RELATIONAL FRAME THEORY

A Post-Skinnerian Account of Human Language and Cognition

Edited by
Steven C. Hayes
Dermot Barnes-Holmes
and
Bryan Roche

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Created in the United States of America

To the memory of B. F. Skinner and J. R. Kantor

They forged the way toward a naturalistic
approach to human language and cognition

A PERSONAL PROLOGUE

Steven C. Hayes
University of Nevada, Reno

I have been asked by my coauthors to write a personal prologue to this volume. I am a bit embarrassed to do so, because it seems entirely too self-conscious, but I have agreed because it gives me a chance both to acknowledge a number of debts and to help reduce the harmful and false perception that RFT is a foreign intrusion into behavioral psychology.

I would like first to acknowledge the debt RFT owes to Willard Day. I heard Willard speak in 1972 or 1973 as a beginning graduate student. His call to understand language as it is actually used became a lifelong commitment. In some ways this commitment was not just to the field but was a personal one to Willard himself, who was one of the most charismatic, intelligent, and complex human beings I ever met. Later, when Willard happily convinced me to join him at the University of Nevada, we were able to spend a few years together before a heart attack suddenly took away this great man. Ironically, Willard himself was extremely uncomfortable with RFT, but he was trying to understand it to the end because he appreciated its purpose. For me, RFT was a way to rise up to Willard's challenge, and if any good comes from it, Willard is partly responsible. He gave me the mission.

I have been asked where RFT came from. The answer may be disappointingly simple to some: it is a direct application of behavior analysis, as I understood it.

I had been encouraged by philosophically oriented people like Jon Krapfl and Hayne Reese (and Willard Day, Scott Wood, my student colleague Bill Myerson, and many others) to think of behavior in the most open and functional way possible. I did not know the word "contextualistic" then, but the wonderful explosion of contextualistic behavior analysis at West Virginia University in the early 1970's made a mark on me that would last a lifetime. They gave me a form of behavior analysis that could breathe free and that had no limits to its

aspirations. Given that training, it was absolutely normal to think in radically functional terms, even when behavioral events and their contexts seemed to have no shared formal properties.

I had also been trained by clinical behavior analysts like John Cone and Rob Hawkins, and by basic behavior analysts like Andy Lattal to insist upon an *experimental* analysis. They had given me a form of behavior analysis that was rigorous and data oriented. On the one hand, I was taught to love and respect the importance of philosophy of science, but on the other hand, I was taught that this was never to be accepted as a substitute for data. In that odd way, the seeds of my discontent with Skinner's approach to verbal behavior were sown. An analysis of verbal behavior that was not a rich source of experimental data was functionally false, however elegant it might be.

As an academic, I was particularly moved by the work of Charlie Catania and his colleagues Elliot Shimoff and Bud Matthews, with whom I later spent a productive sabbatical year in 1986. In the late 1970's and early 1980's my students and I looked to the analysis of rule-governed behavior as a way to begin to address Willard's challenge, but it quickly became apparent that to understand rules one had to understand verbal stimuli. When my late colleague Aaron Brownstein exposed me to the concept of stimulus equivalence in 1982 or 1983, these multiple sources of control clicked together. I believe that I laid out an overarching operant account of equivalence to Aaron in a conversation just a few days later. Aaron was immediately supportive.

I was by then running my laboratory with Aaron, who was perhaps the best basic behavior analyst I have ever known. We began working out the conceptual and empirical details, point by point, with students in our lab at that time (especially Rob Zettle, Irwin Rosenfarb, Jeanne Devany, David Steele, Barbara Kohlenberg, Joe Haas, Dan Gunnarson, Elga Wulfert, Terry Olson, Jill Shelby, David Greenway, and several others). Aaron always pushed the work away from issues of form and toward issues of behavioral principles. He was never interested in equivalence for equivalence's sake. He was interested in what was functionally new and principle-based, and that could be used to understand complex human behavior. The first detailed presentation of the RFT idea was in an invited address jointly authored by Aaron and I at the Association for Behavior Analysis meeting in Columbus, Ohio in 1985 entitled *Verbal behavior, equivalence classes, and rules: New definitions, data, and directions.* In that paper, we laid out the core of RFT and defined verbal behavior as "speaking with meaning and listening with understanding" very much as is done in the present volume. Aaron's boldness was reassuring. If such a careful and conservative behavioral scientist could see the sense of it, I knew we must be on the right track.

Aaron was a rigorous and creative experimental scientist who saw how to break down an idea into a series of studies. In 1985, Aaron and I listed about 20 studies that needed to be done on RFT. Virtually every study on that list has now been done – usually not by me since I have been distracted by many other administrative, organizational, and research projects – and all were successful in RFT terms. Had Aaron not died suddenly, I'm sure he would have been an author on many RFT studies.

Taking RFT from a simple idea to a theory required a mind more careful and analytical than my own. Although I had known my wife Linda for many years, I became involved with her at a 1986 conference in Germany that she had organized and where an elaborated form of RFT and some of the early data was presented and discussed for the first time. When we married a short time later, she helped me with the analysis greatly, smoothing out the rough edges, making it even more contextualistic, giving it its slightly Kantorian feel, and forcing

attention to the issues that needed to be addressed. We ran our lab together for a time, and our students from the late 1980's and early 1990's (especially Gina Lipkens, Chris Leonhard, Kelly Wilson, Sue McCurry, and others) bumped the analysis forward.

Taking RFT from a theory to an actual living research program required a person with greater creativity, organization, focus, and persistence than I possess. Thankfully, that problem was solved by the miracle of Dermot Barnes-Holmes and his students. Inventive, intense, and fantastically productive, Dermot took this theory and a small set of studies developed by an academic clinical psychologist who did basic research on the side, and helped turn it into an empirical research program that has the potential to transform the field. Nothing in my professional life has ever been more heartening. Dermot is a brilliant light that illuminates all around him. If there is a God, I thank her for Dermot.

Where did RFT come from? Putting together these sources of influence – radical functionalism, an experimental orientation, the lead provided by rule-governance and simple equivalence, and the analytic creativity of my basic behavior analytic colleagues – I continue to believe that RFT is a fairly natural extension of the field itself as I was trained to view it. At its intellectual core, RFT is as simple a behavioral theory as one can imagine: think of relating as learned behavior. Yet, in describing these sources of influence over RFT I see that it is more than that – it is a reflection of some of the most able behavior analysts the field has to offer and that I have been lucky to have as teachers and colleagues.

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Steven C. Hayes
Reno, Nevada
December 2000

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PREFACE

Behavior analysis is a field that approaches complex problems by trying to generalize from simpler situations. Inductive, empirical, and fastidious, it is a field that from the beginning aspired to grapple with the most elaborate forms of human behavior, and yet it approached that complexity through the superficially preposterous strategy of focusing on the instrumental actions of rats and pigeons. Even behavior analysts sometimes misunderstood that strategy, others in psychology most certainly did.

This strategy was never based on reductionism, or the belief that the behavior of nonhumans *must* provide a good guide to the analysis of complex human behavior. Rather, it was a strategic course into the complex – one that behavior analysts hoped and prayed, but did not know, would eventually be useful by providing tools for the analysis of complex situations.

It was certainly the long way around, but the hope was that a knowledge base would be formed that was more stable than if complexity were taken head on, with so many ways to get it wrong. Incredibly, this bold strategy, which had every chance of failure, led to a great deal of success. Indeed, functional principles of behavior are used every day to improve or even save the lives of human beings all over the globe, from autistic children to the addicted, to the chronically mentally ill.

Nevertheless, that most elusive of targets, human language and cognition, did not yield. Thinking, problem-solving, and reasoning: all did not yield. As we will show in Chapter 1, as early as 1938 B. F. Skinner wrung his hands in worry. Then, a little less than fifty years ago, he seemingly found a way to reach out and grab even these topics with a direct contingency approach. Skinner's 1957 book *Verbal Behavior* shouted "victory!"

But something was wrong. The victory did not look like other victories in behavior analysis. The research that followed was barely a trickle. The applications were relatively few. The new methods, questions, and preparations never appeared. Criticisms were answered with rhetoric, not data. The field of psychology looked, paused, shook its head, and moved

on to the direct analysis of the complexity of human language and cognition. In basic psychology at least, behavior analysis was elbowed to the sideline.

It was a high price to pay, but the story did not end there. For the last thirty years, the empirical and conceptual analysis of language and cognition moved along within behavioral psychology. It did not (and could not, due to the radically different philosophical and conceptual tradition) ape the developments in cognitive psychology, but the area continued to develop. Slowly, new empirical areas opened up using human subjects. Human subjects were approached on their own terms – not merely as a preparation to assess the generality of principles developed with nonhumans. The list of topics began to grow: rule-governance, stimulus equivalence, mutual exclusion, derived stimulus relations, and yes, relational frames. Quietly, almost entirely unnoticed by the rest of psychology, a new behavioral psychology of language and cognition began to take shape.

This should not be a surprise. After all, an analysis of complex human behavior was one of the goals from the very beginning. It seems time now to note what has been happening.

This book is meant to declare, to behavioral and non-behavioral psychologists alike, that this inductive, slow, fastidious tradition now has the empirical and conceptual tools to conduct an *experimental* analysis of virtually every substantive topic in human language and cognition. Empirical behavioral research on language and cognition, while not a torrent, is hardly a trickle. The applications have begun to arrive. The new methods, questions, and preparations have appeared. Criticisms can now be addressed with data, not merely with rhetoric. A new day has dawned.

This volume is behavior analytic, but it is also post-Skinnerian because if the present account is correct, many of the most prominent Skinnerian ideas about human complexity must be put aside or modified virtually beyond recognition. Using the term "post-Skinnerian" does not mean that someone else will assume Skinner's role in behavioral psychology. The era of great leaders is forever over in behavioral science, and if a single person is to be linked to behavior analysis, it will surely be Skinner. Rather, the term "post-Skinnerian" suggests that it is now time for behavior analysis to abandon many of the specific theoretical formulations of its historical leader in the domain of complex human behavior, on the grounds of the empirical and conceptual developments in that very field.

Other areas established by intellectual giants have faced similar choices. Some have chosen to cling to the leader's canonical texts, or to those texts as modified by close disciples. In so doing, these fields became living shrines to the dead and their close followers – interesting but somehow pathetic and ultimately doomed to a path of irrelevance. Some leapt into new things in such a way that the original position virtually disappeared (e.g., the functional psychology of the followers of William James). In this book we try to convince our behavioral colleagues and interested others that viewing derived stimulus relations as the central core of human language and cognition is a middle path that takes advantage of the best aspects of the behavioral tradition, and yet carries behavioral psychology toward the kinds of phenomena that need a more functional account.

Behavioral psychologists can turn away the challenge we are attempting to present, simply by denying the relevance of the data and of the analyses in this book. The behavior analysis of language and cognition will not get stronger simply by doing so, however. Fifty years in one direction seems to us to be enough. The field needs a new approach.

For our part, we think this field will face its own data and will make a choice consistent with its own values. We believe that the data will win out, and that enough new data have

emerged to demand the careful attention of basic researchers. We have faith that if there is good in this book, our colleagues will know it.

The challenge this book presents to those outside of behavioral psychology is more complex. The need for a pragmatically useful analysis of language and cognition is enormous. Those who looked into behavioral thinking years ago and turned away unsatisfied may find it useful to look again.

We have no illusions that a large number of nonbehavioral psychologists will take this approach seriously, at least not at present, but for those special few who will consider our arguments seriously, we ask for a chance to show that these procedures and concepts are powerful tools for the analysis of language and cognition. We ask also for a chance to show that the kinds of phenomena we are attempting to address are not watered down or prematurely forced into a behavioral mold. The phenomena encompassed by Relational Frame Theory are at the heart of any meaningful psychology of language and cognition. Finally, we ask for tolerance of a behavioral language system. It is virtually an x-rated language for many, and that can be a powerful barrier to being heard. Nevertheless, the precision, scope, and coherence of this language can be a critical ally as we walk into the lion's den of language and cognition itself. If the preconceptions can be put aside, we hope that these qualities will show through.

We would like to thank the support of our Universities, colleagues, students, and families, who have supported this work in a thousand ways. Several of our colleagues have made explicit comments on earlier drafts of the book. In that regard, we would particularly like to thank our colleagues Hayne Reese, Ed Morris, Julian Leslie, and Paul Smeets for their helpful input. Several students helped proof the drafts of the book, including Ian Stewart, Tuna Townsend, Mark Flores, James Porter, Nick Berens, Aki Masuda, and Tim Weil.

In our hands, behavior analysis is not synonymous with Skinnerian thinking, but it is still behavior analysis. Learning to think in relational frame terms means learning to think behaviorally in a molar and contextual way. To those willing to take the journey we promise to try to make it worth the trip.

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LANGUAGE AND COGNITION: CONSTRUCTING AN ALTERNATIVE APPROACH WITHIN THE BEHAVIORAL TRADITION

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The most pivotal topic in human psychology is language and cognition. Humans swim in a sea of talking, listening, planning, and reasoning. From toddling to early adulthood, children are incubated in educational settings in which the tools of language and cognition are honed and the content material that makes use of these behavioral tools is taught and tested. The proximal products of science, law, religion, and literature, among many other social institutions, are verbal. Moreover, in the modern "information age," economies stand or fall on their abilities to develop and disseminate verbal knowledge.

Yet the history of psychology shows that understanding language and cognition is fraught with difficulty. The importance of these topics comes from their obvious pervasiveness in human events. The barriers to their scientific understanding, however, emanate from that same source. A human being considering the topic of verbal events considers these events verbally. The audience attempting to understand what was said does so verbally. The lay culture that developed and envelops these speakers and listeners provided them with the tools to speak with meaning and to listen with understanding long before they had any notion of "science," or "theory," or "data." The very sense, for example, that one "knows what is being talked about," when speaking of a "word," or an "idea," or a "thought," can be an enemy to the fundamental understanding of any of these topics in a scientific sense.

The early acquisition of a common sense understanding can bedevil the clarity of scientists' thinking in any area, but the reflexive quality of this problem in the area of verbal behavior makes it especially difficult to approach the topic in a fashion that is not bound by common sense. A clear sign that a scientist has succumbed to the difficulty is letting common sense examples stand for data and letting loose metaphors stand for theories. It is surprisingly easy to catch psychological scientists in this error. Innocently ask a psychological researcher interested in language or cognition "what is a word?" and by far the most common answer will be to give short lists of them or to use synonyms such as "symbol" or "referent." Ask "what is a thought?" and you are likely to hear another list, more synonyms, or to hear reports of what the psychologist was thinking at the moment. These answers are not scientifically adequate, of course. Instead, we are merely seeing a reflection of distinctions made by the verbal community at large.

Sensing the danger, a psychological scientist may be tempted to develop a more technical account by taking technical knowledge gained elsewhere - knowledge about the brain, or stimulus control, or motivation, or any of hundreds of technical scientific areas – and applying terms from these domains to the domain of verbal events. The difficulty in this case is that the verbal domain may have already been mapped by common sense and the technical patina may be but an afterthought. It is important not to mistake the mere presence of technical language for a technical understanding.

True scientific accounts grow from the bottom up, each analytic step grounded in the assumptions, concepts, and data of the scientific approach being used. They maintain contact with the phenomenon of interest, and allow it to be seen in new and useful ways. This is quite distinct from the process of applying a technical gloss to categories that are not truly integrated into a given scientific perspective. For example, a given scientist may explain how words work by an appeal to the brain, or to stimulus control, or to motivation, but one should be suspicious of this if that same scientist never uses this same technical analysis to explain "what *is* a word?" or even more fundamentally "is there such a thing as a *word*?"

It is impossible to avoid this problem entirely, but most approaches to language and cognition seem hardly to try. In the most typical common sense view of language and cognition, words refer to ideas. Ideas are the products of mental life. In this view, discrete mental events existed before language was even acquired, but language allowed words to be mapped onto these events and for them to be communicated from one mind or brain to another – one only has to learn to encode and decode the symbols properly. We develop and store these ideas in the mind or brain, and try to retrieve them and process them when we need them later on.

Many, perhaps even most, approaches to language and cognition from the British associationists forward have shared these basic common sense assumptions. The task of scientific analysis, when it is based on this view, is to answer such questions as how ideas are encoded and decoded, how the brain stores and retrieves ideas, or how stored and current information is processed and turned into action.

One should not be too critical of this mainstream approach on philosophical grounds, especially when looking at it from another set of assumptions. Assumptions are pre-analytic (they allow analysis, they are not the results of analysis) and thus they are nothing to thump one's chest over (Barnes-Holmes, 2000; Barnes and Roche, 1997b; Hayes, Hayes, and Reese, 1988; Hayes, 1993). The mainstream view is mechanistic (it reduces complex human interactions to discrete parts, relations, and forces) and mentalistic (private events are treated

as if they are private agents, with causal status over the observed world) but it seems relatively coherent when considered on its own terms and surely it has value. Nevertheless, there seem to be good reasons for behavioral psychologists to try to develop alternatives based on different assumptions.

The more contextualistic assumptions and approaches of the bulk of modern behavioral psychology have yielded new knowledge in so many areas that it seems worth trying to extend its reaches to language and cognition. Besides, the more mentalistic and mechanistic plot is farmed so frequently that one wonders if there is much chance of additional, fundamental advancement being harvested there.

1.1. THE BEHAVIORAL TRADITION

The behavioral tradition has always approached the topic of language with considerable caution. Behavioral psychologists are exquisitely sensitive to the problem of dualism in concepts drawn from the lay culture. The lure of reification and common sense solutions was obvious.

Yet the behavioral tradition also recognized this topic as a key mountain to climb. The behavior analytic approach, which comprises one of the main cores of the behavioral tradition left standing, has been clear on this point. Skinner's 1938 book, *Behavior of Organisms,* admits in its last few pages (e.g., see p. 442) that the direct contingency account developed there may not apply to human verbal behavior. Nineteen years later, Skinner's book *Verbal Behavior,* claimed, in essence, that it did. We will analyze that claim shortly, but what is of importance here is seeing how fundamental language is to the behavior analytic tradition.

In the history of psychology, the animal learning and human learning traditions largely went their separate ways. Behavior analysis is part of the animal learning tradition, but the focus on animal preparations was strategic, not final. It was taken as a means of approaching the complexity of human learning. Studying relatively simple acts in relatively simple contexts using organisms with relatively well-known histories was justified by the need to develop the analytic tools needed to address complex human behavior. Skinner (1966) was clear on this point:

> So far as the facts are concerned, *The Behavior of Organisms* is out of date. It still seems to me a viable book, however, for it presents a useful formulation of behavior supported by a selection of illustrative experiments. It may also serve as a reminder that a promising conception of human behavior has been derived from an analysis which began with simple organisms in simple situations and moved on, but only as its growing power permitted, to the complexities of the world at large (pg. xiv; preface to the Seventh Printing).

Seen in that context, Skinner's (1938) admission that the direct contingency account developed there may not apply to human verbal behavior is powerful. In Skinner's own words:

> The reader will have noticed that almost no extension to human behavior is made or suggested. This does not mean that he is expected to be interested in the behavior of the rat for its own sake. The importance of a science of behavior derives largely from the possibility of an eventual extension to human affairs.…Whether or not

extrapolation is justified cannot at the present time be decided. It is possible that there are properties of human behavior which will require a different kind of treatment....I may say that the only differences I expect to see revealed between the behavior of a rat and man (aside from enormous differences of complexity) lie in the field of verbal behavior. (pp. 441-442)

Skinner was exquisitely sensitive to the point we made in starting this book: language is one of the most pivotal topics in human psychology. It would be an enormous limitation if his "bottom up" strategy would not carry all the way to verbal behavior, as he feared. Skinner's 1957 book on verbal behavior seemingly managed to square this circle: verbal behavior too would yield to a direct contingency analysis and the major (even crucial) exception he expected to have to make in 1938 could be avoided.

In the sections that follow, we will briefly examine two of the major integrative attempts to deal with language from a functional behavioral viewpoint, and a few of the offshoots from them. We will try to show why these approaches are not fully adequate, as measured against the goals of what we will call the functional contextual approach. Finally, we will describe the analytic and empirical issues that have set the stage for a more modem behavioral approach to language and cognition.

1.1.1. Functional Contextualism and Behavior Analysis

Behavior analysis has been interpreted in a variety of ways. We feel that it is useful to be specific about our approach, so that the theory we will try to develop in this book can be measured against its own goals and assumptions, and so that readers who hold different assumptions can detect the source of their difficulties with the analysis.

The present account views behavior analysis as an approach based on a type of pragmatism we have called functional contextualism (Hayes, 1993; Hayes et al., 1988; Biglan and Hayes, 1996). The core analytic unit of all forms of contextualism or pragmatism is the ongoing act in context (Pepper, 1942) with its three most important corollaries: (1) focus on the whole event, (2) sensitivity to the role of context in establishing the nature and function of an event, and (3) a firm grasp on a pragmatic truth criterion. Functional contextualism is one of two main types of contextualism (Hayes, 1993; Hayes, Hayes, Reese, and Sarbin, 1993; Rosnow and Georgoudi, 1992) and is defined by its unique goals.

Clarity about the goals of analysis is critical to contextualists because goals specify how a pragmatic truth criterion can be applied. The goal of analysis for functional contextualists is the prediction and influence of events as a single integrated goal. Parenthetically, "influence" is a better word than "control" (even though "prediction and control" is a more common phrase) because "control" also refers to the elimination of behavioral variability in an absolute sense. To accomplish a particular end, some forms of behavioral variability may need to be restricted, but that does not mean that action without variability in an absolute sense is better "understood." The issue is not elimination of variability per se, but rather it is the production of specified response functions, and thus "influence" is a better term (Biglan and Hayes, 1996).

The environmentalism of functional contextualism is a direct result of these goals. Verbal analyses generate rules for people, not rules for the world. If we seek prediction *and* influence, we must have rules that start with the environment, in the sense of the "world outside of the

behavior." That is where we - the rule followers - are: in the potentially manipulable world outside of the behavioral system being examined. To influence another's action one must thus manipulate its context – it is never possible to manipulate action directly (Hayes and Brownstein, 1986). B. F. Skinner said it this way: "In practice, all these ways of changing a man's mind reduce to manipulating his environment, verbal or otherwise" (Skinner, 1969, p. 239).

Thus, only statements that could possibly lead *directly* to behavioral influence as an outcome point to contextual features that are a) external to the behavior of the individual being studied, and b) are manipulable, at least in principle. Analyses that point to relations between one form of psychological action and another (for example, the relation between thinking and overt behavior; or emotion and thinking) can be important but they are incomplete, as measured against the goals of functional contextualism, until the analysis is traced back to the environmental context, both historically and situationally. Knowledge of the manipulable context that gave rise to both forms of action and (importantly) their relation must be specified before prediction and influence can be a direct result of an analysis of the relation between one psychological action and another. This is one reason that behavior analysis is often called the *experimental* analysis of behavior because without manipulation of independent variables, it is difficult to know if its analytic goals have been accomplished. These independent variables will never be the psychological actions that are being analyzed.

1.1.2. The Interbehavioral Approach

Kantor's Interbehavioral psychology (e.g., 1936; 1958) is a thoroughly naturalistic approach to psychology. It was one of the key origins of modern behaviorism (Delprato, 1995), despite the fact that not many behaviorists actively accept it.

Kantor argued that all behavior occurred in the context of a highly complex field wherein all members of that field influenced each other in a mutual or interdependent manner. Such relations are probably best communicated visually: rather than stimulus ⟹ response or response ⟹ stimulus, Kantor felt that response ⟺ stimulus best captured the way in which stimuli and behavior interacted. In Kantor's view the behavioral or psychological field can be defined as:

> the entire system of things and conditions operating in any event taken in its available totality. It is only the entire system of factors which will provide proper descriptive and explanatory materials for the handling of events. It is not the reacting organism alone which makes up the event but also the stimulating things and conditions, as well as the setting factors (1958, p. 371).

According to Kantor, all these conditions and factors participate equally in an event. Linear cause-effect relationships, where a limited set of variables (or at the extreme, a single variable) unidirectionally exerts an effect, were rejected as far too simplistic by Kantor. Rather, variables mutually influenced each other in an interactive field.

Kantor (1958) consistently distinguished stimulus functions and stimulus objects. Stimulus functions occurred only in the context of response functions. A light, for example, was not a stimulus in a psychological sense – it was merely an object. Seeing a light involved both the stimulus functions of a light and the response functions of seeing, not in a linear causal

way, but in a mutually inseparable, and interactive way. Stimulus functions could be substitutive, no longer requiring the presence of a stimulus object. For example, a person might be instructed to imagine a light, in which case the stimulus functions of a light may be present indirectly.

The processes that Kantor relied upon to account for the transfer of stimulus functions from one event to another, always involved similarity or contiguity. In a manner somewhat similar to Guthrie, Kantor did not emphasize sequences of events. For example, contiguity was a double-headed arrow - if a stimulus function occurred in association with another stimulus function, the functions of one might transfer to the other.

Kantor was one of the first behaviorists to develop a comprehensive account of language in his book *An Objective Psychology of Grammar* (1936). What is unique about Kantor's treatment is his great sensitivity to specific features of what he called "linguistic adjustments." The key feature of linguistic adjustments was that the stimulus functions of both a listener and an event simultaneously participated in a response function. He distinguished a variety of these adjustments, based on the precise combination of features.

A detailed account of Kantor's treatment of language does not seem necessary, because few psychologists carried it forward and even within the behavioral tradition it is rare to find references to it. It is worth considering, however, why it had a limited impact on a behavioral psychology of language.

The single biggest problem is that Kantor's system did not lead to a robust empirical tradition of language research. Kantor was a philosophical psychologist, not an empirical scientist. His work in general was difficult to translate into specific experimental preparations.

Part of this empirical difficulty comes from his form of descriptive contextualism (Hayes, 1993). Descriptive contextualists have as their goal an appreciation of the participants in the whole event. Modern examples include narrative psychology, dramaturgy, hermeneutics, and constructivism (see the books by Hayes et al., 1993 or Rosnow and Georgoudi, 1992, for chapters by several modern descriptive contextualists). Because of their goals, descriptive contextualists tend to produce analyses that are more suited to historical interpretation than to experimental analysis and Kantor's system is no exception. To do an experiment one has to begin to emphasize one aspect of the field over others (as when one makes a distinction between independent and dependent variables, for example), but in Kantor's system all participants in a field are equal. Thus, specific experiments never quite seem to hit the mark descriptive contextualists are shooting for: they always seem too limited, superficial, or even dangerously imbalanced.

The other empirical difficulty comes from the limited set of behavioral principles involved. Kantor's reliance on formal similarity and a loose form of associationism simply did not yield coherent experimental procedures and the processes Kantor supposed would account for the substitutive functions of language did not translate readily to the laboratory. Kantor's relative disinterest in temporal sequences was empirically troublesome since in terms of behavioral outcomes it matters a great deal about whether one stimulus function precedes another or not (e.g., in classical conditioning, or in reinforcement contingencies).

Although the behavioral tradition has not picked up Kantor's specific approach, many features of his analysis remain. What was left behind was a clear sense of the importance of verbal interactions to the behavioral tradition, the importance of the substitutive aspects of language, the functional importance of the listener, and sensitivity to important features of a contextual approach (e.g., the focus on the whole organism interacting in and with an

environmental context). All of these aspects were reflected later in Skinner's work, which is not surprising. Kantor brought Skinner to Indiana University before he took a position at Harvard, and they taught classes together there, so their work overlapped early in Skinner's career. Direct and indirect reflections of Kantor's ideas can be found in the work of virtually all subsequent behaviorists grappling with the topic.

1.1.3. Skinner's Approach

With the publication of *Verbal Behavior* in 1957, B. F. Skinner offered a comprehensive behavioral account of language. His account was openly theoretical, with virtually no directly supportive empirical data, and Skinner introduced the book by saying that it was simply "an orderly arrangement of well-known facts, in accordance with a formulation of behavior derived from an experimental analysis of another sort" (Skinner, 1957, p. 11). The well-known facts, of course, were the principles of operant and respondent conditioning, and Skinner relied almost exclusively on the operant in explaining the functions of verbal behavior.

Skinner (1957) defined verbal behavior as any behavior on the part of a speaker reinforced through the mediation of a listener who is trained by a verbal community so as to mediate such reinforcement. For example, if a person asks for a glass of water, and this behavior has historically been reinforced by listeners providing a proper consequence (e.g., water) for it, and if a listener's behavior itself has been reinforced precisely so as to deliver such consequences, then the behavior of the speaker in asking for water is "verbal."

Skinner (1957) described several specific classes of verbal behavior: mands, echoics, textuals, transcription, dictation, intraverbals, tacts, extended tacts, autoclitics, some of which will be employed in the current book (see Barnes-Holmes, Barnes-Holmes, and Cullinan, 2000, for a systematic RFT analysis of these classes). In behavior analytic fashion, each of these classes was purportedly distinguished along functional lines. In other words, a given verbal behavior warranted inclusion in a given class only if it served a similar function of other members of that class, and not if it merely topographically resembled other class members. For example, the statement "I've never been this thirsty before," made in the presence of a listener, might topographically resemble a tact (defined as "a verbal operant in which a response of given form is evoked ... by a particular object or event or property of an object or event" Skinner, 1957, p. 81-82). However, functionally the statement might be a mand (defined as "a verbal operant in which the response is reinforced by a characteristic consequence and is therefore under the functional control of relevant conditions of deprivation or aversive stimulation" Skinner, 1957, p. 35-36), resulting in the listener bringing a glass of water to the speaker.

We will deal shortly with problems in this approach but it seems worth noting that, like Kantor's, Skinner's book was difficult to turn into an empirical research program. There were exceptions. The distinction between the tact and the mand, for example, has received particular attention, either by examining verbal products in these terms (e.g., Salzinger, 1958) or by examining the contingencies giving rise to these repertoires and their functional independence (Lamarre and Holland, 1984; Sigafoos, Doss, and Reichle, 1989). Other researchers studied phenomena linked to Skinner's account, but in ways that would probably not require Skinner's analysis to be coherent, such as studies of speaking and listening (Lee, 1981), spelling and reading (Lee and Pegler, 1982), or echoing (Boe and Winokur, 1978). In

any case, most behavioral researchers seem to agree that a relative dearth of empirical work was generated by Skinner's approach.

Various explanations have been provided for this lack of research (e.g., Vargas, 1991). For example, Michael (1984) noted that behavior analysts had a strong tradition of using only those principles derived from data in their research, and thus that the proper audience is not so much experimental behavior analysts: "the book is really most appropriate for language scholars who are also strongly predisposed to welcome a behavioral approach to their subject matter" (Michael, 1984, p. 369). That is undoubtedly a small group.

The problem here is not just the lack of research – indeed there has been some research coming out of the book – but rather the lack of a vibrant research program. It is worth examining a few attempts by behavior analysts to produce such a program to show the difficulties involved. We will examine two: Day's Reno Methodology, and Salzinger's approach.

1.1.3.1. Willard Day's Approach

Willard Day was the founder of the journal *Behaviorism*. Day took a radically pragmatic or contextual approach to Skinner's writings (for a book-length compilation of his key articles, see Leigland, 1992), and as editor of a key journal he influenced an entire generation of behavior analysts in a more contextualistic direction.

Like Kantor, Day was a descriptive contextualist (Hayes, 1993), more interested in a personal appreciation of the participants in the whole event than in the prediction and influence of behavior. His "Reno Methodology" attempted to translate Skinner's system into a vehicle for such an understanding, without losing touch with the radical functionalism built into Skinner's system. Day saw a close relationship between radical behaviorism on the one hand and hermeneutics and social constructionism on the other, and he blended the two in a way that was sensitive to how personal histories unavoidably and differentially shape the way verbal events are understood.

The Reno Methodology consisted of intensive behavioral analyses of speech episodes. The raw material generally came from episodes extracted from psychotherapy transcripts or from interviews (e.g., about a student's experience of college), but any such material would do as well. The behavior analyst first read the material making notes in the margin about possible sources of antecedent or consequential control that might be influencing the speakers. There was some attempt to express these reactions using operant and respondent principles, often using the categories from the book *Verbal Behavior*. The transcripts were then read again with the focus being on possible historical, antecedent, or consequential control over the notes that were previously written. Finally, these two forms of notes were systematized into categorical schemes with which to characterize the verbal episode, and the transcripts and notes were re-examined using the refined categories.

This kind of qualitative analysis is exhaustive and difficult, focusing even on controlling variables for verb tenses, singular and plural pronouns, and the like. Most of these efforts were dissertations or theses and they tended to be massive. Several hundred pages might be needed to describe even a few hours of transcripts. The problem with such descriptive contextual analyses, however, is that it is difficult to share the results with others (Hayes, 1993). How does one know that a given transcript has been understood behaviorally, or that the historical and current contextual factors influencing both the speakers and the analyst are adequately

addressed? One individual may feel certain that the major events participating in the whole are appreciated, while another analyst may disagree. There is no way to know which is correct in an empirical sense.

As an indication of that problem, none of the many projects conducted using the Reno Methodology by Day and his students were ever published, to our knowledge. A few researchers (e.g., Leigland, Dougher, Hayes) outside of his laboratory have used variants of the method, but this attempt to develop a research program based on Skinner's approach that would produce an understanding of human language as it is naturally displayed never achieved success.

1.1.3.2. Kurt Salzinger's Approach

Kurt Salzinger also generated a program of research that took Skinner's work in some new directions. In the late 1950's and 1960's, Salzinger conducted a series of experimental analyses on verbal behavior. Salzinger was determined to apply a functional approach to verbal response categories, but in order to do so, he had to focus on specific grammatical forms (Salzinger and Pisoni, 1958). The impact of contingencies on a variety of verbal response forms was examined including negative and positive affect statements (Portnoy and Salzinger, 1964) pronoun usage (Salzinger, Salzinger, Portnoy, Eckman, Bacon, Deutsch, and Zubin, 1962), and nonverbal versus verbal response classes (Salzinger, Feldman, and Portnoy, 1964). Taken as a whole these investigations showed that verbal response forms could be thought of and studied as operant behavior. Unlike purely interpretive attempts (Skinner's), the results were not only empirical (like Day's) but were also experimental. Unfortunately, in order to make an experimental analysis possible, topographical verbal response forms were the target, which takes away much of the value of a functional approach.

1.2. WHY LANGUAGE RESEARCH DOES NOT FLOW FROM
VERBAL BEHAVIOR

To date no one has devised an adequate means of measuring Skinner's units in such a fashion that an experimental analysis is possible. In the absence of a means to do an experimental analysis, someone trying to use Skinner's categories of verbal behavior either has to rely on response form (e.g., counting utterances that "look like tacts") or speculation about history and function. Most of the researchers who have tried to use Skinner's nosology have used the former strategy, but doing so misses the functionalism that is at the core of the work. Some (like Day) have used the latter approach but doing so tends to produce research strategies that are difficult to mount and are not analytically progressive.

There does appear to be some empirical utility to the book – for example, the mand/tact distinction seems to be useful in applied settings (e.g., in training developmentally delayed children to name or request items, e.g., Pino, 1994). The problem is that the book did not lead to a progressive research program that raised a large set of new and important empirical questions about language. It did not lead to a rising cycle of research and analysis in the domain it addresses. If one believes that language and cognition are central issues in human psychology, this is disappointing.

Skinner himself was not surprised at the lack of research and he offered few ideas about how to conduct research based on the book. He cast the book as an exercise in interpretation, and said that he doubted that the book could ever be turned into a robust research program (Skinner, 1985).

As the new millennium begins, Skinner's approach to verbal events is approaching 50 years old. *Verbal Behavior* was remarkable in that it developed a comprehensive approach to language using only operant and respondent conditioning principles in a domain that had until then almost always invoked a rash of mentalistic or reductionistic terms. The book set a standard in parsimony and explanatory power for any behavioral conceptualization of language that would follow. The book was brilliant and well-crafted - so much so that it captivated the behavior analytic tradition for decades with the force of its writing and its examples. Even today, criticizing the book will raise the hackles of many behavior analysts.

In order to try new analytic tools, however, the field needs to be convinced that there is a reason for exploration. Readers not familiar with Skinner's approach do not need to be convinced, and can safely skim the next five pages while we try to convince our behavioral colleagues that the lack of programmatic research on language that emerged from the book can be tied to the very definition used of verbal behavior in that volume.

1.2.1. The Definition of Verbal Behavior is Not Functional

The first problem is conceptual. Skinner purported to give a functional definition of verbal behavior, but the definition turns not on the history of the organism of interest, but on the history of another organism. In no other area of behavioral thinking is a functional response class defined in this way. Except in the domain of verbal behavior, "functional definitions" are always definitions stated in terms of the history of the individual organism and the current contextual circumstances. The different definitional strategy Skinner used to define verbal behavior can lead to results that are behaviorally bizarre.

Imagine two rats, each in its own chamber with its own feeding apparatus. In the first chamber, the apparatus is set by an experimenter to release a food pellet on a VR5 schedule. In this case, the rat's pressing of the bar is considered verbal, because the listener or experimenter has been conditioned by a social/verbal (scientific) community to mediate reinforcement of the bar press with the delivery of a food pellet. Some readers may be surprised to hear that this simple operant is considered verbal according to Skinner's definition. We will defend that conclusion in the next section, but for now we ask the reader to take that as a given and allow us to contrast this situation with a similar one that is clearly not verbal according to Skinner's definition.

In the second chamber, imagine that a feedbag is leaning against the manipulandum. The bag has a small hole in it and about every five bar presses a food pellet is jarred loose and is knocked it into the chamber food dish. The behavior is not superstitious: the contingency is nonarbitrary and is produced by the rat's behavior. If we imagine a large enough feedbag, this behavior could be reinforced on a VR5 schedule indefinitely, precisely as is the behavior of the first rat. Indeed, we could switch the two rats from one chamber to another, and it would be impossible for the rat to detect any difference whatsoever in the contingencies. If the behavior of both rats is identical and the contingencies contacted are identical, the functional category should be identical, yet in one case the behavior is verbal according to Skinner's

definition and in another it is not. From a behavior analytic point of view, something is deeply wrong.

Responding to this point, Leigland (1997) has argued that the difference is still important "because a history of trained social mediation makes a functional difference with respect to behavior" (p. 7). To support his case, Leigland cited Skinner's (1953, 1957) theorizing that the restricted contingencies required for abstraction (a highly precise form of stimulus control) could only arise from an extensive history of social mediation. That is a point worth making, and indeed, we will make a similar one regarding our own account, but it is not a telling point as applied to the definitional problem we have described. Some forms of behavior may occur only through consequences mediated by the social community in a procedural or practical sense, but that commonplace fact does not change the nature of functional definitions.

Imagine, for example, that a pigeon is exposed to a highly complex experimental procedure that has probably never existed in the natural environment (e.g., delayed matching-to-sample procedure involving a complex concurrent chain, with limited holds, cross-over delays, and an imbedded multiple schedule). The behavioral patterns revealed could only have occurred through the social mediation of a well-trained experimenter. That does not mean, however, that the behavior of the pigeon must now be defined in terms of the history of the experimenter, while in a simpler situation it can be defined in terms of the history of the pigeon. The functional issue is always a matter of the contingencies contacted by the pigeon, not their procedural source. From a functional analytic point of view what is at issue is the history and current context for the organism's behavior.

The empirical problem presented by this conceptual error, is that there appears to be a need to study the history of the listener in order to categorize the behavior of the speaker. Behavior analysts have few means of doing such a thing.

1.2.2. The Definition of Verbal Behavior is Too Broad

The definition of verbal behavior leads to empirical constipation in another way. Researchers who attempt to use the definition contact the fact that the definition of verbal behavior was much too broad.

In essence, Skinner argued that verbal behavior was a discriminated operant, distinguished only by a special source of reinforcement. The many verbal examples used in the book led to the clear sense that it was about "verbal behavior" as the culture understands the term, but on closer examination the definition was far broader than that and the source of reinforcement was not so special after all.

Let us return to our example of a rat pressing a bar to receive reinforcement (food pellets) in an experimental preparation, to see whether this behavior is considered to be verbal behavior by Skinner's definition. It seems clear that the response – pushing the bar – is reinforced through the mediation of a "listener," namely, the experimenter. Furthermore, it seems clear that the "listener" has been trained by a social/verbal community (e.g., a community of professors and scientists who have taught the experimenter about schedules of reinforcement) precisely so as to deliver reinforcement to the "speaker" (the rat).

Skinner openly acknowledged that his definition of verbal behavior would apply to this situation:

Our definition of verbal behavior, incidentally includes the behavior of experimental animals where reinforcements are supplied by an experimenter or by an apparatus designed to establish contingencies which resemble those maintained by the normal listener. The animal and experimenter comprise a small but genuine verbal community (1957, footnote 11, p. 108).

The wording of this footnote makes the scope of his admission seem narrower than it really is. Skinner refers to situations "designed to establish contingencies which resemble those maintained by the normal listener" as if that would mean some kind of analog or special study. In fact, no such design is needed, since Skinner's definition of verbal behavior is not restricted to any specific action of the listener as long as these actions have been shaped so as to mediate reinforcement to the speaker. Those *are* the contingencies "maintained by the normal listener" in his account. *All* animal operant studies involve experimenters who have been trained (both by teachers and by the effect of their actions of the organisms they study) to apply contingencies to the animal's behavior, virtually by definition. Thus, by Skinner's definition it is difficult to think of a single animal operant experiment ever done that was not a study of "verbal behavior." One wonders why the conceptual category was needed in that case.

Michael (1984) noted that one failing of empirical research based on Skinner's conceptualization of verbal behavior was that it did not produce results different from those evidenced in typical operant studies performed with non-human subjects. This is perhaps not surprising when one examines Skinner's definition of verbal behavior more closely. Research on verbal behavior is unlikely to find results different from those evidenced in typical operant studies performed with non-human subjects if those very studies are supposedly studies of verbal behavior.

The point we are making does not seem to be widely appreciated in behavior analysis in an intellectual sense, but it has often been noticed in a more experiential sense. For illustrative purposes, consider the following scenario. A behavioral researcher sees the need for analyses of verbal behavior. Skinner's book is read with some excitement. The researcher sits down and tries to think of how to model these situations in the lab. If the person is an animal researcher, an attempt is made to find a way to model the concepts using animals. As the procedure is laid out, it becomes more and more like a typical animal operant study. A pigeon pecking a key and receiving food seems to be "manding" food, for example. The researcher feels confused and slightly frustrated, but blames himself or herself for a lack of cleverness or insight. If the researcher tries to maintain contact with the topic of interest through more formal means, the results seem a bit silly. For example, the researcher might imagine trying to study tacting by showing a green stimulus to the bird and then having it peck a key that says "GREEN" on it. The researcher immediately sees that if this is tacting, then any operant under stimulus control is a tact. Surely, the issue cannot be the use of letters on a key instead of colors or graphical forms. If it is not a tact because it is not controlled by a generalized reinforcer, the researcher then realizes that there is no extant literature on generalized reinforcers. What are they? How can one set them up? The researcher once again feels confused and slightly frustrated, but again blames himself or herself for a lack of cleverness or insight.

We have ourselves seen this very process unfold in several laboratories. There must be hundreds of behavioral researchers who have grappled with the book and have failed to turn it into a research program. As we noted in the beginning of this chapter, a sure sign that a researcher is becoming lost in the area of verbal behavior is letting common sense examples

stand for data or developing technical accounts that do not cohere with the phenomenon. That is what happened in *Verbal Behavior*. The large number of wonderful examples made it seem that the book provided an avenue for the analysis of verbal events, but the technical account reverted back to normal operant procedures. Any attempt to apply the analytic categories in the book leads basic behavior analysts inexorably back to what they were already doing in the laboratory.

The empirical problem the behavior analytic community has lived with for nearly 50 years is not due to a lack of researcher cleverness or insight. The problem is with the definition of verbal behavior itself. The definition is too broad, and missed its most important feature. There is much of value in Skinner's account, once this key flaw is corrected (Barnes-Holmes et al., 2000). What is the most important feature of language? Well, that is the topic of this very book.

1.3. THE EMPIRICAL BASIS FOR MOVING AHEAD

The foundation for a modern behavioral approach to language can be found in two empirical areas in the experimental analysis of human behavior: rule-governance, and derived stimulus relations. In the sections that follow, we will briefly review these topics. Both, we would argue, point to the missing feature of a behavioral interpretation of verbal behavior.

1.3.1. Rule-Governed Behavior

The 50's and early 60's brought on an explosion of cognitive theorizing and research. Skinner recollected in his autobiography (Skinner, 1983) the intensive focus contemporary cognitive psychologists were placing on the control words exerted over behavior. This did not seem surprising, since "Behavior was not always shaped and maintained by contingencies, it could be rule-governed" (Skinner, 1983, p. 283).

Skinner first alluded to what he would later call rule-governed behavior in the William James Lectures he delivered on verbal behavior in 1947, which were later published as the book *Verbal Behavior* (1957). In describing an example of the autoclitic frame, Skinner stated:

> when we bring a naive subject into the laboratory and present pairings of the sound of a bell and shock, it may take some time to learn the connection, as we say. We can shortcut most or all of this by simply telling him "whenever you hear the bell you will receive a shock." The greater speed must be attributed to the difference between the cases, and this difference is simply the autoclitic frame: "when you hear – – –, you will receive a – – –." This is effective because many similar patterns have been conditioned upon past occasions. The effect upon the listener…may properly be called instruction (Skinner, 1957, p. 125).

He had also alluded to rule-governed behavior in 1953 when stating that various social control agencies (e.g., the government, educators, and businesses) could exert control over individuals merely by "specifying the consequences of certain actions which in turn 'rule' behavior" (p. 339).

Skinner did not specifically refer to a process known as 'rule-governed behavior' until 1969, when he defined rules as contingency specifying stimuli. He stated that such a contingency specifying stimulus functioned "as a discriminative stimulus [which] is effective as part of a set of contingencies of reinforcement. We tend to follow rules because previous behavior in response to similar verbal stimuli has been reinforced." (p. 148). Skinner (1966, 1989), as he had done with verbal behavior in 1957, cast rule-governed behavior in direct contingency terms. In Skinner's hands, rule-governed behavior was behavior like any other behavior. It occurred in response to a discriminative stimulus existing in the environment, along with the verbal organism's history of reinforcement for responding in specific manners with respect to that discriminative stimulus. The difference was simply that this discriminative stimulus specified a contingency. As we shall see shortly, however, Skinner did not provide a clear definition of the term "specify."

Skinner's definition of rule-governed behavior initially received widespread acceptance in the behavior analytic community, and along with initial studies on human behavior on FI schedules (e.g., Leander, Lippman, and Meyer, 1968; Lippman and Meyer, 1967; Weiner, 1964, 1965, 1969), spurred a program of research in the 1980's. This research program focused primarily upon how the development of human language affected performance in various operant tasks. Researchers such as Lowe, Beasty, and Bentall (1983) and Bentall, Lowe, and Beasty (1985), for example, discovered that human infants initially show non-human like patterns of FI responding, but gradually begin to respond like humans between the ages of 2 and 7. Vaughan (1985) showed that children taught to generate self-rules about direct contingencies performed more favorably on tasks than children not taught to generate such self-rules. The conclusion of such research, by and large, was that verbal humans have a tendency to generate verbal rules regarding schedules of reinforcement, and that these rules serve a role in regulating behavior.

A second line of research, where subjects were placed in situations with changes in reinforcement schedules, emerged alongside the first. These latter studies (e.g., Hayes, Brownstein, Haas, and Greenway, 1986; Matthews, Shimoff, Catania, and Sagvolden, 1977; Shimoff, Catania, and Matthews, 1981) showed that behavior controlled by rules tended to remain insensitive to changes in direct contingencies. Hayes et al. (1986) showed that rules can actually function to increase or decrease contact with natural contingencies, and subsequent research (e.g., Joyce and Chase, 1990) confirmed the notion that part of the insensitivity produced by rules can be explained by how contingencies are contacted when rules are present (for a book-length treatment of this area, see Hayes, 1989).

What energized these research efforts was the "language hypothesis" – that is, the idea that the differences between instructed and uninstructed performances could be accounted for by human language. This simple, common sense idea, was revolutionary in its implications for behavior analysis because it gradually but inexorably undermined the Skinnerian view of verbal behavior itself. Recall that the behavior of the speaker is verbal, in Skinner's approach, because a specially conditioned listener mediates reinforcement of this behavior. The behavior of the listener per se cannot be verbal by this definition, because reinforcement of the listener is itself not mediated by a specially conditioned listener. The role of the listener in any verbal episode was thus "not necessarily verbal in any special sense" (Skinner, 1957, p. 2) and "the behavior of a man as listener is not to be distinguished from other forms of his behavior" (Skinner, 1957, p. 34). Yet the "language hypothesis" was based on the implicit idea that the behavior of the listener *was* verbal.

The problem for Skinner is that he had no coherent way to define what it meant to "specify" a contingency, and thus to define rule-governed behavior adequately, without going afoul of his definition of verbal behavior or to appeal to the forbidden concept of reference (Parrot, 1984; Hayes and Hayes, 1989). If a discriminative stimulus "specifies" a contingency, then rule-governed behavior is not distinct in any way from contingency-shaped behavior. However, rules do not seem to meet the definitional features of discriminative stimuli (Schlinger and Blakely, 1987). If specification is more than discriminative control, then what exactly needs to be added to the definition of "specification?" Without appealing to verbal behavior or to reference, which Skinner could not do, no answer presented itself.

Most behavior analysts seemed to treat the word "specify" as if it referred to verbal specification, but Skinner did not quite take this approach and in fact did not distinguish between verbal rules and regularities observed in other complex antecedents (e.g., see Skinner, 1969, page 163). One of the last papers Skinner wrote on the topic (Skinner, 1989) was in a book edited by one of the current authors (Hayes, 1989). In an early version of his chapter, he referred to rule-governed behavior as behavior governed by verbal stimuli, but he edited this out of the final draft. The problem for Skinner in taking such a step was that verbal stimuli, in Skinner's approach, are simply the products of verbal behavior (e.g., see Skinner, 1957, p. 34).

This is a surprisingly nonfunctional definition of a type of stimulus, very much paralleling the formalistic error made in the definition of verbal behavior itself. In behavior analysis, a stimulus is categorized on the basis of the history of the organism that gave rise to its behavioral functions. If a verbal stimulus is the product of verbal behavior, however, then the word "stimulus" is being used as an object, not a function, and further it is being categorized by its source, not its history.

Suppose a dog retrieves his master's footgear on hearing "get my slippers, Fido." It would be absurd to claim that the behavior is rule-governed merely because the statement is the product of verbal behavior and is thus a "verbal stimulus." Without a functional definition for verbal stimuli, Skinner was left simply with the common sense idea that a contingency was *specified* by the rule, but with no way to define specification without running aground of the approach he had taken in *Verbal Behavior*. Skinner's life passed without this conundrum being solved.

The rule-governed literature thus pointed to a key missing feature of a traditional behavior analytic approach to language. What *does* it mean to "specify" something? The study of derived relational responding began to provide an answer.

1.3.2. Derived Relational Responding

The basic processes involved in stimulus equivalence had been recognized long before Sidman's landmark 1971 paper. S-R psychologists (e.g., Jenkins and Palermo, 1964) had studied the phenomenon, but explained the emergence of such relations using a response mediation model, rather than one based on direct stimulus-stimulus relations.

The first behavior analytic experiment on stimulus equivalence was conducted by Sidman, as an attempt to devise more effective methods for teaching reading comprehension, and was heavily influenced by theoretical work of the neurologist Norman Geschwind (1965). The experiment conducted by Sidman (1971) was as much an attempt to point out the dangers

of non-empirically based theoretical speculation as it was an effort to see if the practical implications of such theorizing would pan out.

Sidman's 1971 study involved a learning disabled subject who had learned to match spoken words to pictures and spoken words to printed words, and then spontaneously matched printed words to pictures and spoken words to printed words, without specific experimental training. Such "untrained" relations are generally termed *derived stimulus relations,* as opposed to those that have been explicitly trained. Speculation by other researchers (e.g., Birch, 1962; Wepman, 1962) had previously indicated that such a result might occur, but it had never before been demonstrated in an adequately controlled experiment. Following the lead of Geschwind (1965), Sidman postulated that such results occurred because "the visual words and pictures became equivalent to each other because each, independently, had become equivalent to the same auditory words" (Sidman, 1971, p. 11).

Over a series of other studies, Sidman and his colleagues refined their conceptualization of the phenomenon. Although several stimulus equivalence experiments were conducted in the 70's, a rigorous account of the phenomenon of stimulus equivalence did not appear until the 1980's (e.g., Sidman and Tailby, 1982; Sidman, 1986). Sidman argued that the phenomenon involved three distinct features: reflexivity, symmetry, and transitivity. In matching-to-sample procedures, reflexivity is identity matching: given a stimulus (call it "A1") the person will pick A1 from an array. Symmetry refers to the functional reversibility of conditional discriminations. If the person learns to pick B1 from an array of stimuli, given A1 as a sample, the stimulus A1 will now be picked from another array given B1 as the sample in the absence of direct reinforcement for doing so. Transitivity refers to the combination of relationships: If the person learns to pick B1 from an array given A1 as a sample, and C1 given B1, the stimulus C1 will now be picked given A1 (sometimes researchers will also use the term "equivalence relation" to refer to combinations of relations that do not combine trained relations, strictly speaking, such as selecting A1 given C1). The class of stimuli with these properties is called an equivalence class.

Stimulus equivalence captured the imagination of behavioral researchers and it has been the subject of hundreds of research studies. This excitement occurred in part because the results are unexpected from a strict operant or classical conditioning viewpoint. In the normal operant context, conditional discriminations would not be expected to reverse or combine. The ready emergence of derived stimulus relations, not directly taught in the experimental situation, is a puzzle that has engaged many researchers.

When a person is taught to select stimulus B given stimulus A, stimulus A is functioning as a conditional discriminative stimulus, in the presence of which stimulus B is functioning as a discriminative stimulus for a selection response. These functions should not be expected simply to reverse, and it would often be disastrous if they did.

Consider a natural example in which a primate learns to hide in a thicket when it sees a lion. We could think of this as a conditional discrimination much like that above: Given lion, approach thicket (rather than the open savanna). The lion is a conditional discriminative stimulus, in the presence of which the thicket is a discriminative stimulus for approach. This contingency does not mean that the primate will now approach the lion when a thicket is seen and yet this sort of performance is precisely what is seen in equivalence – a person taught to select stimulus B in the presence of stimulus A will later select stimulus A in the presence of B.

The most substantive reason for the excitement generated by equivalence, however, is that stimulus equivalence has obvious relevance to human language. In particular there appears to be a strong resemblance between equivalence performances and the kind of bidirectionality that seems to characterize word-referent relations, suggesting a new model for understanding semantic relations (Sidman and Tailby, 1982). In normal verbal training, for example, word-object relations are symmetrical, and transitive relations are also evident. Imagine a child of sufficient verbal abilities who, when shown the word "fox," is taught to select a photograph of a fox from among several others. We would expect that later, when shown the photograph of the fox, the child would be likely to select the word "fox" from among an array of words without specific training to do so, demonstrating a symmetrical relation. Natural examples for transitive relations in language training can readily be given as well. Such symmetrical and transitive relations between written words, spoken words, pictures, and objects is commonplace in early language training, and several studies have used these types of naming tasks to demonstrate the formation of equivalence classes (e.g., Dixon and Spradlin, 1976; Sidman, 1971; Sidman, Kirk, and Willson-Morris, 1985; Sidman and Tailby, 1982; Spradlin and Dixon, 1976; Yamamoto, 1986). Several of the early studies (including the first study, Sidman, 1971) used language training-like procedures (e.g., Dixon and Spradlin, 1976; Spradlin and Dixon, 1976).

This book is based fundamentally on the idea that derived stimulus relations, such as those shown in equivalence classes, are at the core of what has been missing from a behavioral account of language. In order for it to serve as a model, however, a number of steps seem needed. The purpose of this book is to describe these steps.

1.4. CONCLUSION

The analysis of human language remains a mountain that behavioral psychology has yet to climb. The two best known attempts to provide a comprehensive account moved the field into empirical cul-de-sacs. An alternative is needed.

Properly addressed, we believe that the phenomenon of derived stimulus relations makes good order of rule-governance and contingency specification, helps define verbal behavior and verbal stimuli properly, and gives behavioral psychologists a way of addressing cognitive phenomena in a monistic fashion. It removes the barrier to an empirical behavioral approach to human language, and yet in a way that takes from the best of the behavioral tradition. Most importantly it lays out a vibrant research agenda.

The test of any behavioral theory is its coherence and utility in serving as a coordinating account and in opening up new and important areas of research. This book attempts to apply such pragmatic tests to a new behavioral theory. The book is organized into two sections. In the next seven chapters we will describe our approach to human language and cognition. We will explore its key concepts, show how they fit within the behavioral tradition, and describe some of the data supportive of this approach. In the second section of the book we will examine a variety of areas in human psychology in which language and cognition seem to play a role. If our approach is useful, then we would expect to see clear implications for each of these areas, and a progressive research path for future investigations.

Behavioral psychology (indeed, psychology as a whole) is in need of an alternative agenda for the study of language and cognition in a direct and pragmatically useful way. We believe that Relational Frame Theory provides such an agenda. Convincing the reader of this idea is the core purpose of this book.

2

DERIVED RELATIONAL RESPONDING AS LEARNED BEHAVIOR

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Derived relational responding presents itself as a kind of kernel or seed from which a behavioral analysis of language and cognition may grow. It has obvious similarity to language phenomena, such as the bidirectionality expected between words and referents. It seems somewhat unexpected from the point of view of behavioral theory, and requires an analysis.

In the previous chapter we claimed that true technical accounts grow from the bottom up, and yet they maintain contact with the phenomenon of interest. Properly managed, the behavioral tradition is ideally suited to keep these two forces in balance. Behavior analysis is a conservative field, adding new principles only with reluctance. The study of derived stimulus relations in behavior analysis is thirty years old, yet the active attempt to use it as a working model of the core of language phenomena has only more recently stepped to the fore. The study of derived stimulus relations has "grown from the bottom up."

It is one of the ironies of psychology that if there *is* something new in human language, the human learning tradition is unlikely to find it or to recognize it. For human researchers,

whatever may be new would simply be assumed because it would be commonplace in human subjects. The behavior analytic tradition developed principles with nonhumans not primarily in order to understand nonhuman behavior, but in order to have tools to address the complexity of human phenomena. This is the tradition that is in an ideal situation to find something new if it exists, because the difference will be evident. We believe that the phenomenon of derived stimulus relations is, in a sense, something new. Relational Frame Theory constitutes our attempt to explain and integrate it into the study of human language.

2.1. FOUNDATIONAL CONCEPTS IN RELATIONAL FRAME THEORY

Relational Frame Theory is an explicitly psychological account of human language and cognition. That is, it approaches verbal events as activities not products. The emphasis on verbal products typically seen in fields such as linguistics does not serve a psychological account very well. Focusing on verbal products quickly leads to an analysis in terms of structural properties, in which the contextual, historical, and interactive nature of verbal events are to some extent lost or obscured. A psychological approach is better served by an analysis of verbal actions, which retains an emphasis on the developmental and interactive nature of behavioral events.

Relational Frame Theory embraces the simple idea that deriving stimulus relations is learned behavior. Thinking of deriving stimulus relations as learned, operant, or instrumental behavior is difficult only because of the abstract qualities of the action at issue. At this point, therefore, it seems worth discussing the foundational concepts that are needed to deal with this kind of behavior from a behavior analytic point of view.

2.1.1. Overarching, Purely Functional Operants

Skinner used the term "operant" to describe classes that are formed by their functional effects in given contexts. Skinner was quite clear that the form or topography of a response is insufficient to determine its status in a functional analysis. Additionally, there is no restriction on the size of an operant, as long as similar discriminative and consequential control can be demonstrated over the unit constructed by the behavior analyst. Even a large unit of behavior with widely varying topographies, such as writing a novel or driving to the beach, might be usefully analyzed as an operant.

Although operants are classified functionally, they are frequently described or defined topographically for practical and research purposes. The "behavioral definitions" frequently employed by behavior therapists or applied behavior analysts, in which a detailed topographical description of the response is used to guide measurement and intervention, provide examples. This can work, in part, because when contingencies are applied to formal properties, formal and functional descriptions combine to a large extent. For example, if a researcher applies contingencies to the use of plural nouns, more plural nouns may now occur. It is true that the functional class may include class members that go beyond the formal unit (for example, a focus on plural nouns may in fact produce a functional unit that includes, say, numerically ambiguous nouns), but for purposes of analysis the functional unit may become virtually synonymous with the formal unit defined by a structural part of speech.

In most experimental situations, the functional/formal distinction may be safely ignored. Consider a rat pressing a bar for food. The contingency is related to whatever behavior deflects the bar a certain number of degrees, and a wide variety of topographies, such as sniffing, rolling, jumping, sitting, sneezing, and so on, might be part of the class. By far the most common form will likely be pressing down the bar with a front paw. Eventually the researcher may treat the class of actions that deflects the bar, and pressing down the bar with the front paw as virtually the same thing. Because the vast majority of responses will fit both the functional and the formal definition, not much practical harm is likely to occur.

The fact that the formal/functional distinction is not always necessary should not detract, however, from our understanding of the operant as a functionally-defined class of responses in which individual members may vary drastically in form. Clarity in this regard is particularly important when operants arise that have few defining topographical features, either in terms of the stimuli or responses involved. These are sometimes called "generalized," "overarching," or "higher order" operants (Barnes-Holmes and Barnes-Holmes, 2000; Branch, 1994). Some behavior analysts have made various additional distinctions (e.g., that they include sub-operants, Catania, 1996), but we prefer not to take on such a conceptual burden. All operants are merely useful constructions and all of them, in principle, include sub-operants if a researcher chooses to look for them (Barnes-Holmes and Barnes-Holmes, 2000).

Overarching, purely functional operants can be observed with both humans and non-humans. With humans, the production of random numerical sequences can be shaped (Neuringer, 1986; Page and Neuringer, 1985) by giving feedback to an individual, contingent upon the randomness shown in instance after instance of numerical strings. By definition, random sequencing can have no formal similarity among class members, and yet the response class can be trained. Nonhumans can learn to produce novel response topographies when reinforcement is provided only when such topographies occur (Pryor, Haag, and O'Reilly, 1969). By definition, the functional class "novel topography" can have no formal similarity among class members, and yet it can be trained. Along similar lines, researchers have also shaped "generalized attending" (McIlvane, Dube, Kledaras, Iennaco, and Stoddard, 1990; McIlvane, Dube, and Callahan, 1995), although what is being attended to will vary.

There are many more examples, but perhaps the best-known overarching operant class is generalized imitation. Generalized imitation does not refer to a class of topographically similar behaviors on the part of the imitating person; rather, it refers to a functional relation between a model and imitator, and a history of differential consequences for imitating. A virtually unlimited variety of response topographies can be substituted for the topographies used in the initial training leading to a robust imitative repertoire (e.g., Baer, Peterson, and Sherman, 1967; Gewirtz and Stengle, 1968). The history necessary to produce such a generalized response class includes the shaping of a number of specific imitative behaviors of varying topography, each of which was followed by reinforcement (Baer et al., 1967). By varying the contextual dimensions (e.g., having the model do various things), while maintaining consistent reinforcement and gradually introducing increasingly novel or difficult response forms, the functional class is acquired. With enough opportunities to imitate a variety of behaviors under various conditions, the relevant response and contextual dimensions are discriminated. At this point, the functional response itself emerges and is reinforced, not just the form of a particular instance of imitating, and as a result reinforcement for the class will maintain the performance of nonreinforced responses of the same kind (Peterson and Whitehurst, 1971). We believe a similar history – though one that involves the type of

relational responding described below – is involved in producing the overarching operant class responsible for derived stimulus relations.

There are well-informed behavior analysts who want to define behavior in topographical terms, and who view functional classes as functional collections of topographies (e.g., Michael, 1993). In such cases the researcher may be deliberately adopting a mechanistic form of behavior analysis, which is clearly possible (Hayes et al., 1988). More commonly, the researcher may have settled into this habit of thinking because there appear to be few practical reasons to distinguish formal and functional classes. Sometimes this situation can establish a devolutionary process that will lead to a kind of implicit mechanistic thinking. This is one reason we took the time to specify our own philosophical approach to behavior analysis in the previous chapter. In our view, however, there should be nothing surprising to behavior analysts about the idea of purely functional classes since the concept is built into the very definition of operant behavior. The task in the analysis of derived stimulus relations is merely to hold on to this radically functional definition of behavioral classes (Healy, Barnes-Holmes, and Smeets, 2000).

2.1.2. Relational Responding

Most living organisms, given the appropriate training, are capable of responding to relations among the physical properties of two or more stimuli. For example, adult rhesus monkeys can be trained to select the taller of two stimuli (which differ only in terms of height) over a series of training trials with stimuli of varying heights. When later presented with a previously "correct" stimulus and a novel taller stimulus, the monkeys will select the novel stimulus, indicating responding based on relational rather than absolute properties of the stimuli (Harmon, Strong, and Pasnak, 1982). This type of relational responding, based on the formal characteristics of the stimuli, has traditionally been termed "transposition" (see Reese, 1968, for a review of this literature). Although the details of the methods involved differ, this phenomenon has long been demonstrated with a wide range of organisms, including humans (e.g., Reese, 1961), nonhuman mammals (e.g., Hebb, 1937), birds (e.g., Towe, 1954), and fish (e.g., Perkins, 1931).

Although relatively adequate theories emerged (e.g., Reese, 1961), these findings were troublesome for traditional S-R learning theorists, as their mechanistic systems of analysis had a difficult time accounting for why an organism would select a novel stimulus over one which had previously been paired with reinforcement. Behavioral psychologists operating from a more functional, contextualistic perspective, however, should not have this difficulty. What is needed here is the willingness not to think of stimulus functions in terms of specific stimulus objects. Skinner saw this point clearly:

> Actually it is possible to condition an organism either to choose the larger of two objects or to choose a particular size no matter what the size of an accompanying object. Similar conditioning begins very early in the history of the individual, and the behavior which predominates when a test is made will depend upon such a history. The relational case is important in most environments. As the organism moves about in space, reinforcements are generally contingent upon relative, rather than absolute, size (1953, p. 138).

Operant theory, with its reliance on functionally-defined response classes, has little difficulty with the transposition literature. Selecting the larger, or brighter, or rounder stimulus simply becomes a learned operant. Organisms learn to discriminate the relevant stimulus relation, as well as the formal dimension along which the relation is relevant, through multiple training trials in which the relata[1] vary. If selecting only the larger of two stimulus objects is reinforced over a series of trials with varying objects, there is no reason to be surprised if an organism begins to respond to the relation between the stimuli rather than their absolute characteristics. The consequences have shaped just such a response class.

2.1.3. Arbitrary Contextual Control Over Abstracted Response Frames

"Relating" means to respond to one event in terms of another. Responding to nonarbitrary stimulus relations is not itself derived relational responding, because it is entirely bound by the formal properties of the related events. Given that most complex organisms are capable of responding to *formal* or *nonarbitrary* relations between stimuli, 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 relata. 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.

A relational response of this kind is no longer dependent purely upon the physical properties of the relata. Rather, it is brought to bear on any stimuli encountered in the appropriate relational context: it is arbitrarily applicable. We mean *arbitrarily applicable* simply in the sense that in some contexts this response is under the control of cues that can be modified on the basis of social whim. In natural language situations this response class is generally not arbitrarily applied, however, since language is very much bound up with the nonarbitrary features of the environment.

What is the history involved in transforming relational responding into an overarching, arbitrarily applicable operant? The exact answer to this question is an empirical matter. However, both the histories that give rise to other purely functional operants, and the obvious features of most humans' histories, can provide us with useful clues in the search for the relevant answers.

Behavior analysts often present generalized imitation as a kind of archetype for the acquisition and functioning of overarching behavioral classes (Pelaez-Nogueras, 1996; Catania, 1996). It seems that relating as an overarching class could be formed in a way somewhat similar to that of generalized imitation – through exposure to multiple exemplars across a variety of situational contexts that refine the nature of the response and sources of stimulus control over it.

This process of refinement is a process often called "abstraction." As defined by behavior analysts, abstraction typically means a "... discrimination based on a single stimulus property, independent of other properties; thus, generalization among all stimuli with that property" (Catania, 1998, p. 378). In the case of generalized imitation, the single stimulus

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[1.] To avoid confusion, the Latin term *relata* will be used throughout the book to describe related events since the English term, relates, is obscure and has a much more dominant meaning as a verb. In some of our previous writings we have incorrectly used the term *relatae,* in the mistaken belief that the Latin word was feminine.

property that comes to control the response is a correspondence between the actions of the learner and the actions of a model. This "… correspondence itself may become a governing factor in the relation between the two actions, extending to new topographies of behavior" (Dinsmoor, 1995, pp. 264-265). For this to occur, the contextual dimensions of the training tasks must vary (e.g., the model must do various things) while reinforcement is maintained, so that the relevant features of the task (correspondence between the learner's behavior and the model's behavior) can be discriminated.

It is unlikely that generalized imitation would occur if only one specific imitative response was ever trained, for the learner would be unable to discriminate between the relevant features of the task (the correspondence) and the irrelevant features (the specific topography of the imitative response). Through multiple exemplars, children build on a primitive reflexive form of imitation (confined to a few responses, such as tongue thrusting, or mouth opening) to a generalized operant class of "do what the model does in this context."

Arbitrarily applicable relational responding seems to represent a similar form of abstraction, but in this case the pattern of responding among a set of stimuli is abstracted and brought under the control of an arbitrary contextual cue. Several studies have shown that stimulus control may include features of response tasks (e.g., McIlvane et al., 1990; Saunders and Spradlin, 1990, 1993), and the benefits of varying stimuli to sharpen stimulus control along relevant dimensions are widely discussed (e.g., Duncan, 1958). Features of response tasks themselves may, with a proper history and selection of a proper set of examples, come to exert control over behavior. This abstractive process is a core feature of the development of overarching and arbitrarily applicable relational responding.

In order to abstract the behavior of relating, the organism must be exposed to training that allows it to discriminate between the relevant features of the task (responding to one event in terms of another based on a contextual cue) and the irrelevant features (the actual physical properties of the related objects). The explicit training of symmetrical relations between words and their referents seen in early language training is an example. Take the case of a young child learning the name of an object. A caregiver will often name an object in the presence of a young child and will then reinforce any orienting response emitted by the child towards the object. This interaction may be described as, hear name X $\Rightarrow$ look at object Y. Similarly, the caregiver while holding, or pointing to, an object (Y) will utter the appropriate name (X) and ask the child to repeat the name. This latter interaction may be described as see object Y $\Rightarrow$ hear and say name X. Early language training consists of a wealth of such interactions across an extensive range of objects and names. Each type of interaction (i.e., name $\Rightarrow$ object and object $\Rightarrow$ name) may require explicit reinforcement, such that a number of name $\Rightarrow$ object and object $\Rightarrow$ name exemplars must be trained.

Initially, these repertoires will not be coordinated (Fenson, Dale, Reznick, Bates, Thal, and Pethick, 1994). In essence, a symmetrical relation between the object name and the object itself is being directly trained: given name of object, select object and given object, select name of object. Reinforcement for such bidirectional responding is rich in a naturally occurring language training history. This kind of symmetrical responding occurs only in certain contexts (such as naming), and a variety of cues indicate the task at hand, including the use of phrases such as "what's that?" and the juxtaposition of objects and words. This kind of language training is used with a wide variety of stimulus objects, as adults teach children to name the world around them. Eventually, with enough instances of this directly trained

symmetrical responding, symmetrical responding may emerge with respect to novel stimuli because in that context the contextual cues involved and unidirectional response training are together highly predictive of reinforcement for symmetrical responding.

Nonhumans show similar effects in nonrelational tasks. For example, suppose pigeons are exposed to two large classes of arbitrary stimuli with S+ and S- functions, respectively. After near perfect performance, the S- stimuli all become S+ stimuli and vice versa. Once behavior stabilizes, all of the S+ (formerly S-) stimuli become S- stimuli once again and vice versa. As this reversal process is repeated, over and over, eventually a single contact with a function will apply the function to all members of the class (Vaughan, 1988). What this means is that, for example, responding to an S+ and receiving no reinforcement is 100% predictive in that context of now receiving reinforcement in the next trial for responding to the (formerly) S- stimuli. Said another way, the organism's own responding and the changed contingencies in force in a particular context become predictive of future contingencies and therefore exert stimulus control over subsequent responding.

Arbitrarily applicable relational responding adds only a small additional feature to this process: the particular response is relational. Stated in rule form the child learns "in this context if A goes with B, then B goes with A." Very young children initially do not have the verbal repertoire to learn relational responding through such verbal rules – this rule initially describes the contingency established by the trainer, not the process through which learning occurs. Eventually, a relational repertoire is so well established that verbal rules themselves become the source for verbal relations, a topic we will address in later chapters, but initially the regularity is in the contacted contingencies that this rule summarizes.

When a symmetrical response comes under the contextual control of cues other than the related events (such as phrases "is the same as," "is greater than,"), it can be applied to stimuli that do not have formal properties that support the specific relation. Suppose that we arbitrarily designate X as greater than Y and ask "Which is greater: X or Y?" With no formal properties to support making the relational response, the subject must guess. If they guess X and that response is reinforced, the contingencies are now predictable when presented with the question "Which is smaller: X or Y?" Initially the child would have to guess, but eventually the combination of an adequate history in the presence of "greater than," and a history with these same relata in the presence of "smaller than," will lead to a coordinated response: individuals given the relation in one direction will derive the relation in the other direction. That is the core idea of a "relational frame."

The concept of a response frame is useful when the response at issue includes contextual control over an overarching operant that includes specific assigned forms. Skinner's concept of an autoclitic frame, described in the previous chapter, is an example (e.g., "when you hear _____ you will receive a ___"). Imagine that a person hears a variety of sentences, such as "when you hear *a knock* you will receive a *package*" and "when you hear *the recess bell* you will receive a *break*." Eventually any term can be placed into this "autoclitic frame" and the listener may know what to expect. Just as a picture frame can hold many pictures, a response frame can include 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 that pattern.

Autoclitic frames and grammatical frames are examples. So too, we would argue, are relational frames.

