Behavior analysts take the position that prediction and control constitute the goals of science. This assumption has resulted in descriptive operations being overlooked and misunderstood. Among the most serious of these misunderstandings is the confusion of events with descriptive constructions. Confusion is likely when the events described present problems of observation, when they appear to resemble our descriptions of them, and when they are taken to be synonymous with our reactions to them. Examples of confusing events with their descriptions are examined in the context of the radical behavioral interpretation of causality, along with their implications for a scientific understanding. An alternative interpretation of causal knowledge is suggested.

The purpose of all serious intellectual enterprises, including science and philosophy, is to formulate an understanding of the world that directly or indirectly enhances our well being. According to Kantor (1953, pp. 13-14) science is an enterprise directed at increasing our knowledge of the world and such is accomplished by describing confrontable events and elaborating upon our descriptions so as to produce what we may call explanations for the forms and operations of those events. Not all philosophers of science take this view. Science as the means by which our knowledge of the world is accumulated is inexplicably tied to more practical considerations of what use may be made of such knowledge, however; and these more practical considerations tend to take precedence in our characterizations of the scientific endeavor. That is to say, many scientists assume that prediction and control are the principal goals of science (e.g., Skinner, 1953, p. 14 and p. 35). By contrast, Kantor (1953, p. 14; 1959, p. 171) argues that prediction and control have their greatest significance not
in the accumulation of knowledge but in the application of knowledge to pressing problems of adjustment and adaptation.

An emphasis on prediction and control of events is not in itself a bad thing. In fact, many scientists would argue that knowledge of the world has significance only because it allows for prediction and control (Lycan, 1988). Although we do not agree with this argument (Hayes, 1994), we do not intend to imply that a pragmatic orientation to scientific affairs has not borne fruit. Rather, we suggest that a preoccupation with prediction and control to the neglect of description and explanation has had adverse consequences for scientific progress. More specifically, descriptive operations tend to be taken for granted, with the result that they are not well understood, laying the groundwork for confusions of various sorts. Among the most serious of these is a confusion of events with descriptive constructions. It is our contention that the radical behavioral interpretation of causality illustrates a confusion of this sort; and it is our aim to examine this confusion as to its sources and its implications for the science of psychology.

In examining the relative adequacy of a particular causal formulation, we may begin by acknowledging that scientific formulations achieved at any one time arise out of the products of earlier formulations. Although some may be sustained longer than others in the practices of particular cultures, none has survived as an absolute and universal understanding. New perspectives are always on the horizon. Moreover, from our perspective, an absolute and universal truth is not possible to achieve. Its achievement assumes the existence of an independent, objective observer with experience broader than a lifetime could accommodate. No one is in contact with the universe, and no one stands outside of his or her idiosyncratic and cultural circumstances such as to constitute an observer with these characteristics. Science and philosophy are human enterprises and the products of those enterprises unavoidably reflect the circumstances and histories of individual scientists and philosophers (Hayes, 1993). For this reason, we maintain that no formulation is any more true or accurate than any other in an absolute sense.

Kantor (1959, p. 68) makes the same argument in his assertion that "All scientific constructions arise from contacts with events; no system can be either final or absolute." Despite this contention, Kantor maintains that some products of systematizing activity are more valid than others. Our position is more relativistic than this. From our perspective, different scientific formulations are not able to be judged more or less valid as no irrefutable criteria by which to make this evaluation are available (Hayes, 1993). Instead, formulations are just more or less satisfying in relieving our uncertainties, or more or less useful in accomplishing specific aims at particular times over the course of cultural evolution.

Current psychological views, while entertaining more contemporary notions of space and time (e.g., Hayes, 1992; 1996; Ribes, 1984; 1986; Zimmerman, 1979), are still formulated on the basis of older
conceptualizations of these fundamentals, for the most part. Hence, our criticisms of causal notions articulated by Skinner some decades ago are still relevant. Further, regardless of the details of Skinner's formulation, the more general issue is the violation of certain rules of governance upheld in the discipline of scientific philosophy. The process of formulating an understanding of the world, as a logical operation, is achieved in accordance with such rules. Among them are clarity and organization of assumptions or premises, internal consistency, and cross-disciplinary compatibility (Kantor, 1969). These rules of governance provide a means of evaluating particular scientific views as to their adequacy at a specific point in time. Our aim is to examine and evaluate the causal constructions of radical behaviorists along these lines.

