The Development of Self and Perspective -Taking:

A Relational Frame Analysis

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From a relational frame perspective, a child learns to discriminate her own behavior and the behavior of others through a history of exemplar training in arbitrarily applicable relational responding. The current paper argues that the emergence of deictic relations such as "I and you", "here and there", and "now and then" is critical to the development of perspective-taking. The paper also suggests that behavior analysis may have an important contribution to make to the study of perspective-taking, and may provide a functional-analytic account of what is sometimes referred to as "theory of mind."

The Traditional Behavioral Approach to Self

Contrary to popular belief, behavior analysis emphasizes the important role played by self-knowledge in complex human behavior, particularly social and verbal behavior (Dymond & Barnes, 1997). According to Skinner (1974), self-awareness, or self-discrimination is shaped through verbal interactions with others, thereby allowing for greater prediction and influence over an individual's own behavior. It is only when a person's private world becomes important to others that it becomes important to him. By asking questions such as "How are you feeling", for example, other members of the verbal community are, in effect, shaping an individual's ability to respond discriminatively towards his/her own behavior. The person is "made aware of himself" by such questions and is thus in a better position to predict and control his own behavior (Skinner, 1974, p. 31).

Skinner, therefore, accounted for the development of human self-awareness in terms of complex social contingencies. One prominent research strategy that emerged from this interpretation involved determining whether self-discrimination was a uniquely human phenomenon, or whether non-humans could also discriminate their own behavior. A number of studies have answered this question by demonstrating that the behavior of pigeons, for example, may be brought under the control of the pigeons' own previous response patterns (Lattal, 1975; Pliskoff & Goldiamond, 1966; Reynolds, 1966; Reynolds & Catania, 1962; and Shimp, 1982). Although such finding have provided support for Skinner's interpretation of self-awareness, other behavioral researchers have argued that self-discrimination cannot be accounted for entirely with the traditional concept of discriminative control. More specifically, the modern behavior-analytic approach to human language and cognition, known as Relational Frame Theory (RFT), suggests that human self-discrimination may involve verbal processes that distinguish it functionally from the nonverbal self-discrimination observed with nonhumans.

A Modern Behavioral Approach to Self

According to RFT, bidirectionality, derived stimulus relations, and the transformation of stimulus functions are core processes of verbal behavior (see Hayes, Barnes-Holmes, & Roche, 2001). From this perspective, a stimulus or response is defined as *verbal* when it participates in an equivalence or other type of derived relation, involving these three properties. This definition of verbal behavior is critical to the RFT account of human self-discrimination.

A study reported by Dymond and Barnes (1994) provides a very basic example. Adult humans were first trained and tested for the formation of three, three-member equivalence classes (i.e., A1-B1-C1, A2-B2-C2, A3-B3-C3), and were then trained to emit two self-discrimination responses on two time-based schedules of reinforcement. If subjects did not emit a response, choosing one stimulus (B1) was reinforced, and if they did emit one or more responses choosing another stimulus (B2) was reinforced. Finally, subjects were tested for a transfer of these self-discrimination response functions in accordance with equivalence relations (i.e., no response = choose C1, and one or more responses = choose C2). All four subjects demonstrated the derived transfer of self-discrimination response functions via equivalence relations.

Subsequent studies demonstrated similar effects in accordance with the relational frames of more-than/less-than and opposite (Dymond & Barnes,1995; 1996). These studies point to an essential aspect of self-knowledge from an RFT perspective (Dymond & Barnes, 1997).

The RFT view of human self-awareness is that the person is "not simply behaving with regard to his behavior, but is also behaving *verbally* with regard to his behavior" (Hayes & Wilson, 1993, p. 297 [emphasis added]). A nonhuman, when it has learned to respond to responding, is merely performing a discrimination in which the original response (e.g., pecking according to a DRO or DRL schedule) was discriminative for the second response (e.g., choosing between red and green keys; see Hineline & Wanchisen, 1989). The derived self-discrimination performance shown by Dymond and Barnes (1994) is not of that kind. Rather it is an instance of *verbally* discriminating one's own behavior, because the performances necessarily involved the three defining properties of relational framing. The difference between verbal and nonverbal self-knowledge thus becomes a functional one.

