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## SKINNER'S *VERBAL BEHAVIOR* II - WHAT IS WRONG WITH IT

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In a previous article I argued that to explain behaviour in terms of intensional or mentalistic concepts is to explain the behaviour in question on the assumption of a consistent and rational connection between what the agent does and what he says or what is said to him and that therefore any general account of verbal or linguistic behaviour which employs such concepts is necessarily circular, since it explains the acquisition of linguistic skills on the assumption that the speaker already possesses such skills. It follows that this circularity can only be avoided by developing a theory of verbal or linguistic behaviour which is stated entirely in a nonintensional or extensional language. At the *present time*, the most developed conceptual system for description and explanation of the behaviour of organisms at the molar level in purely extensional terms is that provided by the so-called 'Radical Behaviorism' of B. F. Skinner and his followers. Furthermore, in his book *Verbal Behavior* Skinner (1957) has used this conceptual framework to develop a theory of verbal or linguistic behaviour which represents the most ambitious attempt made so far to formulate a theory of linguistic behaviour in nonintensional or extensional terms.

*Verbal Behaviour*, however, has been subjected to a number of damaging criticisms, notably by Chomsky (1959) in his well-known review of Skinner's book, and it is clear that despite a number of important virtues, to which Kenneth MacCorquodale (1969) has drawn attention, *Verbal Behavior*, as it stands, simply will not do as a general account of the phenomenon of human language.

Chomsky and his disciples take it as proven that the combined defects of Skinner's basic theory and the theory of verbal behaviour based upon it show that the whole project is radically misconceived and beyond all hope of redemption. But if, as I have argued, we need a nonintensional conceptual framework within which to describe and explain language behaviour at the molar level, and since there is no obvious alternative to the conceptual framework Skinner has developed for this purpose, it follows that the only course of action open to us is to reexamine the defects of Skinner's theory with a view to putting right what is wrong and presenting a revised version of the theory which escapes those criticisms that have been justifiably levelled against the theory in its original form.

### FOUR DEFECTS OF VERBAL BEHAVIOR

As I see the matter, the account of language presented by Skinner in *Verbal Behavior* suffers from four major defects:

- (1) The failure to draw a clear distinction between words and sentences as units of verbal behaviour.
- (2) The failure to provide an adequate account of the control exercised by verbal operants over the behaviour of the listener.
- (3) A confusion within Skinner's concept of the tact due to a failure to distinguish between tacts as words and tacts as sentences.
- (4) The failure to give an adequate account of the important distinction between those verbal operants (indicative utterances) which are true and those which are false.

Of these defects the first two are fundamental both in the sense that the other two depend on and result

from them and in the sense that they both in their turn result from the inflexibility of certain aspects of Skinner's general theory of operant behaviour on which his account of verbal behaviour is based. Thus the failure to draw the distinction between words and sentences rests on an inflexibility within Skinner's basic unit of behaviour, the operant or response, while the failure to provide an adequate account of the effect of the verbal operant on the behaviour of the listener depends upon a similar inflexibility on the input side within the key concept of a discriminative stimulus.

### THE FAILURE TO DISTINGUISH BETWEEN WORDS AND SENTENCES

The first and perhaps most fundamental defect in the account of language offered by Skinner in *Verbal Behavior* is that, along with what he regards as the mediaeval lumber of traditional grammar and logic with its prescientific mentalistic concepts like knowledge, beliefs, purposes, intentions, rules and above all meanings, Skinner has unaccountably thrown out what would seem to be a perfectly objective and indispensable distinction between sentences and the individual words of which a sentence is composed. However, the statement that Skinner throws out the traditional distinction between words and sentences needs some qualification. For although he does not give the distinction the prominence that it has traditionally been given in linguistic theory and thereby denies it the fundamental role which it plays in the conception of language held by the majority of linguists and philosophers, Skinner does, in fact, make use of the distinction when it suits him to do so. Indeed in Chapter 14 of *Verbal Behavior* he presents what, in my view, is a very plausible account of how a speaker who is acquiring either a first natural language or a second natural language without the benefit of dictionary, grammar books or the services of translators may be supposed to move from a single word utterance to the utterance of a grammatically complete sentence by a process which might be described as "progressive disambiguation."

A slightly amended version of the example that Skinner gives of this process runs as follows. The speaker begins, let us say, with the single word utterance *hungry*. In certain contexts this word alone may be sufficient to secure an appropriate response from the listener, for example, in a case where its utterance is followed by the listener supplying food to the speaker. However, in the case that Skinner considers, where it is not the speaker who is hungry, the single word *hungry* fails to specify who or what is hungry and whether it is a present, past or future hunger that is referred to. If, however, the word *hungry* is combined with the word *man* to form the two-word utterance *man hungry* or *hungry man* a number of possible candidates for that to which the predicate *hungry* applies are now excluded, namely the speaker himself, all animals other than human beings, all female human beings, all male children and not more than one adult male human. We now add what Skinner would call the autoclitic *is* (the third person singular of the present tense of the verb auxiliary 'to be') so as to yield the three word string *man is hungry*, the possibility that reference is being made to the past or to the future is now excluded and the restriction of reference to a single individual is reiterated. Finally by adding another of Skinner's autoclitics, the definite article, we obtain the grammatically complete sentence *The man is hungry* which narrows down the specification to a particular indicated individual.

Although this story provides us with a plausible account of part of the process whereby we learn to string words together into the kinds of functional units that we call sentences, it fails both as an explanation of what does and does not constitute a grammatically complete sentence and as an account of the different functions of different word types in the construction of such sentences. That it fails as

an account of what constitutes a complete sentence is shown by the fact that although the complete sentence *The man is hungry* is less liable to misinterpretation than is the single word utterance *hungry* this is only a matter of degree and not of kind, since we are still dependent on the context of utterance in order to identify the particular individual referred to by the phrase *the man* in just the same way that we are dependent on the context in order to identify the individual to which the predicate *hungry* applies in the case of the isolated utterance of that word.

That it fails to account for the function of words as constituents of sentences is shown partly by its failure to account for the significance of the order in which the words occur in a grammatically well formed sentence and for the grammatical categories such as adjectives, nouns verbs, etc., to which different words belong and which determine the order in which the constituent words of a sentence occur, but above all by the failure to notice that in this example the single word utterance *Hungry!* is performing the linguistic function of a grammatically complete sentence and that that function is different from the function which the same word performs when it occurs as a constituent of a sentence.

It is this last point which brings out most clearly the sense in which Skinner can be said to ignore the distinction between words and sentences. What he ignores is the fact that only complete sentences and those incomplete sentences which can be understood in the context of utterance as equivalent to a specifiable complete sentence can 'convey' anything to a listener. Individual words have a function in communication only insofar as they contribute to the function of the sentence of which they form part or in which, in the case of single word sentences like *Fire!, Stop!, Yes., No.,* etc., they consist.