2.1.4. Show Us the Evidence for the Precise History Involved

Relational Frame Theory has sometimes been criticized for not specifying precisely what history is involved in a generalized relational response (e.g., Horne and Lowe, 1996). This is a weakness, but it is one that is more empirical than conceptual. The general process outlined above seems to us to be entirely consistent with behavioral thinking, and as we will show throughout this book, there are scores of studies that comport with this account. We are not arguing that this is enough. We might guess about the details of history and context that are important (e.g., what kinds of productive repertoires are needed? Is echoing necessary? Is cross-modal discrimination critical? Must equivalence be the first relational response? Must symmetrical and nonsymmetrical responding be trained together to abstract the relevant response?), but in general it seems more conservative and scientifically responsible to work out these details empirically rather than to allow interpretation and speculation to get too far ahead of the data.

There are no published studies yet concerned with how a repertoire of relational framing might be established when it is found to be absent. This would be a higher test of the idea that relational frames emerge through a history with multiple exemplars. What is now known fits the analysis but it does not reach this high level of empirical support. For example, Devany et al. (1986) and Barnes et al. (1990) showed that equivalence was absent in language-disabled children, but no attempt was made to generate a repertoire of equivalencing using interventions suggested by RFT. In a similar vein, Lipkens, Hayes, and Hayes (1993) tracked the emergence of a simple repertoire of relational framing in a single child, and although their findings suggested that derived relational responding showed a developmental trend not unlike language itself, no attempt was made to remediate deficits in relational framing. Although RFT considers relational framing to be a type of generalized operant that is produced by a history of multiple-exemplar training, there is as yet no systematic analysis of the role of multiple-exemplar training in this regard.

An important empirical question, therefore, is whether we can design effective RFT-based interventions that establish or facilitate new repertoires of derived relational responding in young children. Positive evidence in this regard would provide firm support for RFT's approach to derived relational responding, and by implication for the functional analysis of human language and cognition. This program of intervention research with young children is currently underway and will be described in Chapter 10. While positive data exist, as will be discussed in that chapter, we agree that this key point is not yet resolved in RFT research.

If, however, it were resolved in detail, RFT would be fully mature. To show empirically exactly what history is necessary to establish a response function is to do an experimental analysis of behavior. At least within the behavioral community, when RFT reaches that level of support, it will be accepted by all. The purpose of this volume is not to argue that RFT is proven and accepted, but to argue that it is plausible, coherent, supported by the available data, and is experimentally progressive. The rest must be worked out empirically, and the theory must be allowed to stand or fall on its ability to create a robust and supportive empirical research program.

2.1.5. Summary

In summary, then, our approach to derived stimulus relations is to think in terms of a purely functional operant of relational responding, that is abstracted and brought under contextual control. As such it becomes arbitrarily applicable: when contextual cues establish relational responding in a given situation specific events can become part of response frames. The general term for this kind of responding is *arbitrarily applicable relational responding*. Specific kinds are called *relational frames*. Defining these specific relational frames will require a new nomenclature, however, a topic to which we now turn.

2.2. GENERIC ALTERNATIVES TO THE DESCRIPTIVE TERMS FOR STIMULUS EQUIVALENCE

While much of the work on derived stimulus relations has focused on equivalence, if relating itself can be learned and brought under contextual control, a wide variety of relational responses seem possible. The literature on relational responding now makes it clear that this assumption is warranted. An increasing number of studies have generated patterns of derived relational responding other than equivalence (Dymond and Barnes, 1995, 1996; Green, Stromer, and MacKay, 1993; Roche and Barnes, 1996; Steele and Hayes, 1991), including more-than/less-than, opposite of, different from, and before/after. The terms used to describe the properties of a derived equivalence relation – reflexivity, symmetry, and transitivity – are not always appropriate or applicable for other kinds of relations. Take the relation of "larger than," for example. If A is larger than B, it does not follow that B is also larger than A – the relation is not symmetrical. Ordering relations (e.g., A is before B, B is before C, C is before D, etc.) also share this difficulty, as they are nonreflexive, asymmetrical, transitive, and connected (Green et al., 1993). To rectify this problem, RFT has adopted terminology that is more generic and applicable to all possible derived stimulus relations.

2.2.1. Mutual Entailment

A relation between two events involves responding to one event in terms of the other and vice versa. Arbitrary stimulus relations are always mutual: If A is related to B, then B is related to A. The specific relations involved can vary. If A is larger than B, then B is smaller than A. If the first relation is specified, the second is entailed: thus the term "mutual entailment." The term "mutual entailment" describes the fundamental bidirectionality of relational responding, even when such bidirectionality is not symmetrical. It serves as a more generic term for what is called "symmetry" in stimulus equivalence. Mutual entailment is a defining characteristic of arbitrarily applicable relational responding.

All forms of arbitrarily applicable relational responding, by definition, must be brought to bear on the situation by contextual events other than purely the nonarbitrary properties of the relata themselves. Mutual entailment applies when in a given context A is related in a characteristic way to B, and as a result B is now related in another characteristic way to A in that context. It is sometimes useful to have a technical set of symbols to describe this simple concept. Mutual entailment can be represented by the formula:

$$C_{rel} \{ A \, r_x \, B \, ||| \, B \, r_y \, A \}$$

where "C_{rel}" symbolizes a context in which a history of a particular kind of relational responding is brought to bear on the current situation, "r" stands for a relation brought to bear, the subscripts "x" and "y" stand for the specific types of relations involved, "A" and "B" stand for the events in the current context that are included in the overall relational response pattern, and "|||" is a symbol for entailment. These terms provide some precision in refining the concept of arbitrarily applicable relational responding. (The formulae themselves are not critical to an understanding of RFT, and thus they will be used rarely in subsequent chapters of the book. However, some individual terms, such as C_{rel}, will be used quite frequently in freestanding form). Specifically, if an arbitrarily applicable relational response is occurring, then a response to B in terms of A as part of an "r_x" response, entails a response to A in terms of B as part of a "r_y" response. Stated another way, if mutual entailment is occurring, "r_x" and "r_y" are two aspects of the relational operant.

Suppose, for example, that a ball is held up in front of a child and the child is told, "This is a ball." The relational context ("C_{rel}") might include the form of the sentence, tone of voice, the words involved (e.g., "is"), holding up an object, and so on. Given a proper history, these cues may bring a particular type of relational responding to bear on the ball itself and the auditory event "ball." In this case, the specified relation (r_x) is what we will later call a "frame of coordination" and an equivalence relation is the result. Given that particular response frame, when the child later hears "Where is the ball?" or even simply "ball?" the child may see the ball (even before the object is seen) or may scan the environment and orient toward the ball if it is present. The response, in other words, will involve responding to the sound "ball" in terms of the previously experienced functions of actual balls.

2.2.2. Combinatorial Entailment

Combinatorial entailment refers to a derived stimulus relation in which two or more stimulus relations (trained or derived) mutually combine. "Combinatorial entailment" is the generic term for what is called "transitivity" and "equivalence" in stimulus equivalence. For example, combinatorial entailment applies when, in a given context, if A is related to B, and B is related to C, then as a result A and C are mutually related in that context. For example, if Maria is smarter than Lisa, and Lisa is smarter than Shannon, then a derived mutual relation between Maria and Shannon is entailed (in this case, that Maria is smarter than Shannon and Shannon is less smart than Maria).

Symbolically, we can represent combinatorial entailment as follows:

$$C_{rel} \{ A \, r_x \, B \text{ and } B \, r_y \, C \, ||| \, A \, r_p \, C \text{ and } C \, r_q \, A \}$$

This type of entailment is mutual, and because of that mutuality, the longer and more technically precise term "combinatorial mutual entailment" is sometimes used, but the shorter term will usually do for our purposes. This mutuality eliminates some of the unfortunate confusion in the equivalence literature caused by viewing transitivity in a linear fashion (e.g., the need to add the term "equivalence relation" due to the connotations of the term "transitivity").

Combinatorial entailment applies in principle to any form of a relational network and to any combination of relations. Thus, for example, $A\ r_x\ B$ and $A\ r_z\ C$ may entail relations between B and C just as well as a linear network (e.g., $A\ r_x\ B, B\ r_x\ C$) with multiple instances of the same specified relations.

The reason combinatorial entailment must be described specifically goes beyond issues of complexity. It is not the case that we need a new term merely because we are moving from two related events to three (in which case we might need new terms for four, five, or six related events, ad infinitum). In the case of mutual entailment, the specified relation between A and B always entails a relation between B and A at the same level of precision. When relations combine, however, the derived relation may be much less precise than the original relations. For example, if A is different than B and B is different than C, we cannot say what the relation is between A and C and between C and A. This lack of precision, however, is *specified* by the nature of the relations involved: we can say that we cannot say. Stated another way, we know that we do not know, which is itself a kind of stimulus relation.

As pointed out elsewhere, this property is the source of a common joke with children:

> The most common form of specified imprecision of relation occurs when the two or more relations involved exist along different dimensions. In that case, no relation is derivable. This does not seem to be the usual case in natural language, as can perhaps be seen in the following. As a joke we ask a child "if Ralph is older than Joe, and Joe is bigger than Steve, who is more handsome, Ralph or Steve?" The humor in this statement derives from the tension between the child's training in combinatorial entailment and the specified absence of a relation in this particular instance. If combinatorial entailment did not usually lead to a specific derived relation, there would be no humor in the question (Hayes and Hayes, 1989, p. 169-170).

Furthermore, without combinatorial entailment it is not possible to define the relevant forms of relational frames. The differences in the patterns of responding need to go at least to this level of complexity. In the case of same and opposite, for example, the mutually entailed relations are both symmetrical (if A is the same as B, B is the same as A; and if A is opposite to B, B is opposite to A). Only at the level of combinatorial entailment do distinct patterns emerge (e.g., A opposite B opposite C, derives A same C, not A opposite C). Finally, it seems highly likely that combinatorial entailment usually emerges slightly later in language training than mutual entailment due to its complexity and training history. In principle, however, combinatorial entailment need not be linearly related to mutual entailment.

2.2.3. Transformation of Stimulus Functions

When a given stimulus in a relational network has certain psychological functions, the functions of other events in that network may be modified in accordance with the underlying derived relation. Equivalence research has repeatedly revealed that stimulus functions commonly transfer through the members of equivalence classes. Transfer has been shown with conditioned reinforcing functions (Hayes, Brownstein, Devany, Kohlenberg, and Shelby, 1987; Hayes, Kohlenberg, and Hayes, 1991), discriminative functions (Hayes, et al., 1987), elicited conditioned emotional responses (Dougher, Auguston, Markham, Greenway,

and Wulfert, 1994), extinction functions (Dougher, et al., 1994), and self-discrimination functions (Dymond and Barnes, 1994), among others.

Such findings are important because they make relational responding relevant to psychology in general. If the relational functions involved in mutual and combinatorial entailment were only relevant to arbitrary relational functions, they would be of more direct interest to logicians than to most psychologists. Relational responding is important because it can lead to other forms of responding. Indeed, this is one reason that a number of equivalence and relational frame researchers are applied psychologists, and why psychologists interested in the pragmatic impact of language need to attend to the growing literature in derived stimulus relations.

Changes in stimulus functions that occur when relations other than equivalence are involved make the term "transfer of stimulus functions" too limited for generic use. The change in functions of one event that stands in relation to another is not mechanical: it is in terms of the underlying relation. For example, suppose a person is trained to select stimulus B as the "opposite" of stimulus A. Now suppose that A is given a conditioned *punishing* function, such as by pairing it with a loss of points. It might be predicted that B would then have *reinforcing* functions (without having that function directly trained), by virtue of its "opposite" relation to the punishing A stimulus. Dymond and Barnes (1995) have empirically demonstrated just such an effect with derived relations of more-than/less-than (see also Roche and Barnes, 1997; Roche, Barnes-Holmes, Smeets, Barnes-Holmes, and McGeady, 2000). It hardly seems right to say that the reinforcing effects "transferred" in such a case, because they were acquired indirectly through the relation of opposition between B and a punisher. It seems more proper to use the term transformation than transfer, and it is for this reason that Relational Frame Theory has adopted *transformation of stimulus functions* as the general term for this effect. We will still use the term *transfer of stimulus functions,* but will generally reserve it for situations in which the underlying relation leads to derived functions that are similar to those that were trained or that pre-existed. In some situations (e.g., stimulus equivalence) the terms can be used interchangeably, and we will do so when it is linguistically advantageous.

The transformation of stimulus functions must itself be under contextual control. There is a simple reason for this. A given stimulus always has many functions, and if *all* functions of one stimulus transferred to another and vice versa, there would no longer be two separate psychological stimuli. Thus, just as the relational response to be brought to bear on the relata is controlled by context, the specific psychological functions that can be transformed must also be under contextual control. Consider, for example, two stimuli in a relational class of equivalence: the word "banana" and an actual banana. A banana, of course, has several stimulus functions, including perceptual functions of taste, texture, or sight. When a person says, "picture a banana," most verbally able people would "see" a banana in the absence of an actual banana. We would interpret this phenomenon as follows: Actual bananas have visual perceptual functions. The word "banana" and actual bananas are in an arbitrarily applicable stimulus relation (in this case, an equivalence relation or "frame of coordination"). The words "picture a" are a context in which visual functions are actualized in terms of the underlying relation. In another context (e.g., "imagine tasting a …"), other functions (e.g., taste) could be actualized. Contextual cues, then, not only establish and indicate the particular conditions under which relational activity occurs, they also specify which functions should be trans-formed or transferred.

In the early stages of language training, it is likely that many "inappropriate" functions of stimuli participating in a derived stimulus relation will be transformed before reinforcement contingencies are able to establish contextual control. A small child who encounters a photograph of an ice cream cone for the first time may attempt to lick the photograph because the child's limited experience with the photograph has not allowed sufficient contextual control to develop. After licking the photograph, however, and realizing it is not sweet tasting, the child may learn that in the context of glossy paper bearing formal similarity to objects, perceptual stimulus functions of taste are not transferred to the photograph. Similarly, a young child told that "Uncle George is a snake" may be frightened that Uncle George will bite, or be confused because Uncle George does not look like a snake. Eventually, however, the child (through differential reinforcement from the verbal community) will learn that in the context of saying someone is like an animal, the perceptual functions should usually not transfer to the person, unless additional cues are offered (e.g., the words "looks like").

Symbolically, we can represent the transfer of functions this way:

$$C_{func} [C_{rel} A r_x B \text{ and } B r_y C \{ Af^1 \parallel\parallel Bf^2r_p \text{ and } Cf^3r_q \}]$$

where "C_{func}" symbolizes the contextual stimuli that select particular psychologically relevant, non-relational stimulus functions in a given situation (incidentally, this is a term we will use throughout the book in freestanding form), "f" refers to stimulus function, the numerical superscripts refer to the specific functions involved, and "r" refers to a relational response, and the letter subscripts refer to the specific type of relational responding occurring. We can say it this way: given arbitrarily applicable stimulus relations between A, B, and C, and given a context that actualizes the transformation of a given function of A, the functions of B and C will be modified in terms of the underlying relations between A, B, and C.

2.2.4. Reflexivity

A more generic term for reflexivity is unnecessary in Relational Frame Theory. There are difficulties with using the term in relations other than equivalence, since its defining properties do not distinguish between those due to derived stimulus relations and those due to formal similarity. This has been discussed elsewhere (Steele and Hayes, 1991).

2.3. RELATIONAL FRAMES

The term *relational frame* was coined to designate particular kinds of relational responding (Hayes and Hayes, 1989). A relational frame is a specific class of arbitrarily applicable relational responding that shows the contextually controlled qualities of mutual entailment, combinatorial mutual entailment, and transformation of stimulus functions; is due to a history of relational responding relevant to the contextual cues involved; and is not solely based on direct non-relational training with regard to the particular stimuli of interest, nor solely to nonarbitrary characteristics of either the stimuli or the relation between them. A relational frame is thus both an outcome and a process concept. The contextually controlled qualities of mutual entailment, combinatorial mutual entailment, and transformation of stimulus functions are outcomes, not processes. They do not explain relational frames: they

define them. The process is the history that gives rise to a relational operant that is under a particular kind of contextual control. Stated another way, the process involved is contingencies of reinforcement, but unlike Sidman (2000) relational responding is not a previously unknown secondary effect of such contingencies, it is the target of them.

We use the term relational frame in its noun form for the sake of convenience; however, a relational frame is always "framing events relationally" – it is an action. Arbitrarily applicable relational responding is the generic name for behavior of this kind, while a relational frame is a specific type of such responding. The metaphor of a "frame" has been adopted 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. Nonarbitrary relational responding does not require the frame metaphor because the relation is not "empty" and arbitrarily applicable – it is specified by the physical properties of the stimuli to be related.

Relational frames are a unit of responding and a specific class of functional behavior, but it is wrong to think of this in mechanical and physicalistic terms. Relational frames are not mediated by more basic processes: instrumental learning is the process. Of course, any operant contains other operants, virtually without exception, and so too with relational frames (Barnes-Holmes and Barnes-Holmes, 2000). When a pigeon pecks a key for food it necessarily involves orienting toward the key; orienting involves moving the head and looking; looking involves tracking a visual stimulus with the eye; tracking involves focusing the lens of the eye; and so on ad infinitum or until we get tired or disinterested. Similarly, any operant can expand into other "larger" operants, ad infinitum. Such flexible units should be expected in any contextualistic approach (Hayes et al., 1988) because the pragmatic qualities of contextualistic thinking preclude foundationalism and other kinds of ontological assumptions. Operants are analytic units that analysts adopt for specific purposes–they are not things.

The RFT analysis specifically includes various units (mutual entailment, combinatorial entailment, and transformation of stimulus functions) which themselves can be thought of in functional terms. It is quite proper for behavior analysts to become interested in these as individual units, if they wish, and some have (e.g., Pilgrim and Galizio, 1995). It is expected that these units may not always covary and specific contingencies may break them apart or pull them together (Healy et al., 2000, have demonstrated these very effects; see also Lipkens et al., 1993). For the purposes of our analysis, a relational frame is a "unit" for two primary reasons: it seems to be the simplest unit that can describe the different types of arbitrarily applicable relational responses, and it seems to be the simplest unit that can describe the key elements of speaking with meaning and listening with understanding. Even a simple sentence is often too complex to be understood if any of the defining elements of a relational frame are left out. We do not believe that relational frames are "primitives" or "elemental units" however.

As a class of psychological interactions, arbitrarily applicable relational responding need not show all of its defining features in a given instance. Consider a child who says, "I'm walking" as she walks. Imagine further that she has been directly trained to do so by a parent. In this case, the response "I'm walking" could be *solely* under the direct control of walking as a stimulus and the direct history of reinforcement for emitting "walking" in the presence of that stimulus (Barnes-Holmes et al., 2000). Merely because the relational response has been directly trained, however, does not mean that it cannot be a member of a class of derived stimulus relations. Trained relations can enter into a derived relational network. In all likelihood, for example, part of the functions of "walking" come because it is distinct from

running or crawling, and so on. If "walking" is part of an arbitrarily applicable relational response, then in other contexts it can show other features of that class. Consistent with the epistemology of behavior analysis, derived relational responding is a class-based concept.

While arbitrarily applicable relational responding is probably normally taught only in the context of specific relational frames, it seems likely that the larger class itself is strengthened by these specific forms as well. Thus, for example, it would be expected that new relational frames become easier and easier to learn once others are learned, since all relational frames share certain features.

2.4. FAMILIES OF RELATIONAL FRAMES

The number of ways in which stimulus events can be related to one another is great, and this means there are many specific kinds of relational frames. It is useful to classify the large number of possible frames into a few general categories or families. This list is not exhaustive, but serves to demonstrate some of the more common frames and how they may combine to establish various classes of events.

2.4.1. Coordination

Undoubtedly the most fundamental type of relational responding is that encompassed by the frame we will call "coordination." The relation is one of identity, sameness, or similarity: this is (or is similar to) that. It is also the frame with which most stimulus equivalence research is concerned. Much of the earliest language training received by children seems to be of this kind and thus a relational frame of coordination is probably the first to be abstracted sufficiently that its application becomes arbitrary. Frames of coordination establish equivalence classes (stimulus A is the same as stimulus B) and include other derived relations of similarity or sameness.

Naming is an example of the simplest frame of coordination, in part because it often does not require additional features to be disambiguated. If a child is shown a cup and told "This is called a cup" the speaker obviously does not mean that the two are the same in all regards, and that will be evident in the use of "called" or "name of" as a C_{rel} for this relational response. Despite that, there need be no appeal to any other features of the environment to explain what is meant.

Compare this to other frames of coordination and the difference is obvious. Suppose a child is shown a cup and told "this is similar to a bowl." Depending upon what the child already knows, more contextual cues may be needed to relate the term and the object reliably. "Is similar too" requires a dimension along which two events are similar. That dimension might be purely verbal (e.g., "loathing is similar to hate") or it may be based on abstracted features of the environment (e.g., "a cup is similar to a bowl because it can hold liquid").

In the absence of other cues, people usually tend to show simpler relational frames, a fact that has greatly benefited the equivalence literature. We now know that the matching-to-sample procedure can give rise to myriad response patterns, with only a short pre-training history. In the absence of other cues, however, matching-to-sample will usually yield equivalence responding. This is not surprising since equivalence responding is the simplest form of relational response. It is the only arbitrarily applicable relational response that is the same in training and testing, no matter how large the network.

2.4.2. Opposition

Another family of relational frames is that of opposition. Like "similarity," in most practical instances, this kind of relational responding is organized around some specified dimension along which events can be ordered. With regard to some point of reference and an event that differs from that point in one direction along the continuum involved, an opposite differs in the other direction and to about the same degree along that continuum. Along the dimension of temperature, for example, cool is the opposite of warm, and cold is the opposite of hot. The point of reference in this case usually seems to be the temperature of the human body (which makes sense given the pragmatic use to which this relation will typically be put), but in specific contexts that may change (e.g., different stars may be said to be "cool" or "hot"). The relational frame of opposition typically specifies the dimension of relevance (e.g., "pretty is the opposite of ugly" is relevant only to appearance and not to, say, speed), but as an arbitrarily applicable relational response, it can be applied even when no physical dimension of relevance has been specified. For example, symbolic logic can specify that A is the opposite of B, without stipulating which dimension is involved in the relational response. An abstracted frame of opposition is seen in symbolic logic with the concept of the "logical not."

Opposition normally would come after coordination, and for a very good reason beyond mere complexity: the combinatorially entailed relations in frames of opposition include frames of coordination. If hot is the opposite of freezing and cold is the opposite of hot then cold is the same as freezing.

2.4.3. Distinction

Distinction is a third family of relational frame. It involves responding to one event in terms of its differences from another, typically also along some specified dimension. Like a frame of opposition, this implies that responses to one event are unlikely to be appropriate in the case of the other, but unlike opposition, the nature of an appropriate response is typically not specified. If I am told only "this is not warm water," I do not know if the water is ice cold or boiling.

2.4.4. Comparison

The family of comparative relational frames is involved whenever one event is responded to in terms of a quantitative or qualitative relation along a specified dimension with another event. Many specific subtypes of comparison exist (e.g., bigger-smaller, faster-slower, better-worse). Although each subtype may require its own history, the family resemblance may allow the more rapid learning of successive members. The different members of this family of relations are defined in part by the dimensions along which the relation applies (size; attractiveness; speed; and so on).

Comparative frames may be made more specific by quantification of the dimension along which a comparative relation is made. For example, "A is twice as fast as B and B is twice as fast as C" allows a precise specification of the relation between all three elements of the network.

2.4.5. Hierarchical Relations

Hierarchical class membership shares the same basic relational pattern of a frame of comparison. "A is an attribute or member of B" is the general form of a hierarchical frame. "Apples are round" or "Bananas are fruit" are examples. If the nature of B is clear, this may determine responses to A. For example, "John is a man" may permit appropriate responding to John to the degree that the class "man" is relevant. The pattern is like a frame of comparison in the sense that it is diode-like, but because it is not merely qualitative, the combinatorial relations tend to be more specific even without quantification. For example, "Apples are fruit" and "Apples are sweet" will make clear that some fruit are sweet. Conversely, "Apples are sweeter than bananas" and "Apples are sweeter than prunes" will not allow the naive listener to specify the relative relation between bananas and prunes.

Kinship relations provide another example. If I tell you that Bob is the father of Dave and Barb, you can derive that Dave and Barb are siblings (a hierarchical frame). If, however, I tell you that Bob is taller than both Dave and Barb you cannot derive a relation of relative tallness between the latter two individuals (a frame of comparison).

Hierarchical relations are extremely important in the analysis of the use of verbal relations to abstract properties of the nonarbitrary environment. "Part-whole" or "attribute of" relations are hierarchical and when they are applied to the nonarbitrary environment, they draw abstracted physical features into relational networks, allowing the use of these now verbally abstracted properties as verbal relational cues and as verbally related events. This is the process that allows human verbal behavior to have practical implications as it is nonarbitrarily applied to the natural environment. We will discuss all this in considerable detail in Chapter 5, when we deal with problem-solving, because it is a key feature of the use of relational responding to analyze the environment.

2.4.6. Temporal Relations

Temporal relational frames also share the same basic pattern of a comparative frame. They are worth describing separately, both because of their importance and because of the unique nature of the physical dimension that parallels this arbitrarily applicable relation. In a nonarbitrary sense what underlies "time" is merely change. Change is always unidirectional, from now to a new now, or from this to a new this, never from a new this to an old this. Nonverbal organisms are exquisitely sensitive to sequences of change (such sequences underlie contingencies of reinforcement, for example), but abstracting the physical dimension along which temporal / causal comparatives are arranged is a highly verbal action, and one that seems to require the kinds of metaphorical activities we will discuss in Chapter 4. Arranging a past, present, and future along a single so-called dimension is not the same as ordering a small, medium, and large box into a sequence of increasingly larger physical objects. In the latter case, relative size can be presented (indeed, a nonarbitrary relation of relative size can easily be acquired by nonhumans). When size as an abstracted dimension enters into verbal relations, more can be done with it, of course. For example, we can speak reliably of the size of one's reputation, or the size of one's bank account.

In comparison to this kind of dimension, time is inherently more abstract. The dimension along which temporal / causal comparatives are ordered is a more thoroughly constructed

dimension from the very beginning. How can "the future" be presented, and how does it enter into a single dimension of past, present, and future, when the only "time" that can be directly presented is a simple unidirectional sequence of change? It seems most likely that this unidirectional "what next" form of change is related to other relations (e.g., other comparatives) and the bidirectional dimension of time is constructed. If so, this may be one reason that abstract temporal relations tend to emerge later in development than simple comparatives.

2.4.7. Spatial Relations

A large number of relations deal with the arrangement of objects or aspects of objects in space, relative to each other, such as in-out, front-back, over-under and so on. These spatial relations are like comparative relations, but often they imply or specify frames of reference that make them quite specific. For example, if you are told that house A faces the back of house B, you could order the front and back doors of both houses into a linear sequence (back door of A, front door of A, back door of B, front door of B). This is because front and back doors are relative to each individual house, and knowing the orientation of the two houses implies the more detailed information.

2.4.8. Conditionality and Causality

Conditionality and causality share features with both hierarchical relations and comparative relations. For example, if a listener is told, "A causes B and B causes C," s/he may simply derive, via a frame of comparison, that "A caused C and C was caused by A." Hierarchical class membership is involved, however, if the listener derives "B was caused by A alone, but C was caused by both A and B." That is, the listener constructs a precise hierarchy of cause-effect relations, and therefore such relational responding extends beyond the basic frame of comparison. The same type of analysis may be applied to conditional relations such as "if-then." The constructed nature of this relation is more obvious than with temporal relations, particularly as one begins to attribute cause to conditional properties. Events are said to cause events based on many features: sequences, contiguity, manipulability, practical exigencies, cultural beliefs, and so on. Causality itself is not a physical dimension of any event.

2.4.9. Deictic Relations

By deictic relations we mean those that specify a relation in terms of the perspective of the speaker such as left-right; I-you (and all of its correlates, such as "mine"); here-there; and now-then (see Barnes and Roche, 1997a; Hayes, 1984). Some relations may or may not be deictic, such as front-back or above-below, depending on the perspective applied. For example, the sentence "the back door of my house is in front of me" contains both spatial and deictic forms of "front-back."

Deictic relations seem to be a particularly important family of relational frames that may be critical for perspective-taking. Consider, for example, the three frames of I and YOU, HERE and THERE, and NOW and THEN (when it seems contextually useful, we will capitalize relational terms if they refer to specific relational frames). These frames are unlike

the others mentioned previously in that they do not appear to have any formal or nonarbitrary counterparts. Coordination, for instance, is based on formal identity or sameness, while "bigger than" is based on relative size. Temporal frames are more inherently verbal in that they are based on the nonarbitrary experience of change, but the dimensional nature of that experience must be verbally constructed. Frames that depend on perspective, however, cannot be traced to formal dimensions in the environment at all. Instead, the relationship between the individual and other events serves as the constant variable upon which these frames are based. Learning to respond appropriately to (and ask) the following kinds of questions appears to be critical in establishing these kinds of relational frames:

> "What are *you* doing *now*?"
> "What did *you* do *then*?"
> "What are *you* doing *here?*"
> "What are *you* doing *there?*"
> "What am *I* doing *now*?"
> "What did *I* do *then*?"
> "What am *I* doing *here*?"
> "What will *I* do *there*?*"

Each time one or more of these questions is asked or answered, the physical environment will likely be different. The only constant across all of the questions are the relational properties of I versus You, Here versus There, and Now versus Then. These properties appear to be abstracted through learning to talk about one's own perspective in relation to other perspectives. For example, *I* is always from this perspective *here,* not from someone else's perspective *there.* Clearly, a speaker must learn to respond in accordance with these relational frames. For example, if Peter is asked, "What did you do when you got there?" he should not simply describe what someone else is doing now (unless he wishes to hide what he actually did, or annoy and confuse the questioner). We shall consider the relational frames of perspective in greater detail in subsequent chapters.

2.4.10. Interactions Among Relational Frames

At the present time very little is known about the effects of learning to respond in accordance with one type of frame on other framing activities. We have seen evidence in our research of such effects. For example, training in SAME may make OPPOSITION easier; training in deictic relations may make appreciation of contingencies easier and so on. One fairly clear prediction from RFT is that there should be some generalization of relational responding, particularly within families of relational frames. For example, an individual who learns to respond in accordance with sameness, may learn to respond in accordance with similarity (or opposition, since sameness is a combinatorially entailed aspect of opposition) more rapidly than, say, comparison. Similarly, learning across more closely associated families of relations may be more expected than learning across more distinct families. For example, to frame in accordance with comparison may facilitate hierarchical framing more readily than a frame of coordination. For the time being, however, such issues will have to await systematic empirical investigation.

2.4.11. Relational Frames: A Caveat

In listing the foregoing families of relational frames, we are not suggesting that they are somehow final or absolute. If RFT is correct, the number of relational frames is limited only by the creativity of the social/verbal community that trains them. Some frames, such as coordination, have been the subject of many empirical analyses. Others such as opposition and more-than/less-than have also been studied experimentally, but the relevant database is much smaller than for coordination. Many of the frames listed, however, have not been analyzed empirically, or have only been subjected to the most preliminary of experimental analyses. Thus the list we have presented is to some degree tentative in that some of the relational frames we have identified are based on our preliminary, non-experimental analyses of human language. For example, TIME and CAUSALITY can be thought of as one or two types of relations. It is not yet clear if thinking of them as separate or related may be the most useful.

Thus, while the generic concept of a relational frame is foundational to RFT, the concept of any particular relational frame is not. Our aim in presenting this list is to provide a set of conceptual tools, some more firmly grounded in data than others, that may be modified and refined as subsequent empirical analyses are conducted.

2.5. COMPLEX RELATIONAL NETWORKS

It is possible to create relational networks from mixtures of various relational frames and to relate entire relational classes with other relational classes. For example, if one equivalence class is the opposite of another equivalence class, then normally each member of the first class is the opposite of all members of the second and vice versa. This can continue to virtually any level of complexity. For example, consider the relations that surround a given word, such as "car." It is part of many hierarchical classes, such as the class "noun," or the class "vehicles." Other terms are in a hierarchical relation with it, such as "windshield" or "wheel." It enters into many comparisons: it is faster then a snail, bigger than a breadbox, heavier than a book. It is the same as "automobile," but different than a house, and so on. The participation of the word "car" in these relations is part of the training required for the verbal community to use the stimulus "car" in the way that it does. Even the simplest verbal concept quickly becomes the focus of a complex network of stimulus relations in natural language use.

We will deal with this in detail in the next three chapters because this is a crucial form of relational responding in such activities as problem-solving, reasoning, and thinking. The generative implications of this process are spectacular. A single specified relation between two sets of relata might give rise to myriad derived relations in an instant. Entire sets of relations can change in an instant. This kind of phenomenon seems to be part of what is being described with terms like "insight."

2.6. EMPIRICAL EVIDENCE FOR RELATIONAL FRAMES AS OPERANTS

Operant behavior can be originated, maintained, modified, or eliminated in the labora-tory and it is relatively easy to identify operants in that context. Many naturally occurring

behaviors, however, are difficult to bring into the laboratory in such a highly controlled fashion. Nevertheless, we can examine the characteristics of these naturalistic behaviors to see if they have some of the properties characteristic of operants. Four such properties seem most relevant: first, they should develop over time rather than emerging in whole cloth; second, they should have flexible form; third, they should be under antecedent stimulus control; and fourth, they should be under consequential control.

If derived stimulus relations are based upon operant behavior, they should show these four characteristics. Although much work remains to be done, there is some supporting evidence for each of them.

2.6.1. Development

Learning is an inherently developmental concept. As a result of experience with the contingent relationships between situations and actions, these actions evolve. If deriving arbitrary stimulus relations is operant behavior, it, too, should develop over time. The existing evidence suggests that this is the case.

In one of the few existing longitudinal studies, Lipkens et al. (1993) found that relatively simple derived relations such as mutual entailment were present by 16 months of age, but that more elaborated derived relations such as combinatorial entailment emerged later. This study also showed that exclusion produced mutual relations only gradually, but by 23 months the child would mutually relate novel names and objects based on a relation of difference with a known object. Similar effects have also recently been demonstrated when establishing the relational frames of opposite and more-than/less-than in young children (see Chapter 10).

These types of development can also be reproduced within an individual subject in the training of a particular equivalence class. Fields, Adams, Verhave, and Newman (1990), for example, have shown that simpler derived relations (i.e., those separated by a single node in training) emerge more rapidly than relations among stimuli that involve more extended combining of relations (i.e., those separated by more than one node in training). Thus, equivalence relations do not seem to emerge in whole cloth either over the development of these relational responses in an infant, or in the learning of a particular set of relations in an adult with these repertoires in place. This does not prove that relational responding is an operant, but it makes the notion more plausible. If there were no evidence of development, it would prove that such responding is *not* learned behavior.

2.6.2. Flexibility

The flexibility of operants is one of their hallmarks. Several studies show that relations among members of an equivalence class are quite changeable, and even once formed, relations among stimuli in a class may change individually or en masse depending on the conditions. For example, having provided training sufficient to generate equivalence classes, we can change all of the baseline conditional discriminations, and new relations will emerge among the stimuli consistent with these altered baseline relations (e.g., Spradlin, Cotter, and Baxley, 1973). However, if we change only a small number of the baseline discriminations, some of the derived relations will change while others will remain intact (e.g., Pilgrim and Galizio, 1995). The dissociation between symmetrical and equivalence relations seen in studies such as Pilgrim and Galizio's "raise questions about the functional substitutability of

stimuli that is a defining feature of stimulus equivalence, and thus, perhaps, about the integrated nature of 'equivalence' as a behavioral unit" (Pilgrim and Galizio, 1995, p. 226; see also Roche, Barnes, and Smeets, 1997). These findings suggest that relating one event to another and combining relations among events are flexible behaviors under specific environmental control. This would be expected from the point of view of RFT. Indeed, recent RFT research has systematically demonstrated that it is possible to separate and recombine symmetry and equivalence responding using delayed, test-performance contingent feedback (Healy et al., 2000).

The other major source of evidence of flexibility is the demonstration that relational pretraining can greatly modify the results of matching-to-sample performances in accord with multiple forms of stimulus relations. In other words, multiple stimulus relations themselves are a kind of relational flexibility. These data will be reviewed in some detail in the next chapter.

2.6.3. Antecedent Stimulus Control

It has long been known that the composition of specific equivalence classes can come under contextual control (e.g., Wulfert and Hayes, 1988). It is also possible to develop many specific forms of derived stimulus relations such as sameness, opposition, difference, more-than, less-than, and sequencing relations, and in turn to bring all of these under contextual control (e.g., Dymond and Barnes, 1995; Green, et al., 1993; Lipkens, 1992; Roche, Barnes-Holmes, Smeets, Barnes-Holmes, and McGeady, 2000; Steele and Hayes, 1991). These latter findings speak both to the antecedent control possible with equivalence and also to its flexibility discussed in the previous section (see also Spradlin, Saunders, and Saunders, 1992, on the flexibility and contextual control of equivalence relations).

2.6.4. Consequential Control

There is growing evidence that deriving stimulus relations is under consequential control. In one study, for example, Wilson and Hayes (1996) provided conditional discrimination training sufficient to establish three four-member equivalence classes. Later training reorganized the same stimuli into three new classes. When the derived relations emerging from this later conditional discrimination training were punished, there was a resurgence of the older derived relations, exactly what one sees with directly trained operant responses. That is, when an operant response ceases to produce reinforcement or begins to produce punishment, responding becomes more variable and earlier topographies reemerge (e.g., see Epstein and Skinner, 1980; Mowrer, 1940; Rawson, Leitenberg, Mulick, and Lefebvre, 1977 for examples of resurgence of directly trained responses). Derived stimulus relations seem to operate in the same manner.

In another experiment, Leonhard and Hayes (1991) gave subjects matching-to-sample training that would normally give rise to equivalence. During testing, some of these subjects were then given testing trials, 50% of the time, that could not be answered consistently with the derived relations that had emerged (i.e., all answers were "incorrect"). Other subjects had normal testing. These inconsistent testing items greatly reduced symmetry and equivalence on the normal test trials. More importantly, when all subjects were then trained and tested normally with a new set of stimuli, those with a history of odd test items in earlier training

showed much less equivalence class formation in the new class. Leonhard and Hayes argued that one of the proximate consequences for deriving equivalence is making sense of test items, and that inserting items that cannot be answered via equivalence punishes not just the specific class, but also subsequent classes. This "sense-making" seems to be a key form of reinforcement of relational responding, which may explain why mere exposure to language episodes and their outcomes, not necessarily direct reinforcement of verbalization, is so critical in language development (Hart and Risley, 1995).

More recently, two additional studies demonstrated that providing delayed consequences on equivalence test performances could produce very orderly behavioral effects (Healy, Barnes, and Smeets, 1998; Healy, Barnes-Holmes, and Smeets, 2000). In Experiment 1 of the latter study, for example, subjects were divided into two conditions. All subjects were trained and tested, across multiple stimulus sets, for the formation of two combinatorially entailed relations. Each set was composed of novel stimuli. Both Conditions 1 and 2 involved explicit, performance-contingent feedback presented at the end of each block of test trials (i.e., delayed feedback). In Condition 1, feedback was accurate (consistent with combinatorial entailment) following exposure to the initial stimulus sets. When subjects' responding reached a predefined mastery criterion, the feedback then switched to inaccurate (not consistent with combinatorial entailment) until responding once again reached a predefined criterion. Condition 2 was similar to Condition 1, except that exposure to the initial stimulus sets was followed by inaccurate feedback and once the criterion was reached feedback switched to accurate. The results showed that once relational responding emerged *and* stabilized, response patterns on novel stimulus sets were controlled by the feedback delivered for previous stimulus sets. In a subsequent experiment in the study two types of feedback were delivered, one type following tests for mutual entailment and the other following tests for combinatorial entailment. Results from this experiment demonstrated that mutual and combinatorial entailment may be controlled independently by accurate and inaccurate feedback, a finding that has been extended in more recent work (Gomez, Barnes-Holmes, and Luciano, in press).

Overall, the data support the RFT suggestion that derived relational responding is a form of generalized operant behavior. No contradictory evidence has yet been provided and a few dozen studies have now examined this issue, all with confirmatory results. The biggest difficulty, of course, comes because language is a form of human performance that cannot ethically be experimentally contained. It develops so early and powerfully, that researchers are somewhat limited in their ability to test the processes involved in verbal performance. One important area not yet adequately tested is the ability to accelerate relational learning based on an operant conception. Still, the evidence so far is encouraging.

2.7. DEFINITION OF VERBAL EVENTS

Relational Frame Theory takes the position that derived stimulus relations constitute the core of verbal behavior. *Verbal behavior is the action of framing events relationally.* Both speakers and listeners engage in verbal behavior. When a speaker frames events relationally and produces sequences of stimuli as a result, the speaker is engaging in verbal behavior. In more lay terms, we say that the speaker is speaking with meaning. If the same formal stimuli are produced but not because the speaker has framed events relationally (e.g., when a parrot

repeats what was said), then no verbal behavior is involved. Verbal meaning, in this approach, is not a mental event, nor an inference, nor a simple effect. It is a highly specified behavioral process (see the earlier section on the nature of relational frames for that specification).

Similarly, verbal stimuli are stimuli that have their effects because they participate in relational frames. Thus, verbal stimuli are not stimulus products, but stimulus functions. The history that gave rise to these functions is not someone else's history, but the history of the organism of interest. In lay terms, when listeners respond because they have framed events relationally, then they are listening with understanding. Understanding, in this approach, is not a mental event, nor an inference, nor a simple effect. It is also a highly specified behavioral process.

"Verbal" can be used as a technical qualifier for other common behavioral functions, but when this is done it is crucial not to confuse the traditional term with the new one. In RFT terms, a "verbal reinforcer" is a consequence that functions as a reinforcer because it participates in a relational frame. As such, it is a special kind of conditioned reinforcer. The same event formally defined, even if it is produced through verbal behavior and serves as a reinforcer, can be verbal or not depending on the relevant history of the responding organism. For example, suppose a person says "good dog" to a pet. The person may say "good dog" as an instance of framing events relationally (e.g., the good behavior of the dog is in a frame of coordination with "good"), and this event may function as a conditioned reinforcer for the dog. Its behavioral effects on the dog, however, are not due to the participation of "good dog" in a relational frame with other events. Thus, "good dog" is neither a verbal reinforcer nor a verbal stimulus of any other kind for the dog.

Some events so defined may share little with their nonverbal counterparts at the level of process. A verbal discriminative stimulus is a stimulus that has discriminative-like functions due its participation in relational frames (some rules are good examples). The source of control for a verbal discriminative stimulus is not a direct history of a greater probability of reinforcement in the presence of the event for a given behavior than in the absence of that event, as it would be with a nonverbal discriminative stimulus. Similarly, it is not due to stimulus generalization from discriminative stimuli. Rather, this function involves the transformation of antecedent functions through relational frames.

Some psychologists who have been exposed to the RFT approach fail to see why verbal events should be so defined. Nothing in RFT would demand the connection – one could just as well speak of "relational reinforcers" or "relational discriminative stimuli." RFT is a bottom up analysis and it stands on its own, whether or not the term "verbal" is used. The justification for defining verbal events in this way is, a) relational frames have a profound impact on the interpretation of human behavior, and b) they seem to be central to every issue involving language and cognition. By using the term "verbal" in this context, a technical analysis is offered of this domain. The concept of derived stimulus relations emerged from behavior analysis, not common sense, and yet it seems to maintain contact with the basic lay phenomenon. Under these conditions, the use of the term makes the analysis of immediate social relevance, which vitalizes the work and makes it more accessible to others. There is a downside to the connection, of course, in that misunderstandings are probably more likely, but the cost is outweighed by the benefits. We presume that this is much the same reason that Skinner used the term "verbal behavior" in his account.

2.7.1. Language and Cognition

We should be clear at this point that it is not our intention to provide technical definitions of the terms "language" and "cognition." These have been used in this book to orient the authors and readers towards a particular domain within the study of psychology. The common sense definitions of these terms serve us well enough for these purposes at this point: Languages are systems of symbol use maintained by groups; cognition is "knowing by the mind." As we shall see, the technical definition of verbal events in RFT (i.e., framing events relationally) provides us with a route into the analysis of the domain pointed to by these terms, including many of the phenomena that are typically considered to be relevant to the psychology of language and cognition, such as thinking, problem-solving, rule-understanding and following, perspective-taking, and so forth. In effect, relational frame theory allows us to study the psychology of language and cognition without taking on the burden of first providing technical definitions of these terms, and without becoming embroiled in the debate concerning the relationship between them or their relation to supposed subcomponents (e.g., whether thought depends on language or language depends on thought; whether or not animal cognition is really cognition; whether or not sensation, emotion, or perception are examples of cognition). This RFT approach to the psychology of language and cognition is clearly unusual, but as we shall attempt to show in subsequent chapters it shows considerable promise. We will return to the definitional issue in Chapter 8.

2.8. VERBAL EVENTS INVOLVE A NEW BEHAVIORAL PRINCIPLE

Behavioral principles are admitted into the behavior analytic armamentarium only very slowly. We believe, however, that relational frames involve a new type of generalized operant. We say new, because the instrumental behavior of relational framing alters the functions of behavioral processes. We know of no term for such an effect. Consider, for example, the functional reversibility of stimuli in mutual entailment. During derived performances in an equivalence test, a conditional stimulus and a discriminative stimulus, as established in matching-to-sample training, reverse their functions. The former sample is now the discriminative stimulus and the former comparison is now the conditional stimulus. If Relational Frame Theory is correct, the alteration of these behavioral processes was itself a learned process. Said another way, relational framing is operant behavior that affects the process of operant learning itself.

Behavior analysts distinguish between stimulus functions on the basis of history and current context. For example, conditioned and unconditioned reinforcers are distinguished on the basis of the particular histories that give rise to each. The acquisition of stimulus functions based on a learned process is not the same as the acquisition of those functions in which the process itself need not be learned. A rat, for example, does not need to learn how to acquire conditioned reinforcers – its biological history ensures that they are established when unconditioned reinforcers are paired with neutral stimuli. If relational framing is a learned process of altering behavioral processes, we need a name for a previously unseen behavioral effect.

Consider the case of a transformation of stimulus functions. A discriminative stimulus is a stimulus in the presence of which there has been a greater probability of reinforcement for a given behavior than in its absence. Suppose a child is rewarded for waving when the word "dog" is heard. The word "dog" is a discriminative stimulus. Suppose, however, that the child is now taught to say "dog" given the word D-O-G, and to point at actual dogs given D-O-G. Suppose that as a result of this training the child now waves upon seeing a dog. Such an outcome has repeatedly been seen in the literature (e.g., Hayes et al., 1987). The dog cannot be a discriminative stimulus because the child has no history of greater reinforcement for waving in the presence of dogs than in the absence of dogs. The effects cannot be stimulus generalization because there are no formal properties that are shared between the word and actual dogs. The effect cannot be due to classical conditioning because it would require an appeal to backward conditioning. The effect cannot be due to compounding because "dog" and dogs have not even occurred together.

Relational Frame Theory suggests that the performance is due to a learned process that transformed these discriminative functions. In normal discriminative control, the stimulus function is learned, but not the process itself. In contrast, the derived performance is discriminative-like, but it is not discriminative. These discriminative-like effects seem to depend on a learned process of altering behavioral processes, and that is something that is not covered by an existing technical term. Despite the conservatism of an RFT approach, therefore, a new type of behavioral process is suggested and a new technical term is offered. The new process is arbitrarily applicable relational responding (or framing events relationally). Because verbal relations and arbitrarily applicable relational responding are synonymous, the term "verbal" can suffice for this new process, provided the term is used in the technical sense here. The new technical term is relational frame. Thus, in our analysis, verbal events (and relational frames) instantiate a newly identified behavioral process (Hayes and Hayes, 1992).

2.9. CHARACTERISTICS OF VERBAL BEHAVIOR

From the point of view of RFT, verbal behavior has several dominant characteristics that flow from its relational properties.

2.9.1. Indirectness

The transformation of stimulus functions through derived relations allows verbal stimuli to acquire functions related quite indirectly to other events. The greater the complexity of the relational history prevailing for a given individual with respect to a specific verbal stimulus, the more indirect those functions may be (Hayes and Hayes, 1989). In the same way, speakers may derive relations among events in ways that are simultaneously sensitive to hundreds of related events, including events that have never before been brought into relation with the current event. Part of what makes speech insightful, moving, or creative is the degree of indirectness of the relational actions involved.

2.9.2. Arbitrariness

The arbitrariness of verbal events comes from the arbitrary nature of the contextual stimuli involved in the regulation of verbal behavior. Any event can be brought into any relation with any other event, verbally speaking. For that reason, verbal behavior is not defined by its form. It can include gesturing, sound, or graphical stimuli. Meaning need not be based on any similarity between the form of a verbal stimulus and the nonverbal stimulus to which it "refers" (though that occurs in cases such as onomatopoeia, and in particularly early forms of language). The form of verbal behavior is arbitrary and can vary to a much greater extent than behavior of nonarbitrary form. For example, while a doorknob may itself only be turned by particular behaviors, verbal events referring to the opening of the door may range infinitely in form. The forms of verbal utterances are determined by social convention – the correspondence between things and meanings is established by social interaction. It is only by agreement among members of a particular social/verbal community that a word is understood to have meaning in relation to particular events.

The concept of the arbitrariness of "signs" in language is an old one that has been important in linguistics since the beginning of the twentieth century. Saussur's "Course in General Linguistics," which was published in 1915 after his death but was translated into English much later (Saussure, 1959), was particularly influential in that regard. Saussure also emphasized the bidirectionality of the relation between the event signified and the signifier, which together he called a "sign" (Saussure, 1959, p. 67).

2.9.3. Specificity

Nonverbal stimuli necessarily influence a wide variety of responses but verbal stimuli need not have that limitation. A bright light makes it possible to see whatever is present. The word "light," however, can stand in relation to a set of events, the common property of which is illumination. Thus, in a nonverbal sense illumination cannot simply have the abstract property of "illumination" while a verbal stimulus can do so. Skinner said it this way:

> A single property may control a nonverbal response, but it cannot control *only* one such response unless it is the sole and inevitable accompaniment of another set of properties....A verbal response, however, can come under the exclusive control of red because the necessary contingency does not require a practical consequence common to all instances of red (1957, p. 109).

This property of verbal stimuli (in our sense of the term) allows indefinite flexibility in the degree of specificity of functions and events. Verbal events can stand in relation to all events ("the universe") or no events ("non-existent); they can be extremely broad ("everything changes") or extremely narrow ("you have a pin head sized tumor under your fingernail"). This is one reason that verbal events permit degrees of abstraction that could not otherwise occur. We will have a great deal to say about this in subsequent chapters (particularly Chapter 5).

2.9.4. Pervasiveness

The kind of verbal behavior we have described cannot be kept in a nice verbal box. Once established, coherence and sense-making will serve as a continuously available reinforcer for derived relational responding. Verbal behavior will grow in strength until it is hard to find moments and situations in which it does not occur. Indeed, as soon as one begins to wonder if it is gone, it will appear by virtue of that very question.

2.9.5. Intrusion into Nonverbal Domains

For much the same reason, the kind of verbal repertoire that is captured by RFT is one that will always intrude into nonverbal domains. Without intervention, this process is likely to grow as experience imbues nonverbal stimuli with more and more relational and thus verbal functions. Dirt on the walls is "unhealthy;" trash on the ground is "litter" and "a sign of poor moral training of our youth;" a tree in the backyard is "biomass," "diseased," or "ancient." In other words, if the contexts that maintain literal meaning and transformations of stimulus functions are present, the world a human being lives in will become increasingly verbal and truly nonverbal functions will become more and more entangled with verbal functions. This process can lead to behaviors that would be difficult to establish any other way (martyrdom, suicide, turning away from a drug addiction, religious fasting) because the nonverbal functions contacted by these behaviors become less important. We will turn to this topic in later chapters.

2.9.6. Expansion of Social Influence

Verbal behavior is social behavior and continues to be so even in the absence of a social/ verbal community. Only a social community could establish the learning history that would lead to relational frames. Furthermore, verbal behavior has lead to technical innovations that increase the impact of verbal stimuli: books, radio, TV, the Internet, and so on. This has enormously increased the capacity for social influence and has freed it from limitations based on time and location. The reader of this book may be reading it after the authors are long since dead, or in a location far from the locations in which it was written.

2.9.7. The Reconstruction of Time

Nonverbal events occur in nonverbal time. Sequences are nonarbitrary – they are experienced directly. The only future that is known is the past that has been experienced. Verbal organisms turn time on its head. The past is continuously verbally reconstructed as various stories about it are generated and adopted. The future is imagined, planned for, and contemplated, but this verbal future need not ever have been experienced. People live in a world of verbal purpose and verbal intention, constantly framing "the future" in terms of if-then and before-after relational frames. The impact of such verbal temporal relations on how humans interact with their environments is immense.

2.10. CONCLUSION

There are sobering implications of the present analysis for behavioral psychology. 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. While 16-month-old babies readily show robust forms of mutual entailment (Lipkens et al., 1993), even "language trained" chimpanzees show no such thing (Dugdale and Lowe, 2000). Nothing in RFT *requires* that nonhumans fail to show the new behavioral process contained within relational framing. Indeed, it is a tremendous experimental inconvenience that apparently they do not. If future researchers are able to overcome this difficulty, the analysis of relational frames will be made much easier, experimentally speaking. At the present moment, however, it appears that an old strategic assumption of the behavior analytic tradition, namely that animal learning might provide all of the principles needed for the analysis of complex human behavior, can only take us so far.

Verbal behavior emerges from operant contingencies, but the result of verbal behavior is to change how all behavioral principles operate. For this reason, human beings live in two worlds simultaneously. Their continuity with the rest of the animal kingdom means that they constantly live in a world of direct contingencies. Their acquisition of derived relational responding means that they constantly live in a verbally constructed world. That is a difficult thought for behavioral psychologists interested in the analysis of human behavior, and yet, it seems to be the case.

In one sense, RFT does not simplify a behavioral approach to human psychology. It makes it more complex. In another sense, however, it does simplify the picture because it gives us rich empirical and conceptual tools with which to approach that complexity.

3

MULTIPLE STIMULUS RELATIONS AND THE TRANSFORMATION OF STIMULUS FUNCTIONS

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The key concept in Relational Frame Theory is the concept of stimulus relation (Hayes, 1991, 1994; Barnes and Holmes, 1991; Hayes and Hayes, 1989, 1992; Hayes and Wilson, 1996). Understanding the implications of an RFT approach requires clarity about this concept and its flexibility. In this chapter we will attempt to characterize multiple stimulus relations and to distinguish this approach from a traditional class based approach. We will point to ways in which increasingly elaborate relational networks are acquired, modified, and brought under various forms of contextual control. Finally we will describe in some detail the kinds of data that are generated in RFT research, and show how methodological advances are beginning to permit more complex questions to be asked and answered.

3.1. THE IMPORTANCE OF THE CONCEPT OF STIMULUS RELATION

A stimulus class controls a common set of responses based on physical or functional similarity among the stimuli contained within the class (Donahoe and Palmer, 1994). The

formation of a stimulus class can be both a product and a process. Stimulus generalization is considered to be a basic behavioral process that describes how stimulus classes can be formed based on physical similarity (that is, closeness along a physical quantitative dimension of relevance to the evolutionary history of the organism). However, the classes of stimuli that emerge via the process of stimulus generalization are defined as the product of that process.

A lack of clarity about when class concepts were being used as products or processes has caused problems for the analysis of derived stimulus relations. Three undesirable effects have occurred. First, the much more flexible concept of stimulus relation has often been overwhelmed by class concepts. Second, the concept of stimulus class has narrowed the methods and focus of research to a small subset of relational responses. Finally, the concept has stood in the way of a clear understanding of derived stimulus relations at the level of process.

Consider, for example, the definition of an equivalence class. Successfully training and testing for equivalence will, by definition, generate stimulus classes as products. That is, the mutual substitutability of "equivalent" stimuli (reflexivity, symmetry, transitivity) is widely considered to be the defining feature of a specific class concept. If, however, class formation is also considered to be a basic behavioral process, it appears that equivalence requires no additional explanation. In fact, Sidman (1994) has explicitly adopted this position.

We would argue that the emphasis on the concept of class is to some extent driven by the procedures that have normally been used to study derived relational responding. The ubiquitous matching-to-sample procedure certainly encourages class-based analyses. The response normally involves picking or pointing to a stimulus in the presence of another stimulus. If this type of responding is always seen as evidence that the two stimuli have entered into a class, it becomes impossible to observe consistent response patterns in a matching-to-sample procedure without also concluding that stimulus classes have formed. This methodological characteristic also encourages us to view the most unusual or complex matching-to-sample performances in terms of stimulus classes. In order to do so, however, it becomes necessary to suppose that there are multiple classes under various forms of contextual control. In this chapter we will show that this solution is far from parsimonious, especially as the types of stimulus relations increase in number and complexity.

3.1.1. The Challenge of Multiple Stimulus Relations and the Transformation of Functions

Quite a number of studies have now shown that it is possible to produce contextually controlled, arbitrarily applicable matching-to-sample responding in accordance with multiple stimulus relations such as Same, Different, Opposite, or More-Than/Less-Than (e.g., Barnes and Keenan, 1993; Dymond and Barnes, 1995, 1996; Roche and Barnes, 1996, 1997; Roche, Barnes-Holmes, Smeets, Barnes-Holmes, and McGeady, 2000; Steele and Hayes, 1991; see also Chapter 10). The procedure typically involves two steps. First, subjects learn to select comparison stimuli that are physically related to a sample in a given way in the presence of certain cues. For example, subjects may learn to pick a short line given a long line as a sample in the presence of an OPPOSITE cue (naturally, in actual experiments these cues are arbitrary stimuli, not relational words). When the subject can select the correct answer in a wide variety of stimulus problems, matching-to-sample training and testing with arbitrary stimuli is then conducted in the presence of the pretrained contextual cues.

Highly complex patterns of responding have resulted from this basic procedure. In one study, for example, Steele and Hayes trained subjects to pick the arbitrary stimulus B3 from an array given another arbitrary stimulus A1 in the presence of an OPPOSITE cue, and to pick the arbitrary stimulus C3 from another array given A1 and OPPOSITE (again by convention A1, B2 and so on refer to arbitrary visual forms, usually small graphical squiggles or short nonsense syllables). The subjects also learned to pick B1 from an array given A1 in the presence of SAME, and to pick C1 given A1 and SAME. Thus, four relations were trained: A1 OPPOSITE B3 and C3; and Al SAME B1 and Cl. The crucial test came when the subjects were given B3 as the sample, OPPOSITE as the cue, and C1 and C3 as comparisons. B3 and C3 were both related to A1 and both had only been selected in the presence of OPPOSITE. Nevertheless, the subjects did *not* pick C3 given B3 and OPPOSITE, but instead picked C1. When the relational cue was changed to SAME in the same problem, given B3 subjects selected C3 even though no selection of C3 was ever reinforced when the SAME cue was present. Furthermore, when subjects were later trained to pick the arbitrary stimulus D1 given C3 and OPPOSITE, during a test phase they then picked D1 given B3 and OPPOSITE, but responded away from D1 given SAME.

Despite the fact that subjects readily showed these patterns, the previous paragraph can initially seem unmanageably complex because of the arbitrary nature of the description. If instead of a relational cue word, we state the beginning performance in English, the pattern of responding is clearer. When the subjects learned that A1 was the opposite of B3 and C3, and the same as B1 and C1, the subject derived that B3 and C3 were the same, and that each of these were the opposite of B1 and C1. When they later learned that the arbitrary stimulus D1 was opposite to C3, during a test phase they then said that D1 was the opposite, not the same as, B3.

If this sentence is still difficult, we shall restate it exactly using English and Spanish words so that the nature of the subjects' performances will be perfectly clear to most readers. When the subjects learned that *hot* was the opposite of *icy* and *frio*, and the same as *boiling* and *caliente,* the subject derived that *icy* and *frio* were the same and that each of these was the opposite *of boiling* and *caliente.* When they later learned that *scorching* was opposite to *frio*, during a test phase they then said that *scorching* was the opposite and not the same as *icy.*

This transition from matching-to-sample descriptions to everyday language descriptions will help us to make an important point. Most adult readers could read the last sentence in that paragraph without difficulty. Had it been presented first, however, the relational performances required to master the sentence would have been totally obscured by the ease with which those very performances occurred. This is the problem of common sense that was described in the first chapter. The arbitrary relational nature of human language is simply not obvious in the domain of common sense. A sentence like "Furthermore, when subjects were later trained to pick the arbitrary stimulus D1 given C3 and OPPOSITE, during a test phase they then picked D1 given B3 and OPPOSITE, but responded away from Dl given SAME" is obviously relational but not obviously relevant to human language. The functionally identical sentence "When they later learned that scorching was opposite to frio, during a test phase they then said that scorching was the opposite and not the same as icy" is obviously relevant to human language but not obviously relational. Common sense works against behavioral sense in this case.

RFT is an approach to human language that takes the concept of derived stimulus relations to be the central concept of that domain. Amazingly complex human performances

– such as the kind of behavior the reader is engaging in as he or she reads this very book – are made fairly simple at the level of process when relating is allowed to serve that central conceptual role. It is only the result that is complex.

In the next chapter we will deal with the topic of relations among relations: one of the more advanced forms of relational activity. In this chapter we want merely to focus on how relational networks that seem shockingly complex can emerge from a very small set of relations and relata, and to connect this issue to some of the more challenging aspects of the study of language and cognition.

In the network in the Steele and Hayes study, two kinds of relational responses were applied to five stimuli. To see how quickly complex results emerge from simple processes imagine that a given verbal event is related to dozens, perhaps hundreds, of other events. Describing such a network in abstract form (A1, B1 etc.) would seem overwhelming, but in fact normal human adults engage in such activity routinely. Let us take an example. Think of all the "old women" you have known, heard about, seen in the movies, or read about. Now answer the following questions, with as many answers as you can generate in a few seconds. (You may have to put aside your prohibition against prejudicial thoughts to engage in this exercise, but since we are exploring how verbal repertoires work and since even prejudice is part of that repertoire, we hope that will not be a barrier.)

> What are the attributes of old women?
> What are old women most like?
> What is the best thing about old women?
> What are old women composed of?
> What is faster than old women?
> What are old women better than?
> What are old women the opposite of?
> What are old women different from?
> What are old women members of?
> What came before old women?
> What can old women do?

In this exercise, contextual cues are provided for frames of coordination, opposition, hierarchical class membership, comparison, time, and so on. As each relation is derived, the stimulus functions of "old women" change slightly. In addition to directly trained effects, the functions of this stimulus depend upon the specific combinations of derived relations between this stimulus and others that are present in a given moment. This combination is fluid, and the functions that result are both derived and transformed.

For example, when the question was asked "What are old women the opposite of?" some may have answered "a baby," "an old man," "a young boy," "angels," "shallowness," "beauty," "nemow dlo," "me," or any of hundreds of other answers. In each instance, the stimulus qualities of "old women" have changed. Consider the person who answered "beauty." This answer might lead to a visualization of a particularly ugly old woman. If "beauty" is itself related dominantly to "healthy" when the reader answered in this way, the sickly qualities of old women might be accentuated. If "beauty" is related to "superficial" the reader may feel a bit guilty for their bad thought and may be more verbally aware of the depth and wisdom that old women can possess.

In this exercise eleven questions were asked about old women. Each brought to bear a different kind of relational frame. If three or four answers were given to each question, dozens of relata, each with multiple functions, were brought to bear on the central concept. As each relation was derived, the stimulus functions changed, not just of "old women" but also of the other events that had been related previously to the central term. Literally hundreds of derived stimulus relations could have emerged in the last few minutes for some readers. Some of these "thoughts" may have seemed familiar; some were probably new (the reader may have even said privately "I've never thought of that before").

Before we come back to our central point, a second brief exercise making a slightly different point seems warranted. The reader is asked to pick three single digit numbers (you can repeat numbers) and write them down in random order. Now answer the following question, using the first number to pick the word in the first column, the second number to pick the word in the second column, and the third number to pick the word in the third column.

How is a…
(e.g., banana)   (e.g., more than a)   (e.g., candle).

1. banana   1. like   1. prostitute?
2. race car   2. unlike   2. war?
3. kangaroo   3. better than   3. chair?
4. foreman   4. different from   4. candle?
5. priest   5. worse than a   5. house plant?
6. football   6. the father of   6. book?
7. hat   7. the cause of   7. mud hole?
8. computer   8. the partner of   8. baby?
9. TV   9. the opposite of   9. toilet?

Now attempt to answer what promises to be a rather bizarre question. Generate as many answers as possible in a short time. Actually doing this exercise will be helpful in understanding this section of the chapter, so the authors encourage you to stop and try it before moving on.

The primary point of the first exercise is that extremely elaborate relational networks can be generated in a very short time, and that these have perceptible effects on the psychological functions of the related events. The primary point of the second exercise is that the contextual control over relational responding is quite arbitrary.

In the first exercise, the "knowledge domain" is familiar and thus one might suppose that all of the opinions about old women were pre-existing and that the answers simply revealed an elaborate relational network that already existed in whole cloth. That seems unlikely, however. Many of the stimulus relations were indeed familiar but probably some seemed forced, artificial, or novel because the contextual cues that demanded the derivation of a relation may have never been contacted in precisely that way before – or at least not in a similar life context. It may not be immediately obvious what to say when confronted with "what came before old women?" for example. In these cases we must suppose that the act of relating did not reveal a previous pattern, but instead elaborated a new one in the moment.

This possibility became extremely obvious in the second exercise. There are over 700 possible questions in this simple exercise. It is unlikely that more than a few have ever been

asked of the reader before. Yet with some thought, virtually every question can be "answered." The answer may be silly, peculiar, mundane, or profound but it is an answer. Often, in hindsight, the answer will seem to have been explained by the formal properties of the related events. A person answering the question "How is a kangaroo like a chair?" may have said it is because their young sit in their pouches, for example. The physical "truth" of that answer once it is given may make it appear that the relation was not arbitrary at all. Formal properties cannot explain the ability to answer all 729 questions, however, even though physical properties will be appealed to in virtually every answer. These nouns and relations were selected randomly. It is simply not possible that the world is so arranged that every object in the world is in fact (i.e., nonarbitrarily) related to every other object in the world in every possible way.

It seems more likely that something of the following sort occurred. An arbitrary contextual cue ($a\,C_{rel}$) and two relata were presented and the task was assigned: "answer the question." This did two things. It supplied the set of events to be related and the nature of the relation to be derived. It also specified an end state to the relational activity: the ability to make a verbal statement that could be justified by the properties of the related events as seen in terms of the specified relation (the "answer"). As an aside, "justification" does not involve physically contacting the actual properties of the relata (as it might if answering the question "how is a kangaroo like a chair?" involved actually sitting in the nearest kangaroo). Instead, "justification" involves contacting the physical properties that themselves enter into relational frames with the specified event. In other words, justification involves an appeal to the physical properties *as verbally constructed.*

To return to the main point, when the reader was asked to "answer the question," an iterative process of relational activity then occurred. Some of that activity involved contacting previously related verbal attributes of the specified items of interest (what the reader "knows" about the items of interest from life experience, school, books, and so on). As the specified relational frame in the question was applied to these various attributes, the relational networks that resulted were accepted or rejected based on their coherence and an answer was given.

This simple example shows the main features of verbal knowledge and analysis from the point of view of Relational Frame Theory. Mutually entailed relations between words or symbols and their referents provide a naturalistic, functional-analytic entering wedge into verbal behavior. Words and symbols participate in relational networks, and the relational frames that participate in these networks help to establish the meaning or psychological functions of the network for the language user. Consider, for example, the simple sentence, "This is a cup." First, the word "cup" participates in a frame of coordination with the actual cup to which the speaker is referring. Second, the phrase "This is a" may participate in a frame of coordination with other contextual cues that control the frame of coordination itself (e.g., "same as," "goes with," "equivalent to," etc.). Third, the word sequence in the sentence provides grammatical control over relational frames, so that the listener responds appropriately to the statement. For instance, consider the difference between, "This is a cup" and "Is this a cup." The same words are used in each sentence, but the two statements will typically have different effects upon the listener. We are not suggesting all utterances must follow specific grammatical rules for them to function as relational networks. In certain contexts, a speaker simply saying "Cup" may function in exactly the same way as either "This is a cup" or "Is this a cup?" The function of the single word "cup" in this example will be determined by a range of possible contextual cues, such as the conversational context in which the word

is uttered, the facial expression of the speaker, the tone of voice, and so forth. From the RFT perspective, single words, grunts, raised eyebrows, a frown, or virtually any discrete event may function as a relational network, even a very complicated one, if the historical and current context supports the relevant verbal functions.

3.1.2. Complete and Coherent Networks

The concept of relational network provides a way to approach the organization of larger language units in everyday terms, such as sentences, paragraphs, chapters, stories, trilogies, and so on. Relational networks can be more or less complete. By "complete" we mean the degree to which the events in the network, and the network itself, serve as a context for relational activity. At the lowest level, *a network is complete if there are C_{rel} terms that set the occasion for relational activity necessary to specify a relation between the events in the network.* This corresponds closely to the common sense notion of a sentence, and thus one could say that the lowest level of a complete relational network in RFT is a sentence (a similar view can be found in Place, 1998).

According to this view, a sentence does not have to make sense to be classified as a sentence, but it does have to form a complete network in the sense just described. The distinction between complete sentences, meaningful sentences, nonsense sentences, and non-sentences flows easily from this view. Consider, for example, the statement, "This cup is a. .." In ordinary language this would be defined as an incomplete sentence. The approach above would also define this as an incomplete network because the C_{rel} IS A evokes a relational response, a frame of coordination, to be applied to the cup and… something. The "something" is unspecified so the relational response cannot be completed.

Sentences that include proper cues for the transformation of stimulus functions (a C_{func}) are meaningful in the pragmatic sense of that term. Meaningful networks are generally complete, but they need not be in a formal sense. For example, a clinician may say to a client "So, you are saying, 'My life is not going well because I . . .'" and then fall silent. This rhetorical device is meaningful, but it is deliberately incomplete so as to evoke completion of the network by the client. Indeed, incomplete sentences of this kind are commonly used as a form of clinical and educational assessment. Sometimes, sentences are deliberately confusing or paradoxical for the same reason.

Linguists have challenged behavioral theories of language on the grounds that they cannot account for nonsense sentences, which virtually by definition have never occurred. In fact, this is not difficult for traditional behavioral theories, but it is particularly easy for an RFT account. Consider the famous nonsense sentence "Colorless green ideas sleep furiously." This sentence forms a complete relational network. The syntactical structure and the terms themselves serve appropriate C_{rel} functions. It is clear that there is a hierarchical relation between "colorless green" and "ideas," and between "furiously" and the function word "sleep." The relational network is nonsense because it is composed of relations that are almost never found in the relational networks that operate in the natural language community, and thus few functions are transformed through the network. For instance, "colorless" and "green" would normally participate in frames of opposition or difference. A "colorless liquid," for example, is clear, not green. In the foregoing nonsense sentence "colorless" is seemingly an attribute of the color "green." As a result, there is no transformation of stimulus functions. It seems impossible to see colorless green, since seeing it would involve either seeing green

(which is not colorless) or colorlessness (which is not green). Sentences without a C_{func} are purely arbitrary or meaningless, but if they provide both a proper relational context (a C_{rel}) and fulfillment of that relational response, they are complete. Thus "Colorless green ideas sleep furiously" specifies a complete but meaningless (albeit rather unusual) relational network.

Compare that with the non-sentence "Jockstrap purple monkey dishwasher." While verbal events are presented, neither the sentence itself nor the larger verbal context of this chapter provides a C_{rel} that would specify the relations to be derived among the words (e.g., what is the relation between the monkey and the dishwasher?). This is a non-sentence because it is not a complete relational network. By adding contextual cues to specify relations among the words, however, the non-sentence may become a meaningful sentence. For example, "Jockstrap IS A purple monkey IN THE dishwasher" is a coherent network because the relations among the terms are specified, and thus relations among all of the elements can be derived. Similarly, the words can become a coherent network by placing another sentence preceding the words that describes how they are related such as "Name three objects" or "List your three favorite possessions."

This same style of thinking allows us to consider the completeness of larger and larger units of language. A network can be complete in a local sense, but not in a larger sense because previous verbal material or the general verbal context specify that a larger relational network is being formed which requires certain features to be complete. Suppose a parent says the following to a small child: "Let me tell you a story. Once upon a time there was a king who went on a quest to find a magical ring." If the parent then sits down and says nothing more, a child with even preschool verbal abilities will quickly demand, "tell me the rest of the story!" In this case, the child's history with the larger relational networks called "stories" combine with cues, such as the parent's first sentence or the first phrase of the second sentence, to establish a C_{rel} function. "There was a king who went on a quest to find a magical ring" is a complete sentence because there is a fulfilled C_{rel} in the sentence and no C_{rels} that are unfulfilled at that level, but it is not a complete story because that larger relational network would specify how the quest turned out. Sometimes parents who are weary of telling stories have a bit of fun at their children's expense by taking advantage of what it literally takes to remove such a C_{rel}. For example, the parent may say with a great flourish and much fluffing of the pillows "Let me tell you a story. Once upon a time there was a king who went on a quest to find a magical ring. But he fell off his horse and died. The end. Now go to sleep." Any child worth his salt will immediately scream "That's no good!" but the humor comes because it *is* technically complete at the level of a story – it is just a terribly bad story that is not worth the telling and certainly not worth the sleeping.

A wide variety of cues define what is a complete relational network in an extended sense – a book cover, an assigned time for a lecture, the words "Episode 1," pauses in a dyadic interaction, the words "A sonnet," the words "a mathematical proof," and so on, are all examples of such cues. How big or how small the unit, or the specific relational features that are required to complete that unit, are determined by the specific contextual cues and one's history with them. Post-modernists and deconstructionists enjoy orienting listeners to how their own history provides such relational contexts: often that orientation is a main point of their creative work. For example, giving a "poetry" recital that is entirely silent, or beginning a novel with the middle of a story and then proceeding to the end and then the beginning, deliberately takes advantage of pre-existing implicit contextual cues that specify when a larger relational network is complete and meaningful. Attacking such cues can itself provide

a complete and meaningful network – much to the frustration of deconstructionists who may discover another kind of conventionality in their own iconoclasm.

In summary, in our approach, the concept of stimulus relation begins to dominate over the concept of stimulus class. In a superficial way, this begins to look rather more like the network theories of meaning found in cognitive psychology (e.g., Barsalou, 1999; Deacon, 1997) than traditional behavior analysis. In behavioral laboratories, however, networks of derived relations are neither hypothetical nor inferred, and they are neither structures nor mental events. They are contextually situated actions.