A Modern Behavioral Approach to Perspective Taking

In suggesting this clear functional distinction between verbal and nonverbal self-discrimination we have only scratched the surface. A more complete RFT analysis of self requires that we consider perspective-taking frames that appear to be essential in the verbal construction of self. In the language of RFT, deictic relations, that specify a relation in terms of the perspective of the speaker, are a family of relational frames that appear to be critical for the development of perspective-taking skills. The three frames that appear to be most important in this regard are the frames of I and YOU, HERE and THERE, and NOW and THEN. Unlike other relational frames, these do not appear to have formal or nonarbitrary counterparts, and cannot be traced to formal dimensions in the environment. It is the relationship between the individual and other events that serves as the constant variable upon which these frames are based. Responding to, and asking, many questions contained within our common verbal interactions with others (e.g., "What am *I* doing *now* ?"or "What are *you* doing *there* ?") appear to be critical in establishing these perspective-taking frames.

Each time questions such as these are asked or answered, the physical environment is different. What remains constant across these and many similar questions, however, are the relational properties of I versus You, Here versus There, and Now versus Then. Furthermore, according to RFT, these properties themselves are abstracted through learning to talk about one's own perspective in relation to the perspective of others. *I*, for instance, is always from this perspective *here*, but not from the perspective of another person *there*. Abstraction of an individual's perspective on the world, and that of others, requires a combination of a sufficiently well developed relational repertoire and an extensive history of exemplars that take advantage of that repertoire.

According to RFT, the three perspective-taking frames described above can generate a range of relational networks, including: I-HERE-NOW; YOU-HERE-NOW; I-HERE-THEN; YOU-HERE-THEN; I-THERE-NOW; YOU-THERE-NOW; I-THERE-THEN; and YOU-THERE-THEN. Many phrases common to our daily discourse are derived from these eight relational networks. Consider, for example, the phrases; "I am here now, but you were here then"; "You were there then, but I am here now"; and "You and I are both here now, but I was here then". Of course, when used in actual dialog, these phrases would often include or substitute words coordinated with particular individuals, places, and times. For illustrative purposes, consider the following, "It is six o'clock and I am at work [HERE and NOW], but Mary [YOU] is still at home" [THERE and NOW]. What makes perspective-taking frames particularly complex and useful is that they cannot be defined in terms of particular words, even the words, "I", "you", "here", "there", "now", and "then". According to RFT, words such as these (used to describe the perspective of the self and others) are merely examples of the relational cues that control the perspective-taking frames, and a range of other words and contextual features may serve the same function. As is the case for all relational frames, what is important is the generalized relational activity, not the actual words themselves.

Perspective-Taking and Theory of Mind

The RFT approach to perspective-taking is relatively new, but there are more established approaches in mainstream psychology. In the latter half of this article, we will use RFT to provide a behavioral interpretation of perhaps the most prominent theory of perspective-taking currently found in the psychological literature.

Although this constitutes a purely interpretive exercise, it is our hope that it will also serve to stimulate relevant empirical research within the behavioral tradition.

Perspective-taking has traditionally been interpreted within the broader context of 'Theory of Mind' (Baron-Cohen, Tager-Flusberg, & Cohen, 2000). According to a typical approach in this area, there are five levels in the development of knowledge about informational states of the self and others (Howlin, Baron-Cohen, & Hadwin, 1999). We will now look briefly at the cognitive or perspective-taking tasks traditionally addressed within each of these levels.

Level 1 involves simple visual perspective-taking, and is based on the principle that different people can see different things. For example, if a two-sided card is held up between two people, each individual can see only what is on one side. Level 2 involves complex visual perspective-taking, and is based on the principle that people can see things differently. For example, two individuals seated opposite one another across a table will have different perspectives on the same picture placed between them. One will see the picture the right way up, whereas to the other individual, the picture will appear upside down. Tasks such as these are often conducted as part of training programs for establishing or facilitating theory of mind skills in young children, such as those diagnosed as autistic (Reed & Peterson,1990). According to RFT, tasks of this kind establish contextual con-

trol of the relational frame of I-YOU, in that correct responses to questions such as "What can you/I see?" are determined by the cues "I" and "you," which are contained in the tasks.