### **THE FUNCTIONAL UNIT OF VERBAL BEHAVIOUR AND WHAT IS REPEATED**

The reason why Skinner fails to appreciate the significance of this distinction between the linguistic function of words and the linguistic function of sentences is that in order to do justice to this distinction he would find himself in the embarrassing position of having to split apart the two defining characteristics of the *operant*, the fundamental unit which he employs in his analysis not only of verbal behaviour, but of instrumental behaviour in general.

An operant for Skinner is firstly the functional unit of behaviour, the unit of behaviour that brings about a change in the environment or in the relationship between an organism and its environment, it corresponds in other words to our ordinary notion of an action, something that somebody or something does. But an operant is also, for Skinner, the unit of behaviour that is repeated, whether on the same occasion or on a subsequent occasion similar to the first. It is important for Skinner that the unit that is repeated should coincide with the functional unit, because his fundamental explanatory principle is the strengthening and weakening of the probability of the organism's repeating an operant according to the nature of the consequences it produces.

In the simpler forms of behaviour, such as bar-pressing or key-pecking, which Skinner has studied in his experimental work, the unit that is repeated is identical with the functional unit; but in verbal behaviour, the unit which is repeated is not the functional unit. The functional unit of verbal behaviour, the unit which brings about a change in the environment, is the utterance of a string of words which either constitutes a complete sentence or which, if grammatically incomplete, can be readily understood in the context of utterance as equivalent to a complete sentence. But, as Chomsky has repeatedly

pointed (Chomsky, 1957 etc.), sentences are seldom repeated word for word. Moreover, someone who could only understand or produce sentences which he had heard or uttered on some previous occasion could hardly be said to have any kind of linguistic competence. Certainly this would be a very different kind of linguistic competence from that which any human being possesses. As Chomsky points out, it is the distinctive feature of human linguistic competence that the speaker can produce and the listener can understand grammatically complete sentences which neither party have either produced or heard before.

To say this, of course, is not to deny the obvious fact that there are, and indeed necessarily must be, units of verbal behaviour that are repeated over and over again. Clearly, sentences that have never been heard before are only intelligible and thus capable of producing an effect on the listener by virtue of their construction out of units, namely words, which have been repeatedly encountered in the past, ordered in such a way as to form a recognizable or discriminable pattern or hierarchical system of such patterns, each of which has again been encountered in the past, even though the particular combination of pattern and its constituent words may never have been encountered previously.

This means that the functional unit of verbal behaviour, that which produces the reinforcement provided by the response of the listener, is always the utterance of either a complete sentence or its incomplete equivalent; but what that reinforcement reinforces, and which is consequently repeated on subsequent occasions, is not the utterance of the particular sentence which produces the reinforcement, but the components of that utterance, the propensity to use the words comprising the sentence in constructing similar, but not necessarily identical sentences in the future, and the propensity to construct sentences of the same grammatical pattern, but with different words.

Skinner partly recognizes this feature of verbal behaviour when he notes that while there are some sentences which are repeated as complete units, "others are nearly complete skeletal 'frames' upon which an exceptional response or two may be hung" (Skinner, 1957, p. 346). But, just as Chomsky, for his reasons, exaggerates the extent to which sentences are constructed *de novo* on each occasion of utterance and minimizes both the extent to which phrases, idioms, sentence frames and complete sentences are repeated over and over again both by the same and by different speakers, and the contribution which such repetition makes to the acquisition of full linguistic competence, so Skinner, for his reasons, exaggerates the amount of repetition and minimizes both the incidence and significance of the ability to construct and respond to sentences which have never previously been heard or formulated by listener or speaker.

## **THE PHENOMENON OF CREATIVE IMPROVIZATION**

This phenomenon of "creative improvization", as we may call it, in which a response strategy which has been reinforced in a variety of different contexts involving different sets of response elements acquires a high probability of emission in another context with a set of response elements with which it has not previously been combined is a behavioural phenomenon which is not peculiar to verbal behaviour. Many instances of the same phenomenon have been recorded in the psychological literature on problem solving in the higher animals and in prelinguistic human infants. Perhaps the best known example is the so-called "insight learning" displayed by the chimpanzee Sultan who was observed by Köhler (1925) to fit two sticks of bamboo together to form a pole long enough to reach the bananas outside the bars of the cage in which he was confined. In this case the response of using a stick to reach

objects beyond the reach of his arms was already well established in the chimpanzee's behavioural repertoire. Furthermore, although Köhler gives no information on this point, we may assume that the response of fitting one object into a suitably sized hole in another object had been reinforced on a number of previous occasions. What is novel and "creative" in this case is the combination of the two response elements, the use of a stick to pull in food otherwise out of reach and that of fitting one object into another so as to produce a single larger object, yielding a single effective response when the previous reinforcement of its two components gives it a strong probability of occurrence even before the combination is itself reinforced by successful execution.

As far as I can see, there is nothing in Skinner's basic conceptual framework which prevents it from accommodating behavioural phenomena involving this kind of creative improvisation on the basis of previously learned responses. All that is required is the notion of a generalized response strategy capable of execution in a variety of specific forms as a repeatable unit of behaviour whose probability of emission is strengthened or weakened by its consequences independently of that of its specific response component on the different occasions on which it is employed. I suspect that the only reason why such a concept is not already well established within the conceptual framework of Skinner's radical behaviourism is that except in the special case of what I propose to call "sentence construction strategy" it is exceedingly difficult to provide an acceptable operational specification for the repeated occurrence of the same generalized response strategy when the topography of different occurrences of the same strategy varies from one occurrence to another, not only in terms of the actual movements but also in terms of the kinds of environmental object involved in different instances of its employment. In the absence of such an operational specification of different occurrences of the same general response strategy, it would be impossible to carry out the kind of objective experimental study of the conditions under which response tendencies are strengthened, weakened and maintained which Skinner and his disciples have carried out with such remarkable precision and sophistication in the case of responses like lever-pressing and key-pecking whose operational specification presents no such problem.

### **THE CONFUSION BETWEEN TACTS AS WORDS AND TACTS AS SENTENCES**

Skinner's failure to appreciate the full significance of the distinction between words and sentences and the element of creative improvisation involved in the construction of new sentences might be excused if that was all there is to it. Unfortunately the matter does not end there. For Skinner's failure to draw a clear distinction between the different functions performed by words and sentences in the analysis of verbal behaviour has not only laid his position open to the devastating criticism that Chomsky makes in his "Review" (Chomsky, 1959), it has led to a radical confusion within the system of concepts which Skinner introduces in developing his own account of verbal behaviour.

