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Behavioral Contingency Semantics and the Correspondence Theory of Truth

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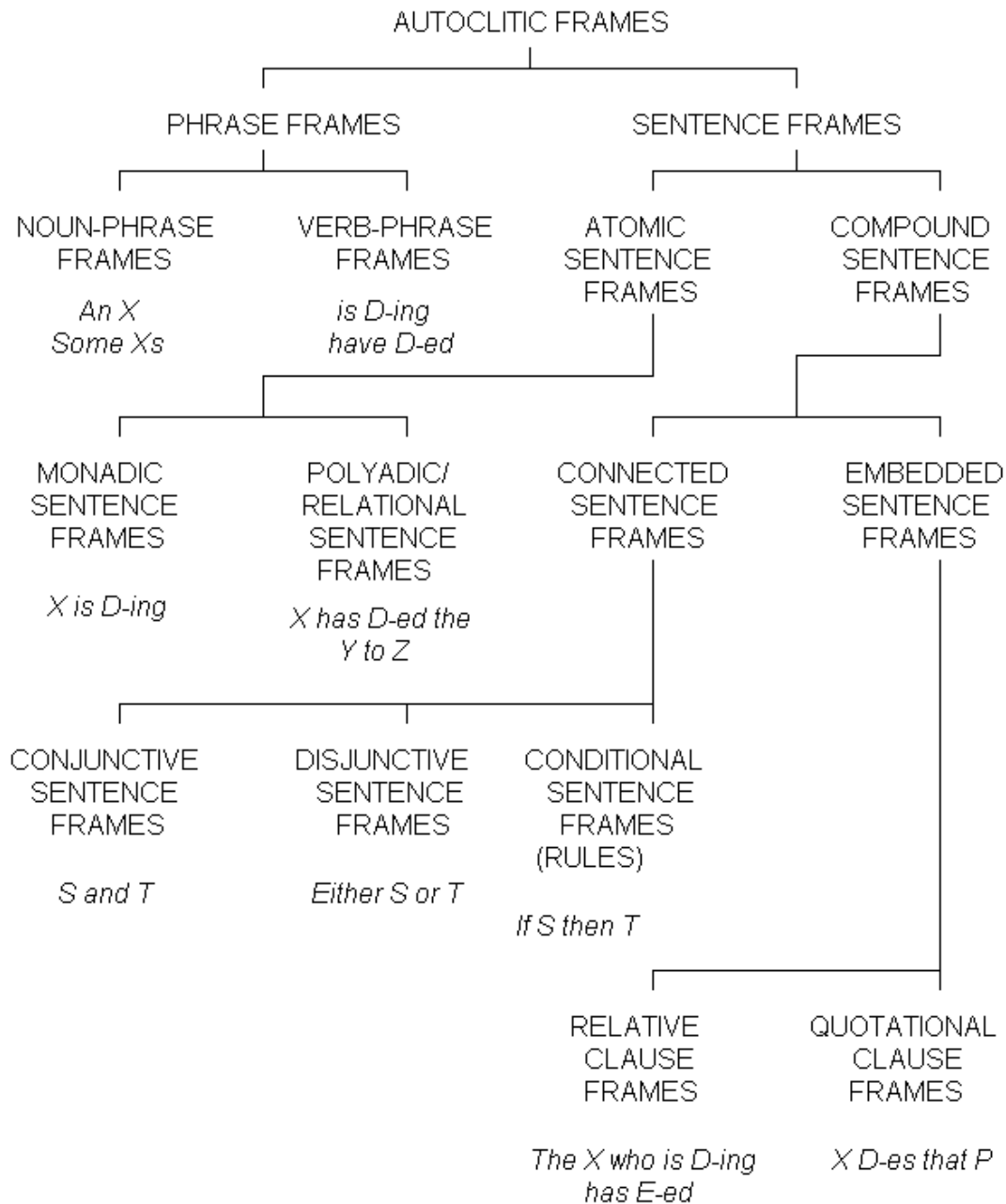
This paper falls into two parts. The first part gives an exposition of what I call "Behavioral Contingency Semantics". The second part examines one of the implications of Behavioral Contingency Semantics, namely, its commitment to a version of the Correspondence Theory of Truth.

Part 1. Behavioral Contingency Semantics

It is now generally accepted by behavior analysts that the effect of a discriminative stimulus is to orientate the behavior of an organism towards the possibility of encountering a particular contingency or type of contingency, where a contingency is defined as a state of affairs whereby, given certain antecedent conditions, behaving in a certain way will have or is liable to have a particular consequence or set of consequences. What is, perhaps, less widely accepted is that the nature of the behavior emitted by the organism, when its behavior is controlled by a discriminative stimulus, depends on the organism's current motivational attitude towards the anticipated consequences of the behavior in terms of which the contingency is defined. The operation of this principle has been demonstrated by Adams and Dickinson (1981) who showed that if a rat's lever-pressing response is reinforced by the opportunity to eat a particular foodstuff and that foodstuff is then subject to a taste aversion procedure outside the lever-pressing situation, lever-pressing is suppressed by the contingent presentation of the devalued foodstuff despite the fact that the rat has never experienced the taste aversion procedure as a consequence of lever-pressing. [the wording of this sentence is slightly changed by the author after publication]

Given this account of the control exercised by discriminative stimuli over behavior, Zettle and Hayes in their 1982 paper on 'Rule-governed behavior' raise a question as to the difference between the stimulus control over behavior which is exercised by a "rule" in the sense which Skinner uses that term in his 'Operant analysis of problem solving' (Skinner 1966/1988) and the kind of control that is exercised by discriminative stimuli which do not qualify as rules in Skinner's sense. According to Skinner, a rule is "a contingency-specifying stimulus"; though, as Zettle and Hayes point out, he does not explain what he means by the verb "to specify", either in this context or in *Verbal Behavior* (Skinner 1957) when he speaks of the mand as verbal behavior which is reinforced when the behavior which it "specifies" is emitted by the listener.

From the fact that for Skinner both rules and mands are varieties of verbal behavior (from the standpoint of the speaker) and verbal stimuli (from the standpoint of the listener), it is safe to conclude that the verb "to specify" connotes some distinctive feature of the control exercised by verbal discriminative stimuli over the behavior of the listener. But since Skinner, on his own admission (Skinner 1989), has had little to say hitherto about the response of the listener, we are left very much to our own devices in trying to work out what difference, if any, there is between verbal and non-verbal discriminative stimuli, between those that do and those that do not "specify" the contingency to the possibility of encountering which they orientate the responding organism.

