

Demonstrative Constructions, Reference, and Truth

Author(s): Tyler Burge

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duce an identifying description of the object. This is mistaken.⁴⁵ The speaker is indeed important, but identification depends not on anything he *could or would do* but on what he *did*: for underlying what he did was a causal network grounded in an object. Only in this way does a speaker identify an object. Causal networks link names to the world.

MICHAEL DEVITT

University of Sydney

DEMONSTRATIVE CONSTRUCTIONS, REFERENCE, AND TRUTH *

SENTENCES whose normal use involves a demonstrative element play a lead role in the employment and acquisition of natural languages. Such sentences appear more than any other kind in day-to-day communication. They occur repeatedly in ordinary empirical thinking. And they are the first sentences to be taught to a first-language learner (or radical translator). Indeed, given the limits of our intelligence, memory, and knowledge, it is doubtful that without them we could learn language or utilize it to describe particular objects, events, or experiences. The reason for this virtual omnipresence of sentences involving a demonstrative element is that they are peculiarly dependent for their interpretation on the context of their use. Their truth value typically depends on someone's actually speaking, writing, or thinking them in a relevant context. The resulting dividend for language learning is obviousness: since the correct interpretation of these sentences occurs, as it were, on the spot, many of them can be taught with relative ease to the novice—one has merely to correlate them with the appropriate spots. The dividend for communication and thinking is economy: a gesture saves a thousand words.

My aim in this paper is to motivate and sketch a unified formal theory of some of the most ordinary kinds of sentences involving a demonstrative element. The theory will emphasize a point that has not been treated with sufficient seriousness in recent formal accounts. The point is that ordinary sentences containing demonstra-

⁴⁵ The move from a correct view to a mistaken one is nicely illustrated by Searle's move from his "axiom of identification" to his "principle of identification"; see his *Speech Acts: An Essay in the Philosophy of Language* (New York: Cambridge, 1969), pp. 77–88.

* I am indebted to Gilbert Harman, David Kaplan, Dana Scott, and John Wallace for criticism of earlier versions and to Harry Deutsch for many helpful and stimulating conversations.

tive constructions are true or false relative, and only relative, to occasions in which people use tokens of them in acts of reference. The demonstrative constructions that I treat are demonstrative pronouns, incomplete definite descriptions, and tensed verbs.¹ I believe that many other constructions—for example, demonstrative adjectives and adverbs ('present', 'there')—are best parsed in terms of those we shall discuss. But I shall not argue the belief in any detail here.

Most demonstrative constructions fill at least two formal roles—a pronomial role and what we shall call a "referential" role. For example, consider the following pair:

If anyone runs for office, he runs a risk.
Who is he? He's been shot!

The demonstrative construction 'he' in the first sentence is (typically) pronomial. In this case the demonstrative is a trace of a bound variable. Pronomial demonstrative constructions may also function as abbreviations for antecedently used singular terms ("pronouns of laziness"). In both functions, demonstratives facilitate cross reference within the immediate discourse. In the second sentence, and possibly in the third, the demonstrative 'he' (typically) plays a referential role—it is instrumental in the language user's picking out *extralinguistically* an object that is nowhere specified in the immediate discourse.

The phrase 'immediate discourse' is vague. Cross reference is not always confined within conventionally punctuated sentences, and people commonly use pronouns whose antecedents occur in previous utterances of other people. I can offer no rule for determining "immediate discourse," hence no general method for recognizing pronomial as opposed to referential occurrences of demonstrative constructions. For analytical purposes, however, I shall assume that the distinction is usually evident, or at least can be established in particular cases by fiat. In what follows I shall be focusing on referential occurrences of demonstrative constructions, largely ignoring pronomial occurrences.

I aim at a *unified* account of constructions involving a demonstrative element. Intuitively, all such constructions are devices for carrying out fundamentally the same activity—they help set the stage for the language user to pick out an object without uniquely

¹ Proper names should for many formal purposes be grouped with incomplete definite descriptions. See my "Reference and Proper Names," this JOURNAL, LXX, 14 (Aug. 16, 1973): 425–439.

specifying it. Other things equal, a theory that gives a unified formal representation to demonstrative constructions and a unified explanation of their contribution to truth conditions will be regarded as superior to a theory that does not. The paper divides into seven sections. Section I discusses an approach by Davidson and motivates a theory which is outlined in sections II–V. Section VI compares our metalinguistic analysis with that of Montague and Scott, and section VII casts a fleeting glance in the direction of psychology and sociology.

I. DAVIDSON'S PROPOSAL

We begin by discussing a proposal by Donald Davidson.² Davidson does not really elaborate a theory of demonstratives, but his approach to sentences containing 'this' and 'that' may be illustrated by the following truth-theoretic biconditionals.

- (1) 'This is a dog' is true as potentially spoken by p at t
if and only if the unique object demonstrated by p at t is a dog.
- (2) 'That dog is an animal' is true as potentially spoken by p at t
if and only if the dog demonstrated by p at t is an animal.

where ' p ' varies over persons and ' t ' over times. Davidson treats 'I' and tenses somewhat differently. Instead of using his primitive 'demonstrates' he calls on the variables for person and time on the left side of the biconditionals to nail down the person and/or time designated with these constructions.

Thus:

- (3) 'I am tired' is true as potentially spoken by p at t
if and only if p is tired at t .
- (4) 'I was tired' is true as potentially spoken by p at t
if and only if p is tired [at some time t'] prior to t .

