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THE IMPACT OF APPLIED BEHAVIOR ANALYSIS ON THE SCIENCE OF BEHAVIOR

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ABSTRACT: Applied behavior analysis is increasing in popularity within the culture at large, the result of which has involved several socio-political developments in the field. This paper provides an overview of J. R. Kantor's description of applied subsystems, as described in his text *Interbehavioral Psychology* (1958). In particular, the verification and exploitation aspects of applied subsystems are highlighted. The implications of this perspective for the discipline of behavior analysis are reviewed, and specifically, the dangers associated with an over-emphasis on application within the discipline are described. It is argued that adopting a systemic perspective highlights possible problems that may emerge within applied subsystems, whereby the development of such problems might be prevented or their impact made less severe.
KEYWORDS: system building, applied behavior analysis, domains of behavior analysis, interbehavioral psychology, interbehaviorism

Behavior analysis is a unique discipline when compared to other approaches in psychology. Most prominently, behavior analysis attempts to remove hypothetical constructs from explanations of behavior (Skinner, 1953, 1971). This aspect of behavior analysis is particularly salient, as other approaches to the subject-matter rely on constructs that have no referent in the event matrix of the natural world (e.g., the mind, cognitive structures, unconscious motivations, inherent personality). In this regard, behavior analysis aims to be a *natural science* of behavior.

Another unique aspect of behavior analysis is the relationship between the philosophical, basic, applied, and service delivery domains of the enterprise (Moore & Cooper, 2003). That is, behavior analysis is coordinated as a scientific

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discipline, where all of the above domains are interrelated and influence one another. Importantly, such coordination and mutual influence can be difficult to achieve, especially as progress is made in each of the respective domains. In fact, behavior analysts have long been concerned with such a schism developing between the experimental and applied domains of behavior analysis (e.g., Elliot, Morgan, Fuqua, Ehrhardt, & Poling, 2005; Poling, Picker, Grossett, Hall-Johnson, & Holbrook, 1981). Moreover, it is well known that an emphasis on application has been emerging in recent years (e.g., Twyman, 2007). The proliferation of certification programs in applied behavior analysis attests to the fact that the applied domain is thriving, and further, that applied behavior analysis is found to have value in the culture. Behavior analysis has longed for public recognition, and indeed, it seems as though such recognition has arrived—in the applied domain at least. No doubt this is a good thing. However, the applied domain also carries several inherent issues with it that may compromise its ultimate contribution to the overall discipline of behavior analysis and impact the enterprise more generally.

In this brief commentary I will review J. R. Kantor's (1958) description of applied subsystems. I do so because there are several important messages in it, some of which might be helpful for behavior analysis as it continues to grow as a comprehensive scientific enterprise.

Applied Subsystems

Kantor refers to the applied domain as a "subsystem" (1958, p. 157), and this terminology may seem somewhat unconventional to those unfamiliar with the interbehavioral perspective. Interbehaviorism views disciplinary sciences as scientific *systems*, and thus, particular components of the overall system are referred to as "subsystems." This is the case for the interpretive, investigative, and data subsystems, for example. Importantly, these subsystems are viewed as having equal importance and participatory status in the overall system. Organizing scientific disciplines in this way reduces the likelihood that certain aspects of the system will overshadow or undermine other aspects (see Fryling & Hayes, in press; Hayes, Dubuque, Fryling, & Prichard, 2009). For example, characterizing the applied domain as a subsystem might underscore that it is indeed related to a more overarching system, comprising various philosophical assumptions, definitions, and more. Moreover, when sciences are characterized this way value is given to all of the participating subsystems, and thus, attention to areas that may otherwise seem less important (e.g., philosophical development) is never questioned.

Kantor's (1958) description of the applied subsystem is the focus of this brief commentary. Again, it is now well known that the applied domain comprises the vast majority of the work pursued in behavior analysis, and because of this specific attention to systemic issues related to the applied subsystem seems warranted. Furthermore, as Kantor puts it "applied psychological subsystems present several unique problems" (p. 157). Therefore, it is the goal of the current commentary to highlight these issues and describe their relevance to the science of behavior.