3.1.3. Why Do We Need the Concept of Stimulus Relation?

There is a way to sustain a class-based analysis of the data on multiple stimulus relations. Sidman (1994) attempted to do just this when he wrote: "… the fact that a stimulus pair can be brought via contextual control into such differing relations as same, opposite, different, and so forth, can be handled by any formulation of equivalence that recognizes the role of context" (1994, p. 561). This sentence appears to be Sidman's only treatment of multiple stimulus relations but it seems worth considering how one might develop such a class-based approach.

Two things need to be done to accommodate the concept of stimulus class with the data on multiple stimulus relations. First, the term "class" must be used simply to indicate the consistent choice of one stimulus in the presence of another stimulus. This is necessary because the classes that result from studies of multiple stimulus relations often do not have the defining features of normal equivalence classes (e.g., transitivity). If we use the term "class" in this way, any consistent matching-to-sample responding is indicative of a "class" by definition–the overall patterns of relational responding are therefore simply classes under contextual control. Thus, if a subject in the Steele and Hayes study chooses C3 in the presence of B1 and OPPOSITE, the subject is not relating the two as opposite. If relations give rise to classes, the primacy of classes in the analysis of stimulus relations would be overthrown. Instead, the subject is placing C3 and B1 in a class under the contextual control of the OPPOSITE cue. Using our natural language reconstruction of the Steele and Hayes data, it is not that a subject relates boiling and frio as opposite, but rather boiling and frio are placed into a class under the contextual control of the OPPOSITE cue.

Second, the patterns of contextual control do not have to be explained in detail. Consider again the results from Steele and Hayes. In their study they found that stimulus pairs trained in the presence of OPPOSITE that were an odd number of nodes away were chosen (were "in a class") given SAME, but stimulus pairs trained in the presence of OPPOSITE that were an even number of nodes away were chosen (were "in a class") given OPPOSITE. Stated in terms of our natural language translation, subjects who learned the opposite relations hot-icy; hot-frio; and frio-scorching knew that icy and frio (which were both selected only given OPPOSITE) did *not* go into a class under the cue OPPOSITE, while scorching and icy (which were also both selected only given OPPOSITE) *did* go into a class under OPPOSITE.

We need to explain how the OPPOSITE cue acquired this odd class-organizing function based simply on pretraining subjects to pick physically opposite stimuli in the presence of the cue. If contextual control over an innate process of equivalence class formation is learned (Sidman, 1994; see Barnes, 1994, p. 94) we would have to appeal to a behavioral history with such contextual cues. But how would this be taught? First, it would likely be taught through the same type of behavioral history that RFT argues is required to establish responding in

accordance with multiple stimulus relations. Second, this behavioral history would have to establish cues with distinct functions in different parts of a stimulus network (e.g., the OPPOSITE cue interacts with the number of nodes between events). These functions are themselves difficult to accommodate in terms of stimulus classes, because the overall pattern of contextual control would still have to be explained.

Perhaps the most serious problem for the concept of stimulus class in accounting for multiple stimulus relations emerges when examining the data on the transformation of stimulus functions through multiple stimulus relations. A study by Dymond and Barnes (1995) provides a relevant example of the kind of multiple relation study that is at the heart of RFT research, and thus we will spend some time on it simply to prepare the reader for similar research that will be described later on. Even simple stimulus networks can be difficult to understand and thus we suggest that the reader examine the figure as we move through this study.

Dymond and Barnes employed procedures like those used by Steele and Hayes to pretrain the three contextual cues of SAME, MORE-THAN, and LESS-THAN using nonarbitrary stimulus sets (for example, subjects were trained to select a six star comparison in the presence of a three star sample given the MORE-THAN cue). After this pretraining, the subjects were trained in six arbitrarily applicable relations using the three contextual cues. The four most important relations were: SAME/B1-A1 (i.e., B1 is the same as A1); SAME/C1-A1; LESS-THAN/B2-A1; MORE-THAN/C2-A1. In English, the resulting relational network can be described this way: B1 is the same as A1 and C1; B2 is less than A1 while C2 is more than A1. The subjects were then tested for seven derived relations, the following three relations being the most critical; SAME/B1-C1 (this is just a test of an equivalence class between A1, B1, and C1); MORE-THAN/C2-B1 (since C2 is more than A1, which is the same as B1, C2 is more than B1), and LESS-THAN/B2-B1 (since B2 is less than A1, which is the same as B1, B2 is less than B1). These various relations are shown in Figure 1.

Three schedules of reinforcement were then used to establish three different response patterns – no response, one response only, and two responses only – and each subject was trained to choose different stimuli conditional upon which of the three patterns had just been produced on a given trial. Dymond and Barnes predicted that if picking stimulus B1 after making one response was reinforced, a subject, without further training, would then choose the following:

1. C1 following 'one response.' This would happen because C1 and A1, and B1 and A1 were in frames of coordination and thus C1 would acquire the same function as B1 by virtue of a transfer of function through the frame of coordination.
2. B2 following 'no response.' This would happen because B2 was less than A1 and A1 and B1 were equivalent. Thus, B2 would acquire a response function that is less than the B1 function.
3. C2 following 'two responses.' This would happen because C2 was more than A1 and A1 and B1 were equivalent. Thus, C2 would acquire a response function that is more than the B1 function (i.e., see Figure 1, upper section).

All four subjects performed as predicted. This is a clear instance of the *transformation* of what we can think of as self-discrimination functions (see Dymond and Barnes, 1996; Roche and Barnes, 1996, 1997; Roche, Barnes-Holmes, Smeets, Barnes-Holmes, and McGeady, 2000, for related empirical research). We must use the term transformation, rather than transfer, to describe the Dymond and Barnes data, because the pattern of responding
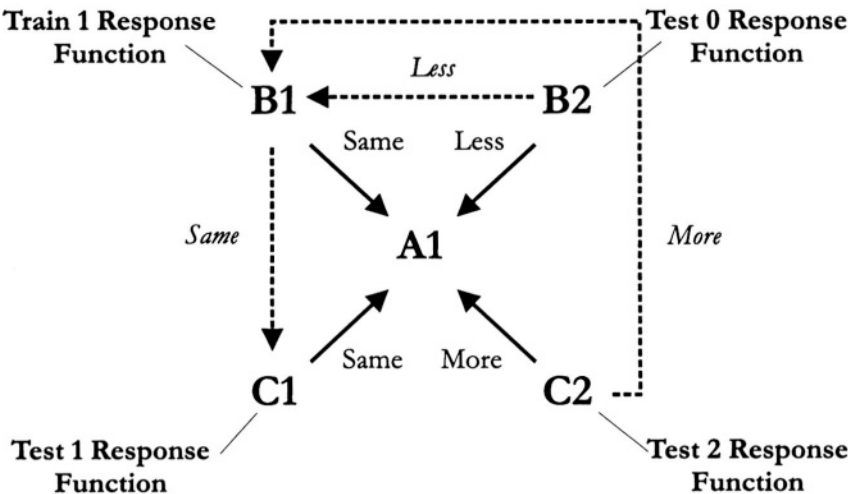
Figure 1. Schematic representations of the most important of the trained (solid lines) and tested (dashed lines) relations in the Dymond and Barnes (1995) study. The italic words "Same," "More," and "Less" indicate the derived relations of sameness, more-than, and less-than; nonitalic relational words indicate trained relations. A one-response function was trained using the B1 stimulus, and tests examined the transformation of the trained self-discrimination response function in accordance with the derived relations of sameness (C1, one response), more-than (C2, two responses) and less-than (B2, no response).

observed during the self-discrimination test does not involve the simple transferring of functions from one stimulus to another. The experimenters explicitly trained the one-response function with B1, and it did indeed transfer to C1, which was in an equivalence relation with B1. This function did *not* transfer to B2 and C2, however. From an RFT point of view these functions should not transfer since neither B2 nor C2 were in a frame of coordination with B1. Rather, the 'one response' function of B1 was *transformed* in accordance with more-than and less-than relations among the stimuli. B2 acquired a zero-response function since it was in a less-than frame with B1, which had a one-response function. C2 acquired a two-response function because it was in a more-than frame with B1 and its one response function.

Predicting or even describing the test performances reported by Dymond and Barnes (1995) in terms of equivalence, or other stimulus classes, is highly problematic. Distinct functions emerged for C1, B2, and C2, and these functions were in accordance with the derived relations among these stimuli and B1. The RFT interpretation of these data is clear-cut, but a stimulus class-based account would apparently require that three separate classes be invoked, one for each function. However, simply invoking three different classes does not allow one to predict the specific transformation of functions shown in the study. Even if B1,

B2, and C2 were members of three different classes, establishing a one-response function for B1 leaves the untrained functions of B2 and C2 unspecified.

One struggles to work out how to deal with these data using only class concepts. Perhaps all the stimuli could participate in an equivalence class if the function transformation was controlled, to some degree, by the nodal distances among the stimuli in the class (see Fields, Adams, and Verhave, 1993). This is the interpretation we offered earlier when we tried to imagine what Sidman might have meant by the idea that multiple stimulus relations can be handled by any formulation of equivalence that recognizes the role of context (e.g., OPPOSITE controls different classes depending on the nodal distance). Nodality will not work in this context, however, because it would not account for the direction of change in the self-discrimination functions. B2 and C2 were both removed by one node (i.e., A1) from the B1 stimulus. Dymond and Barnes considered two other class-based interpretations of their data (separable stimulus compounds and ordinal classes) and they found these also to be inadequate (Dymond and Barnes, 1995, p. 182-183), but these discussions are too arcane to describe here.

It seems much easier simply to embrace the concept of relational responses. There is nothing in behavior analytic theorizing that prohibits such an idea, and quite similar concepts have been used in nonarbitrary situations previously. Thinking of equivalence relations and other types of stimulus relations as relational operants makes quick sense of the data in a very parsimonious fashion. What is a bit overwhelming about the concept of relational operants is the way they can explode into incredibly complex relational networks, with complex forms of the transformation of stimulus functions… but then, that is also what is exciting about them.

3.2. CONTEXTUAL CONTROL OVER RELATIONS AND FUNCTIONS

What manages this complexity is contextual control. We have distinguished between two forms: contextual control over the derivation of stimulus relations and contextual control over the transformation of stimulus functions. In two senses these are co-defining properties: patterns of transformation of help define the nature of a relational response, and derived relations *are* in a sense a transformation of stimulus functions (e.g., simple symmetry involves the functional reversibility of two distinct stimulus functions). Nevertheless, it is useful to treat them separately since any derived relation sets the occasion for new or later functions of an event in a relational network to alter the functions of other events in the network.

In the laboratory it is relatively easy to model the distinction. In the natural language situation, it is more complex. Both verbal and nonverbal events can serve contextual control functions. Entire verbal networks can serve this same role. For example, verbal concepts - coherent networks of derived stimulus relations that allow both the mutual transformation of stimulus functions within that network, and discrimination between that network and others – can regulate the relations and functions of other verbal concepts. Nonarbitrary events in the previously nonverbal world may have their functions modified via participation in relational networks and to that degree become "verbal." These may themselves serve as cues for additional verbal relational activity.

The simultaneous contextual control of derived stimulus relations and the transformation of stimulus functions has been modeled in one study. It seems worth reviewing in order to show how these concepts play out in an experimental context, and to show how unbelievably

complex and yet entirely coherent results can emerge from even a very small set of relations and functions once contextual control is introduced.

Wulfert and Hayes (1988) examined the transfer of a contextually controlled ordering response function through contextually controlled equivalence classes. The strategy of the study was simple. First, two four-member equivalence classes were established in the presence of a particular context (the C_{rel} in this case was the background color of the computer screen). Given a green background, selecting B1, Cl and Dl was reinforced in the presence of sample stimulus A1, whereas selecting B2, C2, and D2 was reinforced in the presence of sample A2. The equivalence relations thus were GREEN/A1-B1-C1-D1 and GREEN/A2-
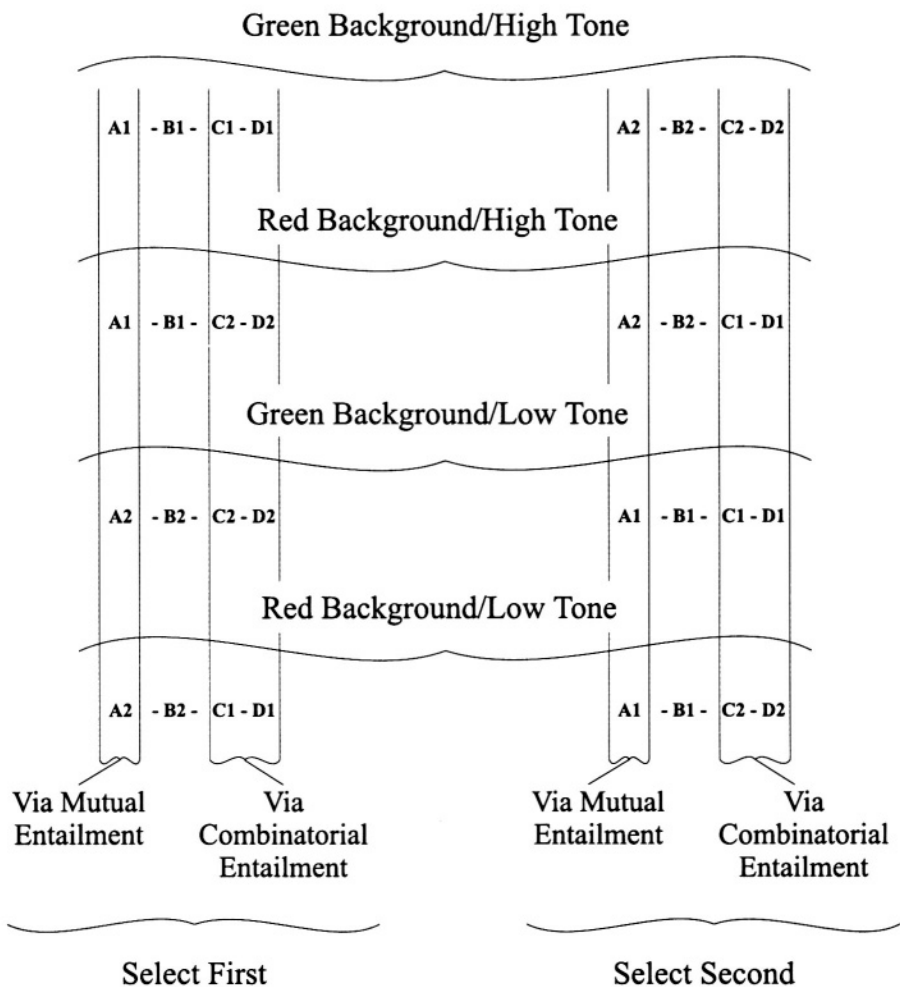
Figure 2. Schematic representation of Phases 1, 2, and 3 from Wulfert and Hayes (1988). The study showed that both the ordering and conditional ordering responses transferred to all members of four conditional equivalence classes. In total, one hundred and twenty untrained sequences (not all of these are reported above) emerged from eight trained sequences for all subjects (see text for details).

B2-C2-D2. Subjects were then trained in a sequential ordering task, using one stimulus from each network. When presented with Bl and B2, pressing Bl first and B2 second was reinforced. Once this sequence was trained, subjects reliably sequenced all other stimuli in both networks without explicit training. That is, subjects consistently selected the stimuli from class 1 (Al, Cl, and D1) before selecting those from class 2 (A2, C2, and D2).

In the second phase of the experiment the equivalence relations were brought under contextual control. When the background color changed from green to red, two of the comparison pairs swapped classes (i.e., Cl and Dl moved to class 2 and C2 and D2 moved to class 1). This led to four distinct relational networks:

GREEN   /A1-B1-C1-D1   GREEN   /A2-B2-C2-D2
RED   /A1-B1-C2-D2   RED   /A2-B2-C1-D1

When the ordering response was now examined in the presence of the two different background colors, the sequences changed. In the presence of green all was as before, but in the presence of red, C2 now came before C1, and D2 came before D1. This makes sense because the subjects had learned to sequence B1 before B2, and in the presence of red, B1 was in a frame of coordination with C2 and D2, not C1 and D1 as before.

The last phase of the study brought the sequencing function under contextual control. The C_{func} was either a high-pitched tone, in which case the original 'B1 first-B2 second' sequence was reinforced, or a low tone, in which case 'B2 first-Bl second' was reinforced. Consider just the two C stimuli. Four different untrained sequences emerged based on the four possible combinations of the screen colors and tone (e.g., given the high-tone and green background, subjects selected C1 before C2 while in the presence of the high-tone and red background, subjects selected C2 before C1 and so on). Figure 2 (on the preceding page) presents a schematic representation of the trained and derived relations in this study. By combining the different relational and functional contexts, one hundred and twenty untrained sequences among all of the stimuli emerged from only eight trained sequences for all subjects.

The generative qualities of these performances are profound. The ratio of derived to trained performances was 15 to 1 in this study, even though a very simple network was established. Because that ratio increases as the network becomes more complex, new verbal relations in normal adults – with their repertoire of tens of thousands of terms controlled by myriad contextual cues – can be incalculably generative.

3.3. CONSTRUCTING A METHOD TO STUDY MULTIPLE STIMULUS RELATIONS: THE RELATIONAL EVALUATION PROCEDURE

Use of the matching-to-sample methodology to study multiple stimulus relations can only take RFT research so far. There are three major reasons for this. First, as we have noted earlier, matching-to-sample results can always be analyzed in class terms due to the nature of the response. Second, key forms of responding other than picking (e.g., productive responses) are difficult to study using the matching-to-sample procedure. Finally, the methods and results are just too slow and cumbersome to model and analyze natural language performances.

The Relational Evaluation Procedure (REP) is an example of the kinds of new method that are needed to avoid these difficulties (Hayes and Barnes, 1997; see also Cullinan, Barnes,

and Smeets, 1998; Cullinan, Barnes-Holmes, and Smeets, 2000). The core method involves allowing subjects to evaluate, or report on, the stimulus relation or relations that are presented on a given trial. In the typical approach, subjects may confirm or deny the applicability of particular stimulus relations to other sets of stimulus relations. In this way, the focus shifts from stimulus partitioning and picking (with its class connotations) to relational specification and evaluation. As we will show in a later chapter, with this shift in emphasis, the door easily swings open to establishing a tight link between the study of derived stimulus relations and the functional analysis of rule-governance. We will describe the REP in some detail, both because we suspect that it will be a major source of new research and because it helps the reader understand the difference between relational and class oriented methods.

Flow Diagram of Trial Sequence
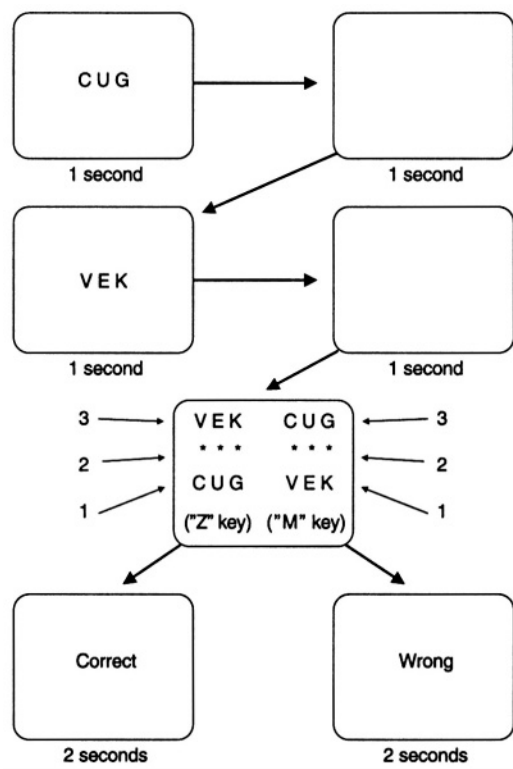
Figure 3. Schematic representation of a training trial used to establish responding in accordance with Before and After relations. Note that the elements on the choice screen were presented in the order indicated (i.e., the bottom elements were presented first, followed 0.2 seconds later by the middle elements, and then finally 0.2 seconds later by the top elements).

3.3.1. Before-After Training

One version of the REP that we have been developing starts with training on Before and After relations. On each trial of this training, two arbitrary stimuli are presented, one after the other, in the middle of a computer screen (e.g., **CUG ⇒ ZID**). The presentation of these two stimuli constitutes a type of nonarbitrary stimulus event (nonarbitrary because the two elements are physically related in time – one before or after the other). Shortly after this stimulus event has been presented, three-element comparison stimuli (which we refer to as "statements") appear on the screen, one in the lower left-hand corner, and the other in the lower right-hand corner. Both statements contain a stimulus just shown (e.g., CUG), an arbitrary relational contextual cue (e.g., XXX or VVV), and the other stimulus just displayed (e.g., ZID) (for ease of communication, alphanumeric labels will be used from now on). Subjects are required to select one of the two statements, and are then given contingent feedback (see Figure 3 on the preceding page). Note that statements are presented from bottom to top so that the procedure does not rely too heavily upon reading skills acquired during the subjects' pre-experimental histories (i.e., no natural language involves reading from the bottom up).

Imagine now that we wish to establish XXX as functionally equivalent to the relational cue "BEFORE." To do so, choosing the statement CUG (A1) XXX ZID (B1) should be reinforced if A1 was physically presented before B1 at the beginning of the trial (see Figure 4). Similarly, if we wish to establish VVV as functionally equivalent to the relational cue "AFTER," choosing the statement A1 VVV B1 should be reinforced if A1 was previously presented after B1. When the BEFORE and AFTER cues have been trained in this way, they can then be tested using new stimuli (see Figure 4). The important point here is that like statements in natural language, the correctness of the "statements" cannot be identified on the basis of the two nonsense syllables, nor the relational contextual cue, but only on the relation among all of these to the nonarbitrary stimulus events presented at the beginning of the trial.

3.3.2. Evaluation of Statements

When the "meanings" or functions of the relational contextual cues have been estab-lished, two statements can now be presented and subjects can be trained to respond by either affirming or denying that the statements "agree" with one another, instead of choosing a statement from two or more "comparison" statements (see Figure 5 on page 68). If, for example, the statement B1 BEFORE A1 is presented above the second statement A1 BEFORE B1, the two statements clearly do not agree. In this case, the subject would receive a point for selecting one of two novel nonsense syllables (the syllable thus becomes functionally equivalent to "No" or "False"). On other trials, A1 BEFORE B1 might be presented with the statement B1 AFTER A1, and a point would be awarded for choosing the "Yes" or "True" stimulus. Once the "Yes" and "No" functions have been trained in this way, they can then be tested using new stimuli (see Figure 5).

When this type of procedure has been established subjects can then be trained and tested on completely novel sets of stimulus relations using the "Yes" and "No" stimuli. Just as with natural language, stimulus relations can be established without the need for explicit, overt responding. For example, simply presenting A1 BEFORE B1 "Yes" to a subject, would likely establish that A1 came first and B1 came second. Furthermore, any relational stimulus can be

trained in this way, provided only that the subject has been exposed to the appropriate pre-training exemplars. In fact, as outlined in Chapter 6, we have used this method to develop a functional-analytic analog of rule-following behaviors. The REP does not require the use of instructions, and thus could readily be adapted for use with nonhuman subjects (a meaningful point because nonhuman research seems needed to address some of the issues raised by the RFT approach to language; see Barnes and Roche, 1996, pp. 501-502).

Our main reason for outlining the REP is to highlight the extent to which the traditional matching-to-sample procedure has emphasized stimulus classes over stimulus relations, and to provide an example of a procedure that focuses on stimulus relations. There is little doubt that it is very difficult to interpret REP performances in terms of stimulus classes alone. Consider the following test performance, for example; C1 AFTER D1 / D1 AFTER C1 – pick "No." When the subject chooses the "No" nonsense syllable, should we see it as participating in an equivalence class with D1 AFTER C1? If so, then its involvement in this class must be

Before / After Training
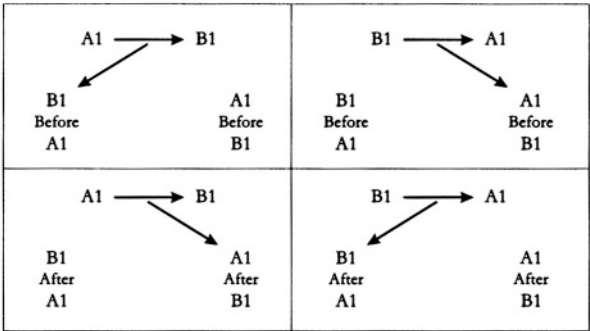
Before / After Test (No Feedback)
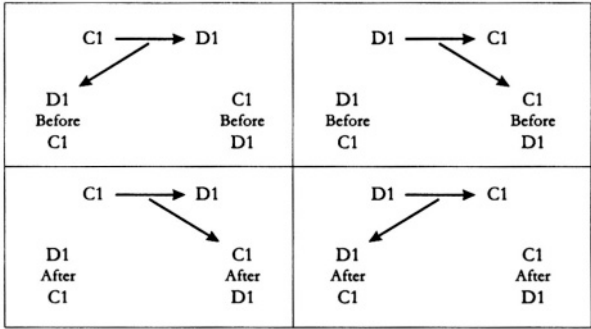
Figure 4. Schematic representation of the tasks used to train and test the contextual functions of BEFORE and AFTER. Arrows point to the "correct" comparisons.

Four Training Tasks

B1	A1
Before	Before
A1	B1
————	————
B1	B1
Before	Before
A1	A1
YES NO	YES NO
+	+

A1	B1
Before	Before
B1	A1
————	————
A1	A1
Before	Before
B1	B1
YES NO	YES NO
+	+
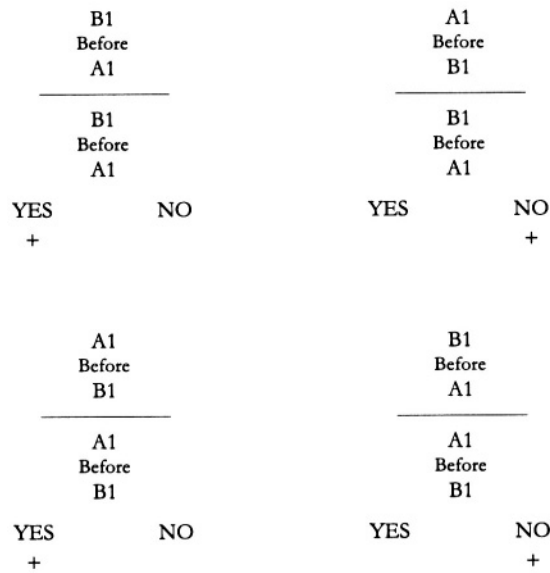
Four Testing Tasks (No Feedback)

D1	C1
Before	Before
C1	D1
————	————
D1	D1
Before	Before
C1	C1
YES NO	YES NO
+	+

C1	D1
Before	Before
D1	C1
————	————
C1	C1
Before	Before
D1	D1
YES NO	YES NO
+	+
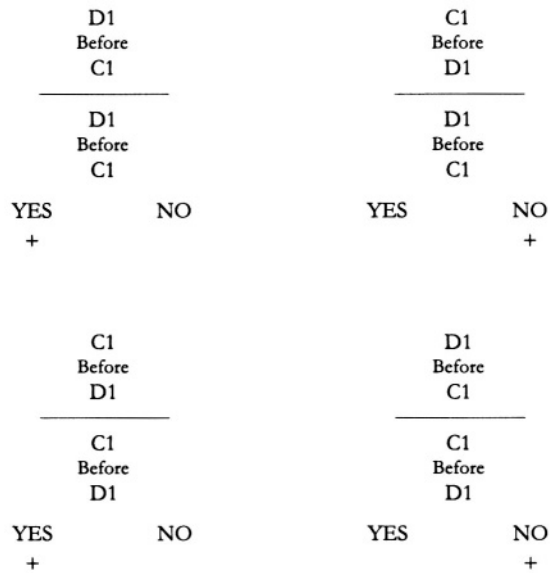
Figure 5. Some of the tasks used to train and test for the evaluation of two separate statements using arbitrary stimuli designed to function as "Yes" and "No." Correct responses are indicated by plus signs.

under complex forms of contextual control, because on other tasks D1 AFTER C1 controls picking "Yes," and on yet other tasks D1 BEFORE C1, and C1 BEFORE D1 also control picking "No."

We are not arguing, of course, that a class-based interpretation could not be constructed for these performances, but we would seriously question the functional utility of approaching the data in such a way, especially as the research moves towards rule-governance, and as more complex tasks are used. In contrast to a class-based interpretation, consider how easily REP data may be described in terms of multiple stimulus relations. From this point of view, the subject is presented, on any particular trial, with a specific piece of a relational network (e.g., one statement) so that it can be compared to the remaining section of the network presented elsewhere (another statement). In effect, when a subject selects "No" when presented with C1 AFTER D1 / C1 BEFORE D1, the response is determined by the arbitrarily applicable relation C1 AFTER D1, the arbitrarily applicable relation BEFORE being applied to C1 and D1, and the relation of difference that obtains between the two (i.e., the arbitrarily applied relation C1 AFTER D1 is different than the arbitrarily specified C1 BEFORE D1). This simple description in terms of a relational network may be applied with relative ease to any of the REP tasks outlined previously, or to their more complicated forms (see Chapter 6). It is very difficult to interpret REP performances in basic partitioning or class terms, because what separates correct from incorrect responses is the applicability of stimulus relations, not mere stimulus partitions.

3.3.3. Grammar and Coherence

Our work with the REP has oriented us to several important features of relational responding that are not as evident in the normal matching-to-sample procedure. It has become clear to us how important contextual cues are in controlling or specifying the direction of nonsymmetrical relations. During the BEFORE-AFTER training, for example, the procedure established a consistent direction for the trained and tested relations. This was done in the early stages by presenting all of the statements from the bottom up, so that subjects would always read in the same direction. If we had not done this, presenting A and B with a BEFORE cue would fail to specify whether the relation was A before B or B before A.

Depending on the subject's performance, this could make it impossible for us to predict the subject's response patterns during subsequent test phases, but worse it could lead to entirely predictable performances that are nevertheless ambiguous. For example, consider the network A > B > C. Given that network, what is the proper answer to the question A < C? The clear answer is "False." It is grammar (and in this case the nonarbitrary characteristics of the relational cues ">" and "<") that specifies the direction of the relation. To see this clearly, let us work through this same example from the bottom up. Suppose you are told that # has to do with relative size and ~ is the opposite of #. Consider the network A # B # C. Given that network, what is the proper answer to the question A ~ C? As long as the two statements (A # B # C and A ~ C) are read in the same way grammatically, the subject will know that the answer is false, but the experimenter will not know the direction of the relation assumed by the subject (which one is bigger). Without grammar, the relations themselves are ambiguous (they have to do with relative size, they are opposite, but they are not directional). Suppose you are now told # means what precedes that sign is larger than what follows that sign. Now the sentence is seemingly disambiguated, and it collapses back into our original example. "A

B # C" means that A is larger than B and that B is larger than C. Since ~ is opposite to #, "A ~ C?" asks if A is smaller than C, which it is not. The correct answer is seemingly again false. This depends, however, on the meaning of the words "precedes" and "follows." In the network A # B, A precedes B for an English reader, but follows B for a Chinese reader. Grammar and syntax thus disambiguate nonsymmetrical relations.

This problem is more obvious in the REP because subjects can be rewarded for knowing that a relational response is incorrect, not merely rewarded for a correct selection response as in matching-to-sample. "True" and "False" are not the same as reinforcement and punishment, since it is possible to receive a reinforcer for knowing that a statement is false. "True" and "False" mean that the network is coherent or not. Without grammar, and thus directionality, you cannot establish the functions of the "True" and "False" stimuli because you cannot know whether the networks are coherent *in the proper way.* For example, a subject presented with A followed by B, and the statement A XXX B, may choose the "True" stimulus, assuming that; (i) XXX means BEFORE, and "True" means "True," or (ii) that XXX means AFTER and the "True" stimulus means "False." In other words, consistent reinforcement can be obtained merely by adjusting the "meaning" of both the relational cues and the "True" and "False" stimuli.

One of the primary functions of grammar in natural language seems to be to provide the relevant contextual cues for specifying or controlling the direction of nonsymmetrical relations. Words such as *If* and *Then,* for instance, control the direction in which we derive relations between words in a sentence and thereby transform the appropriate functions. The sentence, "If it rains, then take the car," for example, specifies a nonsymmetrical relation between rain and driving. Taking the car will not cause the rain, but raining should cause taking the car.

What allows verbal communities to establish directionality through grammar, and thus to train the meaning of "True" and "False," appears to be sequence. In the REP, the simple act of presenting one stimulus before another will establish a relation from the first to the second. When combined with nonarbitrary pretraining, relational cues are no longer ambiguous, and thus "True" and "False" can be trained. Something very like this may happen in natural language communities.

Coherence or sense-making appears to function as a powerful reinforcer for relational activity. In the early stages of developing the REP the procedure failed to specify a direction for the before and after relations, and the subjects who were exposed to this procedure frequently complained that they "couldn't work out what to do" or that "the whole thing doesn't make any sense." In fact, most of the subjects during this pilot work withdrew from the study before the experiment was over. When we modified the procedure so that the direction of the nonsymmetrical relations was specified, none of the subjects ever complained in this way, or withdrew from the study prematurely. In fact, many of the subjects remarked that the study was "quite logical," or "made sense." These sorts of reactions by our subjects appear to support the suggestion by Leonhard and Hayes (1991), mentioned in the previous chapter, that one of the proximate consequences for deriving relations is the identification of coherence in the relational network itself. In other words, given a protracted history of language training it appears that identifying coherence in a relational network may function as a relatively powerful reinforcer. We shall return to this issue in the chapters on thinking and problem-solving (Chapter 5), and psychopathology (Chapter 12).

The key concept in RFT is that of an arbitrarily applicable stimulus relation, through which stimulus functions are transformed. This is an extremely powerful concept, both in the abstract and in the concrete world of experimental research. Extraordinary complexity can be rapidly built up from these elements, once contextual control over multiple relations and multiple functions is added to the mix. Relational frames are classes of relational behavior and they will often give rise to stimulus classes but the latter is the product, not the process. This is becoming increasingly apparent as new experimental methods are being developed that allow highly flexible procedures to be precisely focused on the key phenomena from the point of view of RFT.

4

RELATIONS AMONG RELATIONS: ANALOGIES, METAPHORS, AND STORIES

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Multiple stimulus relations, controlled by contextual features that specify the relevant relations and functions, provide a rich process through which to generate complex human performances. In a given instance, the end performance can be far more complex than the training itself because relational frames involve derived relations. Even without multiple forms of contextual control, two trained stimulus relations can give rise to four derived relations, three trained relations can give rise to nine derived relations, four trained relations can give rise to sixteen derived relations, and so on. If multiple stimulus relations and multiple stimulus functions controlled by contextual cues are added, the number of possible derived performances becomes huge with even a small number of trained relations and functions. If human language is, as we suppose, based on such a process, normal verbal adults can emit virtually an unlimited number of derived relational responses.

Even this level of complexity, however, is not practically adequate to the kinds of precise, complex, subtle, or abstract performances seen in many instances of verbal meaning, or human problem-solving and reasoning. This is so for two reasons. First, based on the processes discussed so far, relational networks must be built one component at a time. Each element in a relational network must be included individually. This seems too arduous and

slow a process to account for some forms of human cognitive and verbal activity. The second problem is related to the first: some forms of human verbal and cognitive activity seem to depend qualitatively on very large or complex relational networks.

For an example, consider the concept of "freedom." A person challenged to explain such a concept to a child would probably not retreat simply to a formal definition, but would immediately move to several verbal examples. "Well, when you put your kitty in his traveling box, he does not feel free" or "It is like when you have a school holiday" or "It is like when you get your allowance and can buy anything you want at the movie theater" and so on. In essence, the child would be asked to detect a theme in these several different examples as they are compared.

Such a performance requires an additional concept not yet discussed: relations among sets of relations. Mutual entailment and combinatorial entailment specify relations between events. A relation itself can be considered an event, however, and thus there is no reason that framing events relationally is not self-reflexive. We find ourselves in agreement with psychologists who have pointed out that "Any relations, once apprehended, may afterwards themselves act as fundaments; they may go on to evoke awareness of relations between each other" (Spearman, 1973, p. 65).

The verbal examples of "freedom" rely on such relations. There are few formal properties that overlap between a kitty in a box, a child on a school holiday, and having money in one's pocket. Kittens and children are not in an equivalence class; a holiday, absence of a plastic container, and money are hardly the same thing. What overlaps, in broad terms, is a set of relations and the formal properties that have been abstracted from that overlap. Detecting the similarity requires that these sets of relations be compared and comparison is, after all, an act of relating.

This property, relating sets of relations, is at the core of analogy, metaphor, allegory, anecdote, parable, and (as we have just discussed) examples. In what follows, we will amplify a technical account of such performances. For sake of clarity we will apply some technically important distinctions to differences between these various lay terms, but it is important to note at the outset that lay terms are not technical psychological terms, and thus there is no reason to expect clear technical distinctions to overlap entirely with them. This chapter is about relations among relations, not analogy and metaphor as technical concepts. Nevertheless, these concepts from lay language will orient us toward the domain of interest.

4.1. ANALOGY

Analogy is one of the most fundamental and important aspects of human cognition. Analogical abilities are commonly used as a metric of intelligent behavior (Sternberg, 1977a) and are frequently used to predict academic success (e.g., in the Graduate Record Examination or the Miller Analogies Test). Analogy is a core component of higher forms of language and cognition, including scientific and mathematical skills (e.g., Polya, 1954) or problem-solving more generally (e.g., Brown, 1989). Probably for this reason, analogical reasoning has received a great deal of attention from cognitive scientists (e.g., Vosniadou and Ortony, 1989).

Analogy comes from the Greek *ana logon*: "according to a ratio" (*New Encyclopedia Britannica, Micropedia,* Vol. I,1987, p. 367). Originally, the Greek mathematicians used the word analogia to denote a similarity in proportional relationships (e.g., Euclid, 1956, p. 112-115). Another form of analogy noted by the Greeks is that of inferring similarity of function (*New Encyclopedia Britannica, Micropedia,* Vol. I, 1987, p. 367). In this sense, analogy designs a direct linking of two terms (the analogates) that are compared with respect to one property attributed in some way to both analogates. In this form of analogy one of the terms must always be the "prime analogate," on which the analogous property is predicated "formally" or intrinsically, while the other receives an attribution in a secondary sense by virtue of some relevant, real relation to the prime analogate (*Encyclopedia of Philosophy,* Vol. I, 1967, p. 95).

These two forms of analogy are known respectively as analogy of proportionality and analogy of attribution (*Encyclopedia of Philosophy,* Vol. I,1967, p. 95; *New Encyclopedia Britannica, Micropedia,* Vol. I, 1987, p. 367). In the *Metaphysics* (Bk. IX, Ch. 6, 1048b) Aristotle stated the formulas of the two kinds of analogy: "As A is in B or to B, C is in D or to D" (1941b, p. 826). Aristotle also formulated the classic proportion schema: A:B::C:D, then (alternando) A:C::B:D, and therefore (componendo) A+C:B+D::A:B (*Ethica Nicomachea,* Bk. V, Ch. 2, 1131b, 1941a; p. 1007).

There is general agreement among cognitive theorists (e.g., Vosniadou and Ortony, 1989) that analogical reasoning involves the transfer of relational information from a domain that already exists in memory (usually referred to as the *source,* the *base domain,* or the *vehicle)* to the domain to be explained (referred to as the *target domain* or the *topic).* In this view, analogy is a mapping of knowledge from the base onto the target, such that a system of relations that holds among the base objects also holds among the target objects (Gentner, 1989). In other words, there is a higher-order relation of equivalence or near-equivalence between two lower-order relations (Steinberg, 1977b).

Eysenck and Keane (1995), for instance, present the following generalized characteristics of what they refer to as analogical mapping: (i) that there is a "matching" between certain elements of the base and target domains; (ii) that elements in the base domain, that are not found in the target domain, are transferred from the former to the latter; (iii) that integrated and coherent pieces of knowledge are more likely to be transferred than isolated pieces of knowledge; and (iv) that priority is often given to the transfer of pragmatically important and goal-relevant knowledge. Eysenck and Keane list also several computational models that incorporate these characteristics, including the 'Structure Mapping Engine' (Falkenhainer, Forbus, and Gentner, 1989), the 'Incremental Analogy Machine' (e.g., Keane, Ledgeway, and Duff, 1994) and the 'Analogical Constraint Mapping Engine' (ACME; Holyoak and Thagard, 1989).

These models share a common weakness, however. The core relational performances are barely described, psychologically speaking. "Matching," "mapping," and "transfer" are left either as lay terms or as terms defined by specific task performances or outcomes. These terms are often well defined computationally, but the equivalence between the underlying computer model and human psychological events is simply assumed. Thus, the models tend to be both psychologically vague and limited to specific computational assumptions.

4.1.1. A Relational Frame Approach to Analogy

An account of analogy in RFT terms was provided by Lipkens (1992). In this account, two relational networks are analogous (i.e., related analogically) if the trained or derived relations in one network are placed in a frame of coordination with the trained or derived relations in the second network.

Given that a person is directly trained to relate A in a particular way to B ($A\,r_x\,B$) and C in the same way to D ($C\,r_x\,D$) in a given context (C_{rel}), then an analogous relation (or similar relation, r_s) is entailed ($\||\|$) between the trained relations. It can be represented this way:

$$C_{rel}\,[A\,r_x\,B;\,C\,r_x\,D\,\||\|\,\{A\,r_x\,B\}\,r_s\,\{C\,r_x\,D\}]$$

That is, the trained relation between A and B is analogous to the trained relation between C and D. For example, after being taught that A is smaller than B and C is smaller than D, an analogous relation can be derived between the relation "A is smaller than B" and the relation "C is smaller than D."

A derived analogous relation between derived relations of mutual entailment can be described as follows:

$$C_{rel}\,[A\,r_x\,B;\,C\,r_x\,D\,\||\|\,\{B\,r_y\,A\}\,r_s\,\{D\,r_y\,C\}]$$

That is, given the same trained relation between A and B, and between C and D, the relation of mutual entailment between B and A is analogous to the relation of mutual entailment between D and C. For example, after being taught that A is smaller than B and C is smaller than D, an analogous relation can be derived between the relation "B is bigger than A" and the relation "D is bigger than C."

Given more than one relation in each system, analogous relations between derived relations of combinatorial entailment can themselves be derived and represented this way:

$$C_{rel}\,[A\,r_x\,B\text{ and }B\,r_y\,C;\,D\,r_x\,E\text{ and }E\,r_y\,F\,\||\|$$
$$\{A\,r_w\,C\}\,r_s\,\{D\,r_w\,F\}\text{ and }\{C\,r_z\,A\}\,r_s\,\{F\,r_z\,D\}]$$

The relations of combinatorial entailment between A and C are analogous to the relations of combinatorial entailment between D and F, and the relation between C and A to the relation between F and D. For example, after being trained that A is the same as B and B is the opposite of C, and D is the same as E and E is the opposite of F, then an analogy can be derived between the relation "C is the opposite of A" and the relation "F is the opposite of D" and vice versa ("A is the opposite of C" and the relation "D is the opposite of F").

It is the characteristic of the transformation of stimulus functions that gives arbitrarily applicable relational responding its psychological significance. We can also extend this notion to include a transfer of a function of a relation to another relation. It can be described this way:

$$C_{func}\,[C_{rel}\,\{(A\,r_x\,B)f^1\,r_s\,C\,r_x\,D\,\||\|\,(C\,r_x\,D)f^1r_s\}]$$

Given that the relation between A and B is similar to the relation between C and D, a function of the relation $(A \, r_x \, B)$ selected by contextual stimuli (C_{func}) transfers to the relation $(C \, r_x \, D)$ based on the derived analogous relation (r_s). As a practical example, suppose an English-speaking child has learned that a nickel is a conditioned reinforcer, and furthermore has learned the arbitrary comparative relation of size, such that when offered a nickel or a dime she will avoid the physically larger nickel to pick the arbitrarily "larger" dime. If when visiting the Netherlands the child is provided contextual cues for the derivation of a relation between a "stuiver" and a "dubbeltje" that is analogous to that between a nickel and a dime (e.g., "stuiver is to dubbeltje as nickel is to dime") then she may now derive that a "stuiver" is half the value of a "dubbeltje" and the latter may have more powerful effects as a "conditioned reinforcer" than the former. Parenthetically, the words "conditioned reinforcer" must be put into quotes in this situation because the effect is entirely verbal and is not based on the same kinds of histories normally expected of conditioned reinforcers.

It should be noted that there is nothing in Relational Frame Theory that would give the analogous relation among relational networks special status as compared to other relations among sets of relations. For example, consider the following:

$$C_{rel} \, [A \, r_x \, B; C \, r_y \, D \, ||| \, \{A \, r_x \, B\} \, r_d \, \{C \, r_y \, D\}]$$

where r_d refers to a frame of distinction. This is not analogy, but it exemplifies the same kind of verbal event. Recognizing a similarity or a difference between relational networks is the same kind of psychological process (relating sets of relations) but there seem to be few practical uses of these other specific types.

A recent study by Barnes, Hegarty, and Smeets (1997) provides an example of a Relational Frame approach to analogical reasoning. 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. In effect, 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 twelve-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 of the study employed the same procedures as were used in Experiment 1, except that subjects were exposed to the test of analogy before being exposed to the standard equivalence test. All subjects, this time including a nine-year-old boy, successfully related equivalence relations to other separate equivalence relations, and nonequivalence relations to other separate nonequivalence relations (see also Stewart, Barnes-Holmes, Roche, and Smeets, in press).

Lipkens (1992) showed similar results using networks that contained relations of Same and Opposite, or of Same, Smaller-Than, and Larger-Than. Subjects could recognize stimuli in one network as related in the same way as stimuli in another, and could produce nonsense syllables (through typing) that related in an analogous way to a given stimulus as did a

specified pair of stimuli. Further, subjects derived specific relations (Same or Opposite; or Same, Smaller-Than, or Larger-Than) when a relational network was related analogously to previously unrelated stimuli.

4.2. METAPHOR

As noted above, analogy is a limited example of relations among relations. The concept of metaphor is somewhat broader or more complex. "Metaphor" comes from the Greek *meta,* which has to do with sharing, common action or pursuit, and *pherein,* meaning to carry or transfer. "Transfer based on sharing" would be a rough literal translation of the word, etymologically speaking. The sharing or transfer of meaning is from a secondary subject, which linguists usually call the vehicle, to a principle or primary subject usually called the topic or target. The ground of the metaphor includes those formal qualities of the topic and vehicle that are shared and that together form the dimensional basis of the figurative interpretation.

As this dictionary-based definition shows, metaphor is based not merely on proportionality, but on common properties. In analogy there need be no formal relations among the stimuli used. In the Barnes et al. and Lipkens experiments just noted, the stimuli were randomly selected nonsense syllables and thus all of the stimulus relations were of an arbitrary nature. Aristotle's example of an analogy "As A is in B or to B, C is in D or to D" shows similar arbitrariness as do mathematical analogies of proportionality. Consider, for example, -2 is to 400 as 103 is to 957. In this case, the first two numbers may be related to the latter two because the two pairs are in separate mathematical categories (i.e., even and odd), and not because of any immediately obvious formal relations among them (e.g., in what way does -2 of something clearly look like 400 of something?).

Metaphorical language requires additional forms of relational control based on the formal properties of some events in the relational network. For example, the clinical metaphor, "Struggling with anxiety is like struggling in quicksand," seems to involve contact with the formal relations that sustain a verbal relation among events, thereby transforming the functions of those events. 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.

The actual relational network (from the foregoing clinical example) is functionally similar to the 'proportion scheme' analogy described earlier: "anxiety" [A] is to "psychological struggle" [B] as "quicksand" [C] is to "physical struggle" [D]. What separates this metaphor from previous examples of simple analogy is that the relational network involves *a formal* relation between two apparently very different events, thereby transforming the functions of those events for the listener. Deriving a relation between anxiety and quicksand could help the listener to discriminate that struggling in either case leads to formally similar effects. Consequently, the functions of "anxiety" may be transformed. For example, a

clinically anxious person might derive certain important cause/effect relations such as "struggling with anxiety will only make my situation worse" or "I am being overwhelmed by anxiety because of my efforts to avoid it." Thus the original problem may come to be 'recast' in view of the new relational network.

The important point is that this type of relational network produces its psychological effects based in part on *formal* or *nonarbitrary* features and relations that participate in an instance of arbitrarily applicable relational responding among networks of stimulus relations. Thus the effectiveness of a metaphor depends, in large part, upon the discrimination of formal stimulus dimensions that provide the ground for the metaphor, such as the emotional/functional similarity between "drowning" in anxiety and drowning in quicksand. Relational responding of this type thus requires:

1. two separate relational networks,
2. that are in a frame of coordination,
3. involving a physical or formal property, dimension, or relation,
4. that modifies the relational network of the target, and
5. transforms the functions of the target.

These components are not stages, and the exact psychological sequence of events may vary from instance to instance. The formal relations under point #3, for example, can serve as the C_{rel} for the frame of coordination, or can itself be discriminated only after the frame of coordination is derived. Some components (e.g., #4) may be missing entirely in some metaphors. These components are typical, however.

Consider the metaphor "cats are dictators." Cats have many verbal and psychological functions that are available in a relational network for normal adults. Under the right conditions most speakers could say that cats are furry, playful, and sleep a great deal, for example, but none of these attributes of the target are activated by this metaphor, because the vehicle "dictators" selects for other attributes. It would be silly to interpret the metaphor to mean, for example, that cats sleep like dictators or are cuddly like dictators. Similarly, dictators are often violent military men, who wear uniforms and who came to power in a coup. None of these attributes are activated by this metaphor, because the target "cats" selects for other attributes in the vehicle. It would be silly to interpret the metaphor to mean that cats wear uniforms or cats are violent military men.

The shared formal features of the two are their demanding qualities. While this is shared, the demanding quality of cats is less salient than the demanding quality of dictators, which is part of why "dictators" are an effective vehicle in this metaphor. Seeing this similarity supports the application of a particular frame of coordination between cats and dictators and brings other related events into the relational network. The demanding nature of dictators is verbally related to their powerful position and coercive practices. Conversely, a cat is merely a small pet, and "powerful" or "coercive" are unlikely attributes of small pets in normal discourse.

Thus, the formal property that relates cats and dictators (demandingness) may carry with it new hierarchical class membership relations for the target. For example, while rubbing a leg may be obviously demanding, the comparison to a dictator may emphasize a nearly coercive quality to the rubbing that may have previously been missed. The source of the humor in the metaphor is the sudden incongruous vision of a small animal successfully ruling the home with humans as the unwitting supplicants due to cats' persistent and high-handed demands. We now see cats in a slightly different way: their functions have been transformed and the

relational network has been elaborated in a coherent and insightful manner. Apt metaphors tend universally to have this feature.

The frame of coordination that is derived between vehicle and target is symmetrical, but comparative or hierarchical relational properties are also often involved. The relation is comparative/hierarchical because it is rare that the dominant features of the original target can point to a new shared function that amplifies the relational network in the original vehicle (cf., Connor and Kogan, 1980; Tversky, 1977). Consider the metaphor "dictators are cats." The metaphor hardly seems to work. Both dictators and cats are demanding, but the demanding qualities of cats are *less* dominant than for dictators so there appears to be no reason for the metaphor. The literature on the aptness of metaphors shows that "the term in second position (the *b*-term in a statement of the form *a* is like *b)* is usually the prototype or better example of the category to which the two terms being compared both belong" (Ortony, 1986, p. 349). (Note that the phrase, "better example of a category," indicates a hierarchical relation). In this example, therefore, the listener searches in vain for alternative properties that are shared, that are dominant in cats, and that coherently alters how dictators are viewed verbally. Finding none, a person hearing such a metaphor would simply be confused.

The metaphor works a bit better with a very slight modification in which a particularly aggressive cat is used as the vehicle: "dictators are tigers." Now the metaphor makes sense because the dominant nonarbitrary feature of the vehicle is shared with the target, but it is not apt because it adds no new relations to the verbal network involving dictators, and thus no functions are transformed. A better attempt is "dictators are crazed tigers." Now something is added. The violence of a dictator, which in normal discourse is often cast as cold and calculating, is instead cast by this metaphorical relation as non-rational and animalistic. The nonarbitrary features of a dictator's violence fit the new relations and the functions are slightly transformed. While not nearly as good a metaphor as "cats are dictators," the metaphorical comparison is both coherent and meaningful.

4.2.1. Traditional Behavioral Accounts

The present analysis agrees with the more traditional behavior analytic approach to metaphor, but not at the level of process. Skinner said it this way:

> 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 (1989, p. 7).

According to the Skinnerian account, 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. The difference in a Relational Frame account is that the process that gives rise to the abstraction is different. We will have more to say about this in the next chapter but for now we would note simply that if something "is 'carried over' from one referent to another on the basis of a common property" then we need a technical account of what is 'carried over' and what is a 'referent' and so on. Relational Frame Theory provides such an account.

4.2.2. Effectiveness of Metaphors

The RFT account seems to comport with the empirical literature on metaphor. McCurry and Hayes (1992) reviewed the entire experimental and clinical literature on metaphor comprehension, aptness, and memorability, and reached several conclusions about the applied use of metaphors. Among other dimensions, they determined that metaphors designed to make an applied difference should:

a. be drawn from the everyday world of common sense,

b. evoke a rich sensory response,

c. contain patterns of events and general relationships that are isomorphic with the client's situation, and that are likely to be cued in situations outside the therapy hour, and

d. have multiple interpretations if the clients' problems are diffuse, but fewer meanings if the clients' problem is more constrained.

From an RFT perspective, these conclusions make sense. In addition to being easily remembered, *common sense metaphors* may be useful because they provide both a verbal guide and relevant data. By definition, "common sense" facts are those that are known to most people. If a particular relationship is shown to be factual in one domain, it seems more likely to be factual in another. A person really can drown by struggling in quicksand. A person really can survive better by laying out flat on top of the unstable area, getting in maximum contact with the surface. Thus, in at least some circumstances natural escape responses can be life threatening while unnatural approach responses can be protective. If that is true in this common sense example, then it might also be true in a less common sense area (e.g., struggling with anxiety).

Metaphors that evoke a *rich sensory response* should be more powerful since a key component of metaphorical responding is the verbal abstraction of a functional dimension, which in turn transforms the function of the target. Verbal events with powerful sensory functions are a richer and more salient source of these functional dimensions.

Metaphors that contain patterns of events and general relationships that are *similar to the client's situation* are more likely to have behavioral impact because the metaphorical and personal stimulus networks can more readily be brought into a frame of coordination.

Metaphors that are likely to be cued in situations outside treatment will be more frequently contacted psychologically and therefore will be more relevant.

Finally, narrow problems are more likely to be solved by a smaller range of behaviors, so more targeted metaphors are likely to be useful. If the behaviors at issue are more diffuse,

avoiding excessive narrowing of stimulus control and resultant insensitivity may be more helpful, and more flexible metaphors may be best.

4.3. STORY TELLING

Allegory, anecdotes, parables, and other forms of story telling show all of the typical features of metaphor, particularly when the relational network in the story is applied in summary form to a moral or when the story is applied to a situation facing the listener. In these cases the two separate relational networks are the story and the verbal network of the moral or the domain of application.

Stories are less complex in some ways than most metaphors because they carefully establish the relational network in one domain rather than relying as much on the existing verbal relations of the listener. Stories are built out, piece by piece, sometimes over many hundreds of pages or hours of telling. After they are built, they then can readily be applied metaphorically. For example, a biblical story is used metaphorically every time someone is called a "Good Samaritan."

This process difference between stories and metaphors is not absolute, because any story relies on unstated contextual and verbal features to be understood. No story is truly built piece by piece, de novo, and out of whole cloth, because all language requires a larger context in order to be understood. The story of the "Good Samaritan," for example, is much better understood when it is made clear how much the Samaritans loathed the Jews, a fact that would hardly be news to the original listeners of the parable. Nevertheless, stories are usually less demanding of a listener in that the listener will be brought along, step by step.

Stories are cognitively simpler for another reason: they contain or develop many nonarbitrary formal properties within the domain of the story via derived stimulus relations and the transformation of stimulus functions that they enable. Even a very small child will listen for hours to a good story because the development of the relational network in the story itself establishes intense, coherent, and direct stimulus functions. In a good story, the child can "imagine" the prince and the princess, or the scary dragon, or the evil witch. These functions cohere with the story. Because of this property, it is said that stories are "concrete" while analogies and metaphors are relatively "abstract." That is, stories have reinforcing value based merely on the properties of developing complex relational networks and transforming functions in terms of these relations. Contacting the value of analogies and metaphors requires more.

There is evidence for this in the experimental literature. Imagery refers to sensory functions evoked by verbal descriptions. Metaphorical and allegorical talk is comprehended best when the vehicle has high imagery (Paivio and Clark, 1986) and is drawn from the common sense world of everyday events and objects (Glucksberg, Gildea, and Bookin, 1982).

Because of their often extended nature, a dominant aspect of stories is the way that stimulus networks themselves serve as contextual cues for specific kinds of relations and for the conditions under which the network will be complete (in the sense discussed in the previous chapter). One clear example of this is the humorous story or joke. In the last chapter we discussed the teasing of a parent shortening a child's bedtime story in such a way that it is technically complete and yet unsatisfying ("The king died. The end. Go to sleep"). A

precisely opposite form of this same process can be seen in "Shaggy Dog" stories, in which a story goes on endlessly. Although there are cues provided that would lead the listener to respond to the telling as if it were a story, with a beginning, middle, and end, the story is told in excruciating detail with constant asides and irrelevant tangents, and tangents from the tangents, until the listener realizes that there *is* no end to the story, it is not truly about anything, and that itself is the joke.

A slightly different process is basic to many other forms of humor. Most jokes create relational networks that are complete, meaningful, and coherent but incongruous. The incongruity can be of several types. In a common form the story appears to be congruous until the punch line. Salient cues are provided that would lead the listener to predict that the network is being completed in a particular fashion. It is about a particular topic, approached in a particular way – or so it seems until the punch line. Suddenly and unexpectedly (thus the metaphor of a "punch"), the network collapses into incoherence, only to reform an instant later in an unusual and often ridiculous and incongruent way. A moment later it is obvious that the listener "should have seen it coming" – that is, that the dominant cues should not have been relied upon so thoroughly.

A simple joke from the movie *Mary Poppins* provides an example. "One guy says to another 'I met a man today with a wooden leg, named Smith.' So his friend replies, 'What was the name of his other leg?'" This silly little joke reveals the process involved. "I met a man named …" is a very common linguistic form that is completed by a name. "Smith" is a common last name, and its presence makes the conventional relation cohere – it appears to be the man's name. In RFT terms, "man" and "Smith" are in a frame of coordination, and the naming context and last name itself are both contextual cues for that relation. Given that assumption, "with a wooden leg" is in a hierarchical relation with "man." The response of the other man takes us by surprise and initially seems to be almost a nonsense sentence. Asking for the other name, as if it is one in a set of names, serves as a C_{rel} for a different and less dominant relation between man, leg, and Smith. Now "Smith" is in a hierarchical relation with the wooden leg. This is technically possible, but also incongruous. It would be extremely rare to name one's leg, and especially to name it "Mr. Smith." The network of relations suddenly collapses from a purely conventional, complete, and coherent network, into a relational network that is also complete and coherent, but one that is incongruous and unexpected. It is funny.

This same device is very common in many other examples of humor, but the exact source of the incongruity differs. In sexual humor, often the network resolves in a somewhat surprising hidden sexual motive or practice. In politically incorrect ethnic humor it resolves into the suddenly revealed supposed stupidities of the derided ethnic group. In puns, the terminal network evokes two parallel meanings at once or shares the same formal properties as another more conventional network with a different meaning. In higher forms of puns and word play, the meaning of the final network conflicts in an incongruous way with the conventional network, but also echoes it formally.

The humor in the following joke comes from a slightly different source. "A horse walks into a bar, and the bartender says, 'Why the long face?'" In this case, the contextual cue that causes the collapse of a conventional network of stimulus relations is the sudden completion of the conventional network itself. There is nothing unusual about a bartender asking "why the long face?" Yet the joke is over and the network is complete. The network of stimulus relations around the word "horse" provides the source of the solution.

More sophisticated, conceptual humor also provides for a shift of relational networks, but in this case the humor is generally "wry" and the resulting network may not be so much incongruous as insightful or original. For example: "I used to think the human brain was the most amazing thing in the whole universe – until I realized what was telling me that" (Emo Phillips).

Riddles and word puzzles rely on the same verbal properties as humor. In both cases, the contextual features needed to solve a riddle are subtle or nondominant. The difference is that the network achieved and the process of achieving it is more clever than incongruous. For example "if you saw a basketball team chasing a baseball team, what time must it be?" Answer: Five after nine. The number of players on a team is a nondominant feature, but it is made relevant by the request to supply a time, since times are usually stated using numbers, and just a few non-numerical words such as "until" or "after." The relation between "chasing" and "after" supports the solution process further.

The ability to solve riddles and word puzzles has long been taken to be a sign of learning, intelligence or creativity. Indeed, the assumed relation between learning and riddles is built into the very etymology of the word "riddle," which comes from a Latin root meaning "to read." Several mythological stories include rites of passage in which the hero must answer a riddle in order to complete a quest. The relation between riddles and intelligence or creativity makes sense if one thinks of the process of puzzle solution as having to do with both the degree of elaboration of relational networks, and the subtlety and flexibility of contextual control over relational responding.

While stories are concrete, making behavioral *use* of stories is abstract by definition. The enormous attention paid by the culture to stories is presumably due to their eventual application. The advantage of stories is that this more metaphorical process can occur over time, while the more immediate and readily available entertainment value remains. At first, very young children listen to the stories without applying them. Then they apply them in a relatively formal way (e.g., in play where one child might be the princess and another will be the dragon). Eventually, they will apply them in a way that is based on the verbal construction of physical or formal relations between a network of arbitrarily applicable relations (the story) and the domain of application. Overcoming a difficult class in school might be aided by behaving like the prince with the dragon, for example. Eventually, art and literature are sought out for their wisdom, not merely for entertainment.

Relating relational networks to relational networks seems also to be at the heart of what is called "remembering." Behavioral psychologists have usually cast remembering as a matter of stimulus control, but in the case of verbal remembering more seems to be involved. When someone remembers they essentially tell a story. Many psychologists are of the opinion that the construction of such life stories is perhaps one of the most central aspects of human psychology (c.f. Gergen, 1985). Elaborated networks can be retained well because the network can often be derived even if a few trained or derived relations are no longer at strength.

The use of allegory, anecdote, and parable is perhaps the dominant feature of oral cultures because stories are so powerful at multiple levels. Stories are entertaining, easily remembered, and readily passed on, and yet they can also serve as metaphorical guides to complex

human behavior and important cultural practices. They can appeal simultaneously to children, the uneducated, and the illiterate, and to the artist, scientist, and scholar.

4.4. WHY RELATIONS AMONG RELATIONS ARE IMPORTANT

The analysis of analogy, metaphor, and parable is important to any theory of language and cognition. Some have cast it as a generally useful test of such a theory.

> 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).

In the context of Relational Frame Theory, this level of language and cognition is important for reasons we have mentioned throughout this chapter. Two seem worth restating. First, the ability to relate networks of stimulus relations is extraordinarily efficient and generative. Hundreds or thousands of existing stimulus relations in one domain can be brought suddenly to bear on another, and generate myriad derived relations as a result. Suppose a son is going off to college and asks a father for advice. The father says "think of college like you think of your time playing baseball and you will be successful." A small number of words could bring hundreds of relations to bear on a new domain in that instant: the value of practice, the importance of coaching, the need for teamwork, and so on.

Second, relating relations is essential in the establishment of abstract verbal terms, precisely because what is meant must be abstracted from a larger set of phenomena. Consider a term such as "patriotism." The word itself is a metaphor, coming from a Greek word meaning "of one's father." Patriotism is something felt towards one's "compatriots" (literally, those who are "with your father") and towards one's "father land." The responses one has toward one's father are rich and emotional. These responses share common features that can be abstracted but cannot be fully described beyond the set from which they have been abstracted. A term like "patriotism" relates that abstracted feature to one's responses toward country, land, language, culture, political system, set of values, and group.

Early in their use the metaphorical nature of such terms is evident, but once abstract terms are established within a verbal community, they can often be trained in more direct ways. Virtually all complex concepts are metaphorical etymologically, but over time these become "frozen metaphors." For example, there was a time when emotional predispositions were entirely metaphorical. To "want" something was to note that it was missing; to be "inclined" to do something was to be about to fall in a direction in which one was leaning; to be "anxious" was to have a difficult time breathing. No modern child would consider wanting, inclination, or anxiety to be metaphors, because the verbal community can teach them directly. A child is asked, "do you want to go?" If the answer is "yes" the child will be scolded if he or she later shows signs that going is not a positive event ("I thought you said you wanted to go – make up your mind!"). In this fashion, the child learns "want" as a concrete verbal event, but the metaphor allowed the development of a verbal community that could shape such verbal

relations more directly. We will return to these topics in Chapter 9, when we discuss the relationship between relational frames and emotional development.

Learning to relate sets of stimulus relations allows the efficient development of entirely new ways of thinking, while providing the guidance or a model drawn from a more known domain. In essence, this allows the construction of abstract and novel concepts upon the foundation of concrete and known verbal relations. If the moon is like an apple, why isn't it constantly falling toward earth? If we could see the world while riding a beam of light, what would we see? Newton's and Einstein's concrete but metaphorical questions lead to answers that were entirely original and extremely abstract. While few human beings will ever reach that level of proficiency, the most ordinary processes of verbal and cognitive development seem dependent on the ability to relate sets of stimulus relations.

5

THINKING, PROBLEM-SOLVING, AND PRAGMATIC VERBAL ANALYSIS

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Human relational abilities are profoundly practical. They are germinated in the greenhouse of conventional social behavior as established by a language community, but they grow in the light of a life lived in and with a nonarbitrary world. The preceding chapter began to consider how relational behaviors are brought to bear on that world, but the present chapter will examine the many other ways that verbal behavior is used in order to interact more effectively with the environment. A variety of terms in lay language are encompassed by this form of verbal analysis, including thinking, reasoning, planning, judging, deciding, problem-solving, and so on. The technical core of each of these specific terms, we will argue, can be addressed by a straightforward application of RFT.

The lure of lay-language is particularly strong in these areas, as has often been noted by a variety of researchers. For example, Skinner noted: "the language in which problem-solving is usually discussed does not differ much from the layman's vocabulary. The rigorous concepts and methods developed in other areas of human behavior are commonly abandoned when this field is reached. It is easy to give an example of a problem, but it is difficult to define the term rigorously" (1953, p. 246). Similarly, Ericsson and Hastie (1994) noted, "technical

and everyday definitions of thinking are not very discrepant and there is probably as much systematic structure within the layperson's system of related concepts as there is in the professional psychologist's" (p. 38). RFT is a bottom-up analysis, which considerably constrains these problems. If informed readers can take the next step up in complexity without abandoning the work already done and without any new principles for RFT, then the applicability and utility of RFT in the analysis of complex human behavior is supported.

This next step up must be dominantly conceptual, not empirical, because so little experimental work has been done from a behavioral point of view (never mind an RFT point of view) on these key topics. Our intention, however, is to frame our analysis in a way that could lead directly to empirical tests and extensions.

5.1. THE NONARBITRARY APPLICATION OF RELATIONAL FRAMES

Let us begin with a very simple example. Two crystal cups with milk inside them are sitting side by side. They are the identical shape but one is physically larger than the other. A child is asked, "which one has more?" The child points to the larger of the two cups.

Up to this point we do not know if the performance is verbal or not in an RFT sense of the term. A properly trained nonhuman would be able to accomplish such a task without difficulty based on a history with different size objects and the nonarbitrary stimulus relation between these particular two objects.

Just because the act is one that could be nonverbal, however, does not mean that it is. The child may be applying a relational frame. To make that determination we need to consider whether the behavior of selecting the larger cup is in a class with behaviors that are controlled in other contexts by arbitrary contextual cues. If so, the act of relating the two cups may be an arbitrarily applicable relational response that is not arbitrarily applied in this circumstance. We would look first to see if there is such an arbitrarily applicable relational response in the child's repertoire. If more-than/less-than fails to appear in arbitrary contexts, then we can rule out the idea that the relation between the cups is verbal, in an RFT sense of that term. For example, imagine the same child being shown a nickel and a dime and being asked, "which one has more?" If the child points to the nickel, we would suspect that nonarbitrary features are still dominantly responsible for more-than/less-than relations since the nickel is larger in a physical sense but smaller in the verbally attributed sense (better controlled tests would of course be available but this common sense example makes the conceptual point).

Even if the child has acquired the more-than/less-than relational frame, however, it does not mean that a relational frame was involved in the selection of the larger cup. We can begin to be reassured if verbal relations can be added to a relational network involving the cups. For example, suppose the child is asked, "which cup holds 200 ml?" and the child learns by trial and error pointing that the small cup is 200 ml. If the child can now respond correctly to the query "which cup has more than 200 ml?" we begin to believe that the relation between the cups is at least by now verbal, since this instance of combinatorial entailment required some kind of arbitrarily applicable relation between the cups. Whether the original relational response was verbal at the moment the larger cup was selected the first time will remain forever uncertain in an absolute sense, of course, since the past is past. It becomes increasingly likely that the relational behavior was arbitrarily applicable, however, if these tests are completed successfully.

The verbal analysis of the nonarbitrary world thus involves an instance of the derivation of stimulus relations, and the transformation of stimulus functions in terms of those relations that is in the same response class as relational performances controlled by arbitrary contextual cues. In this instance, however, features of the nonarbitrary environment regulate classes of relational responses. Stated another way, it involves framing events relationally in a fashion that is arbitrarily applicable but not arbitrarily applied.

This distinction between arbitrary applicability as a property of the relational response class and arbitrary application in a given instance is the source of some careful words that have been used from the very early days of Relational Frame Theory. The definition of relational frames given in Chapter 2 states that the relational response cannot be "solely based on direct non-relational training with regard to the particular stimuli of interest, nor solely to nonarbitrary characteristics of either the stimuli or the relation between them." The word "solely" is not a weasel word, inserted to provide a theoretical escape hatch. The point is that while arbitrary applicability is a core defining feature of relational frames, in fact their use in natural language is anything but arbitrary. When relational frames are applied nonarbitrarily, the source of control is mixed. The relevant history involves both arbitrary training and nonarbitrary features of the environment, and the regulation of relational responses in natural language settings usually comes from both arbitrary and nonarbitrary domains.

There are two senses in which the nonarbitrary environment can become involved in arbitrarily applicable relational responding. In the first, nonarbitrary features or relations set the occasion for verbal relations, but they do not themselves enter into relational frames. A nonarbitrary feature can function purely as a C_{rel}, without ever itself showing the properties of mutual and combinatorial entailment, or the transformation of stimulus functions. For example, a very young child might point reliably to the larger of two toys, when asked "which one is bigger," without the word "bigger" participating in relational frames with the relevant formal dimension or other words (e.g., the child would be unable to answer the questions, "what is the relation between these two toys in terms of size," or "what is another word for bigger," or "what is the opposite of "bigger"). A similar process is likely involved in adult behavior when someone solves a relational problem "intuitively," or based on a "hunch," without "knowing" why s/he emitted the critical problem-solving response. In both cases, the functions of the physical environment that were responsible for the relational responses are not transformed and thus cannot themselves be defined as verbal.

The more important example occurs when nonarbitrary features and relations set the occasion for relational responding of a particular kind because they are functioning verbally. In that case, the nonverbal environment actually becomes verbal to a degree, and verbal relations act upon it. To return to our example of the cups, it is important to know whether the nonarbitrary aspects of the cups served as a relational context (C_{rel}) because these aspects themselves participated in a relational frame. This is more likely if it can be shown that various abstracted features of the cups can be brought into relational frames. For example, suppose the large crystal cup is of the same size as before but has extremely thick interior walls such that only a thin strand of milk can be seen extending down the center of the cup. Imagine that in other contexts the child has placed "milk" and "heavy" into conventional relational networks. Now suppose that the child is given the choice of the two cups again and is asked, "which one has more milk?" and later "which one is more heavy?" If the child points to the small cup in answer to the first question and the large cup in answer to the second, we may

begin to conclude that the child's original performance was regulated by verbally abstracted nonarbitrary features of the choice situation.

It seems useful to have a technical term and a more concise definition for this latter process of verbally analyzing the nonarbitrary world. We will use the term "pragmatic verbal analysis" or at times simply "pragmatic analysis" because these terms orient us toward the concrete, situated nature of this form of verbal analytic activity. Although confusion is possible, "pragmatic verbal analysis" has the additional benefit of being a process that overlaps rather completely with the domain of language pragmatics in traditional linguistics.

We will define the term in the following *way*: *pragmatic verbal analysis refers to framing relationally under the control of abstracted features of the nonarbitrary environment that are themselves framed relationally.* Stated in other words, pragmatic verbal analysis involves acting upon the world verbally, and having the world serve verbal functions as a result.

The more general term "verbal analysis" is a cognate, but the qualifier "pragmatic" is needed because some forms of verbal analysis can become so abstract that they do not necessarily involve the stimulus functions of the nonarbitrary environment in a significant way. Symbolic logic or higher-order mathematics can be examples. Some terms, such as "reasoning" cover both kinds of verbal analysis. We will restrict our analysis in this chapter to the pragmatic variety of verbal analysis, because it involves the new issue of how the nonarbitrary environment participates in arbitrarily applicable relational responding.

The co-dependence between arbitrary and nonarbitrary properties in pragmatic verbal analysis can make the distinction between truly nonarbitrary stimulus relations and verbal relations being applied to the nonarbitrary world empirically difficult in given natural circumstances. Nevertheless, the processes are readily distinguished in controlled circumstances and the conceptual difference seems clear. Part of the confusion comes because the vast majority of what is considered nonarbitrary in human affairs is in fact verbally involved as a result of pragmatic analysis. Any physical dimension that one can speak about meaningfully and can understand, by definition, is functioning verbally for these speakers and listeners.

An exercise can be used to make this point in classroom settings. Place a green leaf in front of a group of students and demand to be told everything that they know about such an object by direct observation. The list will include obvious properties, such as "green" but it will also soon include properties such as "photosynthesizes," "is made of hydrocarbons," or "has chlorophyll." Usually a few questions will reveal that the students have not had any kind of direct contact with these processes, even in biology or chemistry classes. The actual learning process was probably verbal from beginning to end, like "I looked in the microscope and saw green stuff. I was told it was chlorophyll" or even "I read in a book that leaves have chlorophyll." What this shows is that even for rather sophisticated members of the verbal community, the physical properties of events are sufficiently verbal that students have no idea whether or not a property is based on direct observation.

