

Understanding Metaphor: A Relational Frame Perspective

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The current article presents a basic functional-analytic interpretation of metaphor. This work involves an extension of Skinner's (1957) interpretation of metaphor using relational frame theory (RFT). A basic RFT interpretation of a particular metaphor is outlined, according to which the metaphor acquires its psychological effects when formal stimulus dimensions are contacted via the derivation of arbitrary stimulus relations. This interpretation sees the metaphor as involving four elements: (a) establishing two separate equivalence relations, (b) deriving an equivalence relation between these relations, (c) discriminating a formal relation via this equivalence–equivalence relation, and (d) a transformation of functions on the basis of the formal relation discriminated in the third element. In the second half of the paper, a number of important issues with regard to the RFT interpretation of metaphor are addressed.

Key words: metaphor, relational frame theory, equivalence–equivalence, transformation of functions, nonarbitrary relations

In psychology, especially cognitive psychology, characterizing the processes involved in the comprehension of metaphor is not only an interesting challenge in its own right, but the specification of those processes also constitutes a good test of the power of theories of language comprehension in general. (Ortony, 1993, p. 4)

Behavior analysis has had relatively little to say on the topic of metaphor.¹ Indeed, for the main contribution made in this area we have to turn to the largely interpretive work of Skinner (1957). Skinner classified this phenomenon as a subtype of the “extended tact.” The tact is a behavioral relation that is defined as “a verbal operant in which a response of a given form is evoked (or at least strengthened) by a particular object or event or property

of an object or event” (pp. 81–82). The extended tact is a feature of more complex verbal behavior that occurs when a response is evoked by a novel stimulus that resembles a stimulus previously present when a response was reinforced. Metaphorical verbal behavior is a subtype of this latter class of behavior that takes place “because of the control exercised by properties of the stimulus which, though present at reinforcement, do not enter into the contingency respected by the verbal community” (p. 92). The following is an example of Skinner's interpretation of metaphor:

When for the first time a speaker calls someone a mouse, we account for the response by noting certain properties—smallness, timidity, silent movement and so on—which are common to the kind of situation in which the response is characteristically reinforced and to the particular situation in which the response is now emitted. Since these are not the properties used by zoologists or by the lay community as the usual basis for reinforcing a response we call the extension metaphorical. (p. 93)

A somewhat similar analysis of metaphor, in which Skinner (1989) once again provided a behavior-analytic interpretation of familiar real-world events, appears in *Recent Issues in the Analysis of Behavior*.

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¹ Traditionally, a distinction is made between metaphor and simile based largely on structural differences (i.e., simile incorporates the phrases “like,” “as,” or “as if,” whereas metaphor does not). Because the current interpretation and model of metaphor are functional analytic, these structural differences have been ignored for the time being. Subsequent work may well discover that there is an important functional basis to the traditional distinction between metaphor and simile, but consideration of this issue is beyond the scope of the current article.

When we speak of weighing evidence we are using a metaphor. But a metaphor is a word that is "carried over" from one referent to another on the basis of a common property. The common property in weighing is the conversion of one kind of thing (potatoes or evidence) into another (a number on a scale or a verdict). Once we have seen this kind of thing done with potatoes it is easier to see it done with evidence. . . . We could also say that *weight* becomes abstract when we move from potatoes to evidence. The word is indeed abstracted in the sense of its being drawn away from its original referent, but it continues to refer to a common property, and, as in the case of metaphor, in a possibly more decisive way. The testimony in a trial is much more complex than a sack of potatoes, and "guilty" probably implies more than "ten pounds." But abstraction is not a matter of complexity. Quite the contrary. Weight is only one aspect of a potato, and guilt is only one aspect of a person. Weight is as abstract as guilt. It is only under verbal contingencies of reinforcement that we respond to single properties of things or persons. In doing so we abstract the property from the thing or person. (p. 7)

According to the Skinnerian account, therefore, metaphor may be conceptualized as the *abstraction*, via one particular subtype of verbal behavior (i.e., the extended tact), of a common *physical* property from two different types of environmental event. This behavioral interpretation, however, does not detail how a repertoire of metaphorical verbal behavior (especially complex human metaphor) develops from a presumably simpler repertoire of formal property abstraction. This is perhaps the key question left unanswered by Skinner's analysis. However, Skinner's work does provide the basis for a modern behavioral treatment of metaphor using the conceptual and empirical framework of relational frame theory (RFT; Hayes, Barnes-Holmes, & Roche, 2001; see also Barnes-Holmes, Barnes-Holmes, & Cullinan, 2000, for a systematic synthesis of the Skinnerian and RFT interpretations of verbal behavior).

