

BOOK REVIEWS

Steven C. Hayes, Dermot Barnes-Holmes, and Bryan Roche (eds), *Relational Frame Theory: A Post-Skinnerian Account of Human Language and Cognition*. Dordrecht: Kluwer Academic/Plenum Publishers, 2001, 283 pages. ISBN 0-306-46600-7

Reviewed by Andrea J. Frank (University of Iowa)

Relational Frame Theory (RFT), an ambitious theory that tries to explain human language and cognition in behavioral terms, is laid out in painstaking detail in *Relational Frame Theory: A Post-Skinnerian Account of Human Language and Cognition*. This theory originally stems from a body of literature called stimulus equivalence. Formally defined by Sidman and Tailby (1982), stimulus equivalence is the hierarchical and bi-directional relationship between stimuli that allows for those stimuli to be interchangeable with one another. In other words, if a person is taught that a “star” is equal to a “circle”, then that person should also be able to say that a “circle” is equal to a “star”; this is called symmetry. In addition, if that same person is taught that the “circle” equals a “square”, then that person should also be able to say that a “star” equals the “square”; this is called transitivity. These two properties, symmetry and transitivity, in addition to reflexivity (“square” equals “square”) are the three properties that must be obtained in order to say that a person has demonstrated stimulus equivalence. This behavioral phenomenon has been the focus of an extensive body of literature in behavioral psychology for about the last two decades. The attention to this phenomenon is due to the ability of behavioral psychologists to show novel relationships based on teaching only one or two relations between abstract stimuli. This phenomenon is thought by behavioral psychologists to be a way in which to explain complex behavior that could not be explained by direct contingency learning. The authors of this book, however, have taken up the research in stimulus equivalence and greatly expanded upon its explanatory capabilities of novel behavior in humans. They have developed RFT, a theory that the authors believe has the capability to explain human language and cognition in behavioral terms.

The last behavioral theory to attempt to explain language behavior was presented in *Verbal Behavior* by B.F. Skinner (1957). The Introduction of *Relational Frame Theory* pays homage to the efforts put forth by B.F. Skinner

and by J.R. Kantor, another behavioral psychologist that proposed a highly theoretical theory of language. Hayes, Blackledge, and Barnes-Holmes, however, state that Skinner's theory of verbal behavior was lacking in the type of explanatory power needed to explain something as complex as human language and cognition. They explain that Skinner's definition of verbal behavior was too broad; the behavior of a rat pressing a bar to receive food was considered to be verbal behavior. In Hayes et al.'s opinion, this behavior should not be considered verbal because it is behavior that can be induced via direct contingency learning. While RFT is heavily based on the principles of radical behaviorism, a branch of behaviorism defined by Skinner, it also adds complexity to the theory in order to explain language and cognition.

Skinner's main goal in creating a theory of behavior was to define general rules of behavior that would be useful for every organism in every context, rules that might possibly explain all behavior and its interaction with the environment. Skinner attempted to create a theory of verbal behavior that was based on these general rules by defining the dialog between a speaker and listener as a series of contingencies that are mediated by the listener, who has been trained by the verbal community to deliver consequences based on such behavior. In the Introduction, Hayes et al. point out that Skinner may have been mistaken in stating that the listener in a speaker-listener dichotomy delivers the consequences for verbal behavior. This allows for the learning of the speaker to be based on the learning history of the listener rather than his/her own learning history. For any other behavior, the behavior of an organism is based on its own learning history, not the history of another organism.

In the second and third chapters, the authors (Hayes, Fox, Gifford, Wilson, Barnes-Holmes, and Healy and Barnes-Holmes, Hayes, Dymond, and O'Hora; respectively) attempt to return the verbal environment back to the organism performing the behavior, be it the speaker or the listener. In this portion of the book, the main assumptions and premises of RFT are explained. RFT, as previously stated, is based on radical behaviorism and stems from the stimulus equivalence research area. As seen in the stimulus equivalence example above, certain relations are learned, and as a result of those relations, novel behavior emerges. The authors of this book see this relational behavior learning in a slightly different manner. For them the novel behavior that seems to be automatically produced by human adults is actually learned through several instances of relational responding throughout their lifetime. For example, when a child is taught that the word for a dog is "dog", the child experiences a visual stimulus of a four-legged, furry animal, and hears "dog". Later the child might