Davidson's proposals seem to me to be in the right direction. But they fail to meet our goal of giving a unified formal representation to constructions intuitively involving a demonstrative element. For the analysis does not bring out any feature common to the logical or grammatical form of sentences containing 'I' and the tenses, on one hand, and sentences containing other demonstrative constructions, on the other. This shortcoming is perhaps largely a result of the fact that Davidson does not attempt to provide formal representations of the natural-language sentences.

Another shortcoming will require some detail to articulate. For the sake of definiteness, let us take the three-place truth predicate in (3) as the truth predicate for some language or idiolect—say,

² "Truth and Meaning," *Synthese*, xvii, 3 (September 1967): 318–320.

English or, better, my English of April 1973. The variables '*p*' and '*t*' in (3) should be understood as varying over all persons and all times, respectively. According to Davidson's view, particular instantiations for these variables fix the referents of 'I' and present tense in potential utterances of 'I am tired' by the designated person at the designated time. For example,

- (3') 'I am tired' is true (-in-Burge's-English-of-April-1973)
 as potentially spoken by Wallace* at 4/15/1973/noon/EST
 if and only if Wallace* is tired at 4/15/1973/noon/EST.

where 'Wallace*' is a unique specification of John Wallace that involves no demonstrative constructions. Of course, (3), not (3'), is the truth-theoretic analysis that Davidson assigns the sentence 'I am tired'. Unlike (3'), it brings out the fact that, as the sentence is construed by the object-language user, the referent of 'I' (and of present tense) can vary, depending on who uses the sentence (and when). But (3) fails to bring out another feature of these constructions—namely, that the way their referents are established in a particular specified (potential or actual) *utterance* is different from the way the referent of a demonstrative-free singular term is established. Compare the following with (3'):

- (3'') 'Wallace* is tired' is true (-in-Burge's-English-of-April-1973)
 as potentially spoken by Wallace* at 4/15/1973/noon/EST
 if and only if Wallace* is tired at 4/15/1973/noon/EST.

Davidson's approach would assign precisely the same analysis to specified (potential or actual) utterances of 'Wallace* is tired' and 'I am tired' by Wallace at the relevant time. Any two such utterances would, of course, be materially—even "importantly"—equivalent; and any good account should imply this. But a satisfactory semantical theory of demonstrative constructions should also mark the semantical differences between those utterances which involve demonstrative constructions and those which do not.

II. THE REFERENCE PRIMITIVE

We have seen that Davidson's account of demonstrative constructions consists of two strategies. One is to relativize the truth predicate and make the new argument places show up on the right side of the biconditional, to play the roles of the demonstrative constructions. [Compare the treatments of 'I' and tense in (3) and (4).] The other is to relativize the truth predicate and introduce the primitive 'demonstrates' on the right side of the biconditional, to specify the objects to which the speaker applies his demonstratives. [Compare

the treatments of 'this' and 'that' in (1) and (2).] A generalization of one or the other of these strategies itself as a means of attaining a uniform semantical account of demonstrative constructions.

The first-mentioned strategy cannot be generalized without further ado. For there is no bound on the number of demonstrative "this's" ("you's", "he's") that may designate different objects and occur in the same sentence. Thus, straightforward extension of the relativization strategy would lead to a truth predicate of an indeterminable (or interterminal) number of argument places. But the strategy might be modified by relativizing the truth predicate to an infinite sequence where the elements of the sequence turn up on the right side of the biconditional in the same way as before.³ We shall discuss this move in section vi.

I intend, with certain modifications, to generalize the second strategy. In place of Davidson's 'demonstrates', I shall use the primitive 'refers'. My preference for 'refers' is based largely on a desire to apply the term to instances in which the object designated is not perceptually present to the speaker or hearer. (Imagine, for example, that several days after the visit of an obnoxious house guest, the host says to his wife (out of the blue), "He was surely hard to live with.") Remoteness of the object of reference from the speaker can be radically increased when either special context prevails or the speaker uses descriptions or proper names to help narrow the candidates.

In using the term 'refers' I shall have in mind an action on the part of a person—not a relation between word and object. To be sure, a person often refers *with* his words to an object. But reference, as I shall construe it, is a form of intentional behavior rather than a semantical relation such as denotation or satisfaction.

Actually, the term 'refers' is too simple for our purposes. In the first place, since it is tensed, a context-independent theory must make explicit its relativity to a time. Further, there are instances—particularly cases involving incomplete definite descriptions—in which we want to distinguish between there being no act of reference and there being an act of reference that fails to be a reference *to* any object. In addition, since there will often be many acts of reference in the utterance of a single sentence, and since it is usually not convenient to distinguish these acts merely by differentiations between the times at which they occur, we will need to associate with each act the construction that is used to carry it out. For example,

³ This has been moved by David Kaplan and seconded by David Lewis in "General Semantics," *Synthese*, xxxii, 1 (December 1970): 18–67 (appendix).

the occurrences of 'this' (and other demonstrative constructions) in a sentence should be indexed in some fixed order so that an act of reference made with the first occurrence of a construction may be distinguished from an act made with the n th.⁴ I also wish to associate with the act of reference the sentence (if any) used to make the reference, or a deep reading of that sentence (cf. note 4).

