EQUIVALENCE CLASSES, RELATIONAL FRAMES AND THE AUTOCLITIC.

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[Presented at the Christmas Conference of the Experimental Analysis of Behaviour Group,
University College, London, December 1987]

Sidman's theory of Equivalence Classes.

Equivalence class responding may be defined following Sidman and Tailby (1982) as the generalisation of responses on a matching-to-sample task in accordance with the principles of reflexivity, symmetry and transitivity, as set out on Table 1.

Table 1. Sidman's Equivalence Class.

Reflexivity (*Identity*)	*aRa* is true	*a* is ***R*** to itself
Symmetry	If *aRb*, then *bRa*	If *a* is ***R*** to *b*, then *b* is ***R*** to *a*
Transitivity	If *aRb* & *bRc*, then *aRc*	If *a* is ***R*** to *b* & *b* is ***R*** to *c*, then *a* is ***R*** to *c*

According to Sidman the propensity to generalise in accordance with these three principles is a unitary disposition in the sense that, given the appropriate prior training, subjects who generalise in accordance with any one of these principles will also be found to generalise in accordance with the other two. Given this assumption, it seems appropriate to describe the disposition in question as the disposition to treat the relevant stimuli as equivalent to one another. For it would seem that the relation of being the same as or equivalent to something is the only relation to which all three principles apply. Thus:

Table 2. The Equivalence Relation.

Reflexivity	'*A* is the same as *A*' is true
Symmetry	If *A* is the same as *B*, then *B* is the same as *A*
Transitivity	If *A* is the same as *B* & *B* is the same as *C*, then *A* is the same as *C*

Although the matching-to-sample task is one that can be mastered by all the usual laboratory animals, pigeons and rats as well as primates, it is generally agreed that the propensity to generalise in accordance with these principles is a peculiarly human characteristic. Whereas equivalence class generalisation on the matching-to-sample task has been found in children as young as two years of age (Devany, Hayes and Nelson 1986; Beasty 1987; Lowe and Beasty 1987), a study recently reported by Dugdale (1987) shows no evidence of equivalence generalisation in the matching-to-sample behaviour of apes who had been trained by the Rumbaughs to make limited use of a human sign language.

Sidman's interpretation of these findings may be summarised as follows:

(1) Equivalence class generalisation on the matching-to-sample task is a unitary disposition in the sense defined above.

(2) Equivalence class generalisation on the matching-to-sample task is a pattern of generalisation which is widespread in human behaviour outside the psychological laboratory and is fundamental both to the human capacity for language and to the distinctively human approach to reasoning and problem solving.

(3) The semantic relation whereby words, phrases and sentences "mean", "refer to" or "stand for" objects, events and states of affairs is to be understood in terms of the linguistic expression and its meaning being treated as belonging to the same equivalence class.

(4) The capacity to generalise across an equivalence class is an innate predisposition formed in the course of human evolution which precedes and makes possible the *subsequent* acquisition linguistic competence by the child.

The evidence supporting Sidman's theory.

The evidence for these propositions may be summarised as follows:

(1) When asked to characterise the relationship between the stimuli involved after exposure to a matching-to-sample task in which responses conforming to the principles of reflexivity, symmetry and transitivity are given as "correct", while any other responses are labelled "incorrect", older children tend to describe the stimuli as being "the same" or as "going with" one another, while adults may say that they "belong together in a set." [1]

(2) The fact that animals fail to show this kind of generalisation combined with the observation of an association between its development in human children and the earliest stages in the child's acquisition of linguistic competence.

(3) The extensive experimental literature on "semantic" or "secondary stimulus generalisation" [2], combined with Sidman's (1971) observation that reading involves treating a visual stimulus as equivalent to the auditory stimulus constituted by the spoken word.

(4) The study reported in Sidman and Tailby (1982) which showed equivalence class generalisation on the matching-to-sample task in developmentally retarded subjects who appeared unable to verbalise the relationship involved.

Evidence critical of Sidman's theory.

Subsequent research from both the Bangor (Lowe and Beasty 1987; Beasty 1987) and Greensboro (Devany, Hayes and Nelson 1986) laboratories has shown that these assumptions, particularly the last, are in need of substantial revision. What now seems clear is that equivalence class generalisation on the matching-to-sample task develops *after* and not before the child has acquired some of its basic verbal skills.