The basis of Skinner's account of verbal behaviour is the distinction he draws between *mands* and *tacts*. Skinner defines a mand as a verbal operant which is reinforced by subsequent and consequent behaviour on the part of the listener and it is clear both from his definition and from the examples that he gives that the concept of a mand is intended to embrace both imperatives, i.e., rules, instructions, commands, orders, requests, suggestions, etc., which, for Skinner, are the kind of mand which is reinforced by some kind of nonverbal instrumental behaviour on the part of the listener, and

interrogatives or questions, which are reinforced by the reciprocal verbal behaviour on the part of the listener directed towards the previous speaker. Evidently a mand in this sense is a sentence, even if it is only a one-word sentence like *Go!* or *Why?* This might lead one to expect that Skinner's other major classificatory unit, the tact, would also turn out to be a kind of sentence and correspond to the other major variety of sentence recognized by traditional grammar and logic, namely an assertion or statement expressed by a sentence in the indicative mood. Skinner, however, defines a tact as "a verbal operant in which a response of given form is evoked (or at least strengthened) by a particular object or event or property of an object or event" (Skinner 1957, p. 82). A tact is later said to stand in "a unique relation to a discriminative stimulus" which is set up "by reinforcing the response as consistently as possible in the presence of one stimulus with many different reinforcers or with a generalized reinforcer [for example, the approval carried by the verbal stimulus *Right!*]. The resulting control is through the stimulus. A given response 'specifies' a *given* stimulus property. This is the 'reference' of semantic theory" (p. 83).

The upshot of this somewhat confused account appears to be that a tact is a verbal operant which is under the control of a particular object, event or state of affairs or class of objects, events or states of affairs in the common stimulus environment of the verbal community. To say that a tact is under the control of such a stimulus object is to say (a) it is liable to be emitted by a speaker in the presence of such a stimulus object and (b) that its emission in the absence of the relevant stimulus will be reinforced by the subsequent appearance of that stimulus. It is further implied by what Skinner has to say about the tact permitting the listener "to infer something about the circumstances" rather than about "the conditions of the speaker" that the tact acts for the listener as a discriminative stimulus relative to the subsequent occurrence in his environment of the stimulus object or kind of stimulus object which is said to control its emission by the speaker, and in general "that behavior in the form of the tact works for the benefit of the listener by extending his contact with the environment, and such behavior is set up in the verbal community for this reason" (Skinner, 1957, p. 85).

I submit that the only way to make any kind of consistent sense of this account is on the assumption that Skinner is here confusing two quite different senses in which he wants to use the term "tact". When he talks about the inferences about the surrounding circumstances that the listener can draw on the basis of the speaker's tact and about its working "for the listener by extending his contact with the environment", he does indeed appear to have in mind something like an assertion or statement which provides the listener with information often in response to a question or interrogative emitted by a previous speaker. A tact in this sense is comparable with a mand and consists in the utterance of a complete sentence or its incomplete equivalent, typically a sentence in the indicative mood about which it makes sense to raise the question "Is it true or false?" On the other hand, when he talks about the tact as a verbal operant whose emission by the speaker is under the control of a particular stimulus object or class of such objects, he is talking not about the utterance of complete sentences but about an important class of words which occur as constituents in the majority of sentences, mands as well as tacts, namely those words, chiefly nouns, verbs, adjectives and adverbs which are said to "designate", "stands for" or to be "the names of" certain recurrent features of the common stimulus environment of both speaker and listener.

That Skinner has words rather than sentences in mind in most of what he has to say about tacts is clear both from the examples that he discusses, most of which are either isolated words or single-word utterances, as in the case of the single word *Red* whose emission by a child is reinforced by the parent when it is emitted in the presence of a red object (p. 84), by his emphasis on the child's learning to

"name" the objects and events and the properties of those objects and events in acquiring the ability to emit tacts, from his insistence on "the unique control exercised by the prior stimulus" in the case of the tact (p. 83), and from what he says about the multiplicity of different reinforcers which strengthen the connection between the tact and its controlling stimulus, a notion which makes sense only if a tact is understood as a repeatable unit of verbal behaviour which occurs in a multiplicity of different sentential contexts.

In the light of these considerations, it is clear that we need to distinguish two quite different senses of the word "tact". Firstly we have the notion of a tact in the sense of a tact word or an utterance of a tact word, where a tact word may be defined as a repeated constituent of sentences of all kinds, which is used by the speaker and "understood" by the listener to "denote", "refer to" or "stand for" a specific recurrent feature of their common stimulus environment. Tact words in this sense contrast with autoclitic words (prepositions, pronouns, articles, verbal auxiliaries, quantifiers, conjunctions and the various forms of the negation sign) which do not "name" a specific environmental feature and whose function is purely intrasentential.

On the other hand when Skinner (1957, p. 85) says that "behavior in the form of the tact works for the benefit of the listener by extending his contact with the environment, and such behavior is set up in the verbal community for this reason," he is clearly not talking about tacts in the sense of tact words, since tact words in the sense defined can and regularly do occur as constituents of the kind of verbal operant, the mand, which works for the benefit of speaker rather than for that of the listener. What Skinner is talking about here is the utterance of an information-giving or indicative sentence, what we may call "a tact sentence" to distinguish it from "a tact word", where the contrast is not, as it is in the case of tact words, between tact words and autoclitic words, but between tact sentences and mand sentences, both of which are normally composed of a combination of tact words and autoclitic words.

The distinctive feature of the utterance or emission of a tact sentence when contrasted with the utterance or emission of a mand is that whereas the emission of the same mand or a similar mand involving the same sentence construction strategy but with different tact words on similar occasions in the future is reinforced by the listener's response in emitting the behaviour "specified" by the mand sentence in question, the utterance or emission of a tact sentence by the speaker requires some independent or extrinsic reinforcement by the listener in the form of an expression of gratitude for information received or some expression of assent to, or other kind of approval of, what has been said in order to secure the repeated emission of the same or similar tact sentences on similar occasions in the future.

### **THE FAILURE TO ACCOUNT FOR THE STIMULUS CONTROL OF THE LISTENER'S BEHAVIOUR**

Skinner's failure to recognize the fundamental distinction within his concept of the tact between tacts as words and tacts as sentences is due partly to his failure to recognize the importance of distinguishing between words and sentences, but partly also to the inadequacy of his account of the stimulus control exercised by the verbal operant over the behaviour of the listener which leaves him quite unable to explain what he means when he says that "behavior in the form of the tact acts for the benefit of the listener by extending his contact with the environment". This defect in Skinner's account of verbal

behaviour shows itself in other ways. For example in his discussion of the mand (Skinner 1957, Chapter 3), Skinner repeatedly states that the mand "specifies" reciprocal behaviour on the part of the listener whose emission by the listener reinforces the speaker's propensity to emit the same or similar mands on similar occasions in the future; but he nowhere explains in terms of his own theoretical principles how this specification of behaviour on the part of the listener is brought about. The passage in *Verbal Behavior* in which this defect becomes most dramatically obvious is the section of the chapter on the Tact (Ch. 5) under the heading "The Listener's Response to the Tact" (Skinner, 1957, pp. 86-89), which is the only passage in the whole book specifically devoted to the problem of the control exercised by the verbal operant over the behaviour of the listener.

