SKINNER'S VERBAL BEHAVIOR I - WHY WE NEED IT[1]

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Skinner's book *Verbal Behavior,* published in 1957, has the curious distinction of being much better known as the subject of a review by Noam Chomsky (1959) than it is in its own right. I don't have any reliable statistics on the matter, but I would guess that for every reader of Skinner's book there must be at least a dozen who have read Chomsky's review and concluded, from the apparently devastating refutation of Skinner and all his works that it contains, that Skinner not only does not, but necessarily cannot have any significant contribution to make to our understanding of the phenomenon of language. In this paper, I shall try to show that although Skinner's account of verbal behaviour, as he calls it, contains at least one major flaw to which Chomsky has rightly drawn attention, Skinner's project in *Verbal Behavior,* which I take to be the development of a conceptual system or language for talking about talk which dispenses with the logico-grammatical device known to philosophers as intensionality, is not only a perfectly legitimate project in its own terms, but is an indispensable prolegomenon to any genuinely scientific account of the phenomenon of language or, indeed, to any account of language which does not beg the very question it is intended to answer.

PHILOSOPHY AND THE SCIENCE OF LANGUAGE

Before proceeding to my exposition of this thesis, something needs to be said about the audience to which it is addressed. Who, in other words, are the "we", who, in my view, need Skinner's *Verbal Behavior.* Had I been writing this paper fifteen years ago, I would probably have answered this question by saying that "we" here is to be understood as "we psychologists" or perhaps slightly more broadly so as to include those students of language who are prepared to regard linguistics as

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[1] [Added 1999] Much of this paper is now outdated. I no longer believe that it even makes sense to try to extensionalise intensional language, if by 'intensional language' is meant language whose concepts range over the possible as well as the actual. I no longer think that that is what Skinner's linguistic innovations either have succeeded in doing in the past or can be expected to do in the future. Indeed, as was pointed out to me some years ago by Professor Jay Moore of the Department of Psychology, University of Wisconsin, Milwaukee, the key concepts of "stimulus class" and "response class" are intensional in that they include, not just actual stimulus and response events which have occurred in the organism's past history, but, in the case of a stimulus class, the range of possible future stimuli with the same dispositional effects and, in the case of a response class, the range of possible future manifestations of a disposition to respond in a particular way. If, on the other hand, by 'intensional language' is meant, as it seems to be for the most part in this paper, language containing context (predicates or embedded sentences) which display the phenomenon which Frege (1892/1960) calls "indirect reference" and which Quine (1961) calls "referential opacity" whereby co-referring predicates cannot be substituted *salve veritate*, I still maintain that these contexts are quotations, typically in *oratio obliqua* or indirect reported speech, of what the individual in question has said or may be presumed to have said. But although it is his adherence to the notion that language has an extensional logic at its foundation which leads Quine to regard opaque contexts as anomalous, it makes no sense, on this use of the word, to talk of those like Skinner who eschew such language in their theoretical formulations as 'extensionalising the intensional'. It follows from this that I stand by the contention that to use language containing opaque contexts to explain the phenomenon of language is viciously circular, and that an alternative way of explaining linguistic phenomena is required for scientific purposes. I also see no reason to repudiate the account of the different roles of molar and molecular explanations on pp. 18-23 [pp. 16-19 in this version].

an empirical and natural science in the same way that most psychologists regard psychology as an empirical and natural science. For one thing, fifteen years ago I was myself employed as a professional psychologist and was therefore able to use "we" to mean "we psychologists" with a degree of confidence which is difficult to sustain after ten years of employment as a philosopher. But it is not just that my own situation has changed over the past fifteen years; there has also been a significant shift in the climate of opinion within philosophy which has made it much more appropriate to widen the extension of the pronoun "we" in the sentence "We need Skinner's *Verbal Behavior"* so as to include anyone, be he psychologist, linguist or philosopher, who is concerned with the problem of giving a coherent theoretical account of the phenomenon of language.

Fifteen years ago it was still fashionable in philosophical circles, as it had been for some twenty years before that, to draw a very sharp distinction between empirical questions which are the proper concern of the empirical scientist and the conceptual and logical questions which are the province of the philosopher. Ten years later, a number of developments which came to fruition in the 1960s have combined to erode that very sharp line of demarcation between the mutually exclusive preserves of the philosopher and the empirical scientist, both in general and in relation to the theory of language in particular. I am thinking of three things; firstly, the influence of Quine's critique of the analytic/synthetic distinction in his "Two Dogmas of Empiricism" paper (Quine, 1950), secondly the influence of those philosophers of science like Popper (1959), Feyerabend (1957-8, 1962), and Lakatos (1970), who, partly through the influence of phenomenological tradition within the psychology of perception, have been led to emphasize the extent to which scientific observations are themselves theory-laden, and thirdly, in specific relation to the theory of language, the work of Chomsky (1959, 1965, 1967, 1968) and his disciples, in demonstrating the way in which the interests of linguists and grammarians in the study of language overlap and are inextricably bound up with those of the philosophers of language on the one hand and those of empirical psycho-linguistics and socio-linguistics on the other.

LANGUAGE AS BEHAVIOUR

The effect of these developments has been to allow philosophers, especially in the field of the theory of language, to adopt a constructive and creative rather than a purely critical approach to the formulation and elaboration of scientific theory and thus become much more tolerant of the kind of conceptual innovation which is an essential ingredient in scientific theory-construction, but whose appearance in a philosophical context was invariably frowned upon in the hey-day of ordinary language philosophy in the 1950s. But this blurring of the sharp distinction that used to be drawn between philosophical and scientific theorizing is not the only development that has taken place in recent years which has had the effect of narrowing the gap between the point of view of the philosopher and that of the psychologist or behavioural scientist with respect to the theory of language. Philosophers of language in the tradition which has its source in the later works of Wittgenstein (1953) and in particular the tradition which goes back to John Austin's *How to do things with words* (Austin, 1952), while carefully preserving the traditional links between philosophy and the humanities and rejecting any assimilation of philosophy to science, have nevertheless moved significantly closer to the standpoint of the psychologist and behavioural scientist with respect to language in their emphasis on language as a form of behaviour which is used by the speaker to bring about some change in his social environment and whose meaning can only be understood by divining the intentions of the speaker in saying what he says in the context in which the utterance in question occurs. I am thinking in this connection of such philosophers as Paul Grice (1957, 1968, 1969), John Searle (1969), and Jonathan Bennett (1976), whose interests

in the pragmatic or functional aspects of language coincide to a remarkable extent with those of Skinner in *Verbal Behavior,* despite the apparently differences between the conceptual framework within which the problems are discussed.