hear the word “dog” and then see the visual stimulus. In the first instance Stimulus A is followed by Stimulus B. In the second instance Stimulus B is followed by Stimulus A. In this scenario it is easy to see how a child would learn the bi-directional relationship called symmetry in stimulus equivalence research. Whereas stimulus equivalence research has only examined the property of equality, RFT includes other relationships such as opposition, greater-than, less-than, you-I, here-there, now-then, etc. Behavior based on this type of relational learning is called derived relational responding. There are two different types of derived relational responding: one based on non-arbitrary stimuli (physical stimuli present in the environment) and one based on arbitrary stimuli (abstract concepts or stimuli). For example, responding to an object based on size is non-arbitrary responding because size is part of the attributes of the physical stimulus. Arbitrary relational responding, or arbitrary applicable relational responding, as the authors call it, is based on responding to stimuli that are in a context that is modifiable. For example, if Stimulus A is arbitrarily designated as larger than Stimulus B, then that property of “larger-than” is arbitrary because it is not part of the stimulus’s physical form.

RFT’s main focus is on the arbitrary applicable relational responding with some explanation of non-arbitrary responding, and the main premise is that of a functional context, i.e., a context that modifies how a person will respond to two stimuli. If a person is told that Stimulus A is larger than Stimulus B, then if asked which stimulus is larger, the person should answer Stimulus A, however, if asked which stimulus is smaller, then the person should answer Stimulus B. The verbal question of which is larger or smaller is the functional context that controls the responding to the two stimuli that are related through an arbitrary relation. A set of stimuli influenced by an arbitrary relation constitutes a “relational frame”, and responding based on a context is derived relational responding. Non-arbitrary relationships between stimuli do not need a relational frame because the relation between those stimuli lies in the physical properties of the stimuli, whereas arbitrary relations between stimuli need a relational frame in order for a person to be able to respond correctly when given a particular context. This arbitrary applicable relational responding is considered to be a type of generalized operant conditioning (e.g., imitation) produced by multiple exemplar training (p.28).

There are three properties or types of relations that result from a relational frame. Mutual entailment is the reciprocal relationship between stimuli. For example, if Stimulus A is larger than Stimulus B, then Stimulus B is smaller than Stimulus A. Combinatorial entailment is the relationship between stimuli when

two or more stimuli mutually combine. In other words, if Stimulus A is larger than Stimulus B and Stimulus B is larger than Stimulus C, then Stimulus A is larger than Stimulus C (combinatorial entailment) and Stimulus C is smaller than Stimulus A (mutual entailment). The authors state that these concepts should be important to psychologists because stimulus functions (e.g., emotion) can transfer through an arbitrary stimulus class. Any change in stimulus function is called a transformation of stimulus function. For example, if there is a pre-established relationship among Stimuli A, B, and C and then shock is paired with Stimulus A, then anxiety may be observed with subsequent presentations of Stimuli B and C when anxiety was not previously observed with presentations of these stimuli. The process in this case is the learning “history that gives rise to a relational operant that is under a particular kind of contextual control” (p.34). The action involved is framing events relationally, and the outcome is the properties that define the relational frame.

In RFT, the relational frame is a functional unit, and it is the smallest unit capable of encompassing arbitrary applicable relational responding, which includes speaking with meaning and listening with understanding. Given that, this is the smallest possible unit capable of this type of behavior, which means that for behavior to be classified as verbal it must first show the properties of a relational frame. The specific definition given to a relational frame separates humans and animals in the type of general learning rules that can take place. Whereas Skinner’s general learning rules applied to both humans and animals in the form of direct contingency learning, it is proposed that RFT is an additional general learning rule that is only exhibited by humans after extensive training with relational instances. The authors claim that this type of learning has not been found in animals and cite an article that found that language trained chimpanzees did not show the property of mutual entailment (Dugdale and Lowe 2000). It is curious, however, that they do not discuss an experiment that trained and tested for symmetry (mutual entailment) and stimulus equivalence (combinatorial entailment) in a California sea lion, with successful results (Schusterman and Kastak 1993). Although this is the only instance of its kind, this experiment deserves mention in the present context because Schusterman and Kastak gave the sea lion several training instances with relational responding and found all of the properties that define a relational frame with the exception of transformation of functions — a property not tested for in the experiment.