This passage begins with a criticism of the account of the effect of a verbal stimulus on the behaviour of the listener originally proposed by J. B. Watson (1924) and subsequently endorsed by Bertrand Russell (1940) which appeals to the now long-outmoded stimulus substitution theory of classical Pavlovian or, as Skinner calls it, respondent conditioning. Using Russell's example of someone hearing the word *fox* uttered by a man who sees a fox that the listener does not see, Skinner points out, quite rightly, as even Chomsky (1959, p. 48) acknowledges, that the behaviour which the stimulus "fox" elicits from the listener is quite different from that which the supposed unconditioned stimulus in such a case, the actual sight of a fox, would have elicited, and cannot, therefore, be explained in terms of a simple transfer of the behaviour elicited by the Unconditioned Stimulus, the sight of a fox, to the conditioned stimulus associated with it, the word *fox*. Hearing the word *fox* "may, as Russell says, lead us to look around, as the stimulus *wolf* or *zebra* would have done, but we do not look around when we see a fox, we look at the fox" (Skinner, 1957, p. 87).

Anyone who is familiar with the account of the way in which stimuli acquire control over the behaviour of an organism which Skinner proposed as alternative to the stimulus substitution theory in *The Behavior of Organisms* (Skinner, 1938, Ch. V, pp. 167-231) and which he summarized briefly on page 31 of *Verbal Behavior*, would expect Skinner at this point to deploy his concept of the "discriminative stimulus" which is defined in the Glossary appended to Ferster and Skinner's *Schedules of Reinforcement* (1957) as "a stimulus in the presence of which a response is reinforced and in the absence of which it goes unreinforced". Indeed, although he does not actually use the term "discriminative stimulus" in this passage, this expectation is clearly fulfilled by the alternative interpretation of Russell's example of the listener's response to the word *fox* which Skinner offers us in the next paragraph (Skinner 1957, pp. 87-88).

Adverting to his previous discussion (pp. 83-84) of the control exercised by the stimulus provided by "a particular object or event or property of an object or event" over the behaviour of the speaker in naming the object, event or property in question, where he does indeed refer to the stimulus which elicits the naming response as "a discriminative stimulus", he says of the verbal stimulus produced by a tact that "it follows the same three-term relation which has already been used in analyzing the behavior of the speaker". This is a reference to his definition of a discriminative stimulus as involving a relation, not just between stimulus and response, but between stimulus, response and reinforcement which he introduced in 1938. As applied to Russell's case of the listener who hears the sentence *Look, a fox!*, hearing those words is a stimulus whose occurrence in the past has been regularly associated with a situation in which the behaviour of looking in the direction in which the speaker is looking or pointing has been reinforced by seeing a fox, and which therefore, as Skinner puts it, "provides an occasion for" the emission of the behaviour which has been reinforced in its presence, the behaviour of



looking in the direction indicated by the speaker.

Similarly in the case of Skinner's own example of the single-word sentence *Dinner!* this sentence and its equivalents *Dinner is ready!* and *Come and get it!* have been regularly associated with a situation in which moving towards and sitting down at the table has been reinforced by the presentation of food and thus provides an occasion for the emission of that behaviour.

Chomsky (1959, p. 48) objects that in the case of hearing the utterance *Fox!* the listener may never have seen a fox and may have no current interest in seeing one, and yet may react appropriately to the stimulus, fox. Since exactly the same behavior may take place when neither of the assumptions is fulfilled, some other mechanism must be operative here !"

Now it cannot be denied that Chomsky is right when he claims that a listener who had never previously seen a fox would display the appropriate-looking behaviour on hearing the utterance *Fox!*, and to that extent at least Skinner's account of how that utterance acquires its ability to control the behaviour of the listener must be wrong. But what is wrong with Skinner's analysis of the listener's response to the single word utterance *Fox!* is not, as Chomsky suggests, that the mechanism of discrimination as described by Skinner has no application in this case, it is rather that Skinner has again been misled by his failure to draw an adequate distinction between words and sentences into failing to appreciate (1) that single word utterances like *Fox!* and *Dinner!* are single word sentences which are short for *Look! There's a fox!* and *Dinner is ready! Come and get it!* respectively, and (2) that what has been repeatedly associated with the reinforcement of the behaviour of looking in the direction indicated by the speaker in the former case need not be hearing the precise word *Fox!* or *Look! There's a fox!* which serve to evoke that behaviour on a subsequent occasion. All that need have been associated with the reinforcement of looking in the direction indicated by the speaker is hearing the sentence frame *Look! There's an X!* or just *X!* uttered in tones of surprise where the variable X is replaced by a tact word which is the name of any relatively uncommon variety of visible object. In other words what acts as the discriminative stimulus relative to the reinforcement of the behaviour of looking in the direction indicated by the speaker is not the tact word *fox* but the sentence frame *Look! There's an X* or its equivalent, the isolated utterance in tones of surprise of an appropriate tact word.

It follows from this that provided we recognize that it is a sentence frame rather than a particular tact word or particular sentence involving that tact word which acts as the effective discriminative stimulus in cases like *Look! There's a fox!*, the fact that a listener who has never previously seen a fox nevertheless responds appropriately to hearing such an utterance cannot be used as evidence against the explanation of that behaviour as behaviour under the control of a discriminative stimulus as defined by Skinner.

But what of Chomsky's other objection, the objection that the listener may respond appropriately to an utterance *Fox!* when he has no current interest in seeing foxes, in other words when, as Skinner would put it, the stimulus of seeing a fox is not currently a reinforcer with respect to the behaviour of the listener? In this case Chomsky is just plain wrong when he claims that a listener who had no current interest in seeing foxes would nevertheless look in the direction indicated by the speaker on hearing *Fox!* uttered in tones of excitement or surprise. Consider the case of the manager of a fox farm who hears a stranger shouting *Fox!* when confronted for the first time by the sight of a caged fox, which the manager sees and handles every day. Would he be likely to look in the direction indicated by the speaker, unless the direction of the cry indicated that the animal was somewhere it should not

be?

Nevertheless there is another closely related point which can quite properly be made against Skinner's account here, namely, that it is a feature of what I am calling tact sentences, that is indicative sentences or statements, that they are neutral with respect to the listener's interest in the state of affairs which they report. Consider the case of a listener who hears the indicative or tact sentence *Joe is coming*. As in the case of the utterance *Fox!* if the listener has no interest one way or the other in either seeing or not seeing Joe, hearing this sentence will have no effect on his behaviour. If he is a native speaker, he will hear the words and understand their meaning in the sense that if he had had an interest in either seeing or not seeing Joe he would have reacted accordingly; but that is all.

Suppose however he has a positive interest in seeing Joe. Under these circumstances hearing the sentence *Joe is coming* will act as a discriminative stimulus with respect to the behaviour, say, of opening the door and welcoming Joe which has been reinforced on previous occasions when the arrival of some welcome guest has been announced by a sentence of the same general form. So far so good. But suppose that instead of having a positive interest in Joe's coming the listener has an active interest in avoiding Joe, Joe's arrival, as Skinner would say, is for him an aversive stimulus event. In this case, the very same words *Joe is coming* will act as a discriminative stimulus, not for the behaviour of opening the door and welcoming Joe, but for behaviour, such as slipping out of the back door, which has been reinforced on similar occasions in the past by the successful avoidance of unwelcome visitors.