Table 1

I hold that the kind of stimulus which "specifies a contingency" is always a string of what are recognizable by a competent listener as words in a particular natural language which together constitute a sentence in that language. By linking words together in accordance with the conventions of sentence construction, a speaker is able to depict or represent to the listener a contingency the like of which the listener may never have personally experienced. It is within this context of novel sentence construction that I would place Hayes' (1991) concept of

"a relational frame." Construed in this way, a relational frame is a class of relational or polyadic sentences all of which depict a relation between the same number of terms and from which the same pattern of relational inferences can be deduced. A relational frame in this sense has a place in a conditional discrimination learning task (the context in which Hayes introduces the term) only in so far as such sentences are used by the subject to formulate the contingency imposed by the experiment¹.

Table 2

Verb + Qualifying Autoclitic(s)	= Verb Phrase
Noun + Quantifying Autoclitic	= Noun Phrase
Verb Phrase + Relational Autoclitic(s) + Noun Phrase(s)	= Atomic Sentence
Atomic Sentence + Manipulative Autoclitic(s) + Atomic Sentence	= Compound Sentence

In this view, relational frames are construed as a special case of the more general category of *simple or atomic sentence frame* which includes single place or monadic predicate frames like *X is bald* as well as polyadic or relational predicate frames like *X is the same as Y* or *X is the opposite of Y* etc., and these in turn as instances of the still more general category of *autoclitic frames*² which includes phrase frames and compound sentence frames. The proposed hierarchical organisation of the different types of autoclitic frame is set out with appropriate examples on Table 1. What I am suggesting here is that autoclitic frames of which I take relational frames to be a sub-variety need to be understood in terms of the process which is familiar to us from the work of grammarians and linguists over the centuries, and more recently from the work of Chomsky (1957, etc.) and his followers, whereby words are put together to form phrases, phrases are put together to form the simple sentences which predominate in ordinary conversation and form the clauses which go to make up the compound sentences which predominate in literary and scientific texts. Construed in this way, we can understand an autoclitic frame as an abstract structure to which a phrase or sentence must conform, if the resulting sentence is to exercise effective discriminative control over the behavior of the listener, and the autoclitic as the glue which, as it were, sticks the structure together. I have tried to set out these relationships in Table 2.³

1. This is not Hayes' concept of 'relational frame'. For him, a relational frame is a pattern of spontaneous generalization on a conditional discrimination learning task of which *stimulus equivalence*, as defined by Sidman (Sidman 1971; Sidman and Tailby 1982), is a special case. According to Hayes (1991; see also Steele & Hayes, 1991), patterns of spontaneous generalization are found which conform to relations other than equivalence, such as 'different from' or 'is a cause of'. Both Sidman and Hayes would reject the implication of the present analysis that such generalizations are based on a verbal construal of the relation between the stimuli.

2. Skinner's (1957, p. 336) introduction of this term accords with the standard usage of the term 'frame' in grammar. A 'frame' is defined by Crystal (1985) in his *A Dictionary of Linguistics and Phonetics* as "the structural context within which a class of items can be used. For example the frame *He saw -- box* provides an environment for the use of determiners (*the, a, my, etc.*)." Crystal's example is a sentence frame. Skinner's example of an autoclitic frame ("*the boy's _____*") is a noun-phrase frame.

3. Skinner's "descriptive autoclitics" (Skinner 1957 pp. 313-320) are not included in Table 2. A descriptive autoclitic, in these terms, is a quotational-clause frame in which the speaker's identifying indexical ("I") occupies the subject position in the main clause. In this case, however, what is syntactically the embedded subordinate clause is not a quotation, as it is when the subject is in the third person. It is rather a disguised main clause in which the speaker makes

Behavior analysts who are accustomed to thinking about verbal behavior in functional or, as the linguists would put it, in pragmatic terms are inclined to become impatient when these abstract structural features of language are discussed. In particular they resent the negatively prescriptive attitude traditionally adopted by the grammarian towards utterances which are functionally effective, but which break one or other of the accepted "rules" of "correct" literary speech. But underlying the niceties of correct literary speech there is a complex set of syntactic and semantic conventions to which the speaker must conform, if his or her utterances are to exercise effective discriminative (semantic) and establishing (pragmatic) control over the behavior of the listener. I use the word "convention" here rather than the word "rule", because "a rule" in Skinner's sense of that word is a verbal formula or sentence, whereas these patterns of socially reinforced behavior need not be, seldom are, and in some cases could never be formulated in words.

In order to breathe life and function into the bare bones of syntactic structure, we need to appreciate that, by conforming to the syntactic and semantic conventions of a natural language, the speaker is able to construct an infinite variety of novel sentences and, by so doing, to control the behavior of any listener, provided he or she is a member of the verbal community within which that set of conventions is reinforced, in an infinite variety of subtle ways.

There are, it is true, a number of signs, gestures and conventional utterances which perform an indispensable role in verbal communication, but which either have no discernible syntactic structure, like nodding the head and uttering *Mnhmm* as an expression of agreement or shaking the head and uttering *Uhuh* as an expression of disagreement, or which *have* a syntactic and semantic structure, but one which has become stereotyped and ossified to the point where its literal meaning has ceased to determine its function. The sentence *How d'ye do?*² is a case in point. At one time this sentence was a question used to inquire about the listener's state of health. It is now, and has long been, a conventional response on the part of someone who has just been introduced to a stranger, requiring no response on the part of the listener other than participating in the proffered hand shake and, perhaps, a muttered *How d'ye do?* in return.

These non-sentential signs and stereotyped sentences perform important establishing, reinforcing and disinforcing functions in verbal interactions. What they do not do is exercise any precise discriminative stimulus control over the behavior of the listener. In particular they do not enable the speaker to instate behavior which the listener has never before emitted or convey information to the listener about contingencies which he/she has never previously encountered. In order to do *that*, the speaker must put words together in accordance with conventions which are selectively reinforced within the relevant verbal community in such a way as to form a string which constitutes a semantically coherent and syntactically complete sentence.

The fact that the listener can often anticipate the drift of the speaker's sentence before it reaches the conclusion that syntax demands in no way alters the fact that only a semantically coherent and syntactically complete sentence can be relied on to exercise effective discriminative control over the behavior of any competent listener who is a member of the verbal community constituted by speakers and interpreters of the natural language or code to which the sentence in question belongs. Moreover, only by constructing a new sentence on each occasion of utterance can the speaker exercise the kind of discriminative control over the behavior of the listener which does not rely, as do other forms of discriminative control, on a past history of an association between stimuli resembling the currently controlling discriminative stimulus and the contingency towards the possibility of encountering which the behavior of the organism is thereby alerted.