Challenges Facing Applied Subsystems

As I have mentioned, applied subsystems are just like other subsystems in many regards. They are participants in the larger scientific system, and are interrelated with those other subsystems. At the same time, however, *applied* subsystems have some unique features that can present a number of challenges. For one, applied subsystems are "intimately related to practical manipulation" (Kantor, 1958, p. 157), and this factor can make it difficult to organize the applied domain. Put differently, practical circumstances tend to exert more influence over work conducted in the applied realm relative to other areas, and thus, idiosyncrasies unique to settings, classes of behavior, and more tend to make coordination a difficult task. Related to this, particular applied areas may vary from one another (e.g., education and psychotherapy), making their relationship to the overall system less clear. An example of this in applied behavior analysis is the functional analysis methodology developed and popularized by Iwata, Dorsey, Slifer, Bauman, and Richman (1982/1994), which does not easily map on to problems faced by workers in organizational behavior management (see Austin, Carr, & Agnew, 1999). Third, because applied subsystems are so closely related to practical circumstances, it is not surprising that non-scientific factors might overly influence the work pursued (Kantor, p. 157). For example, a range of applied research is pursued for cultural and/or socio-political purposes (e.g., making staff training less costly), which may distract from the more scientific aspects of the applied domain. To better understand these issues I will now describe the two primary functions of applied subsystems: verification and exploitation (Kantor).

Verification

From Kantor's (1958) perspective, one of the main roles of the applied subsystem is verification. In this sense the applied domain provides an examination of the system more generally, *verifying* principles and theories developed in other areas of the system. In this regard the difference between basic

and applied science is not apparent. Specifically, because both research endeavors are aimed at understanding processes, and only differ by context, both are closely related to one another. Nonetheless, Kantor (p. 158) specifies that the verification role of applied subsystems is distinct from exploitation. Specifically, verification involves the "discovery and investigation of novel events" (Kantor, p. 158), and moreover, contact with such events serves to continuously evaluate the validity of theories, definitions, and postulates of the system more generally (p. 158). In other words, verification serves not only to validate work conducted in other areas of the system, but, to the extent that such verification is pursued in novel circumstances of the applied sort, this type of work may also foster discovery and help to continuously evaluate the disciplinary system more generally.

Exploitation

A more obvious role of applied subsystems is to produce results that might be utilized by the general public. Unlike other areas of science, the applied domain involves the specific aim of producing knowledge that can be consumed by the culture for the purposes of improving the quality of life of its members. However, so powerful is the demand for this that it can tend to overtake the entire enterprise. As Kantor puts it, "hardly avoidable is the extreme situation in which the utility motive dominates the scientific scene" (1958, p. 158). When the utility agenda is dominant it impacts multiple aspects of scientific work, and can even alter the very philosophical foundation of scientific enterprises. When exploitation dominates it restricts the scientific enterprise through the "loss of 1) freedom of research and 2) the regulation of scientific work by events" (Kantor, p. 158). In other words, when the utility agenda dominates, scientific work is no longer guided by the interests of the scientist and the aspects of the subject matter that remain to be understood, but rather, by the practical problems of the culture.

Implications for Behavior Analysis

As I have mentioned, it is now well known that behavior analysis is a scientific discipline gaining popularity for its applied efforts. Few would argue with the observation that applied, cultural circumstances set the stage for much of what is being learned in the field. Added to this, the certification of practitioners in behavior analysis has involved the development of a number of new considerations.[2] For example, the extent to which practitioners require expertise or even familiarity with all of the domains of behavior analysis is frequently

[2] Note: I do not make a sharp distinction between application, applied research, and applied practice, as others have done (Moore & Cooper, 2003).

debated, as well as the extent to which practitioners are trained to employ practical strategies to improve the quality of life for particular populations and classes of behavior. Furthermore, there are now organizations that have the primary aim of supporting providers of behavior analytic services. Thus, we can easily acknowledge that practical circumstances have a rather large and growing role in the science of behavior.

Success in the applied domain is a good sign. Indeed, to the extent that behavior analysis is a natural science, it seems likely to have an impact on concrete happenings. Success in this domain affirms that the discipline is one which is valued by the culture, and moreover, that our philosophy and basic principles have the utmost relevance to practical affairs. Still, given Kantor's description of applied subsystems, extensive growth in this area might also be reason for concern, at least when one considers the comprehensive scientific enterprise as a whole.

Assuming a systemic perspective, an obvious concern with the extensive success in the applied subsystem is the possible undermining of other aspects of the system. As the culture begins to appreciate the practical aspects of the applied domain, those aspects may tend to be the focus of education and scholarship in behavior analysis, particularly for those programs aimed at training applied researchers and practitioners. Still, what is to be made of the rest of the disciplinary system in these circumstances? What value do the practices of applied behavior analysis have in the absence of the philosophy and basic science from which they emerged? Moreover, given the extent to which mentalism thrives in the culture and in most perspectives on behavior, it seems critical that applied researchers and practitioners have an understanding of the theory and philosophy underlying behavior analysis. In other words, if such workers are to have any chance of guarding themselves from the pervasive presence of mentalism in the culture an understanding of behavioral philosophy and theory seems essential. Worse, if philosophy and theory were to be overlooked, what may be the ultimate difference, overtime, between the practice of applied behavior analysis and lay approaches to improving the human condition? Clearly, there are substantial issues to consider when the practical agenda begins to be overemphasized.