Circumstances Giving Rise to Confusions of Events with Descriptive Constructions

Before examining the confusion of events with descriptive constructions in this context, it may be useful to explicate the sources of these confusions. Many circumstances give rise to confusions of this sort. Some of these circumstances are described in the sections to follow.

Problems of Observation

In some cases, confusion occurs because the events described present problems of observation, either because they are too large, too small, too far removed from observers in space or time, or because the events, in fact, do not have any actual existence. In physics, for example, particles too small to be observed even by means of available amplifying technologies, are regarded as existent by virtue of logical or mathematical necessity. The subsequent identification of mathematical formulae stand freed from the acts of producing them and as such approach the free event, making confusion easy (Kantor, 1938). The age-old confusion of the Euclidean descriptions with space is an example in point.

Psychological formulations are also impacted by problems of observation, leading to assertions concerning the existence and operation of unobserved and questionable entities. The literature on timing operations in humans and animals is replete with references to hypothetical entities and their processes (e.g., Fetterman & Killeen, 1990). Likewise, references to unobserved entities are commonplace in discussions of innate tendencies and instinctual behavior (e.g., Segal, 1973; Seligman, 1970). When the things described have no possibility of existence within the boundaries set by natural science, such as "gods" or "minds," descriptions take the place of events as there can be no other alternative. From a natural science perspective, however, there are no such things, and constructions making reference to them may thereby be assumed to have their sources in other constructions, as well as in the needs and desires of particular workers.
Similar Stimuli

Observational problems constitute only one of a number of circumstances giving rise to confusions of events with descriptive constructions. Confusions of this sort also arise when the events of interest appear to resemble our descriptions of them. The linguistic sciences are peculiar in this regard. For example, a direct quotation is a preliminary description of a prior verbal event, and it is one which, in many respects, resembles the event itself. Nonetheless, the contextual conditions under which the original event occurred are not duplicated in a direct quotation, and these conditions are a part of the original event. A direct quotation, occurring in a different context, is therefore a different event. The implication is that in studying a direct quotation, one gains an understanding of the direct quotation, not the original verbal event upon which the quotation was constructed. Expectations to the contrary, which are by no means uncommon in the linguistic sciences (Kantor, 1977, p. 17), merely indicate a confusion of events with description constructions.

Similar Reactions to Nonverbal Stimuli

As just indicated, confusions of events with descriptive constructions having their sources in superficial resemblance between events and their descriptions are peculiar to the linguistic sciences because of the nature of their subject matters. Confusions of events with descriptive constructions are not restricted to the linguistic sciences, though. A principal source of confusion in the nonlinguistic sciences is a resemblance not between events and their descriptions as stimulus objects, but between our reactions to those objects in each case. Stimulus objects are often times classified in accordance with our reactions to them, such that objects giving rise to similar reactions or patterns of reaction are conceptualized as members of the same class. This system of classification is functional in nature and does not in any way imply a morphological resemblance among the stimuli so classified. For example, a multitude of morphologically dissimilar stimuli may be collectively referred to as reinforcers on the grounds that their impositions in event fields are correlated with similar patterns of reaction. As noted, a functional similarity among stimuli does not imply a morphological resemblance among them, and indeed no such resemblance is to be found among the stimulus objects employed for the purpose of this illustration.

Nonetheless, functionally similar stimuli may bear a morphological resemblance. In fact, it is more often the case that they do than that they do not. For example, it is observations of similar responding to stimuli bearing a morphological resemblance that underlies the principle of stimulus generalization; and as the articulation of a principal suggests, observations of this sort are very frequently made. That functionally similar stimuli also bear a morphological resemblance is not in any sense a problem. A problem does arise, however, if similarities along one of these dimensions are regarded as indicative of similarities along
another, prior to any observation of their covariance. Unfortunately, this assumption often tends to be made. As a result, if we observe similar responding on the part of an individual under seemingly different stimulus conditions, we may find ourselves searching for a morphological resemblance among those stimulus conditions which may be entirely lacking. The search tends to be terminated by way of an inference concerning mediating behavior of some sort (see Skinner, 1953, p. 137, for an example of this logic). Likewise we may anticipate similar reactions to morphologically similar stimuli and their failure to occur may give rise to investigative efforts of questionable value.