Hayes' theory of Relational Frames.

This evidence, combined with theoretical considerations presented by Zettle and Hayes in their 1982 paper on 'Rule-governed behavior', have led Hayes (1990) to propose a radical revision of Sidman's hypothesis. According to Hayes, the relation of equivalence is only one amongst a number of relations between stimulus events which are learned by the child as it acquires its linguistic competence. From the various relations it encounters the child learns to "abstract" a number of "relational frames". Each relational frame is distinguished by the pattern of relational inferences which it legitimises. Hayes distinguishes four such relational frames which he calls "Coordination" (equivalence), "Distinction" (difference), "Opposition" and "Comparison". To these we would propose adding a fifth which we call "Causation". [3] The distinctive pattern of inferences which are legitimised by relations belonging to a particular relational frame can be classified by reference to five inference types. These inference types are as follows:

Table 3. Types of Relational Inference.

Reflexivity	*aRa* is true	*a* is *R* to itself
Symmetry	If *aRb*, then *bRa*	If *a* is *R* to *b*, then *b* is *R* to *a*
Reciprocity	If aR_1b, then bR_2a	If *a* is *R* to *b*, then *b* stands in the opposite *R* to *a*
Transitivity	If *aRb* & *bRc*, then *aRc*	If *a* is *R* to *b* & *b* is *R* to *c*, then *a* is *R* to *c*
Opposition	If *aRb* & *bRc*, then *a* = *c*	If *a* is *R* to *b* & *b* is *R* to *c*, then *a* is the same as *c*

[1] Information from Dr. Pauline Horne and Neil Dugdale (personal communication).

[2] The basic source for this literature is Osgood (1953 pp. 701-705).

[3] Hayes treats the causal relation as falling under "Comparison". This is quite correct, if one considers the causal relation between *events*. But every causal relation can also be described as a relation between two objects whereby one "acts on" the other. This relationship between objects differs from the relation between events in that the principle of Transitivity whereby *If event (C) is a cause of event (D) and event (D) is a cause of event (E), event (C) is a cause of event (E)* no longer goes through when the relation is described as one object acting on another.

These relationships are summarised in Table 4 *Types of Relational Frame*:

	INFERENCE	REFLEXIVITY	SYMMETRY	RECIPROCITY	TRANSITIVITY	OPPOSITION
Relational Frame	Schema	*aRa* is true	If *aRb*, then *bRa*	If *aRb*, then *bRa*	If *aRb* and *bRc*, then *aRc*	If *aRb* and *bRc*, then *a = c*
Coordination	*A* & *B* are equivalent	Yes	Yes	No	Yes	No
Distinction	*A* & *B* are different	No	Yes	No	No	No
Opposition	*A* & *B* are opposites	No	Yes	No	No	Yes
Comparison	*A* is more than *B*	No	No	Yes	Yes	No
Causation	*A* acts on *B*	No	No	Yes	No	No

Hayes' account of the genesis of relational frame responding.

According to Hayes, children acquire the ability to generalise in accordance with patterns of inference characteristic of these different relational frames through exposure to a variety of particular instances of the relational frames in question in the process of acquiring their initial verbal skills.

However, mere exposure to instances of the different relational frames is not sufficient to account for the changes which appear in the child's responding on the matching-to-sample task as linguistic competence develops. For there can be few living organisms who are capable of some kind of discriminative response who do not regularly discriminate relations between objects and stimuli which conform to all the relational frames described above. Thus any animal that discriminates a particular individual or a member of a particular species by (a) its characteristic visual appearance, (b) the characteristic sound that it makes and (c) its distinctive smell experiences an instance of the Coordination or Equivalence relational frame that holds between these three stimulus classes whose only common feature is that they alert the organism to the presence of the same class of contingencies, those involving the individual or species in question. Likewise any animal which learns to discriminate between one stimulus (S^D) in whose presence a response is reinforced and another (S^Δ) in whose presence reinforcement is withheld thereby experiences an instance of the Distinction or Difference relational frame which holds between the stimuli. Any animal which discriminates between light and dark or between heat and cold experiences an instance of the Opposition relational frame. Any animal that learns to choose the larger or smaller of two objects experiences an instance of the Comparison relational frame, while any form of operant or instrumental learning involves experiencing an instance of the Causal Action relational frame which holds between the behaviour and its consequences. Yet none of these extremely common behavioural experiences are sufficient by themselves to yield generalisation on the matching-to-sample task in line with the inferences which are legitimate as a matter of logic in such cases.