Now although it is possible to state this phenomenon whereby tact sentences or statements are neutral with respect to the listener's interests in the contingencies they report in terms of Skinner's concept of the discriminative stimulus, as I have just done, Skinner's theory of discrimination which has not been significantly developed since its original statement in *Behavior of Organisms* (Skinner, 1938, ch. V) simply does not make room for a single discriminative stimulus which is the occasion for approach behaviour in a situation where the consequences of failing to respond are reinforcing and the occasion for avoidance behaviour in a situation where the consequences of failing to respond are aversive.

Part of the difficulty here is that for accidental historical reasons the term "discriminative stimulus" is not applied by Skinner and his followers to stimuli such as the conditioned stimulus in conditioned avoidance learning (Brogden, Lipman and Culler, 1938) or conditioned suppression (Estes and Skinner, 1941) which control behaviour by virtue of their prior association with an aversive event rather than reinforcement. But this is a detail. What is more important is that precisely the same verbal stimulus which, as we ordinarily understand the matter, refers quite unambiguously to exactly the same state of affairs, the impending arrival of a man called *Joe*, has to be interpreted in Skinner's terms as a discriminative stimulus with respect to two quite different and opposite behaviour patterns depending upon whether the state of affairs to which as we would ordinarily say, it refers, is attractive (positively reinforcing) or repulsive (aversive).

## THE PROBLEM OF REFERENCE

The phenomenon whereby what I am calling a tact sentence, like *Joe is coming*, is wholly neutral with respect to the nature of the listener's interest in the contingency it reports draws our attention to another aspect of Skinner's failure to account for the effect of the verbal stimulus on the behaviour of the listener, namely his failure to account for what on any view must be the most important feature, if not the defining

characteristic of human language, the ability of the speaker to refer the listener to events and states of affairs lying outside the spatio-temporal parameters of the context of utterance, in the past, in the future or, beyond reach of sensory inspection by either party, in the present.

In this connection there are two philosophical points which need to be made about what I am here calling the phenomenon of reference. The first point is that I am not using the verb "refer" and the noun "reference" in the sense of Frege's (1892) *Bedeutung* and *Bedeutung* where an expression is said to refer to something only insofar as there actually exists something to which reference is made. The verb "refer" and the noun "reference" are here being used to stand for somethingt closer to Frege's *Sinn* or sense which is said to determine *Bedeutung*, what is expressed by the *intentio* of the Mediaeval Schoolmen or by Brentano's (1874) "reference to an inexistent object". In this sense of the word a speaker may be said to succeed in referring to an object or state of affairs insofar as any competent listener with the appropriate background information would know approximately where to look to find evidence of the present or past existence of the object or state of affairs referred to by the speaker. This of course does not imply either that such an object or state of affairs actually exists now or has existed in the past or that evidence of its present or past existence would be found if it were sought for in the appropriate place.

My second philosophical point is that in terms of the distinction drawn in my previous paper on this topic (Place, 1981) between intentionality-with-a-t considered as a feature of behaviour and mental processes on the one hand and intensionality-with-an-s, considered as a logico-grammatical feature of *inter alia* the language we ordinarily use to describe the phenomenal of intentionality-with-a-t on the other, the phenomenon of reference in the relevant sense is a variety of intentionality-with-a-t. In my previous paper I argued that although any general account of linguistic or verbal behaviour expressed in intensional-with-an-s language is viciously circular insofar as it accounts for the acquisition of verbal skills on the assumption that the organism in question already possesses those skills, any account of the behaviour of the higher organisms which fails to do justice to the phenomenal covered by the notion of intentionality-with-a-t is grossly defective. I suggested, however, that Skinner's general account of behaviour escapes that criticism insofar as the feature of behaviour which constitutes its intentionality-with-a-t is the phenomenon of goal-directedness for which Skinner provides an alternative account in terms of his notion of the reinforcement and extinction of on-going behaviour as determined by the consequences of previous emissions of similar behaviour in the immediate and more distant past. However the notion of intentionality-with-a-t comprises not only the phenomenon of goal directedness for which Skinner has arguably a perfectly adequate alternative account; it also embraces the phenomenon of intentional reference as it applies to language and other forms of sign-emitting behaviour where the alternative non intensional account offered by Skinner in Chapter 5 of *Verbal Behavior* is demonstrably inadequate.

The account which Skinner gives of "the 'reference' of semantic theory" (Skinner, 1957, p. 83) is as follows:

In the tact ... we weaken the relation to any specific deprivation or aversive stimulation and set up a unique relation to a discriminative stimulus. We do this by reinforcing the response as consistently as possible in the presence of one stimulus with many different reinforcers or with a generalized reinforcer. The resulting control is through the stimulus. A given response 'specifies' a given stimulus property.

In this passage, which is not remarkable for its lucidity, Skinner seems to be confusing two quite distinct

and unrelated points about the information-providing function of language which his term "the tact" is intended to cover. One is a point about tact or information-providing sentences, namely the point made above that tact sentences are neutral with respect to the nature of the listener's interest in the information they provide. This, I take it, is what leads him to speak of the weakening of the link between the verbal response and "any specific deprivation or aversive stimulation" and the multiplicity and generality of the reinforcers that maintain that response. This interpretation, of course, requires us to suppose that what is ostensibly a statement about the determination of the behaviour of the speaker is really a statement about the determination of the listener's response to that behaviour; but since he goes on later to point out that the emission of tact or information-providing sentences are specifically reinforced by expressions of gratitude or assent, the only plausible alternative to this interpretation of what Skinner is trying to say here is to suppose that he is talking, not about tact or information-providing sentences, but about tact words, i.e., words which "stand for" or "refer to" certain recurrent features of the stimulus environment in contrast to autoclitic words whose function is purely intrasentential. This is, indeed, the most natural interpretation of what Skinner is talking about in this passage and the one which is required to make the other point that Skinner seems to be making here, namely, that an important part of learning to use tact words correctly is learning to emit the appropriate tact word in the presence of a stimulus which constitutes an instance of the kind of environmental feature to which the word in question is used to refer. Unfortunately on that interpretation Skinner's remarks about the multiplicity and generality of the reinforcement of tact-emitting behaviour amounts to nothing more than the platitude that the reinforcement of the propensity to emit a particular word depends on the nature and function of the sentence in which it occurs; and that principle applies to any word and not just to tact words.

But what of the principle that learning to use words in the presence of stimuli which constitute instances of the kind of thing to which those words are said to "refer" is an important part of learning the "meaning" of tact words? That children are taught to "name" the various objects and events that they encounter as stimuli in their environment and that this process plays an important part in learning both to use the relevant words correctly in forming their own verbal operants in their capacity as speakers and in responding correctly to the verbal operants of others in their capacity as listeners cannot seriously be doubted. Yet to claim, as Skinner apparently does, that the phenomenon of reference can be exhaustively explained in terms of the control exercised by nonverbal stimuli over the emission of words which are said to "refer" to environmental features of which the nonverbal stimuli are instances is a palpable absurdity.

