POST-SKINNERIAN, POST-SKINNER, OR NEO-SKINNERIAN?
HAYES, BARNES-HOLMES, AND ROCHE'S
Relational Frame Theory:
A Post-Skinnerian Account of Human Language and Cognition

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The perceived inability of behaviorism to deal with complex human behavior has been a recurrent theme among its critics. Although ingenious and subtle, even Skinner's Verbal Behavior (1957) is widely faulted on these grounds, in particular, for failing to explain linguistic generativity (Chomsky, 1959). In Relational Frame Theory: A Post-Skinnerian Account of Human Language and Cognition, Hayes, Barnes-Holmes, and Roche (2001) confidently set out to remedy this situation. In doing so, they do not subvert Skinner's account by postulating hypothetical constructs, but instead extend the account by incorporating the results of a recent program of research known as "relational frame theory" (RFT). The first half of their text describes RFT and its account of language and cognition. The second half extends RFT to additional domains, among them, behavioral development, social behavior, religion, and educational and psychotherapeutic practices.

Overview
Relational frames are higher-order classes of operant behavior that are, as all operants, the product of a history of reinforcement. In particular, they are established through a history of multiple exemplar training, that is, training across multiple sets of differing responses and stimuli, the exemplars, while the reinforcement contingencies remain constant with respect to their relation. That is, although the specific responses and stimuli vary across trials, the reinforcement contingency for labeling or selecting them along a particular dimension remains the same (e.g., bigger than/smaller than, same as/different than, more than/less than, before/after). After training a sufficient number of exemplars, relational framing occurs in the presence of novel examples, that is, those not previously taught.

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For example, we may have learned that the Icelandic word, *einn*, is the same as the English word, *one*, and that *tveir* is the same as *two*. Then, by also having learned that *two* is numerically greater than *one*, the first time *einn* and *tveir* are presented in a *more than* frame, we would say that *tveir* is more than *einn*. In this example, two types of relational frames combine to produce novel responding: (a) a frame of coordination, also called an equivalence relation (i.e., *einn* is the same as *one*), and (b) a frame of comparison (i.e., *two* is greater than *one*). Moreover, the response (i.e., "more than") and stimuli (e.g., "einn" and "one") are arbitrarily applicable, that is, their function is determined by social conventions rather than by their formal properties. RFT suggests that the acquisition of relations such as these may explain how novel words, sentences, and solutions to problems are "generated" without being directly reinforced.

**Precedents.** These phenomena are not new in psychology. Although not acknowledged by the authors, Harlow’s (1949) research on learning sets or “learning-to-learn” is an important precedent. Harlow demonstrated that new problems can be efficiently solved if preceded by multiple exemplar training on problems whose solutions shared common features or patterns. For example, when monkeys were presented with a set of problems in which the correct response was to select one of two arbitrary items in positions that were randomly altered across trials, they at first made many errors. As training proceeded across multiple sets of the problem, each with new items, the sets were solved more and more quickly until some were mastered in one trial. The subjects had learned a higher-order operant, an operant that was independent of the particular items—win-stay, lose-shift. A second antecedent, this one acknowledged, is Baer, Peterson, and Sherman’s (1967) demonstration that higher-order or generalized imitation can emerge from a history of reinforcement across many exemplars of imitation. A third antecedent, this one readily acknowledged, is Sidman’s (1994) research on stimulus equivalence. Sidman has shown that training a few relations can produce many derived relations—relations that were never directly reinforced (Sidman & Tailby, 1982). In RFT, however, equivalence is but one of many relational frames that can be acquired; among the others are the relations of opposition, relative size, and time. Thus, a new, more general term was required—"relational frame"—along with additional terms for relations other than equivalence (e.g., comparison, distinction).

**Entailment.** Among the new terms are *mutual* and *combinatorial entailments*. Mutually entailed relations are the basis of relational framing and include, but are not limited to, the symmetrical relations found in stimulus equivalence. Mutual entailment, for example, may refer to the reversal of stimulus relations, as in (a) if *A* is more than *B*, then *B* is less than *A*—a frame of comparison; or (b) if *A* is the same as *B*, then *B* is the same as *A*—a frame of coordination (i.e., equivalence). In combinatorial entailment, two or more previously acquired relations combine to produce novel responding, as in, for example, if *A* is more than *B*, and *C* is less
than B, then A is more than C. This may include, but is not limited to, the transitive relations found in stimulus equivalence. Mutual and combinatorial entailment describe stimulus relations that emerge or are derived from previously acquired relations without having been directly reinforced or instructed.