To satisfy these needs we replace " p refers to y with 'that' in 'That is a dog' " by the following:⁵

(R) $(\exists x)(\text{Reference}(x) \wp \text{By}(x,p) \wp \text{To}(x,y) \wp \text{At}(x,\text{now})$
 $\wp \text{With}(x, \text{'that'}_9, \text{'That is a dog'})$)

Note that the word 'that' is subscripted to mark a particular occurrence (cf. note 4). The clause 'With (x , 'that'₉, 'That is a dog')' indicates that 'that'₉ and 'That is a dog' are both instruments of the act of reference. The demonstrative 'now' in (R) will disappear in uses of the reference primitive within the truth theory.

The principle logical properties of our primitive apparatus are simple. (R) is extensional throughout. The clause 'To(x,y)' expresses a partial function from acts of reference to objects. The psychological and sociological properties of 'refers' are more complex. Acts of reference are usually, probably always, intentional in the sense that if a person p refers to something, he intends to refer to something. One might question, however, whether it is always the case that, if p refers to something, he intends to refer to that thing. Enough has been said already to indicate that my notion of reference is both familiar and in need of further clarification. Fortunately, clarification is desirable quite apart from the requirements of a formal theory of constructions involving a demonstrative element.⁶

⁴ This is slightly misleading. Even ignoring cross reference within the discourse, demonstrative constructions in surface sentences of natural language cannot always be mapped one-one onto acts of reference. For instance, I shall later suggest (sec. v) that use of the simple past tense sometimes involves two references, even though in surface sentences there are not always two linguistic elements to associate the references with. Hence it is best to require that acts of reference be associated with constructions (generally free variables) in the *formal representation* or "deep reading" of the natural-language sentence. The variables representing demonstrative constructions will, of course, be indexed in some fixed order. Strictly speaking, the truth predicate should be relativized to formal representations (in addition to persons and times). But for heuristic purposes I shall ignore this point.

⁵ The analysis has drawn on Davidson's treatment of action verbs. Cf. "The Logical Form of Action Sentences," in Nicholas Rescher, ed., *The Logic of Decision and Action* (Pittsburgh: University Press, 1967), pp. 81-95.

⁶ Notions of reference in many respects similar to the one here adumbrated have been discussed by Keith Donnellan, "Reference and Definite Descriptions," *Philosophical Review*, LXXV, 3 (July 1966): 281-302, and by David Kaplan, "dthat" (unpublished).

III. FIRST ANALYSES

I propose the following macrotreatments of ‘That is a dog’, ‘That dog is an animal’, and ‘I am human’:

- (7) $(x)(y)(\text{Reference}(x) \wp \text{By}(x,p) \wp \text{At}(x,t) \wp \text{With}(x, \text{‘that}_9\text{’}, \text{‘That is a dog’}) \wp \text{To}(x,y)$
 $\rightarrow (\text{‘That is a dog’ is true with respect to } p \text{ at } t \leftrightarrow \text{Dog}([\text{y}])))$
- (8) $(x)(y)(\text{Reference}(x) \wp \text{By}(x,p) \wp \text{At}(x,t) \wp \text{With}(x, \text{‘that}_9\text{’}, \text{‘That dog is an animal’}) \wp \text{To}(x,y)$
 $\rightarrow (\text{‘That dog is an animal’ is true with respect to } p \text{ at } t$
 $\leftrightarrow \text{Animal}([\text{y}]\text{Dog}(y))))$
- (9) $(x)(y)(\text{Reference}(x) \wp \text{By}(x,p) \wp \text{At}(x,t) \wp \text{With}(x, \text{‘I}_3\text{’}, \text{‘I am human’}) \wp \text{To}(x,y) \wp y = p$
 $\rightarrow (\text{‘I am human’ is true with respect to } p \text{ at } t \leftrightarrow \text{Human}([\text{y}])))$

where ‘*p*’ and ‘*t*’ range over persons and times, or time periods, respectively. For example, (8) should be read, “For any *x* and *y*, if *x* is an act of reference by *p* at *t* to *y* with ‘that₉’ in ‘That dog is an animal’, then ‘That dog is an animal’ is true with respect to *p* at *t* if and only if the object which is *y* and which is a dog is an animal,” or “. . . if and only if that *y* which is a dog is an animal.” These formulations require some explanation.

The formation rules of our truth theory (and of any formal representation of the object language) are to include open singular terms of the form

$$(i) \quad [x_i]A_j^n(x_1 \dots x_i \dots x_n)$$

The bracketed variable marks the free variable in the singular term that represents the demonstrative that governs the whole scope of the term. ‘ $[x_i]$ ’ is not an operator binding the variable ‘ x_i ’. Rather, (i) is equivalent to

$$(ii) \quad (\lambda z)(A_j^n(x_1 \dots z \dots x_n) \wp z = x_i)$$

Since ‘ x_i ’ is not bound in (i), it may be quantified from outside the term, just as ‘ x_i ’ can be in (ii). [Since the term ‘ $[y]$ ’ in (7) and (9) contains no predicates it is equivalent to ‘ $(\lambda z)(z = y)$ ’.] In (7), (8), and (9) the quantifier ‘*y*’ binds the variable ‘*y*’ both as it occurs in the antecedent and as it occurs in the consequent of each sentence.