Level 3 of the traditional theory of mind approach to perspective-taking is 'seeing leads to knowing', and is based on the principle that people only know things that they have seen (Taylor, 1988). In one such task, an object is placed inside a box when a child has his or her eyes closed, and the child is then asked "What is inside the box?" A verbally sophisticated child is likely to admit that s/he cannot know because s/he did not see. If the child is then allowed to see inside the box, and is asked "Now, how do you know what is inside the box?" s/he is likely to correctly reply "I saw what was inside". The basic correct conclusions in this scenario are "I know because I have seen, and I do not know when I have not seen". A similar scenario is then presented to the child in order to demonstrate the perspective of another (e.g., a doll), and the same questions are posed with regard to the doll's perspective. In the language of RFT, training of this kind increases the contextual control of I-YOU and indirectly establishes control by the relational frame of NOW-THEN. Consider these relational frames in the correct answers to the above scenario: "I didn't see THEN so I don't know NOW" and "YOU saw THEN so YOU know NOW".

Level 4 of this traditional model of perspective-taking involves the principle that you can predict actions on the basis of knowledge (i.e., true belief). Consider a traditional training task involving toys, in which two similar scenes are portrayed. In one scene, a car is placed beside a boat, and in the other scene, an identical car is placed beside a plane. A child is then provided with the following true belief story. "This morning, you saw the car next to the boat but you did not see the car next to the plane". The child is then asked, "Where do you think the car is? Why do you think it is near the boat? Where will you go to get the car? Why will you go to the boat?" The correct conclusions from this scenario involve the knowledge that one will only know what one has seen, and will act on this basis. According to RFT, contextual control of the relational frames of I-YOU, HERE-THERE, and NOW-THEN is being established at this level (although again the frames have not been targeted directly). Consider the role of the relational frames in the correct answer as follows: "I saw the car next to the boat (THERE) this morning (THEN) and so I think the car is THERE NOW".

Level 5 of this model involves the principle that you can predict actions on the basis of false belief. In traditional training tasks, this level might be established as follows. A child is shown a biscuit tin, for example, and asked, "What do you think is inside the tin?" Unbeknownst to the child, the biscuit tin does not contain biscuits, but does in fact contain a toy. The child is then shown inside the tin, and asked, "Before we opened the tin, what did you think was inside? And what is really inside?" A similar scenario is then presented from the perspective of another (e.g., a doll), and the same questions are presented with regard to this alternative perspective. In the language of RFT, these tasks indirectly establish contextual control of the three perspective-taking frames I-YOU, HERE-THERE, and NOW-THEN (these tasks also add relational flexibility by requiring control by the relational frame of *logical*.

Consider the relational frames in the correct answer as follows: "I did NOT see inside THERE and THEN, but I do see inside HERE and NOW."

In outlining the traditional approach to perspective-taking, we suggested that the tasks commonly used to establish theory of mind indirectly involve training in relational perspective-taking (i.e., I-YOU, HERE-THERE, and NOW-THEN). According to RFT, however, a more effective means of establishing these repertoires would be to target the relational frames directly, thereby focusing the training on the largely verbal nature of the behavior involved. In line with the current thesis, we are developing RFT-based training and testing tasks that might be used to establish and analyze perspective-taking. The research also aims to demonstrate that perspective-taking might be usefully considered a form of generalized relational operant behavior. In short, our goal is to lay the procedural and empirical groundwork for further RFT analyses of perspective-taking behaviors in young children.

CONCLUSION

Although the current thesis is clearly driven by a modern behavioral approach to perspective-taking, it may be of some interest to non-behavioral psychologists. For example, Benson (2001), a cultural psychologist, has argued recently that a very important aspect of the development of a sense of self is the verbal location of oneself in a time and place relative to others. In a sense, therefore, perhaps behavioral psychology and cultural psychology are closing in on a treatment of self that is similar in function, if not in form. That is, both psychologies see the "self" as largely verbally constructed, but adopt different approaches to the study and definition of what it means to *verbally construct oneself*. Indeed, the fact that two different psychological traditions are drawing similar conclusions would seem to suggest that the current approach to perspective-taking may well have significant value.

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