Even the response "green," while it is based on direct observation, is undoubtedly verbal. The response is not a unidirectional one regulated by a small class of wavelengths of light - it is a verbal response that is one of several about an abstracted physical feature called "color." For that reason, responses that participate in frames with direct physical dimensions are the same, at the level of process, as those responses that participate in frames with physical dimensions that require entire relational networks for their categorization. Suppose, for example, a person holds up a cup and says "this ceramic cup is heavy." "Ceramic" and "heavy"

are both based on abstracted physical features that are framed relationally, although the specific verbal analytic actions were probably more complex for the first attribute than for the second.

5.1.1. Verbal Abstraction of Stimuli

The term "abstraction" comes from the Latin *abstractus,* which means to draw from or separate (Oxford English Dictionary, 1984). In traditional behavioral accounts of abstraction, relevant stimulus properties are 'drawn out' from a background of many co-occurring properties via stimulus discrimination along a stimulus dimension. As stimulus control becomes more precise, more refined or subtle properties are discriminated. For example, with a widely varying group of objects of a common color, stimulus control may come under the control of a small set of wavelengths of light. Responses may come to be controlled by these wavelengths (or, as we say, the "color green") and not other properties such as shape or location.

In Skinner's system, extreme forms of abstraction are "peculiarly verbal" (p. 109,1957) because only verbal behavior has the necessary freedom from accompanying properties to allow exceedingly fine discriminations to occur. The more precise abstraction permitted by language could, according to Skinner, be viewed as the behavioral process underlying meaning and "ideas" (Skinner, 1957, p. 128). The only process leading to these effects, however, is stimulus discrimination, and we are not sure how to put together these points with Skinner's agreement that animal operant studies form "a small but genuine verbal community" (Skinner, 1957, footnote 11, p. 108). Nonhuman "verbal behavior" does not seem to give rise to the kind of result Skinner imagines.

We think the outcome is correct, but not the process. Relational Frame Theory provides an alternative account in which the freedom from co-occurring stimulus properties increases enormously because stimulus attributes participate in networks of relational frames.

Consider, for example, a pigeon learning to pick among red objects, then orange, yellow, green, blue, indigo, and violet. With careful selection of the multiple exemplars, relatively distinct control by these specific classes of wavelengths of light would occur. Imagine further that in the presence of each distinct class of wavelengths, the pigeon is taught to peck a key saying the name of a color. Further, after any peck on a color name the bird is taught to peck a second key saying "color," while after stimulus discriminations not made on the basis of color the bird must peck a key saying "not color." What we will be left with are seven classes of objects organized in terms of physical wavelengths of light, seven additional unidirectional conditional discriminations between these classes and color "names," and unidirectional conditional discriminations between these "names" and the key "color" and between other specific stimuli and "not color."

Contrast that to what would happen if the same training were conducted with a school age child. The child would probably have derived bidirectional stimulus relations between the wavelength classes and the color names, between the color names and the term "color," and between all the classes of wavelengths and the term "color." Relations of difference will have been derived between different colors, and between different color names, which also means that the relation derived between the term "color" and color names and actual colors will not be a simple equivalence relation (since that would collapse the relations of difference between different colors and different color names). Rather, the seven different color equivalence

classes (names and wavelength classes) will be brought into a hierarchical relation with the term "color." Just as parents produce children that are different but still siblings, this network of bidirectional relations will produce colors that are different but still related, because a verbally abstracted physical dimension serves as a relational cue for the frame of coordination between them. That physical dimension or attribute is "color" in a verbal sense. The physical attribute color, in turn, will be distinguished somewhat from other attributes by this training. A difference or opposition relation will have been derived between the terms "color" and "not color" and by extension between those terms and relevant members in the other class (color names, colors, and other non-color stimuli).

The attribute "color" will be organized and systematized by the additional training school aged children receive, so that it's dimensional nature will be evident. For example, if the student has learned the spectral color sequence of red, orange, yellow, green, blue, indigo, and violet (such as through the British children's mnemonic "**R**ichard **O**f **Y**ork **G**ave **B**attle **I**n **V**ain") a specific comparative relation may exist between all combinations of the colors and color names, arranged in terms of a quantifiable dimension.

Mere equivalence and difference is not enough to produce most of what we expect in verbal abstraction because equivalence relations organized along physical dimensions do not demand much more in the way of abstraction than do nonverbal forms of abstraction. The hierarchical relations ("attribute of," or "part of," or "member of) promote abstraction in a verbal sense because these relations treat attributes relationally, which in turn allows verbally abstracted attributes to enter into other verbal relations or to serve as verbal relational cues. (Parenthetically, we do not mean to refer to any rigid or unchanging hierarchy in using the term "hierarchical relation." Hierarchical relations of the sort we are describing are under contextual control and as a result are dynamic and implicative).

The importance of hierarchical relations to abstraction can be seen even in the simple equivalence and distinction training conducted in preschool settings. A task in the children's television program *Sesame Street* shows four objects on the screen. In easy versions of the task, three of the objects are identical and one is not. A little song says, "one of these things is not like the other; one of these things doesn't belong; can you guess which thing is not like the other; by the time I finish this song?" This task trains identity matching and exclusion, and supports the development of frames of coordination and of distinction. In a more difficult variant, the four objects are all different, but three of them share a common attribute. After the song and the answer, the host carefully notes the shared attribute for the children. These three things go together, the host will say, because they all are the same color, or they all are people, or they all are living, or they all have arms, and so on. This kind of training builds on the earlier training by adding a hierarchical relation and using it as a relational cue $(a\,C_{rel})$ for the derivation of frames of coordination among the three similar objects. From an RFT perspective, this amounts to a kind of relational abstraction training, and should greatly enhance the impact of verbal relations on the ability to abstract features of the environment.

To return to our example of color training, what the child may do as a result of the training described above is dramatically different, because of the participation of relational frames, from the results for the pigeon using the same experimental procedure. The pigeon will have only seven classes of stimuli determined by wavelengths of light. Learning to pick color names or the term "color" will be useless in the process of abstraction because those discriminations are not bidirectional and they are not relational, and without that, entailment in terms of equivalence, difference, or hierarchical relations cannot occur. In an abstract, verbal sense,

color will not be distinguished as a dimensional attribute of physical objects for the pigeon. The pigeon will learn to respond to a class of wavelengths humans call "red" but in an important sense will not be responding to "red" or a "color" at all, since these very terms require relational frames to function as they do for members of the verbal community.

New situations might be set up to reveal whether the child has abstracted color as an attribute in the sense that this attribute will participate in a rich, conventionally established network that can be brought to bear on the physical environment. Suppose, for example, a child has learned a wide variety of color and color names, and has placed these into a hierarchical class relation with the attribute "color." Now suppose that the child is shown a patch of black for the first time and learns to relate it to the word "black." We would predict that for at least some children this color and color name would now be bidirectionally related and part of the dimensional attribute "color," without any training relating the color name to the attribute "color" or vice versa. Such a thing could happen only if the physical environment is now gaining verbal functions via the application of relational frames to nonarbitrary features, since the relation of black to the verbal attribute of color could only come through verbally abstracted properties of the actual patch of black and not through formal properties per se. It would certainly not enter into this relation through the arbitrary sequence of letters "black," since in a properly controlled experiment there would be no reason to relate the word "black" to "color" any more than "not color." In our thought experiment, the patch is the only other possible source of the relation. Yet it cannot enter the relation via shared properties in a simple sense. A patch of absolutely black material will share no wavelengths of light with the wavelength classes already learned, and proper controls will not allow shape or other irrelevant features to enter into the performance. The abstracted feature ("color") refers to an aspect of one's interaction with a visual field that is dominantly controlled by wavelength (but also various contextual features, such as luminescence, contrasting field, or immediate history, as the field of perception has long showed), but not by any specific wavelength or subset of wavelengths. Once that attribute is properly abstracted, it can serve as a relational cue for any stimulus. Thus, the color black (or eventually any color) would be available for instances of pragmatic verbal analysis, in the sense that the child could now derive relational frames under the control of this abstracted feature of the nonarbitrary environment that is itself framed relationally, even without any direct history of color abstraction being applied to that specific color.

Conducting such an experiment may not be practically possible with color, since so much early attention is given to that attribute in language training. Particularly with children as subjects it seems quite possible using other attributes that are not widely trained in natural language settings, however. This would probably be easiest with dimensional attributes that go beyond simple physical features to functional, metaphorical, or other relatively abstract dimensions. For example, we may be able to establish control of an attribute such as "things you can be trapped in" and gather together such disparate events as cages, boxes, handcuffs, locked rooms, sitting in the middle of a row in a theater, being in the middle of a vast desert, having a drug addiction, or having a job. Given such a dimensional attribute, a new event, say a marriage, may be said to have this attribute based on verbally abstracted features without explicit training that would give marriage per se this attribute. Such a collection of events seems to be involved in the kinds of so-called "stimulus generalization" seen in clinical situations, such as that shown by a person suffering anxiety attacks and developing a panic disorder with agoraphobic avoidance. The original attack may have happened in, say, a

speech, but the generalization may soon spread to elevators, open spaces, or even a marriage, based on the abstracted features of the situations along the metaphorical but nonarbitrary dimension of "can't easily get out of."

As verbal humans interact with their environment, events gain ever increasing verbal functions of this kind. Place any object in front of a capable speaker and say "tell me everything you can about the features of this object" and a string of abstracted features will be verbalized. All of these features are in relational frames with other events. For example, suppose the object is a rock and the stated attribute is "heavy." If asked, the subject would undoubtedly be able also to generate long lists of heavy or light things, and the rock can thereby enter into a derived relation of coordination or distinction between all of these other terms and their related events. It is these verbal relations that permit verbal analysis to have pragmatic implications.

Some linguists make a similar point. For example, Bickerton said it this way:

> If it is to be any use at all, a vocabulary cannot possibly mark all the particularities of objects that our senses reveal to us. If we are to think off-line in any general sort of way (rather than on-line about the particular things that momentarily happen to confront us), we have to boil down the Jamesian "buzzing, blooming confusion" of sensory experience into a much thinner gruel (1995, p. 61).

The relational abstraction of nonarbitrary features of the environment and the use of these attributes as relational cues provide the process through which that gruel can be thinned.

5.2. THE USE OF PRAGMATIC ANALYSIS

Pragmatic verbal analysis supports more complex forms of interaction with the natural environment that are "purposive" or "intentional" in the verbal sense of those terms. In other words, patterns of verbal behavior are sequenced so as to produce certain consequences as verbally conceived. The distinction between different forms of pragmatic verbal analysis comes from the precise use to which this verbal analytic process is put. We will address two closely related varieties, thinking and problem-solving, to show how a straightforward extension of RFT leads directly to complex cognitive performances of use in interaction with the world.

5.2.1. An RFT Definition of Thinking

Thinking is not a technical term in behavioral psychology, and we do not intend to make it so by offering an analysis. In some meaningful senses of the term, nonverbal organisms "think" and we have no interest in prohibiting the use of the term there. Nevertheless, there are features of thinking in a verbal sense that seem worth noting.

First, thinking involves the purposive action of pragmatic verbal analysis and thus is both situated in the practical environment, and is controlled by direct or verbally constructed consequences. Most perspectives on thinking have taken a similar view, although the terms may differ. For example, Dewey says it this way: "the function of intelligence is ... not that of copying the objects of the environment, but rather of taking account of the ways in which

more effective and more profitable relations with these objects may be established in the future" (1925/1981, p. 17).

Second, the term tends to be used when the specific performances involved are not already established. A person may have to think in order to operate a combination lock, but on subsequent occasions the same behavior will not be said to be due to thinking unless the behavior weakens to the point that "I have to think about it." Skinner expresses a similar concept:

> We reserve the term "original" for those ideas which result from manipulations of variables which have not followed a rigid formula and in which the ideas have other sources of strength. A given procedure in problem-solving may never have been used in precisely the same way before or in connection with the same material, and it does not lead to the conclusion by itself. Some additional strength is supplied by stimulus induction from similar situations. This induction, however, is also the result of a particular personal history and of well-defined behavioral processes (1953, p. 255).

Third, the behavior is reflective in the sense that verbal responses are often made to verbal and nonverbal responses in the process. That is, as a person engages in a verbal analysis of a situation, the results of that verbal activity and other verbal and nonverbal responses serve as the occasion for additional verbal analysis, a point that can lead human problem-solving into ever more abstract and verbal domains.

Finally, the term is often invoked (though not always) when the verbal activities involved are private. At times, however, even social behavior evokes the term so this property is more typical than fundamental.

Putting these features together leads us to define *thinking* in a verbal sense as *a reflective behavioral sequence, often private, of pragmatic verbal analysis that transforms the functions of the environment so as to lead to novel, productive acts*. In this definition, thinking is said to transform the environment, but it should be made clear that we mean this in the sense of the "world outside the behavior" not so much the "world outside the skin" since thinking can be directed at private events. This transformation of stimulus functions is not random, however. It is an action controlled by its consequences (Overskeid, 2000) in a situation in which relatively novel productions are required. These consequences can be both direct and historical (certain forms of thinking may have in the past lead to novel, productive acts) and verbal and anticipatory (certain forms of thinking may be related verbally to verbally conceptualized consequences). The second kind of consequence is probably especially important since the conditions under which novel acts are necessary are likely to be ones in which direct consequences have not alone produced effective action. In essence, this definition treats thinking as a particular kind of verbal problem-solving, a related topic to which we now turn.

5.2.2. An RFT Definition of Problem-Solving

As with thinking, there is no reason to treat problem-solving as a technical term. Instead, it is merely an important and complex response domain that requires an account. The behavioral approach to problem-solving is parsimonious and useful, but can be amplified

considerably by adding RFT concepts. In general terms "problem-solving may be defined as any behavior which, through the manipulation of variables, makes the appearance of a solution more probable" (Skinner, 1953, p. 247), and we can think of having a problem as lacking the behavior which occasions available reinforcement (Skinner, 1953). In that sense, the behavioral approach does not treat problem-solving merely as goal-directed behavior, but rather limits that term to situations in which there are behavioral obstacles to be avoided or removed. A pigeon on a long fixed ratio is not "solving a problem" merely because the behavior is controlled by consequences. Conversely, that same pigeon pecking a box and then standing on it to peck a banana (Epstein, 1987) is solving a problem in the behavioral view.

Traditional views of problem-solving are dominated by the use of common sense terms to describe the linear application of verbal relations to problem-solving. Most extant models of problem-solving define a series of such steps. The specific labels and numbers of such steps vary, but eventually all seem to deal with the following common sense sequence: Define Problem; Gather Information; Identify Possible Solutions; Select Plan; Carry Out Plan; Test Outcome; Change Plan (see Reese, 1994, for an excellent analysis of various models in these terms). Additional distinctions can be made within the traditional approach. For example, convergent approaches are applied when there may be one correct solution, as in a mathematical solution, and divergent approaches are used when there may be any number of acceptable solutions, defined by a successful working criterion.

RFT provides a ready behavioral approach to verbal problem-solving. We may define verbal problem-solving as *framing events relationally under the antecedent and consequential control of an apparent absence of effective actions.* Stated another way, this delineation means that the apparent absence of effective actions is an antecedent for relational activity that is itself oriented toward the establishment of such actions.

Problem-solving so defined is usually but not always a form of pragmatic verbal analysis. Some problems are virtually entirely a verbal problem: solving an abstract mathematical or logical problem may be an example. Dealing with such existential problems as "how will I ever have peace of mind" may be another. These problems may begin and remain verbal and arbitrary. Most problems, however, involve the stimulus functions of the nonarbitrary environment, and in these cases verbal problem-solving can be said to be *pragmatic verbal analysis that changes the behavioral functions of the environment under the antecedent and consequential control of an apparent absence of effective action.*

5.2.3. Strategic Problem-Solving

All forms of problem-solving according to the current definition involve a detection of a problem state, namely, the absence of effective action in a given situation. Implicit in the word "effective" is the idea that to some degree the problem solution is also discriminated, but problem-solving strategies differ in the degree to which this is the case verbally.

A *strategic problem* occurs when solutions are available or have been identified verbally. Said another way, the problem solver has placed the desired goal or purpose into a relational frame. This "goal" or "purpose" can now be compared to various verbal networks that specify the current situation and steps that need to be taken to reach the verbally constructed goal or purpose. This activity is inherently metaphorical in the sense of the last chapter, because entire sets of derived stimulus relations are being related to one another on the basis of physical properties, dimensions, or relations and their transformation.

It is strategic problem-solving that often proceeds in a linear, step-like fashion. The common sense steps described earlier comprise domains in which verbal activity may occur, each with reference to the verbally constructed outcome being sought.

The step-like quality of problem-solving in these circumstances comes not from the necessarily linear nature of verbal events, but from the attempt to formulate heuristic strategies verbally. In other words, the step by step analysis of problem-solving mentioned above is more a prescription than a description. Perhaps an easy way for behavior analysts to appreciate this is to consider the term "functional analysis." Classical functional analysis can consist of many steps, including the following:

1. collect observations on the current state of affairs,
2. refine those observations quantitatively and qualitatively into systematic data collection,
3. select a target behavior,
4. apply behavioral principles and theories so as to identify features of the situation that may be relevant to that target behavior,
5. add additional observational refinements if needed,
6. define a desired outcome,
7. arrange an intervention in terms of the behavioral analysis and desired outcome,
8. apply the intervention,
9. examine the result, and
10. recycle if needed.

This kind of description of functional analysis models strategic problem-solving very well. Given a desired outcome for a target behavior, what is at issue is how to increase the control of features of the situation through pragmatic analysis, in such steps as assessing the behavior and its context, and how to then apply verbal relations to these abstracted features (e.g., though the application of behavioral principles and behavioral theories) so as to reach a verbally defined goal. Applied and even basic science has many of these same features as a human problem-solving strategy.

5.2.4. Valuative Problem-Solving

Another kind of verbal problem-solving applies when the lack of effective action is verbally accessible, but not what would constitute effective action. We may use a nonverbal example to show what is at issue. A newborn child roots "for a nipple." The consequence must be placed into quotes because while the newborn child may be non verbally in contact with the problem - food deprivation - it has never been in contact with the solution – suckling at the mother's breast. In many human verbal problem-solving situations this is the case, and when a strategic problem-solving strategy is employed it may not be very useful.

Valuative problem-solving involves the use of relational frames to contact possible outcomes, so as to select among them. It is the verbal analog to reinforcer sampling, or forcing an animal to both sides of a concurrent chain, but in this case the "contact" is through the transformation of stimulus functions through a network of derived stimulus relations.

Humans often face such problems as "What do I really want my life to be about?" or "What's really important to me?" In major life decisions, such as employment and careers, marriage, or religious practices, the problem may be more about the selection among possible consequences as it is the means of reaching consequences that are selected. Valuative

problem-solving is at the core of "values clarification" in clinical work. Many forms of psychopathology can emerge from the lack of direction provided by a failure to have an overall direction. We will return to the relevance of strategic and valuative problem-solving in RFT terms in the chapter on psychopathology (see Chapter 12).

Faced with problems of this kind, a list of pros and cons may be constructed to try to abstract features of the situation that might be contacted. Often it seems helpful to use verbal processes in a more iterative and metaphorical way to amplify the behavioral effects of a verbally constructed future. For example, a person faced with a job prospect might ask "if this job was a book, what would be its title?" or "if it was a sporting event, what would it be?" Such metaphors may bring some of the nonverbal effects of the situation as verbally constructed into the verbal network itself. Suppose what spontaneously appears to the person trying to relate the job to a sporting event is that it would be like being a referee being run over in a violent game of football. Subtle cues in the job description or interview might have produced a sense of unease about how much control would be possible, or in how the co-workers related to each other. The metaphor may amplify these features and make them verbally accessible. Dream analysis is often used in a similar way.

In many cultures, problems of this kind are associated with mystical or magical problem-solving methods, such as consulting a horoscope, reading entrails, consulting Runes, or casting I Ching sticks. Unlike metaphor evocation, or perhaps dream analysis, from a scientific point of view there is no reason to suppose that these methods are helpful because the content of the practices directly reveal underlying motives or values. That does not mean that they are useless, however, as a problem-solving process. Magical advice, especially if it is itself vague or metaphorical (thus allowing the listener to derive new stimulus relations in response to the input), can produce considerable reorganization of relational networks. Speaking in common sense terms, magical problem-solving traditions undoubtedly cause people to think about their problems in new ways. The arbitrary nature of relational frames will lead the listener to construct new meaning in response to this vague, random, but supposedly magical input.

5.3. THE ADAPTIVE UTILITY OF THINKING AND PROBLEM-SOLVING

Pragmatic verbal analysis is useful for many reasons, some of which should already be obvious. It seems worth mentioning a few of these properties.

5.3.1. Delay and the Reduction of Impulsivity

One benefit of pragmatic verbal analysis may be simply that it reduces immediate responding to the present situation, due to the intrusion of functions that are transformed via human language and due to the increased predictability of temporally extended consequences. Jacob Bronowski (1977) has emphasized the importance of "delayed responding" to language and higher thought processes, arguing that a number of human capabilities only emerge once the reaction to a stimulus is delayed; in other words, once behavior is freed from the imperative grip of direct contingencies.

Russell Barkley (1996), a researcher who has linked the behavioral literature on rule-governance to the analysis of attention deficit hyperactivity disorder, summarized the point this way:

> Bronowski proposed that the evolution of the capacity to inhibit a prepotent response and to impose a delay between a signal or event and the person's [overt] response to that event permitted the development of … advanced psychological processes. Such delays ... are substantially longer than any witnessed in our closest evolutionary relatives. Bronowski reasoned that this matchless capacity for delaying a motor response to a signal formed the central feature in the evolution of human language from a system of social communication to one of personal reflection and self-regulation (1996, p. 320).

In contrast to Bronowski, RFT would suggest that the ability to delay responses is itself a by-product of derived relational responding, a relationship that can be shown in the ontogenetic development of a human infant. This is similar to the linguist Bickerton who has argued that the ability to delay responding in this way is a result of the evolution of language (1990, 1995). Of particular importance in this regard is the construction of temporal relational frames. Learning to describe environmental sequences and delays may considerably reduce the interference of alternative events in accounting for delayed consequences. That in turn may reduce impulsivity by increasing the importance of delayed consequences.

5.3.2. Dealing With Problems Before They Are Contacted

Derived stimulus relations permits a wide variety of problems to be created that have never been experienced before, and to work out verbal solutions to them. Cognitively oriented psychologists call this "off line thinking" because it is verbal problem-solving that is not done in the actual solution of present problems (in the mechanistic metaphors of cognitive theory, the mental machinery is working but is not actually "on line"). This form of pragmatic verbal analysis can be useful both because overarching problem-solving strategies may be learned through such practice, and because problem solutions may be generated that are applicable at a later day. Bickerton says it this way:

> So far as we know (and one would not want to rule out the possibility that there may still be surprises in store for us), only humans ... can assemble fragments of information to form a pattern that they can later act upon without having to wait on that great but unpunctual teacher, experience. ... it is this capacity for off-line thinking ... that endows our species with its unique and uniquely creative intelligence (Bickerton, 1995 p. 59).

5.3.3. Responding to Ambiguity With Over-Arching Verbal Strategies

The point just mentioned, that practice can lead to general strategies of thinking and problem-solving, has frequently been shown to be of importance in the analysis of human cognitive performance. The most common term for this category of performances is

"executive function." Borkowski and Burke (1996) describe the development of executive function as:

> the evolving ability to use, select, evaluate and develop strategies. First, children learn to use a specific learning strategy in a specific context. Then the child learns other strategies and repeats them across other contexts until the child develops the ability to select strategies appropriate for some tasks (but not others) and to fill in knowledge gaps by monitoring performance, especially when essential strategy components have not been adequately learned. At this stage, higher-order executive processes emerge. This is also the beginning of self-regulation, the basis for adaptive learning and thinking (1996, p. 239).

The actual behaviors measured by tests falling under the general rubric of "executive function" (e.g., Tower of Hanoi test, the Wisconsin Card Sorting Test) require that people do not respond to the nonarbitrary properties of the task based on well established relational networks (e.g., by simply piling the larger pieces on top of the smaller pieces on one pole, and then reversing this sequence for the third pole, in the Tower of Hanoi problem). Rather, the tests confront the test-taker with a problem that requires an extended and recursive behavioral sequence that has probably never been emitted before by that individual. In this sense, we can describe tests of executive function as tests designed to ask the following question: "Under what conditions do people select among available rules or generate new ones, follow rules when they are available even though they conflict with other sources of behavioral control, and change them when they no longer work?" (Hayes, Gifford and Ruckstuhl, 1996). These tests correlate with a surprisingly wide variety of productive behaviors (Hayes et al., 1996) presumably because the actual verbal relational activity involved generalizes to other similarly ambiguous problem-solving situations.

5.3.4. Self Knowledge

Pragmatic verbal analysis can be applied to one's own behavior. The value of doing so may be considerable. Self-monitoring and self-awareness may permit greater self-control, for example, by allowing verbal analytic activities to be related to ongoing behavioral streams. Once this kind of self-discrimination occurs, the amount of feedback that can influence behavior increases dramatically. In the case of problem-solving strategies, for example, responding to one's responses may contribute to evaluating the success or failure of behavioral efforts. We will have a great deal more to say about this process when we deal with self-rules in Chapter 7.

5.3.5. Constructing Rules

By far the most important adaptive function of pragmatic verbal analysis is the construction of verbal rules that allow stimulus and response functions to be augmented or diminished, for possible outcomes to be detected, and for lengthy behavioral sequences to be performed with regard to those possible consequences. The nature of verbal rules, however, is a difficult topic in its own right. We will deal with this topic in the following two chapters,

focusing in particular on the verbal construction of self and self-generated rules in the latter chapter.

5.4. THE MALADAPTIVE EFFECTS OF THINKING AND PROBLEM-SOLVING

We would be remiss if we did not mention that despite the enormous benefit to the human species wrought by pragmatic verbal analysis, there is a large downside as well. A detailed RFT explication of this downside can be found in Hayes, Strosahl, and Wilson (1999). We will also address it in Chapter 12.

The harm in derived stimulus relations comes because verbal functions can crowd out other behavioral functions, and because they can lead to self-amplifying forms of self-destructive behavior. Suicide and meaninglessness is perhaps a good example (Hayes, 1993). Among the verbally constructed futures that human beings must deal with are those that include personal death and the dismantling of all that is valued. These relational networks can lead easily to verbal formulations such as "life is not worth living" or "I would be better off dead." Bringing one's behavior under the control of such formulations can be enormously destructive. Examples of other harmful effects from relational frames are developed in Hayes et al. (1999).

5.5. CONCLUSION

RFT is part of the pragmatic tradition in claiming that the variables controlling behavior popularly defined as "thinking" and "problem-solving" include the variables involved in language. RFT offers a technical behavioral analysis of language that can be applied to these domains directly, and without any change in the defining features of language itself.

In the next chapter, we begin to transfer our attention to the behavior regulatory and social effects of verbal formulae. In a word, we turn to the issue of rules.

6

UNDERSTANDING AND VERBAL REGULATION

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In the previous chapter we argued that the most important adaptive function of pragmatic verbal analysis is the construction of verbal formulae that allow functions of the environment to be augmented or diminished, for possible outcomes to be detected, and for lengthy behavioral sequences to be performed with regard to possible consequences. According to RFT, this process of verbal understanding and verbal regulation involves the effects of relational networks and pragmatic verbal analysis.

In this chapter we will unpack the RFT definition of understanding, and then consider the issue of verbal regulation and rule-following. In doing so, we will consider three functional categories of verbal control, and provide RFT interpretations of why a listener may or may not follow a particular rule. In this chapter we will focus only on the effects on a listener of verbal events presented by others (in the next chapter, we will deal with self-rules, but this will require dealing first with the RFT interpretation of self, so it is a somewhat more complex case).

6.1. RULES AND VERBAL STIMULATION

Skinner (1969) distinguished between rule-governed behavior and contingency-shaped behavior. He suggested that contingency-shaped behavior is acquired through direct exposure to environmental consequences, whereas rule-governed behavior is acquired through verbal descriptions of contingencies. Rule-governed behavior is behavior evoked by "rules derived from the contingencies, in the form of injunctions or descriptions which specify occasions, responses, and consequences" (Skinner, 1969, p. 160). As we noted earlier, however, Skinner did not provide a clear functional analytic definition of 'specify' as used in the above quotation. One solution might be to interpret 'specify' as 'specify verbally', but this then requires a functional definition of 'verbal' and 'verbal stimuli' (Hayes and Hayes, 1989). Furthermore, it seemed clear from Skinner's examples that specifying a contingency could mean specifying only part of a contingency, leaving the unstated terms implied. For example, "stand up" could actually mean "in this situation, stand up or else something bad will happen to you." Appealing to implied elements has left the "contingency" aspect of "contingency specification" more rhetorical than real, since virtually any statement could be said to imply a whole contingency.

In behavior analysis, most of the empirical research into rule-governance has focused on the differences between rule-governed and contingency-shaped behavior, and especially on the issue of the sensitivity of human behavior to contingencies of reinforcement. This work (e.g., Galizio, 1979; Hayes, Brownstein, Haas, and Greenway, 1986; Hayes, Brownstein, Zettle, Rosenfarb, and Korn, 1986; Hayes, Zettle and Rosenfarb, 1989; Shimoff, Catania, and Matthews, 1981), proceeded without an agreed upon functional-analytic definition of what constitutes a rule or rule-governed behavior (Barnes-Holmes, Healy, and Hayes, 2000). Traditionally, rules (or instructions) have been identified topographically, or by common sense examples. "Press fast" can be described as a rule, merely because it is an instruction, but in so doing it remains unclear how it differs from a discriminative stimulus. If this distinction cannot be made, the term *rule* appears to be redundant. Furthermore, the same redundancy surely applies to the concept of rule-governed behavior if it is simply identified as behavior that occurs when a rule is presented to an individual.

This early empirical work was important in noting several possible features of the domain of rule-governance, but it suffered from the definitional problems indicated above. For example, while insensitivity to directly programmed contingencies was common, that effect was hardly universal. Researchers have also pointed out that rule-governed behavior may be topographically identical to contingency-shaped behavior and yet be shown later to be functionally distinct (Hayes, Brownstein, Haas, and Greenway, 1986; Joyce and Chase, 1990). This was of particular concern because without a technical understanding and definition of rule-governance, there was *no a priori* way to distinguish these two classes of responding. It may not be surprising, then, that by the time of the first book-length treatment of rule-governed behavior (Hayes, 1989), the empirical and conceptual work on rule-following was already waning, and the conceptual and empirical analysis of derived stimulus relations was waxing. Indeed, the first published presentation of Relational Frame Theory (Hayes and Hayes, 1989) was in that very volume.

That situation has continued until the present time, over a decade later. The empirical analysis of rule-governed behavior has been reduced to a trickle of studies, while the empirical analysis of derived stimulus relations continues unabated. The primary pragmatic purpose of

the analysis of derived stimulus relations, however, is an analysis of the development of verbal rules (e.g., through thinking, reasoning, and problem-solving), and the use of verbal formulae to guide behavior. We believe that the analysis of derived stimulus relations has proceeded to the point that it seems adequate to the challenge presented by verbal regulation.

6.1.1. Understanding Verbal Events

In our approach, for any behavioral event to be classified as verbal, it must show the contextually controlled qualities of mutual entailment, combinatorial mutual entailment, and transformation of stimulus functions. From this point of view, words and other events (e.g., tone of voice, facial expressions) are functioning as verbal stimuli when they have their functions because of those qualities, that is, because they participate in relational frames. A listener's "understanding" is synonymous with the set of derived and specified relations that results for the listener from verbal stimuli. Of course, what is understood may differ from what was meant in the sense that there is a functional difference in the set of derived stimulus relations maintained by the speaker and listener.

Verbally-governed behavior is simply behavior governed by verbal stimuli. In previous chapters we have described how relational frames are elaborated into relational networks that themselves are related and applied to the nonarbitrary environment. At the level of technical process, nothing strictly new is happening at each of these steps of increasing complexity (a list of this kind will be described in Chapter 8 with more than 40 distinguishable items). Nevertheless, behavioral performances are enabled at high levels of complexity that could not occur at lower levels of complexity.

In precisely the same way, verbally-governed behavior can be controlled by stimuli that have their effects due to relational events of increasing complexity. Suppose a child says "cookie." A parent hears the word and passes down a cookie from the counter. If this behavior occurred in part because cookies and "cookie" are in a frame of coordination (that is, if it depended upon verbal understanding) the behavior is verbally-governed to that degree. The behavior could well occur through other, more direct means, of course, such as the way a dog can be shaped to fetch slippers on command. It is not the form of the behavior or the form or social source of its antecedent that defines the performance as verbally-governed. It is the functional source of stimulus control.

Various behavioral researchers other than Skinner have struggled with the precise definition of rule-governed behavior. For example, Zettle and Hayes (1982) defined rule-governed behavior as behavior controlled by two sets of contingencies, one of which included a verbal antecedent. This definition suffered some of the same problems as Skinner's, since there was no specification of what a verbal antecedent might be, although that problem was at least noted. RFT answered that problem seven years later, when Hayes and Hayes (1989) simply defined rule-governed behavior as "behavior controlled by antecedent verbal stimuli" in the sense used in the present volume. Others have weighed in. Schlinger and Blakely (1987) added that the rule must have a function-altering effect on the natural environment (very much in line with the RFT conception of a transformation of functions of the nonarbitrary environment). Chase and Danforth (1991) added the idea that two or more relations must be brought together in rules.

Part of the confusion comes from the multiple sources of control over the word "rule" in natural language. "Rule" comes from the Latin *regula* which originally meant a straight stick,

and then a straight stick used for measuring, and then a consistency or "regularity" (another term from the same Latin root). Only late in its career as a word did "rule" mean "govern" but these earlier connotations remained. Thus, a King (a "ruler") specifies consistencies and regularities (e.g., through law or declaration). We even say that a ruler "lays down the line" – a metaphor that harkens back to a wooden stick (also a "ruler") that can do the same thing.

As verbal antecedents become more complex they are more likely to be called "rules," both by the verbal community at large and by psychologists, because the common sense connotations of the term become more evident. To return to our example, suppose the child says "I would like it if you would give me a cookie now." Unlike the previous request, this statement is a complete relational network – a sentence. It specifies a contingency, including reference to antecedent, behavioral, and consequential events. There has been little or no change in the functions of the cookie, however (to put it in words, the function is "reach for the cookie now" but reaching for it was probably always one function it had, and it is the identical function evoked by the single word request). If we alter these functions, we arrive at a more complex relational network: "If you eat those cookies, Mommy, you will get sick … Tommy put dirt in them." In this case, the verbal stimulus orients the listener toward abstracted features of the nonarbitrary environment in a way that transforms the functions of that environment. The cookies are no longer attractive and will be thrown away. Suppose we alter the verbal statement one final time: "Mommy, about those cookies. They have dirt in them. Never eat food that has dirt in it or you will get sick." Here we have a description of a general consistency or regularity, emphasizing an important aspect of the lay concept of a rule. By the time this level is reached, almost anyone would agree that if the cookies are thrown away the behavior is rule-governed. At earlier levels, all the way down to the single term, some would agree and some would not.

To appreciate the functional definition of verbal understanding being offered here, consider the following illustrative example from Hayes et al. (1998). A person says, "I'm going on vacation in two weeks and will be gone for a month. If you water and mow my lawn each week I am gone, the following month I will pay you $ 100." This is a thoroughly specified contingency. It alters the functions of calendar time, the grass, and the implements needed to mow and water the lawn. It specifies all the major elements of a contingency: a temporal antecedent, topographical form and the context within which it should occur, and the nature and delay of a consequence. The contingencies that are specified could not be effective through direct training; in part because greatly delayed consequences are simply not effective in the absence of verbal rules.

The interpretation of this rule in relational frame theory first requires the examination of the specific relational frames and the cues that occasioned them, and then the functions of the events that are transformed in terms of these relations and the cues that occasioned these transformations. Several core relational frames seem necessary for understanding this rule. Some terms (e.g., grass) need to be in frames of coordination with classes of physical events. Before-after relational frames, made more specific by numerical temporal terms, are used to specify a temporal antecedent and a consequence (e.g., begin mowing *after 2* weeks). If-then relational frames are used to specify the contingent relations (e.g., *if you* mow and water weekly for 4 weeks, *then* you will receive $100). Terms like 'mow' alter the behavioral functions of the grass, and the transformation of stimulus functions provides these actions and contexts with some of the features of the specified consequence (e.g., approach).

Rules may also become quite complex due to increasingly specific contextual control over the transformation of functions. Conditionality, for instance, can control highly specific transformation effects. Consider, the following rule, "When I leave mow my lawn, but only if it is sunny and it has not rained for two days, or if it is sunny and the end of the week." Two conditions are specified here, which may be represented as "only if C1 and C2, or C1 and C3, then mow my lawn;" C2 and C3 alone will not suffice (i.e., it has not rained for two days and it is the end of the week *but* it is not sunny). This contextually controlled hierarchy of conditions (C1, C2, and C3) is critical to effective control by the rule, and such hierarchical control is a thoroughly relational issue. The important point here is that complex rules of this kind do not bring anything new at the level of process – they are simply examples of more complex relational networks and transformation of functions.

As the listener follows a rule, the coordination between the original relational network as understood, and the relations sustained among the specified events when the rule is followed, provides an ongoing source of control over behavior. Stated loosely, the person following a rule can detect that the rule is being followed (or not) because what is being done corresponds (or not) with the rule. This does not require that the rule itself be restated, although often that is what occurs. Rather, the elements specified in the rule are actualized in a particular manner, and these events themselves form a relational network that corresponds (or not) to the original relational network. In our example, suppose a person exposed to our first lawn-mowing rule in fact mows the lawn two and a half weeks later. The listener will be able to detect that the rule is being followed, based on a verbal comparison between what was done and what was asked. The original rule stated "in two weeks [I] will be gone …water and mow my lawn each week I am gone." Two and a half weeks later is during "a week I am gone" and thus the lawn should be watered and mowed.

Whenever a frame of coordination between two such networks serves as a source of control over behavior, it seems to us that the behavior is meaningfully rule-governed. Most complex examples of verbal control seem to have this feature. In such cases, the relational frame interpretation would appear to be immediately useful, in that it provides a technical language for describing and potentially explaining how such complex verbal sequences control the behavior of listeners across such large temporal gaps. When verbal antecedents are much simpler, and when correspondence between the rule and relevant behavior is not part of the source of behavioral control, the concept of "rule" seems to add nothing to the simpler concept of "verbal stimulus." For example, suppose while walking in the woods with a friend you shout "snake" and the friend leaps into the air. This behavior is clearly verbally-governed, but the concept of a "rule" seems to add little else. Compare this to the behavior of that same friend told before the hike "There are a lot of snakes here. Do not step into piles of leaves or sticks while we hike because you might be bitten." In this case, the listener will probably derive a set of relations among leaves, sticks, and snakes. If your friend now looks down regularly and carefully avoids forest debris during the walk, we can suppose that the stimuli contacted in the forest are entering into a relational network and that network is related to the original verbal network. If the person is asked: "why didn't you step there?" the answer might come back "because there might be a snake." Such responses are reflective of the key process involved: current events are entering into networks of stimulus relations, and these are being related to the original rule as understood.

In Relational Frame Theory, the key issue is always the process involved. Events that regulate behavior because of the properties of mutual entailment, combinatorial entailment,

and the transformation of function are verbal stimuli. The complexity of these processes and the degree of involvement of the nonarbitrary environment are important issues, and indeed we have organized the last several chapters in those terms. In RFT there is a clear difference between nonverbal and verbal regulation. Rule-governed behavior is a subset of verbal regulation. The term becomes more likely to be used when the verbal antecedent is a relational network or a comparison of such networks, and especially when comparison between a verbal antecedent and the verbal construction of ongoing events is part of the source of control over behavioral regulation. Rule-governance is also more likely to be used when the nonarbitrary features of the environment are abstracted and transformed, and when the verbal network is generally applicable.

Rather than get stuck over where the precise divisions are between various levels of complexity, it seems more useful to use terms like "rule" in a less technical way, as a method of ensuring contact with a domain of events. In unpacking this domain we need to note the functional processes involved and to collect data that might reflect on those processes. This will allow progress without creating blind spots. For example, while relational frames readily explain the function-altering effects in the natural environment of complex verbal stimuli, defining rules solely in these terms might blind researchers to the use of rules in purely arbitrary contexts (e.g., grammatical rules). Similarly, while relational frames explain how contingency specification occurs, defining rules solely in these terms seems to force behavior analysts into purely inferential activities (e.g., "implied specification") in order to maintain the definitional concept.

6.2. VERBAL REGULATION AND RULE-FOLLOWING

The grass-mowing example provides a functional-analytic interpretation of rule-under-standing. In effect, when a rule is understood, events in the environment that participate in the rule acquire verbal functions in terms of the rule. As explained previously, these functions are established and transformed in accordance with the relational network that constitutes the rule. The newly acquired verbal functions of the previously nonverbal environment allow the rule to control behavior in contexts that are sometimes radically different to those in which the rule was presented. However, listeners sometimes fail to follow a rule although they apparently understand it. This brings us to the issue of actual verbal regulation of overt behavior, and it is at this point that the behavior regulatory and social effects of relational networks or rules become most obvious. One of the first steps in analyzing these regulatory or social effects is to distinguish among three kinds of contingencies that produce rule-following (Hayes, Zettle, and Rosenfarb, 1989). We will briefly outline these three types of contingencies here because they will be drawn upon at subsequent points in the chapter and again later in the book.

6.2.1. Pliance

Pliance is rule-governed behavior under the control of a history of socially-mediated reinforcement for coordination between behavior and antecedent verbal stimuli (i.e., the relational network or rule), in which that reinforcement is itself delivered based on a frame of coordination between the rule and behavior. Stated another way, pliance requires both

following a rule and detection by the verbal community that the rule and the behavior correspond. Suppose, for example, a parent says, "Eat your breakfast." If the child now eats because of a history of socially-mediated consequences for rule-following *per se* (e.g., the parent has previously punished failures to do what the parent says) such rule-following may be categorized as an instance of pliance. The speaker's behavior in this example might be categorized as a verbal mand, in that the parent's statement is reinforced by a characteristic reinforcer: the child eating (Barnes-Holmes et al., 2000). Verbal manding by caregivers plays a large role in establishing pliance in the behavior of young children. In fact, it is difficult to imagine how pliance, and rule-governed behavior in general, could ever be established in the repertoire of a young child without being exposed to a rich history of verbal manding by others.

Pliance need not occur in response only to mands, however. Suppose the parent says, "Eat a good breakfast, and you will have more energy throughout the day." This has the formal appearance of a tact, and indeed it is possible that the parent is simply describing a contingency. The child, however, may still eat because of a history of socially-mediated consequences for rule-following *per se*.

6.2.2. Tracking

Tracking is rule-governed behavior under the control of a history of coordination between the rule and the way the environment is arranged independently of the delivery of the rule. To continue the same example, if the child now eats to have more energy, the behavior is tracking. Both tracks and plys describe contingencies, but in the case of pliance, the contingencies are contacted because coordination between the rule and behavior alters the behavior of the verbal community. In the case of tracking, the contingencies are contacted because of the nonarbitrary properties of the behavior – the form, frequency, or situational sensitivity of the relevant behavior produces the consequence(s) specified or implied in the rule (i.e., when the child eats well s/he actually feels better, rather than simply avoiding parental punishment). From the perspective of the speaker, a track might be considered a verbal tact (Barnes-Holmes et al., 2000) in that it describes the environment-behavior relations that are required to follow the rule.

The distinction between tracks and plys is not a formal one. The consequences for tracking can at times be socially-mediated, because the natural environment includes social variables, but in this case these social consequences come due to the form of the behavior, not due to social detection of the correspondence between the rule and relevant behavior. Most often, however, the consequences are not socially mediated. It is difficult to imagine how tracking could be established in the behavioral repertoire of a young child without first establishing a repertoire of pliance through exposure to verbal manding, in part because verbal tacts do not add new consequences to the situation, while verbal mands do.

6.2.3. Augmenting

Augmenting is rule-governed behavior due to relational networks that alter the degree to which events function as consequences. There are two types of augmentals. Motivative augmenting is behavior due to relational networks that temporarily alter the degree to which previously established consequences function as reinforcers or punishers; formative aug-

menting is behavior due to relational networks that establish given consequences as reinforcers or punishers. A simple example of a motivative augmental is, "Wouldn't an ice-cold Pepsi go good right now?" If this statement produces Pepsi-buying it is probably functioning as a kind of verbal establishing stimulus, not a verbal discriminative stimulus, since Pepsi's are no doubt available whether or not the rule is present.

Motivative augmentals seem to work by presenting some of the sensory or perceptual functions of a consequence, in a manner similar to reinforcer sampling. That is, the words "ice cold" and "Pepsi" come to have sensory functions via a transformation of stimulus functions (they make the listener feel as if ice cold Pepsi has been physically sampled). It is well established that reinforcer sampling will increase instrumental behavior that gives rise to that consequence (Ayllon and Azrin, 1968a; 1968b).

An example of a formative augmental might be "these slips are worth chances on money prizes." If the slips now function for the first time as a reinforcer, the statement was a formative augmental. Even before the value of the slips are ever actually contacted, tracks and plys that include "slips" can function much as they do with established reinforcers. Given the earlier formative augmental, the phrase "push the button to earn slips" becomes the functional equivalent of "push the button to earn money" and money is an existing reinforcer. Thus, formative augmentals can contribute to behavioral regulation even if the "new consequences" are never actually contacted.

Before moving on, we should stress that although pliance, tracking, and augmenting are units of verbal regulation or rule-following, they are based on verbal understanding. It is not possible to follow a rule unless one understands it, by definition, because this would mean that the rule was not functioning verbally. As we have discussed earlier, understanding is not a mental event. It is the derivation of stimulus relations by a listener. It remains to be considered, however, why listeners sometimes follow and sometimes do not follow verbal rules that they readily understand.

6.3. FOLLOWING AND NOT FOLLOWING RULES

The following list is not comprehensive, but it shows how this issue can be approached by analyzing the contextual features and content of an instance of rule-following.

6.3.1. Insufficient Control by Nonverbal Contingencies

Perhaps the simplest reason why a rule may be understood but not followed is that the behavior prescribed by the rule is not yet present in the behavioral repertoire. The descriptions of skilled performances are a common example. A learner driver might read an accurate description of the behaviors involved in driving, without being able to drive competently on a public highway. In this case, the novice driver may claim to "know *what* to do" (i.e., verbalize the stimulus relations and the functions transformed according to the rule), but not "know *how* to do it." The response sequences involved in driving have not been shaped by the direct contingencies that participate in skilled driving (e.g., clutch control when driving a stick shift). A parallel distinction is made in traditional cognitive psychology between declarative (rule-governed) and procedural (contingency-governed) knowledge.

6.3.2. Credibility of the Speaker

Some speakers are more likely to produce verbal formulae that are predictive than others. An obviously insane street person loudly telling all who will listen to "run, or you will be killed by the criminals who are coming" will produce very little rule-following. A policeman saying the same thing in the same way may be able to clear out entire city blocks with his voice alone.

Credibility can be acquired directly or verbally, and generalization of credibility from one speaker to another can be through formal or relational means. Speakers who are said to be intelligent, knowledgeable, rational, wise, honest, experienced, kind, sane, and so on will be more effective in most circumstances in producing rule-following because these very verbal relations are seemingly predictive of rules that are accurate. Consider the two terms "knowledgeable" and "honest." A person will normally be said to be knowledgeable when it can be shown that he or she possesses a highly elaborated and effective relational network in a given domain. Honesty has to do with speaking under the control of such relational networks and not with hidden, especially personal, motives. Both attributes should be correlated (or are *said to* be correlated, which might be equally effective) with the likely effectiveness of verbal formulae, because such rules will seemingly be based on a highly elaborated and effective relational network, without control by hidden motives.

In many situations speakers acquire such verbal functions in ways that are very indirect, and these are deliberately used by speakers as rhetorical devices. A well-dressed professor from a major university speaking on television, a priest speaking warmly from the pulpit, or a criminal shouting from a jail cell will have very different verbal attributes and thus credibility. Of course, the professor could be a liar, the priest could be a child abuser, and the criminal could be an unjustly accused saint, but the relational frames in which "professor," "priest," and "criminal" conventionally participate will tend to dominate unless or until these facts are shown.

6.3.3. Authority and Ability to Mediate Reinforcement

For pliance in particular the capacity to mediate consequences to the listener will predict rule-following. Consider, for instance, a young girl who is presented with the following verbal mand "You must go to bed now." The child understands the rule and going-to-bed-behavior is well established in her behavioral repertoire. Imagine that in one case the speaker is the child's parent, and the rule is followed; in another the child's babysitter is the speaker, and the rule is not followed.

Part of the difference may be the ability and willingness to mediate rewards and punishers. The babysitter may have access to few consequences of importance and the child may know it. Part of the difference may be the verbally ascribed powers of authority. In the context of authority, the babysitter may participate in a frame of difference with the child's parents (e.g., "You can't make me go to bed, you're not my mommy!").

6.3.4. Plausibility of the Rule

Another key variable in determining whether or not a rule is followed is often referred to as the plausibility of the message (c.f., Hovland, Lumsdaine, and Sheffield, 1949).

Consider, for instance, the verbal tact, "Smoke more cigarettes and you will live a longer and healthier life." In the context of our current scientific knowledge as disseminated through the media, listeners today (smokers included) would find this rule completely implausible. Fifty years ago, however, tobacco companies used variants of this statement successfully in advertising. Medical doctors have even been used in cigarette ads in both eras, but the implicit messages were different. In the middle of the twentieth century, the doctors were shown smoking, with the implicit message "this is good for your health." Now, doctors are used in anti-smoking ads, and they are talking with concern about your medical reports. The message is "this will kill you."

What has changed in fifty years is the conventional network of derived stimulus relations involving tobacco products. Plausibility is undermined by the emergence of relations of distinction and opposition between the stated rule and other current and relevant relational networks actualized by the terms in the rule. Today, an average listener will have been exposed to many previous rules of the form, "Cigarette smoking causes cancer" from highly credible sources (e.g., national medical leaders). Because "smoke" and "cigarettes" participate in frames of coordination or hierarchical class membership with words such as "cancer," "heart disease," and so forth, the frame of coordination specified in the rule "Smoke more cigarettes and you will live a longer and healthier life" cannot occur without a radical change in the existing relational network. Fifty years ago that was not the case: such stimulus networks were not being contradicted but elaborated.

6.3.4.1. *Perceived Self-Efficacy*

A variant of rule plausibility might be involved in "self-efficacy" (Bandura, 1977). This refers to the listener's belief in his or her own ability to complete successfully the behaviors specified in the rule. Suppose, for example, that a listener is presented with the following track, "If you stop smoking you will live a longer and healthier life." The listener may well believe this track and also value the specified consequences. Nevertheless, the rule may not be followed if the listener does not believe that s/he is capable of permanently abstaining from tobacco use. From the RFT perspective, this perceived lack of self-efficacy may be interpreted as the emergence of a frame of opposition between the phrase "Stop smoking" and "*I will* stop smoking." First, the rule causes the listener to respond in accordance with the I-You deictic frame (see Chapter 2), such that the functions of *You* are transferred to *I* in the rule (i.e., the rule is now read as "If *I* stop smoking…"). Unfortunately, "… I stop smoking …" may actualize some of the functions of tobacco withdrawal symptoms experienced by the listener during a previous failed attempt to quit smoking. These functions may give rise to additional verbal formulations (e.g., "I tried before and I couldn't quit"). At this point, therefore, the phrases "You stop smoking" and "I stop smoking" come to participate in a relation of opposition ("I can't stop smoking so what happens to you when you stop smoking will not happen to me") and thus the rule fails to exert behavioral control over the listener.

There are other behavioral sources of control over the correlation between perceived self-efficacy and overt behavior (say-do correspondence; social standard setting; predictions based on past behavior), but the analysis above is an example of how self-rules of this kind may exert behavioral control in certain contexts, beyond the purely social effects that are sometimes involved in self-rules.

6.3.5. Values and Purpose

Perhaps the most interesting but yet difficult to analyze feature of rule-following is what might be called values and purpose. These terms have been discussed previously in the behavioral literature, and so we will place them in that context here.

Skinner, refuting charges that behaviorism cannot deal with concepts such as purpose or intentionality, suggested that "operant behavior is the very field of purpose and intention" (1974, p. 55). What Skinner meant by "purpose" in this statement was not verbal purpose (in the sense of "verbal" used here), but reinforcement. A nonverbal organism is able to respond effectively to what it has experienced directly, and to generalizations based on the form of these experienced events. First a tone was sounded, then a lever was pressed, and then food was eaten. Later, a tone was sounded, then a lever was pressed, and then food was eaten. A rat exposed to such a set of events has experienced an orderly process of change from one act to another. The "hear tone-press lever-eat food" relation is a temporal relationship that has been directly experienced by the rat. As such a history accrues, the formal similarities organize these events into a process of change among classes of events. When the rat now hears the tone, it is a tone that reliably predicts that a lever press will be followed by food being eaten.

One can say that the rat presses a lever "in order to get" a food pellet, as if the future reinforcer is the purpose, but this is not meant literally. It would be contrary to a naturalistic psychological account to suggest that the stimulus event that controls the lever press is literally in the future. For a nonverbal organism, the future we are speaking of is "the past as the future in the present" (Hayes, 1992). That is, based on a history of change (the "past"), the animal is responding to present events that have preceded change to other events. It is not the literal future to which the organism responds – it is the past as the future. This is the sense in which reinforcement provides a kind of "purpose" or establishes a future event as a "valued" goal by a nonverbal organism.

Purpose and valued events are not the same in the context of arbitrarily applicable relational responding. Temporal relations are part of a class of relations, such as cause-effect, if-then, or before-after. These relations satisfy the criteria for arbitrarily applicable relational responding. If we are told that "right after A comes B," we derive that "right before B comes A." Similarly, if we are taught directly that "right after A comes B" and "right after B comes C," we can derive that "shortly after A comes C" or that "shortly before C comes A." If B has functions (for example, if B is an intense shock), other stimuli may have functions based on their derived relations with B. For example, A may now elicit great arousal, while C may lead to calm.

Given the ability to frame events relationally, one would be capable of responding to if-then relations that have never been experienced directly. The verbal relation of time is thus arbitrarily applicable: it is brought to bear by contextual cues, not simply by the form of the related events. For example, a person can be told "after life comes heaven," or "after smoking comes cancer," or "after investing comes wealth." These change relations need not be directly experienced for the human to respond with regard to such relations. The relatedness of life and heaven, for example, is constructed - it is an instantiation of a particular relational frame involving a temporal sequence. For verbal organisms, purpose involves the past as the constructed future in the present, where by "construction" we mean the verbal activity of relating - a historically and contextually situated act. The "future" verbal organisms "work

towards" may thus encompass events with which the individual has no direct history at all – only a verbal history.

Consider once again, the individual who failed to follow the track "If you stop smoking you will live a long and healthier life" apparently due to lack of "self-efficacy." Imagine now that the individual is a 45 year old male who has had a minor heart attack, and has just been informed by a doctor that he has seriously high blood pressure, and his health and possibly life are in immediate danger. At this point the man may quit smoking permanently, although he had failed to do so many times before. From the RFT perspective, the functions of the phrase "long and healthy life" in the original rule are transformed by the doctor's statement and the current context such that health and a long life are now more highly valued because they are immediately at risk. In effect, the doctor's statement functioned as a motivative augmental that increased the value of a long and healthy life. Furthermore, the aversive effects as verbally known of "I stop smoking" (remembering how it felt to try to quit) can now be verbally compared to the aversive effects as verbally known of "I do not stop smoking" (remembering how it felt to have a heart attack). Responding does not occur in a vacuum, and the aversive effects of quitting are now much less negatively evaluated than they were before ("this is minor compared to *that* ..."). Note that the listener's belief in the rule remains unchanged (he always believed that smoking was dangerous), but now he follows a previously ineffective rule because he values the specified consequences more highly, and he evaluates the immediate effects of doing so less negatively.

We suspect that many instances in which rules are understood and believed by a listener, but yet not followed, may be interpreted as a lack of motivative augmental control. This may be the case in many applied settings. Consider, for example, the relatively common case of existential angst, in which the problem is the absence of any values or purpose. A person who comes into therapy in an existential crisis will often say things like: "Life is meaningless because everything that we accomplish in life will be washed away. I will die, you will die, the sun will die, the stars will all die, and the universe will collapse into an infinitely dense bit of matter the size of a pea. It is all a waste. What does it all mean? Why should I do anything?" This individual has constructed a temporal relation in which death and destruction is the ultimate outcome of everything. Indeed, the facts are hard to argue with in a literal sense because we all participate in the same verbal system that has ensnared the client. Most of us would agree that physical systems do indeed decline with time, and that the universe itself will either implode or expand infinitely and die out. The goal for the therapist, therefore, is not to argue about the literal content of the client's verbal reasoning or rules. In fact, the goal in therapy might be to undermine this excessive rule control by literal language, so that the client's behavior is brought into direct contact with natural and social reinforcers (e.g., engaging in hobbies, looking up old friends, or changing career; see Chapter 12). In so doing, motivative augmental control may be established for many adaptive rules (e.g., "Keep active and you will meet lots of interesting people and enjoy life more").

Each of the foregoing interpretive examples illustrates how RFT may be used to explain particular instances of rule-following, or lack thereof. However, interpretation alone is not enough. If RFT is to provide a useful and active research program in human language and cognition, and in rule-governance in particular, then it will also need to generate appropriate methodologies for the experimental analysis of rule-governed behaviors. In the next section of the current chapter we will outline how we have recently begun to develop one such methodology.

6.4. RULE-GOVERNANCE: AN EMPIRICAL MODEL

In some of our most recent experimental research we have set about modeling rule-governed behavior, based on the RFT definition of verbal events. In this recent work we have employed the Relational Evaluation Procedure (REP; Hayes and Barnes, 1997), which was outlined in Chapter 3. In short, the REP is used to train and test for before-after and same-different relations, and this relational history is then used to produce new or untaught sequence responses by presenting complex relational networks (i.e., rules) to our subjects. We will briefly outline some of these experimental procedures so that the reader may appreciate how RFT approaches rule-governed behavior empirically.

In our basic procedure, subjects were first trained in Before and After responding using the REP (see Chapter 3). Subsequently, they were exposed to same-different training and testing, again using the REP. The purpose of this training and testing was to establish four arbitrary stimuli as functionally equivalent to BEFORE, AFTER, SAME, and DIFFERENT. These contextual cues (i.e., C_{rel}s) were then incorporated into a range of tasks, each of which presented a relational network designed to control a sequence response in the absence of explicit training. On each task, the following words appeared at the top of a computer screen: "Look at the computer screen and then press the four colored keys on the keyboard" (the 1, 4,7, and 0 keys were covered with Green, Red, Blue, and Yellow squares, respectively). On the top half of the computer screen the following four mutually entailed relations were presented:

> Green Square   SAME   A1
> Red Square   SAME   A2
> Blue Square   SAME   A3
> Yellow Square   SAME   A4

As indicated above, a small green square, for example, was placed in a relation of coordination with an arbitrary stimulus designated as A1. On the lower half of the screen, the following relational network or rule was presented on one trial:

> A1 before A2 before A3 before A4

The prior history of relational training and testing in accordance with BEFORE, AFTER, and SAME would predict the following sequence response: Green (A1) $\Rightarrow$ Red (A2) $\Rightarrow$ Blue (A3) $\Rightarrow$ Yellow (A4). On another trial, the following stimuli were presented: A1 AFTER A2 AFTER A3 AFTER A4, and the sequence, Yellow (A4) $\Rightarrow$ Blue (A3) $\Rightarrow$ Red (A2) $\Rightarrow$ Green (A1) would be predicted. During our work with these procedures, the majority of subjects reliably produce these and other predicted sequence responses.

From the RFT perspective, these untrained sequence responses constitute a functional-analytic model of rule-following because they were produced by the transformation of multiple stimulus functions in accordance with a relational network composed of multiple stimulus relations (in this case, Before, After, and Same). This is an important step because it may allow us to analyze systematically those variables of which rule-following is a function. In some of our work, for example, subjects are allowed to produce sequence responses that are in accordance with a trained and tested relational network, but a punisher (loss of points)

is then delivered contingent upon this performance. Our results indicate that the loss of points may disrupt the derived sequence responding, in that subjects often produce a different sequence response on the next trial (i.e., one that is not in accordance with the relational network). However, it also appears that the level of disruption is a function of the number of sequence-response trials that the subject has completed before the punisher is introduced for "correct" sequence responding. In effect, the more derived sequence responses that the subject has emitted without feedback (i.e., no loss of points), the more likely it is that he or she will continue to respond in accordance with the relational network on trials following a loss of points for such responding. If this finding is found to be robust, it may provide a means of systematically analyzing the so called insensitivity-to-contingencies-effect that has often been associated with rule-governed behavior (e.g., Matthews, Shimoff, Catania, Sagvolden, 1977). Our current data suggest, for example, that "insensitive" rule-following is more likely to persist when an individual has followed a rule (responded in accordance with a relational network) on a number of previous occasions than when the rule has been followed only once. By conducting this type of research it should be possible to subject rule-governed behavior to a level of functional analysis that has not been possible to this point.

6.5. VERBAL COMMUNICATION

Thus far we have tended to focus our attention on the verbal behavior of the listener, but a more complete analysis of understanding and verbal regulation requires that these be considered in the wider context of verbal communication. More specifically, we need to address the relationship between speakers and listeners.

Verbal behavior is an inherently social behavior, at least originally, because only a social community can establish control over relational responding by arbitrary contextual cues. Children learn verbal relations in the context of modifying or regulating their social environment through these verbal relations. Early relational frames (e.g., naming) are developed on the basis of arbitrary social reinforcement, and their functional utility comes largely from the ability to produce verbally-governed behavior in others.

As the etymology of the word suggests, the speaker and listener are "bound together" in communication (in Latin *com* means together and *munis* means bound). In nonverbal communication, this "bound" is based on direct behavioral processes. In verbal communication, the "bound" is based on relational frames. Speaking with meaning and listening with understanding both involve arbitrarily applicable derived relational responding.

As this process is elaborated, however, verbal communication from the speaker's point of view becomes verbally purposive. Verbal behavior is used to produce verbally known effects in a listener. In this case, the verbal construction of that purpose and of the listener and other features of the current context can serve as C_{rel} stimuli for specific patterns of verbal communication (as we noted in Chapter 3, entire networks of stimulus relations as well as nonverbal stimuli can serve C_{rel} functions).

Consider, for example, a simple verbal mand: A guest at a party asks the housekeeper for a glass of water. Now imagine that the guest has recently been told that the housekeeper speaks Spanish, but no English. If the guest knows Spanish, the problem is easily solved by using the Spanish term "agua" instead of "water." If not, the guest may act out drinking from an imaginary glass filled at an imaginary faucet.

The modification of the speaker's behaviors can be understood by the effect the contextual cue "the housekeeper speaks Spanish, but no English" has on various stimulus relations that might be actualized by the verbal purpose of "getting water." "Water" may be in a frame of coordination with "agua" or with "drinking what comes out of the faucet" but given that contextual cue, "water" will not be likely to occur since it is in a hierarchical class membership relation with "English words" (i.e., the speaker knows that the housekeeper will not understand any verbal mands spoken in English words).

The distinctions among types of verbal communication have to do with the specific purposes, contexts, and listeners involved. A parent teaching a child to talk will behave differently than a teacher teaching a child to do math or a lover trying to establish an intimate relationship. It will make a profound difference if the listener is verbally constructed to be friendly, intelligent, psychotic, mean, stupid, and so on.

Early in language development, these various repertoires will not necessarily be coordinated. For example, a young child who can tell another person a name for an object may not be able to request that same object. Over time these repertoires become more coordinated, but even in adults, verbal desynchrony may persist. An adult may be able to make instrumental requests, but be unable to use verbal behavior to establish an empathic relationship.

We will return to the listener as verbally constructed in the next chapter. Some of the language desynchronies seen even in adults may be traceable to certain features of the listener as verbally known.

6.6. CONCLUSION

The current chapter provides a functional analytic, RFT definition of how humans understand and follow verbal formulae. Verbal understanding occurs when functions of the environment are transformed in accordance with complex relational networks. Rule-following is itself learned behavior that is dependent on rule-understanding. In our empirical research we have developed behavioral models of both rule-understanding and rule-following, and these models appear to provide an entering wedge into the functional analysis of rule-governed behavior. Although we believe that this conceptual and empirical work constitutes an important step forward in the analysis of rule-governance, it deals with only one part of this area. The work presented in this chapter has not addressed the topic of *self*-generated rules, and how these impact upon behavior. Developing an analysis of self-rules requires a functional, RFT analysis of the concept of self before we can deal with self-rules. These two topics are the focus of the next chapter.

7

SELF AND SELF-DIRECTED RULES

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The study of rule-governed behavior has sometimes been divided into rules stated by others and self-generated or self-directed rules (e.g., Chase and Danforth, 1991). Although the term *self* is therefore used to distinguish a particular type of rule-governance, a technical analysis of self has not yet been built into the analysis of self-rules. Some very limited behavioral work, both conceptual and empirical, has been conducted on the concept of self, but it has not been applied in a systematic way to the topic of self-generated rules.

The present chapter will provide an RFT analysis of self-directed rules. This will require that we first address the concept of self, before integrating it with the concept of rules. In completing this task, we shall see that the topic of self-directed rules overlaps with problem-solving, and as such Chapters 5 and 7 may be seen as addressing broadly similar issues. Further, it will be shown that self-rules often involve self-knowledge, and with it, the construction of private events. Finally, we will consider how the problem of privacy may be overcome in the experimental analysis of self-rules. We will begin by considering briefly the traditional behavioral approach to *self* before presenting the more modern RFT approach to this topic.

7.1. THE TRADITIONAL BEHAVIORAL APPROACH TO SELF

Of all the concepts and terms in psychology, "self" is perhaps one of the most widely used. This is true of the behavioral literature as well. For instance, terms such as "self-control," "self-monitoring," "self-reinforcement" and "self-discrimination" abound within the basic and applied behavioral literature. Often, however, the causal status and exact nature of the behavior to which these terms are referring is unclear. In an early behavioral effort to bring clarity to this area, Skinner (1974) wrote:

> There is a difference between behaving and reporting that one is behaving or reporting the causes of one's behavior. In arranging conditions under which a person describes the public or private world in which he lives, a community generates that very special form of behavior called knowing (pp. 34-35).

In this way, "self-knowledge is of social origin" (Skinner, 1974, p. 35), since "it is only when a person's private world becomes important to others that it is made important to him' (Skinner, 1974, p. 35). Questions such as "How are you?" and "What are you doing?" help to establish the ability to discriminate different forms of one's own behavior, and provide the verbal community with access to what an individual "sees" and has "seen," and as a result, "a person who has been 'made aware of himself by the questions he has been asked is in a better position to predict and control his own behavior" (Skinner, 1974, p. 35). Thus, self or self-awareness is defined in behavioral terms as discrimination of one's own behavior (see also Guerin, 1992).

This behavioral definition of self has been examined empirically with nonhumans. Researchers have sought to demonstrate responding that is under the control of the subjects' own behavior (i.e., responding to one's own responding). The majority of studies have employed both reinforcement schedules and conditional discrimination tasks in which the subjects' own behavior on a schedule task forms the basis for a conditional discrimination. For example, Lattal (1975) first trained pigeons to respond according to either a Differential-Reinforcement-of-Low rate (DRL) or Differential Reinforcement-of-Other behavior (DRO) schedule. He then produced a conditional discrimination task in which the correct choice was defined by the reinforcement contingency that preceded it (i.e., pigeons learned to peck a red key if they had previously pecked for reinforcement [DRL] and to peck a green key if they had not pecked for reinforcement [DRO]). In effect, responding on the conditional discrimination task represented a self-report of the subjects' own behavior on the previous schedule task. Other studies with pigeons have used duration of interresponse times (Reynolds, 1966; Shimp, 1983), different fixed-ratio (FR) values (Pliskoff and Goldiamond, 1966), temporal intervals (Reynolds and Catania, 1962), and run lengths (Shimp, 1982) as discriminative events. In effect, these studies have provided a nonhuman analog of Skinner's definition of self-awareness.

7.2. SELF AND RELATIONAL FRAME THEORY

From the point of view of RFT, there is a great deal more to self-awareness than simply responding to one's own behavior. Human verbal behavior significantly alters or transforms

the basic type of stimulus control observed when nonhumans demonstrate 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 opposition (Dymond and Barnes, 1995; 1996). These studies point to an essential aspect of self-knowledge from an RFT perspective (Dymond and Barnes, 1997).

7.2.1. Verbal Self-Discrimination

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 and 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 (i.e., pecking according to a DRO or DRL schedule) is discriminative for the second (i.e., choosing between red and green keys; see Hineline and Wanchisen, 1989, p. 234). 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.

Derived relational responding makes verbal self-knowledge both important and useful on the one hand, and often emotional and difficult on the other (Hayes and Gifford, 1997; Hayes and Wilson, 1993). Verbal self-knowledge can be important because verbal reports of one's own behavior, or of the contingencies controlling it, can alter the functions of both. For example, self-instructions can reduce the effect of temporal delays as a young child develops (Bentall and Lowe, 1987). Suppose a child is able to place "waiting" into an if … then relational frame with "getting more." Via a frame of opposition, "not waiting" will probably now be in an if… then frame with "getting less." Getting a reward after not waiting may now be less reinforcing, because by derivation of a relation, the consequence received after not waiting will be in a comparative relational frame with the verbally known alternative that would have been received had the child waited. In a relational analog to behavioral contrast, when the consequence for impulsive action is obtained, its reinforcing effect will very likely be reduced through a transformation of stimulus functions through this comparative relation. If put into verbal form this process could be expressed as something like "this is no good - this is less than I would have gotten." We are not arguing that the child must say such a thing for impulsivity to be reduced – although about the time that relational responding is sufficiently strong to have these effects, statements of this kind will also be likely. The relational (cognitive) processes that make it possible for children to regulate their own impulsive responding from an RFT perspective are:

a) coordination and temporal / causal relations, at a minimum,

b) the transformation of stimulus functions in terms of these relations that can allow uncontacted "consequences" to have stimulus functions,

c) a sufficient history of rule-following that has led to successful contact with previously verbally constructed consequences,

d) comparative relational responding that can lead to

e) the reduction in the relative value of immediate, small, contacted consequences over larger, delayed, verbally-contacted ones via a transformation of stimulus functions, and,

f) rule-following based on this verbal comparison.

Skinner's idea that "a person who has been 'made aware of himself by the questions he has been asked is in a better position to predict and control his own behavior" (Skinner, 1974, p. 35) is true from an RFT perspective, but only in the case of verbal self-knowledge that leads to self-rule following. Nonverbal self-knowledge (responding nonrelationally to ones own responses) should have no such effect, and to our knowledge no reports of that kind are in the literature.

The downside of this same relational process is that self-knowledge of painful events is painful. For example, persons who have experienced a traumatic event seem to re-experience the aversiveness of the event in the report of it. This is not surprising since the verbal report can carry with it some of the functions of the original trauma. Without verbal relations, this effect will not occur. There is no evidence from the nonhuman literature, for example, that a choice following an aversive stimulus will itself become aversive.

Much of psychotherapy is built on the inverse of this same process. For example, a person can go through a past trauma verbally (as we can "in imagination") and change the emotional and other behavioral functions of the stimuli associated with the trauma, such as riding in an automobile for a person who has been in a terrible wreck (see Pennebaker, 1997, for a review). Desensitization and a variety of other verbal exposure processes are built on this process.

7.2.2. 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. There are three of particular importance: the frames of I and You, Here and There, and Now and Then (see Barnes and Roche, 1997a; Hayes, 1984). As argued in Chapter 2, these frames are unlike most of the other relational frames in that they do not appear to have formal or nonarbitrary counterparts. Difference, for example, is based on formal difference or oddity and more-less is based on the nonarbitrary properties of physical amounts. Frames of perspective, however, cannot be traced to such formal dimensions, because the physical properties involved are only abstracted in the context of relational frames. Frames of perspective have no simple nonverbal counterpart, and must be taught through demonstration and multiple exemplars without any use of formal properties. For that reason, they are sometimes called "deictic" relations - literally, demonstrative relations that must be "shown directly" – but these relations are anything but direct. 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 multiple exem-

plars that take advantage of that repertoire. As was discussed briefly in Chapter 2, learning to respond appropriately to (and ask) the following kinds of questions appears to be critical in establishing frames of perspective:

> "What are *you* doing now?"
> "What did you do *then*?"
> "What are *you* doing *here*?"
> "What are *you* doing *there*?"
> "What am *I* doing *now*?"
> "What did *I* do *then*?"
> "What am *I* doing *here*?"
> "What will *I* do *there*?"

Each time one or more of these questions is asked or answered, the physical environment and its formal properties will likely be different. The only constants across all of the questions are the relational properties of I versus You, Here versus There, and Now versus Then. These properties appear to be abstracted through learning to talk about one's own perspective in relation to other perspectives. For example, *I* is always from this perspective *here,* not from someone else's perspective *there. *This issue was first discussed from a behavioral perspective in the following way:

> First, words such as "here" and "there" are acquired which do not refer to a specific thing but to a relation to the child's point of view. For example, "there" is always anywhere else but "here" and "here" is always "from this locus or point of view." Second, children are taught to distinguish their perspective from that of others. Young children have a hard time with the issue of perspective. For example, young children seated across from a doll will, when asked, report that the doll sees what they are seeing. Gradually, however a sense of perspective emerges. A child learns what he or she sees is seen from a perspective. Similarly, a young child, asked what she had for breakfast, may respond with what her brother actually ate, but an older child will not make such a mistake. Through correction, ("No, that is what your brother ate. What did *you* eat?") a child must learn to see seeing from a consistent locus… Suppose a child can give correct answers to the question "what did you *x* ?" where "*x*" is a wide variety of events such as eat, feel, watch, and so on. The events constantly change. In our terms, the seeing and the seeing seeing change. Only the locus does not. Thus, one consistency between the word "you" in such questions and behavior is not seeing or seeing seeing but the behavior of seeing that you see from a particular locus or perspective. Thus, in some real sense, "you" *are* the perspective. (Hayes, 1984, pp. 102-103; emphasis in original)

Frames of perspective build upon simpler relations that are true relative to a given perspective. A very young child can learn "which is your left hand" but this response can be based entirely on a frame of coordination (or no frame at all) at first. The role of perspective in the response "left" emerges only later. Imagine that two children are facing each other when a teacher asks "which way is left?" The two children will immediately point in opposite directions. What makes sense of such behavior is perspective. My left is not necessarily your left. A great many relations of this kind (forward-backward, up-down, above-below, top-bottom, and so on) exist: relations that can be learned without perspective-taking, but that cannot be used in sophisticated form without frames of perspective.

