of mind more fully than is required to trigger recognition in A. It may even be the case that in some languages the distinction is made regularly by formal means; but in that event, it will almost certainly be used for other purposes, too. In English, the distinction can be signalled contextually, but not formally without complete paraphrase.
9. In the light of these three informational types, it is instructive to consider the three primary types of unusual definite descriptions discussed here; opacity results because there are too many routes from lexical to instantiatory information, depending on who is responsible for the description, attributivity results because there are no routes from lexical to instantiatory information, and de dicto results because there may or may not be a route between lexical (or definitional) and instantiatory, all defined in the situations in which the phenomena can appear. The "route" spoken of here means a pointer or pointer chain that leads to retrieval of the instantiatory information. A good deal more can be made of these distinctions.

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