Transformation of function. Another new term and relation is the transformation of function. The term “transformation” is preferred to “transfer” because functions can change in different ways depending on the relational frame. “Transfer” is best reserved for equivalence classes (i.e., frames of coordination), where training a new function for one among many equivalent stimuli (i.e., “same as” stimuli) leads to the transfer of that function to all members of the class. For example, if X and Y are equivalent, and we then learn to press a key just once in the presence of X, we will likely press it just once when Y is presented—a transfer. Transformation of function is different. If we are taught to point to stimulus A in the presence of a “more than” cue and to stimulus B in the presence of a “less than” cue, a frame of comparison has been established where A is more than B and B is less than A. Then, if we are taught to press a key twice when presented with B, but assign no specific function to A, when presented with A, we press the key three times. Here, the function assigned to B (i.e., pressing a key twice) has not been transferred to A (i.e., pressing twice is not evoked by A). Instead, as a result of A and B being put in a frame of comparison (i.e., A is more than B), the function assigned to B has been transformed such that we press the key more times in the presence of A than B.

A key theme of Relational Frame Theory is that the transformation of functions through relational frames can explain important behavioral phenomena, among them, how stimuli come to be reinforcing and aversive. For example, if stimulus class A has been established as being the opposite of stimulus class B, and the stimuli in class A are subsequently given a reinforcing function, the function of B may be transformed into being aversive. As a result, B stimuli may be avoided when A stimuli are present. Such training has important social implications. For example, if the B stimuli happen to be related to an ethnic group, the outcome may be prejudiced behavior. Or, if the B stimuli are related to a particular person, that person may be avoided, perhaps to the disadvantage of both parties. As the authors suggest, purely verbal events may play a key role in the acquisition and explanation of socially undesirable and dysfunctional relations. Moreover, treatments to alter such relations will be more effective if guided by RFT concepts.

Some Limitations

Although the authors present an excellent overview of RFT and compellingly relate how it applies to human language and cognition, their theory and its supporting body of research is not without limitations.

A new or derived process? One limitation lies in the authors’ assertion that relational framing is a new behavioral process unto itself. The
implication is that relational framing cannot be reduced to or explained by more basic behavioral processes (e.g., reinforcement, stimulus control). For instance, according to the authors: (a) "the instrumental behavior of relational framing alters the functions of behavioral processes;" (b) "relational framing is operant behavior that affects the process of operant learning itself;" and (c) "The new process is arbitrarily applicable relational responding (or framing events relationally). . . . The new technical term is relational frame" (pp. 45-46, italics added). In our view, the authors do not explain clearly enough what they mean by the assertion that relational framing "affects the process of operant learning" or how such framing differs so much from other types of operant learning that it requires invoking a new process.

In addition, their analysis is incomplete. It does not name a new process, just a category or type of behavior. Operant behavior, for example, is a type of behavior that is explained by the process of operant reinforcement. Likewise, relational frames are asserted to be a "new type of generalized operant" (p. 45), but in this case, no distinctively new process explains relational framing. And, of course, none may be necessary if relational framing can be explained as an outcome of histories of multiple exemplar training that involve such "traditional" processes as reinforcement, stimulus generalization, and stimulus discrimination. Further empirical and conceptual work seems to be warranted.

The acquisition of relational framing. A second limitation is the lack of support for the claim that relational frames are acquired through the multiple exemplar training that occurs naturally in everyday social and linguistic interactions, for example, between parents and children. The problem: Most RFT research, however, has been conducted with verbally competent humans, mainly college students, who already frame relationally. As a result, research that seeks to develop arbitrarily applicable responding through multiple exemplar training is confounded by preexisting verbal competencies (e.g., relational frames). The hypothesis that relational frames are acquired through such training thus needs further independent support, for example, through developmental research with infants and young children or through training programs with participants who have minimal verbal repertoires (e.g., adults with developmental disabilities; see O'Donnell & Saunders, 2003). The authors downplay the relevance of research with nonhumans in this regard (their subject matter is, after all, human language and cognition), but it might be informative nevertheless. With the possible exception of equivalence (see Schusterman & Kastak, 1993), nonhumans may not be biologically prepared to acquire relational frames, yet their verbal histories can be controlled for in relevant research. In any event, the absence of RFT studies with participants having no or only minimal verbal repertoires leaves the RFT account vulnerable to the suggestion that other behavioral products, for instance, covert or overt problem-solving, may play a pivotal role in relational framing. The question of how relational frames are acquired in the first place remains to be answered.
Relational frames and stimulus equivalence. Also missing is research that compares and contrasts RFT with Sidman's (1994) work on stimulus equivalence. The two programs are, of course, comparable to only a limited degree because, whereas Sidman addresses equivalence relations, RFT seeks to explain all relational framing. Still, a fundamental difference remains: (a) RFT's proposal that equivalence relations, like all relational frames, are acquired through multiple exemplar training and (b) Sidman's (2000) proposal that equivalence relations are produced by the reinforcement contingency. Sidman (2000) has theorized that reinforcement automatically leads to the formation of equivalence relations. In his account, multiple exemplar training is not necessary for the acquisition of equivalence relations and, most likely, is insufficient (Sidman, 1994, p. 557), whereas such training is central to RFT.