RELATIONAL FRAME THEORY

Relational frame theory is an approach to human language and cognition that treats these phenomena as examples of arbitrarily applicable rela-

tional responding. All animals that are capable of complex forms of learning may be trained to make discriminations on the basis of nonarbitrary or physical relations between stimuli (e.g., louder than, larger than, differently colored from). However, according to RFT, language-able humans, having prolonged exposure to certain contingencies of reinforcement that operate within the verbal community, also demonstrate responding on the basis of derived or arbitrarily applicable relations. These relations are defined not by the physical properties of the *relata per se* but by additional contextual cues.

One important example of arbitrarily applicable relational responding is the phenomenon of stimulus equivalence. For example, if a language-able human is taught to match an arbitrary Stimulus A to an arbitrary Stimulus B and to match Stimulus B to an arbitrary Stimulus C, then, without further training, he or she might subsequently match A to B, B to C (thus showing symmetrical responding), C to A (thus showing transitive responding), and A to C (thus showing combined symmetrical and transitive responding). In other words, the person now treats the three stimuli as mutually substitutable or equivalent.

Relational frame theory takes the view that stimulus equivalence, and what has been called a transfer of function through equivalence relations, provide an important basis for the behavior analysis of symbolic relations and human language more generally. From an RFT perspective, one of the important properties of a symbol is that its psychological functions are based to some extent on the transfer of functions through equivalence relations. Suppose, for example, that a young boy enjoys a glass of Coke[™] (Stimulus A) for the first time and is then told by a school friend that Coke is like another drink called Pepsi[™] (Stimulus B). If the boy is subsequently asked "Would you like a Pepsi?" he may well respond positively. This transfer of appetitive function is based on the di-

rectly established psychological function of the word *Coke*, which was paired with actual *Coke*, and the derived symmetry relation between the words *Pepsi* and *Coke* (i.e., *Coke is like Pepsi*). In effect, the boy does not need to experience *Pepsi* directly in order for him to “think” that it will be a pleasant drink. This basic concept of a transfer of function in accordance with stimulus relations forms the core of the RFT approach to language and cognition (Hayes, Barnes-Holmes, & Roche, 2001).

In this article we will describe how RFT has used the concepts of equivalence and transfer of function to analyze metaphor both conceptually and empirically. This RFT interpretation builds on the earlier work of Skinner (1957) by showing how a repertoire of metaphorical verbal behavior might develop from a simpler repertoire of formal property abstraction. Before continuing however, we must first include a caveat.

The model reported herein adds to Skinner’s (1957) analysis of metaphorical extension by showing that it can be based on arbitrarily applicable relations among stimuli. Of course, in 1957, Skinner did not have access to the concepts of equivalence and transfer of function that are necessary to describe the conditions from which arbitrary stimulus relations emerge. Behavior-analytic science can now describe some of these conditions. However, to claim that we have isolated them sufficiently goes beyond currently available data. Under a variety of conditions, with a variety of tests, investigators have revealed the limitations of our understanding of equivalence and derived relational responding more generally, and thus at this time, we are left with empirical questions yet to be answered with regard to these phenomena (e.g., Fields, Hobbie-Reeve, Adams, & Reeve, 1999; Pilgrim & Galizio, 1995; Spencer & Chase, 1996). It should be recognized, therefore, that there are limits to the RFT interpretation of metaphor report-

ed below that will be overcome only through further empirical research.