**Similar Reactions to Nonverbal and Verbal Stimuli**

Reacting to verbal descriptions of events in a manner similar to the reactions we would make to the original events is another important source of confusion between events and their descriptions. Similar reactions to verbal and nonverbal stimuli occur as a result of the readiness with which verbal stimuli acquire the stimulational functions of nonverbal stimuli. The relative serviceability of verbal stimuli in this regard and the reasons for it have been addressed in detail elsewhere (see Hayes, 1991; Parrott, 1984). The conclusions drawn from these analyses are pertinent to the present argument, though, so we will reiterate them here.

**Serviceability of verbal events as substitute stimuli.** Verbal events have two characteristics that distinguish them, at least in degree, from nonverbal events. Both are attributable to the ineffectiveness of verbal responding with respect to the nonsocial environment. First, verbal responding does not interfere with the execution of nonverbal behavior coordinated with the same stimuli. As a result, it occurs in conjunction with other response events more readily than do nonverbal responses. Second, because verbal events are not conditioned by their effects on the nonsocial environment, they display an arbitrariness of form not found among their nonverbal counterparts. Consequently verbal response forms exist in enormous variety, allowing for a greater degree of specificity of relation to stimulus objects than do nonarbitrary nonverbal response forms. As a product of these two characteristics of verbal events, when verbal responding occurs in the absence of relevant nonverbal stimuli, the stimulation supplied by such responding to a listener may give rise to reactions normally occurring under the control of those related, but absent, nonverbal stimuli. The reactions thus brought about are those having a history of frequent conjunctive occurrence with verbal response forms, and the reactions of most frequent conjunctive occurrence with any given verbal response form are perceptual in nature. It is this sort of responding that occurs by way of verbal stimulation (Hayes, 1991; Parrott, 1984). In short, upon hearing the word “pigeon,” one may see a pigeon, hear it coo, smell it, or otherwise react

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1That is, under conditions other than those giving rise to the “tact” relation, as described by Skinner (1957).
to it, despite the absence of a pigeon in the immediate environment. In this sense, at least, our reactions to the word "pigeon" are similar to the reactions we would make to an actual pigeon, and it is this similarity of responding that is implied by the argument that verbal stimuli are able to acquire the stimulational functions of nonverbal stimulus objects.

When our reactions to events and their descriptions are similar, we tend to assume that the events and our descriptions of them constitute the same phenomenon in the sense that our descriptions of events are taken to be accurate depictions of those events. This assumption creates problems in that descriptions of events typically make reference to entities not found among the events themselves. Let us explain.

**Referents in descriptive constructions.** The description of an event is not merely a list of the substantive factors involved in it; it is a statement of the organization of event fields, including the relations sustained among the various factors making up such fields. The organization of event fields, including the relations among field factors, are not aspects of the events themselves, however. Organizations of factors and relations among them have no substantive structure, which is to say, they do not have properties by which they occupy space. They are not thereby among the events to be described. Rather, they are aspects of our descriptions of those fields, not aspects of the fields themselves.

**Sources of referents in descriptive constructions.** This fact poses an interesting question: If relationships among events making up an event field are not among the events as they are observed to occur, from what sources do these features of our description come? The answer is that they come from philosophical traditions imbedded in our language and other aspects of our cultural practices. Descriptions are not verbal pictures of events sharing point to point correspondence with those events; they are logical operations bounded on one side by the events of interest, and on the other by philosophical traditions underlying the scientific enterprise as a whole. Each of these sources makes a contribution to the ensuing description. It follows that if our philosophic descriptions are mechanistic in nature, our descriptions of events will be formulated in causal terms. If our traditions have theological origins, our descriptions will have a spritistic character. And, if we subscribe to an interbehavioral philosophy, we will assert interdependent relations among the factors making up event fields.