As Chomsky observes in connection with Skinner's contention (1957, p. 113) that a proper noun is "a response 'under the control' of a specific person or thing" (as controlling stimulus), "I have often used words Eisenhower and Moscow, which I presume are proper nouns if anything is, but have never been stimulated by the corresponding objects" (Chomsky, 1959, p. 32). As Chomsky's example clearly illustrates, the problem that confronts any theorist of language in connection with the phenomenon is how to account for the speaker's ability to refer the listener to objects, events and states of affairs which are not currently a part of the stimulus environment of either of them and in many cases to objects, events and states of affairs of a kind which have never been part of the stimulus environment of either. The gap between that ability and the ability of the speaker to name and describe such objects, events and states of affairs in his immediate stimulus environment is one over which Skinner has not begun to build even the flimsiest of bridges, of whose very existence, indeed, he seems blissfully

unaware.

However, from Skinner's failure to address himself to the problem of accounting for the speaker's ability to refer the listener to objects, events and states of affairs outside the immediate stimulus environment of both of them, it would be unwise to conclude that no such account can be given in terms of Skinner's theory. It is not just that we have the *a priori* argument presented in the previous paper (Place, 1981), which shows that without such an account there is no way of avoiding the vicious circularity of accounting for linguistic competence on the assumption that it already exists. There are aspects of the account presented in *Verbal Behavior* which we have already discussed which involve both reference by the speaker and reaction by the listener to objects and states of affairs which lie outside their immediate stimulus environment. An obvious case where the speaker refers to an object outside his stimulus environment is the case of a mand like *Bread, please!* or *Pass the salt!* (Skinner, 1957, pp. 36-37). In the context envisaged by Skinner in this connection the speaker can see but cannot reach the objects in question. But the same or similar utterances are frequently emitted in cases where no salt or bread is visible at all and, while it is true that the response of demanding objects which are not present in their current stimulus environment appears at a much later stage in a child's linguistic development than that of demanding what is visually presented to it, the principle whereby such behaviour is reinforced by the reciprocal behaviour of the listener in providing the object demanded accounts equally well for both cases.

Similarly, the behaviour of a listener in responding to a verbal stimulus in the manner appropriate to the existence outside his immediate stimulus environment of an object referred to by the speaker is illustrated by Russell's example of the listener's response to hearing the utterance *Fox!* As we have already seen, on Skinner's analysis of this example the object referred to, the fox, is an object of a kind the seeing of which acts as a reinforcer with respect to the response of looking in the direction indicated by the speaker for which the verbal stimulus *Fox!* acts as a discriminative stimulus.

However, the behavioural analysis offered by Skinner of these two somewhat elementary examples does no more than suggest the possibility of providing an account of the phenomenon of reference in these terms. Have we any reason to believe that this account can be developed in such a way as to provide a comprehensive account of the phenomenon of reference to objects and states of affairs which are not part of the current stimulus environment of both speaker and listener?

Any account of the phenomenon of reference, as it occurs in a fully articulated human language, must begin, so it seems to me, with the observation that the primary function of the process whereby words are strung together to form intelligible sentences is to put together units which by themselves have a very general referring function, as in the case of what I am calling tact words, together with units having no independent referring function, as in the case of what Skinner calls autoclitic words, in such a way as to establish reference either to some actual or potential state of affairs with a specific and identifiable location in space and time or to some general, but nevertheless specific, principle or rule having application in a large number of identifiable instances. It follows from this that an adequate account of the phenomenon of reference must begin with an account of the logical and grammatical structure of simple sentences and of the way in which the logical structure of a simple sentence "maps onto" the event or state of affairs which it represents, characterizes, specifies, or to which, in the relevant sense, it is said to refer. The theory of sentence construction is of course familiar territory to the grammarian and the logician and, although there is some difference of view between different specialists in this case

as to how the process of sentence construction should be conceived, the traditional classification of words into nouns, adjectives, verbs, adverbs, pronouns, prepositions and conjunctions is not seriously disputed. Moreover, despite differences in terminology, the analysis of the simple sentence into a verb phrase, predicate or function attached to or linking together one or more noun phrases, subject/object terms, arguments, names or descriptions or, as in the case of the first-order predicate calculus, into quantifiers, bound variables and multiple polyadic predicates, provides us with a body of theory in this area which, in the absence of the elementary distinction between words and sentences, Skinner has not even begun to emulate.

Nevertheless once the importance of that distinction is recognized and it is appreciated that the functional unit of verbal behaviour, the unit that exercises effective stimulus control over the behaviour of the listener, is a complete sentence rather than an individual word, it becomes possible to entertain the hypothesis that the grammatical structure of the sentence "maps onto" the topography of the contingency, whether it be a contingency of reinforcement or a contingency of the occurrence of an aversive event or punishment, for which the sentence as a whole acts as a discriminative stimulus for the listener.

What I have in mind here can be illustrated by considering the sentence pairs *Look! There's a fox!* and *Dinner is ready! Come and get it!* which, as I suggested in the previous section, are the pairs of sentences for which Skinner's single word sentences *Fox!* and *Dinner!* are the shortened versions. In both of these cases the complete utterance for which *Fox!* and *Dinner!* are short consists of two sentences, an imperative or mand sentence, *Look!* in the one case, and *Come and get it!* in the other and an indicative or tact sentence *There's a fox!* and *Dinner is ready!* Now if we look at these two sentences in the light of Skinner's account of a discriminative stimulus as a stimulus in the presence of which a response has been consistently reinforced ( $S^D$ ) or has consistently remained unreinforced ( $S^\Delta$ ), it becomes apparent that the function of the mand sentences *Look!* and *Come and get it!* is to "specify the behaviour which in these cases has been consistently reinforced in the presence of this or similar verbal stimuli, while the function of the associated tact sentences *There's a fox!* and *Dinner is ready!* is to specify both the nature of the reinforcement involved, seeing something unusual and eating food respectively, and something about its availability subject to the emission of the appropriate response. Furthermore, in the case of the four-word mand sentence *Come and get it!* it is clear that what is specified by this conjunction of verbs in the imperative mood is a simple two-component behaviour chain in which reinforcement - eating food - is contingent upon the behaviour of (a) moving in the speaker's direction (*Come*) and (b) accepting the food that is on offer (*get it*), where the conjunction *and* specifies the chaining relationship between these two behaviours and the ultimate reinforcement and the pronoun *it* serves to identify the reinforcer available by referring back to its specification in the preceding tact sentence *Dinner is ready!*

In the case of the tact sentences *There's a fox!* and *Dinner is ready!* the function of the nouns *fox* and *dinner* is to specify the object whose presence in the stimulus environment of the listener has the property of acting as a reinforcer. The sentence frames *There's an X!* and *X is ready!* on the other hand serve to indicate the immediate availability of the relevant reinforcement contingent upon the emission of the appropriate response. There is, however, an important difference between the two sentence frames in that whereas the negation of the sentence frame *There's an X!* (i.e., *There's no X there!*) signals nonreinforcement ( $S^\Delta$ ) rather than reinforcement ( $S^D$ ), the negation of *X is ready* (i.e., *X is not ready yet*) signals delay in reinforcement, rather nonreinforcement ( $S^\Delta$ ) for which a sentence

frame like *Sorry! No X today!* would be required. This difference has something to do with the fact that in general the tact word which substitutes for the variable X in the sentence frame *There's an X!* is likely to be a word standing for an entity or phenomenon whose existence is beyond the speaker's control, the tact word which substitutes for the variable X in *X is ready!* is likely to be [a] word standing for the end product of a process of manufacture controlled or supervised by the speaker.

