

On Books

The Abstracted Operant:
A Review of *Relational Frame Theory:
A Post-Skinnerian Account of
Human Language and Cognition*,
edited by S. C. Hayes, D. Barnes-Holmes, and B. Roche

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Hayes, Barnes-Holmes, and Roche (2001) have edited a series of tightly integrated articles that present the relational frame theory (RFT) approach to the study of complex human behavior. The book provides a well-elaborated account of RFT and reviews the literature on stimulus relations that bears on the approach. Several articles examine extensions of RFT to a variety of issues ranging from language and cognition to psychotherapy and religion, and these provide illustrations of the comprehensiveness of the approach. Although RFT is a paradigm developed within the behavioral tradition, it is not a traditional behavioral paradigm, and thus has been controversial. Problems and puzzles in the study of stimulus relations and research directions needed for their solution are considered.

Key words: relational frame theory, equivalence, stimulus relations

In the special issue on “Present Trends and Directions for the Future” published nearly 20 years ago (*Journal of the Experimental Analysis of Behavior*, 1984), Marr (1984) urged behavior analysts to extend their experimental methods to the study of problems “presently residing in the domain of cognitive psychology: memory, thinking, imagery, problem-solving, language, perception.” He expressed particular concern that

Language (or verbal behavior as we prefer to say) has become almost the exclusive province

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of the cognitivists with the result that even though the functional relationships they discover might be consistent with behavior analytic theory, proper credit is unlikely to be given or, indeed, acknowledged. (p. 354)

The years following these comments saw exciting developments in the empirical analysis of complex human behavior on both basic and applied fronts, but one of the most productive approaches was the study of derived stimulus relations. The seminal work of Sidman (e.g., Sidman & Tailby, 1982) provided conceptual and experimental tools that allowed an entry to the study of complex stimulus classes that have obvious relevance to language. The stimulus equivalence paradigm generated considerable empirical research as well as novel conceptual developments. Of these, relational frame theory (RFT; Hayes, 1991; Hayes & Hayes, 1989) has been the most prolific, generating scores of empirical and theoretical papers in the past decade. RFT is a comprehensive effort as well—it attempts to provide a behavior-analytic account of virtually

all the complex human phenomena noted by Marr above, and, indeed, goes beyond these as well. The RFT approach has grown large enough and is sufficiently complex that the publication of the volume reviewed here, which provides a detailed explication of the theory along with reviews of the research it has generated, is most welcome.

Many behavior analysts will be put off by the title or at least by the implications of a “post-Skinnerian” account. Be assured that the RFT approach to the problems of human language and cognition remains behavioral. However, the authors do part company with Skinner with respect to critical details of the analysis of verbal behavior (see below), and the implications of their approach lead to significant departures from many of the traditions of behavior analysis. Although many behavior analysts may ultimately disagree with the authors’ approach, it deserves careful consideration and is important reading for experimental and applied behavior analysts in any specialty. Indeed, the intended audience for the book is even broader, and the authors make an effort to reach nonbehavioral psychologists as well as behavior analysts. The technical language and the complexity of the literature on stimulus relations make this a difficult task. Parts of the book will be tough going for behavior analysts, and even more so for psychologists outside the field. Nonetheless, it can surely be recommended to nonbehavioral colleagues, who are likely to develop a better appreciation of the scope and potential of behavior analysis for their efforts.

The book is a collection of 13 chapters with 19 different authors, but it does not read like a typical edited volume. Each chapter is coauthored by at least one of the three editors (I will refer to all collaborators as “the authors”), and it is evident that considerable editorial effort has been made to ensure that chapters flow from and build on the previously developed ma-

terial. Thus, the chapters are seamlessly integrated, and the book reads more like a monograph than an edited collection. The book is divided into two parts, with the first eight chapters developing and reviewing “The Basic Account” of RFT, and the five chapters of the second part exploring the “Extensions and Applications” of the theory. The first three chapters introduce the reader to RFT and present the details of the approach. These chapters represent both the most important and the most difficult part of the book, and special emphasis will be placed on them here. Chapters 4 through 7 review the literature generated by the application of RFT to a number of the puzzles associated with verbal behavior such as thinking, problem solving, metaphor, and rule governance. Following a summary of the basic approach in chapter 8, the second, more speculative, part of the book explores extensions of RFT to a broad list of areas including development, education, social behavior, psychopathology, psychotherapy, and religion.