**Utility of making distinctions.** Our point is not to suggest that one philosophical system embodies more truth or accuracy than another. As previously argued, philosophizing is a human activity subject to the same kinds of personal and cultural influences as any other activity, including the acts of observing and describing (Hayes, 1992). Rather, we are suggesting that an awareness of the nature of description may thwart a tendency to confuse descriptive constructions with the events from which they were at least in part derived, and in doing so may serve to facilitate a more adequate scientific understanding of the world.
Causality: A Confusion of Events with Descriptive Constructions

With this analysis of descriptive operations and their products behind us, we may turn to what appears to constitute an error of confusing events with their descriptions in the context of the radical behavioral interpretation of causality. The logical error concerns both the central concept of reinforcement and the metaphor of selection of consequences, as articulated by Skinner and others of this tradition. We may begin by examining the events upon which the concepts of reinforcement and selection by consequences have been constructed.

Descriptive Substitution for the Events

Before doing so, however, we must acknowledge the fact that in a verbal forum such as this one, there is no way for us to examine the actual events. In other words, we have no choice but to substitute a description of events for the events themselves, which, of course, raises our original difficulty. We cannot overcome this difficulty. Still we may construct a serviceable description if our constructional procedure is carried out in such a way as to prevent reference to factors not among the events as they are observed to occur. For purposes of discussion, we are assuming that only those entities having the property of extension, or occupation of space, are among the factors making up events. Therefore, reference to all factors not sharing this property will be omitted. With this purpose and these assumptions in mind, we wish to propose the following descriptive substitution for actual psychological events, which we shall take, in the ensuing discussions, to be the events under study.

The events upon which scientific descriptions are constructed are constituted of a multitude of component factors undergoing continuous change with respect to their composition and their locations in space. Of specific psychological concern, the component factors include responding organisms, stimulating objects, innumerable setting conditions, and various media through which contacts between organisms and objects take place, including light and air, among others. Deliberately omitted from this description of events are all references to relations sustained among the various factors, including spatial, temporal, and causal relations. All such relations are articulated by observers in accordance with their locations and velocities and for the purpose of organizing and making sense of their experiences. That is to say, in our view, all relations may be understood to be constructions, not events.

Our plan now is to examine what Skinner and others are saying about reinforcement and selection by consequences with the aim of showing that their descriptions of these events include factors not among the events themselves, and further, that these descriptions are being confused with the events from which they were derived. The outcome of this confusion is a view of causality useful for immediate purposes of
prediction and control, but having little validity from an event standpoint and little merit from the standpoint of a philosophy of science.

The concepts of reinforcement and selection by consequences are closely related, particularly as of about 1969 when Skinner began to describe reinforcement by way of an analogy to the biological theory of natural selection. However, prior to 1969, the nature and operation of reinforcement were described in a somewhat different manner, hence we will deal with both the earlier and later conceptualizations of this process.

*Reinforcement as Causal Mechanism*

In Skinner’s books, *Science and Human Behavior* (1953) and *Verbal Behavior* (1957), reinforcement is defined as a process through which classes of responses, called operants, are acquired and maintained. The process involves the occurrence of responses followed by the presentation of a reinforcing stimulus, the outcome of which is an increase in the frequency of occurrence of responses belonging to the same class. Reinforcing stimuli, because they are conceptualized as being produced by responding and hence occur after responding, are called consequences. Consequences, moreover, are assumed to have a causal role in this process: They are assumed to be responsible for the increasing frequency of responding. Consequences are said to strengthen operants (Baum, 1994, p. 89; Catania, 1992, p. 62; Michael, 1993, p. 17; Skinner, 1953, p. 65-66; Skinner, 1974, p. 39).

Further, responding always occurs in the presence of some set of stimulus conditions, which are described after the initial presentation of a reinforcing stimulus, as having the role of setting the occasion for responding. These stimulus conditions are conceptualized as occurring prior to responding, hence the name “antecedent stimuli.” Antecedent stimuli are also believed to have a causal role in this process, however, their influence in this regard is established by and is dependent upon their relation to reinforcing stimuli. Their causal significance is thereby secondary to that of reinforcing stimuli (Michael, 1993, p. 32). In summary, the process of reinforcement is described as a sequence of occurrences wherein a stimulus event at one point in the sequence has a causal influence over a response event at a later point. Reinforcement, as such, is not understood as an enabling condition implying a field of interaction, but rather as a determining condition, or power or some sort, having no concrete referent in the events from which it is derived.