There is, of course, nothing controversial in the claim that something more than the mere experiencing of numerous instances of a particular relational frame is required to explain the propensity to generalise in accordance with the inferences legitimated by that relational frame on the matching-to-sample task. The fact that animals fail to show generalisation on this task which conforms to the principle of equivalence despite repeated exposure to instances of that relation during training is enough to show that something more is needed to account for the ability of the child to succeed where animals fail. Accordingly, Hayes is well aware of the need to provide some account of what it is that distinguishes the relational experiences which child encounters as it learns its first language and which enable it to succeed on the matching-to-sample task from those which are available to pre-linguistic children and animals who fail to show this behaviour. Unfortunately, in our view, his account of what it is that distinguishes these two kinds of relational experiences is defective.

Semantic learning and the experience of arbitrary relations.

According to Hayes, what distinguishes the relational experiences which the child encounters in the course of learning its first language and which give it the ability to respond relationally on the matching-to-sample task from those which are encountered by pre-linguistic children and animals who fail to respond in this way is that the former involve relations which are *arbitrary* in the sense that the stimuli in question have no intrinsic property in common by virtue of possessing which they stand in that relation to one another and are simply defined as related in that way to one another by social convention. He illustrates this distinction by comparing the non-arbitrary case where two objects stand in the relation of Comparison to one another whereby the one is taller than the other with the arbitrary case where the algebraic notation *aRb* is given an interpretation such that *a* and *b* are to be understood as two discrete objects standing in the relation *R* to one another and *R* is to be understood as the relation "taller than". For Hayes, the important difference between these cases is that in the non-arbitrary case the two objects have a property in common, that of having a certain height, with respect to which they also differ in that one has more of it than the other. Moreover, that property and the difference between the two with respect to it can be directly "read off" by the organism from the stimulus pattern presented to the organism's sensory receptors by the simultaneous occurrence of both objects in its stimulus environment. Whereas in the arbitrary case it is only the (in this case temporary) reinforcement practices of the verbal community which define the symbolic formula as standing for two objects related in this way to one another. Thus in the non-arbitrary case the organism is learning to respond directly to a feature of the stimulus pattern which occurs when the two related objects are juxtaposed in that organism's stimulus environment; whereas in the arbitrary case the organism is compelled to "abstract" the relation from the reinforcement practices of the verbal community when it (the organism) emits or responds to the symbolic formula used to represent the relation.

Arbitrariness is not enough.

Now it is perfectly true that the relation between the two stimuli to which the subject is exposed in the training sessions of the matching-to-sample task is an arbitrary relation in the sense defined, one which the subject can only succeed in identifying by, in some sense, "abstracting" from his/her experiences of the reinforcing practices of the experimenter. It also seems likely that this feature of the situation contributes to the difficulty which both animals and younger children have in generalising in ways that appear obvious and natural to any reasonably intelligent human adult. It is also true that semantic learning, learning the meaning of words and other symbols, involves exposure to a relation which is arbitrary in Hayes' sense. But what cannot be plausibly maintained is that repeated exposure to such arbitrary relations is by itself sufficient to explain the childs's acquisition of the ability to abstract arbitrarily defined relations from the reinforcement practices of other members of the verbal community.

For, although animals are not, by and large, exposed to relations which are arbitrary in the sense that the relation needs to be abstracted from the reinforcing properties of the social group rather than from some feature which the related stimuli have in common, they *are* exposed to relations, such as equivalence between (a) the visual appearance, (b) the sound and (c) smell which is characteristic of a particular individual or a member of a particular species, which are arbitrary in the sense that there is no feature which the related stimuli have in common other than the fact that they all act as discriminative stimuli relative to the same contingency or family of contingencies. In other words, animals are regularly required to learn equivalence relations between stimuli which have no feature in common other than the way the behaviour emitted in their presence is consequated. It is true that what makes the stimuli equivalent in the one case is a social convention, whereas in the other case it is the fact that the stimuli have a common source in the individual or species from which they emanate; but this is hardly the kind of difference which would be expected to produce equivalence responding on the matching-to-sample task in the former case and not in the latter.

