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Author: Ullin T. Place, University of Leeds, England.

Introduction

Behavioural Contingency Semantics is a semantic theory in the sense in which that term is used by Morris (1938) when he defines *semantics* as the study of the "relations of signs to the objects to which the signs are applicable", or by Carnap (1942) when he defines it as the analysis of the relations between "expressions and their designata". It brings together two theories of meaning both of which are widely supposed by students of language to have been decisively refuted and to be flawed beyond any hope of redemption. One is the tradition in logic and the philosophy of language represented by the Correspondence Theory of Truth, Russell's Logical Atomism and Wittgenstein's (1922) Picture Theory. The other is the account of language presented by the behaviourist psychologist B. F. Skinner in his book *Verbal Behavior* (1957) known to many only as the subject of a devastating review by the linguist Noam Chomsky (1959).

It was argued by Place (1981a) that a non-mentalistic account of language such as that given by Skinner is needed in order to avoid the vicious circle whereby the initial acquisition of linguistic skills by the child is explained on the implicit or, in the case of Fodor (1978), explicit assumption that it already possesses those skills. It was subsequently argued (Place, 1981b) that Skinner's account, as it stands, suffers from two fundamental defects, (a) his failure to draw the important distinction between words and sentences as units of verbal behaviour and (b) the inadequacy of his account of the control exercised by verbal stimuli over the behaviour of the listener. Behavioural Contingency Semantics was introduced (Place, 1982) in the attempt to rectify these defects in Skinner's account of language by proposing that in putting words together to form a grammatically well formed and intelligible sentence a speaker is constructing what may be described metaphorically as a picture or a map. This picture or map is a picture or map not of an actual or putative fact, as proposed by Russell and Wittgenstein, but of a part or, in some cases, the whole of what Skinner (1969) calls a *contingency*.

1. *Contingencies and the Analysis of Behaviour.* A contingency in Skinner's sense is a causal relationship which holds between, on the one hand, what he calls *the emission of an operant*, i.e. something which someone or something does or might do, and the effects or consequences of that behaviour on the other. According to the so-called *Law of Effect* (Thorndike 1911) which is the basis of Skinner's account of instrumental or, as he calls it, *operant* learning, the propensity of a living organism to emit a particular operant, i.e., behave in a particular way, is either strengthened or weakened by the effects or consequences which behaving in that way has had in the past. If the

effect of a given consequence is to strengthen the propensity to emit the operant in question in future, the behaviour is said to be *reinforced* and the contingency to be *a contingency of reinforcement*. If, on the other hand, the consequences of emitting an operant tend to weaken the propensity to emit the behaviour in future, the behaviour will be said, following the usage proposed by Harzem & Miles (1978), to be *disinforced* and the contingency to be *a contingency of disinforcement*.

Every contingency, as it affects the behaviour of a particular organism, is either a contingency of reinforcement whereby the behavioural propensity in question is strengthened or a contingency of disinforcement whereby it is weakened; though which it is depends on the *motivational attitude* of the organism in question to the consequences in terms of which the contingency is defined. Motivational attitudes to the consequences in terms of which a contingency is defined may vary both from individual to individual and, for the same individual, from occasion to occasion according to the principle whereby "one man's meat" can be and often "is another man's poison".

2. *Shaping and Discrimination Learning*. Learning, as construed on this view, is always a matter of learning the contingencies that are operating within the environment in which the organism in question finds itself. Contingency learning, however, involves two distinct stages. The first stage is the *shaping* stage in which behaviour is gradually moulded by repeated exposure to a particular contingency in such a way as to fit both the objective temporal and topographical characteristics of the contingency and the *subjective* (in the sense of depending on the current state of that particular organism) motivational attitude of the organism to the objective consequences in terms of which the contingency in question is defined. The second stage is the stage of discrimination learning in which an organism learns to emit behaviour appropriate to a particular contingency when and only when a *discriminative stimulus* (S^D) is present which has been consistently associated with that contingency in the past and to omit the behaviour in the presence of a stimulus (S^A) which has been consistently associated with its absence.

In contrast to shaping, where the kind of behaviour that is shaped by the contingency depends crucially upon whether the contingency is a contingency of reinforcement or a contingency of disinforcement, the behaviour elicited by a discriminative stimulus is not tied in the same way to the behaviour that has been emitted in its presence in the past. In discrimination learning what is learned is the threefold relationship between (1) the stimulus, (2) the behaviour and (3) the objective consequences of the behaviour when emitted in the presence of the stimulus, regardless of the current motivational attitude of the individual to those consequences. Consequently a stimulus which has been consistently associated in the past with the reinforcement of approach behaviour may nevertheless elicit avoidance behaviour, if there is a change in the individual's motivational attitude to the consequences of approach behaviour in these circumstances such that the consequences which were previously reinforcing (i.e., pleasant or attractive) have now become disinforcing (i.e., aversive or repulsive) and *vice versa*.