RELATING RELATIONS: A KEY PROPERTY OF METAPHORICAL LANGUAGE

The first published RFT study that was directly relevant to the analysis of metaphor focused on the closely related area of analogy (Barnes, Hegarty, & Smeets, 1997; we will consider the relation between analogy and metaphor at a later point in the article). Specifically, Barnes et al. used what they called equivalence–equivalence responding to construct a relational frame interpretation of analogical reasoning. In the authors’ own words,

Consider . . . the following question based on the classic proportion scheme ($A : B :: C : ?$); “apple is to orange as dog is to (i) sheep, or (ii) book?” If “apple” and “orange” participate in an equivalence relation in the context “fruit,” and “dog” and “sheep” participate in an equivalence relation in the context “animals,” then we would expect a person to pick “sheep” as the correct answer. In effect, the response would be in accordance with the derived equivalence relation between two already established separate equivalence relations. . . . We take the view that equivalence–equivalence responding is an example of a relational network as defined by relational frame theory (e.g., Barnes, 1994; Barnes & Holmes, 1991; Hayes, 1991, 1994). (1997, p. 3)

The first experiment reported by Barnes et al. (1997) examined the relations between two separate equivalence relations and between two separate nonequivalence relations. Subjects were first trained and tested for the formation of four three-member equivalence relations (i.e., train $A1 \rightarrow B1$, $A1 \rightarrow C1$, $A2 \rightarrow B2$, $A2 \rightarrow C2$, $A3 \rightarrow B3$, $A3 \rightarrow C3$, $A4 \rightarrow B4$, $A4 \rightarrow C4$, and test $B1 \leftrightarrow C1$, $B2 \leftrightarrow C2$, $B3 \leftrightarrow C3$, $B4 \leftrightarrow C4$). After successfully passing the equivalence test, subjects were tested to determine whether they would relate pairs of stimuli to other pairs of stimuli based on their participation in equivalence relations. Subjects were presented with samples that contained two stimuli that were from one derived equivalence relation (e.g., $B1C1$), and

were given the opportunity to choose comparisons that contained two stimuli that were from a second separate derived equivalence relation (e.g., B3C3). The result of this first experiment was that a range of subjects, including a 12-year-old boy, successfully related equivalence relations to other separate equivalence relations, and nonequivalence relations (e.g., B1B2) to other, separate nonequivalence relations (e.g., C3C4), in the absence of explicit reinforcement. Experiment 2 employed the same procedures as were used in Experiment 1, except that subjects were exposed to the equivalence–equivalence test before being exposed immediately, and without further training, to the standard equivalence test. Again, the result of this experiment was that all subjects, this time including a 9-year-old boy, successfully related equivalence relations to other separate equivalence relations and nonequivalence relations to other separate nonequivalence relations. In short, Barnes et al. provided an empirical model of analogical reasoning, based on the RFT concept of equivalence–equivalence responding. This basic concept of relating one derived relation to another derived relation also lies at the heart of the RFT analysis of metaphor, to which we now turn.

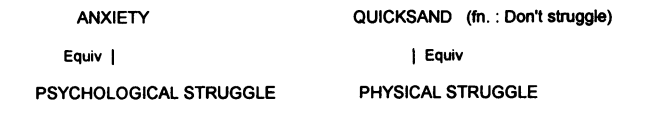
METAPHOR FROM THE RFT PERSPECTIVE

Consider the metaphor, “Struggling with anxiety is like struggling in quicksand,” which might be used, for example, in the psychotherapeutic treatment of clinical anxiety. Contacting this particular metaphor might cause a client to change his or her response to anxiety attacks. The client probably already knows, via the verbal community, that struggling in quicksand only makes drowning all the more likely. When the therapist suggests that struggling with anxiety is similar to struggling in quicksand, then the client may see that struggling with anxiety serves only to make the anxiety worse (i.e.,

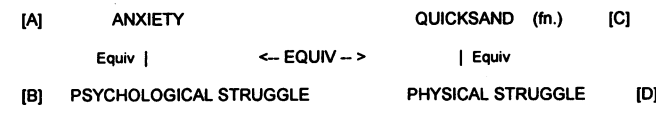
trying really hard to escape feelings of anxiety can often increase those very feelings). Consequently, the client’s behavior in the face of anxiety may change, such that he or she no longer attempts strongly to resist his or her anxiety, but instead accepts the anxious feelings as they arise, and thus prevents the downward cycle into full-blown panic.