I favor the form (i) over the more familiar form (ii) because it better represents the syntax of English: the bracket in (i) may be roughly read as the demonstrative ‘that’. Sentences on the right of the biconditional signs in (7)–(9) have the same form as formalized representations of the object-language sentences whose truth conditions are being given. The only difference is that, in the formal

representations, specially indexed free variables are used to represent the different kinds of demonstratives. For example, the representation of 'That is a dog' would be (roughly) 'Dog($[x_0]$)', where '9' marks the first free variable correlated with the demonstrative 'that'. Variables representing occurrences of the demonstrative 'that' receive indexes to distinguish them from variables representing occurrences of other constructions (e.g. 'she'). Where these variables are bound in the explication of truth conditions, their indexes become irrelevant [cf. (7)]. For then the bracketed variable assumes a pronominal rather than referential role.

Our analyses give us at least three advantages over Davidson's. First, whereas the right side of our biconditionals constitute plausible syntactical representations of the respective object-language sentences, Davidson's use of 'demonstrates' on the right side prevents homophonic treatment of these sentences. (A term like 'demonstrates' is not plausibly part of the grammar of demonstrative sentences.) Second, our approach brings out the intuition that 'I', 'now', and tenses (see section v) play logical roles that are analogous to those of other demonstrative constructions. All such constructions involve a free variable which is typically interpreted only through a language user's act of reference. Third, we can distinguish our analyses of demonstrative constructions from those of context-free constructions in the case of specified utterances as well as in the case of sentences. Instantiations analogous to those carried out in section 1 will make the point evident.

Sentences containing demonstrative constructions are neither true nor false apart from actual use. To evaluate 'That is a dog' as true or false, we need someone to use 'that' in the sentence referentially. For this reason, formal representations of sentences involving demonstrative constructions are open sentences. The object-language user completes the semantical interpretation of such open sentences extralinguistically—via his act(s) of reference. One might intuitively think of the language user as reaching out into the world to grasp an object to satisfy his open sentence.

Whereas the object-language user freely relies on context to complete the semantical interpretations of his sentences, the meta-theorist should not follow suit in explicating truth conditions. For no reasonable explication of the contribution of demonstrative constructions to the truth conditions of containing sentences will result from simply carrying the constructions over into the metalanguage. What is needed there is sufficient generality to account for the referential variability of these constructions. Truth-theoretic laws

like (7), (8), and (9) constitute an analysis of what is relevant in any context to determining the truth value (if any) of the object-language user's sentence in that context.

Some philosophers and linguists have suggested that ordinary sentences containing demonstrative constructions be treated exactly as other open sentences are treated—as satisfied by or true of some objects (or sequences) and not others. This plan overlooks the fact that sentences containing a demonstrative element are on some occasions not just *true of* or *false of* objects, but are *true* or *false*. Thus, we should alter the traditional notion that truth is a property only of closed sentences.⁷

On our account, open sentences containing free variables that help represent demonstrative constructions are provided with ordinary satisfaction axioms, just as other open sentences are. This provision explicates the intuition that ordinary sentences containing demonstrative constructions can be conceived as applying to some objects and not others—or (more vaguely) as being true with respect to some contexts and not others—apart from any actual use of those sentences. If there is no act of reference with these constructions (by person p at time t), then free variables specially indexed to represent them receive different assignments by different sequences, just as ordinary free variables do. But our account also explicates the intuition that sentences containing demonstrative constructions, may, on occasions of use, be true or false *simpliciter*. If a demonstrative construction in a certain grammatical context is used by someone at some time in an act of reference, then all sequences assign to the free variable employed in representing that construction in that context the appropriate object (if any) referred to. Thus sequence assignments to “demonstrative-representing” free variables are a (possibly partial) function of the references of the language user, if the language user refers. If the language user does refer at a given time, the relevant open sentence is *true* (with respect to that person at that time) just in case (a) it has no free variables that do not represent used demonstrative constructions, and (b) it is satisfied by all sequences.⁸

The distinctive behavior of the different demonstrative construc-

⁷ The traditional notion was always applied to sentences of mathematics and related disciplines which do not contain demonstrative constructions. So our view need not be construed as conflicting with it.

⁸ The crucial semantical axioms may be extracted from this and succeeding paragraphs. I leave it to the reader to write them out. He should note that the assignment function as well as the satisfaction predicate will be relativized to a person and a time.

tions is accounted for by differences in the conditions under which the corresponding free variables receive sequence assignments. For example, the theory states that if a language user p refers at time t to a male with a given free variable v_7 that represents an occurrence of 'he', the assignment of all sequences (with respect to p at t) to v_7 is that male. Similarly, if p refers to an addressee at t with a given free variable v_5 which represents singular 'you', then the assignment of all sequences (with respect to p at t) to v_5 is that addressee. The clauses specifying these conditions of sequence assignment to demonstrative-representing free variables will be carried along in the proofs of the familiar truth-theoretic biconditionals.

This treatment of demonstrative constructions can be used to account for the obviousness (some would say the a priori or analytic character) of certain assertions containing demonstratives. For example, we would derive the following conditionalized biconditional for 'I [tenselessly] exist':

$$(10) (x) (w) (\text{Reference}(x) \& \text{By}(x,p) \& \text{With}(x, 'I', 'I \text{ exist}')) \\ \& \text{At}(x,t) \& \text{To}(x,w) \& w = p \\ \rightarrow ('I \text{ exist}' \text{ is true with respect to } p \text{ at } t \leftrightarrow (\exists y) (y = [w]))$$

The peculiar obviousness of assertions of 'I exist' is accounted for by the fact that we can *further* prove within the truth theory that the sentence is true with respect to any person p at any time t —given a certain assumption. The assumption is that p fulfills the conditions for normal assertion at t . These conditions are specified in an antecedent of (10). (To sharpen the conditions for normal assertion, one might well add, as an axiom governing any variable that represents 'I', that no reference by any person p at any time t with such a variable will fail to be to p .)