It is true, of course, that the more common "tact"⁴ or "lexical" words, by which I mean the more common nouns, verbs, adjectives and adverbs, have been repeatedly associated in the listener's past history with contingencies involving the kinds of object, event or property which they are said to "connote". It is likewise true that the various sentence frames which individual sentences instantiate have been repeatedly associated in the listener's past history with recurrent patterns which are common to a wide variety of different contingencies or contingency terms. Nevertheless in most cases the particular combination of a particular sentence frame with a particular set of lexical or "tact" words which fill the gaps or

an assertion and uses what is syntactically the main clause as an autoclitic device to indicate the confidence with which the assertion is made or otherwise modify its effect on the listener.

4. For this use of Skinner's term "tact" see Place 1985.

"argument places" in the frame is one which has never previously occurred in the past history of the listener and, consequently, has never previously been associated in the course of that history with the contingency to the possibility of encountering which the listener is nevertheless alerted.

This ability of novel sentences to act as discriminative stimuli for the listener with respect contingencies the like of which he or she has never previously encountered is explained by means of the principle which I have referred to elsewhere (Place 1983) as "Behavioral Contingency Semantics". This is a version of Wittgenstein's (1921/1971) Picture Theory of the meaning of sentences according to which a sentence is a kind of map or plan which depicts or represents or purports to depict or represent either an actual situation which currently exists or has existed in the past or one whose future existence is either predicted or demanded from the listener.

The concept of a "situation" which I have used in this definition comes from the so-called "Situation Semantics" which has been developed in recent years by the American philosophers Jon Barwise and John Perry, the most accessible account of which is to be found in their (1983) book *Situations and Attitudes*. For Barwise and Perry situations are of two kinds, *states of affairs* in which one or more properties of an entity and/or relations between two or more entities remain unchanged over a period of time and *events* in which the properties of an entity and/or the relations between entities undergo change either at a moment of time (instantaneous event) or over an extended period of time (process).⁵

The distinctive contributions of Behavioral Contingency Semantics are the suggestions

- (1) that the situation or situations depicted by a sentence constitute for the listener a part, or occasionally the whole, of what Skinner (1969) calls a "three-term contingency", consisting of (a) a set of *antecedent conditions*, (b) some *behavior* called for under those conditions either from the listener or, as in the case of a narrative, from someone with whom the listener identifies, and (c) the probable or actual *consequences* of so behaving, and
- (2) that by constructing, in the form of a sentence, a representation of one or more terms of a contingency, the speaker provides the listener with a discriminative stimulus which alerts him or her to the possibility of encountering the contingency one or more of whose terms (antecedent, behavior or consequence) is thereby specified.

It is proposed that this sentential representation exercises stimulus control over the behavior of the listener by virtue of an isomorphism or point-to-point correspondence between the form and content of the sentence on the one hand and the form and content of the contingency or contingency term which is thereby represented or specified on the other. It should be emphasised, however, that the contingency or contingency term which a sentence specifies is not an actually existing situation. The situation or sequence of situations represented by a sentence is what Brentano (1874/1973) calls an "intentional object". In other words, it is the *kind* of situation or sequence of situations to the possibility of encountering which hearing or reading the sentence alerts the listener and towards encountering which the listener's behavior is thereby orientated. All that actually exists in such a case is the speaker's emission of the sentence and the orientation of the listener's behavior which occurs as a consequence of hearing or reading what the speaker has said. When we talk about what a sentence "represents", "specifies" or "means", all we are doing is characterising the behavioral orientation which the sentence evokes or is capable of evoking from any competent listener who is a member of the relevant verbal community by describing the kind of situation or sequence of situations which the listener is thereby alerted to encounter.

But just as there is a point to point correspondence, on this view, between the form and content of the sentence and the form and content of the contingency term or complete contingency (situation or situation sequence) that is thereby specified, so there is a point to point correspondence between the form and content of the sentence on the one hand and the form and content of an actual situation which either exists, has existed in the past or will exist in the future in the case where a declarative sentence is true or will exist in the future in a case where an imperative sentence is subsequently complied with.

In order to give substance to this notion of a double correspondence between the sentence and the situation which it specifies and between the specified situation and the actual situation, we need three things:

- (1) a way of analysing sentences which brings out their various components and the way they are related to one another,
- (2) a way of analysing contingencies and the situations of which they are composed which brings out those features

5. While endorsing their concept of "a situation", I reject absolutely Barwise and Perry's "relational" theory of meaning.

of them to which the various components of the sentence correspond, and

- (3) an account of the way the one analysis maps onto the other.

In selecting an appropriate analysis for sentences I have made use of two reasonably well known logical principles:

- (1) an account of the way in which compound sentences are built up out of simple or atomic sentences, using such logical devices or "manipulative autoclitics", to use Skinner's (1957 pp. 340-342) term, as conjunction *Both s and t*, disjunction *Either s or t*, the conditional *If s then t*⁶, or the embedding of one sentence within another, either in the form of a relative clause used to make an identifying reference to some object or person or in the form of a quotation of what someone has or might say or think, and
- (2) Frege's (1879; 1891) analysis of the internal structure of atomic sentences in terms of the distinction between function and argument place.

For our present purposes the most important variety of compound sentence is the compound conditional sentence of the form *If s then t*. The importance of sentences of this type is that they provide us with a formal syntactic criterion both for distinguishing 'rules', in Skinner's (1966/1988) sense, from other types of sentence, and for drawing the important distinction between *prescriptive rules*, like *If the baby cries, give it a bottle*, in which the consequent is in the imperative mood, and *descriptive rules*, like *If you give the baby a bottle, it will go back to sleep*, in which the consequent is in the future tense of the indicative or declarative mood. This distinction between Prescriptive and Descriptive Rules is close to if not identical both with the distinction which Hayne Reese draws in his chapter between "Normative" and "Normal Rules" and with the distinction drawn by Zettle and Hayes (1982) between "Plies" (or, to use their spelling, "Plys") and "Tracks".

Frege's function and argument analysis which I use to analyse the internal structure of an atomic sentence, was originally conceived in order to account for sentence pairs like $2 + 2 = 4$ and $4 = 2 + 2$ or like *John loves Mary* and *Mary is loved by John* whose equivalence cannot be handled in terms of the traditional Subject-Predicate analysis which had dominated logical, grammatical and philosophical thinking since the days of Aristotle. The term "function" here is being used in its mathematical rather than its biological sense in which, for example, $2 + 2 = 4$ is an instance of the function $x + y = z$ or $z = x + y$ where the function is represented by the autoclitics $+$ and $=$ and the three argument places generated by the function are represented by the variables x , y and z which in this case are occupied by the numerals 2 , 2 and 4 . Likewise in *John loves Mary* the function *loves* creates two argument places occupied by the proper names *John* and *Mary* respectively.