The child's verbal community seems to use the combination of such relational responses and direct multiple exemplars to establish the relational frames of I and YOU, HERE and THERE, and NOW and THEN. The child can construct and respond to a range of relational networks from these three frames. For illustrative purposes, consider the following relational networks:

I-HERE-NOW	YOU-HERE-NOW
I-HERE-THEN	YOU-HERE-THEN
I-THERE-NOW	YOU-THERE-NOW
I-THERE-THEN	YOU-THERE-THEN

In everyday discourse, many phrases may be constructed from these eight relational networks; "I am here now, but you were here then" or "You were there then, but I'm here now" or "You and I are both here now, but I was here then." In actual conversation, of course, the phrases would often include or substitute words coordinated with particular individuals, places, and times (e.g., "It's midday and I am at the airport [HERE and NOW], but Yvonne [YOU] is still at the hotel" [THERE and NOW]). It is important to recognize that these perspective-taking frames are not defined in terms of particular words, such as I and YOU, HERE and THERE, and NOW and THEN. Rather these words are examples of the many C_{rel}s that may control perspective-taking frames. Many other words and contextual features may serve a similar function. For example, "Steven" or "me" (or a person's own name) may be functionally equivalent to I, and "this very spot" my be functionally equivalent to HERE, as in "The car hit me at this very spot." The actual words that function as C_{rel}s are not important; as is the case for all relational framing, the generalized relational activity (similar to what psycholinguists might speak of as "deep grammar") is what matters. With that said, it also seems quite likely that the English speaking community normally establishes perspective-taking C_{rel} functions in words such I, YOU, HERE, THERE, NOW, and THEN.

Once the relational frames of I and YOU, HERE and THERE, and NOW and THEN are established in the behavior of a particular person they become an inherent property of most verbal events for that individual. Whenever the person talks to someone else it will be from the perspective of I located HERE and NOW about events that occurred THERE and THEN. For example, the simple greeting, "How are you?" locates the speaker (I) HERE and NOW, and the listener (YOU) THERE and THEN. In effect, the speaker (I) is asking, HERE and NOW, for a response from the listener (YOU) that will occur THERE (two or three feet away) and THEN (in a second or two).

Even when talking to one's self, a person responds in accordance with these relational frames. Imagine, for example, that a speaker, having spent two hours solving what the speaker considers to be a relatively simple problem, utters the self-deprecating statement "I'm really stupid." In this instance, the statement locates the speaker's current behavior HERE and NOW (having solved the problem) talking about the speaker's behavior THERE and THEN (before the problem was solved). In summary, the relational frames of HERE and THERE, and NOW and THEN establish a constant division between the speaker and the spoken about. The speaker is always HERE and NOW, and the spoken about is always THERE and THEN.

Responding in accordance with the relational frames of HERE and THERE, and NOW and THEN underpins the human ability to evaluate, compare, contrast, and judge all events from a constant perspective. In Western culture most verbally able humans spend practically all of their waking hours responding HERE and NOW to events THERE and THEN as good, bad, easy, difficult, beautiful, ugly, and so on. This constant stream of evaluations is so

pervasive that most of the time we fail to discriminate that an evaluation, HERE and NOW, is an evaluation and is not an inherent property of the event being evaluated. In technical terms, the products of the evaluative processes that occur HERE and NOW become attached to events THERE and THEN, but the relational process itself does not. How often, for example, do we evaluate (HERE and NOW) an individual (YOU) as, say, "obnoxious," and then immediately discriminate the evaluation as an evaluation (that is, thinking of an individual as an obnoxious person is also located THERE and THEN)? In most cases we will respond to the evaluation, conducted HERE and NOW, as being a "genuine" reflection of the person being evaluated THERE and THEN, but the process itself will not be framed relationally at all. In other words, we usually conclude that the person "really" is obnoxious, and miss that we are simply making a personal judgment based on our own personal history of preferences and dislikes.

7.3. THE THREE SELVES

In combination with an elaborated relational repertoire, perspective-taking can establish three types of self: (i) self as the content of verbal relations; (ii) self as an ongoing process of verbal relations; and (iii) self as the context of verbal relations (Hayes, 1995). Stated another way, verbal relations can lead to a conceptualized self, a knowing self, and a transcendent or conscious self.

7.3.1. Self-as-Content: The Conceptualized Self

Perspective-taking frames allow each of us to derive relations between our ongoing unified stream of behavior and a panoply of categorical concepts (e.g., "I'm really stupid"). We can evaluate, interpret, predict, explain, rationalize, and otherwise interact verbally with our own behavior. As soon as we can interact with ourselves verbally (in terms of the frames of I-YOU, HERE-THERE, and NOW-THEN), we begin to form a "conceptualized self." This verbally constructed self may be positive ("Mostly I'm a good and kind person") or negative ("I'm a fraud and a failure"). In constructing a conceptualized self, most of us try verbally to make sense of ourselves and to put our own histories and tendencies into a coherent relational network. In short, self-as-content refers to the descriptive and evaluative relational networks that we construct HERE and NOW when talking about I or ME (or the behaviors of I or ME) located THERE and THEN. A middle-aged man might say (HERE and NOW), for example, that he (I) is a really bad son because he didn't visit his mother before she died (THERE and THEN), but his sister (YOU or not I) is a good daughter because she visited regularly. Self-as-content involves this type of evaluative relational responding in terms of the frames of I and YOU, HERE and THERE, and NOW and THEN.

As discussed earlier, evaluative processes that occur HERE and NOW about THERE and THEN rarely are themselves treated as THERE and THEN. The difficulty in shifting the process of evaluation from HERE and NOW to THERE and THEN also occurs when those evaluative functions are attached to I or ME. If, for example, a married man says (HERE and NOW) "In general, I am a loving, kind, and supportive husband," and his wife disagrees, he will probably defend his self-evaluation quite vigorously. The product of the evaluative process would be defended, but the occurrence of that process would often not be noticed: it

would not itself be viewed THERE and THEN. Only rarely, would he say (HERE and NOW); "You're right. I'm just defending myself. My last statement (THERE and THEN) was based on only some of the data. There are many opinions that I could construct." This can be seen in therapy settings quite readily. Because of the importance of "being right," and the difficulty in catching the process of evaluation:

> …most people come into therapy wanting to defend their particular conceptualized self. They view their positive, or at least familiar ideas about themselves as one would view dear friends. I have had clients tell me in so many words that "I am who I believe myself to be." These same clients, quite naturally, are often defensive and fearful of the changes that might occur by a powerful therapeutic relationship. Even when clients view their conceptualized self as loathsome ("I am bad") that very conceptualization is protected as if a life depended on it. . . . As behavioral therapists, I think we have emphasized content entirely too much. We have been too ready to define certain thoughts as rational, and others as irrational; certain emotions as good, and others as bad. But this kind of categorization is old home week for our clients. It's what they have been doing all their lives. Rather than help them win this war, I think it would make more sense to help the person distinguish themselves from their conceptualized content, however "good" or "bad." It is better to kill off the ossified conceptualized selves that pop up repeatedly in any verbal organism. (Hayes, 1995, p. 95).

As will be discussed in Chapter 12, one of the goals of therapy that makes sense from an RFT perspective is to establish a pattern of relational framing in which self-evaluative functions that are occurring HERE and NOW need to be viewed THERE and THEN. For example, a client's self-deprecating thought, "I'm a failure," located HERE and NOW, becomes just another thought, located THERE and THEN, with no necessary "truth value" beyond its utility.

The conceptualized self is the most readily accessible verbal sense of self, virtually by definition. This sense of self is what we tell others or ourselves about ourselves. It tends to be well elaborated, multi-layered, and rigid. It is well elaborated because the conceptualized self touches on virtually every aspect of life as verbally known (e.g., history, situation, preferences, abilities, private events). It is multi-layered because there are strong social contingencies attached to self in this sense. If people are asked to speak about themselves, they will usually present a sanitized version of the story. It will typically be socially desirable (indeed, it is a sign of psychopathology if it is not, Edwards, 1970), and relatively well worn. If pressed, more negative or difficult material will be presented, but more material will exist that will only be told to close friends, or to no one but oneself. The conceptualized self is rigid because it is historical and a pivot point in reason-giving. History cannot change in a literal sense, and a great deal of the conceptualized self purports merely to report what happened (e.g., "My father was an alcoholic until the day he died. I had a difficult childhood as a result."). This process of reporting is not itself seen THERE and THEN, of course, and thus what is missed is the important role of conceptualizing in the past as conceptualized. Further, the conceptualized self is used as a touchstone in verbal explanations and reasons given to others. The social/verbal community tends to punish the speaker for changing these stories. Suppose a person says "I'm depressed because my father was an alcoholic until the day he died. I had a difficult childhood as a result." If this reason is used and accepted, the person

has created a kind of behavioral trap. Seemingly, the depression cannot change until the past changes, but the past cannot change. If the conceptualized self and its response implications change, the person is "wrong" – a fate that verbal humans avoid at all costs, perhaps due to its pervasive social importance even among very young children. Rigidity of the conceptualized self, and of behavior as it bears on the conceptualized self, is the result. This process may explain why depressed clients who can offer "good reasons" for their depressed behavior tend to be both more depressed and more difficult to treat than other depressives (Addis and Jacobson, 1996).

7.3.2. Self as Verbal Process: The Knowing Self

To understand this second type of self, consider, for example, the training that goes on in forming frames of coordination between the fuzzy set of bodily sensations, behavioral predispositions, thoughts, and environmental situations, and a name for an "emotion." Consider also the training involved in learning to talk about these frames of coordination in terms of the perspective-taking frames (e.g., Oh no, I have that pounding feeling again in my chest [HERE and NOW] – I'm going to panic [THERE and THEN]). According to RFT, humans will have emotions that nonverbal organisms do not because emotions are in large part verbally constructed through complex relational networks. "Depression," for instance, is not simply the loss of energy or sadness that one might see in a nonverbal organism through the presentation of aversive events. It is also the suppression of emotional responding and the relational framing involved in talking about what it feels like to be suppressed in that way (this very property seems to be part of the source of the metaphorical term "depression"). Similarly, anxiety is not simply fear, and pride is not simply a positive history. Human emotion is a complex set of events related together through perhaps complex relational networks.

The reason this type of relational framing is important is that much of our socialization about what to do in life situations is dependent upon this verbal process. Emotional talk is perhaps the clearest example. While conditions, such as anger, anxiety, or sadness, are quite varied in the histories that give rise to them, they are quite similar in the social implications that are verbally related to them. In other words, individuals who are not able on an ongoing basis, to describe and categorize their own behavior (in this example, to apply emotional categories appropriately) have no way of relating their socialization about what to do in life with the highly individualized and changing circumstances in which they find themselves. Emotional talk is the way our culture discusses personal history. It is a kind of talk that cuts across our many differences and provides a common ground for learning how to be human.

A person who has had a deviant history that did not give rise to self-as-process will have a difficult time living a successful life. For example, suppose a young girl has been sexually abused for many years by her father. Suppose during this time expressions of emotion associated with the aversiveness of this experience were reinterpreted, ignored, or denied. For example, the perpetrator might try to convince the child that she actually is not upset when she is. With such a history, the person's sense of self-as-process would be weak. In more technical terms, the perpetrator repeatedly punishes the relational responding typically trained by the wider verbal community. For example, the wider community normally establishes frames of coordination between the term "love," and the provision of physical safety or comfort, whereas the perpetrator often attempts to establish a frame of difference (e.g., "I know it hurts, but you love Daddy, don't you"). In short, the relational framing established by the wider

verbal community with respect to emotional terms are "attacked" repeatedly by a primary caregiver, and thus the abuse victim is left "not knowing what to feel." As an adult, for instance, sexual intimacy may give rise to fear and self-loathing. One of the aims of a therapeutic relationship, therefore, will be to help the person "get in touch with feelings," or in present terms, establish relational framing with respect to emotional terms that coordinate more generally with those operating in the wider verbal community.

Many religious and psychotherapeutic traditions seem to emphasize the importance of this kind of self in the name of openness, sensitivity, or wholeness. It is a bit of a conundrum, because while a knowing self seems so key to empathy, self-control, self-knowledge, personality integration, social sensitivity, and so on, the knowing self also feeds the conceptualized self. The fluid, changing, in the present, kind of verbal knowledge that self as a verbal process provides, can in turn become fodder for the ossified, rigid, explanatory nature of the conceptualized self as these insights become the source of new stories, reasons, and causal constructions.

Behavioral psychologists have pondered how the verbal community can arrange contingencies for self-knowing in which some of the events that are known are not accessible to the verbal community. Skinner (1945) suggested four means by which this can happen. Each of these instances is modified slightly by the concept of relational frames.

The first two instances occur when either publicly accessible stimuli or responses are correlated with private events. For example, a cut arm or wincing and grimacing are treated as correlates of pain. The third involves private stimuli that are correlated with publicly trained verbal discriminations, which become more central as the public behavior weakens. The final process is stimulus induction or metaphorical extension.

What RFT first adds is the importance of bidirectional training in these instances, and with it, comes an increased understanding of the role of private events in behavioral regulation. If we see a deep cut or a grimace when a tooth is touched, we may say to a child "that hurts, doesn't it?" Conversely, a child is also told such things as "be careful with that knife, it will hurt you." Thus, not only are private and dispositional terms used when private events are inferred, they are also used to predict, control, or explain private events. "Pain" is not just what you feel after being cut, it is also what you avoid by avoiding cuts.

The second amplification added by RFT, is a relational process that can give rise to additional private correlates of behavior and to processes of metaphorical extension. For example, a term with a private referent may have been related to a second term that includes public accompaniments. Depending on the relation that is derived, the private term may now be meaningful even though its meaning was not directly trained.

Metaphor is the clearest example of the ways in which derived stimulus relations can establish "private" knowledge. Consider the following therapeutic metaphor: "I want you to watch your thoughts. Imagine that they are coming out of your ear on little placards held by marching soldiers. I want to you to allow the soldiers to march by in front of you, like a little parade. Do not argue with the placards, or avoid them, or make them go away, or chase them. Just watch them march by." This metaphor asks the person to bring relations and functions in one domain to another domain. Thoughts are not written on placards, but this metaphor asks the person to transform that fuzzy set of private events called a "thought" into short written signs. "Thoughts" may never have had such a form previously, but the metaphor may establish precisely such a new function.

In this case, the metaphor asks the person to treat private events that occur HERE and NOW as events that are THERE and THEN. This is a highly unusual function for most people, particularly if they have not had explicit training (e.g., meditation) to establish such a function. The metaphor helps bring the function of dispassionate observation to bear on a class of private events by metaphorically relating it to a domain where these functions already exist (watching a parade go by).

The bidirectional and metaphorical nature of terms coordinated with private events helps explain why emotional and dispositional terms come to be so heavily involved in behavioral regulation (see the section on emotional development in Chapter 9). By relating "hunger" to what occurs privately when one is predisposed to eat, it becomes a relatively simple matter to tell others about such a disposition, to engage in behaviors that will avoid such states, and so on. Details of history can be ignored, a great convenience for the verbal community. Conceived in this way, the private world is an intensely social and publicly useful world. It is how the verbal community speaks with consistency about the conditions that influence behavior. The social construction of a private world allows the individual to function as a social being even with regard to events that are supposedly private. Without this kind of self-knowledge, self-rule following would suffer, because it would not be possible to construct a story about the current situation and about future goals to be pursued in quite the same way.

7.3.3. Self-as-Context: The Transcendent Self

The final aspect of self – self-as-context – is perhaps the most difficult to explain. As indicated earlier, once the perspective-taking frames are established in the behavior of a particular person, they become an inherent property of most verbal events for that individual. Whenever the person talks to someone else it will be from the perspective of I located HERE and NOW about events that occurred THERE and THEN. This inherent property of verbal events serves an important social and communicative function. If I ask you what you did yesterday, for example, I have to be able to trust that the report that is made is from a perspective or point of view that is consistent and predictable. In other words, the speaker is *always* I (not YOU), located HERE and NOW, and the spoken about is always located THERE and THEN. Self-as-context refers to the *I* who is always doing the discriminating (located HERE and NOW). If I ask many, many questions of a person, the only thing that will be consistent is not the content of the answer, but the context from which the answer occurs. "I, HERE and NOW," is the self that is left behind when all of the content differences are subtracted out. This is the sense of self that is most closely related to concepts of spirituality or transcendence. It has these qualities, because consciousness is not thing-like for the person being conscious. One can be conscious of the limits of everything except one's own consciousness, and no thing exists without limits. For that reason, this sense of perspective or self as a place from which things occur does not change once it emerges (around the age of three). Self-as-context is everywhere we have ever been, so far as we know, by definition. It is the sense in which Eastern traditions speak of spirituality, and of God, as everything/nothing. It is the source of such statements as "everywhere I go, there I am." It is transcendent in a directly experienced way.

This sense of self as pure consciousness, or of self-as-context, is critical therapeutically because it means that there is at least one stable, unchangeable, immutable fact about oneself that has been experienced directly, and is not just a belief or a hope or an idea (i.e., self-as-

content). In the context of therapy, it is this kind of stability and constancy that allows a client to confront extreme psychological pain and trauma, knowing in some deep way that no matter what comes up, the client's self-as-context will not be changed. This issue will be considered in greater detail in Chapter 12, and the religious connotations of self-as-context will be considered in Chapter 13.

It should be noted that these three senses of the term "self do not exhaust the behaviorally meaningful uses of the term. We have been focused on the psychological "self from the point of view of the person of interest, because our purpose in this chapter is to examine self-rules and self-knowledge. From the outside looking in, there are many other senses of the term self: self as a biological organism; self as an integrated behavioral repertoire; and so on. We do not mean to say that these other senses of the term are not important – but they are not psychological selves in the same sense, and that is our present focus.

7.3.4. Summary

We have now described the RFT approach to self as verbally known. For RFT the human sense of self is defined by the participation of one's own behavior in relational frames and relational networks. If I am asked what I am doing while taking a walk, for example, many simple responses are possible based on previously established classes of relational framing, such as "walking," "strolling," "ambling," (i.e., coordination) "not running," "not jogging," (i.e., difference). The derived nature of these simple responses may be further enriched, relationally, by the involvement of perspective-taking frames, so that the response might be "I am NOW walking with YOU to the shop (over THERE) which is five minutes away (we will arrive THEN)." Having described these kinds of relational activity we then used this work to distinguish among three different types of self (content, process, and context) that appear to be important for understanding human self-knowledge.

In broad outlines, this approach is not distinct from earlier behavioral approaches. Skinner saw self-knowledge produced by the same kind of questioning that we suppose leads to frames of perspective and consciousness itself:

> I believe that all nonhuman species are conscious in the sense [that]. . . . They see, feel, hear, and so on, but they do not observe that they are doing so. . . . a verbal community asks the individual such questions as, "What are you doing?," "Do you see that?," "What are you going to do?," and so on, and thus supplies the contingencies for the self-descriptive behavior that is at the heart of a different kind of awareness or consciousness (1988, p. 306-307).

Indeed, in broad terms this approach is not distinct from the functional / contextual tradition. William James took much the same direction when he wrote:

> To deny that 'consciousness' exists seems so absurd on the face of it – for undeniably 'thoughts' do exist – that I fear some readers will follow me no farther. Let me then immediately explain that I mean only to deny that the word stands for an entity, but to insist most emphatically that it does stand for a function....That function is *knowing* (1912/1967, p. 3-4)....a given undivided portion of experience, taken in one context of associates, plays the part of a knower, of a state of mind, of 'consciousness'; while in a different context the same undivided bit of

experience plays the part of a thing known, of an objective 'content' (1912/1967,
pp. 9-10).

What is innovative about the RFT approach is not the general direction, but the specifics.
Relational frames provide the behavioral process, and in so doing they make these general
functional and behavioral approaches more specific and coherent. Viewed that way, RFT is
a fulfillment of a functional / behavioral promise. It is a step forward on a path that is nearly
100 years old. It required all that went before, and yet it is new.

7.4. SELF-DIRECTED RULES

Having analyzed the self, we are now ready to deal with the issue of self-rules. In Chapter
5, it was argued that applying pragmatic verbal analysis to one's own behavior could be
extremely useful. For instance, self-monitoring and self-awareness may permit greater self-
control by allowing verbal analytic activities to be related to ongoing activity. Similarly,
responding to one's responses may contribute to evaluating the success or failure of
behavioral efforts. The most important adaptive function of pragmatic verbal analysis,
however, is the construction of verbal rules that allow functions to be augmented or
diminished, for possible outcomes to be detected, and for lengthy behavioral sequences to be
performed with regard to those possible consequences. It is at this point that self-directed rules
enter the picture.

7.4.1. Empirical Research

A number of behavioral researchers have studied self-directed rules in laboratory
settings, most often in the context of schedules of reinforcement. Much of this work has
focused on the suggestion that the main basis for the observed differences between human and
non-human schedule performance could be traced to the effects of self-directed rules on
schedule responding (see Barnes, 1989, for a review). For example, Lowe (1979) suggested
that consistent low rates were observed on fixed interval schedules because human subjects
generated interval-based verbal formulations and then counted out the length of the interval
between reinforcers (e.g., "If I count to 10 and press, I get points"). Consistent high rate
responding was explained by suggesting that subjects were responding according to rate-
based self-directed rules (e.g., "Press fast for points").

Other researchers have examined the effects of shaping and instructing verbal behavior
on schedules of reinforcement (e.g., Catania, Matthews, and Shimoff, 1982). In particular,
this study determined whether shaped or instructed verbal formulations either tracked or
diverged from a subject's schedule performance when the reinforcement contingencies were
reversed. For shaped formulations subjects were asked to write the performance they thought
was required on the reinforcement schedule, whereas for instructed formulations subjects
were simply told what to write down. Reinforcers were sometimes provided for formulations
that did not coordinate with the actual schedule contingencies. Overall, the study showed that:
(i) self generated verbal formulations were subject to shaping just like any other behavior, and
(ii) shaped verbal formulations were more likely to correlate with subsequent schedule
responding than instructed formulations. As an aside, because subjects' verbal formulations

were manipulated and measured during exposure to the schedules, this approach provided a relatively direct measure of self-directed rule control.

7.4.2. Self-Directed Rules and Problem-Solving

Although other studies have been conducted in this area of research (e.g., Rosenfarb, Newland, Brannon and Howey, 1992) the relative dearth of experimental work on self-directed rules fails to reflect what we believe to be the fundamental importance of this research topic. From the RFT perspective, the average verbally sophisticated human produces vast numbers of self-directed rules during each day, some simple and perhaps facile, such as "I must go home and feed the cat," and some more complex and fundamental. Consider, for instance: "I must do something meaningful with my life, and so I must make the right decision now about which career I should choose to follow, but in doing so I should be careful not to sacrifice my personal interests and intimate relationships to that career." From the RFT perspective, the frames of IF-THEN, I-YOU, HERE-THERE, and NOW-THEN are all involved in this complex self-directed rule: IF right decision (HERE and NOW), THEN I will be fulfilled in my career and personal life (THERE and THEN). In this rule, however, some of the terms in the relational network do not possess precisely controlled behavioral functions, and the outcomes of the problem-solving activity are not known – for example, what exactly is the "right decision," and what would the speaker define as "something meaningful?" As a result, this rule generates a type of valuative problem, with strategic problems to be solved once an outcome goal is clearer.

The cat-feeding self-rule is less complex. The problem is purely strategic since the outcome is specified, and presuming that all of the terms in the network possess relatively precise behavioral functions, the problem devolves into a simple matter of when and how to get home, whether there is cat food and so on. These kinds of limited strategic problems involve self-rules, but the role of the self per se is limited. A spouse could just as readily specify the steps to be taken: "Take the car home on your lunch break and feed the cat, using the cat food in the refrigerator." The issues of self enter into the self-rule in this case primarily in the form of the conditions under which the self-rule is generated and in the larger patterns of behavior in which the specific problem participates. For example, the person may have noticed that he was feeling guilty that the cat was home hungry; perhaps the cat was purchased in order to help the children learn to care for others and not feeding the cat properly would present a bad model to the children. It might conflict with beliefs the person maintains about himself, such as "I'm a kind person." Such factors would involve the self in several ways. At the level of process, becoming verbally aware of thoughts about the cat, of feelings of guilt about the cat, or of values regarding child rearing is part of the ongoing process of self-knowledge. Actually going home to feed the cat may involve a conceptualized self ("I am never cruel to animals"). Moreover, if the present analysis is correct, both of these forms of self-knowledge are dependent upon the contextual clarity that this is known from a given perspective or point of view.

The problem that emerges from the complex rule is valuative (see Chapter 5), in that additional relational framing is needed to contact possible outcomes, so as to select among them. For example, a list of pros and cons may be constructed to try to abstract features of the situation that might be contacted (e.g., "being a doctor would be well paid, but the hours are often long and unsociable"). Iterative and metaphorical processes may also be employed to

amplify the behavioral effects of different verbally constructed futures (e.g., "if being a doctor was an animal, what animal would it be?"). No matter how the person attempts to solve this valuative problem, the difficulties involved may be better understood in terms of the three selves outlined previously.

If the person simply chooses a career based largely on self-as-content, little or no contact is being made verbally with many of the important consequences of that decision. Imagine, for example, the person decides to train to be a doctor because "doctors are good people and so becoming a doctor will make me a good person." In this case, it is the verbal construction of self (as content) as a good person that dominates the decision, rather than the verbally constructed future of what it would actually be like to be a doctor. As a result, the person may well find that they do not like being a doctor having spent many years training. A decision based solely on self-as-process might also be problematic. In this case, the person might verbally construct a career as a doctor and decide that it "feels like I would enjoy it." If the decision is made on this basis alone, the person may start training to be a doctor and then give up "impulsively" if at some point it no longer feels good to be a doctor. When a person makes a "good decision" it seems likely that all three types of self play a role. We would argue that self-as-context broadens the scope of the stimulus control, so that neither self-as-content nor self-as-process obtain absolute control over the final decision. In effect, self-as-context provides a psychological space in which the person can contact self-as-content (e.g., I have good eye-sight and a steady hand, so I might make a good surgeon), and self-as-process (e.g., I really enjoy reading medical text books, so I might enjoy being a doctor). In this sense, a more balanced decision can be made in which a broader range of relevant issues is factored into the final choice. Parenthetically, there is a danger with self-as-context in that a decision based only on this self will not be a decision at all. In this case, the person will simply observe all of the thoughts and feelings that show up when the possibility of becoming a doctor is considered, but no choice will ever be made, because there will always be more thoughts and feelings to observe. To make a decision and act upon it requires relinquishing control to both self-as-content and self-as-process.

Self-directed rules and problem-solving constitute extremely complex examples of human behavior. These behaviors play a critical role in some of the most important aspects of being human, such as constructing rules about what to do with one's life, and how to deal with problems that arise in following such rules.

7.5. VERBAL COMMUNICATION REVISITED: THE VERBAL OTHER

In the previous chapter we presented the view that verbal communication is the use of verbal relations to influence the behavior of the listener, and that distinctions among types of verbal communication have to do with the specific purposes, contexts, and listeners involved. Having analyzed the senses of self that emerge from verbal relations, we are in a position to amplify the role of the listener.

The action of the listener as it impacts on that of the speaker need not be verbally known from the point of view of the speaker. In early childhood, as verbal relations are just forming, it certainly is not. Over time, however, as verbal behavior develops, the listener as verbally constructed by the speaker serves C_{rel} and C_{func} functions for the speaker, along with other contextual features of the communicative episode (e.g., the purpose of the communication).

The actual behavior of the listener is also verbally construed, and in extended interactions these verbal relations enter into the ongoing verbal construction of the listener. All of these verbal actions participate in the regulation of the behavior of the speaker.

For example, helpful colleagues have asked the authors of this book "who is the intended audience for your book?" The question is helpful because the answer to that question serves as a relational context for the behavior of writing the book. If the audience is entirely composed of behavioral psychologists, perhaps behavioral terminology should be embraced throughout the book. If it is intended to impact upon others, the use of more accessible terms may be helpful. If students are to be reached, the examples must be clear and technical terminology must be introduced slowly and systematically. If cognitive psychologists are to be reached, issues in the existing cognitive literature must be addressed. These very sentences are examples of the verbal construction of a listener, and an example of the kind of impact they have on the verbal behavior of a speaker.

You can see that the verbal construction of a listener serves a C_{rel} function, but how does it impact on specific verbal relations? To continue with our self-reflective example: Suppose a Relational Frame theorist wishes to speak about a learned pattern of arbitrarily applicable relational activity. A wide variety of terms can be applied to this activity. Learned, relational, operant, functional, contextual, purposive, cognitive, verbal, behavioral, instrumental, effective, historical, mental, arbitrarily applicable, and so on. In particular language communities, or given particular language games, some of these terms will cause miscommunication based on the history of the listener. If the speaker construes the audience as being composed of cognitive psychologists, the word "operant" may not be used while "cognitive" may, because the speaker may have a particular verbal conception of that audience and its history. Previous interactions with such audiences may have lead the speaker to the view that "operant" brings to mind in that audience a limited, mechanistic, formalistic view of purposive, historical behavior. That is not what is meant at all, so the term may be avoided. Conversely, if the speaker is told that the audience is entirely composed of behavioral psychologists, the word "cognitive" may not be evoked while "operant" may. Previous interactions with such audiences may have lead the speaker to the view that "cognitive" brings to mind a dualistic view of behavior in that audience. That is not what is meant at all, so the term may be avoided.

7.5.1. The Three Verbal Others

Perspective-taking leads to both the development of the self and to an elaboration of the verbal other. Perspective-taking can establish three types of verbal other: (i) other as verbal relations about the stable content of the other; (ii) other as verbal relations about the ongoing process of knowing in the other; and (iii) other as verbal relations about the context of verbal relations in the other. Stated another way, verbal relations can lead to a conceptualized other, a knowing other, and a transcendent or conscious other.

The conceptualized other is the normal verbal construction of the listener. The example given above about how one talks about relational frames is an issue of the conceptualized other. "Cognitive psychologists are like x, y, and z" is a verbal construction of the stable content of others' views, history, actions, preferences, and so on. In most verbal interactions, the conceptualized other serves as a C_{rel} for the speaker's behavior, at least to a degree.

The knowing other is more fluid because it is based on a moment-to-moment construction of reactions of the other. This happens commonly in conversation, especially with friends or

others who are willing to share their reactions openly, or with those whom one knows well enough to "read" their expressions and gestures. Successful psychotherapy is often dependent on this level of verbal construction of the other. This level is relevant even to monodies, however, and effective public speakers that are said to be able to "read" their audiences are controlled in part by their moment to moment construction of the audiences' reactions. Sometimes input into this level is deliberately evoked by the speaker (e.g., "did I just offend you?" or "you just thought of your Dad's death, didn't you?"). A sense of the other as process is necessary for the ongoing modulation of the speaker's behavior.

A sense of the transcendent other is relatively uncommon, occurring most often in religious, intimate, or therapeutic relations. This occurs when the speaker is psychologically connected to the listener as a purely conscious person. In this aspect, the speaker and listener are one, since "HERE and NOW" is imputed to be a singular event (i.e., one cannot be HERE and NOW, simultaneously, at different times and places). Perhaps for this reason, the level of self-as-context is associated with a sense of the transcendent other - the two go hand in hand. The difference between speaker behaviors regulated by the verbal construction of a conceptualized versus a knowing listener, is fluidity and modulation. The difference between these forms of communication and that controlled by the verbal construction of a transcendent other, is openness and defusion from the literal importance of content. That point will be clearer after we address these issues in Chapters 12 and 13.

Desynchrony between different kinds of verbal communication in a given speaker may be traced in part to the role of the verbal construction of the other. For example, a person can be very effective in instrumental verbal requests made in formal situations (at stores, in school), but be unable to form an intimate relationship due to an inability to judge the emotional impact of his or her behavior on another, and thus a lack of empathy. Similarly, a person may be able to interact effectively with store clerks but not authority figures, because various aspects of the person's verbal repertoire may be suppressed by constructing a listener as "someone who can judge me."

7.6. SUMMARY

Behavior analysts have paid some limited attention to self-directed rules in the context of schedules of reinforcement, but virtually no attention has been paid to the sheer ubiquity and complexity of this phenomenon. From morning to dusk, a verbally-able human will produce self-directed rule after self-directed rule. Some of these will be rather simple, whereas others will be more complex and will create problems to be solved. The ability to produce self-directed rules and to solve the problems that some of them generate, requires responding in accordance with complex relational networks that include perspective-taking frames.

Perspective-taking is also critical to the verbal construction of the listener. Verbal relations exist because of what they do, and a great deal of what they do is to modify the behavior of the listener. Modulating one's behavior to fit the listener as verbally known is a critical aspect of effective verbal communication.

Given the importance of self-rules and the verbal construction of the contextual features of a communication episode, it is odd that behavioral researchers paid so little attention to these actions in their research. Part of the reason we suspect is the difficulty encountered in

developing appropriate methodologies for measuring private verbal behavior, a topic to which we now turn.

7.7. ASSESSMENT OF SELF-RULES

In light of the RFT analysis of self-directed rules presented in this chapter, one of the important tasks for the relational frame approach to human language and cognition will be the development of appropriate and effective methodologies for studying self-rules, and relational performances more generally. One advantage of a behavioral approach to this topic is that the boundary between public and private is not the same as the boundary between objective and subjective. Private knowledge can be objective in a behavioral approach (see Hayes and Brownstein, 1986, for a discussion of the pivotal role of this idea in behavioral thinking).

As an extension of the same idea, the experimental analysis of public events is a good beginning model of the role of private events. Talking to oneself is not fundamentally different than talking to another; listening to oneself is not fundamentally different than listening to another. For that reason, many of the key concepts of relational framing, rule generation, and rule-following can be worked out in the normal way. However, to understand self-rule generation and self-rule following as they actually occur, more is required.

7.7.1. Talk-Aloud Procedures

There are some circumstances under which it is possible to know, in a functional sense, the self-rules that are present during a given task performance. Stated more boldly, in some circumstances it is possible to know what people are thinking. This argument was first presented in Hayes (1986) and was amplified in Hayes, White, and Bissett (1998).

It was John Watson who first proffered "A good deal more can be learned about the psychology of thinking by making subjects think aloud about definite problems" (1920, p. 91), and he was the first to attempt to use this strategy systematically. In protocol analysis, the subject is asked to talk continuously about what he or she is thinking while accomplishing a task. With the proper set of controls, these protocols are functionally equivalent to self-rules that are not expressed.

These controls have been referred to as the "Silent Dog method" because, like Sherlock Holmes' famous case of the silent dog, it is the *lack* of a behavioral effect of talking aloud in certain key areas (compared to the impact in other areas) that suggests that performance is governed by self-rules and that the verbal protocol is functionally equivalent to those rules. There are three controls that are necessary. First, performance on a task with continuous concurrent talk-aloud must be functionally indistinguishable from performance without overt verbalization. If protocols are functionally identical to self-rules, then it should not matter whether the person speaks aloud or not: what is said is what is already being said privately. Of course, a person may modify their private speech when instructed to make it overt. If this private speech is functioning as a rule, however, such modification should alter task performance since the previously available self-rule is now either not present or not as salient, while modified rules expressed overtly are available.

Second, any of a number of methods of disrupting the continuous stream of self-talk must alter task performance. Self-rules occur spontaneously and continuously in interaction with task requirements. We know that modifying talk-aloud requirements (e.g., "whenever the bell rings, say out loud whatever you thought over the last three minutes") will modify overt protocols (Ericsson and Simon, 1993). If these same modifications do not modify task performance, then we have no grounds to claim that the protocols are functionally related to behavior. In short, we have no reason to suppose that the performance is governed by self-rules.

The more modifications that can be made in continuous talk-aloud performance, the more this control can be applied with precision. If some modifications alter protocols and performance, while others modify protocols and not performance, no firm conclusion can be reached one way or another.

Third, providing these protocols to others engaged in the task must alter task performance in a consistent manner due to the content of the protocols. For example, if a person about to engage in the task is given someone else's protocol and asked to consider this verbal content during the task, providing this material must alter task performance and do so in a consistent and understandable manner related to the protocol. This control makes it more likely that the lack of an effect for requiring talk-aloud compared to not doing so (the first control above) is not because the verbal report is itself automatic or because the task is not rule-governed in the first place. A person who learns to repeat a nursery rhyme over and over while performing a task might produce verbalizations that are not self-rules, but the literal content of this task-irrelevant verbalization is also unlikely to alter task performance significantly in others.

If all three controls are used and the needed pattern of results is obtained, then we can conclude that: a) the behavior is in part governed by concurrently available rules; and that b) the lack of a difference between performance with and without concurrent talk-aloud is explained by the functional similarity of the rules present in the two conditions. That is, the self-rules formulated in the silent condition and the overt verbalizations in the talk-aloud condition are functionally the same.

The set of controls is difficult, and it is not clear that they will be used. Even a few demonstration projects of this kind might provide some reassurance to those who are using protocol analysis that their protocols are reflective of self-rules even when these controls are not used. That would be particularly so if the variables that account for the generation of protocols that do or do nor reflect self-rules were known through a series of "Silent Dog" studies.

7.7.2. Priming and the Transformation of Stimulus Functions

Another method of assessing self rules occurs when private verbal relations give rise to behavioral functions in a consistent manner. Priming is one example that has been used in the behavioral literature (e.g., Hayes and Bissett, 1998) and far more extensively in the cognitive literature.

The prototypical priming effect is shown when a subject more rapidly recognizes that a word is a word when it is preceded by a related word than when it is preceded by an unrelated word or a nonsense word (see Neely, 1991 for a review of the priming literature). For example, a subject will recognize that "bread" is a word more quickly if the word "butter" has immediately preceded it, than if the words "nurse" or "brebneck" have preceded it. Hayes and

Bissett (1998) showed that the effects of priming through relational networks precisely parallels the kinds of results obtained in classic priming studies (Meyer and Schvaneveldt, 1971; use of this method to assess the verbal nature of relational frames was first suggested by Branch, 1994). If expanded, this effect could allow behavioral researchers to know whether events participate in derived stimulus relations. Under some circumstances, this would allow the detection of self-rules, if the proper controls had eliminated external events and the sources of derived stimulus relations involving particular relata.

Priming is a specific example of a more general process: the transformation of stimulus functions. Consider the following example: Suppose a person has learned that a terrorist's word for "bomb" is "fraggle" and the word for "goes off" is "jumjaw." With proper controls, it would be easy to ensure that the relation between these events is entirely derived, and derived via any specific kind of relational frame that we may desire. Now suppose that a nicely dressed person steps into the room, points to a box wrapped in pretty paper, calmly says "In thirty seconds, the fraggle jumjaw," and smiles serenely. As the seconds tick down, the person with the above training may become highly aroused, may run away, may try to throw the box out of the window, and so on, while others in the room without such training might merely wonder who the present is for.

Under proper circumstances, the transformation of stimulus functions may provide a means of assessing self rules by examining the functions that events have, and by inferring the relations that might be necessary for these functions to have occurred. Priming, it can now be seen, is such an example, but so too might be emotional arousal, distraction, attraction, word association, and so on.

7.7.3. Verbal Tests

One method that has been used to assess self-rules since time immemorial in educational settings is the verbal test. Properly structured tests assess the ability to derive verbal relations in specific knowledge domains, and with proper controls, it is possible to be certain that these relations were never trained directly.

A few tests have been designed that are specifically oriented toward an understanding of verbal behavior from an RFT perspective. We will discuss examples of these in Chapter 10, when we discuss education. For example, suppose a child is shown a display consisting of a red spot near the child and a green spot near the experimenter. Suppose the child is asked, "If I were there and you were here, but I was you and you were me, and if near was far and far was near, what color would be near you?" Tests of this kind can assess the strength of relational frames of considerable complexity (by the way, the answer is green).

In a similar way, many existing tests of reading comprehension, reasoning, and the like, are tests of derived relational performances. With proper attention to external sources of control over correct answers, these tests can go a long way toward measuring patterns of self-rule generation and following.

7.8. CONCLUSION

We will need to develop techniques that allow us to identify the units of relational framing that unfold as self-rules are produced, and to analyze how such rules then generate problems

which need to be solved, perhaps through the generation of further self-directed rules. This will not be an easy task, and will require many years of creative and intensive work from many research laboratories. Nevertheless, the ubiquity of self-directed rules and their importance for human psychology must surely make this a worthwhile investment.

With that, we have concluded the presentation of Relational Frame Theory. In the next chapter we will provide a succinct summary of the entire theory, so that all of the threads we have been developing can be reintegrated into the whole fabric of a modern functional contextual approach to human language and cognition.

RELATIONAL FRAME THEORY: A PRÉCIS

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The purpose of this chapter is to summarize some of the key features of RFT and to address some of the common behavioral criticisms of this approach. We have learned from experience that even sophisticated readers readily misunderstand many of the basic concepts of Relational Frame Theory. In order to avoid this as much as possible in this chapter we will state our thesis succinctly, and then we will address each of its major features in the same order in which they appear as emboldened terms in the statement below.

> Relational Frame **Theory** is a behavior analytic approach to **human language and cognition.** RFT treats relational responding as a **generalized operant,** and thus appeals to a **history of multiple-exemplar training.** Specific types of relational responding, termed relational frames, are defined in terms of the three properties **of mutual and combinatorial entailment,** and the **transformation of functions.** Relational frames are **arbitrarily applicable,** but are typically **not necessarily arbitrarily applied** in the natural language context.

8.1. KEY FEATURES OF RFT

This concise statement summarizes the entire first seven chapters of the book. Several of the terms in this statement require amplification and clarification.

8.1.1. Theory

Behavior analysis constitutes a unique approach to the study of psychological events. Although many psychologists consider this approach to science as atheoretical, behavior analysis is in fact richly theoretical. To appreciate this point, one must first understand a behavior analytic approach to psychological science.

As pointed out in earlier chapters, behavior analysts aim to predict and influence the interactions that occur between individuals and their environments. As a means of achieving these goals of prediction and influence, behavioral researchers start with systematic *observations* of individual-environment interactions. Placing a child in an open play area and recording each activity at 10 second intervals represents an example. After sufficient observation, patterns of contextually situated activity will emerge, and thus it becomes possible to predict, for instance, how much time the child will devote to a particular activity, or what activity will likely follow another.

The goals of behavior analysis include influence of the behavioral phenomenon of interest, not merely its prediction. This orientation means that behavioral analyses must seek to identify variables that (at least in principle) can be manipulated. This is what leads behavior analysis toward environmental analyses, not because only the environment situates behavior, but because only the environment can be manipulated to regulate behavior. This feature is why even basic behavior analysis can often be used in applied settings. For example, behavior analysts might study how our child's pattern of activity will change if particular consequences follow certain activities but not others, or what will happen if the child is deprived of access to a particular activity before entering the play area.

The analytic strategy of behavior analysis was surprisingly indirect. As we noted in Chapter 1, behavior analysis was originally a part of animal learning, based heavily on the study of the behavior of pigeons and rats. Even at its inception, Skinner was clear that he was not particularly "... interested in the behavior of the rat for its own sake. The importance of a science of behavior derives largely from the possibility of an eventual extension to human affairs" (1938, p. 441).

The strategy was to seek out generally applicable ways of speaking about behavioral interactions that were sufficiently precise as to be applied, but that were sufficiently broad in scope to yield orderly relationships (this is what Skinner meant by the "generic" nature of the terms of his analysis, Chapter 1, 1938). These ways of speaking are termed *behavioral principles.* For example, when a particular consequence is delivered contingent upon a particular activity, and that activity then increases as a result, this pattern of behavioral change is referred to as the principle of reinforcement.

Knowledge of this principle, and others such as discrimination and stimulus generalization, can easily be used in applied settings to treat behavioral problems (see Martin and Pear, 1999). For example, one could treat an undesirable activity simply by reinforcing a second activity that is incompatible with the first.

A particular principle is considered good or true only if its use helps researchers to deal with the behavior of individual organisms – be they rats, pigeons, young children, undergraduates, or even behavioral scientists (Barnes and Roche, 1997b). Stated more technically, the truth of a behavioral principle is assessed by its functional utility in achieving the goals of prediction and influence with precision, scope, and depth. Precision means that relatively few ways of speaking apply to a given event; scope means that these ways of speaking apply to a variety of events; and depth means that ways of speaking at one level of analysis cohere with (or at least do not contradict) those at another level of analysis (e.g., biology, anthropology). Precision is easy to obtain, but scope and depth are more problematic.

Behavior analysts have focused much of their attention on behavioral principles, which is not surprising given their bottom up strategy in which behavioral principles are not an end in themselves, but instead are analytic tools developed to study complex behavior, especially complex human behavior. The means of this conceptual application is *functional analysis*. When a basic or applied researcher conducts a functional analysis, he or she uses a combination of specific behavioral principles to accomplish an analytic goal with a particular individual. Functional analyses vary widely, because the characteristics of a given situated action may require emphasis on particular principles and not others.

Because of the historical and contextual nature of functional analyses, they are usually thought of only in quite individualistic terms, but sometimes entire sets of functional analyses cohere within a given behavioral domain. This is the essence of theory from a behavior analytic point of view.

Behavioral theories are quite different from the types of theories one usually finds in non-behavioral psychology. Hypothetico-deductive theories attempt to model the underlying mechanisms that mediate the contextual and behavioral features that are directly observed in a given domain. As such, these theories tend to cross levels of analysis. For example, the behavioral domain is often explained by neurological phenomena or inferred mental processes. They are tested using predictive verification or falsification. The meaning of the word "theory" in psychology has been so greatly influenced by the crafters of hypothetico-deductive theories (e.g., Hull, Spence) that this approach is sometimes synonymous with the very word "theory."

Behavior analysts reject such an explanatory strategy. Skinner's famous paper (1950) "Are Theories of Learning Necessary" rightly criticized that approach, but because the alternative was not clearly described it was taken to be a criticism of theory per se. Skinner spent the rest of his life trying to undo the damage, even putting the word "theory" into a title of one of his books (1969), but without complete success.

The resulting misperception that behavior analysis rejects theories is ironic because it is one of the most theoretically oriented fields in all of psychology. Great effort is put forth to acquire and use terms with great scope to analyze behavioral domains. The purpose of that activity is inherently theoretical.

Behavior analytic theories are analytic abstractive (Hayes, 1995). *Analytic abstractive theories* are simply organized sets of behavioral principles that are used to help predict and influence behaviors in a given response domain. They are, in other words, coherent sets of functional analyses. This kind of theorizing is not hypothetical and mediational, but descriptive and functional. Analytic abstractive theory is used to shed light on the nature of psychological events within an important domain; the events are not used to shed light on the theory (Hayes, 1996). Suppose, for example, that particular forms of self-injurious behavior

were shown to be maintained by particular sensory reinforcers. If this abstraction held across many individuals, within this behavioral domain we could speak of a "sensory reinforcement theory" of self-injurious behavior. The relationship between behavioral principles and behavioral theories parallels precisely the relationship between behavioral observations and behavioral principles. In both cases, the shift is from the specific to the general case. The behavior analyst thus aims to increase the scope of his or her analyses while also maintaining precision.

Relational Frame Theory is a theory in this specific sense. It is an abstraction built up for a functional analytic approach to derived stimulus relations. It attempts to explain certain key features of human language and cognition by drawing on a specific set of interrelated behavioral principles. It is tested by its ability to increase the level of prediction and influence over these phenomena.

8.1.2. Human Language and Cognition

The domain of verbal behavior from an RFT perspective should be very clear by now, because quite specific functional definitions have been offered of verbal behavior and verbal stimuli. It is worth restating that our definitions are functional for the organism of interest. Verbal behavior is the action of framing events relationally, and verbal stimuli are stimuli that have their effects because they participate in relational frames. Both speakers and listeners are functionally verbal, without an appeal to the history of some other organism.

This approach allows language and cognition to be addressed in a more rigorous fashion. We began our analysis of language and cognition by refusing, in Chapter 1, to define them beyond their lay definitions. While we still do not propose to treat these terms as technical ones, they can now be reexamined from the point of view of RFT.

A "language" (from the Latin root *lingua* or "tongue") is simply a conventional set of words and rules for word combinations within a particular group – it is a "tongue." Considered as such, language is not a psychological event, but it is based on a psychological event: verbal behavior. Words are simply conventional stimuli that participate in characteristic relational frames. Rules of word combination are conventional contextual cues that disambiguate derived relational responses and the transformation of stimulus functions within a specific group.

What about the word "cognition?" It is helpful to examine what cognition means in lay language. The word "know" in English comes from two quite distinct Latin roots: *gnoscere*, which means "knowing by the senses" and *scire,* which means "knowing by the mind." In the usual human conception, knowing by the mind (knowing things "consciously" – another word from the same root ... as is "science" itself) is familiar, while the unconscious, nonverbal processes that encompass "knowing by the senses" seem strange and hard to understand. Behavior analysis turns this the other way around (Philip Hineline, personal communication). Knowing by direct experience, or contingency-shaped behavior, is something we understand quite well. Verbal knowledge, or "knowing by the mind" is strange and hard to understand. While in lay terms "cognition" refers to knowing in the broadest sense (oddly, it comes from the root *gnoscere,* not *scire*), in psychology it seems now to be synonymous with "knowing by the mind."

Relational Frame Theory views "knowing by the mind" in terms of behavioral functions that are established through networks of derived stimulus relations. Relational behavior is

what "minds" are full of. These relational responses enable other forms of activity that could not occur otherwise. Said another way, cognizing is relating, and thus we see no reason not to speak of "cognition" particularly when the private nature of a relational response may make it awkward to speak of language. Cognition is not a mental event, it is a behavioral event, and there is no reason that a psychology of cognition cannot be a behavioral psychology.

The final word to be analyzed in this section is the word "human." One of the common criticisms of behavior analysis is that the basic principles it has identified, largely with rats and pigeons, cannot handle the richness and complexity of human language and cognition. We find ourselves in partial agreement with this criticism. The traditional focus on nonhumans was based on the idea that the principles of behavior identified with such populations would be generally applicable to humans, as we have noted several times before. This form of the continuity assumption was a strategic assumption: it was a means to an end. It was not a categorical assumption – that is, one that is fundamental to the conceptual coherence of the field. This is why Skinner warned that "We can neither assert nor deny discontinuity between the human and the subhuman fields so long as we know so little about either" (p. 442, 1938), and that "It is possible that there are properties of human behavior which will require a different kind of treatment" (p. 442, 1938).

The continuity assumption is sometimes presented as if it is built into evolutionary theory, but as utilized by behavior analysis, it is not. The evolutionarily sensible form of continuity assumes that new contains old. There is no guarantee or assumption that old contains new. Biological evolution itself would be turned into nonsense by such an assumption. When we look across tips of evolutionary branches we are not looking back in time: we are always looking both back in time (to the point at which specific species differentiated) and forward in time to the present. Thus, discontinuity across present day species would in no way contradict a biologically sensible form of the continuity assumption.

The strategic assumption of behavior analysis is simply that it will be useful to begin an analysis of complex human behavior with principles that are so high in scope as to apply across tips of evolutionary branches. That strategy paid off handsomely for behavior analysis. The great majority of the techniques used in applied behavior analysis are derived in large part from basic research with nonhumans.

Where this strategy has been less useful is in areas in which human verbal behavior dominates. Arbitrarily applicable relational responding occurs readily, even with human infants and with difficulty or not at all with nonhumans. After thirty years of behavior analytic research on derived stimulus relations, that statement is still true. We do not need to take the stand that nonhumans will never show derived stimulus relations in order to begin to launch an extensive and coherent program of basic research into these processes in human beings. The findings will be no less useful and no less scientific simply because they will not necessarily generalize across tips of evolutionary branches, any more than, say, the finding that operant conditioning does not apply to bacteria would limit the validity of such findings in birds or mammals. All that is needed is that behavioral researchers must not be so wedded to this strategic assumption that alternative strategies cannot be pursued.

Relational Frame Theory is oriented toward human language and cognition. Whether the richness and complexity of human language and cognition may yet be shown to be in the same functional class as behavior studied with other organisms is yet to be determined. Only empirical research, not assumptions, will resolve this issue. This is precisely the view adopted by RFT.

If the answer is no (i.e., language and cognition will not yield entirely to principles derived from nonhuman research), it means simply that processes emerged in one evolutionary branch and not another. What was new could be extremely small, and yet produce huge differences in behavioral outcomes. Metaphorically, a person standing at the edge of a cliff may step forward an inch and fall hundreds of feet. The step was not large: only the outcome was large.

If this is the conclusion we are eventually driven to, what kind of processes could produce such an effect? The ability of a listener to derive a bidirectional relation readily from multiple exemplars would be a ready nominee. All primates may run or hide when they hear clear cries of danger and run, but even a single individual could have a significant behavioral advantage over others if in similar contexts a weak cry of danger is "heard" through the derivation of a bidirectional relation. Such a weak substitutive cry might not elicit running, but it might prime the animal to sense danger, to see rustling of weeds, to hear a predator, or to run just a bit more quickly if a real cry of danger is emitted. As this small difference gains prevalence in a gene pool, a group of listeners capable of deriving bidirectional relations could be created, enabling speaking that is based on bidirectional relations to be socially reinforced. Thus, the biological evolution of a capacity for bidirectionality in a listener would set the stage for the cultural evolution of verbal communities, particularly for purposes of immediate social control and environmental regulation. Like a cork being pushed out of a bottle of champagne by rapidly alternating pressure from opposing thumbs, cultural evolution would ever so gradually make use of these abilities in these two areas until the self-amplifying loop of language and culture caused a full blown social/verbal community to explode on the scene with verbal reasoning, planning, problem-solving, written language, religion, philosophy, sense of self, literature, science, technology, and so on.

The history of humankind seems to be the history of some sort of process of that very kind. It seems odd to hold on to a biologically invalid form of the continuity assumption in the face of the obvious fact that the progressivity of human knowledge is not like that of other species. There is no question that there is a difference between humans and other animals. The question is "what is the difference?" Traditional behavior analysis answers that it is complexity, without providing an adequate account for that complexity. Complexity could still end up being the correct answer, but it seems to us that relational frames provide a more coherent and empirically sensible working answer.

8.1.3. Generalized Operants

A relational frame, as an analytic unit, is conceptualized as a three-term contingency. For RFT, the contextual cue is the third term, the relational response (e.g., responding to stimulus B in terms of A and responding to A in terms of B) is the second term, and a history of differential reinforcement correlated with the contextual cue is the first term in the contingency. From this perspective, therefore, responding to B given A and to A given B, may be considered as a single response unit controlled by a relevant contextual cue (or cues) by virtue of its previous correlation with differential reinforcement. In effect, the RFT approach invokes a purely functional concept of an operant, and the term "overarching operant class" (e.g., Barnes, 1994, 1996; Barnes-Holmes and Barnes-Holmes, 2000; Hayes, 1992) is used to emphasize this fact.

This issue was worked through in some detail in Chapter 2 and thus will only be outlined here. The concept of a response class with an infinite range of topographies is a defining property of operant behavior, and has been from the very beginning (e.g., see Skinner, 1938, p. 33-41). Nonetheless, topographical and functional classes of behavior-environment interactions quite often overlap, and thus the two may become confused. Sometimes, however, the independence between topographical and functional classes is made very clear, and behavioral researchers often emphasize this with qualifying words like "generalized" or "overarching." No new type of operant is supposed by these terms – the qualifiers are merely to avoid confusion. A great many analyses of this kind are in the behavioral literature, including research in the areas of imitation (e.g., Baer, Peterson, and Sherman, 1967; Gewirtz and Stengle, 1968; Poulson, Kymissis, Reeve, Andreatos, and Reeve, 1991), attending (McIlvane, Dube, Kledaras, Iennaco, and Stoddard, 1990; McIlvane, Dube, and Callahan, 1995), identity matching and mismatching (e.g., Cumming, Berryman, and Cohen, 1965; Dube, McIlvane, and Green, 1992; Saunders and Sherman, 1986), exclusion (e.g., Lipkens, Hayes, and Hayes, 1993; McIlvane, Kledaras, Munson, King, deRose, and Stoddard, 1987), arbitrary assignment (e.g., Saunders, Saunders, Kirby, and Spradlin, 1988), one-trial learning (e.g., Catania, 1996; Dube, et al., 1992), randomness (Neuringer, 1986), and novelty and creativity (Pryor, Haag, and O'Reilly, 1969), among many other areas.

While the conceptual and empirical tradition in this area is clear, it is true that research on the determinants of operant class formation in those cases in which there is minimal overlap between function and topography is more limited than in the typical, topographical sense (see Pilgrim and Galizio, 2000). RFT suggests possible sub-components that might have been shaped as part of the overall establishment of relational frames, but that ultimately is an empirical question. The research relevant to this question is growing, however. There are several particularly important properties of discriminated operant behavior (Hayes, 1994): (i) operants develop, (ii) operants are flexible and can be shaped, (iii) operants can come under stimulus control, and (iv) operants are controlled by their consequences. If deriving stimulus relations is to be viewed as operant behavior, all four of these properties should apply. Supportive research has been provided on all four points (e.g., Barnes, Browne, Smeets, and Roche, 1995; Barnes and Hampson, 1993, 1997; Barnes, Hegarty, and Smeets, 1997; Dymond and Barnes, 1995, 1996; Lipkens, et al., 1993; Roche and Barnes, 1996; 1997; Roche, Barnes, and Smeets, 1997; Roche, Barnes-Holmes, Smeets, Barnes-Holmes, and McGeady, 2000; Steele and Hayes, 1991; Wilson and Hayes, 1996).

8.1.4. History of Multiple-Exemplar Training

One important question raised by the RFT interpretation of derived relational responding, as a form of generalized operant behavior, concerns the reinforcement histories that are required to produce various repertoires of relational framing (see Hayes, 1991). For example, some researchers have asked whether equivalence responding requires explicit training in mutual and combinatorial entailment, or in mutual entailment alone (e.g., Boelens, 1994; Home and Lowe, 1996).

From an RFT perspective the exact nature of the histories involved is largely an experimental issue. The specific historical details are not specified a priori but are left as important empirical questions that will need to be answered. Consider the following quotation from Hayes and Wilson (1996):

How much and what kind of training is needed for generalization of a relational response is an empirical matter. However, the general logic of RFT suggests that at least some direct training in combining relations (e.g., both $A \Rightarrow C$ and $C \Rightarrow A$ training [following $A \Rightarrow B, B \Rightarrow C, B \Rightarrow A,$ and $C \Rightarrow B$ training]) is necessary. Using RFT terms, this point has been made explicitly in early expositions; for example equivalence emerges because "mutual entailment, combinatorial entailment and transfer of functions are directly trained" (Hayes. 1991, p. 25). It is important to note here that combinatorial entailment subsumes both $A \Rightarrow C$ and $C \Rightarrow A$ relations. It does seem likely, however, that once the most basic relational unit is established through training in mutual and combinatorial entailment, relatively fewer trained instances of combinatorial entailment will be needed to build out this relational response. Were it not true, every level of relational complexity (e.g., with larger and larger sets of related stimuli) might have to be arduously trained. Consider, for instance, a case in which one was taught to select B in the presence of A, C in the presence of B, D in the presence of C, and so on to the 100th node. We doubt that an individual would have to have a history of direct training to match the 100th stimulus to the 1st, the 100th to the 2nd, the 98th to the 1st,… and so on for all possible transitive and equivalence relations among the 100 stimuli. At some point RFT would predict that the operant of combining relations would itself generalize (p. 227).

While the details of history are not specified in RFT, the form of that history is specified. Like all operants, we suppose that relational operants are shaped through contingencies involving multiple exemplars. In keeping with the inductive nature of behavior analysis, this concept of the relational operant will gain or lose strength through basic and applied research rather than logical analysis per se. Such research will involve, for example, identifying the nature and number of multiple exemplars that are needed to establish particular repertoires of relational responding. This should be a relatively straightforward matter (see Barnes and Hampson, 1993,1997), because the definition of a relational frame has been clearly outlined, and generic predictions have been made with regard to the types of histories that are required for relational framing to emerge (Barnes, 1996; Hayes, Gifford, and Wilson, 1997).

On balance, critics of RFT often agree that a history of multiple-exemplar training could generate generalized identity matching, for example, because the physical property of identity can be abstracted across the various common pairs of stimuli employed during the training (e.g., red with red, green with green, etc.). However, when each of the stimulus pairs is arbitrary and thus has nothing in common (e.g., red with triangle, green with circle, etc.), such critics claim that it is difficult to see how abstraction could occur, because there is no common physical property to be abstracted. These critics argue, therefore, that some other process (possibly verbal), in addition to multiple-exemplar training, is needed to mediate derived relational responding. Sidman (1994), for example, put it this way:

> … I find it difficult to see how a common response … to exemplars that have nothing in common except the relation could arise in the absence of a highly complex verbal repertoire… A linguistically naive organism's abstractions among commonalities from a set of exemplars that share no physical feature requires more of an explanation than just a history of experience with the exemplars (pp. 556-557).

There are several behavior analytic responses to the argument that a mediating behavioral process is needed to account for the effect of multiple-exemplar training on derived relational responding.

1. This kind of criticism seems to us to represent an unwarranted intrusion of mechanistic and topographical thinking into the functional approach taken by behavior analysis. Although in many instances structural or topographical features of a particular response or stimulus class may be identified in operant contingencies, there is no reason to assume that all operant classes must possess such structural properties, and there is a body of literature mentioned above to suggest otherwise. Of course, behavioral researchers are free to adopt a structuralistic, mechanistic approach to instrumental responding, but in doing so they are challenging the purely functional nature of the operant – an approach that is as old as behavior analysis itself: "in the case of conditioned operant behavior the defining property of a class is exactly that given by the conditions of the reinforcement" (Skinner, 1938, p. 38). The only restriction on the definition of an operant ever recognized in the Skinnerian tradition is the need to demonstrate an orderly functional relation (Skinner, 1938, p. 40). Conversely, to "insist on the constancy of properties that can be shown not to affect the measurements in hand is to make a fetish of exactitude" (Skinner, 1938, p. 40). If behavioral researchers wish to insist on a non-functional definition of the operant, they should state what that new definition is and defend it on conceptual and empirical grounds.

2. The concept of a relational frame emphasizes stimulus relations as the defining property of the functional response class. In line with the behavior analytic tradition, if a focus on that property of responding gives rise to orderly functional relations, then the definition is successful. While the wheel is still in spin on this point, a great deal has happened in the years since Relational Frame Theory was first presented in 1985 (Hayes and Brownstein, 1985). A large number of studies (listed earlier in this chapter and reviewed throughout this book) have explicitly examined the possibility that arbitrarily applicable relational responding can be thought of as a functional response class. So far as we are aware, every examination of this issue to date has been supportive of a functional conception.

The body of research that has been generated within the conceptual framework of RFT has progressed without appealing to any form of mediating behavioral process. Postulating such a process seems not to be required in order to mount a behavior analytic research program into derived relational responding. On both of these functional grounds there is no immediate need to posit any additional behavioral processes beyond that of a learned functional response class, based on multiple exemplars.

That does not mean that RFT is a molar theory that is silent on more molecular components of a relational response. For example, indirect reflexivity (Barnes, 1994; L. J. Hayes, 1992) may occur when one stimulus comes to elicit some of the perceptual or other functions of a second stimulus, and those functions could then serve as a contextual cue for a symmetrical or other response (the concept of "relational reflexivity," Steele and Hayes, 1991, is a somewhat similar conception). These possibilities can be explored if researchers are interested in a more molecular examination of relational responding, but they do not reduce the importance of a functional account and they are not mediating variables.

3. Although there are currently two behavioral theories that explicitly postulate mediating processes as a means of explaining derived relational responding, these theories are less parsimonious than RFT. The details of these theories are not important here. What does matter, is that upon close inspection both theories postulate a mediating process and draw on

multiple-exemplar training as an explanation for the controlling properties of the mediating processes themselves. The two processes in question are the higher-order name relation (Home and Lowe, 1996) and joint control (Lowenkron, 1998). With regard to the former, Lowe and Home (1996) explicitly stated that the higher-order name relation only functions as such after it has been repeatedly reinforced across numerous novel objects (i.e., multiple exemplars):

> With each reinforced repetition of the name relation, perhaps as new object class members are encountered (e.g., a new dog, a new chair), naming as a functional higher order class is further strengthened. Thereafter, explicit reinforcement by caregivers for new name relations becomes less important as the automatic reinforcing consequences of naming things become the more potent source of control (p. 318).

Similarly, Lowenkron (1998) suggested that the process of joint control comes to determine object selection because the controlling relationship between joint control and object selection is incidentally reinforced across a number of exemplars (see p. 334). In effect, the theories of both Home and Lowe and Lowenkron each posit two separate behavioral processes – a mediating process and a process of multiple-exemplar training that provides the former process with its controlling properties. In contrast, RFT can account for derived stimulus relations more directly. Naming, joint control, indirect reflexivity, and the like, can be viewed as aspects of specific kinds of relational responses given specific histories, but they are not necessary to the relational operant as such. Consequently, RFT appears to offer a more parsimonious approach to explaining complex behavior than the alternative approaches offered by the concepts of higher-order naming and joint control.

8.1.5. Entailment and the Transformation of Functions

RFT makes a distinction between entailment relations (i.e., mutual and combinatorial entailment) and a transformation of functions because many different patterns of transformation may occur, and it is scientifically useful to discriminate these patterns from each other. It should be acknowledged, however, that a relational response is itself a kind of transformation of stimulus function. Indeed, as discussed in Chapter 2, that is part of what is new about arbitrarily applicable relational responding. Sidman (1986) argued that equivalence relations involved a reversibility of stimulus *functions,* an idea similar at the level of outcome, if not process, to the current account. It still seems necessary, however, to distinguish relational functions (which are a kind of learned transformation of stimulus functions) and a transformation of stimulus functions that occurs in terms of an existing derived stimulus relation.

8.1.6. Arbitrarily Applicable versus Arbitrarily Applied

Relational frames are arbitrarily applicable in the sense that cues can be provided for relational responses based on social whim or convention. This is the property that makes relational framing inherently a form of social behavior. Indeed, much as in Skinner (1957), the training history of the "social mediator" is particularly important for that reason. The

history of the audience does not define the functional unit of language in RFT, but such an audience does the practical work of establishing relational frames.

Although relational frames are arbitrarily applicable, they are not commonly arbitrarily applied in natural language settings. It is relational responding freed from the nonarbitrary stimulus control of the related events that is at the heart of relational frames. The field was fortunate to have the phenomenon of stimulus equivalence as a model on this point, because part of the lure of structure in accounting for language is the tendency to account for stimulus relations via shared formal properties and thus to miss the key feature.

In the normal language situation, however, these relational abilities are brought to bear on the physical world. Language in use is far from purely conventional. Verbal relations allow us to break up and reorganize the properties of the natural environment, and thereby interact more effectively with this verbally analyzed environment. Verbal relations are arbitrarily applicable but are rarely arbitrarily applied outside of symbolic logic classes or equivalence experiments.

The exercise conducted in Chapter 3 in which two nouns were randomly related is illustrative. The answer to the question "How is a kangaroo like a chair" – whatever it might be - will be justified by an appeal to formal properties, but it is unlikely that these properties would control the nonarbitrary relational capabilities of nonverbal organisms. In other words,

> the formal properties used to "justify" such relational activities are themselves abstracted as a result of these same relational activities. If it is always possible to answer such questions we must either suppose that all objects are related in all ways to each other, or that such relations are arbitrarily applicable and that formal properties are context for such activities but not the source of them. (Hayes, 1994, pp. 23-24).

Most of the RFT research to date has focused on the largely conventional or arbitrary nature of relational frames. However, future research will clearly need to examine more closely the role of formal properties in the contextual control of arbitrarily applicable relational responding. Research on the derivation of rules and their application to the natural environment (i.e., problem-solving), on social persuasion and communication, and similar topics will provide a natural impetus for this expansion of the RFT research program.

The development of relational responding can be organized into a rough list that gradually becomes more and more complex. We are not presenting this list as a set of stages or steps, and we would expect them to be sequenced only in broad terms and even then only if the training history is typical. Nevertheless, this list gives a sense of the complexity that emerges from the small set of core concepts in Relational Frame Theory.

1. Contextually controlled mutual entailment in equivalence
2. Contextually controlled combinatorial entailment in equivalence
3. Contextually controlled transfer of stimulus functions through equivalence relations
4. Integration of these response components into a functional response class: a frame of coordination
5. Simple examples of verbal understanding
6. Contextually controlled mutual entailment in additional types of stimulus relations

7. Contextually controlled combinatorial entailment in additional types of stimulus relations
8. Contextually controlled transformation of stimulus functions in additional types of stimulus relations
9. Integration of these into additional relational frames
10. Simple examples of genuinely verbal governance of behavior by others
11. Conditional contextual control over the participation of given elements in relational frames
12. The development of relational networks
13. More complex examples of verbal understanding
14. Verbal governance of the behavior of others (e.g., verbal mands and tacts)
15. Transformation of stimulus functions across relational networks
16. Increasing number and complexity of relational frames
17. Increasing acquisition of specific participants in specific relational frames (e.g., vocabulary)
18. Complex interactions between relations (training in one influences development of another)
19. Integration of related types of relational frames into families of relational responses
20. Elaborated and increasingly subtle contextual control over relational responding (e.g., syntax; number of relational terms)
21. Elaborated and increasingly subtle contextual control over transformation of stimulus functions (e.g., number and specificity of functional terms)
22. Nonarbitrary properties serve as a relational context for arbitrarily applicable relational responses
23. Increasingly complex relational networks
24. With acquisition of equivalence, time or causality, and evaluation, the development of relational sentences that function fully as rules
25. Relating relational networks
26. Transformation of stimulus functions based on the relating of relational networks
27. Relating relational networks under the control of nonarbitrary properties of the environment
28. More complex examples of rule understanding and rule-governance, particularly pliance and tracking
29. Regulation of the behavior of the listener through the establishment of relational networks in the listener
30. With the acquisition of hierarchical class membership, use of relational networks to abstract nonarbitrary properties and to have these properties participate in relational frames
31. Abstracting properties of the nonarbitrary environment based on relational networks and the relating of relational networks
32. With the acquisition of temporal, contingency, and causal relational frames, increased insensitivity to temporal delays
33. Development of deictic relational frames
34. Development of perspective-taking and sense of self
35. Construction of the verbal other
36. Construction of the conceptualized group

37. Contextual control of relational responding by the nonarbitrary and arbitrary properties of the listener
38. Further development of rule-following, particularly augmenting
39. Regulation of the behavior of the listener by orienting the listener to abstracted features of the environment
40. Acquisition of increasingly abstract verbal consequences
41. Self-rule generation and self rule-following
42. Pragmatic verbal analysis and increasingly complex forms of problem-solving and reasoning
43. Increasing dominance of the verbal functions of the environment

The foregoing provides a summary of the key features of RFT. The key concept that underlies Relational Frame Theory is extremely simple – try to think of relating *per se* as learned behavior. As the list above shows, however, applying this simple idea leads to many specific points – the nature of an arbitrarily applicable relational response, the role of context, the varieties of relational responses, the role of the nonarbitrary environment, networks of relations, the use of these abilities to solve problems, the development of self, and so on. Each step seemed demanded by the core idea, and when we developed new terms it was because no existing term would do.

We can simplify this list. Globally, there are three pillars of Relational Frame Theory as it is amplified into a comprehensive new approach to language and cognition: relational frames, relational networks, and abstraction from and transformation of the nonarbitrary environment. Each of these is implicit in the others and all are developing simultaneously, but what is barely seen at one level becomes dominant at another. Archetypal examples of these three pillars are naming, story telling, and problem-solving, respectively.

What is exceptional about relational frames per se is their arbitrary applicability. Only a social/verbal community can reinforce and maintain relational responding under the control of arbitrary contextual cues. Framing is made useful to a child through the social mediation of others. This level of simple relational frames (naming, making distinctions, comparing, requesting) would have little utility beyond its immediate social effects, however, unless this complete arbitrary action enabled indirect behavioral functions. These functions become evident at the level of relational networks. As a child begins to understand simple stories, for example, s/he finds great entertainment in contacting indirect perceptual and other basic functions. The child imagines, becomes more verbally-governed, and is able to regulate the behavior of others in more sophisticated ways as a result. The level of simple relational networks (stories; analogies; describing) would have little additional utility, however, unless the natural environment itself became more verbal. Verbal abstraction of features of the environment allows the application of these relational behaviors to the analysis and regulation of the environment. We can see and solve problems in a new way, and the world in which we live becomes gradually more and more entangled in relational networks. That is not all to the good, a point we will make later, but in evolutionary terms it has been tremendously successful. It has enabled art, science, and technology, and has lead to knowledge amplification at a rate that is a universe away from that which is possible based on other behavioral processes.

If Relational Frame Theory is valid we must rethink all of behavioral psychology as it applies to verbal organisms. Language and cognition are keystone behaviors in so many areas,

that if the processes involved in these domains are new, the analyses must also be original. Further, if arbitrarily applicable relational responses themselves modify how behavioral processes work, then even the most basic behavioral preparations with human beings need to be reexamined and reconsidered. In Part II we will begin to do some of that work, but in truth it would take dozens of laboratories many years to do what is needed. It is not clear that this will happen, but from the point of view of Relational Frame Theory it is clear that it needs to be done.

9

PSYCHOLOGICAL DEVELOPMENT

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In attempting to describe and explain human development, behavioral psychologists generally argue that developmental consistencies are the product of relatively stable environmental contingencies supporting increasingly complex behaviors (Gewirtz and Pelaez-Nogueras, 1992). Behavioral changes, they suggest, result largely from changes in environmental contingencies and features of the current context within which a given behavior is located. The contingencies are thought to interact with an individual's history (e.g., the behavioral repertoires that have already been established) with regard to both behavior change and developmental consistencies (see Rosales-Ruiz and Baer, 1996 for a more complete account of this distinction).

The challenge of development from a behavioral approach is not so much change as constancy. A behavioral perspective is focused on ongoing streams of organism-environment interactions. Change is assumed and expected. Given the important role attributed to this stream of an individual's history, why would such order and progression in children's development be found? The conclusion drawn by many is simply that "the child's environment, especially the social environment, does a great deal of teaching in an orderly way" (Rosales-Ruiz and Baer, 1996, p. 176). Furthermore, some behaviors can be more susceptible to change and some can be more complex than others. These factors might also produce orderly change. It is not possible to run before walking, and in the same way, a rough natural ordering of complexity in the verbal domain could produce orderly processes of development.