So far we have spoken mainly of sufficient conditions for demonstrative-representing free variables to take on the relevant referents referred to by a language user. We have also indicated that, if there is no relevant act of reference at all, then the demonstrative-representing free variables receive different assignments by different sequences. But we have left open a number of questions. For example, we have not dealt with acts of reference that fail to be to anything. To handle these, we should add a postulate to the effect that, under such conditions, all sequences fail to assign anything to the relevant free variable (with respect to the relevant person at the relevant time).⁹ But the effect on truth value of such failures of

⁹ For a detailed discussion of a free logic that allows nondenoting free variables, see my "Truth and Singular Terms," forthcoming in *Noûs*.

reference will be left open here. We have also avoided saying anything about cases in which the predicative element in a demonstrative construction is controverted (e.g., when someone points to a male and utilizes the demonstrative 'she'). It is enough for now to see that our approach provides a setting in which such questions can be raised and discussed clearly.

IV INCOMPLETE DEFINITE DESCRIPTIONS

(8) indicates how to interpret *incomplete definite descriptions*. An incomplete definite description is a singular description that contains a demonstrative construction. Normally, incomplete definite descriptions do not uniquely specify an object (cf. 'the oak table', 'that satellite'). But they are not for that reason counted improper. They merely need to be supplemented with an extralinguistic act of reference, to be fully interpreted. Virtually all the definite descriptions used in everyday life or discussed in the philosophical literature—except for the mathematical ones—are, under normal construal, incomplete. Philosophers and logicians have tended to ignore this fact because they have relied on context to make the designation (if any) evident. We cannot do likewise, however; for such reliance provides no analysis of the context-dependence of the relevant constructions.

Our distinction between complete and incomplete definite descriptions intersects Donnellan's distinction between attributive and referential uses.¹⁰ The distinctions should not be identified, however. His applies to the uses to which a person puts his expressions; ours, to the grammatical or logical form of the expressions themselves. Many, perhaps all, complete definite descriptions may be used either referentially or attributively. Many incomplete definite descriptions—e.g., 'the first man to walk on that—may also be used either way. But some incomplete definite descriptions—those, like 'this man', whose entire scope is governed by an unambiguous demonstrative—seem always to be used referentially. Actually this is not quite right. Sometimes demonstratives in these definite descriptions may be best treated as traces of variables previously bound in the discourse or as abbreviations for antecedents (functioning like "pronouns of laziness"). In such cases, if the antecedent is used attributively, the pronominal definite description will normally be used attributively. Still, we can hazard the rough generalization that a definite description whose entire scope is governed by an unambiguous demonstrative and which has no antecedent in

¹⁰ Donnellan, *op. cit.* I shall not take the space to expound the distinction here. I assume that the reader is familiar with it.

the discourse is, when used in an assertion, used referentially. Referential use seems to be *correct use* of demonstrative constructions that have no antecedent in the discourse.

This generalization provides a standard for resolving certain ambiguities in definite descriptions, particularly those concerning the word 'the'. In some contexts, the word may seem unambiguously to play the role of an operator—as when it occurs in phrases like 'the only', 'the unique' and 'the' followed by the superlative form of a modifier. But in other contexts (as in 'the man who likes Jill') 'the' may clearly be read either as a uniqueness operator or as a demonstrative. If we ignore pronomial occurrences of definite descriptions, referential use provides a rough criterion for determining that 'the' in a particular assertion, should be parsed as a demonstrative. On the other hand, attributive use is a rough touchstone for the operator interpretation. The relation between intentional acts and grammatical interpretations is, I think, important and worthy of further study.

V. TENSE

Our reading of present tense would go the way of 'I' [cf. (9)] but for the fact that the "present" of present tense is not always identifiable with the time at which the relevant act of reference (if any) occurs. That time places no very tight restrictions on what the object-language speaker himself may on a given occasion find convenient to count as the present. Suppose, for example, we stipulate that the time during which an act of reference occurs is the duration of the relevant sentence utterance (or argument utterance). Now suppose that the object-language user answers someone's question, "Why didn't you go to the dance last month, old man?" by saying, "My body is too weak for that sort of thing." The answer makes little sense if we confine the temporal application of the present-tense construction to the time required to complete the sentence, or to the time at or during which the construction is uttered. Clearly the man refers with his construction to a larger span—a portion of his life—which includes not only his immediate utterance but the dance as well. There are other examples in which a speaker refers with present tense to the exact instant of an observed event, but circumstances or slowness of reflex prevent his uttering the sentence, or the relevant tense construction, at exactly that instant. (Imagine a play-by-play basketball announcer.) In sum, the extent of "the present" and its relation to the language user varies with context and with the language user's intentions. Similar remarks go for the demonstratives 'here' and 'now'.