In addition, Kantor (1958) has suggested that the applied subsystem also has a verification role; to examine processes discovered in other circumstances, and to the extent that these investigations are pursued in novel situations, to further the understanding of novel events. As Kantor suggested, to the extent that this occurs applied science is not separated from basic science. In other words, both are examining novel events and aiming to understand behavioral processes. When the applied subsystem participates in the discipline in this manner it *adds* something

to the overall system, whereby the information gathered in the applied subsystem might foster further consideration and refinement of basic processes, definitions, and fundamental philosophical assumptions. Participating in this manner would obviously require an orientation to those basic processes, definitions, and fundamental philosophical assumptions, however. Again, were these areas of the discipline to be overlooked or undervalued, such participation would become less and less likely.

Kantor's (1958) description of the exploitative role of applied subsystems also has implications for the science of behavior. Again, two issues become apparent when exploitation dominates scientific systems. First, there is a loss of freedom for researchers. In this sense researchers may be encouraged to conduct research that pertains to certain cultural problems or issues, rather than pursue their own research interests. For example, in behavior analysis various applied workers may be encouraged to do work relevant to special populations (e.g., autism spectrum disorders), partly due to the intense demand for this information from the culture at large. In fact, many employment opportunities in applied behavior analysis encourage or even require such specialization. Interestingly, while behavior analysts have much to offer the culture more generally, (e.g., pediatrics, gerontology, behavioral safety) relatively fewer behavior analysts do research in these areas. Second, exploitation might reduce the extent to which research questions are based upon unknown aspects of the subject matter, ultimately leading to scientific work being controlled by cultural factors and less by aspects of the subject matter. To the extent that a schism exists between the basic and applied domains of behavior analysis, one surely has to wonder if unique factors in the applied subsystem are contributing to it.

Comments About the Future

Given the unique features of behavior analysis, including it being a natural science approach that does not involve dualistic constructs, the dangers of the applied subsystem may be especially concerning. More specifically, to the extent that growth in the applied domain increases the probability that cultural factors will influence scientific work, and that those cultural factors are almost entirely mentalistic in nature, the entire aim of the discipline could be at risk. In this regard emphasis on our philosophical and theoretical foundation seems critical, perhaps *especially* for those who will be working primarily in the applied subsystem as both researchers and practitioners. To this end, failing to fully appreciate the philosophical foundation of behavior analysis in training programs will only further increase the probability that the products of such programs will be ill-prepared to employ a natural science of behavior in their work, especially in

a world full of dualism. Further, behavior analysis is unique because coordination among the various domains is explicit; applied behavior analysis developed out of behavior analytic theory and basic research on behavioral principles. Applied behavior analysis does not exist on its own, independent from this context. Therefore, to the extent that Kantor's perspective is explicitly *systematic*, that the applied domain is indeed a *subsystem*, the fact that applied work *participates* in a larger system, of which philosophy, basic investigation, definitions, and other areas also participate, is emphasized. Put differently, a systemic perspective reduces the probability that any one aspect of the system will overshadow others or dominate the system. If behavior analysis values being a naturalistic approach to behavior, and also one which places value on philosophy, basic science, application, and practice (e.g., Moore & Cooper, 2003), then Kantor's perspective seems to be one which would be useful for behavior analysts to consider.

My goals in this brief commentary were to describe Kantor's perspective on the applied subsystem, highlight the systemic perspective embraced by interbehaviorists, and describe some potential implications of this perspective for behavior analysis. I am certainly not an expert in all of the political issues pertaining to the applied domain in behavior analysis. However, I do hope that my comments have highlighted the fact that they are indeed *political* issues, and perhaps products of the unique features of the applied subsystem. Indeed, the very presence of such issues is an indication of the unique challenges of the applied subsystem. I am an advocate for the entire discipline of behavior analysis, including the applied domain. Thus, the above-mentioned dangers are concerning, and I mention them to increase our awareness of them such that their development might be mitigated to the extent possible. The interbehavioral perspective has a tremendous amount to offer the discipline of behavior analysis, especially when one appreciates the unique features and aims of behavior analysis as a comprehensive scientific enterprise.

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