Relational Frame Theory: An Overview of the Controversy

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Although Skinner's *Verbal Behavior* (1957) was published over 50 years ago, behavior-analytic research on human language and cognition has been slow to develop. In recent years, a new behavioral approach to language known as relational frame theory (RFT) has generated considerable attention, research, and debate. The controversy surrounding RFT can be difficult to fully appreciate, partly because of the complexity of the theory itself and partly because the debate has spanned several years and several journals. The current paper aims to provide a concise overview of RFT and a summary of key points of debate and controversy.
    Key words: relational frame theory

The first comprehensive paper introducing relational frame theory (RFT) as a behavior-analytic approach to human language and cognition was presented at the Association for Behavior Analysis annual convention in 1985 (Hayes & Brownstein). Since that time, RFT has inspired a great deal of research, discussion, and debate. It is not uncommon to witness heated discussions about RFT during both symposia and social gatherings at behavioral research conferences, and a number of criticisms of the approach have been published, usually in the context of reviewing the first book-length treatment of the topic (Hayes, Barnes-Holmes, & Roche, 2001). Whereas behavior analysts have grown accustomed to harsh criticism from those outside their discipline or worldview (e.g., Chomsky, 1959), it is less common for a behavioral theory to generate so much intense debate within the field itself. It is probably accurate to say that RFT has become one of the most controversial, hotly contested topics in modern behavior analysis.

Much of the controversy surrounding RFT seems to stem from two primary sources. First, it is a treatment of human language that differs substantially from that offered by our field's founding father, B. F. Skinner (1957). Although RFT is an extension of Skinner's

view of verbal behavior in some respects (Barnes-Holmes, Barnes-Holmes, & Cullinan, 2000), its proponents are also directly critical of key components of Skinner's analysis. Given Skinner's prominence and importance in the development of behavioral psychology, it is not surprising that a theory challenging his view on a topic, particularly one as important as verbal behavior, might be met with apprehension, suspicion, and even contempt.

Second, if the RFT analysis is accurate, it has drastic implications for how we conduct a science of human behavior (Hayes & Berens, 2004). The transformation of stimulus functions seen in the literature on derived stimulus relations indicates that stimuli can acquire behavioral functions based solely on their participation in verbal relations with other events. The research on stimulus equivalence has revealed that stimulus functions commonly transfer through members of equivalence classes (e.g., Augustson & Dougher, 1997; Dougher, Augustson, Markham, Greenway, & Wulfert, 1994; Dymond & Barnes, 1994; Hayes, Kohlenberg, & Hayes, 1991), and research on other derived stimulus relations has revealed that the behavioral functions of a stimulus can also be changed or transformed based on its derived relation to other stimuli (Dougher, Hamilton, Fink, & Harrington, 2007; Dymond & Barnes, 1995; Roche & Barnes, 1997; Roche, Barnes-Holmes, Smeets, Barnes-Holmes, & McGeady, 2000). For example, if an individual derives an arbitrary relation of ''A is greater than B'' and B is then established as a conditioned reinforcer, with no further training, A may begin to be more reinforcing for the

individual (e.g., the individual will choose A over B or work harder to obtain A than B). Such changes in stimulus functions mean that our ability to predict and influence the behavior of humans with verbal abilities will be greatly impaired if we rely solely on analyses of direct-acting contingencies; we must also take into account the individual's relational or verbal behavior. Such analyses often require new experimental procedures and can lead to interventions that seem foreign and perhaps unnerving to many behavior analysts. For example, the most prominent applied extension of RFT, acceptance and commitment therapy (ACT; Hayes, Strosahl, & Wilson, 1999), often makes use of mindfulness meditation and experiential exercises that can seem out of place in behavioral psychology.

If nothing else, the RFT debate has brought important philosophical, conceptual, and empirical issues to the forefront in our field. Despite being the focus of much attention, however, it seems that RFT in general, and the controversy it has evoked in particular, remain poorly understood by many in behavior analysis. This is due, in part, to the complexity of the theory itself. Although the core claim of RFT is relatively simple (deriving stimulus relations is a learned operant), fully understanding RFT research and analyses can be daunting and requires familiarity with the theory's overall approach, concepts, and terms. Even seasoned behavior analysts must commit to learning some new technical terms to grasp RFT. An additional problem is that the critiques of RFT and the responses to those critiques have been scattered across several journals over several years. It can be difficult to fully appreciate the nature of the controversy surrounding RFT, along with the excellent points made on both sides of the debate, without conducting an extensive literature review. To help remedy this situation, the present paper aims to present an overview of RFT, summarize the primary criticisms of the theory found in the literature, and present the responses to those criticisms by proponents of RFT.