What philosophers like Grice, Searle and Bennett have in common with Skinner is the insistence, firstly, that the verbal utterance or the verbal operant, as Skinner calls it, should be regarded as a piece of behaviour which needs to be described and explained in the same way that we describe and explain other kinds of nonverbal things that human beings do, and secondly, that the first question to be asked about any such item of behaviour, whether verbal or non-verbal, is a question about the role or function which it performs for the agent or speaker in question. Where the two approaches differ is over the conceptual framework to be employed in describing and explaining behaviour and its function for the agent or speaker. On the Grice-Searle-Bennett view, the function of the linguistic utterance for the speaker is, and necessarily must be, characterized and understood in terms of the speaker's intention in saying what he says. These intentions, moreover, are in their turn to be accounted for in terms of what the speaker knows or believes about the situation confronting him and his purpose or purposes in saying what he says in that situation. In other words, the Grice-Searle-Bennett account is indissolubly wedded to the so-called intensional language that we use to explain human behaviour in every day life. It is precisely the use of this kind of language, and the concepts which go with it, that Skinner rejects on the grounds that such language provides a misleading and scientifically unacceptable account of the causal factors governing behaviour in general and verbal behaviour in particular. His account of the function of the verbal operant for the speaker is given, not in terms of the intentions of the speaker in saying what he says, but in terms of the selective strengthening or weakening of the speaker's propensity to emit the verbal operant in question by the consequences which that operant has had when emitted by the speaker on similar occasions in the past.

This radical disagreement about the role of intensional concepts in the explanation of linguistic behaviour cannot be circumvented by suggesting that the scientific considerations which make intensional concepts and intensional language unacceptable to Skinner do not weigh with Grice, Searle and Bennett because the account of linguistic behaviour which they are trying to develop is not primarily intended as a scientific account and is not therefore subject to the same concern for scientific propriety as motivates Skinner, Bennett, for instance, in his recent book (Bennett, 1976), goes out of his way to argue both that no adequate account of linguistic behaviour is conceivable for whatever purpose which does not make use of intensional concepts in general and the concept of the speaker's intention in saying what he says in particular, but also, in direct contradiction to Skinner's view, that there are no tenable objections to the use of such concepts in giving a scientific account of behaviour whether human or animal, verbal or nonverbal.

Furthermore, although on this issue I am myself inclined to side with Skinner rather than with Bennett, the reasons which I see for rejecting an account of linguistic behaviour in terms of intensionality are ones which would apply to any attempt to give a general account of linguistic behaviour regardless of whether any claim was being made for it to the honorific title of "scientific".

INTENSIIONALITY-WITH-AN-S AND INTENTIONALITY-WITH-A-T

This, then, is the nub of the issue before us. Are there, or are there not, insuperable objections to the use of intensional language and intensional concepts in giving a general account of linguistic or verbal behaviour? And if there are, are they objections to the use of intensional language for

technical scientific purposes, or do they apply more generally to any attempt to develop a systematic account of linguistic behaviour for whatever purpose?

At this point something needs to be said about the distinction between what Searle, in a recent paper (Searle, 1979) calls "intensionality-with-an-s" in contrast to the related notion which Searle calls "intentionality-with-a-t". These notions have a long and tangled history which goes back to the logical doctrines of the medieval scholastic philosophers. In its modern form, the notion of intentionality-with-a-t goes back to Brentano (1874), who maintained that what distinguished the mental from the nonmental or physical is that a mental act or mental state involves an intentional reference to an inexistent object. What Brentano appears to have had in mind in formulating this doctrine is a feature of human behaviour which, though this is seldom recognized in the tradition that stems from Brentano, it shares with the behaviour of most other species of free-moving living organisms, namely, that of being organized in such a way as to maximize the probability of (a) achieving certain goals or objectives in the future and (b) anticipating such threats to the attainment and maintenance of those goals and objectives as are likely to occur in the prevailing circumstance, where both the goals toward which behaviour is directed and the threats which it is organized to met are "inexistent" in the sense that they are events or states of affairs which have not yet occurred or do not yet exist and may never in fact do so.[2] Intentionality in this sense is a feature of human and animal behaviour of which some account must be given by any theory which purports, as Skinner's Radical Behaviourism does, to provide a general account of such behaviour, and this feature is in fact accounted for in Skinner's terms by the notion of the control that is exercised over current behaviour by the consequences which similar behaviour has had in the past.

Intensionality-with-an-s, though it also has roots which go back to the work of the medieval logicians, only became clearly distinguished, to my knowledge, from intentionality-with-a-t in a paper given by William Kneale in the first of a sequence of four papers on this topic presented at the Joint Session of the Aristotelian Society and the Mind Association at the University of Liverpool in 1968. According to the usage recommended by Kneale and followed by his fellow symposiasts, A. N. Prior, J. O. Urmson and Jonathan Cohen, intensionality-with-an-s is to be distinguished from Brentano's intentionality-with-a-t by the fact that whereas intentionality-with-a-t is a property of mental processes and behaviour whereby they are directed towards goals and objectives and away from threats and dangers, intensionality-with-an-s is a logico-grammatical property of what are known collectively to logicians as "intensional" or, as Quine (1953) calls them, "referentially opaque contexts". In other words, unlike intentionality-with-a-t, which is a psychological property of behaviour and mental processes, intensionality-with-an-s is a logical property of certain linguistic expressions. It is a feature of, among other things, the linguistic expressions we use to characterize an individual's mental states and mental events, and thereby to explain his behaviour.

An intensional or referentially opaque context is a sentence or descriptive expression which is preceded by and under the control of either (a) a modal operator such as the adverbs "necessarily" and "possibly" or (b) a verb of reported speech such as "say that", "ask what, whether, which etc.," or "tell", or (c) a psychological verb such as "see", "hear", "feel", "know", "believe", "understand", "want", "decide", and "intend".

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[2] My colleague Professor P. T. Geach has drawn my attention to the fact that I have here fallen in with the common mistake of supposing that the "in-" prefix in Brentano's *Inexistenz,* is to be understood as a negation on the analogy of "inexact," "incompetent", etc. In fact it is a translation of the medieval Latin term "inesse," meaning to exist in (the mind or soul). Needless to say, something that exists in the mind need not correspond to anything that exists outside it; so that this etymological misconception does not invalidate the widespread practice of using the actual or potential nonexistence of the intentional object in reality as the mark or defining characteristic of intentionality-with-a-t.

The defining characteristic which unites these different kinds of intensional context is that within such a context a basic principle of extensional logic, the principle of substitutivity *salve veritate,* whereby whatever is true of something under one description is true of it under any description whatsoever under which it falls, is suspended. In an intensional context an alternative description of the referent of any description that occurs within it cannot be substituted without changing the truth conditions of the sentence or proposition in which the expression occurs. Thus although from the propositions "Skinner wrote *Verbal Behavior"* and Chomsky reviewed *Verbal Behavior"* we can infer "Skinner wrote a book that Chomsky reviewed", from "Jones knows that Skinner wrote *Verbal Behavior*" and "Chomsky reviewed *Verbal Behavior"* we cannot infer "Jones knows that Skinner wrote a book that Chomsky reviewed". Similarly, from "Jones wants to smoke pot" and "Smoking pot is a criminal offence" we cannot infer "Jones wants to commit a criminal offence."[3]

As Quine has pointed out in his paper "Reference and Modality" (Quine, 1961, pp. 139-150), in which he first introduced the term "referentially opaque contexts" (in 1953), the explanation of these exceptions to the principle of substitutivity is that in an intensional context we are talking, to use the language of the medieval logicians, *de dicto,* i.e. about what is or might be said, rather than *de re,* i.e., about matters of extra-linguistic fact. In other words, an intensional context is a quotation, a quotation not of a speaker's exact words, but a quotation of what Geach (1957, p. 9) has called "the gist or upshot" of what is or might be said. But although an intensional context does not purport to preserve a speaker's exact words in the way that a direct quotation in *oratio recta* would purport to do, it does purport to preserve the sense or "intension" of what is or might be said. Consequently any substitution which changes the sense of what is or would be said is ruled out as a misrepresentation of what it purports to report, even when, in accordance with the principle of substitutivity, the change in description does not involve any change in the object or objects to which the descriptions in question refer.

