On Terms

Misconstruing Behavioral Consequences: Teleology or Teleonomy

Abdulrazaq A. Imam
West Virginia University

A number of authors, including behavior analysts, have characterized the causal role of consequences as teleological (Griffore, 1978; Moore, 1984; Moxley, 1984, 1987). Traditionally, however, teleology connotes final cause as an explanation of ongoing events (Moore, 1984; Reese, 1984). Final cause is the end that *follows* and *explains* the means; in the operant bar press, for example, obtaining a food pellet would be the goal of the rat, and the pellet thus would explain the rat's previous bar press. As such, final cause assumes that "future events are active agents in their own realization" (Ayala, 1970, p. 8). Final cause also is associated with the notion of a grand design or purpose, predicated upon Divine act (Morris, 1875; Nagel, 1953; Reese, 1984; cf. Moore, 1984). Because of this association, the term *teleology* has been in disrepute in the physical and biological sciences (Ayala, 1970; Mayr, 1965).

Skinner's (1969) formulation of the three-term contingency has been occasionally described by behavior analysts as involving teleological explanation (Moore, 1984; Moxley, 1984, 1987). Moxley, for instance, stated: "In contrast to mechanistic explanations in terms of antecedents, teleological explanations have been proposed as explanations in terms of consequences. . . . According to that interpretation, Skinner's formulation of functional consequences within the three-term contingencies of anteced-

ent occasion, behavior, and consequences exemplifies a teleological explanation of behavior" (1984, p. 87). Such characterization suggests a confusing failure to distinguish between the function of consequences in the three-term contingency and the traditional concept of teleology. In operant conditioning, the response is emitted because of past behavior-consequence relations and *not* because of future consequences (Reese, 1984; Skinner, 1984). Consequences play their causal role with respect to later, not earlier or current, behavior (Skinner, 1984). If no consequence explains a response that *precedes* it, then the causal role of consequences does not entail explanation of current events in terms of future events: the explanation, therefore, is not teleological. The second element in the definition of teleology—that of a grand design—also is missing in the concept of contingencies of reinforcement. Emission of a response does not imply a design on the part of the organism. Taken together, these two points suggest that the causal role of behavioral consequences is inconsistent with the definition of teleology.

Similar problems have been encountered in biology, perhaps due to the similarities between contingencies of reinforcement in operant conditioning and contingencies of natural selection in the evolutionary process (Skinner, 1984). Because some biological phenomena (such as organ systems, homeostatic mechanisms, and patterns of behavior) appear to be goal-directed, some biologists have appealed to teleology in the context of functional explanations (e.g., Ayala, 1970; Nagel, 1953). This appeal, as in the case of operant conditioning, is

The author thanks Phil Chase and Hayne Reese for comments on an earlier version of this paper. Reprints may be obtained from the author, Department of Psychology, West Virginia University, Morgantown, WV 26506-6040.

based on the causal role of consequences in natural selection (Ayala, 1970).

Natural selection is said to be a "mechanistic end-directed process" resulting in "increased reproductive efficiency," as well as producing and maintaining "end-directed organs and processes" which function to enhance the "reproductive fitness of the organisms" (Ayala, 1970, p. 10). End-directed organs and processes, or overall fitness, as consequences of the evolutionary process, however, have a causal role not because they are end-goals, but because they have been adaptive in the past. This point is well made by the distinction between *selection of* and *selection for* (Smith, 1986; Sober, 1984). The *cause* in selection is expressed by the *selection for* locution, whereas the *effect* of selection is expressed in the *selection of* locution and, as Sober summed up, "'selection of' does not imply 'selection for'" (1984, p. 100). An organ or structure evolves (*selection of*) *not* in order to contribute to reproductive fitness, but because it has been adaptive (*selected for*) in the past (Skinner, 1984; Sober, 1984).

Thus, objections to the use of the term teleology to describe biological phenomena have been raised by a number of biologists (e.g., Mayr, 1965; Pittendrigh, 1958). Obviously, using *teleological explanations* to refer both to a final cause and to a functional explanation can be very confusing. In the first case, a grand design is *always* assumed (Morris, 1975); in the second case, it is *never* assumed (Ayala, 1970; Mayr, 1965; Moore, 1984; Nagel, 1953).