WHAT IS RFT?

RFT is a behavior-analytic account of human language and cognition. It is funda-

mentally similar to Skinner's account, and is distinct from most cognitive and linguistic approaches to language, in that ''it approaches verbal events as activities not products'' (Hayes, Fox, et al., 2001, p. 22). It is fundamentally different from Skinner's account in how it defines and accounts for those verbal events and activities.

Challenges to Skinner's (1957) Account of Verbal Behavior

Informal conversations with behavior analysts sometimes reveal a sense of complacency with regard to the topic of verbal behavior. Many seem to believe the field has adequately addressed verbal behavior, thanks to Skinner's 1957 book. Unfortunately, the impact of Skinner's analysis on research and application has been limited. Although research based on Skinner's verbal operants is increasing (Sautter & LeBlanc, 2006), both the volume and scope of this research remain underwhelming at best. Many researchers focus on teaching Skinner's basic verbal operants (primarily mands and tacts) to children with developmental disabilities (Sautter & LeBlanc). Moreover, Dymond, O'Hora, Whelan, and O'Donovan (2006) found that during the period of 1984 to 2004 ''the majority of citations of *Verbal Behavior* were from nonempirical articles'' (p. 81).

Advocates of RFT have argued that the limited impact of Skinner's (1957) analysis of verbal behavior may be due to the manner in which he defined verbal behavior and verbal stimulation. Skinner defined *verbal behavior* as behavior that is reinforced through the mediation of another organism who is trained by a verbal community to mediate such reinforcement.

Hayes, Blackledge, and Barnes-Holmes (2001) claim that this definition is too broad because many behaviors are socially mediated in this manner, and the definition does not provide any way to distinguish verbal behavior from virtually any other social behavior. Skinner noted that his definition included the behavior of the nonhuman animal in an experimental chamber, with a nonhuman animal and experimenter comprising ''a small but genuine verbal community'' (p. 108). Such a broad definition raises the question of why a separate definition or

treatment of verbal behavior is even necessary, and does not lead to any obvious advances in the methods we might use to study verbal behavior (Hayes, Blackledge, & Barnes-Holmes, 2001).

Relational frame theorists have argued that Skinner's (1957) definition of verbal behavior is not functional because it includes the behavioral history of another organism (i.e., the listener) as a defining feature (Hayes, Blackledge, & Barnes-Holmes, 2001). In all other areas of behavior analysis, individuals define behaviors by their function for the organism of interest, not by the behavioral history of another organism. By incorporating the behavior of another organism into his definition of verbal behavior, RFT theorists claim that Skinner placed the researcher in the peculiar position of needing to study the history of another organism (the listener) in order to classify the behavior of the organism of interest (the speaker). This requirement, according to some, can lead to both conceptual and methodological confusion when one attempts to conduct research on verbal behavior. Other behavior analysts do not find Skinner's definition of verbal behavior to be troublesome in this regard (e.g., Leigland, 1997; Palmer, 2008).

In addition, RFT researchers and others have criticized Skinner's (1957) definition of a *verbal stimulus* (Hayes, Blackledge, & Barnes-Holmes, 2001; Hayes & Hayes, 1992). Again, the core objection is that Skinner's definition is not functional. For Skinner, a verbal stimulus is simply the product of verbal behavior. This is a peculiar way to classify a stimulus in behavior analysis, because it relies on the source of the stimulus rather than its function for the individual organism of interest (Hayes, Blackledge, & Barnes-Holmes, 2001). Behavior analysts define other stimuli (including reinforcers, punishers, and discriminative stimuli) by their functions, not what produced them. Some might see this as a minor quibble, but the meaning and coherence of Skinner's taxonomy of verbal operants suffer without a functional definition of a verbal stimulus. To properly classify any response as being an instance of one of Skinner's verbal operants, with the exception of the mand, one must first identify the controlling stimulus as verbal or not. For example, imagine that a girl in the woods hears a ''cuckoo'' sound and says, ''clock.'' Is this response a tact or an intraverbal? Using Skinner's definitions, it depends not on the function of the stimulus for the girl but on whether or not it is the product of verbal behavior. To classify the girl's response in this case, the key variable is the source of the stimulation, not its function. If the ''cuckoo'' sound were the product of her brother's verbal behavior, for example, the girl's response would be an intraverbal. However, if the ''cuckoo'' sound were an instinctual noise made by a bird (i.e., not the product of verbal behavior), the girl's response would be a tact. Classification of the girl's behavior differs depending on the source of the controlling stimulus, despite the fact that the girl is responding in the same way to perceptually identical stimulation in the two scenarios. This method of classification is akin to classifying stimuli according to their topographical properties, and is decidedly not functional.