This explanation of an intensional context as a quotation or report of the general sense of what is or might be said cannot be seriously disputed in the case of those intensional contexts which take the form of an embedded sentence in *oratio obliqua* or indirect reported speech introduced by the verb phrases "say that" or "tell....that" where the embedded sentence is in the indicative mood, by the verb "ask" combined with an interrogative pronoun such as "why", "what", "how" etc., where the embedded sentence is in the interrogative mood, and by the verb "tell" followed by the preposition "to" where the embedded sentence is in the imperative.

Nor is it easy to avoid drawing the same conclusion in the case of those intensional contexts where, as Geach (1957, pp. 75-79) points out, the same grammatical constructions involving embedded sentences in *oratio obliqua* are introduced by psychological verbs such as "know," "believe," "think," "expect" and "remember" combined with the pronoun "that" in the case of embedded indicative sentences, by verbs like "know", "remember", and "wonder" combined with an interrogative pronoun in the case of embedded interrogative sentences, and by verbs such as "want," "expect", "decide" and "intend" combined with the preposition "to" in the case of embedded imperative sentences.

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[3] [Added 1999] In this case an alternative explanation of the failure of substitutivity *salve veritate* is possible. It is arguable that the substitution misrepresents, not what the agent would say, but the goal towards which the behaviour is directed or, as Skinner would say, the conditions under which it would be reinforced. However, consideration of cases where an animal is said to want something suggests that in these cases there is no failure of substitutivity (Cf. Davidson 1982). Take, for example, the case where a dog wants its master to throw a stick and the stick is four foot long. We can still say that it wants its master to throw a four foot long stick. This would seem to confirm the view that failure of substitutivity *salve veritate* occurs only where a possible misquotation is involved.

The application of the quotational theory is less clear in the case of those intensional contexts governed by other psychological verbs such as "see", "hear", "feel", "look for", "think about", "want" (where what is wanted is an object or state of affairs rather than to do something) and the whole range of passive past participles like "pleased," "excited", "irritated", "distressed," "afraid," "disgusted", "depressed" and "relieved" followed by the prepositions "at," "of", "by" or "about" which comprises the language of emotion. In these cases the intensional context consists not in an embedded sentence in *oratio obliqua* but in a description, either definite, as when the object of someone's search is described as "his pen", or indefinite, as when it is described as "a pen" - meaning that any pen will do just as well as any other. In these cases the quotational theory would explain the demonstrable opacity of the context on the supposition that the description which occupies the context reports the sense of the description which the agent has given or would give of what it is he sees, hears, feels, is thinking about, looking for, wants, or is moved (in the emotional sense of "moved") by.

In the case of the objects of thought (what someone is said to be "thinking about"), where the verbal account given by the thinker himself is our only source of information, this is the only possible explanation of the opacity of such contexts. In other cases, however, there is an alternative explanation which, although it is not incompatible with the quotational theory, can be used to justify the use of such language in cases where a reference to what the agent has said or would say is inappropriate.

On this alternative account, the intensionality or referential opacity of the descriptions we give of the objects of perception, search, desire and emotion is explained on the assumption that in these cases we are using the intension or sense of the description in question as a means of indicating the range of possible objects and events which in the case of the objects of perception and the causes, as distinct from the objects of emotion, would have elicited the same response from the agent or which, in the case of the objects of search and desire and of emotion, would end the search, satisfy the desire or cool the emotion.

It should be noted however, that while this alternative explanation can be used to justify the use of intensional concepts such as "perceiving", "searching" and "wanting" and a whole range of emotion concepts in cases where there is nothing that the agent has said or could be expected to say that would correspond to the description which occupies the intensional context, no such alternative explanation is available in the case of those psychological verbs like "know", "believe", "decide" and "intend", which require an embedded sentence in *oratio obliqua* to complete the intensional context. Moreover, in contexts where verbs of perceiving, searching, wanting or emotion, for which this alternative explanation is available, are combined with verbs like "know", "believe", "decide" and "intend", for which there is no plausible alternative to the quotational theory, as when what someone decides to do is explained in terms of what he knows or believes, on the one hand, and what he wants, on the other, we can only make sense of what is being said, if we interpret *all* the intensional contexts involved as quotations of what is or might be said.

It should also be emphasized that the alternative to the quotational theory of intensional contexts which is available in the case of this limited number of psychological verbs does not constitute an exception to the more general principle underlying the quotational theory, namely the principle whereby a description that occurs within an intensional context is not being used, as in any other context it would be used, namely, as a means of picking out or identifying some object, event, or state of affairs in the extra-linguistic universe, but rather as a device for indicating the range of possible cases in which a particular kind of verbal and/or nonverbal behaviour is liable to occur.

Those opaque contexts involving modal operators like "necessarily" and "possibly" and their more common equivalents such as "must", "has to", "might" and "can" are important for our purposes for two reasons. In the first place they can provide the most decisive exception to the rule which might otherwise be supposed to apply whereby intensional contexts occur only as the grammatical objects of a psychological verb. At the same time a comparison of those cases where modal operators do and do not generate opaque contexts provides perhaps the most convincing evidence in favour of the quotational or *de dicto* theory of referential opacity. For it turns out that it is only in those cases where the modal operator is used in the sense of logical necessary or possibility and where it has to be interpreted as commenting *de dicto* on the logical status of the proposition expressed by the sentence in which it occurs, that the ensuing context becomes referentially opaque in that the principle of substitutivity *salve veritate* is suspended. In other cases where a modal operator is used in a causal or ethico-legal sense, the sentence has to be interpreted as commenting *de re* on matters of extra-linguistic fact and there is no suspension of the principle of substitutivity.

This point is illustrated by comparing the sentence

A "The square on the hypotenuse must equal the sum of the squares on the other two sides"

in which "must" has the force of logical necessity, with the sentence

B "If the keystone is removed the arch must collapse"

in which "must" has the force of causal necessity, and the sentence

C "You must not smoke in this building"

in which "must" has the force of ethico-legal necessity. The *de dicto* character of sentence A is shown by the fact that what it expresses can be equally well expressed by the sentence

A_1 "It is necessarily true that the square on the hypotenuse is equal to the sum of the squares on the other two sides".