In the fourth of my papers on Skinner's *Verbal Behavior* in *Behaviorism* (Place 1983), I illustrated the application of Frege's notion to sentences in natural language by the example of a sentence drawn from T. Whellan's *History of York and the North Riding* (1859) where, under the entry for Marton-in-the-Forest, we read *Ascitel de Bulmer purchased Marton of King Henry I*. In this sentence the function is the verb phrase *purchased*. This function generates three "substantial" or "concrete" argument places as I call them which are occupied respectively by the names or descriptions of

- (1) the purchaser, in this case *Ascitel de Bulmer*;
 (2) the vendor, in this case *King Henry I* and
 (3) the property sold, in this case the village or estate of *Marton-in-the-Forest*.

In addition to these three "substantial" ⁷ argument places the function, which can appear either in the form *buy/purchase* or in the form *sell*, generates three additional "abstract" argument places whose filling in this particular sample sentence remains either unspecified, as in the case of the price paid (let us say that it was 25 shillings) and

6. s and t here are to be interpreted as atomic sentences which may or may not have a truth value, and not, as in the propositional calculus, as propositions whose truth value is determinable independently of the truth value (if it has one) of the compound sentence as a whole.

7. *substantial* in the sense that their natural occupants are the names and descriptions of what Aristotle called "substances", four dimensionally extended "space-time worms", such as living organisms, their artefacts and other enduring entities from galaxies down to sub-atomic particles.

the place where the transaction was executed (let us suppose that it was at York) or, as in the case of the time at which the transaction took place, is indicated approximately and indirectly by the information that the vendor was the monarch whose reign coincided with the early years of the 12th century (let us suppose that a more precise date for the transaction was Whitsuntide 1107).⁸

Table 3. shows the complete sentence, with all its six argument places filled, in the form of a six spoke wheel with the functional expression at the hub. Given this basic pattern, it now transpires that there are at least eight different ways of constructing this sentence each of which is derived from the others by the principles of grammatical transformation beloved of the generative grammarians, the effect of which is to alter the position of the various argument places within the sentence so as to bring the occupant of each argument place and, finally, the functional expression itself into the focus of attention by putting it into the crucial subject position at the beginning of the sentence. Thus if we begin with

(1) *Ascitel de Bulmer purchased Marton of King Henry I for 25s. at York on Whitsuntide 1107,*

substituting *sold* for *purchased* we get

(2) *King Henry I sold Marton to Ascitel de Bulmer for 25s. at York on Whitsuntide 1107;*

by Active to Passive transformation Version 1 yields

8. The charter putting this transaction into effect is not amongst those relating to the fee of Bulmer (to which Marton belonged) in Volume II of Farrer's *Early Yorkshire Charters* (Farrer 1915) and must be presumed lost. Consequently, there is no means of knowing precisely when and where it took place and at what price. It seems unlikely, however, that Ascitel de Bulmer would have been qualified to act as Sheriff of York, as he did from c. 1114 until the time of his death in c. 1129, if he had not already acquired the status of tenant-in-chief with respect to the estate from which he and his descendants derived their surname. We know (Page 1912, p. 222) that at the time of the Domesday survey (1086) the Bulmer lands were held by Nigel Fossard as tenant of the Count of Mortain. We also have evidence of a close connection between the Fossards and the de Bulmers. Ascitel de Bulmer is named in a document of the 1120's (Farrer *op. cit.*, p. 339) as steward to Nigel's son Robert Fossard whose daughter Emma was married to Ascitel's son Bertram de Bulmer (Farrer *op. cit.*, p. 128). This makes it tolerably certain that Ascitel was both steward and tenant with respect to the Bulmer fee to Robert's father Nigel. It suggests further that his acquisition of the tenancy-in-chief of the Bulmer fee was part of the disposal of the fee of Count William of Mortain, when it was forfeited to King Henry as a consequence of the defeat (at the battle of Tinchebrai in September 1106) of a rebellion led by the count in an attempt to unseat the king and re-unite the crown of England with the Dukedom of Normandy under the Conqueror's eldest son Duke Robert. It would seem that, as a result of this forfeiture, Nigel Fossard was allowed to acquire (presumably by purchase) the tenancy-in-chief of most of the land which he had previously held as tenant of the count. However, in the case of the Bulmer fee he appears to have ceded his right of purchase to the man who was his steward and sub-tenant with respect to that part of his former estate. The name *Ascitel* (from Old Scandinavian *Asketill*) no doubt indicates a lower social status than that of the other men who were or became tenants-in-chief in Yorkshire at this time whose names are exclusively French. It seems, however (Ekwall, 1959 pp. 11-12), that this is one of the few Scandinavian personal names introduced into England from Normandy at the time of the Conquest and may suggest that Ascitel or his father arrived in Yorkshire from Normandy as part of the Fossard household. This seems more probable than the alternative hypothesis that he was descended from Norman (i.e., "The Norwegian") who is recorded in Domesday (Page *loc. cit.*) as having held Marton T.R.E. (in the time of Edward the Confessor). The hypothetical date proposed for the purchase of Marton (Whitsuntide 1107) is the presumed date of a surviving document mentioned, but not reproduced, by Farrer (*op. cit.* p. v) in which King Henry informs the shiremute of Yorkshire of an exchange of land in the county between himself and another of the beneficiaries of Tinchebrai, Robert de Brus. The hypothetical price (25s.) allows for a reasonable appreciation in the rental value over the thirty years which had then elapsed since the Domesday survey when Marton was valued at 16s. (Page *loc. cit.*), capitalised on the basis of five years purchase.

(3) *Marlon was purchased by Ascitel de Bulmer from King Henry I for 25s. at York on Whitsuntide 1107;*

likewise Version 2 yields

(4) *Marlon was sold by King Henry I to Ascitel de Bulmer for 25s. at York on Whitsuntide 1107;*

bringing the price into the focus of attention gives us

(5) *25s. was the price paid by Ascitel de Bulmer when he purchased Marlon of King Henry I at York on Whitsuntide 1107;*

bringing the location of the transaction into focus gives

(6) *York was the place where the sale of Marlon by King Henry I to Ascitel de Bulmer for 25s. took place on Whitsuntide 1107;*

bringing the date of the transaction into focus yields

(7) *Whitsuntide 1107 was the date when the sale of Marlon by King Henry I to Ascitel de Bulmer for 25s. took place at York;*

finally we can bring the function itself into focus with

(8) *The sale of Marlon by King Henry I to Ascitel de Bulmer for 25s. took place at York on Whitsuntide 1107.*

