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## **REACTIONS OF A LABORATORY BEHAVIORAL SCIENTIST TO A "THINK TANK" ON METACONTINGENCIES AND CULTURAL ANALYSIS**

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For a scientist who spends most of his time in a research laboratory studying behavior of non-human animals, participating in a "think tank" about issues such as cultural evolution and cultural change was challenging, interesting, and educational. My main focus at the "tank" was in attempting to determine what sorts of experiments are needed and are possible in attempts to understand how behavior of aggregates of individuals is established, modified, and maintained. Several participants presented excellent examples of programs that have produced impressive and societally useful changes in aggregate behavior of substantial numbers of individuals. The think tank group generally found it useful to organize what is going on in those kinds of interventions in terms of two major concepts, macrocontingencies and metacontingencies.

Macrocontingencies are individual contingencies applied directly to a large number of people. Ordinary laws and religious proscriptions are examples. Thus, the concept of macrocontingency requires conventional analyses to understand how it works. Macrocontingency simply refers to situations in which the same contingency is applied to many people. Macrocontingencies, therefore, can influence the behavior a large numbers of individuals, depending on how many of them can be subjected to the contingency. In contrast, the concept of metacontingency contains many more subtleties. A metacontingency (See Glenn, 1988) refers to what are called an "interlocking" set of contingencies for a group of individuals, such that particular individuals are not exposed to the same contingencies, but to different ones. The behavior established and maintained by contingencies for one person dictate contingencies for other persons. The result of the interdependent contingencies that participate in a metacontingency is a particular outcome that serves to keep the interlocking contingencies interconnected. A small-scale example of a metacontingency can be found in a corporation in which people play different interdependent roles, the common outcome of which is the product the company produces. The success of the

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product in the marketplace determines if the set of contingencies, and thus the behavior engendered by them, continues. At a larger scale, metacontingencies can be abstracted from cultural activities and are thought to play a role in the evolution of cultures. The metacontingency concept is consistent with speculations about how the environment has played a role in the selection of cultural practices (e.g., Diamond, 1997; Harris, 1989).

It can be argued effectively that macrocontingencies and metacontingencies both provide useful views of how cultural practices develop and are maintained, so they are concepts worthy of analysis. At issue is how that analysis is best accomplished. One approach, of course, is to attempt to arrange macro- or metacontingencies, and see what happens (e.g., Erickson, Mattaini, & McGuire, 2004).

Arranging macrocontingencies is relatively simple, at least in principle. For example, by getting an ordinance passed, one could greatly increase the fine (or jail sentence) for selling tobacco cigarettes to minors. That contingency would be applied to all who sell cigarettes, so the contingency would be widely in effect (to the degree it could be enforced) and presumably change the behavior of many individuals. In addition, it would likely have a cascading effect in resulting in a macrocontingency for underage smokers. Specifically, extinction of behavior allocated to purchasing cigarettes would be in effect. That contingency would be in effect for many more people than the original contingency on the behavior of sellers. Macrocontingencies, therefore, can have very widespread effects.

Arranging metacontingencies is more difficult. In fact, in most cases it seems unlikely that control could be gained over, for example, an entire market so that whether a certain product is successful or not could be experimentally controlled. Research on metacontingencies, as a consequence, has focused on attempting to identify some of the interlocking contingencies “inside” the presumed metacontingency so that those contingencies can be altered in such a way that the overall contingency is modified. For example, one might alter contingencies for someone in the marketing department of a corporation, and then observe what happens to the behavior of the individual, the behavior of other individuals whose contingencies are affected by marketing decisions, and the overall success in sales.

From an experimentalist’s (or at least this experimentalist’s) view, both metacontingencies and macrocontingencies involve behavioral processes that are currently poorly understood. Inadequate understanding is an invitation to research, and that will be the focus of the remainder of this article.

Three key interrelated areas of research are clearly related to understanding how meta and macrocontingencies exert their effects. Those three areas deal with

understanding verbal regulation of behavior, understanding social interactions, and understanding how effects of experience cumulate across one's life. The areas are related because verbal regulation of behavior depends on social processes, many social processes involve verbal regulation, and both result from cumulated experience. Despite their intertwined nature, however, I shall treat the three domains separately. My goal is to provide a broad outline of the questions about these processes that could drive future research.