Furthermore the opacity of the context controlled by the modal operator in this case can be demonstrated by showing that if, in this instance, the hypotenuse is drawn in blue we cannot validly conclude

A_2 "It is necessarily true that the square on the line drawn in blue is equal to the sum of the squares on the other two sides".

Similarly the *de re* character of sentences B and C is shown by the fact that what is expressed by B and C cannot be captured by the sentences

B_1 "It is necessarily true that if the keystone is removed the arch will collapse"

and

C_1 "It is necessarily true that you will not smoke in this building"

as is shown by the fact that both B_1 and C_1 are false, while both B and C may well be true. Likewise, the fact that B and C involve no suspension of the principle of substitutivity, and are therefore extensional rather than intensional can be demonstrated by showing that if both the arch in B and the building in C were designed by Joe Bloggs we *can* validly infer both

B_2 "If the keystone is removed, something designed by Joe Bloggs must collapse".

and

C$_2$ "You must not smoke in something designed by Joe Bloggs".

I make no apology to my psychologist readers for what may appear to them an unnecessarily tedious digression into the obscure logical technicalities of referential opacity, because it seems to me that some understanding of the logical peculiarities of the psychological language we employ in ordinary nontechnical discourse is an essential prerequisite for any discussion of the propriety of using such language for technical purposes. It is essential, not only in order to underline the point, already made, that when behaviourists like Skinner reject mentalism in the description and explanation of behaviour, what they are rejecting is not intentionality-with-a-t, the phenomenon of goal-directedness as a feature of the behaviour of organisms, but rather intensionality-with-an-s considered as a logico-grammatical peculiarity of the language we use in ordinary discourse to characterize and explain that phenomenon. Some understanding of such matters is also important, in my view, because the logical peculiarities of intensional-with-an-s language and its presuppositions provide the only defensible argument for rejecting the use of such language for the technical purposes of psychology and the behavioural sciences in general, as behaviourists like Skinner require.

OBJECTIONS TO INTENSIONALITY (MENTALISM)
IN THE EXPLANATION OF BEHAVIOUR

The belief to which Skinner subscribes, which holds that intensional or mentalistic concepts are inadmissible in giving a scientific account of the behaviour of organisms in general and human behaviour in particular has been a traditional prejudice of the behaviourist movement in psychology since the days of Watson (1919). So far as I am aware, neither Watson or any of his successors have presented any very consistent arguments for this view; but it would seem to be based on three separate sets of considerations, none of which, in my view, provide good reasons for outlawing the use of intensional concepts in the description and explanation of verbal behaviour, whatever may be true of other forms of organic behaviour.

The first of these sets of considerations has a long history, going back at least as far as Aristotle's contention that man differs from other animals by virtue of possessing a rational soul. On this view, to ascribe intensional concepts to animals is to be guilty of anthropomorphism, since it involves attributing to animals powers of rational thought which, on this view, they do not possess. On the face of it, this argument has no bearing on the case of verbal behaviour, since it is generally accepted that linguistic competence in this sense is an exclusively human ability. However, it is argued by behaviourists in the tradition to which Skinner belongs that the sharp division between the behavioural capacities of humans and animals which this implies is incompatible with the Darwinian Theory of Evolution and that in the light of that theory there can be no scientific justification for using different concepts in talking about the behaviour of humans from those we use in talking about the behaviour of animals. Since to use intensional concepts like knowledge, beliefs, purposes and intentions in talking about the behaviour of the earthworm or the amoeba is palpably absurd, it follows that, for scientific purposes at least, it is better to describe human behaviour in a nonintensional way appropriate to the behaviour of amoebae, earthworms, pigeons and rats, than to extend the use of intensional language to cover the behaviour of these animals.

This argument can certainly be used to justify Skinner's attempt to give an account of verbal behaviour in nonintensional terms. But if, as many would argue, that attempt has demonstrably failed, it in no way justifies prohibiting others from using intensional language in

trying to provide an alternative and arguably better account. Maybe there is, after all, a radical difference of kind between human and animal behaviour and the fact that humans talk whereas animals do not is a reflection of precisely this difference.

The second important source of the belief that intensional concepts are inadmissible in a scientific account of the behaviour organisms is the traditional scientific prejudice against purposive, final cause or teleological explanation. This prejudice can be traced back to Galileo's rejection of the Aristotelian entelechies as an explanation of phenomena like gravitational attraction and their replacement through the combined efforts of Galileo, Descartes and Gassendi by the theory of mechanical motion. On this view, the only kind of explanation that is admissible for scientific purposes is one in terms of what Aristotle called efficient causation, and this is often taken to be incompatible with giving a final cause or teleological explanation.

Now it is clear from what has already been said that the concept of having a purpose or desire is an intensional concept. Furthermore, any intensional explanation of the behaviour of an agent requires, along with a specification of what he knows or believes about the situation confronting him,. some specification of his desires, purposes or objectives. Consequently, if teleological explanations are inadmissible in a scientific context, it follows that *any* intensional account of behaviour must be scientifically inadmissible.

This argument, however, depends on the assumption that intensional explanations in general and teleological explanations in particular, are incompatible with giving an explanation in terms of efficient causation; and there are at least two lines of argument which suggest that this assumption is false. The first argument is that despite the well known philosophical shibboleth which holds that reasons are not causes, causes, and efficient causes at that, is precisely what they are, at least in those cases where the reasons that a man gives for acting as he does are his real reasons for so acting. On this view, to say that an event or state of affairs A is an efficient cause or causal factor in the coming about of another event or state of affairs B is to assert the counterfactual conditional "If A had not happened or been the case, B would not have occurred or been the case". By this criterion, a man's reasons for acting as he does are undoubtedly causes of his so acting insofar as it is true that he would not have acted as he did, if he had not had the knowledge, beliefs, desires, purposes and intentions which he had in doing what he did.

This argument, though it may show that purposes are or can be efficient causes of action may not be sufficient to allay the doubt of those scientists who are inclined to say that even if teleological explanations are just another variety of efficient cause explanations, they are not the kind of causal explanation that is acceptable for scientific purposes. To meet this further uneasiness, there is a second line of argument which seeks to remove the need for using intensional-with-an-s language by providing an explanation in nonintensional language of intentionality-with-a-t, that is of goal-directedness or purposiveness considered as a feature of the behaviour of living organisms as well as of certain mechanical systems such as the guided missile. Explanations of the phenomenon of goal-directedness of the causal-mechanical type with which scientists are familiar, can be given either by using the cybernetic principle of negative feedback or, as Skinner prefers to do, by appealing to the reinforcement and shaping of behaviour by its consequences in the past.

