Relational Frame Theory

Over the best part of the last three decades, an increasing number of behaviour analysts have been developing experimental preparations that generate complex and "novel" human behaviour under laboratory conditions. This research has opened up exciting new vistas of research for the behavioural analysis of human language and cognition. We will now outline these research developments.

Many readers will be aware of the well established behavioural principle of Pavlovian or respondent conditioning. A dog, for example, will become excited when it hears the sound of its owner's car engine, because on previous occasions hearing this sound has been followed by the actual arrival of the owner. The same dog may show fear, however, if the owner shouts in an angry tone, because such shouting has previously been followed by punishment. Furthermore, we can train a dog to get excited when it hears a specific word, such as "cookie", by consistently giving the dog some food after saying "cookie". In this way we can attach important psychological functions (e.g., of food) to previously neutral events (e.g., "cookie").

Something interesting happens when we reverse this order of events, however. Imagine that every time we feed a dog with a biscuit we say, "cookie" just after he has finished eating. When we have done this several times, will the dog become excited (anticipating a meal) if we say "cookie" without showing him a biscuit? The answer is no. A large body of research has shown that animals do not readily learn about neutral events, such as words, that follow important ones such as food (see Hall, 1996). Animals can only easily learn about events that predict the onset of something which is psychologically important.

For verbally-able humans it is a quite different story. Imagine, for instance, that we repeated the above experiment in the following way with a young child. Each time we give the child a cookie we say "cookie" just after the child finishes eating. What would happen if one day we shouted "cookie" when the child was in a nearby room? Most likely, the child would come running to us expecting to get a cookie. In effect, the sound of the word would make the child think of cookies, even though the word "cookie" had never predicted the delivery of an actual cookie. This is entirely consistent with a large body of experimental evidence that has shown that humans, unlike animals, have a strong tendency to relate a neutral event to an important event, even though the former has always followed the latter. Respondent conditioning, therefore, is often radically different for verbally-able humans than for all other animals. When the word cookie predicts the delivery of an actual cookie, both humans and non-humans can quickly learn to become excited. Only for the human, however, does the word cookie and the actual cookie enter into a bi-directional stimulus relation wherein each can equally stand for the other. For the new-wave behaviour analyst, this bi-directionality is deemed to be one of the most important defining features of human language and cognition.

Another important feature of human language and cognition, from the new-wave perspective, involves the emergence of complex networks of related events. Imagine, for example, a young girl who eats a cookie. Afterwards she is told, "You have just eaten a cookie, and another word for cookie is biscuit". From now on, whenever she hears the word "biscuit" she will probably think of the word "cookie," and actual cookies as well. In effect, simply hearing the word "biscuit" can make the girl think of an actual cookie, even though the word has never been directly associated with a real cookie. Numerous studies have demonstrated this basic effect, and have also shown that it is possible to teach even young children large and complex relational networks (e.g., Smeets, Barnes & Roche, 1997). When this occurs, we say that an equivalence relation has been established between actual cookies, the word "cookie" and the word "biscuit".

The construction of relational networks, such as equivalence relations, between words and events seems to underlie many facets of human language and cognition. Mathematics, for example, is the result of thousands of years of developing and refining increasingly complex and abstract relational networks. The logical statement "If A = B and B = C then A = C" represents just one very simple relational network that tells me the value for C based on the value for A (i.e., A and C participate in a derived transitive relation). With this simple network, if I weigh A and find it be 1 kg, I now know that both B and C each weigh 1 kg without having to weigh them.

Relational networks are also exciting because they appear to parallel many natural language phenomena, including, for example, naming behaviors. For instance, if a young child is taught to point to an object given a specific written word, the child may point to the word given the object without further training. Consequently, given training in the spoken word "chocolate" and actual chocolate, and between the written word chocolate and the spoken word "chocolate," a child will identify the written word chocolate as in an equivalence relation with "chocolate," even though this performance has never actually been trained. Thus, symmetry and transitivity between written words, spoken words, pictures and objects is commonplace in naming activity (Hayes, Gifford & Ruckstuhl, 1996).

How is relational responding established? We should be clear at this point that the description of language and cognition in terms of relational networks, does not, on its own, constitute a behaviour analytic explanation of these important human phenomena. In order to explain language and cognition (e.g., derived relations between written and spoken words) we use RFT (Hayes & Hayes, 1989) which seeks to explain the generative nature of language in terms of already-established behavioural principles. Let us examine this behavioural theory in greater detail.