Hayes' supplementary account.

In his discussion of this issue, Hayes suggests that there is a parallel between what is learned when the child learns the meaning of a word like *Daddy* and generalisation in accordance with the principle of symmetry on the matching-to-sample task. In learning the "meaning" of *Daddy*, the child learns both (a) to pick out its father when asked a question like *Which is your Daddy?* and (b) to emit the word *Daddy* when confronted by its father. This is an analogy for the situation in which having learned to pick *B* (its father), given *A* (the

word *Daddy*), it is predisposed, given *B* (its father), to pick *A* (the word *Daddy*) and *vice versa* - having learned to pick *A* (the word *Daddy*), given *B* (its father), it is predisposed, given *A* (the word *Daddy*), to pick *B* (its father).

A critique of the supplementary account.

There are three points which need to be made in relation to this suggestion:

(1) This is a quite different point from the one which Hayes makes about the arbitrary nature both of the semantic relation and of the relations involved in the matching-to-sample task. The semantic relation that holds between a word and its "meaning" (however that is interpreted) is an arbitrary relation in Hayes' sense; but that is not the feature which gives initial plausibility to the suggested analogy between learning the meaning of a word and learning to generalise symmetrically on the matching-to-sample task. The significant feature is the training which the semantic relation allegedly gives in the practice of repeatedly switching back and forth between picking *B*, given *A*, and picking *A*, given *B*, and, hence, in generalising in a symmetrical way on the matching-to-sample task.

(2) The semantic relation between a word or other symbol and its "meaning" (however interpreted) is not an equivalence relation, as Hayes - here following Sidman - seems to suppose. Reflexivity (*aRa*) does not apply. *Daddy* means the child's daddy, not the word *Daddy*. Symmetrical inferences (If *aRb*, then *bRa*) don't go through. If *Daddy* means the child's daddy, the child's daddy doesn't mean the word *Daddy*. Transitivity (If *aRb* & *bRc*, then *aRc*.), moreover, only goes through in the special case where one symbol or word stands for another. For example, we might say that the Green signal on the traffic light means *Go* and *Go* means that you may proceed. From this we may infer by the principle of Transitivity that the Green signal on the traffic light means that you may proceed. But in other cases, as when *Daddy* means the child's father, there is nothing that the child's father "means" in the relevant sense of that word. On the other hand, this is clearly a case where the principle of Reciprocity (If *aRb*, then *bRa*) applies. If *Daddy* means the child's father, then the child's father is the referent of *Daddy*. Evidently the semantic relation is an instance, not of Coordination (Equivalence), but of what we are proposing to call the Causal Action relational frame.

(3) We have serious doubts about the analogy between switching from picking an object after hearing the word that stands for it to uttering the word in the presence of the object and *vice versa* and switching without further training from picking stimulus *B* on the matching-to-sample task, given *A*, to picking *A*, given *B*. We are not satisfied that the analogy between the two situations is sufficiently close for the experience of learning to do the former to generalise to and thereby explain the acquisition of the disposition to do the latter. For it to do so, it would be necessary to suppose that the response of uttering a word in the presence of an object with which it has been arbitrarily associated in the subject's reinforcement history belongs to the same response class with that of picking out the word from a number of other auditorily or visually presented words in the presence of the same object. That these two responses would belong to the same response class for any reasonably intelligent adult human subject is not in doubt, since, in the appropriate context, both would constitute a way of answering a question about the meaning of the word in question. What is not so clear is that they would naturally fall into the same response class for a child in the early stages of acquiring linguistic competence.

Relational frames and the theory of sentence construction.

In view of these doubts about the adequacy of Hayes' account of the relationship between equivalence and other forms of relational frame responding on the one hand and the child's acquisition of linguistic competence on the other, we propose to explore another approach to the problem of understanding this relationship. The foundation of this approach is the suggestion made by one of us in a recent paper (Place 1992) to the effect that the relational frames described by Hayes should be understood within the context of the theory of sentence construction and of the role of the *autoclitic* (Skinner 1957) in that process which was developed in an earlier paper (Place 1983).