We, like biologists, have reason to be concerned about the confusion and problems that the term teleology may introduce in our own, radical behavioral, conceptions of causality. In biology, one solution has been to develop a new term. Pittendrigh (1958) and Simpson (1958), among others, have advocated the use of the term *teleonomy*. Teleonomy refers to functional explanations based on consequences. It explains adaptation resulting from natural selection (Ayala, 1970) and is quite distinguishable from Aristotelian teleology (Mayr, 1965). The term teleon-

omy itself is not foreign to psychology. Notably, Allport (1937) and Campbell (1975) have used it, and in a manner consistent with the usage in biology.

A number of reasons may be offered in support of using the term teleonomy rather than teleology in discussing the causal role of behavioral consequences. First, teleonomy does not imply or entail a grand design or purpose. Second, it is not finalistic in the Aristotelian sense: "we do not imply by the method of teleonomic description any notion of future end or goal" (Allport, 1937, p. 206). And third, it avoids the need to appeal to cognitive concepts of goal or internal representation (Woodfield, 1983, p. 630). As Allport (1937) stated: "the teleonomic method makes no use of the notion of consciousness of a purpose imputed to the subject we observe, or of purpose as an agent, motive, or force behind his activities" (p. 205).

In conclusion, the distinction between a teleological (grand design, final) cause and a teleonomic (functional) cause may be useful in behavior analysis. To the extent that we conceptualize consequences within the three-term contingency as controlling the future *probability* of the response, rather than controlling current or past responses, consequences are best described as teleonomic.

REFERENCES

- Allport, F. H. (1937). Teleonomic description in the study of personality. *Character and Personality*, 5, 202-214.
- Ayala, F. J. (1970). Teleological explanations in evolutionary biology. *Philosophy of Science*, 37, 1-15.
- Campbell, D. T. (1975). On the conflicts between biological and social evolution and between psychology and moral tradition. *American Psychologist*, 30, 1103-1126.
- Griffore, R. J. (1978). Toward an Aristotelian analysis of causation in psychological research. *Psychological Record*, 28, 181-185.
- Mayr, E. (1965). Cause and effect in biology. In D. Lerner (Ed.), *Cause and effect* (pp. 33-50). New York: Free Press.
- Moore, J. (1984). On behaviorism, knowledge, and causal explanations. *Psychological Record*, 34, 73-97.
- Morris, G. S. (1975). *The final cause as principle of cognition and principle in nature*. London: Robert Hardwicke.

- Moxley, R. (1984). Graphic discriminations for radical functional behaviorism. *Behaviorism*, 12, 81–96.
- Moxley, R. (1987). Three conceptual units for behavior. *Behavior Analyst*, 10, 17–26.
- Nagel, E. (1953). Teleological explanations and teleological systems. In H. Feigl & M. Brodbeck (Eds.), *Readings in the philosophy of science* (pp. 537–558). New York: Appleton-Century-Crofts.
- Pittendrigh, C. S. (1958). Adaptation, natural selection, and behavior. In A. Roe & G. G. Simpson (Eds.), *Behavior and evolution* (pp. 390–419). New Haven: Yale University Press.
- Reese, H. W. (1984, May). Historical and philosophical analysis of causality. In H. W. Reese (Chair), *Philosophical foundations and current views of causality in radical behaviorism*. Symposium conducted at the meeting of the Association for Behavior Analysis, Nashville, TN.
- Simpson, G. G. (1958). Behavior and evolution. In A. Roe & G. G. Simpson (Eds.), *Behavior and evolution* (pp. 507–535). New Haven: Yale University Press.
- Skinner, B. F. (1969). *Contingencies of reinforcement: A theoretical analysis*. Englewood Cliffs, NJ: Prentice-Hall.
- Skinner, B. F. (1984). Selection by consequences. *The Behavioral and Brain Sciences*, 7, 477–481.
- Smith, T. L. (1986). Biology as allegory: A review of Elliott Sober's *The Nature of Selection*. *Journal of the Experimental Analysis of Behavior*, 46, 105–112.
- Sober, E. (1984). *The nature of selection: Evolutionary theory in philosophical focus*. Cambridge, MA: M.I.T. Press.
- Woodfield, A. R. (1983). Teleology. In R. Harre & R. Lamb (Eds.), *The encyclopedic dictionary of psychology* (p. 630). Cambridge, MA: M.I.T. Press.