Turning now to the analysis of extra-verbal reality to which this syntactic analysis of sentences corresponds, we find that this "metaphysical analysis", as we may appropriately call it, has three sources:

Table 3

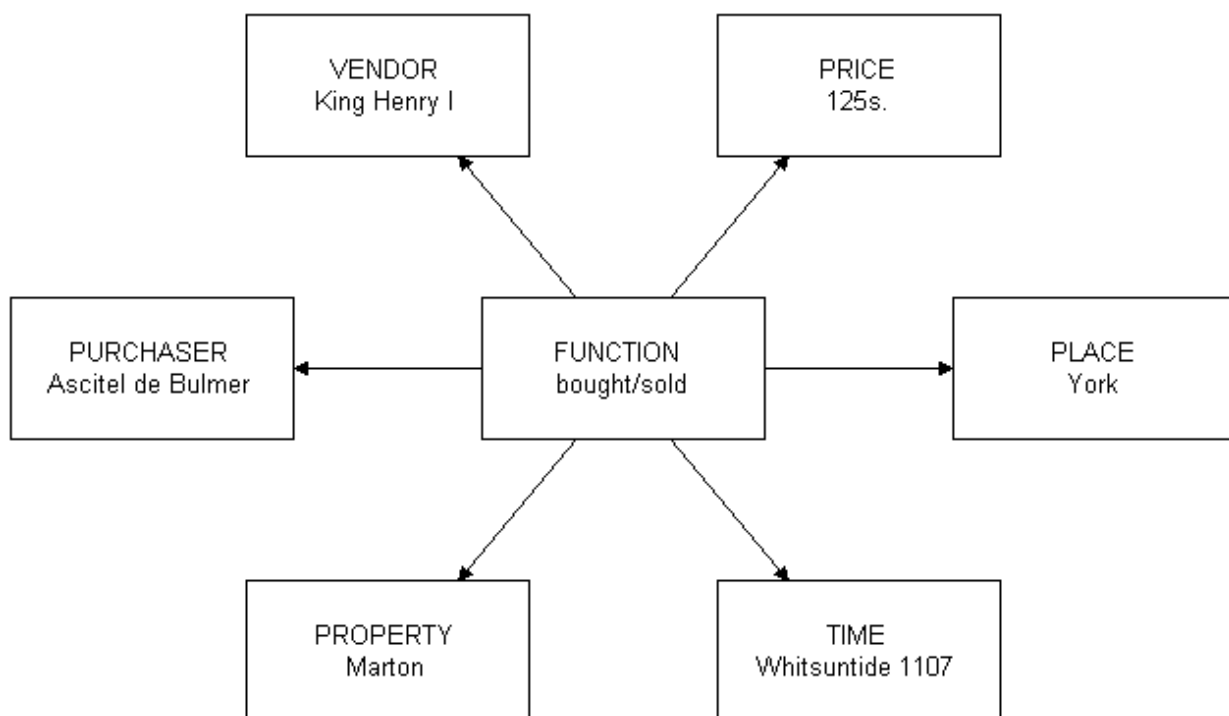


Table 4

<i>Syntactic Unit</i>		<i>Metaphysical Unit</i>
Prescriptive-Descriptive Rule	→	Complete three term Contingency - Antecedent, Behavior, Consequence
Prescriptive Rule	→	Antecedent and Behavior
Descriptive Rule	→	Behavior and Consequence
Function/Predicate/Verb Phrase	→	Property or relation which persists or changes
Verb Phrase with continuous	→	State of affairs, property or aspect relation which persists
Verb Phrase with non-continuous aspect	→	Event, property or relation which changes
Noun phrase in subject, direct or indirect object argument places in an atomic sentence	→	Substance/entity whose property persists or changes or which stands in a relation which persists or changes

- (1) Barwise and Perry's (1983) concept of a Situation,
- (2) Skinner's (1969) concept of the Three-term Contingency,
- (3) The mapping proposed by Aristotle between sentences analysed into Subject and Predicate Terms on the one hand and a Substance or enduring space-occupying entity and its Properties on the other.

We have seen that the term "situation", as used by Barwise and Perry, covers both states-of-affairs which persist without change over a period of time and events in which something changes either at or over time. Any situation in this sense can be regarded from the standpoint of a behaving organism as one of the terms of a three-term contingency. However the same situation constitutes a different contingency term for a different organism. For example, the event constituted by a baby's crying may be a consequence with respect to behavior of someone whose behavior woke the baby, behavior on the part of the baby itself and an establishing antecedent condition which calls for behavior on the part of the mother or baby sitter. When we ask what it is that persists in a state of affairs or changes in an event, we can think of it as either a property of what Aristotle calls a substance, i.e. a discrete spatio-temporally extended body or a relation between two or more such entities or between different parts of one such entity. The correspondence between this metaphysical analysis and the syntactic analysis of the sentence is given in Table 4.

Part 2. The Correspondence Theory of Truth

Having, I hope, given something of the flavour of Behavioral Contingency Semantics, I now want to turn to a discussion of the Correspondence Theory of Truth. Behavioral Contingency Semantics is committed to the Correspondence Theory of Truth by its endorsement of a correspondence between the situation which the sentence specifies and, in the case of a true declarative sentence, a situation which either has existed, exists now or will exist in the future at the time and place specified in the sentence. My reason for raising this issue is that there are a number of behavior analysts, including some of the contributors to this volume, who would subscribe to the following five propositions all of which with the possible exception of the first are, to my mind, patently false:

- (1) There are three principal theories of Truth, the Correspondence Theory, the Coherence Theory and the Pragmatic Theory.
- (2) These theories are mutually exclusive in the sense that subscribing to one theory is incompatible with subscribing to the other two.
- (3) Different scientific methodologies involve subscribing to a different theory of Truth.
- (4) The scientific methodology of Behavior Analysis involves its practitioners in subscribing to the Pragmatic Theory of Truth.

Given these premises, we can deduce:

- (5) The scientific methodology of Behavior Analysis is incompatible with subscribing to either the Correspondence or the Coherence Theory of Truth.

The contrasting theory of truth to which I subscribe and which I would recommend to other behavior analysts takes as its starting point the principle that truth and falsity are properties of things called "propositions". For these purposes a proposition is defined as a family of declarative sentence utterances, both actual and possible, whose members are to be found in every natural language which possesses the conceptual resources required in order to formulate an appropriate sentence. A sentence utterance belongs to the family of sentence utterances which "express the same proposition", if every member of the family

- (1) specifies the same situation or kind of situation,
- (2) has the same truth value (either "true" or "false") as every other member, and
- (3) uses the same or corresponding device (proper name, definite description or indexical) to make identifying reference to each of the entities involved, their spatial location and the temporal location of the situation itself.