It is assumed for the present purpose that Skinner's term "autoclitic", when used as an adjective, can be treated as equivalent to the term "syntactic", as used in grammar, logic and linguistics, and that the term

"autoclitic frame" is the counterpart within Skinner's empiricist theory of sentence construction to the term "syntactic structure" within Chomsky's (1957) nativist theory. Conceived in this way, an autoclitic frame may be defined as an abstract framework consisting of a sequence of "gaps" or "variables" which, depending on the type of autoclitic frame involved, are filled by an appropriate "tact" or lexical word, verb phrase, noun phrase or clause (subordinate sentence) and whose filling is indicated by the autoclitic words, autoclitic suffixes (or "minimal tacts", as Skinner calls them), and other autoclitic features such as word order which define the gaps and give the resulting sentence its formal structure.

Autoclitic frames, so conceived, are of two kinds, *sentence frames* and *phrase frames*. For our present purpose a *sentence* may be defined as a string of words which is capable of acting as a discriminative stimulus with respect to a particular contingency or contingency type for any listener who is a competent member of the verbal community by whose standards the sentence is sufficiently well-formed to be intelligible. Sentences in this sense vary in complexity and in the number of contingencies and contingency terms which they specify. A minimal or "atomic" sentence specifies a single contingency term, i.e., an event or state of affairs which, for the listener or for someone with whom the listener is able to identify in listening to what is being said, constitutes either (a) an antecedent condition, (b) behaviour to be performed or (c) the consequences of some behaviour. Such minimal sentences are invariably found to consist of smaller word strings, known as *phrases* which cannot by themselves control the listener's behaviour in the way that a complete sentence can; but which, nevertheless, function as discrete sub-units within the various sentences in which they can and do occur. Moreover, it is generally accepted by grammarians, linguists and logicians that a minimal or atomic sentence will invariably consist of a *verb phrase* or "functional expression", to use Frege's (1879; 1891) term and one or more *noun phrases* which occupy what Frege calls the "argument place(s)".

Verb phrase frames consist of a gap which is filled either by an adjective or by the root of a verb preceded and/or followed by what Skinner calls the "qualifying autoclitics" which provide indications of affirmation/negation, voice, tense and aspect. Examples of such frames are *will not be (A), is (V)-ing* and *have (V)-ed*. Noun phrase frames consist of a gap to be filled either by a proper name without autoclitic markers or by a descriptive predicate preceded either by what Skinner calls a "quantifying autoclitic", such as the definite and indefinite articles (*an (N)* and *the (N), some (N)s, all (N)s, any (N), no (N)*, etc., or by an indexical like *this (N)* or *that (N)*, a variety of autoclitic which appears to have been overlooked in Skinner's taxonomy.

An *atomic sentence frame* consists of at least two gaps, one occupied by the verb phrase and one or more gaps occupied by noun phrases. Atomic sentence frames are of two kinds, *monadic* or *single-place predicate frames*, like *N is bald* or *N is groaning*, and *polyadic*, *multi-place predicate* or *relational frames*, like *X is the same as Y* or *X is the opposite of Y* etc. In the case of polyadic or relational frames, the gaps are often marked by a preceding preposition. The exceptions to this rule are in the case of the subject term and, in frames involving a transitive verb in the active voice, the direct object term. These prepositions, together with case endings, like the only surviving example in English, the genitive or possessive *`s*, are referred to by Skinner as "relational autoclitics".

Compound sentence frames consist of gaps filled by atomic sentences or "clauses", as they are called by grammarians, linked by what Skinner calls "manipulative autoclitics". Compound sentence frames are themselves of two kinds, *connected sentence frames* and *embedded sentence frames*. In a Connected Sentence Frame two discrete atomic sentences are linked together by such manipulative autoclitic pairs as the Conjunction *Both ...., and ....*, the Disjunction *Either ...., or ....*, and the Conditional *If ...., then .....* . In an Embedded Sentence Frame a complete atomic sentence or clause is used to fill a gap in another atomic sentence frame which would otherwise be occupied by a noun phrase, thereby embedding one sentence inside another. Embedded sentence frames are further sub-divided into two main kinds, those containing *relative clauses* which are used, in the main, in order to make an identifying reference to some individual or topic (as in *the man we met in the pub last night*), and *indirect quotations* which, as Geach (1957) puts it, give the "gist or upshot" of what someone has said or is inclined to say and think. Sentences like *He said that he thought it was going to rain* which are said by philosophers to ascribe "propositional attitudes" to speakers and agents are of this kind.

