

Mitch J. Fryling, Linda J. Hayes

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## THE CONCEPT OF FUNCTION IN THE ANALYSIS OF BEHAVIOR

### *EL CONCEPTO DE FUNCIÓN EN EL ANÁLISIS DE CONDUCTA*

MITCH J. FRYLING AND LINDA J. HAYES

UNIVERSITY OF NEVADA, RENO

#### Abstract

The concept of function is central to the discipline of behavior analysis; it serves to characterize the subject matter of the science and is also used to distinguish behavior analysis from other approaches in psychology. In this commentary we assess the concept of function as it is used within behavior analysis. This is done through the perspective of interbehaviorism, with attention to implications for the validity and significance of behavior analysis as a scientific system. Problems are identified, and an alternative is proposed. Finally, the implications of the adoption of this alternative are reviewed.

**Keywords:** System building, interbehaviorism, function, behavior analysis, subject matter.

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Authors contributed equally to the development of this conceptual investigation. Parts of this paper were presented in 2008 at the annual meeting of the Association for Behavior Analysis International, Chicago, IL. Direct correspondence to Mitch Fryling at Department of Applied Behavior Analysis, The Chicago School of Professional Psychology, 617 W. 7th St., 8th Floor, Los Angeles, CA 90017. Email: mfryling@thechicagoschool.edu or to Linda Hayes, Department of Psychology/296, University of Nevada, Reno, Reno, NV 89557. Email: lhayes@unr.edu

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## Resumen

El concepto de función es central para la disciplina del análisis de conducta ya que sirve para caracterizar o describir su tema de estudio científico y también se utiliza para diferenciar el análisis de conducta de otras aproximaciones psicológicas. En este comentario consideramos el concepto de función como se utiliza al interior del análisis de la conducta. Esto se hace a través de la perspectiva interconductista con atención a sus implicaciones para la validez y para el significado del análisis de conducta como sistema científico. Se identifican los problemas y se propone una solución alternativa. Finalmente se someten a examen las implicaciones adoptadas en esta alternativa.

**Palabras clave:** Construcción de sistema, interconductismo, función, análisis de conducta, tema central.

Semantic supervision is a critical task for workers in the philosophy of science (Kantor, 1969). Kantor has suggested that scientific enterprises must strive towards both validity and significance (1958, p. 50), where validity pertains to internal consistency and coherence, and significance to external consistency within the larger field of the sciences. The consistent use of terms is central to the achievement of both of these goals. This is especially so when terms are fundamental, as when they refer to the events comprising the subject matter of particular scientific disciplines.

Consistency is assured by precise definition. Precise definition is even more important when technical terms are part of the non-technical vocabulary, as the events to which terms refer in ordinary talk, their non technical meanings, tend to insinuate themselves, as referents of the same terms in a technical context. The problem of attachment of non-technical meanings to technical terms is recognized when neologisms are developed to avoid such transfer (e.g., mand, tact). This solution is not always possible or practical, however. Where this is the case precise definition is called for.

The problem of inconsistent usage of a central term in behavior analysis, where the inconsistencies are a product of attachment of ordinary or outdated meanings, is observed in present the case of the term "function" and its derivatives. In this brief commentary we review the concept of function in the analysis of behavior.<sup>1</sup> In doing so, we consider implications for the validity and significance of behavior analysis as a scientific enterprise. Finally, we propose an alternative to avoid further internal confusion and compromised scientific significance.

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<sup>1</sup> Importantly, many of the issues reviewed in this paper are central to the discipline of behavior analysis, and others have commented on them (e.g., Chiesa, 1992; Moore, 2000).

### The Problem

The concept of function has a long and varied history in behavior analysis. Early on, Skinner suggested the term be used as a replacement for old cause-and-effect terminology. As Skinner put it “The terms “cause” and “effect” are no longer widely used in science. They have been associated with so many theories of the structure and operation of the universe that they mean more than scientists want to say.” (1953, p. 23). At the same time, those very same, outdated cause-and-effect ways of thinking seemed to be attached to the concept of function. The following quotes illustrate such an attachment: “The external variables of which behavior is a function provide for what may be called a causal or functional analysis” (1953, p. 35); “What is lacking is a satisfactory causal or functional treatment” (Skinner, 1957, p. 5). In other words, the terms functional and causal are used as synonyms, rendering the proposal that function is something different from cause to be meaningless. Thus, while Skinner aimed to replace outdated ways of thinking, he seemed to embrace those very ways of thinking with another term, that being function. Given Skinner’s suggestion that we move beyond old cause and effect ways of thinking, such a practice represents opportunities for misunderstanding and confusion at best and serious trouble at worst.