This quicksand–anxiety metaphor may be interpreted as a relational network that is functionally similar to the analogy described earlier. In this case, however, “anxiety” (A) is to “psychological struggle” (B) as “quicksand” (C) is to “physical struggle” (D) (see Figure 1, Elements 1 and 2). For current purposes, we will describe the relation between anxiety and psychological struggle, and the relation between quicksand and physical struggle, as two separate equivalence relations. From the RFT perspective, the relational network in this example of metaphor may help the listener to discriminate a *formal* relation between two apparently very different events. This discrimination of formal similarity between the two events may make a transfer of function from one to the other more likely. In this particular metaphor, deriving a relation between anxiety and psychological struggle and quicksand and physical struggle could help the listener to discriminate that struggling in either case leads to *structurally or formally similar* physiological and psychological effects (i.e., massively increased autonomic arousal and a sense of fear and panic; see Figure 1, Element 3). Consequently, some of the functions of “quicksand” might now be more likely to transfer to “anxiety.” For example, a clinically anxious person might derive certain important cause–effect relations (these and other nonequivalence relations will be considered below) including the following: “Struggling with anxiety will only make my situation worse” and “by ceasing to struggle I can begin to overcome my anxiety” (see Figure 1, Element 4). Thus, the original problem

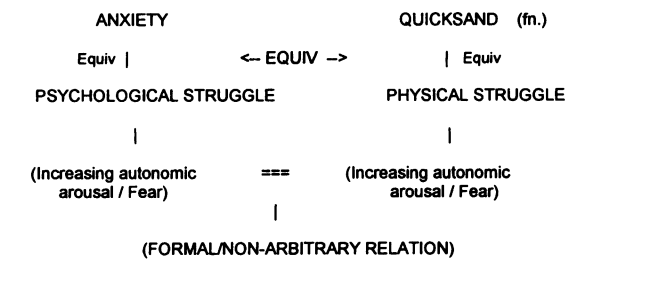
Element (i) : In the client's original relational network, "quicksand" has certain important response functions such as "Don't struggle", for example, which "anxiety" does not.



Element (ii) : The therapist changes the client's relational network by equating the relation "anxiety [A] / psychological struggle [B]" with the relation "quicksand [C] / physical struggle [D]" (i.e., "A is to B as C is to D").



Element (iii) : The newly changed relational network allows the client to discriminate a formal or non arbitrary relation of sameness between the relations "anxiety / struggle" and "quicksand / struggle" (i.e., both relations lead to increasing autonomic arousal accompanied by spiraling feelings of fear and panic).



Element (iv) : The discrimination of a formal or non arbitrary relation between the relations "anxiety / struggle" and "quicksand / struggle" may lead to a transfer of the functions of "anxiety" such that "anxiety" now possesses some of the response functions of quicksand including, for example, "Don't struggle":

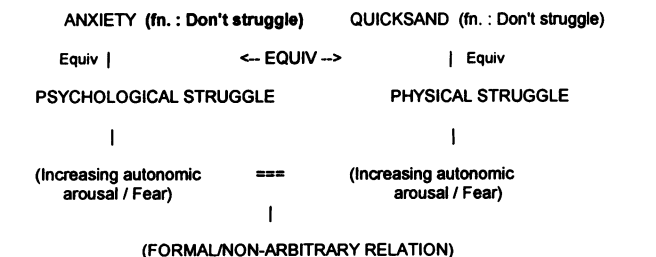


Figure 1. The four elements that, from the RFT perspective, characterize the process of metaphor.

may come to be "recast" in view of the relational network illustrated in Figure 1 (Elements 2 through 4). More generally, this type of pattern of transfer of functions throughout a relational network generates, from the RFT per-

spective, the often-experienced richness and complexity of metaphorical language, as well as the emotional "insight" that metaphor can often confer upon the listener. Parenthetically, we should emphasize that the four ele-

ments involved in metaphorical responding are not stages, and that the exact sequence of these and perhaps other elements may vary from instance to instance. We will return to this issue later in the article.