The Promise of Derived Stimulus Relations

The research on stimulus equivalence and derived stimulus relations offers behavior analysts new insights into understanding verbal behavior and rule-governed behavior (Hayes, Barnes-Holmes, & Roche, 2001). We now know that most humans are capable of deriving arbitrary relations among stimulus events without direct training or instruction to do so. For example, a person who is taught that A = B and A = C, where the letters represent novel stimuli, will likely derive that B = C. This relation between B and C is arbitrary because the stimuli are not physically similar or equivalent. It is also derived because it has not been directly trained. Many relations other than equivalence, such as relations of comparison and opposition, can also be derived in this manner (Dymond & Barnes, 1995; Green, Stromer, & Mackay, 1993; Roche & Barnes, 1996). Moreover, individuals can generate very complex relational networks with just a few directly trained relations (Steele & Hayes, 1991). Describing the origin of derived relational responding is beyond the scope of this paper; however, others have discussed this issue (e.g., Carr, Wilkinson, Blackman, & McIlvane, 2000; Devany, Hayes, & Nelson, 1986; Hayes, Fox, et al., 2001, p. 28).

Furthermore, the behavioral functions of a stimulus may be transformed based on its derived relations to other stimuli. For example, if A is a conditioned reinforcer for an individual, and the individual subsequently derives that B is the opposite of A, then B is likely to acquire conditioned punishing functions. This effect has been demonstrated with many stimulus functions, including conditioned reinforcing functions (Dymond & Barnes, 1995; Hayes, Brownstein, Devany, Kohlenberg, & Shelby, 1987; Hayes, Kohlenberg, & Hayes, 1991; Roche & Barnes, 1997), discriminative functions (Hayes et al., 1987), elicited conditioned emotional responses (Dougher et al., 1994), extinction functions (Dougher et al.), and self-discrimination functions (Dymond & Barnes, 1994).

Derived stimulus relations may provide a useful model for analyzing language and other complex human behavior. The arbitrary nature of derived stimulus relations parallels the symbolism or referential quality of language, wherein words and their referents typically share few formal properties (e.g., the word *fox* looks nothing like an actual fox), yet individuals often respond to them as though they are equivalent and share many psychological functions (Sidman & Tailby, 1982). The phenomenon of deriving complex networks of relations after direct training on just a few relations may explain the remarkable generativity of language (Barnes-Holmes, Hayes, Dymond, & O'Hora, 2001). In fact, there is increasing empirical evidence linking derived stimulus relations to language development. Indeed, verbally able humans easily demonstrate derived stimulus relations, but verbally deficient humans and nonhumans have not demonstrated such relations convincingly or unequivocally (Barnes, McCullagh, & Keenan, 1990; Devany et al., 1986; Dugdale & Lowe, 2000; Hayes, 1989; Sidman & Tailby, 1982). In addition, researchers have shown that the ability to derive stimulus relations correlates with cognitive and verbal skills (Barnes et al., 1990; Devany et al., 1986; O'Hora, Peláez, & Barnes-Holmes, 2005; O'Hora et al., 2008). It emerges in infancy, but develops gradually and at about the same time as language skills (Lipkens, Hayes, & Hayes, 1993). Finally, derived relations produce priming effects, differential event-related potential measures, and neural activation patterns that resemble those in semantic processing (Barnes-Holmes et al., 2005).