From a functional or pragmatic perspective to say that a proposition in this sense is true is to say that any member of the family of sentence utterances which constitute the proposition in question can be relied upon in constructing a plan of action in relation to that part or aspect of the environment to which the proposition relates; whereas any sentence which contradicts it cannot be similarly relied upon. However, sentences expressing true propositions can be relied upon in constructing and executing a plan of action, only in so far as all the sentences which make up the plan of action are similarly true. Only if they are, will the plan of action so formed accurately and completely depict the contingencies involved. Only in so far as the contingencies are accurately depicted, can the plan of action be relied upon to succeed.

A proposition can be relied upon to contribute to the construction of a complete and accurate specification of the contingencies by which an agent is confronted, only if it is true; and a proposition is true only if

- (1) it forms part of a system of propositions (beliefs) accepted as true within a verbal community which is coherent in the sense that no two propositions which manifestly contradict one another are tolerated within the system, i.e., the system conforms to the principle of non-contradiction which holds that if two propositions contradict one another they cannot both be true,
- (2) to the extent that it purports to specify a situation which either has existed in the past, exists now or will exist in the future, there is a correspondence between the situation specified and the actual situation.

It will be apparent that this definition of truth combines elements from all three of the traditional theories of Truth, the Pragmatic Theory, the Coherence Theory and the Correspondence Theory. The Pragmatic Theory is used to provide an account of the adaptive function of preferring true propositions to false ones as a basis for the individual's rule-governed behavior, and hence of the importance that is attached, within the verbal community, to discriminating between true and false propositions. But while the Pragmatic Theory can tell us why truth and its discrimination are important, what it cannot tell us is what the truth of a proposition consists in.

On the present view there is no single answer to the question, "What does the truth of a proposition consist in?" which is true for all true propositions. For this purpose true propositions need to be classified into two classes. On the one hand we have a class of propositions which are true solely by virtue of the relation between the conventions governing the sentence frames which they instantiate and those governing the linguistic expressions which occupy the argument places thus formed. For example, the sentence frame *All X's are Y's* yields a true

proposition of this kind when *bachelor* is substituted for *X* and *unmarried man* for *Y* to yield the proposition *All bachelors are unmarried men*. Again the sentence frame $x + y = z$ yields a true proposition of this kind when we substitute 2 for both *x* and *y* and 4 for *z*, yielding the true proposition $2 + 2 = 4$. Such propositions were said by Hume to express "relations between ideas" or, as we would say nowadays, "relations between concepts". They were described by Kant as "analytic", although he would not have agreed that arithmetical propositions are analytic.⁹ Propositions of this kind are also *necessary truths* in the original Aristotelian sense of a proposition which it is self-contradictory to deny. Moreover, their truth is established *a priori*, in so far as it is fixed by the pre-existing conventions of the language; and no empirical observations, other than those required to determine the reinforcement practices of the verbal community in question, are relevant to their truth. Truth in these cases is determined entirely in accordance with the principle of Coherence.

Coherence in the sense of conformity to the linguistic conventions is also a necessary condition of the truth of the other contrasting variety of true proposition which Hume described as expressing "matters of fact", and which Kant called "synthetic". In this case, however, coherence, though necessary, is not sufficient for truth. There must also be a correspondence between what is said on the one hand and some state or event in the extra-linguistic environment on the other. Such propositions are said to be *contingently* true in that there is no self-contradiction involved in supposing them to be false. They are also *empirical* in the sense that their truth can only be established by demonstrating their coherence with results of observation.

But while it is true of these factual propositions, as we may call them, both that their truth consists in a correspondence between the proposition and some actually existing situation in the extra-linguistic environment and that empirical observation is required to determine their truth, it is a grievous mistake, but one which is often made, to suppose that what is observed in such cases *is* the correspondence between what is said and the way things are in the extra-linguistic environment. What gives substance to this mistaken view is the notion that when a theoretical proposition of science is tested empirically, a prediction is made on the basis of theory as to the outcome of an experiment and this prediction is then verified or falsified, confirmed or disconfirmed, as the case may be, by its correspondence or lack of correspondence with observation statements describing the actual outcome.

Two points need making. Firstly the principle that is appealed to when theoretical predictions are said to be confirmed by the agreement with or correspondence to the actual outcome is not in fact the principle of correspondence between what is said and the actual situation which the proposition specifies, it is rather the principle of coherence in the form of the principle that all true propositions must be consistent with one another. Indeed the reason why a single observation only weakly confirms and by no means establishes the truth of the theory on which the prediction is based is that in order to establish the truth of a theory, you must be able to show that that theory and only that theory is consistent with *all* the propositions which are relevant to its truth and whose truth has been established beyond doubt on other grounds. This, I submit, is totally unintelligible on an account which supposes that correspondence with *observation* is what makes a theory true.

My second point is that the correspondence which is spoken of in the Correspondence Theory of Truth, as I understand it, is not a correspondence between theoretical sentences and observation, as this mistaken view implies, but a correspondence between both theoretical sentences and observation sentences, in so far as they purport to describe matters of fact, and the situations, the events and states of affairs, they describe. That this cannot be a matter of direct apprehension or observation becomes apparent when we consider the case of a very simple observation sentence like *This is a table* uttered, as in the present case, in the presence of the kind of situation which it specifies and to which on the Correspondence Theory it corresponds. In a case such as this we can simultaneously hear the

9. It is widely believed by philosophers that Kant's analytic/synthetic distinction has been decisively refuted by Quine's (1951/1980) paper 'Two dogmas of empiricism.' To my mind, Quine's arguments reflect the logician's reluctance to accept that the speaker's conformity to linguistic convention is contingency-shaped with the result that what is analytic frequently depends on the context of utterance and can only be accessed through the linguistic intuitions of verbal community members. For a more extensive discussion of this issue, see Place (1991).

sentence and see the situation which it describes or specifies. What we cannot either see or hear is the correspondence between them; not because it isn't there, but because it is a function of the linguistic conventions to which speakers must conform if their utterances are to be reinforced by other members of the English-speaking verbal community.

The same goes for the Spanish *Esto es una mesa* which specifies the same situation by virtue of the conventions to which utterances must conform, if they are to be reinforced by the Spanish-speaking verbal community. The correspondence between these sentences and the situation which they specify exists only by virtue of the reinforcement practices of the relevant verbal community and will continue to exist only so long as those reinforcement practices are maintained.