A third line of argument against the use of intensional concepts in the scientific explanation of behaviour is that which derives from the positivist tradition either in its original Comtean form (Comte, 1832-40) as developed by Watson (1919), or in its later Operationist form, as developed by Bridgman (1928), to which Skinner appeals. Both of these varieties of positivism come in two forms, a more moderate form with which it is difficult to quarrel, and a more extreme form which is manifestly false. In its moderate form, positivism holds that no proposition or theory concerning

matters of fact which is not based upon or supported by the evidence of observation is true, and any proposition or theory for which no empirical evidence could conceivably be relevant is unworthy of consideration as a scientific hypothesis. In its more extreme form, positivism rules out as unscientific any inference which goes beyond the available observational evidence. In its operationist form, the more moderate view holds that all concepts used in the description of what is observed or measured be defined in terms of the relevant observation or measurement procedure and that any concept that is used in the formulation of a scientific theory or hypothesis be linked to some operationally defined concept or concepts in such a way that an empirical test of the hypothesis or theory is made possible. In its more extreme form, operationism excludes the use of any concept that cannot be operationally defined for any purpose whatsoever, whether empirical or theoretical.

As interpreted by Comte and Watson, the observations which are required to verify a scientific theory must be objective observations which are capable of being checked by more than one observer. Consequently, both Comte and Watson were led to reject introspection as a method of scientific observation and consequently to deny the possibility of there being a science of private experience using introspection as its method of observation. Watson, moreover, appears to have thought that this principle also ruled out the possibility of using intensional or mentalistic concepts in the explanation of behaviour, on the grounds that such concepts make reference to entities, the case for whose existence depends solely on introspection. If, however, as was first argued by Tolman (1932) and later by Ryle (1949), the meaning of intensional terms can be completely specified in terms of publicly observable behaviour, the use of such concepts in giving a scientific explanation of behaviour can be ruled out, only by adopting the extreme form of positivism which Skinner adopts, which rejects any kind of inference that goes beyond the immediate data of observation. But this principle, if taken to its logical conclusion, would rule out the possibility of making any predictions about the future, any statement about the past, and any statement about causal relationships operating in the present.

I conclude therefore, that neither the traditional scientific prejudice against teleological explanation nor positivism in any of its forms provides a valid argument against the use of intensional concepts in the explanation either of organic behaviour in general or of verbal behaviour in particular, and that while the charge of anthropomorphism can perhaps be made to stick with respect to the use of intensional concepts in the explanation and description of the behaviour of animals, no serious case can be made against the use of intensional concepts in giving an account of human behaviour.

INTENSIONALITY AS THE EXPLANATION OF
WHAT IS DONE BY WHAT IS SAID

In order to take the matter further, we need to consider what is really going on when we explain behaviour in intensional language, for it is only when we do this that important objections to the use of intensional concepts in certain contexts begin to emerge. In a previous section discussing the distinction between intentionality-with-a-t and intensionality-with-an-s, I pointed out that the distinctive and defining characteristic of intensional language when viewed from the standpoint of the logician is the suspension within the intensional or referentially opaque context of the basic logical principle which permits the substitution of any alternative description of the referent of any proper name or definite description that occurs within an indicative sentence without altering the truth conditions of the proposition which is expressed thereby. I also argued that in the majority of cases the only plausible explanation of this logical phenomenon is what I called "the quotational

theory", according to which an intensional context is interpreted as a report, in *oratio obliqua* or indirect reported speech, of the sense of something that someone has said, regularly says, or might conceivably say. I conceded that there are some intensional contexts, namely those governed by verbs of perception, search, desire and emotion, where an alternative to the quotational theory is possible; but I also argued that no such alternative explanation is possible in the case of intensional contexts governed by verbs such as "know", "believe that," "remember", "want to", "decide" and "intend," which take the form of an embedded sentence in *oratio obliqua* and that intensional contexts, such as those governed by the verb "to want" (where what is wanted is some object or state of affairs), for which an alternative explanation is available, have to be interpreted as a quotation of the description which the agent has given or would give of his goal or objective in any case where they are combined with intensional contexts governed by a verb phrase such as "know" or "believe that" for which no alternative to the quotational theory is available.

Add to this the observation first made, to my knowledge, by Geach in his book *Mental Acts* (Geach, 1957, p. 8) to the effect that not only can no predictions about how someone is likely to behave be inferred from information about what he knows or believes to be the case, unless we are told something about what he wants, about his goals or objectives, but also, though here I extrapolate beyond what Geach actually says in *Mental Acts*, that no such predictions can be inferred from a knowledge of what someone wants, except in the special case of "wanting to do something", unless we are told something about what he knows or believes about the means by which he can hope to achieve what he wants. In the light of this observation, it becomes apparent that, apart from a few cases where we explain what someone does as "acting on impulse" or as "doing what he wants to do" or "enjoys doing", all intensional explanations of behaviour have to be interpreted as involving an implied quotation of what the agent has said, regularly says, or would say, if asked, about the situation confronting him and his goals and purposes with respect to it.

I suggest that in the light of these considerations we are compelled to conclude that intensionality-with-an-s when used in the explanation of behaviour, is a logico-grammatical device whereby what we may call the dispositional determinants of human behaviour are characterized in terms of the assumption of a consistent and rational relationship between what a human being does and what he or she has been told or instructed to do. The characterization of behavioural dispositions in terms of what the agent does or would say, if asked, is illustrated most clearly in the case of what philosophers call propositional attitudes, where what someone does is explained in terms of what he knows or believes about the situation confronting him and about the consequences of the various courses of action that are open to him in that situation. In this case we are characterizing the dispositional determinants of behaviour in terms of the various propositions about the situation confronting him which he either does, would, or could assert or assent to, if asked the appropriate questions, under conditions where he has no incentive to deceive his questioner as to the assumptions on which his decision to act either has been or will be made. In this case we characterize the proposition he is said to know or believe by means of an embedded sentence in the indirect or reported speech form introduced by the word "that". In other cases, we characterize the behavioural capacities and incapacities of the agent using words like "know", "remember" or "forget" followed by a clause in the indirect or reported speech form introduced by an interrogative pronoun such as "why", "which", "how", "whether", "when", etc., in which we are characterizing the individual's behavioural capacities in terms of the questions he can or cannot answer correctly.

In applying this analysis to the case where someone is described as "wanting something", it is important to distinguish between the case where what is wanting is some object or state of

affairs and the case where someone wants to do something. In describing someone as wanting some object or state of affairs, we are characterizing his behavioural propensities in terms of the kind of thing he would ask for, the kind of request he would make to someone who was in a position to supply him with an object or bring about a state of affairs answering to a description that he would give in thus specifying what he wants (Toulmin, 1960). "Wanting to do something", on the other hand, is more closely related to the case where someone is said to intend to do something, in that both serve to characterize the agent's behavioural propensities in terms of their relation to the kind of speech act of which the much discussed (Searle, 1969) speech act of promising is a special case, in which the speaker provides a signal to his audience indicating the action that he is about to attempt or will be attempting in the near future. In telling his audience what he wants to do his utterance functions partly as a warning of the behaviour to be expected from him and partly as a request not to impede his performance of that action. In stating his intention, the signal given is more in the nature of a promise than a warning, in that its normal function is to indicate whether and to what extent the agent is prepared to do what he has been asked to do, rather than to clear a path towards objectives of his own.