Relational Framing: Deriving Stimulus Relations as Learned Operant Behavior

Derived stimulus relations present a challenge to behavior analysts because the results are not expected from a strict conditioning paradigm; this is why the relations are often called *derived* or *emergent*. According to RFT, deriving stimulus relations is a special generalized form of relational responding. Most organisms, from insects to birds to mammals, can learn to respond to the relative physical properties of stimuli, such as selecting the brightest or longest of two stimuli (a phenomenon traditionally known as *transposition*; see Reese, 1968, for a review). Relational responding of this sort has some interesting characteristics. The first is that stimulus relations are bidirectional, and any relational response reflects this. If A is related to B in some way, then B is necessarily related to A in some way. When an organism selects a stimulus because it is longer than another is, for example, it is simultaneously not selecting the other stimulus because it is shorter. A relation between two stimuli in one direction (A to B) entails a relation in the other direction (B to A). RFT refers to this feature as *mutual entailment* (in equivalence relations, this feature is often referred to as *symmetry*). Another feature of relational responding is that stimulus relations can mutually combine to reveal new relations. When arranging three objects according to size, for instance, responding to just two stimulus relations can reveal a third stimulus relation. One might place a watermelon the left of an apple because it is bigger, and a cherry to the right of the apple because it is smaller. Responding to just these two relations (the watermelon is bigger than the apple and the cherry is smaller than the apple) reveals a third relation: The watermelon is bigger than the cherry. This relation is entailed when the other two relations are combined, and can be determined without even directly comparing the watermelon to the cherry. The manner in which bidirectional stimulus relations can mutually combine to reveal new relations is

called *combinatorial entailment* (in equivalence relations, this feature is often referred to as *transitivity*).

RFT researchers argue that the early language training received by most humans allows arbitrary contextual and social cues, rather than just the formal properties of the related stimuli, to control relational responding. For example, in the presence of the contextual cue of ''X is bigger than Y,'' one can learn to respond to X as though it actually is bigger than Y (e.g., by pointing to the X when asked, ''Which is bigger?''). Furthermore, because mutual entailment is a feature of relational responding, reinforcement is likely in this context for responding to Y as though it is smaller than X (e.g., by pointing to the Y when asked, ''Which is smaller?''). Likewise, because combinatorial entailment is a feature of relational responding, if one were also told, ''Y is bigger than Z,'' one could combine the two specified relations and, thus, respond to X as though it is bigger than Z. All of these relations among X, Y, and Z are arbitrary because they are not based on their physical properties, and some of them are derived (rather than directly trained) due to the bidirectional and combinatorial features of the relational response applied to them. From the perspective of RFT, humans are capable of deriving stimulus relations because we learn to arbitrarily apply relational responses to stimuli based on contextual cues to do so.

Different types of relations have different patterns of responding associated with them, and the term *relational frame* is used to describe a generic pattern of arbitrarily applicable relational responding that has the features of mutual entailment, combinatorial entailment, and transformation of stimulus functions. Contextual cues specify both the relevant relations and the functions to be transformed in a relational frame. The metaphor of a frame is used ''to emphasize the idea that this type of responding can involve any stimulus event, even novel ones, just as a picture frame can contain any picture'' (Hayes, Fox, et al., 2001, p. 34) and parallels Skinner's use of the term *autoclitic frame* (1957). A number of relational frames have been identified and examined, including frames of coordination, opposition, distinction, comparison, hierarchy, and deictic frames of perspective-taking (Hayes, Barnes-Holmes, & Roche, 2001). Although RFT researchers use the noun form of ''relational frame'' for convenience, it is important to remember that relational frames (and relational networks) describe behaviors or repertoires, not hypothetical or inferred mental structures or knowledge constructs. Specifically, relational frames refer to contextually controlled patterns of relational responding that individuals learn through contingencies of reinforcement established by their verbal and social communities.

According to RFT, arbitrarily applicable relational responding is the foundation of human language and cognition; hence, the definition of *verbal behavior* is simply ''the action of framing events relationally'' (Hayes, Fox, et al., 2001, p. 43). Accordingly, the definition of *verbal stimuli* is ''stimuli that have their effects because they participate in relational frames'' (Hayes, Fox, et al., 2001, p. 44). The history of the acting organism is the basis for bringing about verbal stimulus functions, not the history of another organism or listener. In the RFT analysis, both the speaker and the listener are engaging in verbal behavior. The speaker does so by producing stimuli that are based on relationally framed events, and the listener does so by responding based on these relationally framed events.