THE RFT INTERPRETATION OF METAPHOR: ADDITIONAL ISSUES

The foregoing provides an RFT interpretation of how metaphor may be used to change the behavior of a language-able human in important ways. In fact, we have developed a four-element empirical model based on this RFT conceptualization (Stewart, Barnes-Holmes, & Roche, 2000). Nevertheless, our conceptual and empirical work constitutes only a beginning, and there are many issues that remain to be addressed.

Metaphor and Relations Other Than Equivalence

According to RFT, equivalence is just one example of derived or arbitrarily applicable relational responding. Relational frames of opposite, difference, before–after, and so forth have been the subject of both conceptual and empirical investigation, thereby extending the range of behavioral phenomena that might emerge from trained relational responding (e.g., Barnes & Hampson, 1993a, 1993b; Barnes & Keenan, 1993; Dymond & Barnes, 1994; Roche & Barnes, 1997; Steele & Hayes, 1991).

In the current article, we have presented an RFT interpretation of metaphor based on equivalence–equivalence responding, that is, one in which the listener responds in accordance with a relation of equivalence between two equivalence relations. However, according to RFT, metaphors also may involve relations of equivalence between other types of relation. For example, the metaphor “Struggling with anxiety is like struggling in quicksand” might be more accurately described as an equivalence relation be-

tween two causal relations (i.e., a “causal–causal” relation). Specifically, struggling causes more rapid sinking into either quicksand or anxiety. Further research in our laboratories is currently utilizing novel methodologies (e.g., Hayes & Barnes, 1997) to model metaphorical language in which non-equivalence relations participate in the underlying relational networks.

The Distinction Between Metaphor and Analogy

The current interpretation of metaphor proposes that the key properties of metaphorical language include, for example, the relating of relations and the discrimination of nonarbitrary similarity via arbitrarily applicable relational responding. However, these properties could also be seen as characterizing analogy. Consider, for example, the classic Rutherfordian analogy “An atom is like the solar system.” This analogy involves the relating of relations. That is, in both cases, there is a relation between a central hub and orbiting elements, and because these are similar relations they may be treated as equivalent. Nonarbitrary relations are also involved, because the relation between the central hub and orbiting elements in both systems is an obviously physical or nonarbitrary relation. Given that analogy involves relating relations and nonarbitrary relations, the question remains: How does metaphor differ from analogy, and how might we interpret this difference in functional terms?

One test that has been used to distinguish between analogy and metaphor is the directionality test (see, e.g., Chase, 1986), according to which analogies are bidirectional, whereas metaphors are unidirectional. In any example of either analogy or metaphor, two events, A and B, are related in a phrase of the basic form “A is (like) B.” In the case of analogy, the position of the A and B terms may be swapped and the result is another meaningful analogy. For example, if the A and B terms

in the analogy “An atom (A) is like the solar system (B)” are swapped, the result, “The solar system (B) is like an atom (A)” is still a valid and understandable analogy. However, in the case of metaphor, if the A and B terms are swapped, the phrase loses its metaphorical quality. Consider the metaphor “Cats (A) are dictators (B),” for example. Metaphors such as this work because the A and B terms have a property in common that is obvious and stereotypical in the case of B but is not obvious in the case of A. In this example, dictators are clearly demanding and coercive, whereas cats may also be seen in this light but far less obviously. The inclusion of these terms in the metaphor in the order cats (A) are dictators (B) serves to amplify the property of “demanding-ness” in the A term, “cats.” However, this amplification effect occurs only if this specific order is maintained. If the terms are swapped, so as to yield the phrase, “Dictators are cats,” then there is no appropriate amplification effect, because now there is no longer a common property that is obvious in the second term and not obvious in the first.

The earlier example, “Struggling with anxiety is like struggling in quicksand,” also qualifies as a metaphor based on this definition, because the property in common between the two events (i.e., self-defeating struggle) is obvious in the second term but not in the first. Hence, the juxtaposition works in the direction just shown but not so well in the other direction.