## NOVEL SENTENCE CONSTRUCTION AND THE PROBLEM OF TRUTH AND FALSITY

Although it would be necessary to show that this analysis can be successfully applied to a much wider range of examples before it would be safe to conclude that the structure of any intelligible sentence maps onto the contingency of reinforcement or punishment - or disinforcement, to use the term preferred by Harzem and Miles (1978) - for which it acts as a discriminative stimulus. I would suggest that the analysis of these two sentence pairs, *Look! There's a fox!* and *Dinner is ready! Come and get it!* presented above is sufficiently promising to justify confidence that it will ultimately be possible to give an adequate account in terms of Skinner's notion of the discriminative stimulus both of the phenomenon of reference and in general of the control exercised by the verbal operant over the behaviour of the listener.

But consider what happens when the notion that different kinds of sentence and the different parts of a single sentence map onto different aspects of the contingency of reinforcement or disinforcement for which the sentence acts as a discriminative stimulus is combined with Chomsky's observation that speakers have, and frequently exercise, the ability to construct intelligible sentences which they have never uttered before and listeners have the ability to respond correctly to sentences they have never heard or read before. It then becomes apparent that the process of sentence construction must be a matter of putting together discriminative stimulus elements (words) each of which is abstracted from a number of different discriminative stimulus complexes (sentences). These sentences have been repeatedly associated in the past with particular contingencies of reinforcement and disinforcement in which a given stimulus element (a particular word or word combination) has been repeatedly associated with a recurrent feature of the different contingencies for which the different stimulus complexes (sentences) act as effective discriminative stimuli, even though the particular combination (sentence) of discriminative stimulus elements (words) has never previously occurred in the past learning history of the listener.

Given that such novel combinations (sentences) of discriminative stimulus elements (words) can combine in such a way as to act as effective discriminative stimuli for contingencies of reinforcement and disinforcement which have not previously occurred in the past learning history of the listener or, for that matter, in the past learning history of the speaker, we have a situation in which a speaker can prepare the listener to encounter and take effective action appropriate to contingencies of reinforcement/disinforcement which are operating in his (the listener's) environment, but which he has not previously encountered and for which he would not otherwise have an appropriate response.

However, while the advantage to the listener of attending to the information provided by the speaker about aspects of the contingencies operating in his environment to which he (the listener) does not have direct access is obviously very great, there is a serious penalty to be paid insofar as the same

mechanism allows the speaker to construct sentences which prepare the listener to encounter contingencies of reinforcement or disinforcement which do not in fact correspond to the contingencies actually operating in his (the listener's) environment. In some cases these discrepancies between the contingencies for which the speaker's sentence acts as a discriminative stimulus and the actual contingencies operating are due to unintended errors, inaccuracies or ambiguities in the sentence uttered by the speaker. But in other cases, cases in which the speaker is deliberately lying, the effect of his words on the behaviour of the listener reinforces the behaviour of the speaker in the direction of constructing sentences which act for the listener as discriminative stimuli for contingencies of reinforcement or disinforcement which do not actually obtain in his environment.

In either case, the possibility of being misled by what the speaker says raises a serious problem for any listener of how to distinguish between those sentences uttered by a speaker which act as discriminative stimuli for contingencies of reinforcement or disinforcement which actually obtain in his (the listener's) environment and to which the adjective *true* is applied, and those where the relevant contingency does not in fact obtain, to which the adjectives *untrue* or *false* are applied.

According to Chomsky (1959, p. 53) Skinner's system "has no place for *true*", no place, that is for the distinction between verbal operants or utterances that are true and those that are false. This is not quite accurate insofar as there are two separate passages in *Verbal Behavior* (Skinner, 1957, p. 147 and pp. 435-436) where Skinner discusses the conditions for the application of the word "true" along with those for the application of related words such as "objective", "valid", "correct", and "certain". In the first of these passages he gives a similar account of the application of these adjectives to an item of verbal behaviour to that just presented. "When", he says (1957, p. 147) "the correspondence with stimulating situation is sharply maintained, when the listener's inferences regarding the objective situation are most reliable, we call the response 'objective', 'valid', 'true', or 'correct.'" But in the later passage, where he is discussing the truth or "validity" or his own verbal behaviour in writing the book of that name he concludes with the skeptical answer to the question "Have I told him [the reader] the truth? Who can say? A science of verbal behavior probably makes no provision for truth or certainty (but we cannot even be certain of the truth of that)" (Skinner, 1957, p. 456).

Although the skepticism expressed in this latter passage may be used to support Chomsky's contention that there is no place for truth in Skinner's system, it is perhaps possible to reconcile these two passages in the first of which he tries to draw a distinction between true and false utterances and the second in which he appears to deny the possibility of drawing any firm distinction between the two within a science of verbal behaviour. For it can consistently be held both that an utterance is true if, and insofar as, it specifies a contingency of reinforcement or disinforcement which actually obtains within the environment and false insofar as it misleads the listener by specifying a contingency which does not in fact obtain, and yet that there is no way in which a listener can effectively decide whether the contingency for which a sentence uttered by the speaker acts as a discriminative stimulus does or does not in fact obtain. On this view, in other words, we can know what it is for an utterance to be true and strongly suspect that there are in fact many such utterances without being able to pick out with any degree of confidence any particular instance as a clear-cut instance of a true utterance.

Although we may suspect that like other versions of skepticism this view will ultimately prove to be incoherent and self-defeating, the distinction it implies between what makes an utterance true and how we know it to be true, if indeed it is, is a valuable and important one. But quite apart from the ultimate incoherence of supposing that we can understand a word without being able to give even an



imaginary instance to which it would certainly and unambiguously apply, it seems highly implausible to maintain, as this view implies, that the human listener can never learn to effectively discriminate between true and false utterances, if by that is meant discriminating between verbal operants emitted by a speaker, which act as discriminative stimuli for contingencies which do in fact obtain in the environment and those which do not.

For if the listener's ability to make effective use of the information conveyed to him by the verbal operants emitted by the speaker depends, as it clearly does, on his ability to discriminate between reliable and unreliable information, and if the danger of encountering misleading or unreliable information is as great as it manifestly is, we could predict *a priori* that human beings would do what they manifestly have done, namely, devote a great deal of time, effort and ingenuity, ever since they first began to talk to one another, to the problem of learning to distinguish the reliable from the misleading, information from misinformation, the true from the false.

It is evident that Skinner has totally failed to provide us with an account of how human beings learn to make this vitally important discrimination without which language would be useless as a vehicle for conveying information from one individual to another. But this is not, I suggest, because his theory of learning lacks the resources to handle this form of discriminative learning. It is rather because he fails to appreciate the importance for the listener of being able to make this discrimination.