Verbal regulation of behavior, often referred to as rule-governed behavior, is an essential component of interactions among humans. Unfortunately, very little is known about how it develops and is maintained. Many macrocontingencies involve verbal regulation. In the example above about selling cigarettes to minors, a good deal of the control of seller behavior would be via verbal regulation. That is, sellers would be informed, usually in writing, of the new ordinance, and their behavior would likely change without ever having been exposed to the new consequences. Verbal regulation most likely plays a key role, at least in the interlocking contingencies for individuals in a metacontingency. For example, many cultural practices, e.g., religion, are based heavily on verbal regulation.

Verbal regulation is obviously of social origin. Because only humans exhibit verbal behavior and verbal regulation, ethical considerations make it very difficult, if not impossible, to carry out experiments that identify and manipulate variables responsible for the development of speaker's and listener's repertoires. It is also obvious that verbal regulation plays a very large role in human behavior. Clearly, that role has been positive overall to this point in human evolution, having played a key role in the development, for example, of modern culture and modern science. Verbal regulation, however, is not without its negative effects. In fact, it may turn out that verbal regulation is a fatal adaptation for the human species. Consider the role that verbal regulation plays in international relations, in post-modernist accounts of science, in fundamentalist religion, in the "intelligent design" debate, and in politics, just to cite a few examples. In those cases, the correspondence between verbal regulation and reality is not particularly close.

Another interesting area of research ripe for investigation by behavior analysts lies in the domain of propaganda. What makes propaganda effective? What are the roles, if any, of Pavlovian processes (i.e., those tied to emotions) in making verbal regulation more or less effective? It is well known that Pavlovian processes can influence the effectiveness of already established reinforcers (e.g., Colwill & Rescorla, 1990). Is rule-governed behavior more resilient if its social reinforcers have been influenced by Pavlovian processes?

One thing that seems certain is that the development and maintenance of verbal regulation depends mainly on social consequences. A fertile area for

research therefore is one that increases understanding of such consequences. Are they mainly conditioned reinforcers? What variables influence their effectiveness? This is a crucial area for increased understanding.

The fact that many social reinforcers appear to be conditioned reinforcers may help us to understand why such consequences have substantial effects. Recent research by Shahan and Podlesnik (2005) showed that behavior maintained by conditioned reinforcement was considerably *more* resistant to disruption than comparable behavior maintained by unconditioned (primary) reinforcement. Resistance to disruption has become a widely used measure of “response strength” (Nevin, 1992; Nevin & Grace, 2000), so it may be, counterintuitive though it may be, that conditioned reinforcement can establish responding that is more difficult to change than behavior controlled by primary reinforcement. Additional research on variables that determine the effectiveness of conditioned reinforcers therefore could provide valuable knowledge related to verbal regulation.

Another important area of research, scarcely touched by behavior analysts, is the behavior of groups. Little is known, for example, even about the simplest of groups, those involving only two people (or other species). The concept of metacontingency rests on the notion of interlocking contingencies, so analyses of social interaction seem essential if advances are to be made in understanding how interlocking contingencies influence behavior.

Relevant both to understanding verbal governance and social interactions is another field of research not much studied by behavior analysts (or any other behavioral scientists, for that matter), specifically, how effects of experience cumulate. In keeping with the analogy from natural selection, a person’s complex behavioral repertoire can be conceived as a result of the cumulative operation of basic operant and Pavlovian conditioning processes (Donahoe & Palmer, 1994). Certainly, verbal regulation depends on a long cumulation of effects of experiences that establish speaker’s and listener’s repertoires.

There has been a modest amount of basic research on how history with one set of contingencies interacts with a subsequent set (e.g., Wanchisen, Tatham, & Mooney, 1989), but very little on how behavioral history builds on itself. Of course, research on shaping (e.g., Eckerman, Heinz, Stern, & Kowlowitz, 1980; Pear & Legris, 1987) falls into this category, as does preliminary training to establish behavior under intermittent reinforcement, but there remains precious little systematic research.

Of course, it is unlikely that research on verbal regulation, social processes, and how effects of experience cumulate can ever get to the point where a complete account of effects of macrocontingencies or metacontingencies is at

## BRANCH

hand. Such research, however, should help to provide a firm empirical base for understanding and employing such contingencies. There may well be “emergent” phenomena that arise when macro- or metacontingencies operate, but basic research in the three domains suggested here could make at least two important contributions to understanding macro- and metacontingencies. One, results of such research would set constraints on the speculations about how the larger scale contingencies operate. That is, just as principles of physiology set limits on behavioral theorizing, principles relevant to social control would set limits on what can be said about large-scale contingencies. Two, it is only with understanding of basic social processes that one can determine if there are truly “emergent” phenomena at the level of larger aggregates.

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