A technical RFT account of the different directionalities characterizing analogy and metaphor is as follows. In the case of analogies, such as “An atom (A) is like the solar system (B),” the nonarbitrary properties that A and B have in common are equally characteristic of both A and B. Thus, there will be a relation of equivalence between the A and B terms, and reversal of the order of the terms still yields an analogy. In the case of metaphor, there are often contextual cues for the deri-

vation of a *hierarchical* frame between the two elements involved (see Hayes, Fox, et al., 2001). For example, English speakers respond to a sentence of the form “A is B” (e.g., apples are fruit) as signifying that A are members of the class of B, and thus that A (e.g., apples) have at least some of the typical properties of B (e.g., fruit). That is, “apple” is contained in the class “fruit,” but “fruit” is not contained in the class “apple.” This hierarchical frame is an important property of metaphor. In technical terms, “Cats are dictators” may cause a transfer of the psychological functions typically associated with dictators (e.g., “demanding-ness”) to cats, and if some of the nonobvious functions of cats are amplified by this transfer, the listener will respond to it as a metaphor. However, if the A and B terms are reversed, the obvious qualities of cats transfer to dictators and amplification is less likely (e.g., dictators have none of the qualities of small, furry pets). In effect, the unidirectional, hierarchical relation between the terms involved is an important feature of the phenomenon of metaphor, because it differentiates it from analogy.

Elements, Not Stages

As pointed out earlier, the four-element interpretation of metaphor is not sequential—the exact sequence of elements may vary from instance to instance. The formal relations specified in Element 3, for example, could serve as a contextual cue for equivalence responding or could itself be discriminated only *after* the equivalence relation is derived. Consider again the metaphor, “Cats are dictators.” As was pointed out, the shared formal features of the two terms are their demanding qualities. This common quality may itself function as a context for applying a frame of equivalence between cats and dictators (i.e., Element 3 may occur before, or at least feed back to support, Element 2). Furthermore, certain elements (e.g., Element 4) may be

missing entirely in some metaphors (i.e., the metaphor is understood, but there is no change in behavior). Nevertheless, the four elements presented in this example are typical of many instances of metaphor.

Understanding Metaphor Versus Creating Metaphor

The current work has focused on the *understanding* of metaphorical language as opposed to the *creation* of novel metaphors. Future research, however, will need to focus on the undoubtedly important behavioral processes involved in the creation of novel metaphors. Within the context of the current interpretation of understanding metaphor, the creator of a metaphor might first perceive some formal or nonarbitrary similarity between two different environmental events, and then subsequently behave verbally in accordance with a new relational network into which this novel formal similarity has been incorporated. The creator of the metaphor "surfing the Internet," for example, might have been using the Internet at some point and found that this context suddenly produced some of the perceptual functions of actual surfing. Consequently, he or she may have immediately related the two terms, "surfing waves" and "surfing the Internet," thus creating a relational network on the basis of nonarbitrary relations.

Although we have argued that the creation of novel metaphorical language may involve the discrimination of formal relations prior to the first demonstration of the new metaphor, we would also argue that a prior history of arbitrary relational responding is necessary for the initial discrimination of the nonarbitrary relations to function as the basis for metaphor (i.e., verbal history → nonarbitrary relations → arbitrary relations). The metaphor, "surfing the Internet," for example, is surely based, in part, on the verbal history that gave rise to descriptions of both surfing the sea (e.g., "surfing is fast

and exciting and feels like 'skimming' or 'riding' the sea") and using the Internet (e.g., "accessing information on the Internet is fast, and it feels as if the user is 'skimming' or 'riding' over a sea of information"). In other words, these descriptions facilitated the discrimination of the formal relations that led to the production of the metaphor for the first time. From this perspective, therefore, the creation of metaphor involves the discrimination of nonarbitrary relations based on a history of arbitrary relational responding, and thus the processes involved in understanding *and* creating metaphor may be functionally similar. Although this issue will certainly require further analysis, the current RFT model of understanding metaphor should provide a useful starting point for developing a more complete functional-analytic model of metaphorical language.

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