### TRUTH VALUE AND THE MAND - TACT DISTINCTION

Skinner's failure to appreciate the importance for the listener of being able to discriminate between true and false verbal operants emitted by the speaker is a direct consequence of the other three defects we have identified in the account he presents in *Verbal Behavior*. His failure to draw the distinction between words and sentences leads him to overlook the possibility available to the speaker of constructing novel sentences which refer to events and states of affairs of a kind not previously encountered by either speaker or listener; at the same time, his preoccupation with the verbal behaviour of the speaker and consequent neglect of the listener's response to that verbal behaviour leads him to underestimate both the importance of the information-conveying function of language and the danger to the listener of being misled both accidentally and deliberately by misinformation conveyed to him by the utterances of the speaker.

But perhaps the most significant contribution to Skinner's failure to do justice to the distinction between true and false verbal utterances comes from his failure to draw the distinction between tacts as words and tacts as sentences. For had he drawn this distinction, he would have appreciated not only that it is tact sentences rather than tact words which contrast with mands which must likewise be construed as sentences, but also that his distinction between mands and tacts, once this is construed as a distinction between two types of sentence, corresponds to the distinction drawn by logicians and grammarians between statements or sentences in the indicative mood (tact sentences) to which, when properly constructed and uttered in an appropriate context, a truth value can always be assigned and sentences in the imperative and interrogative moods (mands) to which it makes no sense to assign a truth value.

What is interesting here is that whereas for the logician the possibility of assigning a truth value is the defining characteristic of a statement or proposition, the distinction between mand sentences and tact sentences can be drawn within Skinner's system in three different ways, none of which involves any

reference to the possibility of assigning a truth value to tact sentences, but which taken together provide us with something that no other theory of language to my knowledge provides, namely with an explanation of why it is only to tact or indicative sentences that truth values are assigned.

We have seen that, as defined by Skinner, a mand is an operant which, when emitted by a member of a given verbal community, is typically reinforced by the emission of reciprocal behaviour on the part of a listener who is a member of the same verbal community, where the reciprocal behaviour emitted by the listener is specific to and is "specified by" the verbal operant emitted by the speaker. In other words the mand acts for the benefit of the initial speaker by eliciting the specified behaviour from the listener. Tact sentences, on the other hand, act for the benefit of the listener rather than the speaker, and this is reflected in the fact that the typical tact sentence is emitted by a speaker in response to a question or interrogative mand previously emitted by the listener and is reinforced by an expression of gratitude or assent on the part of the listener which, unlike the response which reinforces the emission of a mand, is not specific to or specified by the sentence whose emission it reinforces.

This way of drawing the distinction between mands and tact sentences draws the distinction in terms of differences in the way the emission of these two varieties of verbal operant is controlled by its antecedents and consequences. Consistent with his preoccupation with emission of verbal behaviour by the speaker at the expense of the listener's response to the resulting verbal stimuli, it is the way of drawing the distinction preferred by Skinner himself. But the same distinction can also be drawn in terms of the analysis of the listener's response to the verbal operant as a discriminative stimulus with respect to the behaviour of the listener. In this case the distinctive feature of the mand, *qua* stimulus controlling the behaviour of the listener, is that it acts as a discriminative stimulus for the emission of behaviour whose reinforcement contingency is controlled by the speaker who provides or withholds reinforcement, usually in the form of an expression of gratitude or the withdrawal or execution of a threat of disapproval, depending upon whether or not the behaviour specified in the mand is performed by the listener. By the same token, the distinctive feature of a tact sentence, *qua* stimulus controlling the behaviour of the listener, is that it acts as a discriminative stimulus for a contingency of either reinforcement or disinforcement (punishment) where the contingency in question is outside the control of the speaker who in this case merely provides information about it.

When the distinction between mand and tact sentences is drawn in this way, it becomes apparent why the truth value of the utterance is a relevant consideration in the case of the tact sentence or statement, but not in the case of the mand. For if, as I have suggested, the distinction between true and false sentences is primarily the distinction between discriminative stimuli which provide the listener with a reliable indication of the prevailing contingencies of reinforcement and disinforcement or punishment and those which do not, it follows that it is only insofar as a verbal operant is being emitted for the benefit of the listener that the truth value of the utterance will be a relevant consideration. Where, as in the case of the mand, the consequences of the emission of the verbal operant benefit the speaker and where the contingency of reinforcement for which the verbal operant acts as a discriminative stimulus for the listener is under the speaker's control, it is entirely up to the speaker to ensure that the contingency of reinforcement for which the verbal operant acts as a discriminative stimulus for the listener coincides with the contingency that obtains in practice, since only if it is, will the speaker be able to secure the listener's compliance with his demand or request. But where, as in the case of the tact sentence, the emission of the verbal operant benefits the listener by providing him with a discriminative stimulus for contingencies to which the listener would otherwise have no access, but

over which the speaker has no control, the problem for the listener of discriminating between the true and the false, between those verbal operants emitted by a speaker which act as discriminative stimuli for contingencies which do and do not obtain, becomes vitally important.

Although this way of drawing the distinction between mand and tact sentences as verbal operants which subserve the interests of speaker and listener respectively helps to explain why truth values are assigned to indicative sentences or statements and not to imperatives and interrogatives, it is important to emphasize that the distinction between mands and tacts, when drawn in this way, does not entirely coincide with the grammatical distinction between sentences in the imperative and interrogative moods on the one hand and sentences in the indicative mood on the other. For there are examples both of utterances of indicative sentences, such as my wife saying to me *I haven't got any cigarettes*, which functions as a mand or request for me to go out and buy her a packet, and utterances of imperative sentences like the sentence *Cross the road to the bus stop and take a number 1 or 4 bus to City Square*, made in response to the question *How do I get from the University to the Railway Station?*<sup>2</sup> which functions as a tact insofar as it acts for the benefit of the listener by providing information about contingencies of reinforcement beyond the control of the speaker.

The grammatical distinction between imperative and interrogative sentences on the one hand and indicative sentences on the other corresponds more exactly to a third way of drawing the distinction between mand and tact sentences which we encountered above in our analysis of the sentence pairs *Look! There's a fox!* and *Dinner is ready! Come and get it!* where both sentences in each pair count as tacts insofar as they provide information to the listener about contingencies of reinforcement beyond the control of the speaker, but where each pair consists of an imperative or, in this sense, mand sentence which specifies the behaviour on the part of the listener required to secure reinforcement, while the indicative or tact sentence specifies the nature and contingency of the reinforcement available for that behaviour.

## CONCLUSION

I have tried to show that Skinner's book *Verbal Behavior* suffers from four major defects, (1) the failure to draw a clear distinction between words and sentences, (2) the failure to distinguish tact words and tact sentences, (3) an inadequate account of the listener's response to the verbal operant and the phenomenon of reference, and (4) an inadequate account of the truth and falsity of verbal operants and how truth and falsity are discriminated. I have also tried to show that these defects are not irreparable and, to give a general indication of how Skinner's basic theory can be adapted so as to make good these deficiencies. The detailed exposition of a modified version of Skinner's account of verbal behaviour, which will avoid the objections to the original account raised by critics such as Chomsky (1959), will be the subject of a subsequent paper.

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