The influence of causal ways of thinking has had a particularly large impact on the investigative and applied domains of behavior analysis. For example, the functional analysis movement has made great use of Skinner’s conceptualization of function as synonymous with cause (see Hanley, Iwata, & McCord, 2003). Indeed, functional behavioral assessment is a general phrase used to describe practices aimed at obtaining information regarding the causes of behavior. Three general practices fall within the purview of functional behavioral assessment: a) indirect assessments (e.g., interviews), b) direct observational/descriptive methods, and c) experimental/functional analysis procedures (Cooper, Heron, & Heward, 2007). Interestingly, only the latter is given the status of demonstrating cause-and-effect relations, and is considered the gold-standard for demonstrating function. While a thorough review of this literature is far beyond the scope of the current commentary, the point is that the concept of function as cause has had a large impact on the applied literature.<sup>2</sup>

The term function is also attached to ordinary meaning, as when it is used to refer to the purpose or utility of something. A common example of this is the popular applied treatment package functional communication training (e.g., Carr & Durand, 1985). Here, an appropriate behavior which serves the same function (i.e., purpose

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<sup>2</sup> It is important to note that the phrases “reason why behavior occurs”, “purpose of the behavior”, and “identification of the controlling variables” are all used at various times by workers in the functional analysis literature. Each of these phrases seems to embrace the idea that a functional analysis is aimed at discovering the causes of behavior.

or utility) as the identified problem behavior is targeted for intervention. A similar attachment is observed with the phrase “functional skills” and the like, as is particularly common in the autism and developmental disabilities literature. The functional contextualism movement represents yet another use of the term function as synonymous with utility or purpose. In fact, functional contextualism has utility as its “truth” criterion, and is explicitly organized around this goal (e.g., Hayes, 1993). Interestingly, in these cases it is not clear whether the issue at hand is conceptual in nature or if it pertains more to the use of the term by workers in the field, and it seems plausible that the latter may be a product of the former. Either way, the important point here is that the term has been associated with both outdated ways of speaking (cause-effect) as well as non-technical or ordinary meanings of the word.

The term function is also used to describe various conceptual relationships in behavior analysis. For example, stimuli are said to have discriminative, evocative, eliciting, and reinforcing functions (e.g., Michael, 2004). While all of these relations are similar in that they are observed correlations, they are interestingly not all given the same status within the enterprise. For instance, discriminative stimuli are said to “set the occasion” for responding, whereas reinforcers are said to have a more powerful, causal role. In fact, discriminative stimuli are said to depend upon reinforcers for their functional status. This is to say, some stimuli have more powerful/causal roles than others, although such causality is never actually observed (see Hayes, Adams, & Dixon, 1997 for further discussion). The point here is that even with respect to our own technical vocabulary in behavior analysis, function is used in inconsistent and outdated ways, both of which threaten the validity of behavior analysis as a scientific enterprise (see Parrott, 1983 for a more detailed discussion of these issues).

Given the centrality of the concept of function in behavior analysis, it is interesting that the term is used in such a wide range of ways. As we have described, the term is attached to both ordinary and outdated meanings, despite Skinner’s explicit aim to avoid causal ways of thinking. This sort of inconsistency can only result in confusion within the discipline, the implications of which may be more or less serious at different times. Thus far we have primarily focused on systemic issues regarding the concept of function in the analysis of behavior, however, meta-systemic problems are also apparent, and it is to these issues that we now turn.

### A Bigger Problem

The sciences are differentiated by the events isolated by each for their special study (see Hayes & Fryling, 2009a, 2009b; Kantor, 1953). The sciences are the same, however, in that what they study are relations among events. It is for this reason that mathematics, the science of relations (without regard to the events participating in them) is interdisciplinary in nature (Kantor, 1958). Relations are unitary phenomena, which is to say the factors participating in a relationship are not distinguishable parts

(except for analytical purposes). That is, relationships are events themselves, and their parts do not comprise the subject matter of any science. There are two broad types of relations relevant to the term function in behavior analysis.

Types of relations:

a) Dependency relations are uni-directional:  $R=f(s)$  but  $S\neq f(R)$ . Dependency relations are investigative constructions. They constitute abbreviated descriptions of happenings for practical purposes, namely prediction and control. Causal relations are dependency relations. There are no effects without causes.

b) Functional relations are bi-directional.  $R=f(s)$  and  $S=f(R)$ . Functional relations are interpretive constructions. They constitute descriptions of happenings (for explanatory purposes). The factors participating in a functional relation are absolutely equivalent. That is, there is no cause and no effect.