The RFT approach to studying verbal behavior is leading to a growing body of empirical research, applications, and conceptual analyses. It serves as the theoretical basis for an increasingly popular form of psychotherapy known as acceptance and commitment therapy (Hayes et al., 1999). Furthermore, its implications have been explored for topics such as psychological development, rule following, logical reasoning, persuasion and rhetoric, problem solving, social behavior, prejudice and stigma, cognitive perspective taking, sexual attraction, and even religion and spirituality (see Hayes, Barnes-Holmes, & Roche, 2001).

CRITICISMS AND RESPONSES

Novelty of RFT

Post-Skinnerian. One criticism of RFT is that it is not truly post-Skinnerian because of

its reliance on many of the same fundamental principles as Skinner's (1957) analysis (Osborne, 2003). Osborne argued that RFT is simply an extension of Skinner's work on verbal behavior because RFT, like Skinner's analysis, describes complex human behavior using a small set of behavioral principles. He noted that fundamental principles of behavior are unchanged with the RFT account of human and nonhuman behavior, verbal or otherwise. Thus, ''no paradigm shift lurks in RFT'' (p. 22).

RFT researchers maintain the position that RFT is a new theory. These researchers admittedly use the fundamental principles of behavior proposed by Skinner (1957) and credit him for them; however, they have moved beyond the analysis of verbal behavior that Skinner provided. Therefore, RFT is post-Skinnerian because of its refined approach to human language and cognition (Hayes, Barnes-Holmes, & Roche, 2001, 2003).

New behavioral principle or theory. Although Malott (2003) regarded relational responding as an important aspect of human language, he was hesitant to call this a new behavioral principle. Rather, he argued that fundamental behavioral processes might explain relational responding. Malott suggested that, through appropriate stimulus control, reinforcement, and generalization, a complex behavioral chain might account for relational framing. Although he did not allege that he had identified the correct fundamental principle, he did argue for a molecular explanation of human language, rather than the molar description that RFT researchers provided.

Similarly, Salzinger (2003) reported apprehension about moving away from formerly established behavioral principles. In fact, he stated that rule-governed behavior might explain relational responding rather than RFT explaining rule-governed behavior. Salzinger maintained that individuals form relations based on rules. Accordingly, he concluded that relational frames might simply be a form of rule-governed behavior rather than an act of framing events relationally.

Burgos (2003) stated that RFT is not a new theory because of its basis in other theories. Specifically, he argued that RFT is a combination of set theory and symbolic logic applied to verbal behavior. The full explanation of each of these theories is beyond the scope of this paper; however, the following is a brief explanation of how RFT could be the combination of set theory and symbolic logic. RFT has a basis in and expands on equivalence relations, and Burgos noted that this approach uses set theory language. In regard to symbolic logic, Burgos stated that RFT authors point out that entailment is seen in symbolic logic. Burgos declared that additional RFT concepts, beyond entailment, are equivalent to those of symbolic logic. Burgos also explained that many mathematical and philosophical theories combine set theory and symbolic logic in order to have a powerful theory. Similar to these mathematical and philosophical theories, Burgos concluded that RFT is potentially powerful and of broad scope because it is a combination of set theory and symbolic logic applied to verbal behavior.

Advocates of RFT rejected Malott's (2003) attempt to explain verbal behavior based on a behavioral chain. Malott's analysis requires the use of a vocal repertoire, and Hayes et al. (2003) cited several studies in which relational responding developed in the absence of vocal repertoires. In addition, RFT researchers pointed out the proposal of several other molecular mediational accounts of language and cognition, but noted that they lack empirical support. Therefore, it is unlikely that a behavioral chain or other molecular mediational events are sufficient to explain the complex process that takes place with language and cognition (Hayes et al., 2003).

Hayes et al. (2003) argued against both the rule-governed account of Salzinger (2003) and the symbolic logic account of Burgos (2003) by contending that there are no adequate functional explanations of either of these phenomena in behavior analysis. Thus, attempting to explain RFT via logic or rules is not very helpful until we have a functional, technical account of logic and rules independent of RFT. Rather than rules or logic explaining RFT, the philosophy of RFT uses basic operant principles to account for derived relational responding in a manner that offers a functional account of both rules and logic.

Beyond stimulus equivalence. One of the most common criticisms about the novelty of RFT is that it is no different from Sidman's and others' accounts of stimulus equivalence. In particular, some claim that the new technical terms introduced by RFT to describe the features of derived relational responding (i.e., mutual entailment, combinatorial entailment, and transformation of stimulus function) are redundant with the existing terms used by researchers who study stimulus equivalence (i.e., reflexivity, symmetry, transitivity, and transfer of stimulus function). Thus, critics claim that RFT does not add new information to the existing literature on stimulus equivalence (Fox, 2006; McIlvane, 2003).