Chapter 1: Why Post-Skinnerian?

The opening chapter provides a brief overview of behavioral accounts of language, inevitably coming to a focus on Skinner’s (1957) *Verbal Behavior* and its limitations. *Verbal Behavior* has been a rich source of conceptual and interpretative analyses, but it has been less successful in terms of generating empirical research. Although there has certainly been an increase in the experimental analysis of verbal behavior in recent years, as the authors point out, much of this work was in the areas of rule-governed behavior and derived stimulus relations and did not directly emanate from Skinner’s book. The authors argue that this limited empirical productivity is intrinsic to Skinner’s definition of verbal behavior as the behavior of a speaker that is reinforced through the mediation of a listener with a specialized history of reinforcement. The authors take issue

with this definition on two counts. First, they argue that it is not a functional definition because the determination of whether a speaker's behavior is verbal or nonverbal may depend, not on the history of the speaker, but rather on the history of the listener. Second, the authors argue that Skinner's definition is too broad in that it includes any three-term contingency in which reinforcement is provided by an appropriately trained listener (including lever pressing by a rat with reinforcement by an experimenter). The authors argue that a new definition is needed that better captures the important features of language, and that RFT provides such a definition. These criticisms of *Verbal Behavior* are likely to push some hot buttons for many behavior analysts, and some have already responded to an earlier statement of these points (Leigland, 1997). However, the value of RFT can be appreciated without completely rejecting Skinner's approach in *Verbal Behavior*. Although RFT is post-Skinnerian in certain respects, a crucial point of commonality is that, like Skinner, the authors offer an analysis of verbal behavior as operant behavior.

Chapters 2 and 3: The RFT Account

Verbal behavior is a special kind of operant behavior in the RFT account: "*Verbal behavior is the action of framing events relationally*" (p. 43). Chapters 2 and 3 provide a description of RFT that attempts to explain just what that means. The starting point of the analysis is the concept of the relational operant—that organisms can learn to respond to the relations between stimuli. So, for example, a contingency can be arranged in which selecting the larger of any pair of stimuli is reinforced. Given a training array with stimulus pairs of varying sizes, it could be ensured that it is the stimulus relation, rather than any particular stimulus size, that controls selections. The authors would view such a demonstration of responding to the relations between

stimuli as evidence for a relational response class. The next step is to posit that if relational operants can be trained with respect to nonarbitrary, or formal, relations like size, then

It seems plausible that some organisms, given the appropriate history, may have such relational responding come under the control of contextual features other than simply the form of the relation. That is, organisms could learn to respond relationally to objects where the relation is defined *not* by the physical properties of the objects, but by some other feature of the situation. (p. 25)

The authors refer to such cases as *arbitrarily applicable relational responding* and provide, as a key example, the training of symmetrical relations between words and their referents that is evident in early language learning. A parent might name a ball, and then reinforce any orienting behavior to the ball (but not other objects) on the part of the child. Alternatively, the parent might point to the ball, ask the child what it is, and then reinforce the child's saying "ball." An instance of a symmetrical relation is being trained in this example, and after such training with many different names and objects (multiple-exemplar training) in the appropriate context, given an object, the child will name it, and given a name, the child will select or orient to the object with that name.