Another case which is perhaps not usually considered as an intensional concept, but which follows a very similar pattern is the concept of following a rule which, mainly through the influence of Wittgenstein (1953) has become the central concept in the philosophy of language and linguistic theory. In this case we are characterizing the behavioural dispositions of the agent, not, as in the case of "knowing", "believing", "wanting" and "intending" in terms of the relationship between what the agent himself says, or would be inclined to say, and what he does, but rather in terms of the relationship between what he does or is doing and the orders or instructions he has been given by others, or, in some cases, has given to himself. A rule, after all, in the primary sense of that word, is an imperative, not a particular imperative like "Shut the door", but a universal imperative like "Always shut the door when you come into the room", and to follow a rule is to conform to or obey such a universal imperative.

THE PRESUPPOSITIONS OF INTENSIONAL EXPLANATIONS OF BEHAVIOUR

If this account of intensionality is correct, it follows that when we use intensional concepts in giving an account of the behaviour of a living organism, we are making the following three assumptions:

1. That the individual whose behaviour we are talking about is a reasonably intelligent adult human being, whose verbal skills are such that he (or she) has the ability to make or assent to assertions about the situations confronting him, act on those assertions, answer questions, make requests, announce his intentions and follow rules and instructions given to him.

2. That the individual actually would say what we are implicitly claiming he would say in the case in question or in the case of rule-following that he actually has been or has given himself the relevant instructions.

3. That there is a causal connection between the way the individual behaves or is disposed to behave and what he is disposed to say or the instructions he has been given, in the sense that if he had not been disposed to say what he is in fact disposed to say or if he had not been given, or given himself, the relevant instructions, he would not have acted or been disposed to act in the way he is acting.

Now if these *are* the assumptions we are making in using intensional language in the description and explanation of behaviour, it follows that, provided that these assumptions hold, there can be no objection, scientific or otherwise, to the use of intensional language in the description and explanation of the behaviour in question. Equally, if any one of these assumptions does not apply to that extent, the use of intensional language in giving an account of the behaviour in question becomes problematic, to say the least. In other words, where we are dealing with the behaviour of adult human beings whose actions are determined by explicit decisions taken at some time in the past, of which they can give a reliable account when called upon to do so, there can be no possible objection to talking about such behaviour in the language of intensionality. On the other hand, there are obviously grave objections to the use of such language in talking about behaviour where the first of the assumptions I have mentioned does not hold, that is to say when dealing with the behaviour of animals, very young children, or cases of severe mental subnormality who can neither speak themselves nor, except in a very rudimentary way, understand what is said to them by others. The objections to the use of intensional language in such cases are, firstly, that it involves the introduction of the wholly fictitious assumption that an organism which manifestly cannot either speak or effectively understand any kind of human language can in fact do so, and secondly, and perhaps more importantly, that two vital checks on the accuracy of the assumptions that we make when we interpret the behaviour of a human adult in terms of his propositional attitudes, desires, intentions and rule-followings, namely our knowledge of what he has said and of what he has understood of what has been said to him in the past is wholly absent in such cases.

THREE PROBLEM CASES

The cases that present the greatest difficulty, however, are those which are in some way intermediate between these two extremes, as in the case of the child that is in the process of acquiring the verbal skills of the adult, but has not yet mastered them sufficiently for us to be entirely sure that to talk of its knowing, believing, wanting, intending, or rule-following has all and the same implications as it would have once these skills have been fully mastered.

Another kind of intermediate case is the irrational behaviour exhibited from time to time by otherwise intelligent adults which, if it persists, becomes the professional concern of the psychiatrist. In such cases, the assumption of a consistent and rational connection between what the patient says or has been told and what he does on which intensional explanations of behaviour are based breaks down, and the intensional account of such behaviour can only be retained by introducing the fiction of the unconscious mind which, if it could control the organs of speech, would say all those things which the patient's conscious mind does not and would not say, but which some other part of him must be supposed to be disposed to say, if we are to make any kind of sense of his behaviour in these terms.

A third intermediate case is of course, the case which concerns us here, the case of verbal behaviour itself. The problem here is that while there are rational and consistent relationships between *different* things that people say or are disposed to say, such that it is often possible to explain why someone said what he did in terms of what he knew or believed about the

consequences of his saying what he said and his purposes in saying it, any attempt to give a *general* account of why people say what they say in terms of the relationship between what they say on this occasion and things they would say or have been told on other occasions, is clearly circular, and viciously circular.

LINGUISTIC RULES - AN UNACCEPTABLE METAPHOR

The problem here is well illustrated by the well-known difficulties that arise in connection with the interpretation of linguistic competence in terms of the mastery of a set of rules. It is not just that we do not as a matter of fact have to learn a set of explicitly stated grammatical rules from a grammar book in order to learn how to speak and understand our native tongue correctly, we couldn't conceivably learn it in this way for the obvious reason that we couldn't understand the rules as set out in the rule book if we did not already understand the language in which those rules are expressed.

It is clear from this that the notion of a rule of language or linguistic competence as the ability to follow rules is a gigantic metaphor, a metaphor, moreover which is systematically misleading, insofar as it implies that in speaking and in understanding the speech of others, we are following a set of verbal instructions which we are not in fact following, which we couldn't follow unless we already had the necessary linguistic competence, and which in many cases not only have never been, but never could be formulated.

It may be argued, of course, that when linguists and philosophers talk about "linguistic rules", they are not using the term "rule" in its original and literal sense of a universal imperative, but in a special technical sense, in which a rule can be said to exist and be followed without there being any actual imperative sentence which has been, or conceivably could be, uttered in the sight or hearing of the person who is said to be following the rule. But if this is what is claimed, it is up to those who claim to use such a notion to make clear what they mean by this mysterious notion of following an unstated and often unstateable rule.

When we try to do this, it appears that what those who use the word "rule" in this curious way have in mind is a contrast between two kinds of consistency, regularity or correlation to be found in the world around us. On the one hand there are so-called laws of nature which admit of no exception, we know that our existing formulation of the law must be wrong. On the other hand there are man-made laws or rules which, although they apply universally without exception to every case, do admit, in a way that the laws of nature do not, of being broken in practice. Now it is clear that if we are compelled to decide with respect to the kind of consistency or regularity that is to be found in language and on which its intelligibility depends, between classifying these regularities as laws of nature on the one hand or as man-made laws and rules on the other, we are bound to put them in the man-made rule basket rather than in the law of nature basket, partly because language is an artifact and peculiarly a human artifact, partly because the rules vary from one social group to another in much the same way that the laws and customs vary from one social group to another, but above all because the notion of breaking the rule, of making a mistake, of getting it wrong, has purchase in the case of the unstated rules of language in a way that it does not have purchase in the case of the laws of nature.

But why should we be forced onto the horns of this dilemma? Are there not in fact many other kinds of regularity that we encounter in the world which are neither manifestations of the laws of nature nor products of explicitly formulated rules and laws? What about behavioural dispositions, things like habits and motor skills? The analogy between linguistic competence and a motor skill like swimming, shooting, knitting, typing, driving a car or playing tennis, is

particularly close. There is no law of nature which determines the consistency with which a skilled tennis player exercises his skill. Nor does that consistency preclude the possibility of his sometimes making a mistake. Yet in making a mistake, he does not have to be breaking any explicitly stated rule or instruction that he has been given at some time in the past. Explicitly stated rules and instructions often play a useful role in the acquisition of a skill, but they are not essential. At best they play an ancillary role to practical example and demonstration and above all, practice. Using the language of intensionality, we talk about the possession of a motor skill as knowing how to do something, as if to be able to give a verbal account of how one goes about doing something were a necessary and sufficient condition of being able to do it, when in fact it is neither.