*Relation of constructions to events.* Let us now examine the correspondence between this description of events and our descriptive substitute for the events themselves. Immediately apparent is the inclusion of relations among events in their description, among them the temporal relations of antecedence and consequence. Time is not an event, however, and neither are temporal relations. These are

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2This argument appears as early as 1953 (p. 140) though is not emphasized until some time later.
constructions by means of which we may react to one event in terms of another. It is our point of vantage and purposes as observers that results in our calling one event antecedent or consequent to another. After all, the events themselves are not comprised of linear sequences of isolated entities. They consist of an enormous number of co-present factors continuously evolving into new factorial combinations. The effect of an antecedent-consequent construction is to reduce the complexity of actual happenings to a manageable subset of occurrences, fostered by scientific purposes of prediction and control, not description and its elaboration into explanation. To reiterate, time is a metric—the product of an act of measurement—and, as such, it belongs to the domain of constructions, not events.

Causal relations are also implicated in the process of reinforcement. The suggestion here is that one event has some sort of power over another event, and further that events fall into dichotomous classes of causes and effects. There are no such powers or forces to be found among the events themselves, however, and neither do events exist in classes. Causes and effects are products of acts of classifying, and classifying is construction not observation. “Causes” and “effects” are reactions to events, not features of the events themselves.

In short, reinforcement is a descriptive construction, not an event. Like all constructions, it is influenced not only by the events as they are observed to occur but also by the philosophic assumptions and particular purposes of individual workers. The assumptions of causality and linear sequence underlying this early articulation of the principle of reinforcement are mechanistic in nature (Hayes, Hayes, & Reese, 1988). This is not to suggest that the concept of reinforcement, arising out of such influence, is lacking in utility. On the contrary, it is an extremely useful concept, provided that one's goals in science are prediction and control.

It is not our intention to imply that descriptions ought to be something other than they are. Descriptions are descriptions, not events, and the fact that they make reference to factors not among the events is not a serious problem. Descriptions are articulated for particular purposes, and references to non-event factors are dictated by these purposes. This is the mode of operation of applied science (Hayes, 1994.) A more serious problem is a confusion of events with their descriptions, and it is to this problem that we may now turn.

Conceptual confusion. As previously argued, the causal influence of consequences on responding is not a feature of events but of our descriptions of events. A confusion of events with their descriptions, therefore, would be indicated by an attempt to provide a substantive basis for causal influence. In other words, because causality is a term without an event referent, there is no reason but confusion to account for causal influence by locating its source in substantive events. This, however, is exactly what Skinner attempts to do. He argues that an organism is changed by reinforcement. In Skinner's words: “Something is done today which affects the behavior of the organism tomorrow. No
matter how clearly that fact can be established, a step is missing, and we must wait for the physiologist to supply it. He will be able to show how an organism is changed when exposed to contingencies of reinforcement and how the changed organism then behaves in a different way, possibly at a much later date” (1974, p. 215). Others make this same claim (Baum, 1994, pp. 60-61).

An organism is a substantive entity, however, while reinforcement is only a descriptive construction, and a construction cannot change a substantive entity, let alone in a substantive way. Clearly, by this argument, Skinner and others of the behavioral tradition (Baum, 1994) are confusing events with their descriptions of them.

**Reinforcement as Selection**

*Construction.* We may turn now to the interpretation of reinforcement as selection by consequences. As previously mentioned, this interpretation becomes more prevalent in Skinner’s writings after 1969. We believe it may be described as an attempt on his part to depart from more mechanistic ways of thinking. We do not believe that the attempt is successful (Hayes et al., 1988). Regardless, it is a confusion of events with constructions and not Skinner’s philosophic assumptions that are at issue at this time. We may begin, then, as with the earlier conception of reinforcement, by presenting Skinner’s description of the process of selection by consequences. The process is described by way of an analogy to natural selection. We will start with a brief discussion of natural selection and will draw the analogy as we proceed.