A rough ordering of relational skills in terms of complexity was outlined in the previous chapter, providing a start on the topic of development. As should have been clear, although RFT is quite parsimonious at the level of psychological process, quite a complex picture can result from these few core concepts. There are limited data on development from an RFT perspective, so a plausible sketch of this kind is all that the current situation affords.

Another way to approach a developmental analysis, however, is to examine concrete domains of development and to see if the RFT analysis illuminates these domains. That is what we propose to do in this chapter, focusing on some traditional areas of developmental concern. A significant problem in mapping an RFT view of cognitive development onto traditional areas of developmental concern is the spread of the core RFT concepts. From an RFT perspective, relational frames enter into virtually all developmental changes, and become a defining feature of complex human behavior and psychological maturity. The traditional distinctions between cognitive, linguistic, social and emotional development simply do not apply with the traditional force. Nevertheless, for present purposes, it seems best to present our RFT analyses within the same broad categories as those normally found in the traditional developmental literature; cognitive, language, emotional, and moral development.

9.1. COGNITIVE DEVELOPMENT

Approaches to cognitive development across the lifespan have traditionally adopted an organismic, structuralist, and stage-oriented perspective. Typically, these conceptions reflect an organicist world view (Pepper, 1942) in which the root metaphor is that of an unfolding organic system. Piaget (1976) provides a well-known example. Piaget assumed that higher psychological functions grow out of developing biological mechanisms. His primary concern was to *describe* the development of the child's basic cognitive concepts and systems, and to delineate this in a stage-like sequence. Piaget outlined a progressive hierarchical sequence from simpler to more complex levels of cognitive organization spanning four developmental stages (sensorimotor stage, preoperational stage, concrete operations, and formal operations) until conceptual maturity is attained in early adolescence. The most obvious feature of such structuralist approaches to cognition is the conception that at each stage of intellectual development the child's thinking is qualitatively distinct. Piaget's account is notable also because each of the stages is closely correlated with a particular age range, and the order of a child's progression through the stages is thought to be invariant.

Reflecting their contextualistic leanings, behavior analysts are sensitive to any hint of stages or invariant sequences and this also applies in the domain of cognitive development.

Most behavioral accounts of cognitive development (including RFT) incorporate a limited number of behavioral processes that become increasingly complex and organized through interactions with the environment. In Fischer's behavioral skill theory (1980), for example, he conceptualized cognitive development as a hierarchical system of overlapping cognitive skills assembled by environmental events. Specifically, Fischer suggested that Piaget's concept of the cognitive scheme (or schema) may be better understood as an operant response class. According to this operant account, behavior-environment relations develop into classes of behavior, and these classes develop into functional response classes or *skills*. These skills build gradually upon each other in a hierarchical fashion with earlier skills giving rise to more complex skills across a range of skill domains (e.g., social skills or expressive language). Fischer's hierarchical system consisted of four qualitatively different types of behavior: reflexes, sensorimotor responses, representation, and abstraction. Furthermore, each type of behavior was comprised of four key skills, namely the formation of single classes, mapping between two classes, organizing systems of classes by relating subclasses of classes, and relating entire class systems with one another. One important cognitive skill, for instance, within this system involves mapping one representational class of responses on to another representational class of responses. Fischer's analysis, although behavioral in orientation, bears resemblance to Piaget's stage theory in its emphasis on an ordered developmental sequence, the inclusion of linear (i.e., additive) changes, and the use of terms such as representation.

Behavioral accounts of development have also included more quantitative analyses such as the General Model of Hierarchical Complexity outlined by Commons, Trudeau, Stein, Richards, and Krause (in press). The fundamental goal of this system is to devise a model of hierarchical complexity, the sequence of which will match the empirically-scaled order of a task (see Commons and Miller, 1998). This approach bears even greater resemblance to Piaget's with its emphasis on specifically cognitive tasks and quantitative measures of task performance. There are further similarities with Piaget's analysis in the use of the terms pre-operational, concrete, and formal to describe a behavioral sequence at a given order of hierarchical complexity.

The RFT approach to cognitive development differs from Piaget's in many of the same generic ways as the two accounts above (i.e., given their different philosophical standpoints, and scientific aims and objectives). Specifically, the emphasis on process, the role of organism-environment interactions as opposed to inherent organismic capabilities, the non-reification or use of mentalistic terminology (e.g., schema), the absence of circular descriptives (e.g., conservation), and the analytic goals of prediction and influence, are key differences. The RFT account, however, also differs from the behavioral accounts described above. In particular, certain sequences of events are implicit in RFT, but unlike the aforementioned accounts the complexity of the contingencies and the behaviors (derived relational responding) involved are at the heart of this analysis. For RFT the primary focus is on the increasing complexity of the relational responding; if so-called developmental stages often correlate with various points in the orders of complexity this fact may be noted, but RFT does not require that such correlations must occur.

There is a small but growing body of empirical research that supports the RFT account of relational responding and the emergence of verbal events with children of various ages.

This work has included: a) demonstrating a link between equivalence responding and human language, b) establishing that the derived transfer of function effect is a realistic analog of verbal control in young children, c) tracking a developmental sequence in relational responding, d) applying RFT to the experimental analysis of children's emotion and self-concept, and e) testing the RFT prediction that derived relational responding is to some extent produced by multiple-exemplar training (Barnes, Browne, Smeets, and Roche, 1995; Barnes, Lalor, Smeets, and Roche, 1996; Devany, Hayes, and Nelson, 1986; Barnes, McCullagh, and Keenan, 1990; Lipkens, Hayes, and Hayes, 1993; see Chapter 10, this volume). The implications of these and similar changes for cognitive performances more generally are just beginning to be tested (see Luciano, Herruzo, and Barnes-Holmes, in press; Smeets and Barnes, 1997; Smeets, Barnes, and Roche, 1997b; Smeets, Barnes-Holmes, and Roche, in press). Thus, extensions into these areas must necessarily be more speculative. As an example of how such speculative work might begin, however, we will now offer an RFT interpretation of the traditional psychological concept of intelligence.

9.1.1. Intellectual Development

Relational Frame Theory provides a behavioral conceptual framework for an analysis of intelligent behavior. According to RFT, a small number of psychological processes are sufficient to yield the full gamut of cognitive skills (e.g., deductive reasoning, inductive reasoning, analogy, etc.). Some forms of intelligent behavior are so closely linked to topics that have already been discussed in the current book, that further explication (as opposed to further research) is hardly necessary. Nevertheless, it may be useful to consider these topics once again and other related issues in order to appreciate how RFT, in broad terms, accounts for the development of intelligence. We will divide our treatment up into the traditional areas of verbal and numerical intelligence, and the implications of this analysis for education. In so doing, we do not mean to treat intelligence as an object (e.g., as a thing one has). It is, instead, a property of certain behavioral processes. Furthermore, when we speak of verbal intelligence we are not using the term "verbal" in a technical RFT sense. From the point of view of RFT, both verbal and numerical intelligence are verbal. There are meaningful distinctions between the two in RFT terms, however, as we shall see.

9.1.1.1. Verbal Intelligence

When intelligence tests are factor analyzed, certain main verbal factors are relatively consistent across various tests, such as vocabulary, reading comprehension, the use of analogies, or verbal problem-solving. We will briefly address each.

It is no surprise that vocabulary would emerge as a primary factor in verbal intelligence. Relational frames originally emerge in this context, and acquiring elaborated networks of verbal content develops and applies every relational frame in common use. Thus, persons with a highly elaborated vocabulary will tend also to have highly elaborated relational repertoires. Nevertheless, it is the relational skills that are key, not merely verbal content in a formal sense. A task such as learning to spell is far less relationally rich than learning word meanings, and thus it is no surprise that spelling performance will correlate less with overall levels of intellectual behavior than will vocabulary, even though both tasks involve verbal material.

Reading comprehension and the use of analogies and metaphors can be approached in the same way. These tasks require that an individual relate relational networks with flexibility and relative ease. What is being acquired beyond vocabulary is the ability to elaborate entire networks of stimulus relations quickly, to bring them under increasingly subtle forms of contextual control, to transform stimulus functions through entire networks, and to abstract features of the natural environment that will support and sustain relational responding.

These relational performances are abstract, but they also are dependent on a great deal of verbal content, and there is a natural developmental transition that is based on acquisition of that content. Consider the following phrase:

Bird is to sky as fish is to ...

The relation involved in the solution of this analogy is a type of comparative relational frame, namely, containment. If this relation is applied to "fish" then a word equivalent to "sea" is entailed. Solving the analogy, however, requires a history of explicit reinforcement for the use of an appropriate vocabulary, in addition to the acquisition of appropriate relational frames. Put simply, one needs to *know* that fish live in the sea before the arbitrary application of the bird-sky relation to "fish" can produce the correct answer (i.e., sea). If every analogy was dependent on abstraction of the same relation, verbal content would quickly become the only issue, and analogies would be a less generally useful measure of intellectual behavior. In normal tests of analogical ability, however, a wide variety of specific relational frames must be abstracted from the specific examples and the contextual cues for that process may be quite subtle. Thus, solving analogies requires a range of relational skills that simultaneously assess for the amount of verbal content acquired, and the range, speed, flexibility, and subtlety of contextual control over relational responding. All of these skills are central to the cultural dimension of intelligence (see Quay, 1971).

One reason that educationally disadvantaged children can be harmed for a lifetime is that the disadvantages make it hard to learn even when the environment supports learning (i.e., with limited verbal content the opportunities for acquiring the relational abilities involved in analogical reasoning are severely restricted). The acquisition of verbal content also helps develop relational skills that increase the rapidity with which future content is subsequently acquired. One hopeful implication of this analysis for education is that it may be possible to design special environments that explicitly develop relational abilities, providing the educationally disadvantaged with the tools that would normally emerge only as a side effect of more content oriented education.

All of these relational abilities come together in verbal problem-solving, thereby emphasizing the verbal abstraction of features in the environment and the transformation of the functions of the environment. Because problem-solving involves interacting with the nonarbitrary environment, however, tests must be well constructed, so that problem-solving requires pragmatic verbal analysis as opposed to other skills in dealing with the nonarbitrary environment. If the careful selection of tasks is successful, there should be a strong correlation between verbal problem-solving and other forms of relational responding, and indeed that is what is typical. All of these relational skills should correlate one with the other since they involve aspects of the same behavioral domain. From the RFT perspective, the general

intelligence factor ("raw g") that underlies all of these tests may not be just biological readiness, but also the core acquisition of relational responding.

9.1.1.2. Numerical Intelligence

Numerical skills are treated separately in many intelligence tests. We have had little to say about mathematical skills to this point, so a brief analysis seems warranted. Consider the common example of the detection of patterns in numerical sequences. A typical number-series problem might appear as follows on an intelligence test:

1, 7, 13, 19, 25, ...   *What is the next number in this series?*

Most verbally-able adults will have little trouble correctly providing the next number in this series (i.e., 31). Relational Frame Theory views the derivation of this solution as primarily relational. The problem is correctly solved by responding to the single relation that consistently obtains between subsequent items in the series and applying that relation arbitrarily to the last number in the series. In the above case, the relation between subsequent items in the series might be called "plus 6." The problem is solved, therefore, by applying the quantified comparative relation detected in the series to the last number in the series (i.e., 25) resulting in the correct answer of 31.

A history of arbitrarily applicable relational responding is necessary before a number-series problem can be solved correctly. Moreover, a child will require *explicit* training on a variety of such problems before the problem-solving skill can become generalized (i.e., in simple terms, before the child understands the nature of the task). A child who has difficulty solving the foregoing problem, therefore, will be provided with the correct answer through explicit feedback. This child will not, however, be re-exposed to the same problem repeatedly, at least not as a test of problem-solving skill. An understanding of number-series problems can only be tested using *novel* problem sets, because what we mean by "understanding" is *derivation* of stimulus relations, not a simple performance however achieved. A problem-solving skill has not been adequately acquired until it is generalized from specific cases. The proper relational performance is acquired by presenting a child with multiple exemplars of given problem types (e.g., with solutions based on other relations, such as "plus 7"). In mathematics, the range of quantitative comparative relations is large, but the core relational skills are not. Consider the following:

3, 9, 27, ...   *What is the next number in the series?*

This new problem in multiplication looks quite different, but at the level of abstract relational responding, it is a fairly simple extension of the previous relational performance. Multiplication is addition writ large, and that insight would allow an excellent adder to answer this problem even before the techniques of multiplication were well understood.

The precision involved in this type of mathematical reasoning may explain in part why mathematical performance and verbal performance, while roughly corresponding, are quite distinct relational domains. Mathematical relations are highly precise and focused. Until the level of higher mathematics is reached, the contextual control over relational performances is highly specified. Mathematical relations depend less on verbal content and thus less on normal verbal discourse.

Higher mathematics has more of the features of abstract verbal skills because the contextual cues controlling the numerical relational response become increasingly subtle, and the range of specific responses becomes more varied. These higher mathematical skills differ from content dominated verbal skills, however, because the relational frames involved are essentially "empty" and almost completely arbitrary. The quality of arbitrariness at a higher level of analysis forms a barrier to successful acquisition of mathematical relations for most children, but it removes barriers of another kind. Once mathematical relations come under abstract and arbitrary contextual control, amplification and elaboration of these skills is not dependent on significant verbal content. That may explain why mathematics is one of those few areas (along with music, logic, or art) in which child prodigies periodically appear. These areas require highly developed abstract relational abilities, not content knowledge about real world domains. Child prodigies in history, chemistry, or psychology do not appear because the importance of the arduously acquired content of relational networks in these areas is too great.

Some disabled children (e.g., those with Asperger's Syndrome) can acquire astounding relational abilities in highly specific mathematical areas (e.g., they can instantly find the square root of seven figure numbers) and yet cannot apply mathematical reasoning in other numerical areas, or to simple concrete problems such as purchasing goods at a store. These children have not acquired a range of numerical relational skills and their relational responding has not been brought under a range of contextual control. It is for this reason that highly specific mathematical abilities will not necessarily correlate highly with more global measures of intellectual behavior, which are also dependent on a variety of contextually controlled relational responses.

9.1.1.3. Implications for Education

The key goal for a relational frame analysis is the prediction and influence of behavior. Thus, ultimately the value of an RFT account of intellectual behavior is to be found in the educational programs that might be established to produce such performances. As will be discussed in Chapter 10, educational technology is characterized by its almost exclusive focus on technique and content rather than on process. What RFT provides is some of the core processes that may be involved. The combination of this focus on process and traditional behavioral education suggests that the establishment of fluency and competence in relational domains requires; a) the arrangement of tasks that can only be mastered by specific relational responses, b) variation of irrelevant dimensions of task performance, c) expansion of the range and subtlety of contextual control over relational responding and the transformation of stimulus functions via relational responding, and d) contact with the limits of the relational task. For example, in acquiring a particular frame of comparison such as the containment example used earlier, training should be:

1. focused on the fluency of the derived (not merely the trained) performances. Thus, it is more important when taught that "the ground contains wells that contain water," to be able to *derive* quickly that the ground contains water and water is contained by the ground, than merely to say that the sky contains birds. The right process is more important than the "right answer."

2. the specific application of this frame should vary widely (e.g., the sky contains birds; bread contains wheat; space contains us; this sentence contains a period; life contains death),

3. the arbitrary contextual control should be increased (e.g., "if a bird contained the sky, where would the sky be?"), and

4. the limits of the relation need to be contacted (e.g., a ball does not contain a ball next to it, but air contains the bird in it).

These implications of RFT have not yet been tested systematically. Some of them are non-obvious, and if education and training are improved by their use, RFT would be supported accordingly.

There is a great deal to learn about the frequency and complexity of relational frames in natural language so as to train for intellectual performance in an efficient way. What kinds of relational responses are most commonly needed? Is there a hierarchy of relational perfor-mances? Once frames of coordination are very well acquired, would further content training based on other frames that give rise to coordination (e.g., mutual exclusion; opposites) be more efficient than further training based simply on frames of coordination? How do nonarbitrary relational responses set the stage for arbitrarily applicable ones? It would not be difficult to generate dozens or even hundreds of such questions. That shows that RFT is a generative theory, but we will not know if RFT is a truly progressive and pragmatically useful theory until we see if the results of such studies establish a coherent pattern that leads systematically to new questions, and until we see whether the answers increase our ability to improve verbal and cognitive performances. Given the known centrality of intellectual behavior, it would be an excellent domain within which to examine these issues.

We have shown that RFT may provide possibly interesting research questions in a domain typically seen to be outside the remit of behavioral psychology. Although this topic of intelligent behavior has yet to be fully addressed in behavioral psychology, the topic of language development has been pursued more vigorously in the behavioral camp. Skinner's (1957) *Verbal Behavior* was clearly focused on this topic. However, as most students of psychology are aware, many criticisms were leveled at this text, especially from those researchers who we label here as nativists. In the next section, we will revisit some of these criticisms, now in the context of RFT.

9.2. LANGUAGE DEVELOPMENT: ANSWERING THE NATIVISTS'   CONCERNS

The generative or productive nature of language in particular formed the basis of many nativist accounts of language development and constituted one of the main nativist concerns with a behavioral account of language. For example, Chomsky's (1959) critique of Skinner's (1957) *Verbal Behavior* formed the basis of perhaps the key nativist theory of language acquisition (e.g., 1965). Chomsky argued that language was essentially a generative system and the weakness of Skinner's analysis, he suggested, was that it failed to account for numerous common effects that characterize the productive nature of language acquisition.

In the current section we will work through questions raised by nativist researchers with regard to specific linguistic effects such as novel utterances and speech errors, and attempt to answer them from the technical perspective of RFT. More could be said about the value and accuracy of Skinner's *Verbal Behavior,* but others have done so (e.g., Barnes-Holmes, Barnes-Holmes, and Cullinan, 2000; MacCorquodale, 1969) and we have little to add to that debate. Some of the following replies to the nativist criticisms could also be made from the

perspective of *Verbal Behavior*. However, it is not our concern here to clarify the differences between RFT and Skinner's approach.

9.2.1. Production of Novel Utterances

Children from a young age show productivity in their language acquisition. They produce novel utterances, and can deal with novel words. In one study, for example, Berko (1958) presented children with novel words, and asked them to perform operations on them. Children were able to produce the correct forms of novel words even though they had not encountered them before. For example, given "This is a wug" and "These are two__," children produced the word "wugs" even though wug is not an English word. To account for this finding using RFT, we would suggest that the word "wug" in this example enters into a frame of coordination with other nouns, brought to bear by the contextual cue "This is a...." In the past, many specific words have appeared in "This is a...." ("This is a car;" "This is a desk;" etc.) or its relational equivalent ("That's a ..." etc.). In general, all of these terms are treated similarly. For example, you cannot usually add "ly" to these words ("carly" or "deskly" are almost certainly incorrect) because they are usually nouns. The children who participated in this experiment had presumably already learned (probably by direct reinforcement at first) that when referring to more than one noun, an "s" must usually be added to the word. Therefore, the plural function (i.e., the "s") transferred through the relational frame of coordination from already known nouns, to the novel "noun." Parenthetically, one might argue that the production of "wugs" might also be explained in terms of stimulus generalization and/or response induction, but we suspect that, in at least some cases, some element of relational framing is involved in the production of novel nonsense words.

9.2.2. Speech Errors

Analyses of speech errors reveal features of early speech which nativists claim cannot be explained by behavioral accounts of language. For example, Pinker (1991) suggested that children often use the incorrect prepositions in conjunction with verbs, and that their misuse reveals an underlying difference in conceptualization. For example, a child might say, "can I have any reading *behind* dinner" as though time were spread out like space (example from Pinker, 1990). Pinker suggests that such utterances reveal something about underlying conceptual errors at work rather than simply reflecting reinforced sequences, or random errors.

Relational Frame Theory would account for this phenomenon by suggesting that children develop somewhat loosely constrained relational frames in the early stages of language development. For instance, prepositions denoting temporal events (e.g., before or after) and spatial events (e.g., in front of or behind) are broadly similar relations, as was noted in Chapter 3, and thus they may initially participate in a more general relational frame. Due to the loosely constrained nature of these relational frames, errors of the type "can I have any reading *behind* dinner" are likely to occur. As language skills are shaped up through ongoing interactions with the verbal community, these relational frames become increasingly refined so that prepositions denoting temporal events such as "before" and "after" come to participate in more specific temporal relational frames, and in turn enter into relational frames of difference with prepositions denoting spatial comparatives, such as "behind" and "in front of" (see Barnes

and Roche, 1997c). Thus, the relevant relational frame will be brought to bear by the context of a particular sentence. This process of contextual refinement of relational frames into elaborate networks of relations will result in the gradual elimination of so called "conceptual errors" in sentence construction.

9.2.3. Negative Evidence for Incorrect Utterances

Given that children produce novel utterances, how do they learn which are correct and which are incorrect, or do they in some way "know" this in advance? It is interesting that young children are rarely exposed to an ungrammatical sentence, and told, "now, that is an example of an ungrammatical sentence." Some nativist researchers have claimed that the fact that such negative evidence is not provided by the child's verbal community suggests that knowledge about the grammatical correctness of utterances may be innate, governed by some hypothetical inbuilt mechanism. Brown and Hanlon (1970), for instance, analyzed transcripts of naturalistic parent-child interactions, attempting to separate utterances into children's correct and incorrect sentences, and the parents' responses (in terms of approval or disapproval) to them. They failed to find a correlation; presence or absence of parental approval was not contingent on the grammaticality of the child's utterance. Instead approval depended on the truth of the utterance. So, for example, a child saying "I go*ed* to school yesterday" was corrected with "No you didn't, yesterday was Saturday" rather than informing the child of the grammatical error.

This and other studies (e.g., deVilliers and deVilliers, 1979) that have replicated these results suggest that adults do not generally correct syntactic errors emitted by children, at least when the child provides the correct meaning and the utterance appears to be true. Further research has suggested, however, that parents do sometimes show sensitivity to the grammaticality of the child's utterances, but this sensitivity is dependent on the situation, the child, the age of the child, and a range of other contextual factors. Their corrections of errors are not, therefore, independent of the social and verbal context.

The lack of *consistent* negative evidence as to the grammatical correctness of utterances does not pose a problem for the RFT approach to language development. The RFT account suggests that a repertoire of relational responding is brought to bear by particular contexts. Children learn to speak grammatically in a largely context-dependent way, and thus all forms of feedback on grammatical speech (whether positive or negative) will depend on the very context of the speech act itself (e.g., a child of 10 years would normally be corrected for saying "I go*ed* to school," whereas a three-year-old might escape such correction). Furthermore, once relational frames are acquired, one of the main consequences that maintain them is sense-making and coherence. These consequences are automatic. They depend upon a social / verbal history but they are not social in form. Being exposed to proper models, for example, may alone allow a child to detect consistencies and inconsistencies as relational performances are acquired. In fact, a number of RFT studies have demonstrated that mere exposure to coherent patterns of stimulus events, with no performance-contingent feedback, often produces appropriate relational framing in both adults and young children (see Barnes, Smeets, and Leader, 1996; Leader, Barnes, and Smeets, 1996; Smeets, Leader, and Barnes, 1997; Leader, Barnes-Holmes, and Smeets, 2000; Leader and Barnes-Holmes, in press a; in press b). From the RFT perspective, therefore, children do not require *consistent* (i.e.,

context-independent) feedback on grammatically incorrect sentences for grammatically correct adult speech to develop.

9.2.4. The Poverty of the Stimulus

Nativist researchers such as Chomsky (1965) argued that children may often be exposed to *degenerate stimulus input,* and therefore cannot use such input for language acquisition. Adult spontaneous speech is characterized by numerous dysfluencies; partial and incomplete sentences, pauses, false starts, slips of the tongue, lapses of concentration, grammatical errors, ambiguous sounds, meanings, word boundaries and so on. How then can the child learn to produce well-formed sentences, given such input? Moreover, Chomsky argued that children are not exposed to enough examples of correct grammatical constructions in order to be able to produce them consistently. This led him to argue that they must be able to *deduce* the structure of the language system based on an innate language acquisition device.

From the RFT perspective, however, the explicit training of just a few examples of grammatical constructions, in combination with the formation of relational frames, could result in the generation of a potentially vast range of novel constructions, given only relatively little "input." Some evidence of this has already been demonstrated by Wulfert and Hayes (1988), for example, who showed that both an ordering response and a conditional ordering response transferred to all members of four conditional equivalence classes. In total, one hundred and twenty untrained sequences emerged from eight trained sequences for all subjects (see also the RFT interpretation of nonsense sentences outlined in Chapter 3). These, and related data, support the view that even very few examples of correct grammatical constructions may provide the necessary behavioral history for the derivation of a very large number of grammatically correct and incorrect novel constructions. It should also be noted that grammatical errors occur relatively nonsystematically, whereas more grammatically correct speech occurs more often and across a wider range of contexts and speakers. This is precisely the kind of learning history that tends to weed out inappropriate forms of stimulus control that give rise to nongrammatical speech. In contexts in which nongrammatical speech predominates, however, children will indeed acquire systematically nongrammatical speech. For example, a child systematically exposed to sentences like "he done did it" will speak exactly that way, whereas a child who hears a broad range of such errors on television and in school, may learn to speak perfectly well. These contextual effects over language acquisition are entirely consistent with RFT.

9.2.5. Child-Directed Speech

Nativist researchers have also argued against the role of reinforcement and imitation in language acquisition. For example, adults in many (but not all) countries speak to children in a special style of "child-directed speech." This style of speech is well segmented by clear pauses, is relatively high in pitch and slow in pace, and is clearly pronounced and repetitive (Fernald, Taeschner, Dunn, Papousek, Boysson-Bardies, and Fukui, 1989). All of this makes good behavioral sense since such speech should be easier to understand and to learn, and indeed infants prefer to listen to speech of this kind (Cooper and Aslin, 1994). Some nativists, however, have made much of the fact that the amount of child-directed speech the child is exposed to does not affect the speed of language acquisition (Newport, Gleitman, and

Gleitman, 1977). More recent research, however, has shown that the key issue seems to be whether speech complexity is modified over time – staying with baby talk too long can slow down comprehension, but using it and then fading it can increase comprehension (Murray, Johnson, and Peters, 1990).

There is not much for RFT theorists to answer for in this area, since the data are fairly supportive of what makes behavioral sense: train relational responding slowly and carefully at first, but shift to more complex forms over time. Furthermore, recent evidence from behavioral laboratories shows that given a minimal verbal repertoire, mere exposure to many verbal episodes increases language ability (Hart and Risley, 1995). What is probably occurring here is that as a relational repertoire is acquired, sense-making begins to function as a powerful reinforcer. This can occur in comprehension as well as production, and merely by watching the predictive relationships established by verbal episodes of others (see Barnes, Smeets, and Leader, 1996; Leader, Barnes, and Smeets, 1996; Smeets, Leader, and Barnes, 1997; Leader, Barnes-Holmes, and Smeets, 2000; Leader and Barnes-Holmes, in press a; in press b)

9.2.6. Comprehension versus Production

Nativist language researchers have mounted further arguments against the role of reinforcement and imitation because they cannot account for the fact that comprehension precedes production at all stages of language acquisition. Many words (e.g., such as "no") are understood well before they are produced. As adults, for example, we know many more words than we use. We know words that we may have heard only a few times (or even once in a salient context), and that we do not use in everyday conversation. We know the correct usage of a word without being able to define it. We know the meaning of a word from the context in which it was uttered.

Relational framing is as readily established for a listener as it is for a speaker. Consider the following example. Imagine a child sees Daddy and is told, "that's Daddy." At a subsequent point when the child orients toward Daddy upon hearing the name, this may instantiate mutual entailment and could be rewarded in the same way as if the child had said the word "Daddy." Imagine also, that a child is told, "This is an orange, and an orange is a type of fruit." This child may now be able to get oranges when asked to "go get some fruit." As these relational repertoires of coordination and hierarchy begin to combine, both kinds of performances help establish a relational response, and responses in one domain will generalize to the other. Furthermore, as noted above, a great deal of language training occurs without any explicit reinforcement of either productive or receptive speech, because making sense of the world begins to have feedback functions.

The acquisition of meaning from hearing single instances is not surprising once relational frames have been acquired. Imagine that a person drops a valuable vase and the owner of the vase, looking at the destruction, screams at the offender "You are a sligbot!" The term "sligbot" is a novel utterance but it will have immediate and perhaps even lifelong meaning for the listener. The context, as verbally abstracted by the listener, makes it likely that the owner is angry about an accidentally destroyed vase and is negatively labeling the person who accidentally destroyed it. Whether the term means, precisely, "clumsy oaf," "jerk," "stupid

idiot" or all of these at once is not known, but it does not need to be precisely known to be used later by the listener in similar circumstances.

9.2.7. U-Shaped Development

Another concern of nativist researchers is that certain observed features of the development of grammar in children are not readily accounted for by Skinner's direct contingency analysis. One of these features is known as U-shaped development (see Pinker, 1999). This is a characteristic of certain aspects of natural language acquisition, whereby initially good performance is replaced by incorrect performance, before the final good performance is reinstated. The acquisition of the irregular past tenses is a common example. Children initially produce these forms correctly, but then a stage occurs when an incorrect form is produced. During this stage, both forms will be produced, with the correct form gradually being produced more and more. Finally the correct form is produced consistently, forming the pattern correct-incorrect-correct (such as "he ate it"- "he eat*ed* it"- "he ate it"). This pattern is observed in many other aspects of syntactic development, such as irregular plurals ("look at the mice"- "look at the mous*es*"- "look at the mice"). These characteristic patterns of language acquisition have been proposed by nativist accounts as evidence for the application of internalized rules, which children then apply productively.

A common explanation of this type of internalization is as follows (see Pinker, 1984, for a full discussion). First, children memorize present and past tense forms directly from the speech they are exposed to. They correctly use the irregular forms because at this stage they are simply reproducing the forms that they have heard. Regular forms are produced in the same way. At some point, the difference between, for example, "look" (concern with the present) and "look*ed*" (a past action) is appreciated, and the two forms are linked with each other. The child 'notices' the rule that to convert the present tense form to the past tense, one adds *–ed* to the stem. It is at this stage that over-regularizations are produced; the child mistakenly adds *–ed* to all verbs to produce the past tense form. At some later point the child realizes that it is incorrect to say "*goed*" or "see*ed*." Here, according to the nativist accounts, an innateness principle would be applied that says "there is only one past tense form for each verb." Having the two forms "went" and "go*ed*" the child must 'realize' that "went" is the past tense of "go" and so comes to drop the "go*ed*" utterance, and produce the correct verb form once again.

This characteristic feature of language development can be readily accounted for using an RFT analysis. Oddly, it overlaps somewhat with Pinker's analysis. Grammatical errors come in part from overgeneralization and inappropriate contextual control over relational frames and the transformation of functions through them. Thus, errors may not occur, then begin to occur, and then fade away, because relational processes may gradually emerge which make errors possible, but then fade as these processes come under better refinement and control. Far from conflicting with a relational account, systematic errors give hints at the relational responses being acquired.

A child may at first be taught the irregular past tense of some verbs under the control of arbitrary features of the situation. "I went home to see Grandma" may be controlled by imitation of others, for example (e.g., hearing mother say on the phone "we went home to see Grandma") or by direct training. Gradually relational framing behavior becomes an increas-

ingly important source of grammatical constructions, however. A frame of coordination may begin to be formed between known verbs, and speaking of the past or present may be controlled by application of a temporal relational frame. For example, the child may begin to use a past tense because this is a context in which "now / then" applies. These two frames can combine, and "past tense verbs" may form as a class. Because regular verbs are more common than irregular ones, formal features of regular past tense verbs begin to transfer for the first time to irregular verbs. The child may now say "I goed home to see Grandma." However, as additional relational frames are established and come under increasingly complex forms of contextual control, frames of distinction will develop between 'regular' and 'irregular' verbs, resulting in the correct endings being again applied to irregular verbs. In short, U-shaped development is observed as the child's speech shifts from being based on direct reinforcement and imitation, to limited forms of relational framing, and then finally to complex forms of framing activity.

9.2.8. Nonsense Sentences

The behavioral account of language development is often criticized because it fails to predict or explain the emergence of nonsense sentences. This criticism has little punch in the case of RFT. What is being learned in language development is not specific sentences but relational responding and specific stimulus relations. As was noted in Chapter 3, the nonsense sentence "Colorless green ideas sleep furiously" is a complete relational network, even though it is nonsense.

9.2.9. Summary

We have focused in this section on a few facts of language development that are often thought to conflict with a behavioral account. We are unable to find facts that conflict with basic RFT conceptions. Furthermore, the list of 43 areas of the development of relational responding in the last chapter, lays out an agenda for the future analysis of cognitive and language development. For example, what level of relational framing is needed to produce simple examples of rule-governance? How does training in one frame influence another? Are there in fact functional families of relational responding? Is verbal abstraction aided by hierarchical relations? Are hierarchical relations correlated with the ability to transform the functions of dimensional properties of the physical environment? Is a sense of self augmented by deictic relations and perspective-taking? Is reasoning and problem-solving dependent upon a certain level of relational framing ability? What is the relation between temporal relational frames and sensitivity to temporal delays? These are questions about cognitive and language skills. The questions lay out very specific domains of concern for developmental analysis.

9.3.   EMOTIONAL   DEVELOPMENT

In turning our attention to emotional development, a significant problem presents itself; namely the difficulty in finding an appropriate definition of this concept. As Fehr and Russell aptly pointed out, "Everyone knows what an emotion is, until asked to give a definition"

(1984, p. 464). Probably no other term in psychology shares non-definability with frequency of use as much as the term emotion.

Most researchers agree that there is a biological basis for emotions. There are two main schools of thought on the nature of this inheritance. Componential theories adopt the view that emotion is similar to language on a number of dimensions (Harré, 1986; Lang, 1988; Mesquita and Frijda, 1992; Ortony and Turner, 1990; Russell, 1978). According to this view, emotion is a universal with a generic biological basis, but specific emotions derive from patterns of parts, that are emphasized and talked about in different ways by different cultures just as specific languages derive from different patterns of words. Emotions, according to this definition, consist of patterns that reflect styles of life and socialization in the cultures from which they arise. Theories of Basic Emotions, on the other hand, hold that specific emotions are universals, derived from evolutionary selection (Ekman, 1992a, 1992b; Levenson, Ekman, and Friesen, 1990; Oatley and Jenkins, 1996; Oatley and Johnson-Laird, 1987; Stein, Trabasso, and Liwag, 1993; Tooby and Cosmides, 1990). More specifically, given a genetic 'start-up' program of basic emotions, interactions with others help to generate emotional development, and considerable cultural and individual differences can emerge. RFT is largely unconcerned with the subtleties of this debate between componential and basic emotion theorists. For RFT, the key focus is on the role played by the psychological process of relational framing in all forms of emotional behavior. The genetic origins of emotional behavior per se are largely unimportant from an RFT perspective. In spite of the significant differences of opinion regarding the source of emotion, all schools of thought, including RFT, agree that emotions play a central role in physical, cognitive, and social development.

The study of emotional development is often loosely divided into two broad subject areas; understanding the emotions of self, and understanding the emotions of others, although it is generally agreed that the two are inextricably bound. For present purposes, we will construct our RFT analysis of emotional development around these two broad categories.

Emotional terms play a key role in human socialization. So-called emotional states, such as anger, anxiety, or sadness, are quite varied in the histories that give rise to them, but are broadly similar in terms of the social implications that are verbally related to them. For example, "I'm hungry" makes clear that the person is motivated to eat. If food is then presented and turned away, the person supplying the food might say, "I thought you told me you were hungry." Specification of the conditions under which people are likely to eat is more variable in its response implications. For example, "I have been food deprived for _X_ hours" could mean that the person is ready to eat or not across a wide range of values for "X." Seeing a favorite desert, a person who has recently eaten may once again "be hungry." A person who is ill may not have eaten for many hours and still "not be hungry." What the social/verbal community needs to know is not the history of the person in a formal, scientific sense, but the predispositions of the person in a functional sense. Emotional language is the vehicle for that task.

The detection of behavioral predispositions is quite a complex task. Modern emotional terms are almost always frozen metaphors, passed down from a time when all of these dispositions were talked about in more concrete ways that carried clearer social implications. For example, "want" comes from an Old Norse word *vant*, which meant "lack" or "missing." That use of the term remains in English in such sentences as "for want of food he died." Such a sentence does not mean that the person died because the person had an emotion – rather the

person died from the lack of food. There was presumably a time when "I want food" sounded to a listener something more like "I'm missing food" or "there is no food" or even "where is the food?" Eventually, the more internal and emotional sense of the term became dominant, but the response implications for others remain. Even a stranger coming to the door and saying, "I want food" might lead to the provision of food. In much the same way, "anxiety" came from a Latin word *angere* that referred to choking or difficulty in breathing; "excite-ment" comes from a Latin word *ciere* which means "to set in motion;" and "lethargy" comes from a compound of Greek words meaning "to escape notice" and "to forget." Indeed, the behavioral nature of emotional talk is even evident in the etymology of "emotion" itself. In this case the Latin roots are fairly obvious: *e* is a prefix meaning "out" and "motion" comes from *movere* meaning "to move." Like a sergeant calling, "let's move out" these internal states supposedly cause us to behave – they move us out – but they also cause the social/verbal community to behave – for others to move out in providing what we are missing (what we "vant").

From this perspective, emotional development involves learning to describe and to categorize one's own behavioral predispositions in ways that others in the culture readily understand and will respond to in ways that are reinforcing. In a sense, emotional talk cuts across our many differences and provides a common ground for learning how to relate to each other as humans. For RFT, therefore, healthy emotional development involves learning to respond in accordance with relational networks, which contain emotional terms, in ways that overlap significantly with similar networks operating in the wider verbal community.

In constructing our RFT analysis of understanding the emotions of self and others, we will draw heavily upon the concepts of self-as-context, self-as-content, and self-as-process. Although these were previously outlined in Chapter 7, in the interests of clarity we will briefly review them again here before employing them in our subsequent RFT analyses.

Self-as-content involves the application of a panoply of categorical concepts to oneself as a totality (e.g., "I really am stupid"). As soon as we can interact with ourselves verbally (in terms of the frames of I-YOU, HERE-THERE, and NOW-THEN), we begin to form a "conceptualized self." In constructing a conceptualized self, most of us try verbally to make sense of ourselves and to put our own histories and tendencies into a coherent relational network. In short, self-as-content refers to the descriptive and evaluative relational networks that we construct HERE and NOW when talking about I or ME (or the behaviors of I or ME) located THERE and THEN.

Self-as-process is similar, but it is more fluid, involving the dynamic application of relational frames (especially frames of coordination) to our ongoing stream of behavior, internal physiological states, behavioral predispositions, thoughts, environmental situations, emotions, and so on. According to RFT, humans will have emotions that nonverbal organisms or pre-verbal children do not, because emotions are in large part verbally constructed through complex relational networks. Being able to "get into touch with your feelings" is not like finding a needle in a haystack – the emotions are not there waiting to be discovered. Rather, it is more like being able to direct yourself and others in a way that meets your needs. Without ongoing contact with your own body, states of reinforceability, and behavioral predisposi-tions, this is very difficult.

Self-as-context refers to the boundless and limitless sense of self. Once the perspective-taking frames are established in the behavior of a particular person they become an inherent property of most verbal events for that individual. Whenever the person talks to someone else

it will be from the perspective of I located HERE and NOW about events that occurred THERE and THEN. In other words, the speaker is *always* I (not YOU), located HERE and NOW, and the spoken about is always located THERE and THEN. Self-as-context refers to the *I* who is always doing the discriminating (located Here and Now). If I ask many, many questions of a person, the only thing that will be consistent is not the content of the answer, but the context from which the answer occurs. "I, HERE and NOW," is the self that is left behind when all of the content differences are subtracted out. For that reason, this sense of perspective or self as a place from which things occur does not change once it emerges (around the age of three).

9.3.1. Understanding the Emotions of the Self

The functionalist approach to emotional development views emotion as a central force in all aspects of human behavior because it facilitates action in the service of personal goals. Berk (2000) stated that "Emotion .. expresses your readiness to establish, maintain, or change your relation to the environment on a matter of importance to you" (p.398). The very earliest emotional reactions probably serve to establish learning that is critical for the fulfillment of biological needs, including survival. RFT would be in broad agreement with this view of the functional nature of emotional development.

According to many traditional theories, subsequent emotional development that extends beyond mere survival maps closely onto cognitive development. Emotion thereby serves to satisfy more complex and cognitively-driven needs and goals, as an increasingly complex bidirectional relationship between emotion and cognition emerges. Evidence of the dynamic interplay between cognition and emotion is available from the very earliest beginnings of a child's cognitive development. In a study with children as young as one and a half years old, for example, Lewis, Sullivan, Ramsay, and Alessandri (1992) found increases in positive emotional expressions (i.e., interest, happiness, and surprise) with improved learning on a task, and rapid changes to negative emotional expressions (i.e., anger and sadness) when this learning no longer proved adequate to complete the task successfully. Again this view is broadly consistent with RFT. As limited forms of relational framing are established in the behavioral repertoire of the young child, the bidirectional transfer of functions between self-as-content and self-as-process begin to emerge. An example of a transfer of functions from content to process might occur when a young child is told that a family relative has died, and that they should be "sad." The child may actually experience some of the psychological properties of sadness which otherwise might not have occurred without the content statement "When a relative dies I should be sad." A reverse example might occur when a young child is asked why s/he is laughing during a game, and replies with the content statement "When I play games, I am happy." In this case, the self-as-process discrimination "I am happy" may be transformed into a content discrimination through the verbal construction of an 'if-then' relational network (i.e., 'if games, then I am happy').

From a traditional perspective, one's ability to describe, control, and display one's own emotions also works in tandem with the development of social skills. Emotional responses emitted by the child influence the emotional and social conduct of others, and the emotional responses of others in turn guide and shape the child's subsequent emotional and social behavior. In line with the complex interplay of emotions with cognition and socialization, by late childhood, emotional expression is largely internalized and socially constrained. In other

words, in order to adapt to their physical and social environments, children must gradually gain voluntary control over their emotions, or at least their social expression. This process is commonly referred to as emotional self-regulation, and is said to be guided, in large part, by the emergence of self-awareness (Thomson, 1994). Most gains in emotional self-regulation occur after children enter formal education, where they need to learn to control their emotions, especially those that threaten their self-esteem (e.g., excessive aggression). By age ten, most children are believed to have a relatively well-adapted set of internalized techniques or rules for emotional control. For example, even in situations in which they perceive themselves to have little physical control, children of this age will engage in techniques of emotional control, including distraction (Aldwin, 1994).

Emotional self-regulation involves the application of pragmatic verbal analysis (see Chapter 5) to emotional states. Consider the following relatively simple relational network that a child might construct as a means of dealing with fear of the dark, "If I am afraid of the dark, then I'll close my eyes and pretend I'm at the seaside." According to RFT, particular classes of pragmatic verbal analysis will either strengthen or weaken depending upon how successful they are in producing appropriate forms of emotional control (e.g., reducing fear when alone in the dark).

In addition to regulating their own emotional states, children also have to learn to separate these from the emotional expressions they portray to others (i.e., the acquisition of emotional display rules) (e.g., Miller and Sperry, 1987). These rules stipulate when, where, and how it is appropriate to express emotions. From as early as two years of age, children begin to play down or exaggerate expressions of their emotions and even portray alternative expressions in order to satisfy personal goals. Greater conformity to rules of emotional display develops both by direct feedback from caregivers, and by indirect shaping from the wider social community. Berk suggests that "at first, children obey display rules to avoid punishment and gain approval from others. Gradually, they see that each rule is followed by members of the culture, and they come to understand its value as a culturally-accepted standard for expressive behavior" (p. 407). Once again, RFT would be in broad agreement with the foregoing non-technical description, but would define emotional display rules as a class of self-directed rule control. This rule control will have been established by rules provided by significant others with well-worn phrases such as "Big boys don't cry." Obviously, the ability to control emotional expression will likely increase with the development of more complex forms of relational framing activity. For example, as temporal, if-then, and perspective-taking frames are established, a child may learn to stand back on some occasions from what s/he is feeling (i.e., as self-as-context develops) and choose not to display that emotion in the service of some future goal (e.g., "Don't cry now or my friends will laugh at me later"). This advanced form of relational framing with respect to emotions brings us to what some researchers have described as emotional intelligence.

9.3.2. Emotional Intelligence

The developmental literature suggests that emotional intelligence is evident even in the first emotional relationships (Goleman, 1995b). By 10-12 months, babies can distinguish between happy and sad vocal and facial expressions. By 3 or 4 years, they understand the relationship between situations and the emotions of others, (e.g., that failure and sadness are

often correlated). In attempting to study the development of emotional intelligence, psychologists have concentrated on the development of *empathy*, which refers to experiencing similar feelings to those experienced by another individual. What is required is believed to be a complex interplay between emotions and cognition; detecting different emotions in self and others; taking the perspective of another so as to determine how the other feels; and responding in an appropriate and similar manner. We will outline the four stages of empathy development that have been suggested (Hoffman, 1982), and will in each case provide an RFT interpretation.

1. Global empathy is observed in one-year-old children, as they imitate the emotions of another. For example, they cry when another child cries. From the RFT perspective, this is largely nonverbal behavior, in that these imitative responses appear to be largely elicited rather than derived through relational frames.

2. Egocentric empathy is observed in children aged between 12-18 months, who appear to discriminate emotions expressed by another, but offer solutions that are egocentric. One possible interpretation of this stage is that some basic emotional terms (e.g., happy and sad) and emotional states are coordinated, but the I-YOU frame is not yet fully established. The child, therefore, offers solutions for I rather than YOU.

3. Empathy for another's feelings comes with increasing age, in that children discriminate more subtle emotions in others, and act less egocentrically in response to them. For RFT, the number of emotional terms that coordinate with emotional states increases in number, and the perspective-taking frames are more fully developed, relative to stage 2.

4. Empathy for another's life condition comes in late childhood and early adolescence, as children and teenagers respond to the generalized condition of another, and not just to the immediate situation in which the feelings are expressed. It is not until adolescence that young people learn that other people may *hide* their feelings or behave discordantly with feelings. One interpretation is as follows. Level 4 abilities require relatively complex forms of relational framing. This level of empathy requires that the individual create a mini narrative (i.e., a complex relational network) concerning the events in another's life, and then coordinate that relational network with an emotional term or other network. For example, the relational network, "My friend's parents are getting a divorce," may participate in a hierarchical relation with events that would be coordinated with emotional descriptors (e.g., "my friend's parents are getting a divorce – she must be so upset"). In learning to frame complex and extended events with emotional descriptors, a young adult will also learn that although a person may be upset, that person may not behave in a way that coordinates with the descriptor (e.g., "I am upset, but mom said that I had to put a brave face on in front of my friends").

9.3.3. Emotional Causes

The behavior analytic approach has long embraced the analysis of private events (Skinner, 1945). Why, then, have emotions and other private events been so little studied within that tradition? The simple reason is that Skinner's epiphenomenal analysis held that emotions and overt behavior emanated from the same source and thus an understanding of emotions was not necessary to an understanding of behavior. It has been argued elsewhere that this is incorrect (e.g., Friman, Hayes, and Wilson, 1998), and is based on flaws in Skinner's

analysis of verbal behavior. In nonverbal organisms (or in verbal organisms if "verbal" is defined in the way Skinner defined it) Skinner's point seems valid. A shocked animal will run and be afraid, but as measured against the goals of prediction and influence there is no reason to say that the animal runs because of being afraid. Both the fear and running are effects of the shock and unlike the running or emotion, shock is an independent variable. Thus, functionally speaking it is more useful to say that the animal ran and felt afraid because it was shocked.

The same is not true of human emotional behavior, because of the entailed relations between emotional terms and other events. It makes a difference whether a person calls arousal "fear" or "excitement" because each term is related to many other stimuli. According to this line of thought, emotions and other private events require an analysis in order to understand human behavior because they are, in part, verbal. Behavior with emotional concomitants may thus be controlled by two sets of contingencies: the direct contingencies and the contingencies engaged by relational frames.

Even so, emotions are not "causes" as measured against the goals of prediction and influence. All "causes" in contextualistic theorizing are only ways of speaking adopted for pragmatic purposes. Emotions cannot be "causes" for behavior analysts because emotions are dependent variables and are not directly manipulate. Events that cannot be manipulated in principle cannot ever directly accomplish the goal of behavioral influence. At best emotions are controlling variables that participate in an overall causal relation (Hayes and Brownstein, 1986). Examining emotional responses is useful in detecting how verbal contingencies influence current behavior, however, and for that reason an analysis of emotions and other private events is an essential component of any adequate human psychology.

9.3.4. Summary

In this section, we have attempted to sketch an outline of the literature on emotional development and provide possible RFT interpretations of the main phenomena in this area. We certainly do not pretend that what we have offered is well-formed and complete, but this was not our intention. Rather, we wished only to show that this area of developmental psychology might be usefully approached within the framework of Relational Frame Theory. In the next section we will turn our attention to perhaps the only other remaining area in developmental psychology, that of moral development.

9.4. RULE-GOVERNED BEHAVIOR AND MORAL DEVELOPMENT

Thus far in the current chapter, we have interpreted developmental phenomena in terms of learning to respond in accordance with relational frames and relational networks. As outlined in Chapters 6 and 7, three broad functional classes of rule-following (pliance, tracking, and augmenting) are made possible when a sufficient repertoire of relational framing has developed, and thus rule-governed behavior plays a critical role in the RFT analysis of psychological development. In fact, Hayes, Gifford, and Hayes, (1998) recently outlined an RFT interpretation of moral development based on pliance, tracking, and augmenting. In the interests of completeness, we will summarize this previously published work. The interpretation is divided into listener activities (Group 1) and speaker activities (Group 2), and each

of these is divided into pliance, tracking, and augmenting behaviors (see Table 1). After presenting the RFT interpretation, we will compare it with Kohlberg's stage theory of moral development, and then finally, we will briefly consider the implications of the analysis for training moral development itself.

9.4.1. Group 1: The Role of the Listener

Training pliance requires consequences that are contingent on the correspondence between rules and relevant behavior. If a child stops throwing objects when a parent says, "Stop that," because of a history of punishment from the parent for violations of rules of this kind, the behavior is an instance of pliance. On the other hand, a rebellious child may do the opposite of what the parent demands in order to get negative attention; this constitutes an instance of counterpliance – a form of responding that is the opposite of the behavior specified in the rule. The development of moral pliance is based on a history of arbitrary socially-mediated consequences for the correspondence between behavior and rules about what is "right." In this sense, rule-following is based on the power of rule-givers and their agents (i.e., the verbal community). From the point of view of a child as young as three years, being told to "Stop that" adds consequences for behavior that were not present before the parent made the demand. Thus, it seems likely that pliance is learned and may directly consequate the behavior of the rule giver. Pliance is thereby based on a very simple social system.

The controlling function in tracking is maximizing existing reinforcers while avoiding existing punishers. Tracking emphasizes longer-term and usually more probabilistic conse-

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Table 1. A Rule-Governed Account of Levels of Morality: Categories and Examples

Group 1: Rule-Governance
Pliance
I have to do what Mommy tells me.
Tracking
How can I do what gets me reinforcers?
Augmenting
I want to be a good person.

Group 2: Support for Systems of Rule-Governance
Social Concern for Pliance
How can we establish law and order?
Social Concern for Tracking
How can we eliminate self-destructive behavior in others?
Social Concern for Augmenting
How can we establish a society that seeks justice?

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quences of behavior. In tracking, the rule places an event and the consequences that follow into a cause and effect relational network, and is controlled by a history of contacting specified consequences in the past. The ability to follow moral tracks develops over time; the tracks given to young children describe immediate consequences because a history of contacting a variety of consequences may not as yet be acquired. Over time, however, with the development of increasingly complex verbal repertoires (i.e., relational networks) the ability to follow verbal consequences evolves. Such moral tracks may describe contingencies that cannot be contacted in a lifetime – for example how certain forms of behavior may lead to a reward in the after life (see Chapter 13).

With an increase in verbal understanding and transformation of stimulus functions, a more complex form of rule-governance emerges. Augmentals are rules that establish consequences but do not change the probability of reinforcement contingent on a behavior. Augmenting involves increasingly complex and abstract relational networks. For example, the "desire" for a child to be a "good person" may be based on a long history of relational responding in which the term "good person" has acquired reinforcing functions based on its participation in highly abstracted and complex relational networks. In the words of S. C. Hayes and G. J. Hayes (1994):

> Augmenting begins with the establishment of important verbal consequences such as "being a good boy" particularly as "good boy" comes to have more functions than mere conditioned reinforcing functions because of the verbal relations sustained between it and other largely verbal events (a good boy is kind helpful. .. etc.). Over time these verbal consequences become more and more abstract as individuals work to be "right" or "fair" or "honest" or "free" (pp. 53).

9.4.2. Group 2: The Role of the Speaker

The important issue in this second group of moral actions is the development of social systems that support rule-following. The activities in this group generally emerge after activities in Group 1 are established. First, a social concern for pliance exists in order for the establishment of pliance either in another person or in the social group as a whole. An example of such concern for pliance may involve care about obeying the law and respecting authority. Second, a social concern for tracking involves concern for the long-term social consequences of action. Because the benefits for the speaker are probabilistic and less immediate, this kind of moral behavior is likely to emerge after a social concern for pliance. This kind of moral activity involves experiencing that reinforcers for others are like those for oneself (i.e., "do unto others as they will do unto you"). Supporting an examination of one's own reinforcers in order to predict what will function as a reinforcer for others may lead to increased awareness of the long-term consequences of rule-following. Third, a social concern for augmenting focuses on the establishment of verbal consequences in others or in the social group as a whole, and increasing the motivation of others to work toward such abstracted consequences. This type of moral behavior is about concern that people care about abstract verbal consequences. It emerges last because it involves; (a) consequences based on highly abstracted verbal events and the verbal histories that control such responding, and (b) quite abstract contingencies that lead to concern for the behavior of others in the first place.

**Table 2. Comparison of the Pliance-Tracking-Augmenting RFT Model
and Kohlberg's Theory of Moral Development**

RFT Model	Kohlberg
Pliance	Punishment and Obedience
Tracking	Instrumental Change
Pliance mediated by peers	Interpersonal Conformity
Social Concern for Pliance	Law and Order
Social Concern for Tracking	Social Contract
Social Concern for Augmenting	Universal Ethical Principles

9.4.3. Kohlberg's Stage Theory of Moral Development

Kohlberg, one of the better known moral development theorists, argued for culture-consistent, universal stages during which an organized system of thought developed and gradually became more advanced in the infant (Kohlberg, 1980,1983). Such a progression from one stage to the next is viewed as an evolutionary process that simply requires a supporting environment. Table 2 compares Kohlberg's stage theory to the "pliance, tracking, augmenting model." Kohlberg's Stages 1 and 2 resemble both pliance and tracking, and Stages 4 to 6 correspond respectively to social concern for pliance, tracking, and augmenting. Stage 3 (Interpersonal Conformity) does not seem to fit with the "pliance, tracking, augmenting model," but it could be interpreted as a type of pliance that emerges when peers, rather than parents, become the relevant mediators of reinforcement.

This model of moral development, based on RFT and rule-governance, is essentially historical and contextual, and unlike Kohlberg's theory does not rely on a stage-oriented approach. An analysis of moral behavior then, in terms of an RFT view of rule-governance, involves a distinction between six types of moral activity, which are divided into two groupings. We have seen that the approach differs from traditional perspectives (e.g., Kohlberg) in that it is based on increasing behavioral complexity, namely verbal behavior, and is sequential rather than stage-oriented.

9.4.4. Training in Moral Development

According to RFT, training in derived relational responding (see Chapter 10) provides the behavioral basis for pliance, tracking, and augmenting. In fact, it seems likely that moving from one type of moral behavior to a more complex one requires increasingly complex forms of derived relational responding. In so far as this is the case, it should be possible to facilitate the training of moral development. This would likely involve: (a) increasing arbitrarily applicable relating, thereby adding to the number of relational frames learned; (b) increasing the contextual control over these relational actions; (c) combining relational frames, and (d) improving contextual control over the transformation of stimulus functions through relational frames. Hayes, Gifford, and Wilson's analysis of moral development is useful to the extent that it enables an understanding and construction of environments that engender increasingly moral behavior. In effect, if moral behavior is governed by, and consistent with, verbal rules provided by the verbal community, then the RFT analysis outlined here provides a good working approach to the development of morality in terms of rule-governance and rule-following.

In this view of moral development, there is a progression of moral behavior but it results not from invariant developmental stages, but from the gradual building up of increasingly complex relational and rule-following repertoires. The fact that similar patterns of development are observed across individuals can be accounted for by the fact that these forms of behavior are differentially complex and contact contingencies in orderly ways. One of the more exciting implications is that it seems possible to progress with an empirical approach to the topic of evolving moral repertoires, based on a consistent behavioral account.

9.5. CONCLUSION

Psychology is comprised of many diverse areas, which in turn give rise to numerous theories. The area of human development, for example, has led to considerable debate as to when exactly changes occur during the lifespan and to what these changes are owed (e.g., nature or nurture). The behavioral approach is an essentially developmental approach, but the analysis is pragmatic and contextualistic, not mechanist or organicist. Furthermore, given the inductive quality of behavioral theorizing, behavioral developmental theories will normally be based on a small set of basic concepts. We would argue that one thing that has been missing from a behavioral approach is an adequate account of human language. If RFT is such an account, then there should be clear implications for human development. The current chapter has examined this issue in a small but important subset of topics in developmental psychology. In each area, RFT seems to leads to interpretations that are consistent with the existing data and that suggest new approaches to these domains.

10

EDUCATION

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In the previous chapter a sample of RFT analyses in the broad area of developmental psychology were presented. One of the primary areas of application of an understanding of developmental processes is education. Education is a broad topic both in and outside of psychology, and so to begin we will briefly consider the wider context of education before examining how RFT might make a contribution to this area.

10.1. EDUCATION: OVERVIEW

Education evolved as a means of nurturing the social and intellectual development of the individual outside of the home environment. While this is perhaps the universal aim of all who participate in this institution (parents, teachers, students, and so on), there is no clear agreement on specific educational objectives or how best these might be achieved (Ingham and Greer, 1992). In elementary education, disagreement on these issues is compounded by different worldviews regarding the nature of childhood and the role of education in it. Stone (1994) described the dominant worldview in education as "developmentalism," defined according to the following three theoretical tenets. First, the majority of children have a natural, sufficient inclination to learn; second, the limits on learning set by biology and

environment cannot be transcended; and third, instruction has more to do with the attributes of the student than those of the teacher.

Worldviews such as this play a key role in the organizational policies and educational practices operated by an educational institution. With regard to policy, Pennypacker (1994) distinguished between static (Type S) and functional (Type F) organizations. Many educational establishments can be categorized as static, according to this definition, in the sense that they are maintained primarily by self-survival contingencies. These contingencies establish characteristic patterns of organizational behavior. For example, static organizations do not engage in any activity or change that might result in their demise (even when there is evidence to suggest that this may solve many of the problems on which the institution was founded). A related feature is the reliance upon invented wisdom rather than empirical evidence, which gives rise to more rule-governed than contingency-shaped behavior at the level of the institution. According to Novak, "much of today's cynicism toward our political and educational institutions may be traced to the public's frustration with Type S organizations" (1996, p. 265). Functional organizations, on the other hand, operate with specific regard to the societal problems for which they were established (e.g., academic or educational deficits), and rely more heavily on discovered knowledge than on invented wisdom in pursuit of these goals. For example, a functional school may seek alternative empirically-validated methodologies for student instruction. This is not common policy amongst many educational establishments (see Watkins, 1988).

Functional organizations also emphasize function at the level of practice. In the structural approach to teaching practice, adopted by the majority of static educational institutions, teaching is defined as *all* interactions between teacher and student, irrespective of functional outcome. Common educational methods employed from this perspective are constructivism and eclecticism, which rely to a lesser or greater extent on Piagetian models of learning. Functional teaching, on the other hand, is defined purely in terms of how much learning is evident in the student's progress. In other words, the teacher has taught only when the student has learned or when the function of the student's behavior has changed appropriately. Functional teaching is the primary focus of direct instruction techniques. In a comparative study of these three methods of instruction (i.e., constructivism, eclecticism, and direct instruction), DeVries, Haney, and Zan (1991) found clear superiority on measures of academic skill for students in direct-instruction classrooms. Direct instruction has long been a hallmark of behavioral approaches to education. Many educators outside of the behavioral tradition reject this approach in the belief that it focuses on academic improvements to the detriment of other important skills, such as socialization.

For reasons outlined above, it does not fit the ethos of many educational establishments to focus primarily on the academic or cognitive achievements of their students. However, from a behavioral perspective, this may be to the detriment of their students' progress. For example Novak (1996) stated, "If the purpose of schools is to provide for the economic and self-actualization goals of children, a primary function of education must be to increase the cognitive development of children" (p. 262). Behavioral approaches to improving cognitive skills have tended, in large part, to concentrate on explicitly training an extensive array of instructional content (e.g., large numbers of mands and tacts), followed by the use of generalization techniques for maintaining the explicitly-taught skills. As far as we are aware, however, few behavioral systems of instruction have been designed to specifically establish *overarching* or higher-order cognitive skills, which can then be arbitrarily applied to any

stimulus content. This is precisely the approach to education that would be advocated by RFT, if one is to encapsulate the functional, overarching nature of human cognition as defined by this perspective.

10.2. EDUCATION AND RELATIONAL FRAME THEORY

There are many avenues of research or types of intervention that could be generated from RFT that might have implications for the way in which both normally-developing and developmentally-delayed populations are taught. For example, empirical investigations guided by RFT may generate new procedures for establishing relational skills that correlate with the normal milestones of language and cognitive development, or whose absence correlates with impairments in these areas. Hayes (1994) argued that it should be possible to train equivalence and other relational activities as operant behavior, and that the subsequent improvement in relational responding should lead to improved abilities in areas of cognition, such as language and intelligence (see also Barnes, Hegarty, and Smeets, 1997; Healy, Barnes-Holmes, and Smeets, 2000). Training overarching or relational operants such as these, without regard to the specific features of the stimuli involved, is not the typical approach to training or testing language and intelligence adopted by mainstream education. Rather, this tradition tends to emphasize cognitive skill with regard to specific "content," as opposed to overarching cognitive skill that is governed more by context than content. More traditional cognitive tasks, for example, often focus on training specific words and/or the acquisition of specific concepts applicable in the real world. While these are important, RFT emphasizes that the flexibility and development of the underlying behavioral processes (e.g., relations between or among content) are equally important.

Consider, for example, a classroom setting where educational activities or games could be designed to improve the flexibility of a child's relational responding. Questions could be asked such as: "If X is the same as Y, and Y is the same as Z, do I like Z if I like X?" For younger children, the games could be simplified to include questions such as: "If the doll is called Becky please bring Becky over here." In both of these examples, it is the relations between the stimuli that are targeted directly with RFT interventions, and not the stimuli themselves.

One such RFT-based intervention for establishing these types of over-arching relational repertoires is multiple-exemplar training. At least initially, multiple-exemplar training is perhaps the key educational strategy that RFT adopts in teaching children and adults the cognitive skills involved in relational framing itself. To appreciate this strategy and its implications for education, we will now examine some of the research that has been conducted on the role of multiple-exemplar training in establishing specific relational repertoires.

10.3. RELATIONAL MULTIPLE-EXEMPLAR TRAINING WITH CHILDREN

Arbitrarily applicable relational responding is based on two broad functional categories of relational responding. The first of these is *nonarbitrary* relational responding, in which responses are controlled by the formal properties of the related events. Consider the example of responding on the basis of more and less with regard to physical appearance. Even a very

young child will be able to choose the physically larger of two objects when asked to do so. As the relational response is abstracted and comes under the control of additional contextual cues, other than the relata themselves, relational responding becomes *arbitrarily applicable*. For illustrative purposes, imagine a child who is praised for choosing the smaller of two coins when asked to pick the more valuable one (i.e., the relative value of the two coins is *not* determined by their size, but by the arbitrary relationship applied to them by the verbal community). A range of other such exemplars might also need to be explicitly trained (e.g., choosing the more important of two chess pieces), for the child to abstract eventually the relational frame of more-than and less-than to the extent that it can be applied arbitrarily to almost any event. According to RFT, these types of training histories are required to establish the cognitive skill we describe as relational framing behavior.

A number of studies have demonstrated different patterns of derived stimulus relations, including sameness, difference, and opposition (Steele and Hayes, 1991), and more-than and less-than (Dymond and Barnes, 1995). These studies successfully demonstrated how various instances of relational framing could be observed in the behavioral laboratory. Such demonstration studies could be criticized, however, because the subjects used were verbally sophisticated, and thus it seems likely that the experimental procedures were drawing on already established repertoires of relational framing (Barnes and Roche, 1996; Barnes-Holmes, Barnes-Holmes, Roche, and Smeets, in press a, in press b). A more complete experimental analysis of multiple stimulus relations would involve establishing repertoires of relational framing when they are absent or not fully formed. At the present time, however, the role of multiple-exemplar training in the development of relational framing has received little empirical attention. Evidence will need to be gathered that shows that relational framing behavior may be developed in both basic and educational/applied settings, with interventions emphasizing multiple-exemplar training.

A number of such studies have recently begun to address the role of multiple-exemplar training in this regard. In these studies, children aged between 4 and 6 years were exposed to multiple-exemplar training procedures to determine whether such training would facilitate both simple and complex forms of derived relational responding. The work that has been conducted to date has provided firm support for the role of multiple-exemplar training in the establishment or development of various forms of derived relational responding, but much more remains to be done. To illustrate how this future work might unfold, we will describe in the following section some of the data gathered from a number of research initiatives with these young children. First, we will outline the use of multiple-exemplar training in establishing simple derived transformations of function in accordance with symmetry. Second, we will describe a study which examined the role of multiple-exemplar training in more complex forms of derived relational responding in accordance with the relational frames of more-than, less-than, and opposite. In a subsequent section, we will describe preliminary data from a third research project on the development of complex perspective-taking in young children, with another intervention derived from RFT.

10.3.1. Transformation of Functions in Accordance with Symmetry

One of the first studies to investigate systematically the role of multiple-exemplar training in the development of relational framing identified a task in which most children failed to show a transformation of functions in accordance with symmetry (Barnes-Holmes

et al., in press b). Children were first trained in an action-object conditional discrimination task. For example, during training when the experimenter waved, choosing a toy car was reinforced (i.e., the trained relation was wave-car), and when the experimenter clapped, choosing a doll was reinforced (i.e., the trained relation was clap-doll). Subjects were then exposed to a test for derived object-action symmetry relations. For example, during testing when the experimenter presented a toy car, a correct response involved the child waving (i.e., the tested relation was car-wave), and when the experimenter presented a doll, a correct response involved the child clapping (i.e., the tested relation was doll-clap). Using a multiple-baseline design, multiple-exemplar training in the form of explicit symmetry training was introduced (i.e., object-action training) for those subjects who failed the symmetry test. Subjects were then re-exposed to the procedure involving a novel set of actions and objects. In total, 11 out of 16 subjects failed to show the derived symmetry performance until they received explicit symmetry training. As an aside, a number of similar experiments employed an alternative naming intervention commonly used in education, and found this to be much less effective than the multiple-exemplar training in establishing the derived test performances (Barnes-Holmes et al., in press a).

One interesting finding from this program of research was the very limited number of exemplars that were required in this context for children to demonstrate arbitrary responding in accordance with the derived symmetrical relations. In fact, the majority of these children required only one exemplar of explicit symmetry training and testing, and the remaining children required only two such exemplars. This suggests that the exemplar training simply activated a previously established relational repertoire of symmetrical responding. Given the age and verbal sophistication of these children, this was almost certainly the case. Although these data support the RFT view of multiple-exemplar training, they did not demonstrate that multiple-exemplar training can establish repertoires of relational framing *ab initio.* Clearly this limits the relevance of these data to educational practice, in that we assume that educationalists would want to know how to establish these cognitive skills *ab initio.* In more recent research conducted by the first author of this chapter, however, multiple-exemplar training has been used to establish the relational frames of more-than, less-than and opposite when they were found to be completely absent in the behavioral repertoire.

10.3.2. Establishing the Frames of More-Than, Less-Than and Opposition

In this study, a basic problem-solving task was employed to test and train the relations of more-than, less-than and opposite. The problem-solving task designed to test and train responding in accordance with more-than and less-than involved presenting a child with two or three identically sized wooden coins. The experimenter described how the coins compared to one another in terms of their value, and the child was then asked to pick the coin that would buy as many sweets as possible. On some trials involving two coins, for example, the child was told that one coin (coin A) would buy more sweets than another coin (coin B) (i.e., A>B). On other trials involving three coins, for example, the child was told that one coin would buy less sweets than another coin, and that this coin would buy less sweets than yet another coin (i.e., A<B<C). Numerous sets of coins were employed to create multiple-exemplars for training and testing this type of task. Three children each required between 30 and 40 experimental sessions, each lasting approximately 30 minutes, before s/he demonstrated responding in accordance with the arbitrary relations of more-than and less-than in any

direction between a novel set of three random objects. To provide a flavor of this work, the data recorded from one subject are depicted in Figure 1 below. The graph shows the percentage of correct responses for this child during each exposure to a block of test trials across baseline, intervention, and reversal conditions.

This study provided evidence that responding in accordance with the relational frame of more-than and less-than may be effectively established by a history of multiple-exemplar training as predicted by RFT. The findings also point to the operant nature of these performances, and the flexibility of this relational repertoire once established in this way.

Another study conducted by the first author adopted a similar approach to the analysis of the relational frame of opposite. Subjects received the following type of instruction when presented, for example, with three coins: "If this coin (coin A) buys many (or few) sweets, and is opposite to this coin (coin B) and if this coin (coin B) is opposite to this coin (coin C), which coin(s) would you take to buy as many sweets as possible." In order to appreciate how difficult this task actually was, consider the following opposite test trial as an example. Ten novel objects were randomly scattered by an unfamiliar experimenter in a novel environment. A four-year-old child was asked, "If this coin buys many sweets, and this is opposite to this (experimenter pointing to one coin then another), and this is opposite to this, and this is opposite to this " [and so on], which would you *not* select in order to buy as many sweets as possible [in addition, at one point in the experiment the normal contingencies for correct responding were reversed]. A great many experimental sessions were required until each of three children could respond in accordance with the arbitrary relation of opposite in any direction among a novel set of up to ten randomly positioned objects.
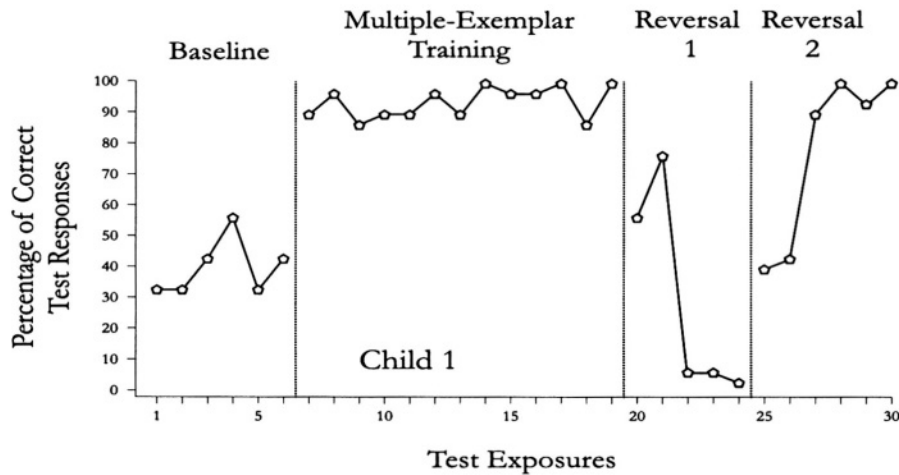
Figure 1. The effect of multiple-exemplar training on derived relations of more-than and less-than

The foregoing study provided evidence that responding in accordance with the relational frame of opposite may be effectively established with very young children by a history of multiple-exemplar training. The relational frame of opposite also appeared to be operant and flexible in nature when established in this way. There were, however, a number of additional features of opposite responding that were not encountered with more-than and less-than. With all children, it proved somewhat difficult to establish opposite responding, and many exemplars of training were needed to establish even mutually-entailed opposite relations. Training combinatorially-entailed opposite relations proved even more difficult. For one child in particular, this type of responding could only be established by explicitly instructing the relation of "same" to facilitate the multiple-exemplar training in opposite (i.e., If A is opposite to B, and B is opposite to C, then A and C are the same). Interesting effects were also observed regarding the multiple-exemplar training in terms of the amount of training required at a particular point in the procedure. Subjects required many exemplars of training to derive the opposite relations between two, three, four, and five coins, but needed few or no exemplars of training when working with six, seven, eight, nine, or ten coins. In other words, increasing the number of coins used during the course of multiple-exemplar training functioned to establish the relational frame of opposite as a generalized cognitive skill that could be applied arbitrarily to any number of stimuli.

As relational frames are acquired, educational methods can become more based on verbal instructions. Indeed, entirely new forms of relational responding may eventually simply be instructed, as seems to happen in, for example, higher mathematics. Even in the area of verbal instruction, however, careful attention to the speed, accuracy, and flexibility of relational responding may speed the development of relational performances. For example, a child might be exposed to relational problem-solving sentences, such as "If TOP was BOTTOM and PRETTY was UGLY and IN was OUT, and a pretty rabbit was in the bottom of the closed box, what would you see on top?" (Answer: an ugly rabbit). As these relational abilities develop, multiple-exemplar training and verbal instruction blend together, because in one sense the target of the multiple-exemplar training is verbal instruction itself. Thus, we do not mean to say that RFT is linked to shaping as the only or the best method of education. Rather, our core point is that the development of fluid, flexible relational responses is key to education of all types.

In the studies outlined above, relatively complex forms of relational responding were readily demonstrated with young children using multiple-exemplar training. We should emphasize at this point that multiple-exemplar training does occur during the course of normal educational practice, in that much of education involves presenting children with clusters of tasks that are grouped by content rather than function (e.g., adding two numbers together, identifying the adverb in numerous sentences, etc.). However, these tasks are not designed specifically to target the key cognitive or relational skills that we assume to be incidentally trained during the normal course of educational practice. In short, we know that education sometimes works and sometimes fails, but at the level of psychological process we cannot account for these successes and failures. RFT is directly concerned with these psychological processes and how they might be harnessed for bringing about improved educational achievement. What is most exciting about this research agenda is that the same general process of relational framing may be at the heart of a very wide range of cognitive abilities. To illustrate just how broad the impact of RFT might be in educational practice, we will now turn to the topic of perspective-taking in young children.