In all these respects, the acquisition of linguistic competence is much more like acquiring a motor skill than it is like learning to conform to a set of rules or instructions. There is, however, one respect in which the acquisition of linguistic competence is more like learning to obey a set of explicitly stated rules, namely that whereas, in acquiring a skill like tennis-playing, it is primarily the mechanical relationships between the movements of the body and the racquet in relation to the movement of the ball which determine whether or not a successful performance is achieved, the conditions for successful performance in verbal communication is determined by social custom and convention. The mechanics of verbal communication require that the units of verbal communication, the different words, be clearly distinguishable from one another by their sound, or in the case of writing, by their visual appearance, and that each such word shall have a specific function or a limited number of clearly distinguishable functions or meanings which do not vary significantly from speaker to speaker within a given linguistic community. But which sound combinations are used for which functions is wholly arbitrary from the point of view of the mechanics of communication and is decided in practice by slowly changing customary usage. It is this feature, together with the fact that this body of customary usage permits of being written down and tabulated in the form of dictionaries and grammar books, which makes the rule-following metaphor so tempting in this case.

In his book *Convention* (Lewis, 1969) and in a subsequent paper (Lewis, 1975), David Lewis has presented an account of what he prefers to call "linguistic conventions" which meets almost all the objections raised above to the notion of "linguistic rules"; and although, as Lewis himself recognizes, the term "convention" is misleading, insofar as it implies some kind of explicit agreement between the parties concerned to adopt a particular convention, it seems to me that to speak of social norms or conventions is the least objectionable way of talking about the unstated and often unstateable patterns of social conformity of which language provides the most striking example.

On the other hand, although it meets the objection that following a linguistic rule is not a matter of obeying any explicitly stated universal imperative, Lewis's elegant account of linguistic conventions, both in its original (Lewis, 1959) and revised (Lewis, 1975) form, fails to meet the more general objections raised above to the use of intensional concepts in the explanation of verbal behaviour. The reason for this is that two basic constituents of Lewis's theory are (a) a belief on the part of members of a given linguistic community that all members of that community conform to the convention in question and (b) the motive to likewise conform to the convention which is supplied *inter alia* by that belief. But if, as I have argued, believing that *p* presupposes that the believer would assert the proposition he believes under appropriate circumstances and if, when combined with the attribution of a belief, the attribution of a desire or motive to someone presupposes that the agent would, under appropriate circumstances, be able to specify the conditions under which his desire would be satisfied, it follows that Lewis's theory not only fails to avoid the basic objection to all intensional explanations of language behaviour that such

explanations of linguistic competence presuppose the very abilities they purport to explain, it also fails to meet the specific objection to the rule-following account of language namely, that linguistic rules or conventions are not only unstated, but often in principle unstateable.

MOLAR AND MOLECULAR EXPLANATIONS OF VERBAL BEHAVIOUR

It is conceivable that in the case of the concept of following a rule and, perhaps, in the case of other intensional concepts, it may ultimately prove possible to provide an operational definition of such concepts in extensional terms, so that the vicious circularity of explaining verbal behaviour by means of concepts which imply an existing linguistic competence, on the part of the speaker or listener, can be avoided. Something like this has already been achieved in the case of the concept of "a bit of information" as defined within information theory and that of "a choice" or "decision" as defined within decision theory. In the case of "a bit of information", as defined for the purpose of information theory, it no longer makes sense to ask what such a particular bit of information provides information about; nor does the making of a choice or decision in decision theory imply a subsequent intention to bring about what one has decided to do, as it does when used in its ordinary nontechnical sense.

But although such "extensionalised" intensional concepts and the theories to which they belong have proved immensely valuable in developing theoretical models of the brain mechanisms involved in the control of behaviour (Broadbent, 1958, 1971) experience has shown, so it seems to me, that such concepts and theories are quite unsuited to the description and explanation of behaviour at the molar level, where the intensional concepts from which they derive belong. A striking example of this failure of extensionalised intensional concepts to cope with the phenomena of behaviour at the molar level is the failure of Donald Davidson's attempt to apply decision theory to the actual choices made by human subjects which led him to abandon his incursion into experimental psychology in disgust (Davidson, 1976).

This raises an important issue which needs to be discussed before the need for a theory of language such as Skinner presents in *Verbal Behavior* can be established beyond doubt. For it has been suggested by a long line of experimental psychologists, of whom Karl Lashley (1929) was perhaps the first, that the only profitable way to account for the phenomena of organic behaviour in general and verbal behaviour in particular (Lashley, 1951) is in terms of the physiology of the central nervous system and its most important ganglion, the brain. This view, as applied to the special case of linguistic behaviour, has been endorsed by Chomsky both in his review of *Verbal Behavior* (1959) and elsewhere (Chomsky, 1967).

It is often suggested that an explanation of behaviour in neurophysiological terms is an alternative to and is in direct competition with the kind of analysis of behaviour in terms of stimulus, response and reinforcement which is offered by Skinner and this view is itself reinforced by Skinner's refusal to allow any role for speculation about hypothetical neural events in a scientific explanation of behaviour (Skinner, 1953, pp.27-29).

In my view there is a place for both types of explanation, whether in the explanation of behaviour in general or in the explanation of linguistic behaviour in particular and each type of explanation has its distinctive role and function to perform which is complementary to, rather than in competition with, that of the other. In order to appreciate what these different functions are, we need to draw a distinction between two fundamentally different types of scientific explanation, the molar explanation, of which Skinner's explanations of behaviour in terms of controlling variables in the environment are an instance, and molecular explanations, as when we explain behaviour in terms of the neurological mechanisms involved in its production.

The molar-molecular distinction has been drawn in a number of different ways since it was first introduced by the philosopher C. D. Broad in his book *The Mind and its Place in Nature* (Broad, 1925). But although, in the sense in which I want to use it, it is a distinction which has application to any field of scientific research and theory construction, the molar-molecular terminology has had little currency outside the context of discussion in which Broad first introduced it, that of behaviourism and the description and explanation of the behaviour of living organisms.

When he introduced the distinction in 1925, Broad was discussing behaviourism considered as the theory that mental processes are a form of behaviour. Within behaviourism in this sense, he distinguishes two positions (a) Molar Behaviourism, which holds that mental processes consist entirely in some form of muscular movement and (b) Molecular Behaviourism, which extends the concept of behaviour to include neural events as well as muscular movements, which identifies mental processes with these neural events rather than with the muscular movements they control and is thus indistinguishable from the view of the nature of mental processes which Broad calls "Reductive Materialism".