Two principles emerge from this this discussion :

(1) autoclitics provide the "glue" which holds together the different types of autoclitic frame,
(2) the different types of autoclitic in Skinner's taxonomy correspond rather precisely to the different stages which need to be distinguished within the hierarchically ordered process of sentence construction and provide the "glue" which holds together the autoclitic frames which are constructed at each stage of the process. [4]

These relationships are summarised in Tables 5 and 6:

Table 5. Autoclitics and the sentence construction hierarchy.

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

Some implications of this view for relational response generalisation.

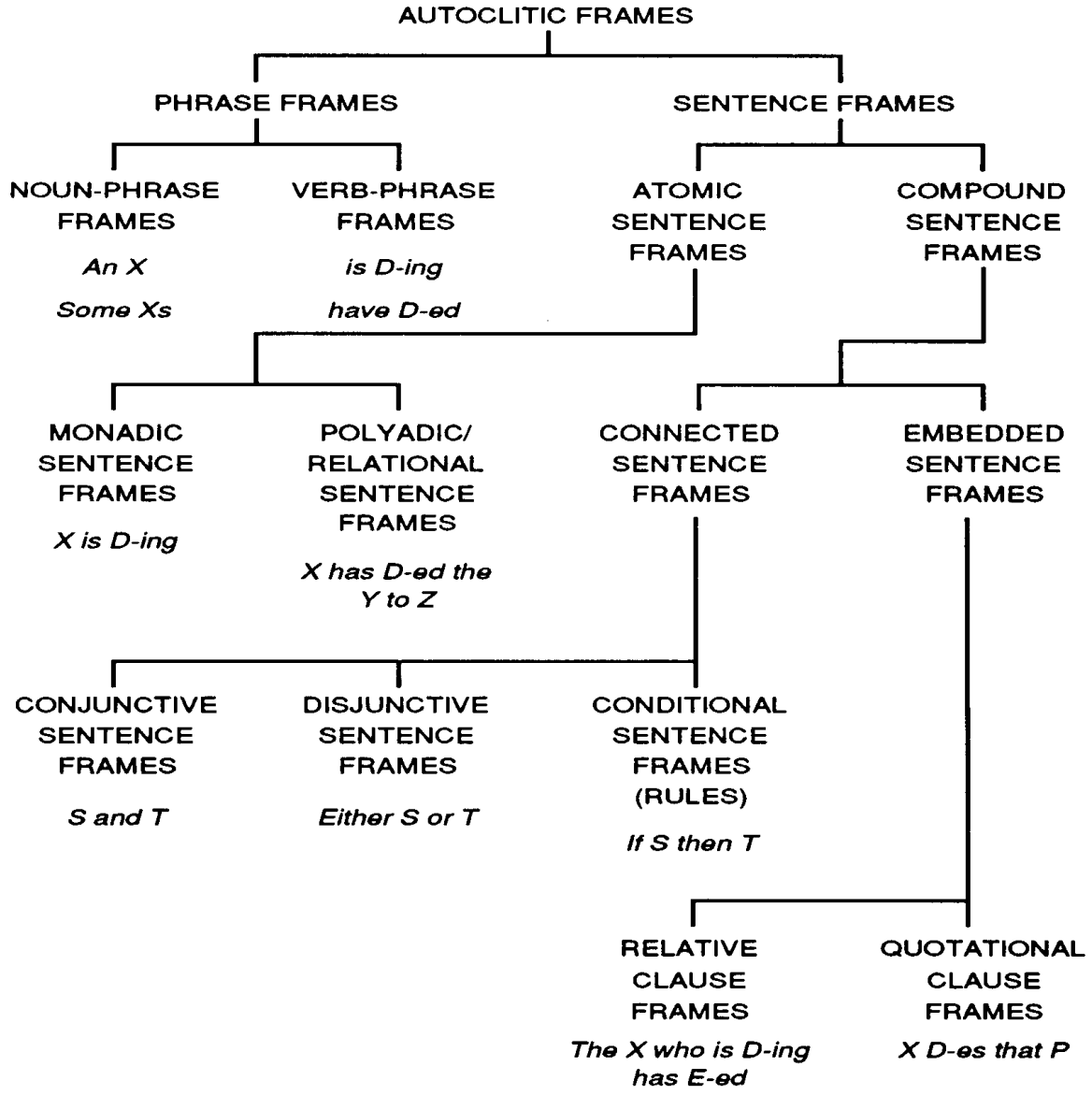
What implications does this view of the nature of relational frames in general and of equivalence, considered as a species of relational frame, in particular have for our interpretation of the phenomenon of equivalence class generalisation on the matching-to-sample task? As shown on Table 6, a relational frame is a variety of atomic sentence frame, one which is constructed around a relational or multi-place predicate and from which, as a matter of logic, a particular pattern of inferences can be drawn. It assumed, moreover, that equivalence class generalisation on the matching-to-sample task is behaviour that not only conforms to, but is controlled by a relational frame in this sense. From these two premises it follows that such generalisation is mediated by the subject's self-directed emission of a relational sentence which conforms to the relational frame in question. In other words, equivalence class responding on the matching-to-sample task resembles most, if not all the human behaviour studied in the psychological laboratory, which, as John Wearden (1987) has argued, almost invariably consists of what Skinner (1966; 1969; 1984) calls "rule-governed behavior". In other words, it is behaviour which is controlled by a verbal specification of the prevailing contingency, in this case the relation between the sample and the stimulus which, when matched to it, secures reinforcement.