Pragmatic considerations. Finally, RFT as yet lacks sufficient support in applied and intervention research. Although RFT may improve our understanding of human language and cognition through basic research, its validity needs to be tested by practical considerations. One reason behavior analysis has survived thus far in competition with cognitivism is its effectiveness in solving problems of social importance. RFT's validity and its survival may likewise rest on its applicability. The authors, themselves, propose one such test: Training children to frame relationally may improve their cognitive functioning and educational outcomes. This would involve multiple exemplar training, starting with the most rudimentary frames (e.g., coordination) and systematically progressing to more complex relational networks. Although such training presumably occurs in most social environments, RFT suggests some means for enhancing it, but as the authors point out, the relevant data are still preliminary.

Comparisons and Contrasts with Skinnerian Behavior Analysis

Notwithstanding the book's off-putting subtitle, *A Post-Skinnerian Account of Human Language and Cognition*, RFT remains Skinnerian in most respects, among them, the assumption that relational frames are operants, in this case, higher-order operants. The authors argue, though, that the Skinnerian account of human language and cognition is flawed. In particular, they criticize Skinner's definition of verbal behavior for being too broad. By defining verbal behavior as behavior whose reinforcement is mediated by other persons who "must be responding in ways which have been conditioned precisely in order to reinforce the behavior of the speaker" (Skinner, 1957, p. 225; italics in original), Skinner addressed mainly the direct contingencies between speakers and listeners. On this account, the experimenter-trained behavior of rats is "verbal," as are human interactions that might otherwise be described as social (e.g., team sports). According to RFT, the defining feature of verbal behavior is not to be found in direct contingencies such as these, but in the emergent or derived nature of relational frames. However, if Skinner's definition of verbal behavior is too broad, RFT's may be too narrow. It discounts as verbal what we ordinarily call verbal just because it does not participate
in relational frames. For example, if a child has been prompted to request a snack from an adult by saying "cookie" when a cookie is present and the child is hungry, and this behavior is reinforced by receipt of the cookie, the subsequent emission of "cookie" under similar conditions would not be verbal according to RFT. Most behavior analysts and lay people would disagree.

Of course, asking that scientific concepts, verbal behavior and relational frames, map onto ordinary language concepts may be neither fair nor useful. A better test may be the practical action the concepts allow us to take. To that end, Skinner's (1957) *Verbal Behavior* has already proved useful, for instance, in early language interventions (Partington & Bailey, 1993) and in the treatment of destructive behavior (Bowman, Fisher, Thompson, & Piazza, 1997). RFT, in contrast, is not yet well supported in these ways. If and when it is, then the relative effectiveness of the two approaches can be evaluated on this dimension.

Even then, trying to decide for the Skinnerian account *or* for RFT may be misguided. A better understanding of human language and cognition may result from their integration. Indeed, some relational frame theorists have already begun this work, retaining many of Skinner's concepts (e.g., mands, tacts), yet emphasizing a distinction between language that is based in relational framing and that based in more direct contingencies (see, e.g., Barnes-Holmes, Barnes-Holmes, & Cullinan, 2000). Not only may this integration lead to a more accurate and complete account of human language and cognition, it may also make RFT more accessible (and acceptable) to mainstream behavior analysts and prove more successful in application. In the meantime, behavior analysts unconvinced about RFT may continue to demonstrate how basic behavioral processes explain the generativity so apparent in human behavior, much of it falling under the purview of language and cognition (e.g., Marr, 2003; Shahan & Chase, 2002); this research may yet account for the phenomena RFT purports to explain. In turn, RFT theorists might more directly compare their explanations with those already found in behavior analysis. Whether RFT will replace more traditional behavior-analytic accounts, be an addition to them, or be explained by them remains to be seen.

**Conclusion**

Overall, Hayes, Barnes-Holmes, and Roche have done an important service in offering this book-length treatment of RFT and its account of complex human behavior. The account is ingenious and ambitious, exciting and stimulating, and should serve as an impetus for further empirical and conceptual work in the post-Skinner, not the post-Skinnerian, era, lest someone call RFT neo-Skinnerian. Behavior-analytic readers who agree with the authors' thesis, concepts, and interpretations will likely be inspired by the book, while those who do not agree will be provoked, but provoked, we hope, to test the theory empirically against alternative accounts. Readers disinclined to behavior analysis in general
may find themselves intrigued by RFT's ability to provide a naturalistic account of phenomena thought to lie beyond behaviorism. We thus recommend the book to anyone interested in human language and cognition, as it will directly or indirectly advance our understanding of them, as well as of behavior analysis and psychology more generally (see the Appendix for other reviews of the book and rebuttals to them).

References


Appendix

Reviews and Rebuttals