In mathematics, a line is a functional relation in which the variants  $x$  and  $y$  are absolutely equivalent. However, in behavior analysis, the noun function frequently refers to relations of the dependency type. Indeed, this is seen throughout popular writings in behavior analysis, as when a change in the independent variable corresponds to a change in the dependent variable is said to represent a functional or causal relationship (see above comments on cause-effect ways of thinking). So important is this to the discipline of behavior analysis that it is often used to criticize other approaches in psychology (e.g., Schlinger, 1995). The pervasive aim of understanding dependency relations in behavior analysis is not surprising, however, as behavior analysis places a relatively strong emphasis on the prediction and control of behavior (see Delprato & Midgley, 1992; e.g., Skinner, 1953).<sup>3</sup>

Confusion occurs when the use of investigative constructs is expanded beyond the investigative domain to characterize events in a broader context. This occurs within individual sciences as well as in the domain of the sciences more generally. In behavior analysis, investigative constructs (e.g., dependency relations) are confused with interpretive constructs. More specifically, the goals of a particular subsystem, namely the investigative subsystem, are confused with the goals of the entire enterprise. Again, this may be particularly common when subsystem goals, such as those of prediction and control are overemphasized within individual sciences. Unfortunately, the result of this practice is a relative lack of appreciation for the other aspects of scientific systems.<sup>4</sup>

Added to the above concerns, dependency relations (e.g., causal relations) are not suited to effective interdisciplinary work because their effect is to suggest that the subject matter of one science depends for its existence (as an effect) on the

<sup>3</sup> Morris (1992) has suggested that declaring the focus of behavior analysis to be "prediction and control" is an example of our discipline being "economical to a fault", and suggests that our goal be re-interpreted as understanding.

<sup>4</sup> Interbehaviorism is unique in its explicit distinction between constructs and events (see Kantor, 1957; Smith, 2007; and Fryling & Hayes, 2009, for more on this distinction).

events of another (the cause)-given that there are no effects without causes. This is the basis fallacy-reductionism, which undermines the “seriousness” characteristic of the sciences which distinguishes them from other human enterprises (Kantor, 1953, p. 6; Observer, 1969; see Hayes & Fryling, 2009a, 2009b for a more elaborate discussion of these issues).

While our concerns are serious, none of this is to say that the investigative methods and procedures derived from the term function and the employment of dependency relations in behavior analysis has not been useful. In particular, the experimental and applied domains have benefited tremendously from procedures and practices derived from the term. For example, the movement away from the traditional focus on the topography of behavior has revolutionized assessment and treatment practices in applied behavior analysis (see Hanley, Iwata, & McCord, 2003). However, even within these domains some problematic side-effects are found. For example, it is not uncommon to encounter behavior analysts who purport to have found the function of problem behavior, often times overlooking the complex, interrelated field within which such problem behaviors occur. That is, dependency relations can lead workers to assume that behaviors have a cause, that they are dependent on something, which, when found, can dominate the focus of intervention efforts. We briefly mention this to highlight the fact that this is not merely a conceptual or philosophical issue; practical implications abound.

If behavior analysis is concerned with validity and significance, as we argue it should, clarification is needed. Within our discipline, the concept of function is used in a variety of ways, some of which are a product of attachment to ordinary uses of the term (e.g., utility), and others a result of attachment to outdated ways of thinking (cause-effect). Indeed, so tightly do behavior analysts embrace cause-effect ways of thinking, that they use it to distinguish behavior analysis from other perspectives in psychology. This is to say, behavior analysis is said to be able to demonstrate “cause”, whereas others aren’t. Of course, cause isn’t actually a thing that can possibly be observed (see Hayes, Adams, & Dixon, 1997). That is, all we can observe are relations, and if we consider some relations to be more powerful than others, this power is not derived from the observed events, but rather, from the larger cultural milieu (Kantor, 1950, 1953). Thus, not only is inconsistency present, but such inconsistency seems to be plagued with outdated assumptions, assumptions that our founders explicitly aimed to avoid.<sup>5</sup> This can only result in confusion and impact our ultimate productivity. Moreover, the significance of behavior analysis as a discipline also seems to be impacted by our idiosyncratic use of the term function. Indeed, other disciplines (e.g., mathematics and biology) seem to use the word in different ways, and while there may not be a way that other sciences use the term, we can at

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<sup>5</sup> Our point here is that all perspectives, including behavior analysis, only observe correlations; what is unique about behavioral approaches is that the environmental side of the correlation can be manipulated, whereas both structural and hypothetical constructs, often inferred in other areas of psychology, cannot.

least say that the attachment of outdated ways of thinking seems to be particularly troublesome. Given these concerns, it seems that an alternative is needed.