Where do Relational Frames Come From?

We have long known that organisms can respond to the formal relations between stimuli. For example, many species can respond to the "dimmest" of several illuminated stimuli (Reese, 1968). Such non-arbitrary relations are based on the formal properties of the relata (i.e., one of the stimuli really is the dimmest). However, humans can respond in accordance with relations that are controlled, not by the formal properties of the relata, but by specific contextual cues.

Contextual control for relational responding becomes established during early language training interactions. During these interactions, children are often presented with objects and asked to repeat their names. This can be described as; see object A, then hear name B, and say name B. Children are also taught to identify objects when they hear the appropriate name. This may be described as; hear name B, then see object A. Initially, each object-word and word-object relation is explicitly trained. However, when a child has been exposed to enough of this relational training, derived relational responding may emerge. Suppose, for example, that a child with this history of naming is taught; "This is your shirt". Contextual cues (such as the word "is", and the context of the social interaction more generally) predict that if this object is a "shirt" (object A - name B), a "shirt" is this object (name B - object A). Consequently, the child may now identify the shirt when asked "Where is your shirt?" in the absence of differential reinforcement for doing so. This derived, arbitrarily applicable relation is referred to as a "relational frame". Thus, deriving relations is not genuinely novel, but is a type of generalized operant behaviour. In other words, patterns of relational framing are brought under the control of contextual cues (e.g., the word "is") through a process of differential reinforcement. That is, to begin with, both elements of a relation are explicitly trained (e.g., "A is B" and "B is A" are both reinforced). Only then can this history of reinforcement generalize so that a derived relation emerges without reinforcement (e.g., if "X is Y" is reinforced, then "Y is X" is derived). In effect, a well established principle of behaviour analysis, that of the generalized operant, has been used by RFT to explain one of the key generative features of human language.

Other types of stimulus relations that permeate human language may also be explained in terms of generalized operant behaviour. Imagine, for instance, a young child who is taught to respond to a range of questions such as "Which cup has more milk?" or "Which box has more toys?" Given sufficient exposure to such questions and appropriate reinforcement for answering them correctly, the relational response (e.g., between two cups) will come under the control of cues other than the actual relative quantities (e.g., the word "more"). When this occurs, the relational response can be arbitrarily applied to other events, even when the formal properties of the related events do not occasion the relational response. For example, a five pence piece is worth more than a two pence piece, even though the former is smaller than the latter. This provides yet another example of the way in which RFT explains advanced language and cognitive phenomena (e.g., a child's understanding of financial value) in terms of a history of differential reinforcement that is generalized to novel events.

Relational Frame Theory is a behavioural theory insofar as it draws together a number of well established behavioural principles to explain many aspects of human language and cognition. For example, RFT has drawn together the principles of respondent control (or Pavlovian conditioning) and generalized operant behaviour to explain spontaneous and apparently uncontrolled human anxiety (see also the subsequent paper). For illustrative purposes, imagine a young child who hears that she is going on a "boat", and subsequently experiences a terrible bout of sea sickness (i.e., the word "boat" becomes aversive via Pavlovian conditioning). The child may then learn at school that a "Car Ferry" is a type of boat. Later, on hearing that she is going on a car ferry, the child may show signs of anxiety despite having had no direct experience with car ferries. This effect is based on the respondently acquired function of "boat" and the derived relation between "boat" and "car ferry". In effect, the child does not need to experience the possibly aversive consequences of traveling on a car ferry in rough seas, in order to show signs of anxiety. Several authors have combined behavioural principles in accordance with RFT (e.g., respondent conditioning and generalized operant behaviour) to account for a wide range of complex psychological phenomena that have hitherto fallen outside the purview of behaviour analysis, such as anxiety (Friman, Hayes & Wilson, 1997), depression (Hayes & Wilson, 1993), rule following (Barnes, Healy & Hayes, in press), prejudice (Watt, Keenan, Barnes & Cairns, 1991), self-awareness (Dymond & Barnes, 1995), self concept

(Barnes, Lawlor, Smeets & Roche 1996), sexual arousal (Barnes & Roche, 1997b; Roche & Barnes, 1997, 1998), spirituality and mysticism (Barnes & Roche 1997a; Hayes, 1984).