From the RFT perspective, symmetrical responding such as that described above represents an abstracted operant class that is generalized across object–name pairs. This is the sense in which the concept of a relational frame is used. If an adult says "wug" and then points to a novel object, then given the object, and perhaps the question "what is this?" the child will say "wug." The response of saying "wug" has no history of reinforcement in response to any object, but the response of relating objects and names symmetrically does, and so in the appropriate context, given the name–object relation, the object–name relation will emerge. The authors argue that all trained relations exhibit this property of bidirectionality, which they call *mutual entailment*: If A is re-

lated to B, then B is related to A. But, note that the nature of the entailed relation varies with the trained relation. So if A is greater than B, then the entailed relation is that B is less than A. Another entailed relation may occur when two or more relations are trained: *combinatorial entailment*. So if A is related to B and B is related to C, then A is related to C (or may be, depending upon the nature of the trained relations). The familiar transitivity property of equivalence classes is seen in RFT as an instance of combinatorial entailment in which the relation is one of equality: If $A = B$ and $B = C$, then $A = C$. RFT posits an additional property of these complex relations: *transformation of function*. That is, functions trained to one stimulus that participates in a complex set of relations will alter the functions of the other stimuli in the set in predictable ways. A classic example is the finding that an emotional response directly conditioned to one member of an equivalence class transfers to other class members without direct training (Dougher, Auguston, Markham, Greenway, & Wulfert, 1994).

These complex relational operants are considered as a type of response frame called a relational frame:

Just as a picture frame can hold many pictures, a response frame can include many different formal features while still being a definable instance of an overall pattern. "Frame" is not a new technical term, and it is not a structure, mental entity or brain process. It is a metaphor that refers to a characteristic feature of some purely functional response classes: The behavioral class provides an overall functional pattern, but the current context provides the specific formal features that occur in specified parts of the pattern. (p. 27)

A relational frame designates a particular type of response frame that defines a class of arbitrarily applicable relational responding and shows mutual and combinatorial entailment and transformation of function. Note also that a relational frame is an operant without a specifiable topography: It is an abstracted operant.

Sometimes referred to as *higher or-*

der, generalized, or overarching operants, the analysis and status of such response classes have been controversial (see Pilgrim & Galizio, 2000). Of course, operant classes of this sort are perfectly consistent with the Skinnerian view that a response class is determined by its function and may include a wide range of topographies. Yet, while the authors make an effort to ground the notion of relational frames in terms of more traditional operant behavior, they also argue that relational frames, and therefore, verbal behavior, involve a new behavioral principle because of the emergent relations inherent with these generalized operants. This leads the authors to some radical departures from behavior-analytic traditions:

If the present analysis is correct, relational frames alter other behavioral processes as a direct target of that learning. This means that much of what we know in behavioral psychology must now be reexamined in the context of the relational framing process. This would not be quite so threatening to the tradition that gave birth to the present approach if nonhumans could readily acquire arbitrarily applicable relational responding. Apparently they do not. (p. 49)

Both the promise and the controversy associated with RFT are well illustrated by this quote. Students of stimulus relations, regardless of theoretical orientation, are excited about the possibilities of increased understanding of uniquely human behavioral processes. However, not all will accept the argument that the traditional methods of behavior analysis, such as exploration of fundamental processes through research with nonhumans, are inadequate to understand relational frames. Behavior analysts are also cautious about adding new processes and require compelling demonstrations of the need to do so. However, the study of stimulus relations in humans has led many behavior analysts to the conclusion that some modification in basic principles is needed (Horne & Lowe, 1996; Sidman, 2000), so RFT may be no less parsimonious than other contemporary accounts in this regard. In any case,

many basic questions remain regarding these higher order relational operants. In particular, the histories required to produce the entailed relations and transformation of function via relational frames are poorly understood, and the ultimate fate of RFT may hinge on progress in this direction.

Before these questions can be explored, however, it is important to consider why RFT theorists find it necessary to posit these elaborate operant classes. For example, the reader may note that many of the examples used above come directly from the study of equivalence classes; of course, there is a familiar terminology and theoretical framework already in place (Sidman, 1994, 2000) to account for them. Why should terms like *symmetry* and *transitivity* and the emphasis on stimulus classes be replaced with entailments and relational frames? Indeed, with respect to the study of equivalence classes, it is not at all clear that the RFT approach confers advantage. The extensive literature can be interpreted from either the stimulus class or RFT perspectives (and other theoretical positions as well; e.g., Horne & Lowe, 1996) without great difficulty (Clayton & Hayes, 1999). Further, Sidman (2000) argues that the stimulus class position makes predictions about equivalence relations in certain situations that do not clearly follow from RFT or other points of view (e.g., Dube & McIlvane, 1995; Estevez, Fuentes, Mari-Beffa, Gonzalez, & Alvarez, 2001).