10.3.3. Relational Responding and Perspective-Taking

One area in which RFT may make a significant contribution to education, especially with developmentally-delayed populations, is in the teaching of perspective-taking skills, often referred to as 'Theory of Mind'. In Chapter 7, we considered the possible role of the relational frames of I-YOU, HERE-THERE, and NOW-THEN in perspective-taking and in the verbal construction of self. This approach to perspective-taking is relatively new, not only for RFT, but for psychology in general. To begin with, therefore, we will look briefly at the traditional approach to understanding perspective-taking and how this skill has been taught. In each case, we will also offer a brief RFT interpretation of the cognitive skill that we believe is being established.

Perspective-taking has traditionally been approached in mainstream psychology from a 'Theory of Mind' perspective. According to one such approach described by Howlin, Baron-Cohen, and Hadwin (1999), there are five levels in the development of knowledge about informational states in self and others. These levels of perspective-taking, and the methods by which the above authors suggest they might be established, are as follows. Level 1 is simple visual perspective-taking. To train this level, a child is presented with a two-sided card with a fish on one side and a car on the other, for example. The child is then asked, "What can I see and what can you see?" If the child responds incorrectly to either question, s/he is provided with corrective feedback until correct responding is established.

Level 2 is complex visual perspective-taking, and is trained as follows. A child is presented with a card on which a character (e.g., a lion) is depicted the right way up on one side and upside down on the other. The child is asked, "When you or I look at this picture, is the lion the right-way-up or upside-down?" Correct responding again is established by corrective feedback. An RFT view of these tasks is that contextual control of the relational frame of I-YOU is being established, even though it is not targeted directly (i.e., the correct response is determined by the cues I and YOU in the questions).

Level 3 involves the principle that seeing leads to knowing. An example of how this level may be established is as follows: A child is asked to close his/her eyes, and the experimenter hides an object behind a door. The child is asked, "Do you know what is behind the door? Why don't you?" (Presumably the answer will be a variant of "no, I can't see through the door"). The child is then shown behind the door, and asked again, "Do you know what is behind the door?" and (assuming that the child has answered "yes") s/he is then asked, "How do you know?" The correct conclusions in this scenario are basically "I know because I have seen, and I do not know when I have not seen." A similar scenario is then played out before the child from the perspective of another (e.g., a doll), and the same questions are asked regarding the doll's perspective. An RFT interpretation of these interactions would point to further training with I-YOU and the indirect introduction of control by the relational frame of NOW-THEN. Consider, for example, the role of these relational frames in the correct answer as follows: "I didn't see THEN so I don't know NOW" and "YOU saw THEN so YOU know NOW."

Level 4 involves the principle that you can predict actions on the basis of knowledge. Consider the following training task in which four toys are used; two identical cars, one plane, and one boat. One car is placed next to the boat and the other car next to the 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 same story is then enacted with a doll, for example, and the same questions are asked regarding the doll's perspective. The correct conclusions from this scenario involve the knowledge that one will only know what one has seen. From an RFT perspective, contextual control of the relational frames of I-YOU, NOW-THEN, and HERE-THERE are being established at this level, although again they have not been targeted directly. For illustrative purposes, consider the relational frames involved 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 analysis involves the principle that you can predict actions on the basis of false belief. This level might be established as follows. A child is shown a moneybag and is asked, "What do you think is inside the moneybag?" Unbeknownst to the child, the moneybag does not contain money, but instead contains two dice. The child is then shown inside the bag, and asked, "Before we opened the bag, what did you think was inside? And what is really inside?" A similar scenario is then enacted from the perspective of another (e.g., a doll), and the same questions are posed regarding this alternative perspective. According to RFT, these tasks incorporate incidental training in contextual control of the three perspective-taking frames (i.e., I-YOU, HERE-THERE, and NOW-THEN) and also add relational flexibility by requiring control by the relational frame of *logical not*. Consider the role of these relational frames in the correct answer as follows: "I did NOT see inside THERE and THEN, but I do see inside HERE and NOW."

These traditional approaches to perspective-taking involve relational frames (i.e., I-YOU, HERE-THERE, and NOW-THEN) but a more effective means of establishing these repertoires might target these relational frames directly. In this way, the training would focus on the largely verbal nature of the behavior involved. An ongoing study by the first two authors is attempting to do just that, by developing RFT-based interventions for establishing perspective-taking in young children. We will describe the types of training and testing procedures that were developed for this purpose, in part because they show how RFT leads to innovative procedures as flexible contextual control over relational frames is targeted.

The relational frame of I-YOU was the first of three primary perspective-taking frames that was trained. To train this, a child was presented with two colored blocks and asked, "If I (experimenter) have a green block, and YOU have a red block, which block do I have? Which block do you have?" If the child responded incorrectly to either question, corrective feedback was provided until correct responding occurred regularly. Once correct responding to these simple I-YOU relations was established, the relations between I and YOU were reversed. For example, the child was asked, "If I was YOU, and YOU were ME, which block would YOU have? Which block would I have?"

Once contextual control by I-YOU was trained, control by HERE-THERE was taught. This relational frame was established as follows. A child was presented with the following query: "I am sitting on the black chair, and you are sitting on the blue chair. If I was over THERE, and YOU were over HERE, where would YOU be sitting? Where would I be sitting?" In this task, both relational frames of I-YOU and HERE-THERE are being established directly, but in this example, notice that only the HERE-THERE relation is reversed. Once correct responding on this task was demonstrated, the task is made more complex by reversing both I-YOU and HERE-THERE relations at the same time, in what might be called a double reversal. In this case, the child was instructed as follows "I am sitting on the blue chair and YOU are sitting on the black chair. If I was YOU and YOU were ME,

and if I was over THERE and YOU were over HERE where would YOU be sitting? Where would I be sitting?" Again, corrective feedback was provided to establish correct responding.

Once the perspective-taking frames of I-YOU and HERE-THERE were established, the relational frame of NOW-THEN was introduced. In order to establish responding in accordance with NOW-THEN, the child was presented with the following query: "Yesterday I watched TV, today I am reading. What am I doing NOW? What was I doing THEN?" In working with NOW and THEN, it is necessary to separate the I-YOU relations, because responding to I-YOU and NOW-THEN when mixed together leaves some of the relations unspecified and thus occurs only very rarely, if at all, in natural verbal interactions. Once this pattern of simple responding in accordance with NOW-THEN was mastered, the relation was reversed. Training this task was as follows. "Yesterday I watched TV, today I am reading. If NOW was THEN, and THEN was NOW, what would I be doing NOW? What would I be doing THEN?"

With a flexible form of NOW-THEN responding thus established, the child can be taught to respond to the complex task of mixing NOW-THEN and HERE-THERE. This is established as follows, "If I was THERE on the red chair yesterday, and I am HERE on the green chair today, and if HERE was THERE, and THERE was HERE, where would I be sitting NOW? Where would I be sitting THEN?" In this task, both frames are being targeted directly but only HERE-THERE is reversed. Clearly this task could be made even more complex by reversing both relations at the same time (i.e., If HERE was THERE and THERE was HERE, and if NOW was THEN and THEN was NOW). Once again, however, responding to these frames when mixed and reversed is extremely complex, and probably occurs only rarely in verbal interactions. This task type was not employed in the current research.

To date, only a limited number of subjects have been exposed to these procedures. One seven year old female has passed the entire training program above, showing that even young children can learn rather complex relational responses through these means. A three and a half year old boy is currently being exposed to the same training sequence. This child failed level 1 of the theory of mind test, but passed this test after successful I-YOU relational training and its reversal. At the time of writing, HERE-THERE has also been learned and reversed, but the double reversal of I-YOU and HERE-THERE is not yet mastered.

The absence of perspective-taking skills presents a critical obstacle to the progress and quality of life of many developmentally-delayed children in particular, and so there are important educational implications of these training techniques. While a great deal remains to be done, it is seems apparent that RFT has clear implications for the nature of perspective-taking and its establishment.

Relational Frame Theory also leads to a line of questions that need to be researched in this area: what are the key relational frames that underpin high levels of educational achievement? Does multiple-exemplar training in nonarbitrary relations facilitate or hinder arbitrarily applicable relational responding? Are there some cognitive skills for which multiple-exemplar training is more or less effective? Is flexibility of contextual control over relational responding critical to the creative use of relational repertoires? Is the speed of derived relational responding predictive of the ability to generate complex relational networks and do these abilities correlate with other forms of intellectual behavior? Will highly unusual exemplars establish more arbitrarily applicable forms of relational responding (e.g., will hot OPPOSITE cold establish less generalization to other relata than acid OPPOSITE

alkaline)? Are there families of relational frames that should be trained together or in sequence; for example, should SAME be overtrained before training OPPOSITE? These are just some of the questions that are generated by this analysis which need systematic investigation, and that have important implications for practically all levels of educational practice.

The RFT analysis, and its reliance on multiple-exemplar training, extends beyond the education of young children. RFT predicts that multiple-exemplar training should also be useful in establishing the most highly complex forms of relational responding, in areas such as logic and abstract mathematics. In fact, the first two authors have recently attempted to train undergraduate students in logical reasoning using multiple-exemplar training. In the final section of the chapter we will briefly describe this research program.

10.4. RELATIONAL MULTIPLE-EXEMPLAR TRAINING WITH ADULTS

10.4.1. Logic: A Relational Frame Analysis

Logic, from an RFT perspective, is in essence a relational activity that involves the derived transformation of functions in accordance with multiple stimulus relations. Although specific examples of relational framing may sometimes appear logical (e.g., if A is the same as B and B is the same as C, then A is the same as C), logic does *not* provide an explanation for relational framing. Instead, it is RFT that provides the basis for a behavioral explanation of logical reasoning, including instances in which individuals fail to reason logically.

Logic, as a discipline, is too broad a topic to cover here. To illustrate the RFT view of logic, therefore, we will focus on deduction, and in particular on reasoning based on conditionals. We will begin by reviewing four examples of such reasoning, focusing on the errors that non-logicians often make when confronted with these examples. We will then provide an RFT interpretation of these errors, and suggest how a relational frame researcher might approach the study of such reasoning. Finally, we will outline how we have begun to use multiple-exemplar training to train logical reasoning in undergraduate students. Our aim, therefore, is simply to illustrate how RFT interprets and approaches the topic of logic by focusing on specific examples of deductive reasoning. Nevertheless, the same general, RFT-based strategy could be applied to any other area of logic, but that will have to await a more detailed and systematic treatment.

10.4.1.1. Four Deductions Based on Reasoning with Conditionals

Research has shown that when individuals reason from conditionals, they usually make the modus ponens deduction:

1. If there is a square then there is a circle.
   There is a square.
   Therefore, there is a circle.

Individuals, however, often fail to make the modus tollens deduction:

2.   If there is a square then there is a circle.
      There is not a circle.
      Therefore, there is not a square.

In fact, many verbally sophisticated individuals report that nothing follows in this case (see Wason and Johnson-Laird, 1972; Evans, 1982). Two other logical errors that people often make when reasoning from conditionals involve denying the antecedent and affirming the consequent. An example of denying the antecedent is as follows:

3.   If there is a square then there is a circle.
      There is not a square.
      Therefore, there is not a circle,
      (i.e., logically, there could be a circle).

An example of affirming the consequent is as follows:

4.   If there is a square then there is a circle.
      There is a circle.
      Therefore, there is a square.
      (i.e., logically, there may not be a square).

How does RFT explain these examples of logical and illogical reasoning? According to RFT, they may be explained, in part, by focusing on the verbal histories that established the functions of the contextual cues contained within the premises and conclusions. The two cues that seem most relevant here are the words "if and "then." For RFT, therefore, the key question is, what relational functions have been established for these words in the history of the reasoner? Casual observation indicates that in the language community of most English speakers (i.e., excluding logicians), if-then statements are often used to specify a contingent relationship, sometimes of a temporal quality, between two events, in which the latter event is entirely contingent or dependent upon the former, but not vice versa. For example, a child might be told by a parent; if you tidy your room, then you will get some chocolate. In this statement, the if-then relation is normally used to convey to the child that getting the chocolate is entirely dependent upon tidying the room. Parents would not normally use this if-then statement to indicate to the child that he or she might get some chocolate even if the room is not tidied. According to strict logic, however, this possibility *is* implied by the if-then statement (see deduction 3 above). Furthermore, the if-then statement is not used by the parent to imply that eating chocolate might occur in the absence of a tidied room. Again, according to strict logic, this is implied by the if-then statement (see deduction 4 above). In summary, RFT suggests that *if* and *then* may function as contextual cues that cause a listener to respond to the term that directly follows "then" as completely dependent upon the term that directly follows "if."

Given this RFT interpretation, deductions 1 and 2 also make sense, at least behaviorally. In the case of deduction 1, if the presence of the circle is entirely dependent upon the presence

of the square, and the square is present, then the circle must also be present. In the case of deduction 2, the circle is not present, and thus the presence of the square remains uncertain. In effect, the direction of the dependency relation between the square and the circle is unidirectional (i.e., the presence of the circle depends upon the presence of the square, but the presence of the square does not depend upon the presence of the circle).

Of course, not all reasoners produce the typical errors associated with deductions 2,3, and 4. To explain why this is the case, RFT would again look to the verbal history and current context of the reasoner. One possible source of the individual differences observed across reasoners is the fact that "if and "then" are sometimes used in ways that do not establish a relation of dependency between the latter and former terms within a sentence. For example, the statement, "If you're interested in human behavior, then RFT is a good theory" does not imply that the "goodness" of RFT depends upon the listener's interest. In effect, the verbal history of most sophisticated reasoners will have established multiple relational functions for the cues "if and "then" – in some sentences these cues establish a relation of complete dependency between the latter and former terms, and in other sentences they do not. Clearly, the nature of the relational functions that are actualized within a particular instance of reasoning will determine whether or not the reasoner reasons correctly.

From the RFT perspective, some of the cognitive research on reasoning has involved manipulating the relational functions of "if" and "then" by changing the current context of the premise. Consider, the following example of denying the consequent:

> If Yvonne finishes the chapter she will have a pizza.
> Yvonne did not finish the chapter.
> Therefore, Yvonne did not have a pizza.

Research has shown that it is possible to suppress this fallacy by presenting an extra premise that establishes an alternative antecedent bringing about the same consequent (e.g., Markovits, 1984). Thus, where the original conditional is:

> If Yvonne finishes the chapter she will have a pizza.

the additional presentation of:

> If Yvonne misses her dinner she will have a pizza.

changes the relational functions of "if" and "then." In other words, subjects realize that Yvonne having a pizza is not completely dependent upon her finishing the chapter. From the RFT perspective, this type of research suggests that multiple relational functions have been established in the verbal histories of most English speakers, and that it is possible to actualize these various functions (and suppress others) by manipulating the current context of the reasoning task.

Of course, some individuals produce logically valid conclusions in the absence of alternative antecedents, and thus RFT must also account for this fact. One possible explanation for the drawing of a valid conclusion is that the premises may actualize certain private visual functions that facilitate logical reasoning. Consider the following example of affirming the consequent:

If it rains then the ground will be wet.
The ground is wet.
Therefore, it may or may not have rained.

How might a person (not trained in logic) draw the foregoing valid conclusion? According to RFT, the first premise may actualize privately seeing a scene in which rain produces a wet ground. However, when the second premise is presented, only a wet ground might be privately seen. The image of wet ground, without rain, may actualize further private images, based on the individual's history, in which a wet ground was caused not by rain, but by some other event, such as snow or a car wash. If such an image is actualized (e.g., snow leaving a wet ground), the person may thus conclude that nothing follows (i.e., it may or may not have rained). In effect, RFT predicts that the private visual functions that might be actualized by a given premise may sometimes help a reasoner to determine whether or not a particular conclusion follows. In fact, a broadly similar argument has been made by a number of cognitive researchers in this area (Byrne, 1989; Johnson-Laird and Byrne, 1991), but a detailed treatment of this issue would take us outside the remit of the current chapter. Let us focus therefore on how RFT might approach deductive reasoning in the context of education.

10.4.2. Teaching Deductive Reasoning

One RFT approach to teaching deductive reasoning would involve the use of multiple-exemplar training to establish various relational functions in arbitrary stimuli, so that they would have the type of effect on reasoning behavior that a logician would like to see for the words "if and "then." Consider the following hypothetical study. Subjects are presented with the following sentence on a computer screen, "Cug there is a square, vek there is a circle." Subjects are then exposed to a number of trials during which the square and a circle are presented in various sequences. These sequences are designed to establish specific relational functions for "Cug" and "vek" such that they will come to control correct deductive reasoning in novel sentences. On some trials the square is presented first followed by the circle (i.e., training for deduction 1), but across other trials the circle is presented with and without the square (i.e., training for deductions 3 and 4). On no trials, however, is the square presented without the circle (training for deduction 2). Following extended exposure to this training, subjects are presented with various tests to determine whether the nonsense words "Cug" and "vek" are functioning as contextual cues for deductive reasoning. For example, would a subject reason logically, if s/he was presented with the following test involving new shapes:

Cug there is a triangle vek there is a cross.
There is no triangle
Therefore. . .

And assuming that the subject reasoned correctly above, s/he could also be tested to determine whether the relational functions of "Cug" and "vek" generalize to sentences incorporating stimuli other than geometric shapes:

Cug there is rain vek the ground will be wet
There is no rain
Therefore. . .

If subjects failed any of these tests, they could be exposed to additional training exemplars, with Cug and vek as contextual cues, before being re-exposed to the types of tests listed above. In one related study that was just completed at the time of writing (deMey, unpublished manuscript), this type of deductive reasoning had been successfully established with a group of thirty undergraduate students using multiple-exemplar training. In fact, increasing numbers of subjects demonstrated correct deductive reasoning with each exposure to an additional training exemplar (in this study four exemplars was the maximum number employed). Although once again preliminary, these data indicate that the RFT approach to deductive reasoning, and how to teach it, shows promise. By targeting specific relational functions, such as if and then, we may be better positioned to design the appropriate multiple exemplars that need to be trained to generate deductive and other forms of logical reasoning.

10.5. SUMMARY AND CONCLUSIONS

In the current chapter we have outlined preliminary findings from a new research agenda in the experimental analysis of complex human behavior, and the educational implications of this research strategy. This research was designed to supplement the somewhat limited empirical work conducted within the conceptual framework of RFT, with a particular focus on the teaching strategies or interventions that give rise to complex forms of relational framing, such as arbitrary opposite responding, complex perspective-taking, and responding on the basis of logical reasoning. This new research initiative consisted of studies in which both very simple and very complex forms of derived relational responding were targeted for assessment and remediation using interventions indicated by RFT.

A key theme running throughout the diverse content areas covered in this chapter is the role of a basic understanding of relational responses in teaching important cognitive skills in both children and adults. It is our belief that identifying the core relational units involved in these cognitive skills, and targeting their fluid and flexible development with appropriate training, will lead to significant improvements in the methods used in many educational settings. Progress toward such a goal is a necessary pragmatic criterion for any adequate theory of language and cognition.

11

SOCIAL PROCESSES

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Behavioral psychologists have previously approached the field of social psychology using traditional behavioral concepts and, when verbal processes were needed, concepts drawn from Skinner's *Verbal Behavior* (e.g., Guerin, 1992). RFT has only begun to be used in some behavioral studies of social psychological processes (e.g., Barnes, Lalor, Smeets, and Roche, 1996; Kohlenberg, Hayes, and Hayes, 1991; Roche and Barnes, 1996, 1997; Watt, Keenan, Barnes, and Cairns, 1991). In the current chapter we will use RFT to interpret some of the key phenomena that have been highlighted in the social psychological literature. Our purpose here, therefore, is simply to illustrate how RFT might be used to develop a modern behavioral approach to human social behavior. As such, the current chapter is an orientation to action, rather than a definitive RFT statement on social psychology.

11.1. BELONGING TO A GROUP

Let us begin with an RFT analysis of perhaps the most basic issue in this area – the psychology of *belonging to a group*. Groups serve many different functions for their

members. They provide affection and attention. Through cooperation they reduce workloads on individuals, they provide safety in numbers, and they impart many important survival skills to their members (e.g., snow-monkeys teach each other how to access and wash potatoes). None of these potential benefits of being in a group, however, necessarily involve verbal processes and all are widely available to non-human populations. In the context of RFT, we are particularly interested in those social activities that depend upon verbal relations for their emergence and maintenance. Furthermore, because RFT is a psychological theory, not a sociological or anthropological account, we are interested in the psychology of the individual as it relates to groups, rather than in the behavior of groups per se.

From an RFT perspective, when a verbally sophisticated human claims to be part of a social group three relational phenomena are likely involved. Two of these were considered in Chapter 7 -- the conceptualized self and the conceptualized other. The third phenomenon is what we will refer to as the conceptualized group. Belonging to a group, in a verbal sense, can only occur if an individual has learned to talk about a range of physical, cultural, and psychological characteristics that are typically used to describe human beings. So, for example, people can be tall, short, fat, thin, white, black, democrats, republicans, oriental, catholic, poor, rich, sensitive, strong, weak, and so on. These and many other characteristics may participate in a conceptualized self and a conceptualized other (e.g., I am tall; you are short. I am kind; you are mean, etc.). Much of early socialization appears to involve teaching children to establish these types of relational networks. For example, a mother might say to her young son "You are a little boy, but your sister is a little girl; you have red hair, your sister has black hair." A conceptualized group emerges for a particular person when two or more individuals come to participate in a frame of coordination under the contextual control of one or more shared characteristics that are contained in a conceptualized self and conceptualized others. A likely early example of this is the family unit. For instance, a father might say to his young daughter, "you, me, and mommy are a family because we all live here in the same house." In this case, "living in a particular house" is identified as a characteristic that participates in the conceptualized self for the child and the other family members, and is used to define a conceptualized group (i.e., the family unit). This same basic process occurs again and again throughout the lifetime of an individual. As a person learns more and more about the social world, the relational networks that define the conceptualized self and conceptualized others also function to create conceptualized groups. When a young child develops a rudimentary understanding of religion, for example, a conceptualized group may emerge (e.g., "All the people who go to church on Sunday are Christians like me"). In fact, behavioral regularities across individuals, such as religious practices, help to define conceptualized groups and have long been studied by social psychologists. We will now consider some of the key issues in this area of research and suggest how RFT might approach such phenomena.

11.1.1. Normative Social Behavior

According to social psychology, norms may be viewed as implicit rules for action. The implicit rules derived and followed by individual group members, however, are not to be confused with the explicit rules derived by scientists to describe regularities in behavior. Nor are they the mere regularities themselves (see Reese, 1989). Social psychologists also differentiate between two types of norms, specifying that some norms amount to what we

might call habitual behaviors (i.e., normative influence), while others are explicitly verbal in nature (i.e., informational influence, see Crutchfield, 1955; Deutsch and Gerard, 1955). The norms of interest in the current context are those of the latter kind; verbal rules derived by group members. These rules are typically inferred across multiple exemplars of behavior correction and the occasional explicit verbalization of a normative rule by fellow group members (e.g., "it is rude to refer unnecessarily to someone's handicap"). Aside from their implicitness, these rules would appear to function like any other rules as described in Chapters 6 and 7 of this book, except that the rules are often derived based on the construction of a conceptualized group. In other words, by responding to an individual as a member of a particular group (e.g., the clergy), a rule may be generated that suggests how one should behave in the presence of that person (e.g., avoid using any profanities).

One of the most important functions of a group, according to social psychology, is that it provides feedback to individuals regarding the "correctness" of their opinions, beliefs, and actions (Festinger, 1954). From this perspective, "being right" is one of the more highly valued consequences for most people. There is evidence for this view. Even young school children spend significantly more time asserting their status within groups through the use of rhetoric designed to show the lightness of their views than they do in more direct or physical attempts to gain status (cf. Harré, 1993). In effect, "being right" in a verbal sense results in considerable social approval and status. From an RFT perspective, "being right" can be viewed as a verbally contacted consequence for verbal behavior itself. It is the discrimination by a speaker or listener that what has been said is congruent with itself (e.g., "I am a good person because I like to help others") and with a broader verbal network (e.g., In general, good people help others). Making such a discrimination requires advanced verbal skills because it involves relating verbal relations to other verbal relations and entire relational networks to other relational networks. If the derived relations and stimulus functions of two networks are similar from the individual's perspective then the two networks can be said to mean the same thing, and as such, verbal coherence has been achieved.

The norms of a group provide a framework for action in novel situations and thus reduce ambiguity and stress for individuals at key decision points. An organized religion provides a convenient example. Religions typically provide action codes for their members that allow them to "be right" even when engaging in novel behavior in novel circumstances. This effect could only be achieved by a highly verbal organization. Consider, for instance, the Christian maxim "do unto others as you would have them do unto you." This statement is a relational network that is applicable to an infinite number of decision-making situations. It is precisely the infinite flexibility of this maxim that makes it important.

Imagine that a practicing Christian, called Paul, is at an ambiguous choice-point. He is angry with his friend John, because John has forgotten his birthday. As a result, Paul verbally constructs the self-directed rule "I will ignore John next time I see him." However, as a practicing Christian, Paul's self-directed rule must be approached in terms of the principles of Christianity. In RFT terms, all self-directed rules must coordinate with the relational network constructed by the religious group as a whole, such as "do unto others as you would have them do unto you." Learning to respond in accordance with the perspective-taking frames I-YOU, HERE-NOW, and THERE-THEN (see Chapter 7), and the frame of IF-THEN appears to be critical in this regard. Specifically, these frames allow Paul to construct the following relational network: "If I were ill-treated by John then I would feel bad." For RFT, what we might call "having a conscience," therefore, requires a shift in perspective and

a relatively advanced degree of verbal skill (see Chapter 9 on Moral Development). Perhaps it is not surprising, therefore, that Christians do not attribute children with a conscience until they have reached the "age of reason" at about seven years.

Rule-following of the foregoing kind is an essential feature of group membership. Using general rules ("do unto others as you would have them do unto you"), implicit or otherwise, behavior can be regulated at a distance and in the absence of frequent punishers or reinforcers. Without such general rules, an individual would have to rely upon verbal relations and functions established in specific situations to give rise to novel and creative solutions at all choice-points. If this were the case, however, it is likely that in sufficiently novel situations, no solution would be forthcoming and a great deal of stress would be experienced at many junctures in an individual's life. General rules or group norms rid us of this problem by establishing tried and tested relational networks that allow for novel and appropriate behaviors in a wide variety of situations.

11.1.2. The Ties That Bind: Group Cohesion

Group cohesiveness is a key feature of belongingness in groups. Several factors have been identified that appear to determine strong intra-group bonds, such as attraction (see Hogg and Hains, 1996), similarity (Goethals and Darley, 1977), shared perceived threats (Lanzetta, 1955; Turner, Pratkanis, Probasco, and Leve, 1992), or shared values and norms (Cota et al., 1995; Zacarro and McCoy, 1988). It is not clear, however, why such factors would increase cohesion. Behavioral researchers have conceptualized the cohesiveness of groups in terms of the reinforcing effects of membership and the punishing effects of group desertion (see Cota, Evans, Dion, Kilik, and Longman, 1995), but these ideas do not appear to consider the clearly verbal nature of the reinforcing effects of group membership. Factors such as status, a sense of belonging, and self-esteem are, we would argue, inherently verbal. Similarly, the punishing effects of abandoning a group are never contacted by those who remain within the group. It appears that both positive and negative consequences are often verbally constructed (e.g., "I feel like I belong" and "I would be lost without the group").

From an RFT perspective, the discrimination of any shared features (e.g., values and beliefs) across group members may lead to a strengthening of the conceptualized group as a verbally constructed entity. In technical terms, such abstracted similarities can increase cohesion because they serve as contextual cues for frames of coordination and/or hierarchical class membership being applied to group members. For example, groups may adopt universal dress or conduct codes to increase the salience of shared characteristics as defining properties of group membership, and to decrease the salience of the unique characteristics of members (particularly those characteristics that might conflict with group membership).

The more characteristics of the group that are shared by non-group members, the less these characteristics are likely to be important to group membership. For instance, a Bronx gang will contain members who live in the United States, on the East coast, in New York, in the Bronx. Living on the East coast will be a much weaker source of frames of coordination among group members than will living in the Bronx, simply because the former feature is more broadly shared with group members and non-group members than the latter.

One factor that has long been thought to have a powerful effect on group cohesiveness is the level of common threat felt by group members (Turner et al., 1992). Studies have shown

that when groups are under threat, members tend to become more concerned for the welfare of other group members. When the group is under perceived threat, other members function as more important to the individual. The concept of the conceptualized group may help to explain this from an RFT perspective. As noted earlier, an individual's participation in a conceptualized group depends on one or more shared characteristics between the individual and other members of the group. If the group is threatened, therefore, the conceptualized self of any group member is also threatened. In technical terms, the threat to the conceptualized group may transfer through hierarchical relations to each individual in that group. Given this derived threat to each individual, it is hardly surprising that group cohesion often increases. If an individual feels threatened based on a characteristic that he or she shares with a number of conceptualized others, each member may well derive through perspective-taking frames that the other group members also feel threatened, and thus "we should stick together."

Having provided this brief analysis of groups and group cohesiveness from an RFT perspective, we are now in a position to consider two examples of the ways in which group cohesiveness might be enhanced.

11.1.2.1. The Use of Formative and Motivative Augmentals

Another way in which groups maintain or enhance cohesion involves the alteration of reinforcing functions through the use of formative and motivative augmentals. Religions, for instance, sometimes "re-frame" pleasurable biological reinforcers such as sex, drugs, food, alcohol, and rest, as undesirable. Such reinforcers can threaten group cohesion because they often control behavior more effectively than the verbally constructed distant consequences of religious rule-following. In order to ameliorate the possibility of membership loss as a result of these, it is necessary, therefore, to establish negative functions for these activities so that they participate in frames of coordination with terms such as "bad," "evil," "morally weak," "dangerous," and the like. Where the threat of desertion is great, group members will exert considerable effort in forbidding contact, and verbally reconstructing relations between group members and their families or mainstream society in general (e.g., the Moonies, the Branch Davidians). Non-members may thus be verbally coordinated with terms such as "the problem," or "evil ones," or verbally constructed in frames of opposite with terms such as "the chosen" or "holy ones." Such alterations to verbal networks may have the effect of rendering the functions of contact with family and other non-members as less reinforcing, and possibly even aversive, thereby protecting the cult from dissolution.

Just as cohesive groups must sometimes arrange for the transformation of reinforcing functions, it is sometimes necessary to transform the functions of some natural punishers such that they function as reinforcers. For instance, gangs will sometimes verbally construct physical ill-treatment of group members as virtuous (e.g., initiation rights). It is often the case, that an individual can only become a full group member when he or she has undergone some form of physical or psychological trauma. Furthermore, a greater number of physical assaults endured by a member will often secure greater status for this individual within the group. By confining the source of reinforcement to activity within the group and re-framing previous reinforcers as punishers, and former punishers as reinforcers, a group can successfully verbally construct a new picture of social reality in which good becomes bad, and bad becomes good (see Wilder and Shapiro, 1991). In so doing, it becomes more difficult for any member of the group to return to the mainstream culture.

11.1.2.2. Establishing Operations and Competing Verbal Relations

The use of establishing operations such as fasting, special diets, sleep deprivation, sensory deprivation, elimination of means of telling time, and the like (e.g., during "brain washing" sessions) can serve an important role in altering previously established verbal relations. Under conditions of exhaustion and fatigue, for example, previously well-established patterns of derived relational responding may be greatly weakened. The individual may become less capable of discriminating inconsistencies in verbal networks. Consequently, the individual may quite readily accept statements such as "You are not who you think you are" or "your family does not really love you." In short, the use of appropriate establishing operations to manipulate existing relational networks may serve to increase group cohesion, particularly in cult or religious contexts.

We will now turn our attention to three other common topics in the field of social psychology: prejudice, persuasion, and sexual attraction.

11.2. PREJUDICE

Prejudice involves responding to people or events based on conceptualized groups, but in this case the conceptualized self shares few if any of the salient characteristics with the conceptualized others (i.e., the prejudiced person is not a member of the conceptualized group). From an RFT perspective, prejudice involves a derived transformation of the functions of individuals based on direct or verbal contact with the functions of a few members of a conceptualized group. For instance, if my car is vandalized in a particular neighborhood then the functions of other "members of that community" may be transformed in such a way that I also respond to them as vandals. This transformation of the community members is derived and this, in essence, is what makes behavior towards them prejudicial.

Social psychologists have studied the phenomenon of prejudice extensively. For example, using what has become known as the minimal groups paradigm, Tajfel, Billig, Bundy, and Flament (1971) found that British schoolboys at summer camp expressed a preference for other members of a temporary in-group to which they had been randomly assigned, allegedly based on their common fondness for the work of particular painters. Furthermore, when asked to distribute pocket money to other children identified only by code numbers and group membership, a bias towards in-group members was observed. In effect, simply being categorized as an in-group or out-group member is enough to produce ethnocentric behavior and inter-group competition (Tajfel, 1982).

From an RFT perspective, the social functions of subjects in the Tajfel et al. (1971) study were transformed by their participation in conceptualized groups. This transformation was based on derived relations between particular individuals and the group category (i.e., from the boys' perspective; "if my group is the preferred group then all members of my group are preferred individuals and all members of the other group are non-preferred"). Prejudice, therefore, is based largely on derived relations among individuals and their groups rather than upon direct experience. As such, RFT suggests that prejudice is a natural effect of human language, and that instructional approaches to reducing prejudice are unlikely to be successful. The effect is natural because the transformation of stimulus functions through relational frames is a common verbal event. It seems to be impossible, therefore, to prevent the

construction of groups based on myriad features. Like the thought exercise in Chapter 3 ("How is a TV like a prostitute?"), similarity can be constructed between any two events, and seemingly be explained by the physical features that participate in that arbitrary relation. Once a relation is formed, it is difficult to prevent the transformation of stimulus functions in terms of that relation.

Instruction is unlikely to reduce prejudice for three reasons. First, these instructions usually refer to group membership and thus increase group membership. For instance, the instruction "don't think bad things about black people, they have great abilities" increases the salience of "black people" as a conceptualized group and adds features to that group. This process is easy enough to detect when the conceptualized group involved is unusual. A person hearing the sentence "don't think bad things about short people with harelips, they can play the piano wonderfully" may form a conceptualized group ("short people with harelips") that had never been formed before, and verbally attribute features to the entire group. Even if the sentence is known to be a joke or an example, the verbal relation may still occur. The readers of this volume, for example, may indeed be somewhat more likely now to think "piano" if they ever come across a dwarf with a harelip.

The second problem is that anti-prejudice instructions may actually strengthen stereotypes in the name of denouncing them. Common stereotypes are already available in the verbal repertoire of most members of a culture, by definition. A simple priming study would probably show that stereotypical verbal relations are in the verbal behavior of saint and bigot alike. Just as "white" will prime "black," "Jew" will probably prime "money" whether the person has been instructed that Jews *are* more interested in money than others, or that they *are not.*

Finally, anti-prejudice instructions may increase the fearsomeness of groups, since they often add negative functions to the presence of prejudiced thoughts. As will be reviewed in Chapter 12, suppressing thoughts tends to increase their frequency. Consider the instruction "It is horrible to think that disabled people are being punished by God." This instruction is likely to strengthen the salience of conceptualized group membership and the relatedness of the specified stereotype, as we have already discussed, but it also makes it essential to avoid the very verbal relation that the sentence helps establish, since noticing it "is horrible." This is very likely to increase the frequency of the prejudiced thought, and to lead to avoidance of occasions that might give rise to it (such as spending time with disabled people). That precise implication has been examined by Harvard psychologist Ellen Langer.

In one of her studies (Langer, Bashner, and Chanowitz, 1985) children were shown a disabled person in a wheelchair through a one-way mirror. There were two conditions. In one, children were encouraged to say aloud all of the prejudicial things they had heard about disabled people. No punishment, correction, or support was provided – the statements were merely acknowledged. In the second condition, prejudicial statements were corrected and non-prejudicial statements were instructed. The children were then led into the room with the disabled person. The group that received anti-prejudicial instructions avoided going near the disabled person significantly more than the group that was allowed to notice prejudicial thoughts without confirmation or disputation.

The key point is that RFT suggests that verbal relations are only amplified by direct verbal attack, since these relations are additive, not subtractive. A more effective method of reducing prejudice may be to create contexts that reduce the psychological importance of categorization per se, or the likelihood of a transformation of stimulus functions in terms of such

categorization. Langer's "mindfulness" intervention is an example. Repetition of verbal statements until they become meaningless (e.g., Titchener, 1916, p. 425) may be another – a method that has been successfully used by sex therapists to reduce the fearsome quality of sexual terms. The creation of myriad overlapping categorical concepts ("white gay dwarfs with harelips – Native American women Baptist vegan millionaires") may be another. More basic work needs to be done on how to loosen relational networks, and avoid the transformation of stimulus functions through them. That simple process is the essence of prejudice and we have good reason to suppose that a front, logical attack on prejudicial behavior may strengthen some of the basic processes it is designed to undermine.

11.3. PERSUASION AND RHETORIC

The traditional view of global persuasion was that it functions best through appeals to logic (Hovland, Lumsdaine, and Sheffield, 1949). From this perspective, peoples' attitudes are swayed primarily by coherent arguments, and the goal must therefore be to get individuals to notice, understand, and remember an alternative viewpoint. Hovland also argued that propaganda works by suppressing intellectual reasoning during the delivery of a novel message, for instance by bombarding an individual with information.

Recent RFT evidence shows, however, that once derived, verbal relations may resurge at a later time in an appropriate context without additional training designed to bring about such resurgence (Wilson and Hayes, 1996; see also Healy, Barnes-Holmes, and Smeets, 2000). It seems, therefore, that the propagandist needs to alter the functions of already-established verbal relations through rhetoric rather than attempting to extinguish them, a point we made in the section on prejudice.

Perhaps the simplest form of rhetoric involves the weakening of psychological functions maintained by verbal relations. It is necessary for rhetoricians to achieve this because, as Hovland established, individuals are slow to respond positively to messages that compete with their beliefs and opinions. For illustrative purposes, let us consider the example of the salesperson that has to contend with many problematic socially established verbal relations such as "all sales people are liars." Once such relational frames are established, it is difficult for the salesperson to say anything without having the functions of "liar" actualized for the listener by whatever the salesperson says. One rhetorical means by which the functions of the "you are lying" relational network can be weakened, however, is to use terms and phrases that coordinate with trustworthy individuals and that participate in frames of opposition with dishonest salespersons. Examples might include the use of the phrase "you are under no obligation to buy," or "if you are not completely satisfied you can have your money back," or "take it now for free and if you like it you can send us the money next month." Perhaps these and similar phrases can transform the functions of the sales pitch so that it does not actualize functions of dishonesty.

A salesperson is unlikely to weaken problematic "dishonesty functions" by contradicting them directly. Relational Frame Theory provides a sound rationale for this. Any direct reference to dishonesty itself is bound only to actualize the relevant functions, even when the term is placed in a frame of opposition with salespersons. In the same way, it is impossible to literally follow the rule "do not think of a pink elephant" because in order to do so, one must

first respond covertly to the visual perceptual features of a pink elephant. Thus, the poor way for a salesperson to generate trust may be to use the phrase "trust me" because the phrase may actually serve to strengthen the problematic functions of dishonesty attached to salespersons.

Motivative augmentals may also be used to increase the value of verbally constructed consequences. Advertisements for health and life insurance rely heavily on this technique. These advertisements typically aim to bring the listener into direct emotional (i.e., non arbitrary) contact with verbally constructed consequences of not purchasing life or health insurance. Whereas insurance companies make money from the necessary fact that a greater number of people buy insurance than need it, they nevertheless speak of these risks in such a way that they become psychologically proximate. It is not unusual for advertisers to play on the listener's worst fears depicted in the most graphic terms that the censor will allow. Increasing the value of verbally constructed consequences may be achieved through a variety of relations, such as temporal relations (e.g., "you are getting old faster than you think"), if-then relations (e.g., "if you injure your back you will not be able to support your family"), and relations of coordination (e.g., "this could happen to you"). In each case, of course, deictic relations are also involved (e.g., a listener may respond to "this could happen to you" as "that could happen to me").

The foregoing suggestions are entirely consistent with the rationale of the *Theory of Reasoned Action,* proposed by Ajzen and Fishbein (1980). That theory attempts to make sense of attitude and behavior change in terms of an individual's perception of susceptibility to aversive consequences (e.g., developing lung cancer because of smoking), their perceived competence in avoiding negative consequences (e.g., quitting smoking), and the value placed on the consequences of a behavior change (e.g., avoiding cancer). Thus, an advertisement that is emotionally provocative, informative, and directive should be effective in generating a change in attitude and an attendant change in behavior. From an RFT perspective, such an advertisement works by bringing aversive verbally constructed consequences into psychological proximity. In addition, the provision of a directive rule that actualizes functions of escape from these aversive consequences through appropriate relational frames (e.g., "buy our insurance and sleep easy") may make rule-following more likely.

One further technique commonly used by rhetoricians for the transformation of verbal functions involves the showcasing of the listener's verbal incoherence. Good speakers know that verbal incoherence functions as a punisher for most individuals. Put simply, nobody likes to feel foolish or confused. The rhetorician, therefore, will find ways to actualize the frustrating functions of two incongruent verbal relations that are produced by the listener. An insurance advertisement, for instance, may read, "People who care about their families are insured with Acme insurance." Here the listener must respond to a verbal relation (i.e., the slogan) that does not cohere with other relations in the listener's verbal repertoire (e.g., "I care about my family and I do not have Acme insurance"). If verbal coherence is to be maintained, then one of the two verbal relations must change. Interestingly, the problem faced by the listener in this case is similar to that presented to subjects in Festinger's (1957) cognitive dissonance studies. If effective, the rhetorical devices used by advertisers will be powerful enough that the verbal behavior of some individuals will be transformed such that coherence is achieved. For other individuals, however, previously established verbal relations such as "advertisers will say anything to get you to buy their products" will reduce the impact of advertising slogans.

One study has been conducted on rhetoric that was explicitly driven by RFT conceptions. In this study, Clayton (1995) identified beliefs commonly held by workers in a human service organization about their work environment. The Executive Director of the organization gave a persuasive speech that attempted to move these beliefs toward a more desirable end. The scripted speech used two methods. In one case, the desired attributes of the organization were instructed. In the second, the desired attributes were instructed but were linked to the undesirable attributes already held to be true by the workers. Desired attributes were randomly assigned to each condition and the speech was scripted accordingly. To give one small example, one goal was to have a work environment that was believed by workers to be creative and caring. "Creative" was assigned to the negative attribute condition; "caring" to the instruction only condition. Pre-testing had shown that the workers believed that the work environment was chaotic. Thus, the speech included the statements. "This is a caring place – we care about our clients. And yes it is a bit chaotic, but that gives us the freedom to be creative in meeting our clients needs." Testing showed that worker attitudes changed much more when the positive attributes were linked to existing negative beliefs. This effect was predicted from RFT concepts, since it should be much easier to elaborate an existing verbal network than to establish a new network that may literally conflict with the existing one.

In summary, RFT appears to provide the beginnings of a technical analysis of the behavioral processes involved in effective persuasion and the use of rhetoric. Once again, our analyses are largely interpretive, but they do demonstrate that RFT can make direct contact with concepts and phenomena that have hitherto received scant attention in the behavioral literature.

11.4. SEXUAL ATTRACTION

The study of sexual attraction relies heavily on the idea that individuals follow cognitive schema or sexual arousal scripts that help to identify suitable partners (Brown, 1986; Byrne, 1977; Storms, 1981). Although this makes intuitive sense, RFT brings a functional-analytic language to this arena. From the RFT perspective, an arousal script is a set of verbal relations that govern emotional reactions. Furthermore, because RFT allows for the transformation of covert and overt response functions, it provides a conceptual framework for the experimental analysis of perceptual functions such as sexual "mental" imagery. Thus, RFT may move us towards a behavioral account of how sexual arousal scripts work at the level of psychological process.

An important feature of relational responding is that ongoing interactions with the verbal community allow the sexual functions of stimuli to transform in increasingly complex ways. For example, the verbal nature of sexual fantasizing (i.e., fantasies are story-based) makes it likely that covert sexual images will participate in a relational frame of coordination with each other, and thus some of the sexual functions of one fantasy may transform that of another. Consider a person who on some occasions sexually fantasizes about a colleague, and on other occasions fantasizes about sexual encounters in public. For this person, both acts of fantasizing may become related via terms such as "sexual fantasy." The transformation of functions in the latter fantasy by the former may result in a fantasy involving sexual relations with a colleague in a public place (see Roche and Barnes, 1998). An individual may, therefore,

imagine novel and apparently original sexual images and scenarios. Although sex researchers have long been aware that composite sexual fantasies may emerge and that sexual arousal scripts can change across time (e.g., Laws and Marshall, 1990), RFT provides a behavioral account of these outcomes. In effect, an RFT approach to complex emotional arousal explains, at least potentially, the emergence of novel sexual attraction patterns that might otherwise require explanation in terms of cognitive schema.

Unusual or illegal forms of sexual behavior may also be approached from an RFT perspective. Consider, for example, the topic of sexual coercion. In the Western verbal community "gentle, helpless, and submissive" women often participate in a relational frame of coordination with sexual attraction for many men. For some of these men, women also participate in frames of coordination with phrases such as "not knowing their own minds" and "meaning 'yes' even when they say 'no.'" Thus, women may fall into a frame of coordination with terms such as "weak" and statements such as "they must be controlled for their own good." In contrast, women may participate in frames of opposition with terms such as "strong" and "must be taken seriously." In effect, these verbal relations appear to parallel the types of social constructions of gender that have been of concern to the feminist movement (cf., Gergen, 1988). An RFT analysis of such verbal relations, therefore, may help us to understand the psychological processes underpinning acts of sexual coercion and dominance by men in our society.

Consider, for instance, the relational network in Figure 1 (following page). The lower section of this figure (indicated by brackets) represents one possible set of taught and derived relations according to which members of our culture might respond in the context of gender. For example, it is safe to say that most members of our culture are explicitly taught that males and females are "opposites" (e.g., members of "opposite" sexes; see Bem, 1993). Many children also learn through interaction with popular culture that women are submissive, whereas men are dominant (the feminist movement is based largely on attempts to change this fact). Furthermore, the words "dominant" and "submissive" often participate in frames of coordination with the terms "a lot of control" and "lacking control," respectively. Thus, if many members of our culture respond in accordance with such relational networks as this, we should expect to find that many men are attracted to submissive women who lack control. Similarly, we might expect to find that many women are sexually attracted to powerful men, or men that possess a lot of control.

The foregoing analysis pertains to sexual attraction patterns that perhaps fall within a "normal" range. However, an RFT analysis contributes to our understanding of illegal sexual arousal patterns such as those that typify rape. Consider, for instance, the upper right-hand section of Figure 1. This extended relational frame indicates that in a suitable context, men may respond to the term "no control" as related to the term "lack of control" through a relational frame of comparison (i.e., less control). In an appropriate context, the term "no control" may also be related to the term "victim" according to a frame of hierarchical class membership. This extended relational network represents one of the processes by which female terms (e.g., woman, female) may become related to terms of victimization. Of course, in contexts such as that of reading the present chapter, the derivation of the foregoing relations involves the transformation of nonsexual functions. It is likely that the reader is responding to the derived relation between the terms "female" and "victim" at a purely intellectual level. In some suitable context, however, the sexual arousal functions that have been socially
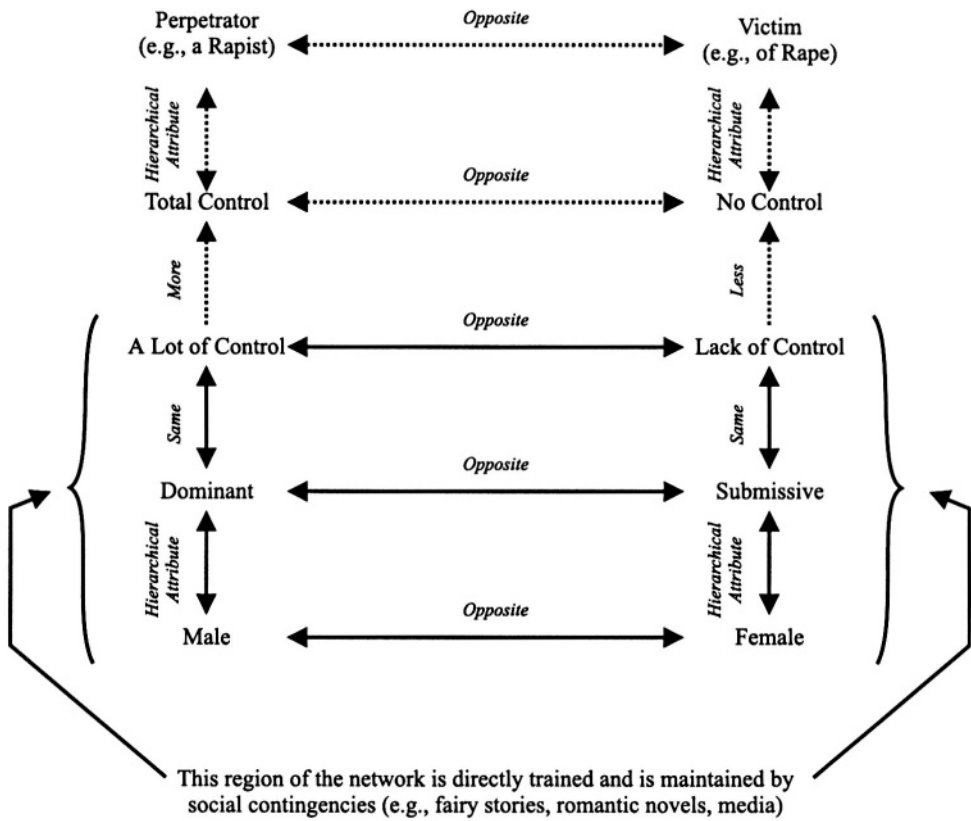
Figure 1. An extended trained and derived relational network through which sex role socialization may transform sexual arousal functions in a fashion that supports rape.

established for female terms may transform according to such extended relational networks as that in Figure 1, and emerge for terms pertaining to victimization. When this occurs, verbal descriptions of powerless, submissive, or victimized women (e.g., in pornography) will actualize sexual arousal. The relational frame interpretation offered here suggests that verbal functions established in childhood (e.g., by media images and fairy stories) might contribute indirectly to sexual coercion or violence in later life. Of course, the act of rape is not purely sexual in nature. Nevertheless, the foregoing RFT interpretation may help us to understand how sexual stimulus functions might *combine* with acts of violence and power to produce rape. In this way, an RFT approach can bring us into closer empirical contact with constructions of gender in terms of the control they bear over social behavior.

11.5. CONCLUSION

The social psychological research reviewed and interpreted in the current chapter suggests that RFT may provide a new and useful framework within which to study social psychological phenomena from a behavioral perspective. Of course, RFT was applied here somewhat speculatively to a range of social phenomena and thus much work remains to be done in assessing its utility in this regard.

12

PSYCHOPATHOLOGY AND PSYCHOTHERAPY

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In this chapter, we turn our attention to the broad areas of psychopathology and psychotherapy. We will consider several traditions in psychopathology, including the syndromal, the biological, and the functional diagnostic, and will focus in detail on the functional diagnostic approach as a means of illustrating an RFT approach to psychopathology. Subsequently, we will consider how RFT can add to psychotherapy, especially how it interconnects with the new wave of behavior therapies (i.e., Clinical Behavior Analysis) including Acceptance and Commitment Therapy (ACT), Functional Analytic Psychotherapy (FAP), Dialectic Behavior Therapy (DBT), and Integrative Couples Therapy (ICT).

12.1. PSYCHOPATHOLOGY

In the current section of this chapter, we will briefly examine some of the basic assumptions of the traditional biological and psychological perspectives on psychopathology. This will provide an appropriate context for considering what RFT can add to the understanding of this domain.

12.1.1. The Syndromal Approach

The most common approach to psychopathology is syndromal. Clinicians and researchers adopting this approach generate evermore fine-grained categories based on the form of the behavior in question. The American Psychiatric Association's *Diagnostic and Statistical Manual IV* (American Psychiatric Association, 1994) is an archetype of this approach and its success has contributed to the hegemony of syndromal classification as an analytic strategy in psychopathology. The ultimate purpose of syndromal classification is not merely the careful organization of signs and symptoms, but the discovery of diseases. Unlike syndromes, diseases are disorders that are organized by *functional* differences: differences in etiology, course, and response to treatment. Stated another way, syndromal classification is a formistic or topographical strategy with a functional purpose. In physical medicine the syndromal approach has been found to be particularly weak when a single syndrome appears to have a number of diverse processes, or alternatively when different forms of the same syndrome share similar processes. Cancer is a classic example of this type of unitary syndrome with diverse processes. Psychopathology in general also falls into this category, and indeed, after over one hundred years of effort, only a handful of syndromes (e.g., general paresis) have been clearly identified as known diseases. In spite of this, however, the number of psychiatric syndromes continues to increase at a startling rate (Follette, Houts, and Hayes, 1992). We would argue that this botanization is simply a means of cataloging the topography of behavior, without regard to its function.

What is needed is an approach that will lead to the identification of psychopathological processes, not merely to the identification of dysfunctional outcomes, and to the creation of a tight link between these processes and successful treatment approaches. In physical medicine, when the syndromal strategy fails, research often turns to basic processes. For example, when the botanization of types of cancers did not lead to a successful approach to the treatment and causal analysis of cancer, researchers refocused on alternatives such as epidemiological analyses (e.g., documenting the role of smoking or of pollution in cancer) or on the biological processes that characterized cancerous and noncancerous cells. The discoveries that emerged (e.g., of the role of oncogenes in cancerous cell growth) have transformed those fields.

12.1.2. Biological Analyses

The biological approach to psychological syndromes is in part an attempt to arrive at basic processes. For example, researchers have examined the levels of given neurotransmitters associated with a range of syndromes. Unfortunately, progress in this regard has been slow. For example, depression may develop in the presence or absence of deficits of noradrenaline or serotonin (Hoes, 1986). Furthermore, when major-depressives and generalized anxiety disordered subjects are compared they produce similar results on the dimethesone suppression test (Schweizer, Swenson, Winokur, Rickels, and Maislin, 1986). Consider also that both panic disordered and non-panic disordered subjects experience anxiety and panic during lactate infusion (Margraf, Ehlers, and Roth, 1986). The important point here is that biological markers that are both sensitive and specific to any psychological disorders have not been forthcoming (see Hoes, 1986), and biological treatments for major behavioral disorders have few specific effects.

At a metatheoretical level, the biological approach seems worthwhile: try to understand basic processes. If, however, most forms of psychopathology are psychological disorders, the biological approach is unlikely to be fully successful. The psychological level of analysis concerns the whole organism interacting in and with a context considered both historically and situationally. While all psychological events can be considered from the biological level, it is difficult, if not impossible, to maintain contact with the interaction between an organism and its environment while examining and analyzing, say, levels of brain chemicals. Thus, there is no guarantee that a biological approach to psychopathology will be fully successful.

12.1.3. A Functional Dimensional Approach

A behavioral approach to psychopathology has generally tried to identify common functional dimensions that emerge from the application of psychological principles to a functional analysis of major problem domains. The goal of this approach is not just understanding common functional dimensions in terms of the behavioral processes involved, but also the identification of methods of assessment and treatment that are effective with these processes.

This emphasis on function was more prevalent in the early days of behavior therapy (e.g., Bandura, 1968a, 1968b; Kanfer and Grimm, 1977; Kanfer and Saslow, 1969). For example, clinical problems were categorized according to the reinforcers that maintained them, or according to poor stimulus control. These functional analyses were often too gross to serve the general needs of clinicians. The concept of "poor stimulus control" for instance proved useful in individual functional analyses, but it also involved many specific forms and idiosyncratic histories, and was thus of limited use across individuals. Syndromal classifications, with an emphasis on topography, became the preferred option for clinicians. In the area of assessment, psychometric evaluations were similarly supported, while the treatment utility of assessment was virtually ignored (Hayes, Jarrett, and Nelson, 1986).

From the functional contextual point of view inherent in a modern behavioral approach, the goal of assessment and classification is the identification of common processes of etiology or maintenance that suggest effective courses of action (Hayes et al., 1996). There seems to be wide agreement in the clinical fields that many forms of psychopathology are based on problems in the areas of language and cognition. This is reflected in the very name of the field, mental health, and in the names of both its disorders (e.g., thought disorders) and its most empirically successful treatments (e.g., cognitive behavior therapy). If RFT forms the basis of a successful contextual account of language and cognition, it must have important implications for the analysis of human psychopathologies and their treatment. We believe that it does.

12.2. RELATIONAL FRAME THEORY AND THE FUNCTIONAL DIMENSIONAL APPROACH

In order to illustrate how RFT might contribute to an understanding of human psychopathology we shall begin by considering its sheer pervasiveness. We will then provide an RFT account of this well established but often ignored fact.

12.2.1. The Pervasiveness of Human Psychopathology

Most approaches to psychopathology view human suffering as "abnormal behavior," that should be assumed to be a statistical oddity caused by uncommon behavioral processes. The logical corollary is also embraced, "the assumption of healthy normality," namely that human beings will be naturally healthy psychologically speaking, if these uncommon behavioral processes do not intrude (Hayes et al., 1999). From an RFT point of view, a very different assumption can be entertained: that a normal behavioral process (arbitrarily applicable derived relational responding) can and often does have destructive effects.

Data on the pervasiveness of human suffering challenge the assumption of healthy normality. The data show that human beings have a very difficult time living a happy life. The National Comorbidity Survey, for example, found that 29% of the nationally representative sample of 8,098 adults (ages 15-54) met criteria for at least one major psychiatric disorder during the previous year, and nearly half do so in their lifetime (Kessler, 1995). Fully 79% of those with lifetime disorders were comorbid for another DSM-III-R disorder (Kessler, et al, 1994). Surprisingly, however, only one in four of these lifetime subjects had obtained any professional help (Kessler, McGonagle, Zhao, and Nelson, 1994).

Even these statistics, bleak as they are, do not tell the whole story. In healthcare delivery systems that do not restrict access to care based on such diagnoses, more than half of the people who seek psychological treatment in a given year are doing so for subclinical distress in areas like academic, employment, and relationship problems (Strosahl, 1994; cf., Strosahl et al, 1998) that are distressing but that do not show up in the statistics on major psychiatric disorders. Moreover, about 95% of the human population will have suicidal thoughts, and more than half will struggle for two weeks or more with them at some point in their lives (Chiles and Strosahl, 1995). About 10% of the human population will make a suicide attempt, and a large percentage of those who succeed will not have a major mental disorder (Chiles and Strosahl, 1995). Now add to this the shockingly high rates of divorce (about 50%), or of violence, abuse, substance problems, insecurity, excessive shyness, extreme prejudice, and so on. A cold look at the facts leads to the conclusion that human suffering is nearly ubiquitous.

Given the ubiquity of human suffering, it seems reasonable to suggest that the cause is equally widespread. While we may look to biological abnormalities to explain this, it seems unlikely that biological flaws would be so widespread in the human gene pool; humans have been enormously successful as a species. Indeed, instances of disorders with a well-established genetic basis, such as Down's syndrome, are relatively rare as compared to mood, anxiety, and substance related disorders. Relational Frame Theory, however, suggests another possibility: that human language and cognition is a direct source of many human psychological problems. More specifically, although the bidirectional transformation of functions allows for impressive and advantageous expansions of an individual's behavioral repertoire, this repertoire at the same time sows the seeds for psychological suffering.

12.2.2. The Costs and Benefits of Bidirectional Transformations of Functions

It is very difficult to contain the cost of bidirectional transformation of functions while retaining its benefits because the same relational properties are common to both. Without these properties, human language reduces to the direct social and warning functions of

nonhuman communication systems and self-knowledge is useless. With it, self-control is possible and language can literally drive humans crazy. To appreciate how relational framing may help to generate human misery consider the following example.

A very young child given a choice between an M&M now and a bag of M&M's later, will choose the former – as will all nonverbal organisms with a similar choice using consequences of value to them. About the time the child can analyze and evaluate this choice verbally, the behavior begins to change. At this point a child can say, after picking a small immediate reward, "that was bad – I could have had the big one." These verbal events can change the actual function of the small reward later on because there is a bidirectional relation between the two. The functions of "bad" and of tasting a small sweet combine, and the small reward is less of a verbally constructed reinforcer the next time it is available. As we discussed in Chapter 5, all forms of pragmatic verbal analysis depend upon this bidirectional property of relational frames, because it is the process through which the functions of the nonarbitrary environment are transformed by language.

The pain that can come from this same property is enormous, however. A nonhuman shocked in a colored box will be reminded of the pain by the colored box, but not by self-reports of being there. If a nonhuman organism is trained to report whether or not it was shocked (e.g., by responding on a manipulandum), it will do so without distress, because such reports followed the shock and thus do not contain the functions of the shock. For humans it is different: reports of past pain can themselves produce pain, because the two are mutually entailed (i.e., bidirectionally related). In virtually any situation, humans can recall being shamed, abused, and traumatized, and when they do, it may hurt. Thus comes the paradox that a species that has by far the fewest contacts with direct sources of pain of any species on the planet, through language is able to suffer with a degree of intensity, constancy and pervasiveness that is literally unimaginable in the nonhuman world. Because of the bidirectional transformation of functions, we can judge ourselves and find ourselves to be wanting; we can imagine ideals and find the present to be unacceptable by comparison; we can reconstruct the past; we can worry about imagined futures; we can suffer with the knowledge that we will die. As the biblical story of the fall from grace has it, humans have eaten from the Tree of Knowledge and our eyes have been opened. We know the difference between good and evil, and in that story, the immediate effect is that we hide because we are ashamed.

The shame that humans feel is not perceived to be merely in the eyes of another. The language processes described in this book allow humans to be ashamed of themselves in their own eyes too. Thus, human language has transcended its function as a simple signaling and warning system for use by a community. The aversive functions that humans avoid are now aspects of their own selves. As a result, humans avoid self-knowledge of past pain or abuse the way nonhumans would avoid the abuse itself. Humans learn to try to "feel good." Said another way, experiential avoidance is built into human language itself. Experiential avoidance is the tendency to attempt to modify the form, frequency, or situational sensitivity of private events (thoughts, feelings, memories, behavioral predispositions) even when this effort produces behavioral harm. An example would be avoiding feeling sad or hurt, or trying not to think of a dead loved one, even when this effort deflects from living in accord with valued goals (e.g., raising a family, maintaining an intimate relationship, working).

In the area of phobic avoidance, in particular, it is easy to recognize the ways in which effective functioning can be interrupted by avoidance of specific stimuli (e.g., heights, small places, traveling). Experiential avoidance is quite similar in its function, but more difficult to

discern in its form. A broad range of actions are engaged in trying to avoid making psychological contact with a wide array of private events including thoughts, emotional reactions, bodily states, or behavioral predispositions, among others. These actions include thought suppression, emotional suppression, social withdrawal, drug use, sexual acting out, among many other forms. In the last few years, experiential avoidance has received considerable attention as an etiological and maintaining factor in psychopathology (see Hayes et al., 1996, for a review). In the following section, we will briefly consider three areas that are relevant to the study of experiential avoidance: thought suppression, avoidant coping, and reason-giving, and then interpret these from an RFT perspective.

12.2.2.1. Thought Suppression

When human beings are asked what they do when they face negative thoughts and feelings, suppressive strategies (e.g., "think about something else," "forget it," and "avoid thinking about it") are among the most common responses (Rippere, 1977a). Clinical populations show the same pattern (Brewin, Watson, McCarthy, Hyman, and Dayson, 1998). The belief that these are effective strategies seems to come from their immediate effect, but when a slightly longer time frame is examined, deliberately suppressing thoughts is a shockingly counterproductive coping strategy (Beevers, Wenzlaff, Hayes, and Scott, 1999; Wenzlaff, 1993). Thought suppression leads to a temporary decrease in the frequency of the avoided event, followed by a substantial increase in the event (Wegner, 1994). As would be predicted by RFT, when thought suppression occurs in the presence of negative mood, a bidirectional relation is established between mood, thought, and suppression. For example, Wenzlaff, Wegner, and Klein (1991) found that reinstating a mood that subjects were in while suppressing a target thought resulted in a return of the suppressed thought. The implications of this are immediately disturbing. The relational qualities of human language glue together mood and the literal content of verbal events. Thinking about a death, for example, will often induce sadness. This negative quality leads to overt attempts to reduce the thought. In the short term, this works, but in the long term suppression leads to more thoughts of death and more sadness. A vicious cycle is established. Depression, panic, and other extremely destructive forms of psychopathology could also be the result of similar behavioral sequences.

From an RFT point of view, what is happening in thought suppression can be interpreted as follows. Private events become psychologically present and have aversive functions through relational frames. For example, a thought of one's own eventual death is verbally related to events with frightening or sad functions; and thus even though one's own death has never been experienced it is fearsome. Private events, such as thoughts of death, are targeted verbally for change very much the same way external events are targeted, and rules are constructed for behaviors that will change the form, frequency, or situational sensitivity of these events. For example, a person thinking about death might "think about something else." Functionally, however, the full rule is "think about something else not your own death because that makes you sad." Suppose the "something else" is a thought about visiting a local lake. So now, the full thought is "think about the lake and not your own death because that makes you sad and the lake makes you happy." Now the lake is verbally related not merely to happy, but also to "not sad" and to "not dead." Unfortunately, these frames of opposition are also relations and "lake and happy not dead and sad" can change the functions of the lake. The actual lake and the word "lake" may now paradoxically evoke thoughts of death and sadness,

much the same way that "white" can evoke "black." In essence, thought suppression, in this example, enables more and more of the neutral environment to become death-related, and thus thoughts of death will increase instead of decrease.

Thought suppression strategies have two other negative effects. First, the outcome of rule-governed behavior usually needs to be evaluated to make sure that the rule is effective. For example, if a person takes medicine to reduce a fever, his/her temperature will be checked periodically. Similarly, if the person is following the rule "think about the lake and not your own death" that person will periodically check to see if the thought of death has gone. Unfortunately, "death" is in the rule being checked. Thus, checking involves contacting the verbal event that the rule nominally is designed to eliminate. Such contact is likely to evoke the verbal event being avoided. Second, thought suppression occurs in, and strengthens the context of, literality. When thoughts of death are avoided, the avoidance behavior itself strengthens the behavior regulatory effect of the avoided event. In effect, successful avoidance of the thought of death as a fearsome external thing makes it less likely that the person will in future respond to the thought as merely a contextually situated verbal process. As a result, the next time a thought of death occurs it will be even less likely to be viewed as merely a verbal event to be noticed and observed. A fearful, literal, internal focus will increase, and with it the weakening of other, more productive sources of control over behavior (e.g., actively engaging thoughts of death).

12.2.2.2. Ineffective Coping Styles

The literature on coping styles offers a similar cautionary tale about the destructive effects of the natural verbal processes that come from derived stimulus relations. Avoidant coping styles that focus on "regulating an individual's emotional response to a problem" (DeGenova, Patton, Jurich, and MacDermid, 1994, p. 656) are known to be singularly ineffective in producing successful results. Persons with psychopathology are more likely to use such avoidant approaches (DeGenova et al., 1994), although it is not merely because depressed or anxious persons have more to avoid. On the contrary, studies show that these coping styles make it more likely that people will *later* develop psychopathology (Rohde, Lewinsohn, Tilson, and Seeley, 1990). For example, studies that have focused on traumatic community events, (e.g., storms, accidents, earthquakes) show that persons with avoidant, emotion-focused coping strategies are more likely to develop pathological reactions to these traumas, even when controlling for baseline levels of functioning (e.g., Nolen-Hoeksema and Morrow, 1991). Furthermore, avoidant coping is associated with lower response to treatment, and with higher maintenance of psychopathology (Krantz and Moos, 1988; Nolen-Hoeksema, Parker, and Larson, 1994; Swindle, Cronkite, and Moos, 1989).

From an RFT perspective, avoidant, emotion-focused coping strategies involve the same basic processes as thought suppression. Consider, for example, the person who thinks, "I must not feel anxious." From an RFT point of view, anxiety is a loose, verbally constructed set of private events that are attributively "bad." Functionally, the full rule is not just "I must not feel anxious." It is "I must not feel anxious or else horrible things will happen." Unfortunately, the natural response to imminent horrible events is the very same kind of arousal that is called "anxiety." Anxiety becomes something to be anxious about. Possible events that might instigate feelings of anxiety are noted and avoided, which through bidirectional transformations of functions increases their anxiety relatedness and anxiety-producing qualities. While

this strategy initially reduces the likelihood of anxiety, it increases the number of contextual features that are anxiety related, and it does not reduce the fearsomeness of anxiety when it occurs. Indeed, it increases it, and for the same two reasons noted earlier in the section on thought suppression: the avoidance rule needs to be evaluated and thus evokes the avoided events, and the avoidance rule strengthens a context of literality and thus the behavior regulatory effect of the avoided event. Anxiety really must BE "bad" if so much avoidance is necessary. These processes eventually lead to more frequent and more intense anxiety, even as the situational inducements to anxiety (e.g., facing difficult social situations) are gradually eliminated through overt avoidance or reduced through other means (e.g., drug use). The end result is a person living a life that is restricted and confined in endless ways, and yet constantly entangled in the anticipation and avoidance of anxiety. The ability to respond to negative events easily (which may be inherited – what we know colloquially as being "high strung") is an invitation to engage in this process, but the amplification process is entirely ontogenetic. Further, with a sufficiently negative history, the originating conditions can be established in anyone.

12.2.2.3. Reason-Giving

Several recent studies have shown that giving reasons for psychopathological behavior is a dangerous practice. Those who can offer what they believe are "good reasons" for their pathological behaviors tend to be both more severe and more difficult to treat than others (Addis and Jacobson, 1996). These persons ruminate more, particularly in response to negative moods (Addis and Carpenter, 1999).

When humans engage in causal analysis focused on their own psychological pain, the vast majority – 80 to 90% or more – focus on internal events (Bloor, 1983; Rippere, 1977b). Reasons that refer to private events would not be problematic were it not for the fact that the verbal-social community (and clients themselves) see such reasons as literal causes (Zettle and Hayes, 1986). Thus, reason-giving draws people into endless ruminations, which in turn often lead to the dead ends of suppression and avoidance. This relationship has been demonstrated empirically. For example, Nolen-Hoeksema and Morrow (1991) found that people who tend to avoid negative emotions were also more likely to ruminate about them. Similarly, widows who avoided talking with others about loss were more likely to ruminate about it than widows who were more open with others (Pennebaker and O'Heeron, 1984). Ruminative worry, in short, is a form of experiential avoidance that reduces uncertainty (Dugas, Gagnon, Ladouceur, and Freeston, 1998), avoids more distressing topics (Borkovec and Roemer, 1995), and reduces arousal (Wells and Papageorgio, 1995). Unfortunately, although the worrier believes that rumination will help deal with the situation, it has, in fact, no such instrumental benefit (Borkovec, Hazlett-Stevens, and Diaz, 1999).

From an RFT perspective, sense-making (in terms of reason-giving) is at the very core of relational activities once adequate relational repertoires have been established. Explanations for one's behavior are comforting because they seemingly make events more predictable and controllable. When applied to external events, this strategy is useful (e.g., pragmatic verbal analysis). When applied to personal psychological pain, however, these verbal formulations may often be counterproductive. Developing an adequate understanding of psychological events is extremely difficult, scientifically speaking, and few people examining

their own psychological difficulties are psychological scientists. The historical events that give rise to psychological functions are usually long since forgotten or distorted, and self-explanation and reason-giving tends to stop at the easy mental way stations supplied by the verbal community (e.g., "I know I should have gone to the interview, but I didn't have the confidence to go through with it"). Thus, reason-giving leads readily to the dead ends of the suppression and avoidance of private events (e.g., "Okay, so I didn't go to the interview–I'm a screw-up – let's get drunk so that I can forget about it!"). What is perhaps even more problematic is the fact that reason-giving engages a history in which it appears important to be right about verbal analyses. Thus, the formulations that emerge can be held onto even if they are pragmatically useless or harmful, because letting go of them is an admission that one is wrong or does not know what to do – either of which is a powerful punisher for a verbal organism.

12.2.2.4. Conclusion

From the point of view of Relational Frame Theory, human beings are in a very difficult situation. Human language and cognition is at the core of their success, both as individuals and as a species. Unfortunately, these same processes mean that there is no place to go where pain cannot follow. A nonhuman faced with aversive situations will seek out ones that are more positive. A human cannot trust that this same strategy will pay off. A person sitting by the beach on a warm day watching a sunset might feel wonderful, or might feel sad that a dead loved one is not there to see it. Faced with a greatly increased ability to produce pain, and an inability to solve the problem by situational manipulation, humans tend to turn inward and to try to avoid the pain itself. RFT provides a behavioral explanation for the pervasiveness of experiential avoidance, while also helping to explain why it is an etiological and maintaining factor in psychopathology.

12.3. THE MINIMAL VERBAL UNITS NECESSARY FOR VERBALLY-PRODUCED PSYCHOPATHOLOGY

It is worth trying to think through how simple a relational repertoire can create psychological difficulties of the sort we have just been analyzing. If the abilities involved are quite complex, then it might make sense to try to learn to prevent these processes directly. If, however, the relational abilities necessary to create difficulties are minimal, occurring even in small children, then some way must be found to live with these processes.

It seems to us that the verbal creation of psychopathology can occur with an elementary relational repertoire. The number of relational frames that could be generated is infinite, limited only by the creativity of the trainer, but certain relational frames appear necessary for adequate language skills within the verbal community and for the productive use of those skills in the natural environment. We will consider five important frames in this regard: coordination, contingency or causality, evaluative comparison, hierarchical class member-ship, and frames of perspective-taking. If psychopathology can readily emerge from these frames or subsets of them, then the pervasiveness of human suffering might be more adequately explained.

Coordination is the dominant relational frame. This is the simplest relational frame, in part because all derived relations are the same as those trained (e.g., Leslie, Tierney, Robinson, Keenan, Watt, and Barnes, 1993). This relation can readily provide psychological content for verbally produced problems. For example, a man may avoid being intimate with women because of the transfer of anxiety functions from an abusive mother to a more general class (e.g., "women who could hurt or judge me").

Contingency analyses contain two distinguishable types of relations. Temporal relations such as before-after and now-later, allow changes to be ordered and sequenced. Conditionality/causality allows the specification of functional relations among specified elements through such relations as If-Then and Because. Contingency analysis is needed to create self-rules that begin from a given state of affairs and proceed to some other specified state of affairs. This can expand the ability to create psychological problems, however, because the sources of difficulty targeted can be counterproductive.