The molar-molecular distinction was first introduced into the mainstream of psychological theory by Tolman (1932). Tolman, however, uses the terminology in a rather different way from that of Broad. In contrasting molar and molecular behaviourism, Tolman is concerned not, as Broad is, with behaviourism as a theory about the nature of mental processes, but with behaviourism as a methodological programme within psychology which takes the publicly observable behaviour of organisms as the primary datum to be observed, described and explained. Within behaviourism, so understood, Tolman distinguishes two ways of analysing and describing the behaviour which the behaviourist sets out to observe and explain. Molecular Behaviourism, according to Tolman, is the kind of behaviourism which analyzes behaviour into a series of muscular movements, glandular secretions, and the neural events controlling those movements and secretions. Molar Behaviourism, on the other hand, is concerned with behaviour considered as an "emergent whole" of which the muscular movements, glandular secretions and neural events are the constituent parts and which has descriptive properties of its own, such as goal-directedness, which cannot be wholly accounted for in terms of the properties of its constituent parts.

Tolman's account of the molar-molecular distinction unfortunately confuses two different distinctions. The first is the distinction between two different ways of analysing and describing the behavioural phenomena, the molecular description in terms of a pattern of effector activity, muscular movements and glandular secretions, and the molar description of behaviour which describes behaviour in terms of the topography of the environmental situation in which it occurs. Although the molecular description in this sense involves going inside the skin of the organism to examine the reactions of particular muscles and glands, neither the molar nor the molecular description requires any reference to the neural processes intervening between physical stimulus input on the one hand and effector output on the other. In this sense the distinction is close to, if not identical with, both the distinction drawn by many contemporary philosophers between action (molar) and movement (molecular) and that drawn by Skinner (1938) between operant (molar) and respondent (molecular) behaviour.

The distinction, which Tolman confuses with the action-movement, operant-respondent distinction, is a distinction, not between two ways of analysing or describing behaviour, but between two ways of explaining behaviour. A molar explanation in this sense is one in which the behaviour of entity is explained by reference to the dispositional properties of the entity itself considered as a whole, in contrast to a molecular explanation in which the behaviour of an entity is explained in terms of the properties of its constituent parts. It is in this sense that an explanation

of behaviour in terms of the supposed or known properties of the neural mechanisms involved is a molecular explanation, whereas both the standard intensional explanation of human behaviour in terms of what the agent believes, wants and intends, and Skinner's explanation in terms of the control of behaviour by its environmental antecedents and consequences are molar explanation. This is also the sense in which I propose to use the molar-molecular distinction for our present purposes.

The different functions of molar and molecular explanations can be illustrated by considering an example which has been repeatedly used in philosophical discussions of the explanatory function of dispositional concepts (Ryle, 1949; Geach, 1957), the example of the brittleness of glass. The brittleness of glass comes, as it were, in two forms: brittleness as a characteristic of glass in general, and the particular degree of brittleness that is characteristic of a particular piece, specimen, or variety of glass. Moreover, both the brittleness of glass in general and the particular degree of brittleness characteristic of a particular piece of glass can occur either as the thing to be explained, or as part of an explanation of something else. A molecular explanation, which in this context would be an explanation in terms of the properties and arrangement of the actual molecules of which glass is composed, is appropriate when what is to be explained is either (a) the brittleness of glass in general or (b) the brittleness of a particular piece or variety of glass, where this is either unusually or abnormally brittle or unusually or abnormally tough. If however, what is to be explained is either (a) the brittleness of a particular piece or variety of glass, where this is within normal limits or (b) the fact that a particular piece of glass cracked or shattered or failed to crack or shatter on a particular occasion, a molecular explanation in terms of the molecular constitution of the glass would be entirely beside the point. What is wanted here is a molar explanation which in the case of the brittleness of a particular piece of glass would consist of a historical account of how glass of the particular brittleness in question came to be used for that particular purpose, or, in the case of the brittleness of a particular variety of glass, in a historical account of how a piece of glass of that degree of brittleness was manufactured and how and why it came to be selected for production and sale, and, in the case of the particular piece breaking or failing to break, in an account of the relevant causal factors, one of which is the particular degree of brittleness of the piece of glass in question.

The analogy between the kinds of explanation we give of the brittleness and breaking of glass and those that we give of different aspects of verbal behaviour is exact. A molecular explanation, this time in terms of the brain mechanisms involved, is called for when what is to be explained is either (a) the capacities and limitations of human language users in general with respect both to the interpretation and generation of meaningful sentences, regardless of the particular natural language involved, or (b) the linguistic capacities and limitations of particular individuals where, as in dysphasia, there is abnormal functioning due to brain damage or to some sensory or motor defect. If, however, what is to be explained is either (a) some peculiarity in the linguistic habits and dispositions of the individual or of a particular linguistic community where these peculiarities are not due to any kind of sensory, motor or brain defect, or (b) the fact that a particular individual said what he did or understood, misunderstood or failed to understand what was said to him on a particular occasion, a molecular explanation in terms of the underlying brain events and brain mechanisms involved would be entirely beside the point. What is wanted here is an explanation in molar terms which, in the case of linguistic habits peculiar to individuals or groups, where these fall within normal limits, would consist in a historical account of what Skinner would call the "reinforcement history" of the individual or group in question, and in the case of the particular utterance, would consist in an account of the precipitating causal factors amongst

which would always be the particular linguistic habits and dispositions of the individual concerned.

In giving a molar explanation of the particular linguistic habits of individuals and groups where these fall within normal limits and in using these linguistic habits to explain what is said or understood by particular individuals on particular occasions, as well as in describing the linguistic capacities and limitations both of language users in general and of those whose language functions have been disrupted by sensory, motor or brain defects, before trying to explain those capacities and limitations in molecular terms, a molar language is needed in terms of which the linguistic capacities and propensities of the individual language user can be characterized.

In everyday life the molar language we employ in characterizing the linguistic capacities and propensities of language users is the language of intensionality. We talk about the speaker knowing how to put into words the idea that he wants to express, or about his intention in saying what he says, about the assumptions that the listener has to make about what the speaker knows, believes, wants or intends, in order to interpret what he says, etc., etc. But as we have seen, the use of intensional language in order to describe the linguistic dispositions of the language user involves the circularity of characterizing the capacities of a language user in terms of what he is disposed to say or, as in the case of following a rule, what has been said to him.

For most practical purposes, the circularity involved in describing the linguistic capacities and propensities of a language user in terms of other linguistic capacities which can be plausibly attributed to him need not concern us, provided it helps us to explain and predict what a speaker says and a listener understands. But for theoretical and scientific purposes where accuracy, precision and the avoidance of misleading implications are important, we cannot justifiably condone the circularity involved in describing and explaining the linguistic skills of the language user in a molar language which presupposes that the language user already possesses those skills whose possession by the language user is to be described and explained. For such purposes we need a nonintensional molar language in which to describe and, where a molar explanation is appropriate, to explain, the linguistic skills and habits of the language user.

That, as I see it, is what Skinner has attempted to provide in his book *Verbal Behavior* and that is why, in the absence of any visible alternative to it, we need what Skinner has attempted to provide.

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