The RFT account is different from Sidman's equivalence account in four important ways. First, although Sidman provided one of the earliest behavioral accounts of stimulus equivalence, his approach was, and is, primarily a descriptive one. In fact, he noted, ''My own theorizing has been directed not so much at an explanation of equivalence relations but rather, at the formulation of a descriptive system—a consistent, coherent, and parsimonious way of defining and talking about the observed phenomena'' (Sidman, 1994, p. 536). A precise, coherent description of empirical phenomena is important, but it does not satisfy the need for a functional, behavioral explanation. Sidman's account, then, is a description of the behavioral phenomenon known as stimulus equivalence, whereas RFT is a behavioral explanation for how that phenomenon (and other phenomena) might come about.

Second, RFT is a scientifically more conservative way of accounting for equivalence because it does not require any new behavioral principles at the level of process (RFT proponents do propose a new behavioral principle at the level of outcome, but that is simply due to the unusual effects seen from the transformation of stimulus functions; Hayes, Fox, et al., 2001). Sidman, on the other hand, suggests that equivalence is probably a basic stimulus function and that his mathematically based account involves ''new—previously unknown—behavioral variables or theoretical principles'' (1994, p. 537).

Third, the terms used in RFT to describe equivalence and other derived stimulus relations are more general than the terms adopted by Sidman and other equivalence researchers. RFT introduced these new terms to provide a language to talk about all types of stimulus relations (e.g., bigger than, before–after, opposites, darker than). Sidman's terms, taken from mathematical set theory and applied to equivalence relations, do not work for types of stimulus relations other than equivalence. Because RFT researchers examine many derived stimulus relations in addition to equivalence, terms with broader scope were warranted.

Fourth, as suggested above, RFT research and application focus on a wider range of stimulus relations than equivalence. Stimuli can be related to one another in multiple ways and along multiple dimensions, and presumably each of these types of relations can be brought under arbitrary contextual control. Although much of the excitement about stimulus equivalence in the behavioral community was due to its apparent connection to word meaning and vocabulary building, it is difficult to account for more complex verbal units, such as sentences, using only equivalence relations. By incorporating relations other than equivalence into their analyses, RFT researchers have been able to provide cogent accounts of complex language-related phenomena such as sentences, rules, spirituality, morality, and more (see Hayes, Barnes-Holmes, & Roche, 2001). In addition, the complex patterns of responding seen when training multiple types of stimulus relations (e.g., Steele & Hayes, 1991) and the accompanying transformation of stimulus functions are readily predicted by RFT, but are not easily accounted for by Sidman's (1994) theory of stimulus equivalence.

Clarity of Concepts

Several authors have criticized RFT for unclear or incomplete explanations of concepts. Malott went as far as postulating that ''the complexity and difficulty of understanding their analysis may be so great that their analysis will also fail to persuade the faithless hordes'' (2003, p. 17). Another author stated that as the topics of study in RFT broaden, the analysis becomes less precise (Tonneau, 2004).

Specific misunderstandings have occurred regarding the description of higher order operants, the development of transfer of stimulus function, relational frames as a class of behavior, and the new behavioral process or principle. Galizio (2003a) considered calling a relational frame a higher order operant to be unclear. He contended that RFT provides no definition of a higher order operant; therefore, it does not make sense to label a relational frame a higher order operant. Galizio (2003b) also questioned how the transformation of stimulus function begins. He stated that the analysis provided by RFT leaves out the initial development of the transformation of stimulus functions, thus lending itself to an unclear description of the phenomenon. Palmer (2004b) criticized RFT for the uncertain description of whether relational frames are a class of behavior or if relational frames are part of the history that brings about a class of behavior. When RFT proponents describe relational frames as both an outcome and a process, the distinction is vague (Palmer, 2004b). Finally, Palmer (2004a) proposed that, if RFT researchers claim that relational behavior is a higher order operant and that the transformation of stimulus functions occurs without direct training, they ought to present a new principle. He asserted that a ''statement of principle'' (Palmer, 2004a, p. 231) is necessary to fully explain relational operants.