The authors develop several arguments for RFT over the stimulus class approach, but perhaps the most compelling is scope: Stimuli can be related in many ways, and RFT provides a general account that encompasses not only equivalence relations but many other important relational phenomena as well. Equivalence relations are described in RFT terms as a frame of coordination. In a frame of coordination, mutual and combinatorial entailments produce the familiar patterns of symmetry and transitivity, respectively.

Transformation of function would result in the simple transfer of any trained functions to the relata. However, other relational frames have been described including opposition, distinction, causality, the various spatial relations, and many more. These different frames may produce different sorts of entailments and transformations of function. For example, if we train that Stimulus A is opposite to B and B is opposite to C, RFT predicts that combinatorial entailment will make A equivalent to C, and functions trained to A will transfer to C but be transformed in a fashion consistent with opposition to B (e.g., if A is associated with a positive affective response, then B will evoke a negative one). Chapter 3 reviews empirical research testing such predictions with several relational frames, and the results are generally consistent with RFT predictions (e.g., Dymond & Barnes, 1995; Steele & Hayes, 1991). It should be emphasized that as yet there are only a few studies of relational frames other than coordination (equivalence), and these have largely been conducted with adult subjects with heavy use of instructions to accomplish the complex training procedures, so the histories necessary to produce such performances remain poorly understood.

Although the findings to date are preliminary, they offer a glimpse into the exciting potential of the study of complex stimulus relations. The relevance of studies of phenomena like the complex transformations of function described above provide an entry to understanding the power of verbal behavior and many of the complex effects on behavior that words can produce. Although it may be that other theoretical approaches can also provide accounts of such phenomena (some possibilities are suggested by Sidman, 1990, 1994), the strength of RFT is that it is actively generating both predictions and new research programs in these exciting areas. Most of the book is an exploration of the broad scope of

problems that might be addressed by RFT.

*Chapters 4 through 8:
Extending the Account*

These chapters extend the RFT account to specific consideration of a variety of complex phenomena. For example, chapter 4 provides an interesting treatment of analogy and metaphor in terms of relations between relations. That is, analogy is proposed to involve placing two relational networks in a frame of coordination with one another. As an example, the authors suggest that if we are told that two foreign coins are related in the same way as a dime and a nickel, the extant relational network between the familiar coins will transfer to the foreign one, such that one coin will have twice the worth of the other. Although more complex, the analysis of metaphor is similar, but involves relational responding based on some formal properties of the stimuli in the two relational frames that are to be coordinated. These RFT approaches to analogy and metaphor are beginning to generate exploratory research with positive outcomes (e.g., Barnes, Hegarty, & Smeets, 1997; Stewart, Barnes-Holmes, Roche, & Smeets, 2002). Chapter 5 addresses thinking and problem solving from the RFT perspective by introducing a new technical term—*pragmatic verbal analysis*—that “refers to framing relationally under the control of abstracted features of the nonarbitrary environment that are themselves framed relationally” (p. 90). Although this definition may seem a bit opaque, the gist seems to be that a complex verbal history with the attendant history of abstraction means that virtually any stimulus will provide a context for a variety of possible relational frames, and these inevitably invoke verbal processes that, in turn, alter reactions to that stimulus. One implication is that verbal processes influence virtually every aspect of human behavior. In addition, pragmatic verbal analysis is used to describe be-

haviors termed thinking, planning, and problem solving. Whether a new technical term is needed to make these points is arguable, and it remains to be seen whether these features of RFT will generate empirical analyses. Chapter 6 focuses on rule-governed behavior, and the account will be familiar to those acquainted with Hayes’ earlier work in this area (e.g., Hayes, Zettle, & Rosenfarb, 1989). However, as our understanding of the regulation of transformation of function by complex stimulus relations is increased, there should be corresponding gains in understanding rule governance.