Given this variability, it is implausible to identify the speaker's present with the time at which the act of reference (if any) occurs, or with the time at which the relevant sentence is uttered. [Contrast (3).] We shall use the expression 'Present(*t'*,*p*,*t*)' to express the notion that time *t'* is person *p*'s present at time *t*. Our metalinguistic explication of the truth conditions of sentences containing present tense is illustrated by

- (11) (*x*) (*t'*) (Reference(*x*) & By(*x*,*p*) & With(*x*, '*t*₁₇', 'Myrdal is wise')
 & At(*x*,*t*) & To(*x*,*t'*) & Present(*t'*,*p*,*t*)
 → ('Myrdal is wise' is true with respect to *p* at *t* ↔ Wise(Myrdal, [*t'*]))

Formal representations of tensed sentences again contain specially indexed free variables. Thus, for example, 'Myrdal is wise' receives the reading 'Wise(Myrdal, [*t*₁₇])' where '17' marks the first free variable ranging over times (or time periods) which represents present tense. Such readings are incompletely interpreted (that is, lacking truth value, but typically true of some times and not others) except when tense constructions in sentences represented by them are used referentially, or at least pronominally, by some person.

There is a set of readings of tensed sentences that has been largely ignored in the literature because of a general neglect of the demonstrative element in tensed sentences. These interpretations may be illustrated by the simple past construction. Consider the sentence 'John was tired' as applied to some particular John. On Davidson's account [cf. (4)] and others, the sentence is true if and only if John is tired at some time before the sentence is spoken. But although this interpretation might properly be applied to some utterances of 'John was tired', it does not apply to very many. Thus suppose that John's neighbor asks John's brother why John did not join the soccer game. If John's brother answers 'John was tired' and John was not tired *then* (at the time of the soccer game), the answer is untrue even if John had once been weary. Other tenses provide similar examples, some of which increase the number of demonstrative references needed to interpret the relevant sentence. In the present case what is needed, of course, is provision for delimiting the particular past time intended. In our explication of truth conditions the reference clauses turn the trick. In formal representations of the object-language sentence, the verb 'was' is read as playing two semantical roles: it provides the demonstrative instrument for fixing the two relevant times (a 'then' as well as a 'now' may be

regarded as implicit); and it provides a predicative element ('is past with respect to') which relates them.

The neglect of the demonstrative element in tense goes beyond particular tenses. Formal representations of tensed sentences which have been offered by traditional extensionalist logicians and by tense-logicians fail *generally* to represent the demonstrative element in the grammar of those sentences. Traditional extensional approaches have simply introduced constant singular terms specifying the relevant times, thus obliterating (usually intentionally) the distinction between noneternal and eternal sentences. Tense-logicians have utilized a variety of nonextensional sentence operators in order to represent the formal features of tense. But their representations again have the effect of obliterating the demonstrative element in the grammar of tensed sentences. For the formal representations of such sentences are presented as having nothing in common with the representations of sentences containing other demonstrative constructions.¹¹ For example, in the writings of Montague and Scott sentences containing demonstrative constructions other than tense seem to be represented as having the logical form of open sentences, capable of taking different semantical interpretations (assignments to the variables) on different occasions of use. But formalizations of tensed sentences (with no other demonstrative constructions) are closed sentences.¹² Thus the variability in temporal assignments to tensed sentences is left unrepresented in the object language.

¹¹ The insight that a salient feature of tense constructions is that there is no time which they designate independently of a person's immediate use of sentences containing them is due to Bertrand Russell, *Inquiry into Meaning and Truth* (New York: Allen & Unwin, 1940), ch. vii; and to Hans Reichenbach, *Elements of Symbolic Logic* (New York: Macmillan, 1947), pp. 284–298. A. N. Prior argued that the apparent demonstrative element in tensed constructions is spurious. Cf. his *Papers on Time and Tense* (New York: Oxford, 1968), ch. ii, "On Spurious Egocentricity." But the argument is weak and unpersuasive. For a discussion of it, see my dissertation, *Truth and Some Referential Devices*, Princeton University, 1971, pp. 62–65. Recently Barbara Partee has called attention to syntactical evidence that supports representing tense on an analogy to demonstrative pronouns (in terms of variables, quantifiers, and predicates, instead of operators): "Some Structural Analogies between Tenses and Pronouns in English," this JOURNAL, LXX, 18 (Oct. 25, 1973): 601–609.

¹² Richard Montague, "Pragmatics," in Raymond Klibansky, ed., *Contemporary Philosophy/La Philosophie Contemporaine* (Florence: La Nuova Italia, 1968); "Pragmatics and Intensional Logic," *Synthese*, xxi, 1 (March 1970): 68–94; Dana Scott, "Advice on Modal Logic" in Karel Lambert, ed., *Philosophical Problems in Logic* (Dordrecht: Reidel, 1969). Part of the motivation for their work is to give a unified account of intension and token-reflexivity. In this and the next section I shall be doing it the injustice of focusing entirely on the latter aspect.