RFT advocates maintain that the concepts involved in RFT are clear, yet they acknowledge that some concepts are difficult to grasp due to their abstract nature (Hayes, Barnes-Holmes, & Roche, 2001). Therefore, they have responded to critics by providing additional descriptions and examples. Although the details are beyond the scope of this paper, further information regarding the concepts of higher order operants, transfer of stimulus functions, and relational frames as a class of behavior is available in other articles (see Barnes-Holmes & Hayes, 2003; Hayes & Barnes-Holmes, 2004).

In response to Palmer's (2004a) criticism of the lack of a new principle, proponents of RFT stated that a new behavioral principle is not necessary to address the concept of relational operants. Hayes and Barnes-Holmes (2004) noted that relational responding is a result of differential reinforcement,

which is a well-established process in behavior analysis. They also claimed that other functionally oriented behavior analysts had no difficulty accepting relational operants without the development of a new behavioral principle and are, thus, uncertain as to why Palmer had concerns with this approach.

Variety of Research Areas

Palmer (2004a) criticized RFT for having limited scope. He stated that RFT researchers typically study only teenagers or adults; moreover, when children have been included in studies, they show only the emergence of equivalence. McIlvane (2003) made a similar claim in that RFT researchers primarily study university populations. In doing so, the researchers cannot answer the important question of how relational responding develops.

Palmer's (2004a) criticism of limited scope also applies to RFT researchers not accounting for mediating events. He stated that the dependent variables measured in RFT research tap into only a small amount of the behavior in which the participants engage. Palmer alleged that RFT research does not consider the importance of the covert behavior involved in the emergence of relational frames. Thus, RFT researchers are ignoring an important line of study, the control of relational responding by covert behavior.

Although relational frame theorists have admitted that additional research is needed, they have defended the position that RFT has a broad scope. RFT researchers have conducted several studies with various populations. They have shown relational responding in children, teenagers, and adults on several occasions (e.g., Berens & Hayes, 2007; Stewart, Barnes-Holmes, Roche, & Smeets, 2002). Thus far, studies have revealed relational phenomena including, but not limited to, opposition and comparison in typically developing preschoolers, mutual exclusion in human infants, and analogical reasoning in children (Hayes & Barnes-Holmes, 2004).

RFT proponents agree with Palmer (2004a) that individuals likely engage in covert relational framing behavior, but they do not consider such behavior to be a mediating event. Thus, RFT researchers have not limited their research scope but rather

have studied the correlation between covert and overt responding using several procedural variations such as the relational evaluation procedure, respondent-type pairing procedures, developmental studies, talk-aloud procedures, response latencies, semantic priming and implicit association test procedures, and recording event-related potentials. Through this experimentation, RFT researchers are developing an empirical account for covert forms of relational framing, seeking a more precise explanation than the nontechnical account of mediating events proposed by Palmer (Hayes & Barnes-Holmes, 2004). Furthermore, in response to criticism related to mediating events, Hayes and Barnes-Holmes noted that mediating events are not the central issue of study in human language and cognition. The differing opinions on the importance of mediating events is likely due to irresolvable philosophical differences between individuals concerned with mediating events and those less concerned with these events.

CONCLUSION

RFT researchers are studying an area that most investigators in behavior analysis have not previously studied. Since the beginning of this endeavor, other researchers and theorists have been quick to denounce the work. They have criticized the novelty of RFT, the clarity of the concepts, and the scope of the research. Proponents of RFT have responded to each of these criticisms, although one's view of these debates may be guided more by underlying philosophical assumptions than logic or empirical data.

Despite the criticisms, even critics agree that RFT researchers are tackling an important subject area (Malott, 2003: McIlvane, 2003; Spradlin, 2003). Behavior analysts have long overlooked the area of human language and cognition, but proponents of RFT are ambitiously addressing these difficult and important topics (McIlvane). Although critics may not agree with all of the concepts presented by RFT, they have acknowledged that RFT is valuable in the study of language and cognition (Galizio, 2003a; Malott; McIlvane). Applied and experimental behavior analysts are encouraged to consider RFT when conducting research, particularly when verbal behavior is an important independent or dependent variable. Moreover, the wide range of topics being addressed and methods being used in RFT may make the field of behavior analysis somewhat more appealing to those who long ago deemed behaviorism ''dead'' and irrelevant. Hopefully, the intense debate and controversy inspired by RFT will serve to move the field forward and contribute to an increased behavioral understanding of the complexities and importance of human language.

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