Chapter 7 takes on the issue of self-generated rules, and begins with an analysis of what is meant by *self*. The authors introduce the notion of “deictic” relational frames that specify a relation in terms of the speaker’s perspective, particularly relations such as “I–you,” “here–there,” and “then–now.” The complexity of this analysis is beyond the scope of this review, but it leads to some interesting speculation about self-regulation and self-concept with wide-ranging implications. Part 1 of the book ends with a summary chapter (chap. 8) that reviews the basic principles developed in the first seven chapters, and, by this point, the reader is definitely ready for a bit of a recap! Although this chapter apparently was designed to stand alone, after working through the dense material of the main body of the book, most readers will benefit from the further clarification and review provided here.

*Chapters 9 through 13: To Boldly
Go . . .*

Part 2 takes the RFT approach to areas in which there is less of a research base, and of necessity, these chapters are more speculative. However, they successfully illustrate the potential and promise of RFT and behavior analysis to address a host of problems that are often considered by outsiders to be beyond the scope of the field. Chapter 9 on development is particularly strong

in that it considers some of the classic objections to behavioral views in the developmental area (Piagetian stages, language acquisition, moral development) and briefly outlines behavioral accounts of these in RFT terms. For example, children's ability to add plural endings as appropriate to novel words is explained in terms of a novel noun entering a frame of coordination with other nouns. When more than one noun object is presented, transfer of plural function would result in adding the appropriate plural sound. Chapter 10 describes some implications of RFT for education and along the way provides an interesting RFT account of "theory of mind" and of logic learning. These efforts to show nonbehavioral readers that there are behavioral solutions to some of the problems of special interest in their fields were very welcome in these chapters, and more of this sort of thing would have been beneficial throughout the book. Chapter 11 addresses some classic issues in social psychology such as prejudice, persuasion, and social attraction. Although the accounts are speculative, they do suggest that RFT may lead to interesting insights into social behavior. Chapter 12 focuses on psychopathology and psychotherapy, and it is worth noting that a system of behavior therapy that has received book-length treatment itself (Hayes, Strosahl, & Wilson, 1999) is derived from RFT. In brief, the RFT account of psychopathology emphasizes its verbal sources. The authors argue that human suffering is linked to the uniquely verbal capacities to imagine something better and to fear something worse. The emphasis of therapy, then, is to help clients accept that private events of this sort cannot be escaped but need not be debilitating. However, the reader will have to go beyond the brief chapter in the present book to get much more than an outline of the approach. Finally, the authors show that they are not afraid to take on the really big issues with chapter 13: religion, spirituality, and transcendence. The chapter includes an ac-

count of religious control as rule-governed behavior and also of spiritual experience in terms of the relational frames of perspective taking that provide the RFT approach to self. Obviously, the accounts in these final chapters are speculative and thus may be somewhat off-putting to many behavior analysts. However, these chapters provide valuable illustrations of the interpretative scope of RFT and may be understood as an "orientation to action, rather than as a definitive RFT statement" (p. 197).

Problems, Puzzles, and Directions for Future Research

The authors are excited about the directions that RFT can take behavior analysis and the excitement is infectious. There are RFT and acceptance and commitment therapy Web sites, a listserv, and specialized conferences.¹ Although the authors certainly promote the value of the approach, to their credit they also recognize that the status of the theory remains tentative and depends on the resolution of a number of problems. In fact, one of the major virtues of the book is that almost every chapter poses unanswered questions and leads to new directions for research to address them.

The problems that seem most urgent to address are the most basic: the issues revolving around the theoretical and empirical status of the abstracted, or higher order, operant. These are fundamental to the approach because relational frames are understood to be higher order or overarching operants, yet just how such operants are to be defined is unclear (see Pilgrim & Galizio, 2000). Some theorists have emphasized that higher order operants are those that include multiple operant classes within them, but as the authors note, such properties could probably be ascribed to nearly any operant. To the authors, the critical feature of higher

¹ Listserv address is rft@unr.edu; Web site is <http://www.relationalframetheory.com>.