Although we can justifiably claim to have intuitive knowledge of the kind of situation which the English sentence *This is a table* specifies, intuitive knowledge, as Skinner points out in 'An operant analysis of problem solving', is both acquired and maintained by the contingency-shaping of the behavior involved by repeated exposure to the consequences of emitting that behavior in the appropriate context. In this case the relevant consequences are those provided by the verbal community, when the sentence is uttered in the presence of the situation which it purports to describe. It is this opportunity which it provides for the speaker's utterance to be reinforced in the presence of the situation it describes which, in my view, is the key to the importance of the observation sentence as the foundation of empirical knowledge. By uttering a sentence like *This is a table* in the presence both of an actual table and of one or preferably more fully competent members of the English-speaking verbal community, the speaker's verbal behavior will be reinforced by the other speakers present, always provided that it conforms to the syntactic and semantic conventions governing its construction and use. The speaker is thereby reassured that he or she is using his or her words and sentence frames in accordance with the accepted conventions and that the sentences he or she constructs using those words and sentence frames will have the desired effect on the behavior of any listener who is a member of the verbal community in question on relevantly similar occasions in the future.

This view of the epistemological function of observation sentences has a number of important consequences. I shall mention only a few of them. The first is a consequence which connects up with a principle which is fundamental to Behaviorism as a standpoint both in Psychology and in Philosophy, the principle of objectivity in scientific observation. This principle contrasts with the subjectivist epistemology of Ernst Mach (1885) and, following him, of the Logical Positivists who saw the observation of private sense-data as the ultimate foundation of empirical knowledge.

If the function of observation sentences is to ensure correspondence between what is said and what is described by giving the verbal community the opportunity to reinforce a sentence utterance in the presence of the situation it describes, it follows that the only kind of observation sentence that can perform this function is an observation sentence describing a *state of affairs* (events tend to disappear too quickly into the past) in the common stimulus environment of one and preferably more observers who are members of the relevant verbal community and can agree that the sentence correctly describes the state of affairs in question. There is just no way that an observation sentence describing a private event could conceivably perform this function.

That is why Comte (1830-42) was right to insist that introspective observation could never provide a basis for an empirical science, and, since in his day Psychology was defined as the science which uses introspection as its only source of empirical data, right to insist that Psychology, so defined, could never be a science. That is why J. B. Watson (1913) was right to insist that if Psychology is to be a science, its observational data must be the publicly observable behavior of living organisms. That is why Wittgenstein (1953) was right to insist that our ordinary mental concepts are used primarily to describe and explain public behavior, and that, in those cases where we *do* talk about our own private events, we can only do so by characterising an experience in terms of its "publicly observable concomitants", both on the stimulus and on the response side, in the standard or typical case.

Mention of Wittgenstein brings me to the second consequence of this view which I would like to discuss, namely, the light which it throws on that cryptic remark which he makes in paragraph 242 of *Philosophical Investigations I* (1953)

If language is to be a means of communication there must be agreement not only in definitions but also (queer as this may sound) in judgments.

Taken at its face value, it might be supposed that what Wittgenstein is saying here is that communication is only possible if there is total agreement in judgments between speaker and listener. Clearly this cannot be right. So unless we are

prepared to dismiss this statement of Wittgenstein's as an aberration, we must suppose that there are some kinds of judgment on which there must be agreement if communication is to occur and others on which there need not be agreement.

There are no doubt other judgments on which speaker and listener must agree in order for effective communication to be possible. For example, as Strawson points out in his book *Individuals* (1959), some of the basic facts of local history and geography must be agreed, if identifying reference is to be made to objects, persons and events remote in time and or place from the context of utterance. But agreement between speaker and listener on the correct description of the more salient features of their common public environment is even more fundamental than this to the process of linguistic communication. If you won't agree with my judgment that this in front of us is a table, I begin to lose my grip on how we are using words, and so, I suggest, do you.

This brings me to the third and final consequence of this view of observation sentences to which I would like to draw attention, namely, the light which it throws on the practice whereby speakers frequently emit "tact"¹⁰ or descriptive sentences which are often unsolicited or solicited only out of politeness and which are reinforced by an expression of agreement on the part of the listener and where this expression of agreement is frequently pursued by an expression like *Right?*, *True?*, *Not so?*. Again the assurance which this agreement provides that the speaker is using his words in accordance with the standard conventions accepted within the verbal community is part, but only part, of the explanation for this phenomenon.

The other factor which would take us too far afield to explore adequately is the speaker's need, in his or her capacity as agent, to have a stock of ready-made descriptive rules or beliefs which can be called upon as required to govern his or her behavior in relation to the contingencies which they specify. In order to perform this function effectively it is important that, as far as possible, all of the beliefs in the stock be true, that they should combine to provide accurate predictions of future outcomes on which effective action can be based, and that they should include beliefs relating to as wide a variety of possible future contingencies as can be achieved.

All members of the verbal community share this need for a reliable and comprehensive stock of rules or contingency-specifying beliefs which they can use to govern both their own individual behavior and that of the group in any co-operative venture undertaken with other community members. Moreover, a rule which correctly specifies a contingency which operates in the common public environment for one member of the verbal community will do so for all. It is, therefore, in the interest of every community member to co-operate with others to ensure the construction and maintenance of a common stock of such beliefs within the community which each individual member can rely on in constructing his or her individual stock.

However, this stock of common beliefs which is maintained within the verbal community by the constant exchange of information and opinions between its members is not just a resource on which members can draw in constructing their own individual stocks, it also provides a standard against which the truth of the individual's beliefs are evaluated and to which they must conform, if their utterance is to be reinforced by an appropriate expression of agreement.

Since it is informed by the collective reinforcement history of the group going back over the centuries, this collective view is on balance more likely to be true, and hence reliable as a basis for behavior, than is that of a single individual who has only his or her own experience to go on. Nevertheless *vox populi* is not always *vox dei*. The opinions endorsed within the verbal community must eventually give way, if they can be shown to conflict with observation sentences which are consistently reinforced by the verbal community in the presence of the situation which the observation sentence describes. Though, as the history of science repeatedly demonstrates, beliefs which are deeply entrenched in the collective view will survive repeated and unambiguous disconfirmation by the empirical evidence, unless and until an alternative is found which integrates the new observations with the rest of the existing stock of beliefs without conflicting with any of those beliefs, apart from the ones it replaces.

This brings me to my final point. We have been concerned thus far with the metaphysical question of what

10. For this, in contrast to other uses of the term, see Place (1985).

truth consists in; not with the epistemological question about how we tell true propositions from false ones, and about the criteria we can use for this purpose. Nevertheless, certain consequences with respect to this epistemological question can be deduced from the account that has been given.