Natural selection refers to a process in which random genetic and chromosomal mutations give rise to new organismic morphologies and structures. Some of these variations are neutral, some are lethal, and some help or hinder an organism’s survival in a given environment. As a consequence, some organisms survive long enough to breed and produce offspring, thereby contributing to the gene pool of the species, whereas others do not. As a result of many occurrences of this sort, over a long period of time, species are gradually modified in the direction of the most advantageous variants for a particular ecological niche.

Now we may look at the analogous process of selection by consequences. The ability of organisms to be influenced by the consequences of their actions is said to be a product of natural selection (Skinner, 1971, pp. 114-115), evolving in parallel with two other sets of conditions. One of these conditions is an inherited susceptibility to reinforcement by certain kinds of consequences (Skinner, 1981, p. 501). These inherited susceptibilities are what make certain kinds of consequences capable of increasing the frequencies of the behaviors they follow, and they are analogous to the interrelations of ecological and morphological conditions responsible for the survival of particular organisms, as postulated in biological perspective. The other condition is the availability of a supply of behavior not specifically committed to
eliciting or releasing stimuli (Skinner, 1974, pp. 52-53; 1981, p. 501). These behaviors are analogous to the random genetic and chromosomal mutations responsible for variation in organismic structure. Given an inherited ability to be influenced by the consequences of our actions, inherited susceptibilities to be influenced by certain kinds of consequences, and a supply of behavior not specifically committed to other influences, the outcome is as follows: Responses occur for no particular reason. Some of these responses produce consequences which increase their frequency of occurrence, by which they are maintained in the organism's repertoire. Other responses fail to produce consequences having this effect, and these responses are thereby not maintained in the organism's repertoire. The outcome of selection by consequences, then, analogous to the modified species of natural selection, is the modified repertoire of the organism.

Relation of constructions to events. With this description in hand, we may now examine its relationship to our previously articulated descriptive substitution for events. First, both evolutionary biologists and operant conditioners taking Skinner's lead (Skinner, 1981, p. 501; Baum; 1995, Catania, 1992) regard selection as a causal process. As already discussed, however, causal influence is not a feature of events but of our descriptions of events, and this is the case regardless of the subset of events at issue. In other words, the biological hypothesis of natural selection is as much at odds with the events of species evolution as is the behavior analytic hypothesis of repertoire development through selection by consequences. There are no causal powers among the events themselves, regardless of how they are conceptualized. Furthermore, as a causal process, selection implies two categories of events, those that select and those that are selected. Nature is not divided into categories, though. Categories are products of categorizing acts—they belong to the domain of reactions to events, not the domain of events. Second, although the acts of organisms are among the events as they are observed to occur, the issue of whether they are or are not committed to releasing or eliciting stimuli is not an issue to be decided at the level of events. This is an issue of relations among events, and relations as previously argued are not among the events themselves. They are aspects of our descriptions of events.

In summary, selection by consequences is a construction—derived from events—but also making reference to factors not found among the events themselves. The imposition upon events in this particular case has its origins in the philosophical tradition of reductionism, wherein the events of one science are held to be amenable to explanation by way of an appeal to the events of another science.

Conceptual confusion. As to the question of whether or not this description of events is being confused with the events themselves, the answer is obvious: If relations among events are not aspects of events but only of our descriptions of events, then there is no reason to attempt to account for relations in terms of events having substantive structure.
This is essentially what is being attempted, though, by suggesting that causal relations have their sources in the biological organism (Adams, 1994). Neither the causal influence of consequences nor the susceptibility to influence by certain kinds of consequences requires a basis in substantive structure, nor does it make sense to suggest that they do unless a proper distinction between events and their descriptions has not been made. It seems clear to us that is has not.

Causal Knowledge

Our purpose has been to show that causal descriptions of events implicate factors not among the events as they are observed to occur, and that these descriptions are influenced by the interests of particular workers and by the philosophical assumptions upon which they knowingly or unknowingly operate. We have not argued that some interests are more legitimate than others nor that some philosophical systems are more valid than others.