order operants is the lack of defining topographical features: Such operants are purely functional (or nearly so) and are truly abstracted operants. Of course, no operant is properly defined solely in terms of formal properties, so a matter of degree is involved here. The rat may show a highly consistent topography of pressing a lever with its paw, but occasional movements that result in the animal deflecting the lever with its head or back may still be part of the response class. However, operant classes that lack *any* consistency in terms of a topographical response definition often *do* seem to involve special cases. Thus, examples of higher order operants include the production of novel responses, the generation of random numbers, and generalized imitation—response classes whose topographies are enormously variable. One puzzle concerns just what is selected when such an operant is reinforced. A particular instance of the operant is followed by reinforcement, of course, but that instance may be quite different topographically from all other members of the class, so induction cannot be invoked, and the question becomes how these different instances become integrated operant class members. Certainly there are many clear demonstrations of these purely functional operant classes, but that does not mean that they are well understood. In what ways, if any, do such operants differ from their more concrete relatives in acquisition, extinction, generalization, or other basic processes? Unfortunately, there has been too little empirical analysis of these fascinating phenomena to address such questions.

Demonstrations of the acquisition of higher order operants have rarely gone much beyond the observation that multiple-exemplar training is sufficient to establish the functional relation (or not, as in much of the nonhuman research). Some have raised concerns that even the successful demonstrations with arbitrary relations do not provide a sufficient account: “A linguistically naive organism’s abstraction among com-

monalities from a set of exemplars that share no physical feature requires more of an explanation than just a history of experience with the exemplars” (Sidman, 1994, p. 557). However, the authors take the view that if orderly functional relations are observed within a particular response definition, then that definition is successful, and several studies of antecedent stimulus control and consequential control are reviewed throughout the book to support the status of relational frames as operants (e.g., Healy, Barnes-Holmes, & Smeets, 2000; Wilson & Hayes, 1996). These experiments are important advances, but because they have generally involved adult subjects with sophisticated preexperimental relational repertoires, they do not completely address Sidman’s point. For example, Healy et al. provided an elegant demonstration of consequential control of components within a frame of coordination. However, it does not necessarily follow that such frames originate as posited by RFT. Initial development of such frames must occur very early in childhood and would involve the establishment of generalized symmetry and transitivity by multiple-exemplar training, presumably in a common context, to produce the linkage between the forms of mutual and combinatorial entailment required for the frame of coordination. RFT predicts that only after these types of training would frames of coordination emerge, but the logistical difficulties of testing these predictions are considerable.

A similar set of questions can be raised regarding the sources of transformation of function. It is a crucial concept for virtually all of the many applications of RFT, and a detailed account of its roots is needed. Like mutual and combinatorial entailments, transformations of functions are also presumably generalized operants under contextual control. That is, transferring a response trained to one event participating in a frame of coordination to another would be reinforced, and, after multiple-exemplar training of this kind,

such transfer would become generalized in a coordination context. It is not too hard to imagine such early training developing in children with words and objects. A child trained to say "meow" in the presence of a cat might produce a positive parental reaction by saying "meow" in the presence of a picture of a cat or the letters C-A-T. If this sort of contingency occurred across multiple exemplars, a generalized transfer of function might develop. However, training of a somewhat different sort would be required to produce appropriate transformations of function in frames of opposition and other complex frames, and it is not clear precisely what sorts of experience would be required to bring these about. There is very little research available to clarify the histories necessary to produce transformations of function. Barnes-Holmes, Barnes-Holmes, Roche, and Smeets (2001a, 2001b) showed that multiple exemplar training facilitated the transformation of function in accordance with symmetry in several 4- to 5-year-old children who failed to show the effect after initial training. These studies provide a neat demonstration of the operant control of transfer of function, but the limited transfer observed initially was a bit puzzling. Presumably such behavior would already be at a high operant strength as a prerequisite for even rudimentary language function. As Barnes-Holmes et al. note, the repertoire of transformation in accordance with symmetry was certainly not established *ab initio* in their study, but, more likely, contextual control of the frame was shaped. Clearly, our understanding of the development of transformation of function is very limited at present. Indeed, there are significant questions regarding the determinants of transformation in adults (e.g., Markham & Markham, 2002).