The discussion of RFT in the book, which is general throughout the explanation of the main theory, later moves into a more concrete discussion of

how RFT applies to language. “The lowest level of a relational frame [a relation that sets the occasion for some relational activity to specify a relation between the events in a frame] is a sentence” (p. 57). A sentence does not have to make sense to be a sentence; it only has to “form a complete network” (p. 57). The authors use the example of the sentence “Colorless green ideas sleep furiously” (p. 57). This sentence contains a relation between the “colorless green ideas”, which is sleep. The sentence makes no logical sense because there is no psychologically relevant function. In other words, “colorless green ideas” has no relevant meaning for humans because it is not a term that exists in our learning history. This illogical frame, or network, is complete as a sentence because it contains all the required components (verb, noun, etc). The specific contextual cues determine if the network is complete (e.g., a story, a sentence, or a mathematical proof). If this was only meant to be a sentence, then it is complete; but if it was meant to be a story, then the network is incomplete. To show how productive the relational frames are as a method of allowing novel responses, the authors discuss an experiment that trains 8 relations and results in 120 derived relations given different contexts and different arbitrary relations trained among stimuli (Wulfert and Hayes 1988). In addition, at the end of Chapter 3, Barnes-Holmes et al. introduce a new empirical method that can be used to train arbitrary relations in most verbal contexts, and they call this method the relational evaluation procedure.

In the Barnes-Holmes, Hayes, and Lipkens chapter, “Relations among relations: analogies, metaphors, and stories”, extensions of RFT are discussed and the network becomes more complex. The authors argue that relations among relations are necessary for language learning because building a language with singular relational frames would take too long by creating one component at a time. Without relations among relations, one would not expect to see the language ‘explosion’ that occurs in very young children. There are two types of common relations among relations: analogy and metaphor. Analogies contain two frames. There is a similar relation in each frame and the two frames are related to each other via another relation. For example, in explaining the concept of freedom to a child by using examples, one might say that freedom “is like a child that is home from school on a holiday” (p. 74). Freedom and a child home from school both contain a similar concept, and the additional relation is that they are alike. With continued examples, eventually the child will begin to make a connection between the examples and come to understand the concept. The treatment of metaphor is similar to that of analogy, but contains an additional relation between two or more frames. There is, however, also an

additional transformation of function because one of the statements is changed slightly due to the other.

The next chapter, “Thinking, problem-solving, and pragmatic verbal analysis”, is different from the previous ones. Hayes, Gifford, Townsend, and Barnes-Holmes begin to extend RFT into theoretical ground where research is either scarce with regard to RFT or has not yet been conducted. They discuss the non-arbitrary application of relational frames. According to them, there are two ways that non-arbitrary relations can mix with arbitrary relations. First, non-arbitrary features can set the occasion for verbal relations, but not enter into the frames. For example, the question “Which one is bigger?” sets the occasion for a verbal relation. Second, non-arbitrary features and relations can set the occasion for relational responding and function as verbal stimuli when the answer is based on a relational frame.

In this chapter, Hayes et al. also address the position of animals in the relational frame theory framework. There seems to be an unstated assumption that there is some fundamentally different process that happens for animals and people when taught arbitrary stimulus relations. For example, if an animal and a human child were each taught a unidirectional relation between colors and the written color names, the child — but not the animal — would learn bi-directional relations and relational frames (p. 91). Every child is taught certain relations that are the basis for their subsequent relational responding. This is one of the assumptions of RFT. But one must insist that the authors overlook the findings mentioned above, which demonstrate bi-directional relations in animals (e.g., Schusterman and Kastak 1993).

Chapters 6 and 7 deal with rule-governed behavior and self-behavior. Chapter 6, “Understanding and verbal regulations” addresses rule-governed behavior, i.e., behavior that is under the control of a verbally stated contingency rather than a past history of a directly applied contingency. For example, telling a child that if they pull the cat’s tail he/she will get time-out. Chapter 7, “Self and self-directed rules”, deals with the rules one sets up for one’s self. The authors define the concept of self in RFT terms: it is “not just behaving in regard to [one’s] own behavior, but behaving verbally with regard to [one’s] own behavior” (p. 120). According to them, children initially learn to discriminate themselves from the rest of the world through the relational frames of you-I, here-there, and now-then.

In the next chapter, “Relational Frame Theory: A précis”, Hayes, Barnes-Holmes, and Roche restate some of RFT in the simpler terms of behavior analysis. They state that, if RFT is a valid theory, then “we must rethink all of

behavioral psychology as it applies to verbal organisms” (p. 153), but they do not state exactly what would need to be reconsidered. They also state that the three properties of RFT, mutual entailment, combinatorial entailment, and transformation of functions, may have to be directly trained in order for animals to show this behavior. At this point in the book, there seems to be an obvious confusion as to animals vis-à-vis RFT. Earlier in the book animals are said to have never shown this behavior, in a later chapter it is implied that animals would not be able to perform this behavior as humans do, and in Chapter 8 it is claimed that, with proper training, it may be possible for animals to show relational responding.