If I am right in thinking that we can never observe correspondence between a sentence and the reality it depicts, it follows that correspondence cannot be a criterion of truth; even though, if I am right, it is what the truth of a synthetic proposition consists in. That leaves us effectively with only two criteria of truth, the pragmatic criterion - what works - and the coherence criterion - what agrees. The principal application of the pragmatic criterion is in evaluating the truth value of factual-synthetic propositions; although, if I am right in thinking that arithmetical truths are analytic, the practical utility of arithmetic and other forms of mathematical reasoning is not wholly irrelevant in persuading us of the truth of at least some analytic propositions.

The coherence criterion, on the other hand, operates somewhat differently in the case of analytic propositions than in the case of synthetic ones. In the case of an analytic statement, it is a matter of relying on intuition and demonstration to show that the denial of the statement involves an inescapable contradiction sooner or later. In the case of a synthetic proposition, it is a matter demonstrating that the proposition in question is at least consistent with and preferably entails a greater number and variety of objective observation sentences than any alternative that has been suggested hitherto. These truth criteria, *pace* the Pepperians (Pepper 1942), are not in conflict. They reinforce and supplement one another. And we need all the help we can get.

References

- Adams, C. D. and Dickinson, A. (1981) Instrumental responding following reinforcer devaluation. *Quarterly Journal of Experimental Psychology*, 33 B: 109-112.
- Barwise, J. and Perry, J. (1983) *Situations and Attitudes*. Cambridge, Massachusetts: M.I.T. Press.
- Brentano, F. (1874/1973) *Psychologie vom empirischen Standpunkt*. Leipzig: Duncker u. Humblot. English translation as *Psychology from an Empirical Standpoint*. L. L. McAlister (ed.) London: Routledge & Kegan Paul.
- Chomsky, N. (1957) *Syntactic Structures*. 's Gravenhage: Mouton.
- Comte, A. (1830-1842) *Cours de Philosophie Positive*, 6 vols. Paris.
- Crystal, D. (1985) *A Dictionary of Linguistics and Phonetics*. Oxford: Blackwell.
- Ekwall, E. (1959) Etymological notes on English place-names. *Lunds Universitets Årsskrift. N.F. Avd.1 Bd. 53 Nr 5. (Lund Studies in English. XXVII.)*
- Farrer, W. (1915) *Early Yorkshire Charters*, Vol.II. Edinburgh: Ballantyne, Hanson & Co.
- Frege, G. (1879/1960) *Begriffsschrift*. English translation P. T. Geach. In P. T. Geach & M. Black (eds.) *Translations from the Philosophical Writings of Gottlob Frege*, 2nd. Ed. Oxford: Blackwell, 1960.
- Frege, G. (1891/1960) Function and concept. *Jenaischer Gesellschaft für Medizin und Naturwissenschaft*. English translation P. T. Geach. In P. T. Geach & M. Black (eds.) *Translations from the Philosophical Writings of Gottlob Frege*, 2nd. Ed. Oxford: Blackwell.
- Hayes, S. C. (1991) A relational control theory of stimulus equivalence. In L. J. Hayes and P. N. Chase (eds.) *Dialogues on Verbal Behavior: Proceedings of the First International Institute on Verbal Relations*. Reno, Nevada: Context.
- Mach, E. (1885) *Contributions to the Analysis of the Sensations*. English translation C. M. Williams. Chicago: Open Court, 1897.
- Page, W. (1912) *The Victoria History of the County of York*, Vol. II. London: Constable.
- Pepper, S. C. (1942) *World Hypotheses*. Berkeley, California: University of California Press.
- Place, U. T. (1983) [Skinner's Verbal Behavior IV - How to improve Part IV, Skinner's account of syntax. Behaviorism](#), 11:163-186.
- Place, U. T. (1985) [Three senses of the word "tact"](#). *Behaviorism*, 13, 63-74.

- Place, U. T. (1991) [Some remarks on the social relativity of truth and the analytic/synthetic distinction](#). *Human Studies*, 14, 265-285.
- Quine, W. v. O. (1951/1980) Two dogmas of empiricism. *Philosophical Review*, LX, 20-43. Reprinted in *From a Logical Point of View*. Third Edition, Cambridge, MA: Harvard University Press, Chapter II, pp. 20-46.
- Reese, H. W. (1992) Problem solving by algorithms and heuristics. In S. C. Hayes and L. J. Hayes (Eds.) *Understanding Verbal Relations* (Chapter 10, pp. 153-179). Reno, NV: Context Press.
- Sidman, M. (1971) Reading and audio-visual equivalences. *Journal of Speech and Hearing Research*, 14: 5-13.
- Sidman, M. and Tailby, W. (1982) Conditional discrimination vs. matching to sample: an expansion of the testing paradigm. *Journal of the Experimental Analysis of Behavior*, 37: 5-22.
- Skinner, B. F. (1957) *Verbal Behavior*. New York: Appleton-Century-Crofts.
- Skinner, B. F. (1966/1988) An operant analysis of problem solving. In B. Kleinmuntz (ed.) *Problem Solving: Research, Method and Theory*. New York: Wiley. Reprinted with revisions and peer commentary in A. C. Catania and S. Harnad (eds.), *The Selection of Behavior. The Operant Behaviorism of B. F. Skinner: Comments and Consequences*. Cambridge: Cambridge University Press, pp. 218-236.
- Skinner, B. F. (1969) *Contingencies of Reinforcement*. New York: Appleton-Century-Crofts.
- Skinner, B. F. (1989) The behavior of the listener. In S.C.Hayes (ed.) *Rule-Governed Behavior: Cognition, Contingencies and Instructional Control*. New York: Plenum, pp. 85-96.
- Steele, D. L. & Hayes, S. C. (1991). Stimulus equivalence and arbitrarily applicable relational responding. *Journal of the Experimental Analysis of Behavior*, 56, 519-555.
- Strawson, P. F. (1959) *Individuals*. London: Methuen.
- Watson, J. B. (1913) Psychology as the behaviorist views it. *Psychological Review*, 20: 158-177.
- Whellan, T. & Co. (1859) *History and Topography of the City of York and the North Riding of Yorkshire (Volume II)*. Beverley: John Green.
- Wittgenstein, L. (1921/1971) *Tractatus logico-philosophicus Annalen der Naturphilosophie. Tractatus Logico-Philosophicus* with second English translation by D. F. Pears and B. F. McGuinness, Second Edition, London: Routledge and Kegan Paul.
- Wittgenstein, L. (1953) *Philosophical Investigations*. English Translation by G. E. M. Anscombe. Oxford: Blackwell.
- Zettle, R. B. and Hayes, S. C. (1982) Rule-governed behavior: a potential theoretical framework for cognitive behavior therapy. In P. C. Kendall (ed.) *Advances in Cognitive-Behavioral Research and Therapy (Vol.1)*. New York: Academic Press.