At first sight this view of equivalence class generalisation may seem implausible when placed alongside the evidence that this kind of generalisation is found in children as young as two years of age. For the notion that two visual stimuli which differ radically in appearance are to be treated as equivalent to one another would seem to be a much too sophisticated notion for a child of that age, however precocious, to be able to express in the form of sentence. What a child of that age might well be able to give sentential expression to is the notion that the stimuli in question "go together" or "belong together". But whereas anyone who has grasped the concept of two things being equivalent to one another knows what inferences do and do not follow from the statement that one thing is equivalent to another, it is not at all clear what inferences do and do not follow from the statement that two things "go" or "belong together".

This may be unimportant when it comes to explaining the generalisation observed in the matching-to-sample task. For it is arguable that all that is required in order to explain *that* behaviour is that child's formulation of the relationship should *suggest* the inferences in question, not that the inferences should follow as a matter of strict logical entailment; and there seems no reason why the notion of two things "going" or "belonging together" should not do *that*. Nevertheless, the vague notion that two things somehow "go" or "belong together" would only be expected to suggest the drawing of inferences conforming to such principles as Reflexivity, Symmetry and Transitivity in so far as the child has already and learned to draw those inferences in the case of sentences where the ability to draw them is part and parcel of learning what it means to say that one thing is "the same as", "different from" or "bigger than" another.

[4] Skinner's "descriptive autoclitics" (Skinner 1957 pp. 313-320) are the exception here. What Skinner calls "a descriptive autoclitic" is what we are here calling "a quotational clause frame", like *I am inclined to think that* or *I am sorry to have to tell you that* whose subject term is in the first person. These self-quotations are used by speakers as an autoclitic device to qualify the embedded assertion thereby indicating the speaker's degree of confidence in making the assertion or otherwise modifying its effect on the listener.

Table 6. A taxonomy of autoclitic frames



Now while it may well be the case that no child of two is likely to have mastered a relational sentence from which all three types of inference follow as a matter of logic, it seems not implausible to suggest that a child of that age would have encountered Reflexivity in learning what it means to describe two qualitatively identical stimuli as *the same as* one another, Symmetry in learning what it means to say that one thing is *different from* another, and Transitivity in learning what it means to say, e.g., that one thing is *bigger than* another.

Conclusion.

This, however, is pure speculation. What we need here is hard empirical data, data on the way in which the development of the ability to generalise on the matching-to-sample task in accordance with the principles of Reflexivity, Symmetry and Transitivity is related to the development of the child's ability to construct and draw the appropriate inferences from relational sentences which instantiate relational frames involving those inferences. On the evidence we already possess there can be little doubt that there is some kind of causal

relationship between the child's acquisition of linguistic competence on the one hand and its ability to generalise in accordance with the inferences licensed by equivalence and other relational frames on the other. But what we do not know is what aspect of the child's newly-acquired linguistic competence makes the difference. We have made one suggestion, the suggestion that it is the acquisition of the ability to construct and draw inferences from relational sentences. Whether we are right only time will tell.

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