3. *Language Learning*. The distinction between shaping and discrimination learning has important consequences for our understanding of the process whereby the child acquires its initial verbal skills. For whereas the process whereby the child learns to respond to verbal stimuli in its capacity as listener is evidently a form of discrimination learning, the process whereby the child acquires its initial capacity to emit verbal behaviour in its capacity as speaker is, and necessarily must be, a process in which behaviour is shaped by repeated exposure to the relevant contingencies. Furthermore, although learning to respond to verbal stimuli in one's role as a

listener is a form of discrimination learning, like other forms of discrimination learning it necessarily presupposes a previous exposure to and consequent shaping of behaviour by the contingencies whose presence the individual thereby learns to discriminate.

There is however, an important difference between learning to understand a first language in one's capacity as a listener and other forms of discrimination learning. For whereas in most other forms of discrimination learning each effective discriminative stimulus has been consistently associated as a complete unit with a single contingency or contingency type, in the case of verbal stimuli the effective discriminative stimuli are *sentences* which, for the most part, have never, as such, been previously associated with the contingencies for which they nevertheless act as discriminative stimuli. It is *sentence patterns* rather than sentences as such which are consistently associated with types of contingency and certain *words* which are consistently associated with features which recur as elements in variety of different contingencies.

4. *Sentence Construction and the Representation of Contingencies.* Conceived in this way, language may be compared to a child's construction kit in which a finite number of element types (words in the speaker's vocabulary) can be put together in accordance with the *conventions* accepted within and maintained by the *verbal community* to which the speaker belongs so as to form an infinite number of different possible sentences. Each of these sentences, when uttered in the appropriate context, is capable of acting as a discriminative stimulus for the same kind of contingency for every competent listener who is a member of the verbal community for whom those sounds or marks on paper constitute a well formed sentence.

Although words only act as effective discriminative stimuli for particular contingencies in so far as they form part of what, in terms of the conventions endorsed by the verbal community, is a well formed sentence, it is words and patterns of sentence construction rather than sentences as such which are repeatedly uttered by speakers and responded to by listeners. It is also words and sentence patterns rather than sentences that are repeatedly and consistently associated, in the case of words, with recurrent elements involved in and, in the case of sentence patterns, the common temporal and topographical structure of different contingencies and contingency types. It is this that enables a speaker to construct sentences that are intelligible to any competent listener who is a member of the verbal community concerned, despite the fact that the listener has not only previously encountered that precise combination of words and sentence pattern, but has never previously encountered the precise contingency for which the sentence nevertheless acts as a discriminative stimulus.

On this theory, when words are put together in accordance with the conventions endorsed by the verbal community so as to yield a grammatically well formed sentence, they acquire the collective ability to act as a discriminative stimulus with respect to a particular contingency by virtue of an *isomorphism*, i.e. an identity of form or pattern, between the structure of the sentence on the one hand and the structure of the contingency which it *maps onto* on the other. When uttered in the appropriate context, a sentence which maps onto an identifiable contingency in this way may be said to 'depict', 'describe' or 'specify' the contingency .

5. *Atomic Sentences and the Legs of a Contingency.* In Behavioural Contingency Semantics an *atomic sentence* is a simple sentence like *The cat is on the mat* consisting of a verb phrase (*is on*) and one or more noun phrases (*The cat, the mat*) where the noun phrases designate concrete objects (Aristotle's 'primary substances', i.e., living organisms and inanimate material objects) and the verb phrase some change or persistence in the properties of or the relations between the objects designated by the noun phrase(s).

Every atomic sentence in this sense which, when uttered in the appropriate context, is semantically effective (i.e., it conveys something to the listener) maps onto and thus specifies one and only one of the three components or *legs*, as I propose to call them, into which, according to Skinner (1969), every contingency can be analysed. The three legs of a contingency are identified by the mnemonic *ABC* standing for *Antecedents, Behaviour and Consequences*. These correspond to the three components of a causal relationship in which the effect is an event rather than the persistence of a state of affairs. Thus Skinner's Antecedents correspond to the *standing preconditions* like the dryness of the match which is a precondition of its lighting. The Behaviour to be emitted corresponds to the *triggering event* (the striking of the match against the sandpaper) which completes the set of causal conditions which are jointly sufficient for the coming about of the effect. While Skinner's Consequences correspond to the effect (the igniting of the match) which is produced by the triggering event given the fulfillment of the relevant preconditions.

Examples will be given both of atomic sentences which specify each of the three legs of a contingency and of compound conditional sentences constructed from them which specify two or all three legs and their contingent relationship to one another.

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