Adding new tense operators (like a “now” or a “then” operator) to deal with the constructions mentioned in the penultimate paragraph will not solve the problem of explicating the semantical analogies between demonstrative pronouns and tense constructions. Furthermore, there appears to be no end to the number of new primitive constant operators that would have to be added. Tense logic gives us no principled means of accounting for mid-sentence shifts in temporal point of reference. In natural language, ‘If now it is 3 o’clock, it is not now 3 o’clock’ can be interpreted so as to be true, with true antecedent.¹³ Similar examples may be given for other tenses (try using ‘then’ in either its future or its past use). An immediate response is to confer on the sentence different (subscripted) present-tense operators. But then there are sentences like, ‘The spaceship is now 3 miles away, and now it is 4 miles away, and . . . and now it is n miles away’, for virtually any n —sentences which may be interpreted as true on occasions of use. Adding infinitely many constant operators would complicate the formal representation of natural language unacceptably, particularly when a simple appeal to variables is available. Our approach accounts for the token-reflexivity of tense constructions by altering free variables in representations of different occurrences of the same construction. Shifts of reference by a given tense construction within a single occurrence of a sentence are thus as easily explicated as shifts between occurrences. When implications between different occurrences of the same sentences *are* conceived as holding, at least one occurrence of the relevant tense construction will be functioning pronomially. So the same free variable will be reemployed in representing the different occurrences.

There is a surprisingly widespread notion that, in order to give tensed sentences a credible formal representation, one “must” invoke intensional operators. The notion is perhaps understandable in light of the fact that most logicians bent on preserving extensionality have insisted on applying their formal apparatus to tenseless, or detensed, sentences. But the use of indexed free variables to represent demonstratives, and predicates to represent temporal

¹³ Harry Deutsch has suggested, independently, the example, “Now you see it, and now you don’t.” Whereas such sentences provide difficulty even for current metalinguistic accounts, the most fundamental problem they raise is for the tense-logical object language, where (in quite ordinary uses), they defy the usual representations of the form $\Gamma p \rightarrow \sim p \urcorner$ and $\Gamma p \wedge \sim p \urcorner$. This inflexibility in current accounts of tensed sentences will be particularly unpleasant in applications to communication and thought, where it is often illuminating to see extended passages of discourse as single sentences. (See note 17 below.)

relations, provides an alternative to tense logic. It is sometimes said that tensed sentences "obviously" do not contain reference to times. But Reichenbach and others have had contrary intuitions (see note 11). The claim of obviousness derives from rather than supports a theoretical view. One can paraphrase 'John is tired' by 'John is tired now', 'John is tired at the present time', and 'John is tired at this time'. To some it will seem plausible (I avoid 'obvious') that one should take the paraphrases as revealing a temporal reference in the original sentence. The considerations in the present section constitute grounds for this view.

VI. SPEAKER REFERENCE AND POINTS OF REFERENCE

An elegant metalinguistic account of the truth conditions of sentences containing demonstrative constructions has been offered by Montague and Scott (see note 12). In effect, their work is an extension of one of the two strategies for unifying a semantical explication of demonstrative constructions which we mentioned at the beginning of section II. Instead of introducing reference clauses, as we have done, they relativize the truth predicate to the relevant points of reference and (roughly speaking) make the new argument places do the work of singular terms on the right sides of the biconditionals. The truth value of a sentence containing a demonstrative or tense construction is relative to a point of reference, where a point of reference is construed as a sequence of things, times, locations, persons, and events, with the places of such sequences ordered in some fixed way corresponding to a fixed method of indexing demonstrative constructions. These sequences are most conveniently taken to be infinite in length, since there is no plausible bound on the number of "this's," incomplete definite descriptions, or tense constructions that may be used in a sentence to pick out different particulars. (See note 3.) From the viewpoint of a theory of truth this means that satisfaction is to be regarded as a relation which has *two* infinite sequences among its arguments—a "Tarskian sequence" which assigns values to ordinary variables and a "points of reference sequence" which assigns values to variables (or dummy constants) used in representing demonstrative constructions.¹⁴ With allowances for irrelevant differences in present-

¹⁴ It has been suggested that one can save an argument place in the satisfaction predicate by letting variables range over ordered pairs of infinite sequences. But this move effects no real formal simplification. Cf. Nelson Goodman, "On the Simplicity of Ideas," *Journal of Symbolic Logic*, VIII, 4 (December 1943): 107-121.

Although Montague and Scott's discussions are model-theoretic rather than (absolute-) truth-theoretic in character, nothing essential to our purpose is lost

tation, their biconditional for 'That is a dog' looks like this:

$$(x) (y) (\text{Sequence}(x) \& \text{Sequence}(y) \& \text{Point of Reference}(y) \\ \rightarrow (x \text{ satisfies 'That}_y \text{ is a dog' with respect to } y \Leftrightarrow \text{Dog } (y_0)))$$

where 'y₀' is read 'what y assigns to 9'.

What are the differences between their metalinguistic account and ours? The Montague-Scott approach introduces the notion of a point of reference, where we have relied on the notion of an act of reference by a language user at a time with a demonstrative construction. But whereas we need two more primitives ('To', 'With', 'By', 'Reference' instead of 'Is a speaker' and 'Point of Reference'), they introduce an extra set of infinite sequences. The net effect of these differences, from a purely formal point of view, is that the Montague-Scott theory utilizes a somewhat more complex (or more powerful) primitive-predicate basis than our theory does.¹⁵

My preference for the approach set out in earlier sections, however, is based on nonformal considerations. In the first place, the account given by Montague and Scott does not explicate the peculiar emptiness—the incomplete semantical status—of sentences containing demonstratives when those sentences are not being *used* by a language user to establish points of reference. (Consider the sentence 'This is green' apart from any act of reference.) Their account indicates that sentences containing demonstrative constructions are true relative to some points of reference and false relative to others. But there is no explication of the fact that these sentences are like open sentences in being incompletely interpreted when they are not being *used*. I believe that accounting for this fact in a sophisticated way will require introduction of primitives like ours.