Particularly problematic is the transformation of respondent function. Emotional responses established through respondent conditioning with one stimulus participating in a frame of

coordination may transfer to other stimuli participating in the frame (Dougher et al., 1994). However, respondents, by definition, are not members of operant classes, so it appears that a history of multiple-exemplar training would not be sufficient to establish generalized transfer or transformation of such behaviors. Unless the authors are positing that responses traditionally viewed as respondents (e.g., emotional responses, salivation) are controlled by their consequences in relational frames (and no argument of this sort is developed in the book), some new process would have to be proposed to account for respondent participation in transformations of function. Thus, it is not clear how RFT would account for the mechanisms of many of the transformations that seem crucial in the analysis of much interesting human behavior (e.g., psychopathology; see chap. 12). Do other theories fare better on this point? Sidman's (2000) theory can account for transfer of the sort observed by Dougher et al. by positing that responses (operant or respondent), like stimulus events, become class members. However, it is not at all clear that Sidman's approach can handle transformations of respondent function involving relations other than equivalence (e.g., frames of opposition). So it seems that much remains to be learned about transformation of function. Because of the importance of this concept, it is hoped that analysis of transformation of function will be at the top of the research agenda for students of stimulus relations. However, until such work is available, some fundamental questions about RFT (and other theoretical approaches to stimulus relations) will remain unresolved.

The development of research programs capable of answering basic questions about the origins of relational frames poses formidable challenges. Clearly, research with infants or very young preverbal children is one important direction to take. The authors have recognized the importance of such

work and indeed one of the few studies of infants has come from their laboratory (Lipkens, Hayes, & Hayes, 1993). However, Lipkens et al. were unable to train conditional discriminations in a 12-month-old child with differential reinforcement alone. Subsequently, verbal interventions were ultimately successful in establishing conditional discriminations, and by 16 months simple derived relations were observed. Unfortunately, the sophisticated verbal interactions required to produce the initial performances in the Lipkens et al. study make it difficult to interpret the origins of the observed relational frames. Nonetheless, their work points to the importance of future research with nonverbal infants.

Because the importance of studying relational framing in organisms without a preexperimental history of arbitrarily applicable relational responding is paramount, the authors' dismissal of the value of nonhuman research to the development of RFT may have been premature. Although it is certainly the case that it has been difficult to demonstrate behavior that could meaningfully be described as relational framing in nonhumans, there are some recent encouraging studies (e.g., Kastak & Schusterman, 2002, with sea lions; Thompson, Oden, & Boysen, 1997, with chimpanzees). It seems ironic that over 40 years after his disparaging review of *Verbal Behavior*, Chomsky has finally come around to recognizing that the understanding of human language can be enhanced by the study of its rudiments in nonhumans (Hauser, Chomsky, & Fitch, 2002). It would be a greater irony if behavior analysis, the science that pioneered this type of bottom-up approach to language, left the field to the cognitivists. It may require new research strategies on the part of animal researchers, but it seems possible that nonhuman subjects may ultimately provide an important testing ground to examine the development of relational frames.

Conclusion

RFT provides a comprehensive new paradigm for psychological research. It is a paradigm developed within the behavioral tradition, to be sure, but it is one that questions many of the assumptions and approaches within that tradition. The book is a snapshot of the status of RFT, and reveals an approach that is already highly successful in terms of parsimony, scope, and productivity—three hallmarks of a good theory. The book provides a detailed account of RFT, reviews the relevant literature, and proposes fascinating empirical and interpretive extensions to a wide range of complex human behaviors with the goal of “a functional, contextual, monistic, nonreductionistic analysis of human language and cognition” (p. 255). All of these features make the work a signal contribution that should be read and carefully considered by behavior analysts as well as nonbehavioral psychologists. As the authors note, at present the empirical support for RFT is limited, and “Whether others in the behavioral tradition will note or embrace the change we think is needed, we cannot say. It is our deep belief that behavioral psychology will, over time, respond to the data and if RFT is useful, the data will come” (p. 254). The publication of this book will go a long way towards ensuring that the research needed to evaluate the place of RFT in behavior analysis will indeed come.

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