Evaluation is a type of comparative frame in which one event is either compared to another event, or where some event is compared to some absolute standard (e.g., "X is better than Y"). Evaluation is necessary for the proper operation of verbal consequences. As is shown by the matching law, direct consequences are always impactful relative to other contacted consequences. A similar process exists verbally, though direct contact is no longer needed (the establishment of stimulus functions via derived stimulus relations is sufficient). Frames of evaluation allow the relative weighing of consequences to occur verbally.

Hierarchical class membership enables the abstraction of features of whole events, so that what is being talked about can be scaled from whole systems to tiny components. Finally, as was discussed in Chapter 7, self is a component of self-generated rules, and frames of perspective seem to be necessary for the development of a verbal "self."

Because they are pithy and easily remembered we will refer to these five forms of relational activity as IS, TIME, BECAUSE, BETTER, ATTRIBUTE, and PERSPECTIVE (and which we will capitalize consistently in this context to show that they refer to relational frames).

These five relations are more than enough to establish many of the most difficult forms of psychopathology. The purpose of this exercise is neither to suggest that all psychopathology is verbally produced, nor that only these relational frames are relevant to the topic. The purpose is to show how very basic language functions are more than enough to produce significant psychological suffering, when "good frames go bad."

12.3.1. That's Bad

The structure of language does not readily distinguish between primary and secondary attributes of events. As an example, consider the following two IS frames: "This is a plastic cup" and "This is a bad cup." These sentences involve the conjunction of two IS frames (e.g., "This is a cup" and "This is plastic") into a hierarchical class membership relation: "plastic" IS an ATTRIBUTE of "this cup."

When both sentences are considered, a problem can be discerned. The structure of the two sentences is identical. The object IS a "cup," and "bad" and "plastic," are attributes of the "cup." What is easily missed is that bad is an evaluation – a secondary attribute of the cup, not a primary attribute, like "plastic."

Evaluation always involves someone evaluating an event in relation to some goal or standard. If all of the people disappeared from the planet, the cup would still be a cup, and it would still be a plastic cup, but in what sense would it be a bad cup?

The psychopathological problem from this simple language difficulty can be seen if we consider what would be necessary for the cup to not be a cup. We could melt the cup down or grind it into powder, and then it would no longer be a cup. We could reform the plastic into a small toy car and then it would not be a cup. We could refine the hydrocarbons in the plastic into jet fuel and then it would not be plastic. Stated another way, IS relations and primary ATTRIBUTE relations can change only when the form of the event changes. "Bad" differs in that the cup might become a good cup without any property of the cup changing. EVALUATION changes when the person doing the evaluating says so, and that depends upon context. The same cup might be good for hot beverages, but bad for cold beverages.

The result is that there can be a verbally produced rigidity in the evaluative attributes of events. Consider such simple sentences as "anxiety is bad," or "my childhood was rotten," or "my spouse is a pig." The structure of these sentences suggests that for the events to no longer be bad, the "badness" must be eliminated, changed, or at least avoided. On the same basis that an evaluative frame can give avoidance functions to objects in the environment that pose real physical threat (e.g., "if you eat meat that smells bad it will make you sick"), they can occasion avoidance of one's thoughts, emotions, and one's future when applied to these domains. Further, the linguistic structure of such evaluations leads to the false sense that nothing can change until the form of the event changes. Yet, in these instances, efforts at change are unlikely to be successful. One cannot relive a childhood; changing emotions is fraught with difficulty (as we have just discussed); and attempting to change another person often backfires. Thus, even such a simple relational network, as "that's bad," can create a conundrum.

It is a tiny step from "That's bad" to "I'm bad," requiring only sufficient perspective-taking to talk about oneself as an object. But such a simple relational network is more than enough to engender full-blown forms of psychopathology. Based on the process just discussed, if I'm bad, I cannot be good until I change. Unfortunately, the methods used to change are themselves verbal, and it is easy to set up conflicts between the function and forms of such rules. Experiential avoidance (e.g., thought suppression; avoidant coping) is an example we have already discussed, but there are others.

Consider what can happen, for example, when a person who thinks, "I'm bad" tries to change in order to change that attribute. BECAUSE rules will be generated that supposedly provide the correct analysis of how to change. These rules, however, are based on the very proposition that the rule intends to change. Consider a person who attempts to change the thought "I'm bad" by doing good things that others will applaud. The person who is doing good things, is now the "bad person doing good things." The person who pretends to be good is now the "bad person pretending to do good." If others applaud, and say how good the person is, the likely conclusion is not "I'm good" but "I'm a bad person who fooled others" and the opinions of others will have minimal impact, since after all, how can the opinions of fools be believed?

The general point being made here is that the functional control and verbal relevance of "bad" is being increased, not decreased, when "bad" is the functional source of efforts to become "not bad." This helps makes sense of why personal evaluative attributes are very slow

to change. Some of the most successful and able humans on the planet are tormented by the idea that they are bad, or failures, or unlovable.

The culture makes use of this terrible property of human language. The culture can set impossibly high standards of achievement and link self-evaluations to these standards. The student with all As and one B will be asked more about the B than the A. The person who came in second will be asked about how it feels not to be first. The person making a lot of money will be asked about how they can make more. At the cultural level of analysis, these practices may be reinforced and maintained because they can produce extremely high levels of effort and achievement that will allow the culture to compete successfully with other cultures. At the individual level of analysis, however, this achievement may be purchased at the cost of psychological health.

12.3.2. Now Bad, Later Worse

The ability to consider and evaluate a verbal future is at the core of pragmatic verbal analysis. This ability allows humans to plan, to consider, and to have goals. It also can draw humans into a future orientation filled with worry, despair, and failure.

"I will always be depressed" or "my life will never get better" present a bleak picture and seemingly demands that we do something now to change these events. The events, however, are purely verbal. The future is not here. Thus, often trying to solve problems such as "my life will never get better" leads not to effective action, but to experiential avoidance, as the person tries to suppress or remove the fears constructed in the future. Similarly, anxiety patients are drawn into useless struggles with purely imagined futures by such sentences as "I might get so anxious I can't function" or "I might poison someone with my germs."

When temporal relations are combined with contingency relations, causal analysis is born. Instrumentally useful projections of the future are constructed that point to clear and reasonable action outcome relations. Smoking, for example, produces dramatically increased risk for cardiovascular disease, pulmonary disease, and cancer: smoking is unhealthy. Each year thousands of humans stop smoking because "smoking will kill me." This is a remarkable bit of behavior since the immediate effects of stopping smoking are almost entirely negative. This same verbal ability, however, can produce shocking forms of behavior that are known only in human beings. Consider the following newspaper story:

> Dania, Fla. June 16 (AP) – A 6-year old girl was killed today when she stepped in front of a train, telling siblings that she "wanted to be with her mother." The authorities said that her mother had a terminal illness.

> *– New York Times, June 17, 1993*

Six year old children do not have highly developed verbal repertoires. Even so, they have the ability to imagine a future with or without a parent, and to act accordingly. Such behavior requires only "Now bad, later worse" and a simple contingency analysis to get to "now bad, kill myself, later better."

The construction of causal relations is a major theme of child development. We are taught early on that we must be able to explain ourselves. We ask our children questions like "Why

did you hit your sister?" and "Why did you skip school?" If "good reasons" are given for behavior, the social community may alter how a given instance of behavior is treated. If a person does something objectionable and gives no reason, sanction is likely. If they give good reasons, the social/verbal community may be more forgiving, or even supportive. Sometimes physical and structural reasons suffice. For example, if someone is asked why s/he did not go to school, a malfunctioning car might be a good reason. However, many instances of behavior are quite complexly determined, and there might be a convergence of reasons that have little to do with any physical impediment to going to school.

The social/verbal community teaches us to talk about these more complexly determined instances of behavior in the language of emotions, wishes, wants, needs, inclinations, thoughts, and memories. If, for example, someone says, "I stayed home from school because I was very depressed and felt like killing myself," this reason will almost certainly be taken seriously. Instead of socially imposed negative consequences, such an individual is likely to garner considerable sympathy and social support. The social/verbal community might look for the broken car in the first instance in order to verify the reason in the because-frame. In the latter because-frame, however, the reasons lie in the world of what is felt and thought. In these instances, the social/verbal community looks for overt responding that co-occurs with depression. If there are not other overt signs of depression, the person expressing such a reason may eventually receive other negative consequences for having "manipulated" the situation or having "lied." The verbal community demands a certain level of correspondence between the language of thoughts and feelings and expected patterns of overt behavior, and provides consequences for the maintenance of this correspondence.

From a behavior analytic perspective, thoughts and feelings are not the causes of behavior in a mechanical sense. They participate as components of complex behavioral patterns that are in part maintained by socially mediated contingencies (e.g., social reinforcement for say-do correspondence). Although thoughts and feelings are not causes in a scientific sense, the social/verbal community behaves with respect to these causal frames in the same way as scientific causal frames, such as the frame about the impact of smoking.

The net effect is an increased dominance of frames that point to emotional or cognitive things that people have, rather than to the effects of what people actually do. These might include frames such as "I can't go to the mall because I am too anxious" or "I couldn't go to work because I was too depressed." Sometimes these BECAUSE frames are constructed in terms of emotions that are missing, such as, "I can't speak up for my self because I am not brave enough" or "I can't get the job done because I'm not enthusiastic enough." Cognitions are dealt with in the same way: "I didn't try because I thought I would fail" or "I drank again because I didn't think I would get drunk."

Let us consider an example of how this focus on private events can lead to very ineffective action. Suppose a person does not feel confident and wishes to change this. A variety of simple relational frames are involved: "Non-confident is bad;" "confident is good;" "I'm not confident;" "now not confident, if I do nothing, later not confident;" "if I change maybe later I will be confident;" "I should get rid of my lack of confidence," and so on.

Unfortunately, this verbal network is self-defeating. The etymology of the word "confident" shows why. *Con* is Latin for "with." "Fident" comes from the Latin *fides* which means "faith" and from which we get words like "fidelity." Behaviorally speaking, a confident act is one that is done with faith or self-fidelity. Unfortunately, these simple relational frames draw the person into the exact opposite behaviors. Supposedly, confidence-the-feeling will

come by deliberately trying not to feel afraid, small, or insecure. All of these actions (deliberately not feeling) are non-confident actions. In other words, confidence-the-feeling is supposed to emerge from non-confidence-the-action.

The opposite tack might work over time. A person who is willing to feel non-confident, who refuses to avoid or suppress these feelings, and who is willing to share them with others is doing confidence-the-behavior. Eventually he or she may feel confidence. Yet, that contingency relation is much harder to construct verbally since the actions required are not *formally* consonant with the results being sought.

As a final example of how relational frames may participate in psychopathology, consider the following note that was written by a 36 year old man:

> I'm tired, so tired, but sleep does not come. My only rest sits on the table waiting.
> Am I waiting, to be saved – but I know that can't happen. No explanations left
> only action. The loaded silver gun on the table – my answer. All I have to do is
> pick it up, and pull the trigger.

A number of problematic frames are revealed in this paragraph. Several aspects of the note set up ATTRIBUTE and IS relations between "I" and some other event. The attribute of weariness and motivation for rest is laid out in the first sentence: "I'm tired, so tired." "Am I waiting to be saved – but I know that can't happen" involves a CAUSE frame that transfers extinction functions to the operant waiting. "The loaded silver gun on the table – my answer" is another CAUSE frame that constructs relief as the consequence of using the gun. Finally, "My only rest sits on the table" gives extinction functions to all alternative behaviors that might have produced relief in the past. Given the complex set of causal and temporal contingencies set in place by these words, there only is one solution to the problem. "My answer" involves "only action." The note heightens a sense of pain and channels it into one, and only one, direction.

These lines were written in the early morning hours. The next morning, a friend broke into his apartment and found him dead as result of a self-inflicted gunshot wound.

Two facts are evident with regard to suicide (Hayes et al., 1999): 1. it is ubiquitous in human societies, and 2. it is absolutely absent in all other living organisms. RFT explains why. Suicide requires the verbal construction of a future that has never been experienced. It also requires the construction of a present that is worse than that constructed future, and an action that will supposedly move the state of affairs from one condition to another. Relational frames are necessary for that to happen, but the kinds of frames involved are so simple and so important to the use of language that six year-olds are already prepared to engage in the relational activities needed. "Now bad, do X, later better" is a relational network that is at the very core of problem-solving. Suicide is just problem-solving gone awry.

12.4. GENERAL CONCLUSIONS ARISING FROM THE RFT ANALYSIS OF PSYCHOPATHOLOGY

Given the foregoing analysis of psychopathology in terms of relational frames, and the description of RFT provided in the book thus far, we can make a series of general statements about the critical importance of arbitrarily applicable relational responding in the develop-

ment and maintenance of human suffering. Having provided these summary statements, we will then be in a position to consider the implications of the current RFT analysis for a range of cognitive behavior therapies.

The following generalizations are taken in part from Hayes et al. (1999).

1. Verbal relations in humans are primitive, dominant, and fundamental. They occur early and readily, even in infants. The basic behavioral processes involved may not occur at all in nonhumans, and certainly do not occur as readily.

2. Much of the human world becomes verbal in an RFT sense of that term. Verbal stimuli include far more than words. Even the most obviously "nonverbal" event is probably at least in part functionally verbal for humans.

3. All verbal relations are contextually controlled. In some contexts they occur more than in others, and the specific forms of the relations derived occur due to contextual features. These contexts include verbally abstracted features of the nonarbitrary environment, previous relational activity, audiences, task demands, and so on.

4. The stimulus functions that are transformed by verbal relations are also contextually controlled and thus the behavioral impact of verbal relations is contextual, not mechanical. Under many contexts, symbols and referents can virtually fuse together, causing considerable behavioral difficulty when the ongoing verbal stream does not support effective action (a process sometimes termed "cognitive fusion"). In other contexts, the verbal relations exist but few stimulus functions are transferred among them.

5. The bidirectionality of verbal relations makes self-knowledge useful but it also makes self-knowledge painful (see Chapter 7).

6. Experiential avoidance is a normal result of human verbal activity for this reason.

7. Verbal relations can occur with minimal continuing environmental support. Contexts that support sense-making (in which there are payoffs for being able to draw stimuli into a coherent network of stimulus relations) are enough to maintain verbal behavior, but these direct contexts are amplified by the way the verbal community demands reasons and rationales for behavior (see Chapters 4 and 10).

8. Verbal relations are loosened by contexts that do not support linear, analytic sense-making; do not encourage right and wrong thinking or reason-giving; do not encourage experiential control; and that support the dispassionate observation and mindfulness of verbal events as an ongoing process. In short, the main way to weaken verbal relations effectively is to alter the context supporting literal verbal processes, not by focusing on the verbal content per se (see Chapters 4 and 7).

9. Changing verbal relations by adding new verbal relations elaborates the existing network – it does not eliminate it. At the level of content, verbal relations work by addition, not by subtraction. Because sense-making is a common context, left to its own devices, verbal networks are ever more elaborated and multiply-controlled (see Chapter 4).

10. Verbal rules often induce relative insensitivity to the direct consequences of responding (see Chapters 6 and 7).

11. Such insensitivity is particularly likely with social pliance, tracking tied to untested or untestable rules, or augmenting linked to abstract or remote consequences. In

many clinical circumstances, rule-governed behavior may continue even when it is ineffective.

12. Pliance, tracking, and augmenting are in an ascending order of complexity. All three are developmentally necessary for effective verbal regulation, but over time the less complex forms become less relevant to effective living, except in specific contexts. Therapy should limit rule-governed behavior to contexts that benefit from it (see Chapters 6, 7, and 9).

12.4.1. Examples of Clinical Implications of the RFT Approach

Before moving on to consider the relationship between RFT and the new wave of behavior therapies, we should note that these twelve generalizations provide an outline for ways in which RFT can be of use to many traditional forms of assessment and treatment. That is a book length topic in its own right, but a brief set of examples seems useful.

12.4.1.1. Inferring Nonobvious Domains to Explore

The analysis of contextual control over derived relations provides an important source of clinical information, and can often suggest domains to explore. When a person describes events, this description is under multiple sources of control. Sometimes what is more important than the literal meaning of the statement is its possible source of control. Consider a client who describes past actions normally, but selects terms that are somewhat unusual. If a theme emerges that might explain the unusual set, the therapist might probe for possible sources of control over the statements within that thematic area. In essence, the therapist is probing for the importance of verbally abstracted features of the nonarbitrary environment in the control of current verbal relations (Generalization #3 above). For example, consider the following statement from a client:

> My wife and I had a good time over the weekend at the resort. I'm afraid she drank too much though ... she was really smashed on Saturday. I got a bit thumped myself, so I guess I can't complain. One or two stiff drinks is about all I can handle ... if it goes beyond that I'm going down for the count, no question. Normally I try to avoid situations like that. Sunday we recovered a bit, but it must have been after noon that we got going. I scared up some equipment from the hotel manager and we went to the park and hit a few balls around. It was a lot of fun. We haven't had a chance to do that in a while. I was knocked out by how well she was playing! She's been working really hard on her ground strokes and it's paying off. I initially had a hard time of it, which is unusual when we play. My serve was just terrible, but eventually I worried it into shape. I just limped through the first game, but I kept probing and probing and eventually came back. I crushed her in the last game.

The literal content of this statement is entirely normal, and should be treated that way. In addition to its literal meaning, however, many of the terms could participate in other

conventional relational networks. Consider the following verbal relations that were implicit in this monody (conventional topic on the left, client wording on the right):

Drunk	–	Smashed
Drunk	–	Thumped
Drunk	–	Down for the count
Impressed	–	Knocked out
Winning	–	Crushed
Playing	–	Hitting

The terms selected are all appropriate and understandable, but they are also all violent. A few of them (e.g., thumped) are fairly low probability statements, compared to other, more common terms for the same event. A therapist who has learned to track verbal discourse on multiple levels, could make a note to explore issues of anger and violence at some point in the future (perhaps in the relationship; perhaps with regard to women; perhaps more generally), without taking on the burden of interpreting the client, or going beyond the weak data this possible theme suggests. The therapist could also look for pain, hurt, insecurity, or anxiety, knowing that the kind of aversive stimulation that gives rise to anger tends also to be reflected in feeling statements of these kinds.

Consider this a second set of terms from this same client statement:

Playing tennis	–	Hitting balls
Playing tennis	–	Strokes
Strong	–	Stiff
Drunk	–	Going down
Exploring; trying	–	Probing
Difficult; effort	–	Hard
Recovered	–	Came back
Stumbled	–	Limp(ed)

Here few of the terms are unusual, but the density of terms that participate in conventional networks having to do with sex is high. It could mean nothing. It could mean that the person thinks in sexualized ways. It could reflect a clinically significant concern about sexuality, or sexual performance. The clinician would be unwise to act clinically in a significant way on any of this, but little could be lost and much could be gained by asking at a future point about sexual issues and about the sexual relationship with the spouse, since this statement was made in the context of the relationship between them.

Consider a third set of terms from this same client statement:

Making a statement	–	Afraid
Don't like	–	Try to avoid
Finding	–	Scared up
Worked on	–	Worried

Once again, we have terms that are unusual, particularly the last two. A possible theme of fear and avoidance seems worth exploring.

Slips of the tongue, neologisms, and loose associations provide the same ground for an RFT analysis. Any statement can be understood a) literally, b) as a statement under multiple sources of control, c) as a social behavior in the context of the relationship between the speaker and the listener, and d) as a sample of a speaker's social behavior that occurs elsewhere. Continuously listening at all of these levels at once opens up a wide variant of possible sources of information.

None of this advice will seem unusual to therapists trained to listen for latent content. Behaviorally-oriented therapists have long been skeptical of that approach, but their skepticism comes more from the clinically arrogant way that psychodynamic therapists and others have gone so far beyond the data. RFT provides a way to think about latent content that is plausible, but without wrapping that possibility into a theory of psychopathology that suggests that the therapist has an x-ray into the mind.

12.4.1.2. Doing a Better Job of Traditional Forms of Therapy

In the main section that will follow this section, we will analyze how RFT is contributing to and can help understand some of the new behavior therapies that are emerging from clinical behavior analysis. RFT can be useful to many forms of therapy, however. In this section, we will consider traditional cognitive behavior therapy (CBT) as a brief example.

According to most cognitive models, negatively biased thinking is a core process in psychopathology. The "cognitive triad of depression" is an example. Depressed patients are thought to have a negative view of themselves, their environment, and the future. They view themselves as worthless, inadequate, and fundamentally unlovable; they typically view the environment as overwhelming, and as continually resulting in failure or loss; and they may view the future as hopeless and they believe that their own efforts will be insufficient to change the unsatisfying course of their lives. Depressed patients are thought to distort their interpretations of events so that they maintain these negative views. These distortions are deviations from the logical processes of thinking typically used by people. Examples of cognitive distortions include arbitrary inference, all-or-nothing thinking, overgeneralization, selective abstraction, and magnification. Patterns of cognition coalesce into cognitive schemas, which are structures for screening, coding, and evaluating stimuli that impinge on the organism (Beck, Rush, Shaw, and Emery, 1979). When negative schemas are in ascendancy, positive schemas become less accessible, data are distorted to maintain the negative schema, and depression may result.

The focus of cognitive behavior therapy is on changing maladaptive schemas and eliminating maladaptive automatic thoughts, so as to foster better mood, behavior, and biochemistry. These changes may be brought about through behavioral experiments, logical discourse, examination of evidence, problem-solving, role-playing, and imagery restructuring, among others. All of these techniques are designed to convince the individual that the thought is faulty or invalid, and thus should be rejected.

There is little doubt that CBT is helpful for a wide variant of clinical problems. What could RFT add to CBT, considered on its own terms? There are many implications, but the following seem particularly clear and easy to defend.

1. RFT explains what cognition is, rather than relying on common sense terms or examples. This implication is a rather abstract one, but it is one that could have effects. RFT focuses the clinician on the relation the client derives between events. If that is what

"cognition" is, then it may provides CBT with a more precise approach to the detection of particular kinds of cognitions, and to their modification.

2. RFT helps explain why various cognitive errors may have negative effects. Selective abstraction may provide an example. There can be little doubt that this process occurs. RFT suggests why. Selective abstraction maintains the coherence of the network, with minimal modification. The reinforcer for relational activity includes sense-making and being right, both of which are promoted by this cognitive error, and thus the error is motivated by the natural contingencies in human verbal activity. Pitted against this is the practical cost of the error, which cognitive therapists highlight in their clinical work.

3. RFT provides a way of thinking about the link between cognition and action with immediate clinical implications. Relating events is not enough to produce action. The transformation of stimulus functions through a relational network is also necessary. A good deal of cognitive work has focused on the former issue (what the client is thinking) but a focus on the latter is equally important (how the client is holding the thoughts that they do have). RFT encourages that addition. One way that this might be talked about in a way that is easily understood in the cognitive model is that it is not just what you think, but also what you believe that makes a difference. "Believability" is often a kind of proxy variable for the likelihood of action based on a relational network. A strongly held "belief" is a basis for action. In the cognitive model, action occurs *because* one believes a verbal formulation; in the RFT model, a verbal formulation can be considered a belief because contextual features support action with regard to it. This insight is important because RFT suggests that believability can be quickly reduced by changing the context in which troublesome thoughts occur. An irrational thought that is repeated 500 times, or said aloud extremely slowly, or watched meditatively as if one is watching a spot on the wall, might be present in a literal sense, but may no longer be a goad to action. Stated another way, it may be possible to change a belief into a thought very quickly and without any attempt to change its form. That is not obvious in cognitive theory, but it is obvious in Relational Frame Theory.

Some of the effects of psychoeducational information in clinical treatment can be addressed in the same way. For example, if a panic disordered person is told that many panic disordered people experience such thoughts as, "I am going to die" or "I am going to go crazy," it automatically introduces into the mix the idea that these thoughts may not need to be *believed.* Instead, this is merely what panic disordered people do, which gives the individual a new way of understanding the meaning of these thoughts.

4. RFT suggests ways of changing thoughts that are counterintuitive. In an RFT view, relational networks are easier to elaborate than to reduce. An implication of this is that positive thinking may be more readily produced by elaborating existing relational networks with minimal conflicts and disputation than by more direct challenges. We have already noted one piece of research that showed this in a study designed to change attitudes toward the worksite (Clayton, 1995), but the same point seems relevant to CBT. Consider, for example, a person who is feeling guilty because he has been unfaithful in his marriage. As a result, he is being more secretive and withdrawn in the marriage. The client reports that he "is a scumbag" who "doesn't care about anything and can't be trusted." One method of approach would be to challenge the obvious cognitive errors involved in such statements. For example, it is clearly an overgeneralization and an example of all-or-none thinking to conclude that because a serious error was made, "I am scum, don't care about anything, and can't be trusted." This

error could be pointed out and remediated. RFT would suggest that the therapist attempt to build on the existing network rather than to challenge it. For example, the therapist might say:

> I can see how distressed you are about the scummy thing you did. You clearly care about the lack of caring you showed in that moment. Your very distress tells me that this relationship, and building trust and caring, is important to you. So your values seem to be very much intact. But what I am most concerned about is the possible lack of caring and trust you are building by now withdrawing from this relationship you care about so deeply. Life might be asking this question of you: Are you a person who can make mistakes and still move toward things you value, one step at a time?

In this approach, the client's existing relational network is used to support a change in that network and in actions linked to it. The client has linked an evaluated action to a conceptualized self, and has concluded "I am scum." Rather than challenge this logical error directly, the therapist has related this strong evaluative word (scum) back to the action, and has linked the client's emotional reaction to the evaluated action, making a coherent relational network that helps explain the upset ("I can see how distressed you are about the scummy thing you did"). The client's distress over a lack of caring is then taken as evidence for caring, which subtly shifts the issue from "I am bad and can't be trusted," as if something needs to be fixed inside before more effective action can be taken, to the strengths that the client has and the action implications of these strengths. Framing the upset this way is not allowed to sit for long, however, as if to reassure the client ("there, there, you poor boy. Don't be so hard on yourself. After all, you obviously care about your wife"). Instead, the client is reoriented toward actual steps to be taken, linked to his caring, so that the upset can serve a motivative function in the service of difficult but needed behavior change. At that moment, the therapist models a verbal relation that emerges naturally from this reorientation ("I can make mistakes and still move toward valued ends, one step at a time"). The modeled statement is rational in a way that the client's original statement is not, but this statement is developed in a way that is never allowed to directly contradict the original statement,

A cognitive behavior therapist might do all of this, but they are also more likely to challenge the obvious cognitive errors. There are no data on the efficacy of embracing the negative to build the positive, compared to a challenging the negative, but RFT leads to this nonobvious alternative. It seems to be an alternative worth testing.

5. *RFT suggests possible processes that would account for the impact of traditional CBT methods.* The various cognitive behavioral methods have usually been talked about in a relatively mechanistic way, but the data on processes of change in cognitive behavior therapy remain very much the target of debate (Barber and DeRubeis, 1989; DeRubeis, Evans, Hollon.andGarvey, 1990; DeRubeis and Feeley, 1990; Sullivan and Conway, 1991).It does seem clear that traditional cognitive models cannot readily account for the data, in part because too much emphasis is placed on changes in the frequency and form of negative thoughts. RFT can easily account for changes in outcomes based on changes in the frequency and form of negative thoughts, but it adds other processes (especially, contextual control over the transformation of stimulus functions) that seem obviously relevant to many cognitive techniques.

12.5. NEW FORMS OF PSYCHOTHERAPY: CLINICAL BEHAVIOR ANALYSIS

Clinical behavior analysis can generally be defined as the application of the assumptions, principles and methods of behavior analysis, with a particular emphasis on a modern approach to language and cognition, to the problems encountered by normal adults and treated in outpatient settings (Dougher and Hayes, 1999). As such, it is a subfield of applied behavior analysis. There are several examples of clinical behavior analysis. We will outline four examples, and then consider how these innovations are consistent with the RFT analysis of human language and cognition.

12.5.1. Acceptance and Commitment Therapy

Acceptance and Commitment Therapy (ACT, stated as a word, not A-C-T: Hayes et al., 1999; Hayes and Wilson, 1994) is the only clinical behavioral approach to psychotherapy that is consciously derived from RFT (and thus it will be presented in more detail here than the other new wave therapies). It is philosophically based on functional contextualism (Biglan and Hayes, 1996; Hayes, 1993) and contemporary behavior analysis more generally. ACT attempts to create a special verbal/social community within therapy that undermines experiential avoidance, cognitive fusion, reason-giving and other verbal contexts and constructions that help support psychopathology. It relies heavily on metaphor, paradox, experiential exercises, and other nonliteral forms of language. There are several phases to ACT.

12.5.1.1. Creative Hopelessness

The first goal of ACT is to undermine experiential control as a reasonable agenda for psychological health. The goal is not for clients to *feel* hopeless, but to see the hopelessness of avoiding or escaping from private events as a means of effective living. This realization of hopelessness is creative because it implies new behavior. Here is a metaphor that expresses some of the qualities of this stage of ACT (see Chapter 4 for the RFT analysis of metaphorical language):

> It would be like if you were caught in quicksand. Of course, you'd try what you know how to do to get out, but almost everything you know about how to get out will only get you deeper into the quicksand. If you pushed down with one foot to get out, your foot would only sink in. The safest thing to do with quicksand is to spread out and try to get yourself fully in contact with the quicksand. Maybe your situation is like that. It may not make logical sense, but maybe what you need to do is stop struggling and instead get fully into contact with what you have been struggling with.

Metaphors of this kind undermine reason-giving, block experiential avoidance, and weaken the normal, literal functions of language.

12.5.1.2. The Problem of Control

The goal of this phase of ACT is to identify the functional class of the solution-focused behaviors the client has been engaging in, and to give this class a name: Control. We discussed the control agenda earlier and provided the specific examples of experiential avoidance and thought suppression as two varieties.

A metaphor that might be used to undermine control strategies is the *Feeding the Tiger Metaphor*:

> It's like living with a small tiger who looks very hungry. It looks like he is going to eat you. Or so you think. It's a small tiger, but scary. So you throw him some meat so he doesn't eat you, and, sure enough, it makes him quiet while he's eating the meat. For a while he leaves you alone. For a while. But he also grows a little bigger. So the next time he's hungry, he's a little bigger and more dangerous. Or so it seems. And you throw him more meat. That little tiger is getting bigger and bigger. And pretty soon it's a big tiger. A really big tiger. You've got anxiety (or urge, etc.) tigers out there that could seemingly swallow you whole, and you keep hoping that if you just keep feeding them, keep trading in your life flexibility just a little bit more, eventually they'll leave you alone. Maybe it's time to recognize that those tigers aren't leaving anytime soon..."

A series of "thought experiments" and exercises are also presented to underscore how deliberate attempts to control private events typically "backfire." With regard to the control of feelings, something like the following commonly is presented:

> Let's imagine you were hooked up to the world's most sensitive polygraph and in such a way that both of us could clearly see its readings and thereby immediately know how anxious or relaxed you were. Now suppose I presented you with the following task – all you have to do is remain relaxed. Furthermore, to increase your motivation on the task, I take out a loaded revolver, point it to your head, and tell you I will pull the trigger if you fail at the task by becoming anxious. What will happen?

After clients acknowledge that they would be unable to remain relaxed under such circumstances, the presentation continues:

> Do you see in this situation that it is very important for you to avoid becoming anxious? But what happens when you deliberately try to avoid becoming anxious? Do you see that now anxiety itself becomes something to be anxious about? Isn't it true in your own experience that a very similar thing happens with other unwanted emotions as well – that if you're depressed and have struggled to get rid of it, depression itself can be something to be depressed about, so that now you are even more depressed. Sure you don't go through life hooked up to a polygraph, but we all have something that serves the same purpose – our own nervous systems. We don't need a machine to tell us when we are anxious or depressed; our own body and nervous system will tell us. We also don't have

> guns pointed at our heads either, but you must be motivated to get rid of your depression or why would you be here? You won't be shot if you become even more depressed, but what do you think will happen to you and your life if you don't successfully rid yourself of it? Notice that deliberately trying to control feelings doesn't work with positive emotions either. Suppose I offered you a million dollars if you could fall in love within 24 hours with the first stranger you encounter upon leaving here. Could you do it?

To underscore the futility of trying to control unwanted thoughts, clients are typically asked to suppress a specific thought; e.g., "For example, whatever you do right now, don't think of jelly donuts! Especially jelly donuts that are big and round, are all covered with powdered sugar, and are all sugary and gooey when you bite into them. Whatever you do, don't think of them."

12.5.1.3. Willingness

Once clients more fully understand the counterproductive nature of their control agenda, it is useful to present willingness as an alternative. The *Two Scales Metaphor* is used to differentiate deliberate control from willingness:

> Imagine there are two scales, like the knobs on a stereo. One is right out here in front of us and it is called "Depression." It can go from 0 to 10. In the posture you're in, what brought you in here, was this: "My level of depression is too high." In other words, you have been trying to turn the knob down on this scale. But now there's also another scale. You may not have even known it's there because it's hidden and hard to see. This other scale can also go from 0 to 10. What we have been doing is gradually preparing the way so that we can see this other scale. We've been bringing it around to look at it. It's really the more important of the two, because it's the one that makes the difference and it is the only one of the two that you can control. This second scale is called "Willingness." It refers to how open you are to experiencing your own experience when you experience it – without trying to control it, avoid it, escape from it, and so on. When Depression is up here at 10, and you're wrestling with it to make it go down or go away, then you're unwilling to feel and experience the depression. In other words, the Willingness scale is down at 0. But that is a terrible combination. It's like a ratchet or something. You know how a ratchet wrench works? When you have a ratchet set one way, no matter how you turn the handle on the wrench, it can only tighten the bolt. It's like that. When depression is high and willingness is low, the ratchet is in and depression can't go down. That's because if you are really, really unwilling to have depression, then depression itself is something to be depressed about. It's as if when depression is high, and willingness drops down, the depression kind of locks into place. So, what we need to do in this therapy is shift our focus from the depression scale to the willingness scale. You've been trying to control depression for some time and it just doesn't work. Don't believe me when I say this, but look at your own experience. It's not that you weren't clever enough; it simply doesn't work. Instead of doing that, we will turn our focus to the willingness scale. Unlike the depression scale, which you

can't move around at will, the willingness scale is something you can set anywhere. It is not a reaction – not a feeling or a thought – it is a choice. You've had it set low. You came in here with it set low – in fact, coming in here at all may initially have been a reflection of its low setting. What we need to do is get it set high. If you do this, I can guarantee that if you stop trying to control depression, your level of depression will be low… or… it will be high. I promise you! And when it is low, it will be low, until it's not low and then it will be high. And when it's high it will be high until it isn't high anymore. Then it will be low again … I'm not teasing you. There just aren't good words for what it is like to have the willingness scale set high.

12.5.1.4. Defusion

In the next phase of ACT a variety of methods are used to promote cognitive defusion. These include the use of mindfulness exercises, paradox, metaphor, as well as several "verbal conventions." For example, clients are asked to repeat a single word for several minutes and see what happens (it completely loses all meaning). Clients may be asked to practice "just noticing" thoughts in forms of therapeutic meditation. Clients may be asked to label all evaluations as evaluations; all feelings as feelings; and so on (e.g., "I am having the feeling of anxiety and I am evaluating it right now as bad"). One such convention has to do with use of the words "but" and "and." What "but" literally means is that what follows the word "but" contradicts what went before the word (the etymological meaning of the word is "be out"). The convention that ACT adopts as part of the language of therapy is to replace "but" with "and." For example, a client who says, "I wanted to go out with my friends, but I was too depressed" would be prompted to reformulate the statement with an "and" – "I wanted to go out with my friends *and* I was depressed." In the latter sentence, both things may be true and one doesn't negate the other. The client might then be asked, "Is it possible that you could have gone out with your friends *and* feel depressed?"

12.5.1.5. Self as Distinct from Private Events

In order for clients to loosen their attachment to verbal content as a matter of personal identity they must find a sense of self that transcends the literal. That self is defined by the continuity of consciousness itself (Hayes, 1984). The sense of observing from "here and now" is a sense that all verbally-able humans have under some conditions, such as when meditating (see Chapter 7). Through metaphor and experiential exercises, ACT attempts to highlight this naturalistic sense of spirituality (see Chapter 13). An observing self is crucial to acceptance work, because it means that there is at least one stable, unchangeable fact about oneself that has been experienced directly and that will not be threatened by allowing in previously rejected psychological content. It is less threatening for a client to face pain in life if he or she knows that no matter what happens, the "I," in at least one important sense of that word, will not be at risk.

The *House and Furniture Metaphor* is useful for establishing the relationship between undesirable psychological content and self as perspective:

"It's as if you were a house, filled with furniture. The furniture is not, and can never be, the house. Furniture is the content of the house, or what's inside it. The house merely holds or contains the furniture and is the context in which furniture can be furniture. Whether the furniture is thought to be good or bad, says nothing about the value of the house. Suppose you are more like the house than the furniture. Just as the furniture is not the house, suppose in some deep sense that your thoughts and feelings are not you."

12.5.1.6. Values and Commitment

In ACT, the acceptance of previously avoided private events is not a goal in its own right. Rather, it is sought in the service of enabling clients to move their lives in a valued direction. Values are verbally-constructed, globally-desired life directions. Values manifest themselves over time and unfold as an ongoing process rather than an outcome.

A series of values clarification exercises are used to help clients make contact with the directions they would go in if they had a free choice. When that is clearer, the core ACT question can be placed on the table:

Given a distinction between you and the things you've been struggling with and trying to change, are you willing to experience those things, fully and without defense, as they are, and not as they say they are *and* do what takes you in a valued direction in this situation?

If the client can answer "yes" to this question, then ACT becomes a form of traditional behavior therapy. What will take a client in a valued direction depends on the client's goals, abilities, history, and current situational context, but the issue is entirely behavioral. In a more global way, if the answer is "yes," life itself opens up just a bit. If the answer is no, then psychologically speaking the client's life becomes a bit smaller.

In summary, the general goal of ACT is to encourage a client to contact private events without needless defense ("psychological acceptance"), and to reduce the needless domination of language ("deliteralization") while at the same time setting concrete goals based on overall values and behaving in a way that moves toward these goals ("commitment"). Thus, ACT seeks to orient direct change efforts toward more readily changeable domains, such as overt behavior or life situations, rather than personal history or automatic thoughts, and to encourage greater openness to events that are not readily changeable by altering the context in which such change efforts normally occur (see Hayes, Jacobson, Follette, and Dougher, 1994 for a book-length review of acceptance methods). ACT is designed to: a) lessen the degree to which thoughts are taken literally and to promote the evaluation of thoughts on the basis of the degree to which they lead to valued life changes, b) undermine reason-giving and believability of reasons in areas where these efforts have been used to justify and excuse ineffective behavior, c) foster the experience of private events, rather than engage in counterproductive avoidance behavior, d) clarify life values and identify barriers to implementation of life goals, and e) foster commitments to actions linked to life values. ACT shares common ground with experiential therapies in that experiencing and feeling are accepted and valued, not controlled out of existence. While some of the techniques used in ACT are borrowed from experiential approaches, the core conceptualization remains thoroughly behavioral.

The data on ACT are still preliminary, but growing. A recent randomized controlled trial showed that it was more effective than traditional behavior therapy in treating worksite stress (Bond and Bunce, 2000). Another randomized controlled trial showed that a three hour ACT intervention reduced the rehospitalization rates of the severely mentally ill by 50% over a four month follow-up (Bach, 2000). Controlled research has shown that training in ACT produces a generally more effective clinician as measured by client outcome in the broad range of clients normally seen in an outpatient setting – the only procedure yet to have shown clinical effectiveness of that kind (Strosahl, Hayes, Bergan, and Romano, 1998).

12.5.2. Dialectical Behavior Therapy

Dialectical Behavior Therapy (DBT; Linehan, 1993) was designed to treat the parasuicidal behavior of individuals diagnosed with borderline personality disorder (BPD). According to DBT, clients need to learn to incorporate alternative and even contradictory positions into a dialectical process. Acceptance and change is an example. Both radical acceptance and validation of the individual strategies and the need for behavior change are simultaneously entertained and neither is superior to the other.

There are three stages to DBT: skills acquisition (e.g., mindfulness skills, interpersonal effectiveness, emotional regulation), exposure, and the achievement of self-respect and individual goals. DBT includes a focus on the interpersonal client behaviors within the therapy session, and on the generalization of issues noticed in the client-therapist relationship to relations with significant others.

DBT helps clients become more aware of their private emotions and thoughts through focused attention. Mindfulness training is a primary method involving focused awareness on personal experiences without excessive entanglement with the content of those experiences. Mindfulness is used to increase distress tolerance and to help clients to view their experience (thoughts, emotions, behaviors) as they are experienced directly to be, above and beyond how they are evaluated.

DBT is a mix of Eastern and Western approaches. It is functional, behavioral, and contextual, and is equally focused on cognition, emotion, and behavior.

12.5.3. Integrative Couple's Therapy

Integrative Couple's Therapy (ICT; Christensen, Jacobson, and Babcock, 1995) is another clinical behavior analytic approach that combines change and acceptance strategies. The change components include modified elements of behavioral marital therapy, including communication training, behavioral exchange, and problem-solving. When these direct change strategies reach their limits, ICT promotes acceptance-based strategies. Among the strategies employed are building tolerance, viewing the troublesome behavior as an external event, empathic joining, and self-care.

12.5.4. Functional Analytic Psychotherapy

Functional Analytic Psychotherapy (FAP; Kohlenberg and Tsai, 1991) is a relationship-oriented therapy that seeks to shape more effective social behavior directly. The

underlying assumption is that it is easier to deal with actual relevant behavior within session than with a mere description of the behavior that occurs elsewhere. The goal is to use natural social consequences in therapy to promote clinically healthy behavior. Arbitrary consequences, and explicit instruction are avoided: the former because it is unlikely to generalize to the natural environment, and the latter because rules may keep clients from contacting important real-world contingencies. The FAP therapist is asked to notice instances of clinically relevant behavior, both problematic and healthy, to interpret them functionally, and to respond contingently to client improvement. The FAP therapist tries to structure therapy so as to increase the likelihood of observing clinically relevant behaviors, and the therapist's responses to them.

12.5.5. Commonalities

There are several notable commonalities between these fours approaches. All four therapies:

- ♦   are contextual and radically functional;
- ♦   are cautious about rule-governance;
- ♦   are experiential;
- ♦   include acceptance and change components;
- ♦   use language at times in non literal ways;
- ♦   are focused on the role of the therapeutic relationship; and
- ♦   emphasize values clarification.

Each of the foregoing commonalities is entirely consistent with the RFT approach to human language and cognition. Consider, for example, the radically functional way in which each deals with literal language and rules. ACT uses paradox, defusion and experiential exercises to undermine literal language, focusing instead on workability. DBT uses mindfulness exercises to change distance from troublesome thoughts and emotions. FAP attempts to increase the proportion of the client's experience that is contingency-shaped, rather than rule-governed. ICP encourages a more direct focus on the function and utility of behavior, rather than maintenance of an unnecessary change-oriented rule. These disparate treatments show a common functional, pragmatic core that is sensitive to a modern behavioral conception of language and cognition.

RFT is part of the intellectual backdrop for these procedures. ACT is explicitly based on RFT. DBT, FAP, and ICT are not, but they each show that in modern clinical behavior analysis context is key, verbal processes are as important as verbal content, rules are necessary but dangerous, and experiential avoidance is a common result of human language. RFT has been part of the intellectual backdrop for these important insights in clinical behavior analysis.

Behavior analytic psychotherapy did not exist a decade ago. Today, it is clear that values-oriented, relationship–oriented, cognitive-oriented and emotionally focused treatments all can emerge from modem behavior analysis. It will be interesting to see what other procedures will emerge as a more adequate account of human language and cognition is developed.

13

RELIGION, SPIRITUALITY, AND TRANSCENDENCE

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In this chapter, we will first consider an RFT approach to religious control in terms of rule-governance. We will then go on to consider spiritual and transcendent experience in terms of the RFT account of *self* that was presented in Chapter 7. We will also present an experiential exercise that may be used to illustrate the RFT approach to these topics. Finally, we will consider the implications of this analysis for an RFT interpretation of the use of the word "God" in human language.

13.1. A NATURALISTIC AND FUNCTIONAL ANALYSIS

For more than a century, there has been a tradition within psychology of thoughtful philosophical discourse about spirituality, religion, and God (e.g., Freud, 1927/1964; James, 1902; Schoenfeld, 1993). However, very few contemporary behavioral accounts of religion have been offered. In fact, behavior analysis has tended to treat this subject as taboo (see Day, 1983). The objection of behaviorists to spiritual phenomena is, however, understandable.

Over the course of history, the nonspatiotemporal soul, and later the secular mind and consciousness, were treated as the fundamental subject matter of psychology (Kantor, 1963), and behaviorism was in part a rebellion against that tradition.

Taken literally, terms like "God" and "spirit" refer to nonspatiotemporal or supernatural events. The referents of such terms are not interpretable from a natural science perspective because they do not exist in space and time and cannot, therefore, be directly observed or manipulated. However, if these concepts are approached as verbal events, the conditions under which such concepts are used and the effects they have on human behavior can be investigated. As a functionalistic approach to human language, RFT is well suited to the analysis of spirituality, transcendence, and God in these terms.

13.2. RELIGION AND RULE-GOVERNANCE

The behavior analytic approach to religion has normally focused on its social-regulatory functions (Skinner, 1953). In this approach, the direct effects of social consequences for participating in religious practices have been emphasized, and no doubt these social contingencies play an important role in religious behavior. A teenager, for example, may simply attend a weekly religious ritual to "keep mom off my back." An RFT analysis of *religion* has little to add to the study of such social-regulatory functions, beyond that already presented in the current book. For example, attending church to "keep mom of my back" may be considered a form of strategic problem-solving that is functionally no different from the non-religious example of "doing my homework to keep my teacher off my back." In both cases, the consequences of "not attending church" or "not doing one's homework" have likely been contacted in the past in one form or another. Where additional RFT analyses seem to be needed, therefore, is in developing a behavioral understanding of those instances in which religious control is established and maintained in the clear absence of any consequences that have been, or even could be, contacted in the person's lifetime. Imagine a teenager who faithfully abides by a particular set of religious rules to avoid "eternal damnation." In this case, the consequence has not been contacted directly, and thus particular kinds of derived relational responding and rule-governance likely play a critical role in the teenager's religious behavior. We will now provide an RFT analysis of this type of religious control.

As was shown in the previous chapter, the temporal relational frame is key to our understanding of how it is that humans come into experiential contact with such states as emptiness, meaninglessness, and lack of purpose. At a young age, children are taught to value temporally remote consequences (e.g., academic degrees, employment, marriage, children, and so on). They are also taught that they will eventually die. Thus, humans have two kinds of verbally constructed futures, each created through the same relational process. In one, positive outcomes can be achieved. In the other, they all disappear.

The process through which a person's behavior comes increasingly under the control of natural contingencies and less under the control of plys and verbal constructions of past or future consequences may begin with tracking and may, later, involve motivative and formative augmenting. In normal development, pliance produces insensitivity to direct contingencies. This also means, however, that remote or probabilistic contingencies can then

be contacted and tracked. For example, a child required (through pliance) to study may later contact the more natural but remote consequences of doing so, and rules regarding studying may come to function as tracks (cf., Michael and Bernstein, 1991). Eventually even rules that specify consequences that are too remote to be contacted at all may function as tracks or augmentals.

As an example of the latter, consider the statement "Repent your sins before the eyes of God and accept the Lord thy God and Jesus Christ, his only son, as your personal savior and you will experience eternal happiness in Heaven." Superficially, it would appear that such a statement could only function as a ply since the "natural contingencies" specified can only be contacted after death. However, real world events that are related to such psychological events as happiness can be directly contacted.

The rule, "repent your sins," for example, may evoke a particular pattern of responding that then brings a listener into contact with natural contingencies leading to the experience called "happiness." And, although consequences like "Heaven" cannot be directly experienced like street signs and buildings, by way of a transformation of functions through relational frames, it may be possible for "Heaven" to elicit similar stimulus functions as, say, a warm spring day, a loving embrace, or a pristine mountain lake. These events can be directly experienced and can come to function as reinforcers. Thus, through its derived relation with events that can be experienced directly, "Heaven" can come to function as a consequence for rule-following, a kind of formative augmenting (Hayes and Wilson, 1993).

The foregoing provides an RFT analysis of how extremely remote consequences may function as powerful determinants of behavior when those consequences are verbally constructed in relational networks or rules. Although this analysis is important for understanding how religious doctrine may establish behavioral control, the analysis does not appear to speak directly to the topics of spirituality, transcendence, and God. Most individuals who practice a religion (and many of those who do not) would be quick to point out that there is a great deal more to religious practice than simply following the rules. Although the evolution of religion may well serve an important source of social control (Guerin, 1994), religion is clearly related to other aspects of human psychology. Talk of spirituality, transcendence, and God is commonplace amongst those who practice and do not practice a religion. Even those who profess to be atheists may well use these terms when describing specific psychological experiences. The topics of spirituality, transcendence, and God therefore require RFT analyses that extend beyond that of religion per se, and it is to these issues that we now turn.

13.3. SPIRITUALITY, TRANSCENDENCE, AND GOD

In Chapter 7, three relational frames were identified: I-YOU, HERE-THERE, and NOW-THEN. These frames, it was argued, help to provide a functional analysis of the concept of self. In fact, three categories of self were identified: self-as-content, self-as-process, and self-as-context. In what follows, we will attempt to show how the RFT analysis of self may be used to develop a functional analysis of spirituality, transcendence, and God.

13.3.1. Spirituality

If we ask many, many questions of a person, the only thing that will be consistent is not the content of the answers, but the context from which the answers occur. In Chapter 7, this absence of content was labeled self-as-context, and it was defined by RFT as "I," "HERE," and "NOW." In other words, all psychological experiences, all thoughts and feelings, occur from the perspective of "I" located "HERE" and "NOW." This RFT definition of self-as-context, we will argue, is closely related to the concept of spirituality.

Self-as-context has a rather strange quality to it because it seems to have no limits. One can be conscious of the limits of everything except one's own perspective or consciousness. For that reason, this sense of perspective, or self-as-context, as a place from which things occur, does not change once it emerges (around the age of three). Of course, a nonverbal organism can also "see" the world, but it cannot know that its own perspective is unique. This would require responding in accordance with the relational frames of I-YOU, HERE-THERE, and NOW-THEN. Verbal organisms "know" that I is not YOU, HERE is not THERE, and NOW is not THEN. (Please note that although the current chapter is multi-authored, for the purposes of communication we will sometimes write in the first person singular, rather than in the first person plural).

For RFT, the strange quality of self-as-context is rooted in the fact that verbal organisms always respond relationally from I, HERE, and NOW. I may remember what I did yesterday or 20 years ago, or I may even imagine what it would have been like to live as Sir Lancelot in King Arthur's court, but these events will be viewed from the ever present I, HERE, and NOW. In a sense, I can never escape this relational responding. To do so would require that I cease to be me. Even if someone states, "I can't believe I did those terrible things-that wasn't me," this statement is made from I, HERE, and NOW. Self-as-context is the perspective from which all life events are experienced - the good and the bad. In this sense, "I" is the same person as the "I" who was a child. Although my body has undergone many changes since that time and is definitely not still the same physical structure, "I-as-context" remains unchanged. In other words, I-as-context is the "I" referred to when someone states, "*I* can remember being six years old." Nothing about my physical nature, nor my thoughts, feelings, and emotions are the same, but in a real sense that is just as much me as the me that I experience now. In this sense, there are no physical limits to I-as-context. All experiences are contained within this context, and thus one cannot identify the limits or edges of self-as-context. It is boundless, timeless, and without finitude.

The implication of this infinitude is that I-as-context somehow exists *independently* of one's body, thoughts, and emotions. The verbal community refers to "my body" as if I possess a body – not that I am my body. For a materialist, this seems literally impossible. However, the "I" referred to by the verbal community is not based on an assertion of scientific truth, but rather refers to the timeless and limitless experience of I, HERE, and NOW (i.e., self-as-context). This strange class of relational responding is what does not change, and is what will remain constant as my environment, body, thoughts, and emotions change radically. Only the context of self-knowledge –1, HERE, and NOW – will not and cannot change. If it could, the verbal community could not get reliable answers to such questions as "what did you do yesterday? or "will you do that for me next week?" Clearly, therefore, the unchanging, limitless, and timeless quality of self-as-context serves a very important function within the verbal community, in that without it social chaos would result. From the RFT perspective,

however, this infinite quality also gives rise to talk of the spiritual, the immaterial, and the incorporeal.

To support our argument, let us begin by checking a standard definition of spirituality. The Oxford English Dictionary defines "spirit" as pertaining to the immaterial and that which has no extant reality. The term "spirituality" is provided as an adverb of that noun. Thus, "spirit" is non-experienceable as a thing. Self-as-context seems to fit this definition rather nicely. As described above, self-as-context is the ever present I, HERE, and NOW. It is simply not possible to "jump out" of this perspective without taking another perspective, and thus I, HERE, and NOW always continues unbroken and without limit. As soon as I take another perspective, I am HERE and NOW, and the perspective that was, is THERE and THEN. Thus, self-as-context is only experienceable in its effects, and is certainly not experienceable as a thing or object by a person taking that perspective. The essence of a thing or object is "this – not that." To see a thing we must also see "not-thing." Thus, all things must be finite – they must have edges or limits. It is the edges or limits that allow us to see a thing. If a thing was absolutely everywhere, we could not see it as a specific thing. For the person experiencing it, self-as-context has no stable edges or limits – it is not fully experienceable as a thing. Rather, self-as-context is the aspect in which things are held. In the Eastern tradition, spirit is even called "no thing" (Suzuki, 1968). The matter/spirit distinction appears to have its source, therefore, in the content/context distinction that emerges as a necessary side effect of language. More specifically, this distinction emerges because it allows us to speak about our ever-changing experiences from a consistent and unchanging perspective.

Talking in this way helps us to understand some of the characteristics that are said to be part of the world of the spirit. Consider the characteristics of temporal immortality or physical infinity. This means undying; without limit or end; boundless. So far as I can directly know, I have never been anywhere that my self-as-context has not been. There is nothing I have ever done or experienced that I know about that wasn't known in the context of I, HERE, and NOW. On experiential grounds, so far as I know I have no limits and I am without end. Even in reading this sentence, it is from the ever present and unchanging perspective of I, HERE, and NOW. As such, I have never experienced any limits or boundaries, or an end that I know about. If I know about it, I was there to know about it.

What we are arguing here, then, is that the distinction between self-as-content and self-as-context is the experiential source of the matter/spirit distinction. That distinction is an ancient one, originating long before a scientific perspective dominated in human culture. Rather than rejecting this distinction, we are suggesting that it is a very reasonable and sophisticated one - allowing us to use language in a situation where the normal use of language does not readily apply. In short, RFT suggests that spirituality is an experience of "transcendence" or "oneness" that comes when the literal, analytic, and evaluative functions of relational framing are massively reduced, and the relational functions of I, HERE, and NOW are thereby allowed to predominate. We shall present a more detailed technical analysis of transcendence in the next section.

Interestingly, many of the foregoing ideas have been present in non-technical form for many years. Meditation, chants, and the repetition of mantras, or elective silence all have, as their central goal, the loosening of the dominance of evaluative language, or deliteralization (Hayes, 1994). For example, the purpose of zazen, in Zen Buddhist meditation, is simply to observe the flow of one's thoughts and feelings. As Suzuki (1968) explains:

> If you try to calm your mind you will be unable to sit, and if you try not to be disturbed your effort will not be the right effort. The only effort that will help you is to...concentrate on your inhaling and exhaling. We say concentration, but to concentrate your mind on something is not the true purpose of Zen. The true purpose is to see things as they are, to observe things as they are, and to let everything go as it goes (pp. 32-33).

Practices such as these sometimes lead to a spiritual or transcendent experience (see next section). Although the language of spirituality is dualistic, the spiritual experience itself need not be so construed. As indicated above, spiritual content seems to occur when the dominant experience is a sense of I, HERE, and NOW.

Having presented the RFT approach to the concept of spirituality, we are now ready to consider the RFT approach to the related concept of transcendence. As we shall see, this approach is firmly rooted in the RFT interpretation of spirituality. However, our treatment of transcendence will not be purely interpretive. In dealing with this issue we have developed an experiential exercise that may be used to help bring about the experience of transcendence, and thereby illustrate, perhaps more effectively than with text alone, the RFT approach to this difficult area of human psychology.

13.3.2. Transcendence

According to RFT, a sense of transcendence results, in large part, from a situation in which the evaluative functions attached to HERE and NOW repeatedly transfer to THERE and THEN in these two relational frames. More specifically, when an evaluation (located I, HERE, and NOW) is discriminated as just an evaluation, it immediately acquires the relational functions of I, THERE, and THEN. If this form of shifting within the frames keeps repeating itself, a person's "normal" perception of reality may be undermined, leading to a sense of transcendence. From the RFT perspective this is exactly what happens during some forms of meditation. For example, dispassionate observation of spontaneous thoughts and feelings is encouraged in Buddhist forms of meditation, and with sufficient practice, feelings of tranquility and transcendence often emerge (see Hayes, 1984). For RFT, the "experience" of transcendence occurs because each evaluative function that occurs during meditation immediately loses most of its psychological functions when it shifts from I, HERE and NOW to I, THERE and THEN. For example, if the thought occurs (I, HERE and NOW), "I am such a failure," the emotional functions actualized by this verbal event may quickly dissipate as the thought is discriminated as just another thought (I thought that THERE and THEN) in the ongoing stream of verbal events (the experiential exercise outlined below will expand upon this suggestion).

The current RFT interpretation is clearly reflected in certain therapeutic techniques employed by behavior therapists (as described in Chapter 12). For example, one of the goals of Acceptance and Commitment Therapy (ACT; see Hayes, Strosahl, and Wilson, 1999; Hayes and Wilson, 1994), is to encourage clients to discriminate between the context of their experience (I, HERE and NOW) and the actual content of the experiences (thoughts, emotions, evaluations etc., located I, THERE and THEN). One of the techniques used in ACT, as described in the previous chapter, requires clients to adopt a particular verbal style in which, "the type of verbal event is named, rather than simply stating the content of that event" (Hayes

and Wilson, 1994, p. 294). For example, clients may be taught to say, "I'm having the thought that I can't go to the job interview," rather than, "I can't go to the job interview." This way of talking can also include evaluative aspects such as, "I'm having the evaluation that I'm a worthless person," as opposed to simply saying, "I'm worthless." Therapeutic techniques such as this help undermine the assumption established by the verbal community that thoughts and feelings are the literal causes of behavior, and thus can be used as reasons or causes for emotional avoidance (e.g., "I was so anxious that I had to leave the party"). In other words, ACT helps the client to discriminate negative thoughts and feelings as located I, THERE and THEN, rather than I, HERE and NOW, and this weakens the control that the wider verbal community has established for thoughts and feelings over the client's behavior.

Although there has been no laboratory-based research to support the current RFT analysis, we have developed a teaching exercise to help students better grasp the RFT interpretation of spirituality and the transcendent. We will present this exercise here because we believe it will help clarify and bring to life the current RFT interpretation. With this aim in mind, we would also encourage the reader to try the exercise on his or her own, and if possible to try it in the classroom.

13.3.3. A Teaching Exercise to Illustrate an RFT Interpretation of the Transcendent Experience

The following exercise is normally employed with students who are following an advanced course in behavior analysis, and who have studied RFT as part of that course. We normally present a simplified version of the material covered thus far in the current chapter, and then invite the students to engage in a brief relational frame exercise. The students are informed that the exercise is designed to help them experience how difficult it is to respond to their own thoughts, feelings, and evaluations as located I, THERE and THEN, rather than I, HERE and NOW, and that making contact with this difficulty should help them better appreciate the RFT interpretation of the spiritual and the transcendental experience. Before starting the exercise, the students are reminded that responding to one's own thoughts and evaluations as I, HERE and NOW is a behavior that was established in early childhood, and has been reinforced incessantly by the verbal community, and as such, the behavior is particularly difficult to extinguish.

13.3.3.1. The Exercise: Learning to Respond to Thoughts, Feelings, and Evaluations as Located I, THERE, and THEN, Rather Than I, HERE, and NOW

Teacher: I'd like us to do an exercise to show how difficult it is keep transferring one's thoughts and evaluations from I, HERE, and NOW to I, THERE, and THEN in these relational frames. All I'm going to ask you to do is to think whatever thoughts you think and to allow them to flow, one thought after another. The purpose of the exercise is to notice when there's a shift from locating your thoughts I, THERE, and THEN to locating them I, HERE, and NOW. When your thoughts are located I, THERE, and THEN you will perceive them to be just thoughts and respond to them as relatively unimportant. But when your thoughts are located I, HERE, and NOW you will lose yourself in them and forget that they are just thoughts. This sounds a bit weird, I know, but just give the exercise a go and see what happens. I'm going to ask you to imagine that you are sitting

comfortably by the side of a stream on a warm summer's day. As you sit by the stream leaves float by on the water, and each thought you have is a sentence written on one of these leaves. Some people have a hard time putting thoughts into words, and they see thoughts as images. If that applies to you, put each image on a leaf floating down the stream. Does everyone feel happy with this so far?

Students: General agreement [if anyone seems unwilling to participate, they may be invited to leave].

Teacher: Okay. In a minute I am going to help you relax, and then I want you to begin letting your thoughts go by written on the floating leaves. Now here is the task. The task is simply to watch the leaves go by without having it stop and without finding yourself carried off down the stream on a leaf. You are just supposed to let it flow. It is very unlikely, however, that you will be able to do this without interruption. And this is the key part of this exercise. At some point you will have the sense that the stream has disappeared, or that you have lost the point of the exercise, or that you are down in the stream, or on a leaf, instead of being on the bank. When that happens, I would like you to back up a few seconds and see if you can catch what you were doing right before the stream disappeared. Then go ahead and put your thoughts on the leaves again, until the stream disappears a second time, and so on. The main thing is to notice when it disappears for any reason and see if you can catch what happened right before it disappeared. Okay?

Students: General agreement [again, if anyone seems unwilling to participate, they may be invited to leave].

Teacher: One more thing. If the stream and the leaves never get going at all and you start thinking "it's not working," or "I'm not doing this right" then let that thought be written on a leaf and send it down the stream. Okay. Now let's get comfortable, close your eyes, get settled into your chair and follow my voice. If you find yourself wandering, just gently come back to the sound of my voice. For a moment now, turn your attention to yourself in this room. Picture the room. Picture yourself in this room and exactly where you are. Now begin to go inside your skin, and get in touch with your body. Notice how you are sitting in the chair. See if you can notice exactly the shape that is made by the parts of your skin that touch the chair. Notice any bodily sensations that are there. As you see each one, just sort of acknowledge that feeling and then move on. [Pause]. Now picture yourself by the side of the stream. You stay up on the bank looking at the leaves float by. If the stream disappears, or the leaves stop floating by, or you find yourself on a leaf, or in the stream itself, note that, and see if you can notice what you were doing right before that happened. Then get back up on the bank, and let the leaves begin to float by again. Okay, let's begin . . . Whatever you think, just put it on the leaves, . . . [for about three to five minutes, allow the group to work. Don't underdo it timewise, and use very few words. Try to read where the group are and add a few comments as needed, like "just let it flow and notice when it stops." Don't engage in conversation with any member of the group. If a student opens his or her eyes, calmly ask that they be closed and the exercise be continued. If a student starts to talk, gently suggest that even that thought be put on a leaf, saying something like, "we will talk more about this when the exercise is finished, but for now there is no need to talk with me. Whatever you think you want to say, let that thought be written down and let it float by too"]. Okay, now we will let the last few leaves float by, and we will begin to think about coming back to this room [pause]. Now again picture

yourself in this room. And now picture the room. Picture (describe the room). And when you are ready to come back into the room, open your eyes. Welcome back.

Teacher: Okay, any comments?

Student 1: I found it very tough to keep going without losing it. I'd be fine for a short while, and then I'd cotton on that I'd lost it.

Teacher: As if you had left the stream altogether?

Student 1: That's it – the exercise was nowhere.

Teacher: Did you notice what had been happening right before you forgot about the exercise?

Student 1: I think so. I was thinking that the exercise was a bit Zen-like, and I was surprised that it was part of behavioral psychology. Then I started thinking about how little I really know about psychology although I'd been studying it for almost two years. Then I started to think that there would never be enough time to learn all the stuff that you needed to have a really good understanding of the discipline, and then I thought, 'Oh no, I didn't put any of that on a leaf.'

Teacher: That's great. When the thought first showed up, "This is a bit Zen-like," was that thought written on a leaf?

Student 1: I can't quite remember, I don't think so.

Teacher: Where was it instead?

Student 1: Nowhere I suppose. I was just thinking it.

Teacher: In other words, the thought was located I, HERE and NOW, about you studying psychology, I, THERE and THEN. Can we say it this way? At some point you engaged in a piece of private verbal behavior (i.e., you had a thought) and you failed to respond to it as located I, THERE, and THEN. The thought was located I, HERE, and NOW, and so you got hooked up by the thought and forgot that it was just a thought, and at that point the stream and the leaves are gone. Instead you are dealing with the reality of not having enough time. The thought is happening I, HERE, and NOW – "I don't have enough time" – rather than I, THERE, and THEN – as a thought written on a leaf.

Student 1: I know what you mean. I can see what you are getting at.

Teacher: Did you get the thought about lack of time for study on a leaf?

Student 1: When I noticed that the exercise was gone, I imagined myself back on the bank, and put the thought on a leaf and let it float past.

Teacher: Did things go okay after that?

Student 1: Kind of. At various points I'd notice that I'd lost the exercise. So I'd start again by putting my last thought on a leaf and watching it float by.

Teacher: So you were sort of cycling between responding to your thoughts as I, THERE, and THEN, on the leaves (and thus you responded to them dispassionately as thoughts) and I, HERE, and NOW when you got hooked up by them and forgot about the exercise.

Student 1: Yes – that's what happened.

Teacher: Good. Thanks for sharing that with us. Any more comments from anyone else?

Student 2: I was okay for a short while, but then I started to think about a trip that I have to make this weekend.

Teacher: And did you respond to that thought as I, THERE, and THEN, on a leaf, or did you respond to it as I, HERE, and NOW by getting carried off by the thought?

Student 2: I got carried off.

Teacher: What happened to the stream?

Student 2: I forgot about it.

Teacher: Right. Isn't it the case that every time you forgot about the stream, it was because you responded to a thought as located I, HERE, and NOW, rather than located I, THERE, and THEN? In effect, as soon as you stopped responding to thoughts as just thoughts (I, THERE, and THEN) you immediately got carried off by the content of those thoughts.

Student 2: Yeah. That's what happened to me.

[Process some of the other students' comments in a similar way, and then round up with the following.]

Teacher: Okay. Thanks for sharing your experiences with the group. That was great. The point of the exercise was to get you to experience the difference between responding to a thought as located I, THERE, and THEN, and responding to a thought as located I, HERE, and NOW (i.e., when you forgot about the exercise and were carried off by the content of the thought).

The floating leaf exercise can help you perceive your thoughts about yourself and the world as relatively unimportant, and this can be very useful. The next time you feel anxious or down about something use the exercise. For example, if you find yourself thinking, "I could never be that good, I might as well give up now," try putting that thought on a leaf, and see how your reaction to the thought changes. If it works for you, the negative power of the thought will diminish, and you will feel less inclined to "give up."

By the way, I haven't met anyone who can let the leaves float by 100 percent of the time. That is not realistic. With practice, however, you can let them float by for longer periods. You can practice this at home and you'll be able to do it more and more – it is a kind of meditative exercise really. In fact, if you practice the exercise regularly, you may find that it sometimes brings on a state of deep relaxation, or a feeling of peace and tranquility. One might even say that it can lead to a spiritual or transcendental experience.

The transcendental is often spoken of as a non-physical experience that in some way transcends physical reality. The transcendental experience cannot be pointed to or defined as a thing with specific boundaries in time and space, and cannot easily be described in ordinary language. Relational frame theory accounts, in part, for the non-descriptive qualities of the transcendental experience in terms of *a massive reduction in the evaluative functions actualized by relational framing activities*. Normally, when we engage in relational framing we constantly evaluate, I, HERE, and NOW, events located THERE and THEN – for example, "these objects are big, small, and medium sized;" "she is nice and he is nasty;" "that is difficult, but that is easy;" "that will take a long time, but that will not;" and so on. If, however, the stimulus functions actualized by this activity are dramatically reduced, our evaluations may simply be observed I, HERE, and NOW as just thoughts or behavioral events located I, THERE, and THEN. In effect, our "normal" perception of reality is challenged when we experience our own ever-changing stream of evaluations *as* evaluations rather than as reflections of the way things *really* are. And of course, this experience of our own evaluations cannot be expressed in ordinary language without further evaluations, as "good," "bad," "weird," etc. From an RFT perspective, this inability to verbalize such an experience, without further evaluations, gives rise to the intangible and inexpressible quality of the transcendental experience. One is left, so to speak, with nothing more to say, because anything said would simply be another evaluation. Something close to this experience may happen during the exercise as you place each thought on a leaf and watch it float away down the

stream. In effect, you are learning to respond to your own "inner dialog" as neither true nor false, good nor bad, pleasant nor unpleasant, etc., – but to simply observe your thoughts as thoughts, and no more. For RFT, this is an important feature of the transcendental experience.

13.3.4. God

Having dealt with the spiritual and the transcendental, there is only one key incorporeal concept that remains for us to analyze within the framework of RFT, and that is the concept of God. The RFT interpretation of this concept draws heavily on the previous analyses of spirituality and transcendence. Recall, that for RFT the concepts of spirit and transcendence appear to be coordinated with the limitless or boundless experience of self-as-context (or more technically, the relational properties of I, HERE, NOW). In other words, there is nothing I have ever done or experienced that I know about that wasn't known in the context called I. On experiential (not logical) grounds, so far as I know I have no limits and no end. This view of spirit and transcendence in terms of self-as-context may be used to construct RFT analyses of the use of the word God in natural language (Hayes, 1984). For illustrative purposes, let us now examine the characteristics of a metaphysical God and see how this relates to self-as-context. Consider these terms that have been used to describe God.

a. Absolute, The One, Perfect Identity, Unity

I can directly experience no divisions in my own perspective. I am always I, HERE, and NOW. I do recognize, however, that others exist, so while I participate in or model ultimate unity, I don't usually claim it for myself. God's "Perfect Identity" is, in a sense, a logical extension of my own experience of myself as I, HERE, and NOW (i.e., as context or pure perspective).

b. Nothing/Everything

This more Eastern view of God is easily understandable in the same way. Self-as-context is not experienceable as a thing. Therefore, I (self-as-context) is "no thing" (the word "nothing" was originally written as "no thing"). The only events that are without edges (they are not things) are nothing and everything. Experientially, I am everything/nothing.

c. Unchangeable, Eternal, Omnipresent

Because self-as-context can hold content, but is itself not experienceable as content, there is no thing about self-as-context to change. I have experienced the world from I, HERE, and NOW my whole life. I, HERE, and NOW, in a sense, is everywhere I have ever been. The words listed are perfectly good ways of saying this. Obviously, however, I recognize logically that I do die, and change; that I am here and not there. Thus, there is a logically-induced tension that makes it difficult to accept what my

experience tells me about self-as-context. God is an entity without any such contradictions.

d. Love

When people speak of "God as love," they are referring usually to a quality of a metaphysical God of absolute acceptance. In a sense, God is seen as the context of all contexts. As described in the previous chapter, self-as-context is perfectly accepting of all content. Pain and pleasure are equally welcome. The fact that I don't like pain (and so on) is just more content that is also equally welcome. A metaphor for self-as-context might be a flat floor going in all directions endlessly. The floor will hold something ugly as well as something beautiful. Love is a reasonably good word for this in our personal lives (when someone really accepts "who we are" completely), and by extension the context of all contexts is, in its essence, loving in this sense.

What we are claiming is that the qualities of a metaphysical God can be understood as a metaphorical extension of the experienced relational qualities of I, HERE, and NOW – the constant, boundless, and limitless sense of self-as-context. If spirit is a by-product of the relational frames of perspective-taking, then a metaphysical God is yet another by-product within the framework of RFT. As an aside, this statement, and to some degree this entire chapter, might be thought by some to be sacrilegious. We are not arguing, however, that God or spirit in a religious sense does not exist independent of humankind. To the contrary, God could have created the very behavioral processes that we are describing that make spirituality knowable. The chapter is only meant to talk about spirituality within the language game we call science.

13.4. CONCLUSION

Previous behavioral analyses in the area of religion have tended to dwell on the moralizing aspects of religion, or the possible superstitious behavior that brings it about. Without the experience of our spiritual aspects (in the sense used here) such institutions may have developed anyway, but it seems their universality is more easily explained by a common original source. Learning to respond in accordance with the perspective-taking frames of I-YOU, HERE-THERE, and NOW-THEN appears to set the stage for dualism, religion, spirituality, transcendence, and God. In effect, these frames help to create a "dualism" of context and content – the context of I, HERE, and NOW and the content of I/YOU, THERE and THEN. This RFT approach thus appears to provide a naturalistic, functional analysis of spirituality and other related concepts.

Language, it has been argued, produced a "loss of innocence" in humankind. The story of Adam and Eve is perhaps a reflection of this thought. Spirituality is said by some to reestablish a kind of "experienced innocence." Like the Zen koan that asks, "does a dog have Buddha-nature?" we find that we cannot really go back, but that spirituality (self-as-context) offers one possible solution to the dilemma. By engaging in particular patterns of relational

framing activity (as illustrated in the previously described exercise), it may possible, when necessary, to weaken the analytic and evaluative functions that characterize most human verbal behavior. Engaging in these meditative forms of relational framing may allow the direct contingencies themselves to take more control. As one Eastern monk puts it "When I am hungry, I eat; When I am tired, I sleep."

In summary, then, an RFT interpretation of spirituality, transcendence, and the like suggests not only a source, but also possible maintaining contingencies for the use of such concepts in the wider language community. In line with the material presented in the previous chapter, we believe that in these difficult and perilous times there is a desperate need for a type of spirituality that will allow our behavior to come under more effective control by the direct contingencies. Relational frame theory may thus provide a good rationale for the utility of certain aspects of spirituality and transcendence, and it may also help us to design experiential exercises for generating the strange behaviors typically referred to as spiritual and transcendent. This is certainly an unexpected contribution for a scientific, naturalistic, and functional-analytic theory of human language and cognition.

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