It is time now to clarify our own interests and the assumptions upon which we are operating with respect to the issue of causality. We have argued that only those factors having the property of extension are among the factors making up event fields, and we have for this reason argued that all relations among extended factors are aspects not of the events themselves but of our reactions to them. We have argued, as well, that these extended factors show a continuous evolution with respect to their compositions and locations in space, such that nature may be depicted as an unbroken stream of changing factorial combinations.

This depiction of nature is not void of assumption nor of reference to relations among events. Specifically, reference to evolution or change and to combinations of factors implies relations among the factors making up event fields. Likewise, an event field is itself a construction implicating the point of vantage of a particular observer (Capra, 1975, p. 150). The implicit assumptions upon which this description is constructed are that all factors constitute aspects or phases of an interrelated whole and that the focus of any given scientific observation is a commutative or functional relation obtaining between some subset of factors making up that whole (Kantor, 1971, pp. 92-94; Zimmerman, 1979). In a psychological context, for example, the focus of observations is a functional relation obtaining between the responding of an organism and the stimulating of an object, event, or other organism. To avoid confusion, we hasten to add that the term "function," as here used, implies an absolute equivalence of variants and no causal dependence or independence (Kantor, 1970).

As previously mentioned, descriptions of events are influenced by the interests of particular workers as well as the philosophical assumptions upon which they operate. Our own interests pertain to the philosophy of science, not its applications; and it is for this reason that we have constructed what appears to be a noncausal description of
nature. Scientific philosophy and scientific practice are not completely independent domains, however. We believe that the relation between them is one of mutual influence and reciprocal benefit. With this in mind, we now illustrate the difference between a philosophical and practical interpretation of a causal situation with a simple example, taken from Kantor (1977).

A spark falling upon a highly flammable substance surrounded by a suitable medium, such as oxygen, results in an explosion. From a practical standpoint, the effect of an explosion would be described as having been caused by the spark, because prior to the imposition of the spark no explosion had taken place and subsequent deliberate repetitions of this sequence of events would always result in an explosion. From a philosophical standpoint, in contrast, we must recognize that the occurrence of an explosion depends as much upon the flammable substance and the medium of contact, as well as other properties of the medium such as its temperature and pressure, as it does upon the spark. From this perspective, an explosion is an event constituted of all of these factors, conceptualized as occurring not in sequence but simultaneously, in a particular arrangement or pattern. An explosion is not a result of the prior imposition of a spark. In fact, the occurrence of the spark prior to its contact with the flammable substance is not even relevant to the explosion event. The spark becomes relevant to this event when the event takes place and when it does, the spark operates like any other factor necessary to complete a particular kind of event combination. To reiterate, from a philosophical perspective, no object or action of an object may be regarded as a causal factor prior to its presence in a specified field. In Kantor's (1950) terms: "Causal changes in any field constitute a rearrangement in the simultaneous coexistence of factors in a unique pattern." As such, the spark constitutes a part of the causal data in this situation, along with all of the other factors involved in it. Causal knowledge, from a philosophical standpoint, is simply knowledge of the pattern of events, nothing more (Kantor, 1950, p. 174; Kantor, 1970).

Implications of Confusing Events with Constructions

Finally, and in conclusion, we must deal with the issue of why we should be concerned about confusions of events with their descriptions. As previously discussed, the issue is not one of constructing descriptions of absolute or universal variety. Descriptions do not have these properties. They are constructed for different purposes and one purpose is as good as another (Hayes, 1993). Failing to properly differentiate between events and their descriptions is problematic, however. Specifically, failing to appreciate this difference leads us to look for answers in the wrong places, which is frequently accompanied by a shifting of the responsibility for finding those answers from ourselves to other workers. The radical behavioral interpretation of causality is a case in point. So long as we assume that causal influence has existential
reality and that the causal influence of consequences has its origins in natural selection and its locus in the current structure of the organism, we are obliged to search for evidence of a biological sort to support our contentions. In addition to the fact that the impetus for this search arises out of a fundamental confusion and is unwarranted for this reason alone, we must also realize that the subject matters of biology and psychology are not the same and no collection of biological findings will ever tell us anything about that which is distinctly psychological in nature. If the science of psychology is to register progress, we must attempt to understand psychological happenings at a psychological level of analysis, and the confusion of events with constructions characterizing the radical behavioral interpretation of causality prevents us from doing so.

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