Moreover, our theory gives a better explication of the sociological content behind the point-of-reference idea. In a sociological setting, "points of reference" are established by the person who uses the sentences of the object language. In a sense our theory indicates how points of reference (or, to use a different term, contexts) are individuated, whereas the Montague-Scott approach does not. Consider their treatment of the first-person personal pronoun. To over-

by translating their discussion into a truth-theoretic setting. Moreover, we shall be converting their predominantly many-sorted formulation into a nearly single-sorted one. We shall also be ignoring the fact that they analyze tensed sentences as containing intensional operators. Despite differences in our formal representations of object-language sentences, noted in the previous section, our explications of truth conditions are relatively easy to compare.

¹⁵ For relevant considerations, see Goodman, *op. cit.*; "The Logical Simplicity of Predicates," *Journal of Symbolic Logic* xiv, 1 (March 1949): 32-42; *The Structure of Appearance* (Cambridge, Mass., Harvard, 1951), 2d ed. 1966, pp. 63-123.

simplify slightly, the sentence 'I am male' is true at any point of reference i if and only if i is male, where ' i ' ranges over possible speakers. Since the theory leaves 'Point of Reference' as an unexplicated primitive, we are not prevented from viewing the sentence as true with respect to any speaker (taking him as the point of reference), regardless of whether he speaks English or ever uses 'I' in the way in which the theory interprets it. The possible speaker is not even required to be a speaker of the relevant sentences. But intuitively, a possible speaker who (in a given possible world, if you will) never uses 'I' in the relevant way will never be the referent of 'I' (under its intended reading).

To put the point another way, the distinction between ' x is male' and 'I am male'—between a sentence containing an ordinary free variable ranging over speakers and a sentence containing the demonstrative 'I'—is nowhere explicated by the Montague-Scott theory. The distinction is simply marked by the primitive 'Point of Reference'. But one of the central tasks of a formal theory of demonstratives, I think, is to explicate this sort of distinction and its effect on truth value. Noneternal sentences differ from ordinary open sentences in that, in addition to being true of some objects and false of others, they may be used to make assertions that are true or false. Our view gives an explication of the difference, rather than merely marking it, by specifying those aspects of people's use of such sentences which are relevant to determining truth value.

The expected reply to this line of criticism is that the Montague-Scott theory is and is meant to be abstract: such distinctions may be explicated outside of formal pragmatics. But, insofar as the theory is more abstract than our theory, the abstractness is not evidently well motivated. For it does not clearly yield important generalizations about noneternal sentences that our theory cannot yield; yet it fails to explicate systematic features relevant to the truth conditions of such sentences which our theory explicates.

VII. TOWARD SOCIAL APPLICATION

The understanding of sentence utterances by radical translators, ordinary communicators, and (at some stage) first-language learners crucially involves correlating those sentence utterances with entities in the world. Such correlation is most immediate and evident in the interpretation of simple sentences containing demonstrative constructions. For example, in interpreting a normal assertion of 'That's a rabbit' (or 'Rabbit!'), we hear the sentence utterance and look for an object which the speaker refers to and which fits (satisfies) the uttered sentence. Problems in determining the

speaker's reference or in construing his open sentence, whether practical or theoretical, do not, I think, effect this basic paradigm.¹⁶ Of course, the interpretation of most noneternal sentences is not as simple as that of our example. But interpreting any utterance of such a sentence involves attempting to correlate the utterance with entities that are extralinguistically identified by the speaker in the act of utterance.

The use of semantical theory in formalizing such interpretation yields a picture of much (I think almost all) of ordinary linguistic communication as a process in which the speaker utters open, incompletely interpreted sentences and acts in such a way as to enable the hearer to complete the interpretation of them and incorporate them into his own system of interpretation as closed sentences.¹⁷ In such contexts, truth is seen as a mesh between correlations conventionally associated with the uttered sign and correlations referentially established by the speaker in the immediate circumstances. This viewpoint bears striking analogies to a more traditional model. The theory of truth may be construed as an organon of rules governing and evaluating the application of "concepts" (open sentences) to nondiscursively identified events, objects, persons, times, or places. The argument of this paper explicates one of the senses in which "concepts" without reference are empty. It should already have been clear that reference without "concepts" is blind.

TYLER BURGE

University of California at Los Angeles

¹⁶ Quine has urged the existence of such problems in defending his doctrines of the inscrutability of reference and the indeterminacy of translation. Cf. W. V. Quine, *Word and Object* (Cambridge, Mass.: MIT Press, 1960), ch. II; *Ontological Relativity* (New York: Columbia, 1969), chs. I and II. The term 'noneternal sentence', which I have used on several occasions, is his.

¹⁷ A differently motivated view of communication as involving open sentences is proposed by Herbert Bohnert, "Communication by Ramsey Sentence Clause" *Philosophy of Science*, xxxiv, 4 (September 1967): 341-347. If the observational-theoretical distinction is treated as the distinction between familiar and unfamiliar terms, an intriguing view of language learning emerges. The theoretical terms that are eliminated in favor of quantified variables in the Ramsey sentence come out in the process of communication as demonstratives.