The remaining chapters in the book deal with areas of psychology which RFT may contribute to, such as psychological development, education, social processes, psychopathology, and religion. Chapter 9 discusses cognitive development as viewed from a behavioral and from a cognitive approach. A discussion of verbal and emotional intelligence is also included. In this chapter, the authors also address the concerns of the nativist tradition by analyzing such phenomena as the production of novel utterances, speech errors, child-directed speech, and U-shaped development. Chapter 10 deals with issues of education. Barnes-Holmes, Barnes-Holmes, and Cullinan discuss the utility of RFT as a tool for teaching language skills. In addition, they discuss how RFT relates to logic and how these two areas can be used to teach deductive reasoning skills. In Chapter 11, “Social processes”, Roche, Barnes-Holmes, Barnes-Holmes, and Hayes apply RFT to such phenomena as group social behavior, prejudice, persuasion, and sexual attraction. They describe how emotion can be transferred to new stimuli through a relational frame, especially in cases of rape, where emotion can be associated with seemingly non-related stimuli.

The theme of emotional transformation of functions carries over into Chapter 12, “Psychopathology and psychotherapy”. In this chapter, Wilson, Hayes, Gregg, and Zettle examine how emotional transformation of function perpetuates depression and how RFT can be used in a clinical setting to alleviate some of the emotional stresses of the disorder. They also discuss how RFT can be added to several behavioral therapies, providing a “functional diagnostic” approach to stimulus control and transformation of stimulus functions (e.g., emotion, see p. 211). The authors also discuss the use of RFT by patients in the construction of ineffective coping strategies and ways in which it can be used to teach effective coping strategies.

In Chapter 12, “Religion, spirituality, and transcendence”, the application of rule-governance by religion is discussed. Barnes-Holmes, Hayes, and Gregg

discuss in detail how the relational frames of I-you, here-there, and now-then are used in the conceptualization of religion and God. They argue that “learning to respond in accordance with the perspective-taking frames of I-you, here-there, and now-then appears to set the stage for dualism, religion, spirituality, transcendence, and God” (p.250).

The book *Relational Frame Theory: A Post-Skinnarian Account of Human Language and Cognition* describes a brave new theory that attempts to explain human language and cognition, as well as other psychological phenomena in a neo-behaviorist framework. The theory is complex, but described in good detail. The authors seem to have left no stone unturned in their quest for a theory that is not afraid to tackle any topic within the domain of human mental life. While there are some questions that are left unanswered along the way, overall this is an intriguing book that would be appealing to anyone interested in language development and the pervasiveness of relational responding in human cognition.

References

- Dugdale, N. and Lowe, C.F. 2000. “Testing for symmetry in the conditional discrimination of language trained chimpanzees”. *Journal of the Experimental Analysis of Behavior* 73: 5–22.
- Schusterman, R.J. and Kastak, D. 1993. “A California sea lion (*Zalophus Californianus*) is capable of forming equivalence relations”. *The Psychological Record* 43: 823–839.
- Sidman, M. and Tailby, W. 1982. “Conditional discriminations 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.
- Wulfert, E. and Hayes, S. C. 1988. “The transfer of conditional sequencing through conditional equivalence classes”. *Journal of the Experimental Analysis of Behavior* 50: 125–144.

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Istvan Kecskes, *Situation-Bound Utterances in L1 and L2*. Berlin/New York: Mouton de Gruyter, 2003, vii + 228 pages. ISBN 3–11–017358–1

Reviewed by François Cooren (University of Montreal)

In his new book titled, *Situation-Bound Utterances in L1 and L2*, Istvan Kecskes offers readers a very insightful model of the production and interpretation of formulaic expressions — what he calls Situation-Bound Utterances (SBUs) — which, according to Altenberg (1998), could represent up to 80% of our language use. Starting from a cognitive-pragmatic and multilingual perspective, Kecskes shows that the study of SBUs can lead scholars to the core of a given language, since these types of pragmatic idioms can be considered “‘windows’ to the culture, thought patterns, social values, communication structures, and institutions of the society in which the source language is used” (p. 2). SBUs are defined by Kecskes as highly conventionalized and prefabricated units whose production is linked to standardized communicative situations. For instance, “I’ll talk to you later!”, “Enjoy your meal!”, and “You bet!” are pragmatic units that typically correspond to specific interactional situations, respectively the end of an exchange, what precedes the process of eating between guests, and what follows the expression of thanks by one’s interlocutor. SBUs are thus bounded to specific situations, a characteristic that explains why it is often so hard for non-native speakers to transform their conceptual system — a process that Kecskes calls “conceptual socialization” (p. 11) — in order to fit the functional requirement of the language and culture they are learning.

To investigate the features of these formulaic expressions, Kecskes introduces what he calls the Dynamic Model of Meaning (DMM), which attempts to fill the