Mechanism and Contextualism in Behavioral Pharmacology

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"Leaving one still with the intolerable wrestle with words and meanings." (T. S. Eliot, *Four Quartets*)

Both Ed Morris (1993) and Jackson Marr (1993) draw our attention in their usual scholarly manner to difficulties with words and how we use them. Morris identifies many meanings of *mechanism*, in particular illustrating that the connotations of this word may be either positive or negative depending on who uses it and when. Morris concedes that in some ways behavior analysis can fairly be described as mechanistic. Ultimately, however, he renews his call for behavior analysts to adopt the root metaphor of contextualism and "refrain from 'mechanistic' talk" (p. 38). Yet Marr argues with equal cogency that even in the physical sciences, mechanisms cannot be abstracted from contexts and that to "place mechanism and contextualism in contrast" (p. 60) is no more than a category error.

What is a poor artisan to do when faced with such important but unresolved issues resulting from such erudition? Not try to resolve them, for sure! Perhaps, however, it may be useful briefly to consider how the terms *mechanism* and *contextualism* can be used in behavioral pharmacology. This focus may be particularly illuminating, because here we have an active interface between the traditional and confident mechanists of pharmacology and the uncertain mechanists/contextualists of the experimental analysis of behavior. Here we may see too the wisdom of Skinner's assertion that "meaning and referents are not to be found in words but in the circumstances under which words are used by speakers

and understood by listeners" (Skinner, 1974, p. 192).

In its early years, the study of drug-behavior interactions was marked by an imbalance in the relative contributions of pharmacological and behavioral data and concepts. Only relatively recently has it been recognized that adequate empirical studies in behavioral pharmacology must be based on systematic explorations of both pharmacological and behavioral parameters. However, in discussions of the most appropriate conceptual framework for explaining these data, it is again the pharmacological modes of thought that have long been dominant. Their focus is to be found in essentially reductionistic models that seek organismic mechanisms for drug effects, elucidated at neuropharmacological, neuroanatomical, neurophysiological, or even neurochemical levels. In fact, of course, many (indeed, most) experimental psychologists seem to favor similar reductionistic explanatory models for their data. Some, however, including the very behavior analysts who have done so much to add systematic behavioral parameters to the data base of behavioral pharmacology, favor explanations couched in nonreductionist behavioral terms.

Such nonreductionist accounts are now often discussed in terms of "behavioral mechanisms." Thompson (1984, p. 3) has argued that the level of analysis in behavioral pharmacology that will lead to identifying distinctively behavioral mechanisms is not reductionistic in the senses discussed above, but is expressed in terms of "a more general set of environmental principles regulating behavior" (1984, p. 5). Such principles are to be found in detailed explorations of notions such as schedule or rate dependencies, discriminative control, and the effects of behavioral history or environ-

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mental context (Barrett, Glowa, & Nader, 1989; Sanger, 1987). Barrett et al. (1989, p. 214) have emphasized that "Behavior is not a passive transducer of drug action but appears to actively impart direction and magnitude to drug effects." This behavior is also, of course, in turn now well understood to be a function of (present and past) environmental contingencies. Therefore, in a real and important sense, the behavioral effects of drugs are, in turn, a function of environmental contingencies.

As Poling (1986, p. 63) has pointed out,

The notion that the description of functional relations provides an adequate explanation of behavior, or any other phenomena, may not be intuitively obvious. However, in behavioral psychology as in science in general, it is held that something is "explained" when we can specify the events that cause it.

For exponents of functional analysis, a description of a functionally important set of environmental principles would provide the explanation of the behavioral effects of drugs, without the need for assumed "underlying" processes or responses. Thus, behavioral effects of drugs emerge from a functional analysis not as appendages to some other (underlying) events but instead as phenomena of scientific interest in their own right, explicable, at least in part, contextually, in terms of environmental principles acting upon behaving organisms. It is in this sense that one can detect a growing emphasis on contextualistic explanations in behavioral pharmacology.

But, as may be all too obvious from this brief exposition, there is an irony and source of potential confusion here. It returns us perhaps to Morris's wish that behavior analysts avoid using the term *mechanism*, for it is the increasing emphasis on behavioral mechanisms in behavioral pharmacology that is being described here as contextualistic! A relevant tension is interestingly illustrated in a well-received recent book that provides authoritative reviews of the phenomena of tolerance and sensitization in the behavioral effects of repeated drug administration (Goudie & Emmett-Oglesby,

1989). The first part of this book is addressed to "behavioral mechanisms" and the second to "molecular mechanisms." In the first part, chapters written by experts can be said to describe and analyze how Thompson's (1984) "general set of environmental principles regulating behavior" contributes to the effects of repeated administrations of a drug. However, as I have pointed out (Blackman, 1989, pp. 536-538), in many cases the writers seem unsatisfied by this contextual level of explanation: They are often tempted to go beyond the level of "behavioral mechanism as environmental principles" in order to address some question of "why" the effects discussed occur, often appealing to assumed underlying phenomena or processes such as competing responses, behavioral repertoires, cognitions, or expectations. Thereby, the force of what might be described as contextualistic explanations of behavioral effects of drugs is subordinated to what seems to me less-than-convincing versions of reductionistic forms of mechanism.

The root metaphor of contextualism provides a different approach to the understanding of natural phenomena from that of the more traditional scientific emphasis on (usually reductionist) mechanisms. Marr (1993) argues that mechanism and contextualism are not categories that should be contrasted in a simplistic manner. However, at the very least, behavior analysis is unusual in experimental science in that it emphasizes the explanatory power of demonstrated functional relationships between dependent and independent variables. To that extent, behavior analysis can be fairly described as contextualistic, and thereby claim welcome but often-neglected points of contact with other intellectual traditions, such as social constructionism and symbolic interactionism (see Blackman, 1991).

The acceptance of a role for contextualistic explanations is sorely needed in conjunction with traditional mechanistic modes of pharmacological thought in a truly interdisciplinary science of behavioral pharmacology. The subtlety of be-

havioral determinants of the effects of drugs (e.g., the differential development within individual animals of tolerance to the effects of a drug as a function of the behavioral baseline; see Smith, 1986) poses currently impossible challenges for the aspirations of reductionist mechanists in behavioral pharmacology.

As McMillan (1991, p. 433) has noted,

Pharmacology sometimes seems to be obsessed with attempts to find the mechanism underlying every pharmacological effect. To most pharmacologists, the term mechanism implies a biochemical, or molecular, event. Phenomenological research or explanations at the behavioral level are frequently considered to be of lesser importance.

To this extent, and in light of Skinner's (1974) discussion of meaning alluded to above, I feel comfortable with the idea that the current circumstances provided by behavioral pharmacology are such that behavior analysts should speak of contextualistic explanations. Listening mechanists from the domain of pharmacology may then have fewer misunderstandings about the relative importance of behavioral parameters and explanations in the interdisciplinary science of behavioral pharmacology.

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