### A Solution to the Problem

Interbehaviorists have long pointed out the peculiar and problematic use of the term function in behavior analysis (e.g., Kantor, 1970; Parrott, 1983), and with lingering notions of causality more generally (Hayes, Adams, & Dixon, 1997; Kantor, 1950). Closely related to this, interbehaviorists do not make the traditional distinction between description and explanation. Rather, explanation is viewed as a more elaborate form of description; and thus not viewed as something that demonstrates more powerful, causal relations (Kantor, 1953, pp. 33-34). Thus, we advocate for the use of the term function in a purely descriptive sense, one that refers to an observed relationship, for example, between stimulation and responding. Importantly, this is similar to the use of the term in other disciplines (e.g., mathematics). In this sense, behaviors don't "have a function", they are functions; they are interbehaviors. It is for this reason that interbehaviorists conceptualize the subject matter of psychology as an interaction (sf<- ->rf), and the reasons for, and implications of this practice certainly aren't trivial. Moreover, the sf<- ->rf interaction is a participant in a multi-factored field, with all of the participants having equal status. That is, when one factor is manipulated it is the entire field which is altered. The relationships between setting factors, stimulation, responding, interbehavioral history, and media of contact are interrelationships, that is, they are all best described as interactive participants. When the term function is more explicitly descriptive of an observed relationship the likelihood of overlooking the multi-factored, interrelated field is reduced. In other words, this use of the term function allows for the analysis of what interbehaviorists refer to as multi-factored fields (Delprato & Smith, 2009; Kantor, 1958; Smith, 2006). It is our perspective that the interbehavioral field should be the subject matter of a natural science of behavior.

If the interbehavioral field were to become the subject matter the "independent" variables would remain the same; that is, we would still manipulate some aspect of that field and measure the extent to which it reconfigures the field by measuring another aspect of the field. What is important is that we would never attribute causality to one factor, and that we would acknowledge that it is always all factors which are participatory. Thus, rather than "stopping at the cause", we might continue to pursue a more thorough understanding of all of the participants in psychological events. The field wouldn't impede a meticulous analysis; in fact, it would require that such a meticulous analysis be even more thorough, more considerate of every factor participating in psychological happenings.<sup>6</sup>

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<sup>6</sup> Related to this, investigative constructs are acceptable in the context of investigation (Kantor, 1958; Fryling & Hayes, 2009), but they are not to be confused with the subject matter more generally.



At the same time, many behavior analysts seem to be acknowledging the interdependent nature of the subject matter. This is seen with the increased focus on history, setting factors, and context more generally within the analysis of behavior. This is to say behavior analysts seem to be moving toward the conclusion that behavior doesn't have a cause, that it is interrelated with everything in the organism's history and present context, all of which constitute the organism's present psychological field (see Hayes, 1992).

We acknowledge that some may interpret Skinner's system in a manner that is somewhat consistent with the interbehavioral approach. However, the fact that it may be interpreted in this way is precisely the problem. That is, it may not be. Indeed, it has been acknowledged that Skinner's system requires some "unpacking", and in fact, when it is so unpacked, the end result looks rather similar to that of interbehaviorism and interbehavioral psychology (see Morris, 1992). Unfortunately, this practice results in the dismissal of the unique features of interbehaviorism, and with it, the need to consider it altogether. We do not encourage such practices.

Nevertheless, what can be agreed upon is that there is reason for concern, regardless of why such concern is said to exist. At the same time, the field is clearly beginning to embrace a more integrated field-orientation. While this is a good sign, conceptual issues abound while we move in this direction. The power of the interbehavioral alternative is that its philosophical assumptions are clearly articulated, they are made explicit; they are not implicit assumptions, waiting in the darkness to emerge. Therefore, there is much less opportunity for misunderstanding and misinterpretation along the way. In fact, so explicit are these relatively less ordinary assumptions that workers in behavior analysis and psychology in general seem to have a difficult time appreciating the interbehavioral position. In other words, the clarity of interbehaviorism, in combination with the culturally bound assumptions of scientific workers, may make the position a challenging one to understand, at least for some. However, given the importance of these issues, we urge readers to consider the value of the interbehavioral position. The concept of function is central to the enterprise of behavior analysis, and thus warrants careful consideration and clarification. It is our hope that such clarification will only strengthen behavior analysis as a scientific enterprise. It again seems as though Kantor has "always been there first" (Moore, 1987), perhaps it is time we meet him there.

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