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Date: Sun Apr 18, 1993 9:42 am PST
Subject: Collecting data about behavioral regularities

[From Bill Powers (930418.0900)] Ken Hacker (930418) --

> You recently described how social and behavioral scientists amass findings about behavioral regularities and how PCT scientists develop first principles about human behavior. I believe you are right, but I do not agree with the implication that there is anything wrong with collecting data about behavioral regularities.

Before I talk about collecting data, let's make the "first principles" claim clearer. It's easy to let that claim slide gradually into a boast that PCT can explain everything that happens in the animal kingdom without even collecting any data.

When I say that PCT applies to all behavior all of the time, with no exceptions, I'm trying to convey the KIND of theory it is, not claim that PCT has finally wrapped up all the problems of life and we can all go home. I'm trying to say that a principle like control of perception isn't meant to apply only to a certain population under certain conditions, and only to some unspecifiable set of people within that population. If it's true, it never stops being true and there's no person for whom it's not true.

The only comparable theory in psychology is stimulus-response theory which, regardless of semantic quibbles, is still the primary theory of behavior in the life sciences. The basic principle of S-R theory is that the environment acts on the organism through direct contact and through the sensory organs, and that out of these effects come the motor activities and their consequences that we know as behavior. This theory, too, applies all of the time to all individuals with no exceptions. It is that KIND of theory. It is meant to be a universal principle like the law of gravitation which never turns off.

There are very few psychologists today who would admit to being S-R psychologists. This is because "S-R" has come to mean a special narrow application of the principle in which only specific simple physical stimuli are assigned the role of cause, and behavioral outputs -- motor outputs -- are linked directly to the stimuli without any attempt to characterize the intervening organism -- reflexology. I have had psychologists tell me that of course S-R theory is dead -- everyone now knows that the correct theory is S-O-R, stimulus-organism-response. So if you talk about what happens to stimuli on the way through the organism, if you talk about traits and tendencies and propensities and cognitions, you are not an S-R psychologist. But of course the underlying theory is that what happens to an organism determines what it does, just as before, although now the process is more complex and takes longer.

Skinnerians do not consider themselves S-R psychologists. They talk about classes of stimuli grouped according to their effects and classes of behaviors grouped according to their consequences; they talk about contingencies and reinforcing effects which are not stimuli that affect the senses, but conditioning processes which alter the shape of behavior simply by being in existence. But if you ask any of them what, in the final analysis, determines the way organisms behave, they are very firm about the only proper answer: the environment. If you approach it the other way around and ask what it is that the environment determines, the answer is "behavior." Water deprivation causes drinking, not thirst. The only difference from S-R theory is that under Skinner, it is no longer a theory but a fundamental scientific principle. If you don't believe that the environment determines behavior, you're not a scientist.

There is one certain way to see whether any given approach to behavior is based on S-R theory: look at its experimental methodology. This cuts through all the verbal BS and shows you what the underlying model is. Throughout the behavioral sciences, the almost universal practice is to hold all variables constant as nearly as possible, and then vary just one thing -- the schedule of reinforcement, the stimulus, the situation --, while recording the change

in behavior. The more careful scientists also run dummy experiments -- odd that they should call them "control" experiments -- in which the critical manipulation is replaced by some neutral operation, so the effects of merely doing the experiment can be factored out. The results of such studies are reported, almost universally, as "The effect of treatment A on behavior B."

While philosophers of science have provided all sorts of modifying statements and disclaimers of causal implications in such conclusions, the fact is that those who do experiments under this methodology believe that if it were not for the treatment A, the change in behavior B would not have happened. The behavior changed BECAUSE OF the treatment, and without the treatment it would not have changed in the same way.

This is still S-R theory, no matter how many scientists who use this method howl that they are not, not, not S-R theorists. Those who object are simply looking at the situation too narrowly; it never occurs to them that the shape of behavior might NOT depend AT ALL on what happens to an organism. It's just that behavior doesn't depend on the environment in the simple-minded way they associate with the term S-R. For most scientists in the behavioral sciences, the real principles of S-R theory apply to all organisms all of the time with no exceptions. They have just stopped calling those principles "S-R."

PCT is incompatible with S-R theory because it says that the behavior of organisms is part of a closed loop of relationships, at the center of which is the organism's preference for what effects the environment is to have on it. If organisms are organized as PCT says they are, then S-R theory is incorrect under all circumstances and with respect to every organism, all of the time. It is incorrect now and it has always been incorrect. It was incorrect every time it was used to design an experiment, and every time it was used to interpret the results. There is no possible compromise: you can't have two incompatible universal principles operating at the same time. Since either must operate all of the time, they are mutually exclusive.

Now let's talk about "collecting data about behavioral regularities."

What does the term "behavioral regularity" mean? Usually it doesn't mean that an organism regularly, and for no reason at all, emits some pattern of behavior. Usually what it means is that the behaviors we observe have some regular connection to an observable condition in the environment of an organism. It means that if there is some change in the environmental situation -- in happenings, arrangements, information, processes -- we can learn to expect that some typical change in behavior will follow. The "regularity" in question isn't just a regular behavior like the swinging of the pendulum of a Grandfather clock. It's a regular relationship between behavior and something else. The pendulum behaves regularly, but not as a consequence of what's happening in the environment around the clock. The regularities the behavioral scientist is interested in are those that can be seen as consequences or influences of some antecedent event or situation.

So with that understanding, how would we go about gathering data about behavioral regularities?

Why, we would look for or create changes in the environment of the organism, and record consequent changes in the behavior, trying to find some regular dependency of behavior on the change in the environment. If the regularity is hard to see, we could apply the sophisticated techniques of statistical analysis to bring it out. But basically what we would be looking for is some regular way in which behavior is affected by the environment. We would be applying the fundamental principle of S-R psychology, taking it for granted. The S-R principle would be at the root of all our interpretations of what these regularities mean, as well as the method by which we go about finding them.

What would be done differently if the S-R principle were replaced in toto by PCT? As we are talking about universal principles here, there is no halfway measure or compromise possible. To use PCT, you must totally abandon the S-R principle. This means that every experimental result, every fact obtained so far under the S-R principle, must be re-evaluated and reinterpreted -- not necessarily discarded, but seen in the light of a different concept of what behavior is.

The first item to be reinterpreted is behavior itself. Under PCT, behavior is not simply a motor output of an organism or a subsequent effect in the environment. What has been termed behavior, in fact, turns out to be something quite different: a controlled outcome. And controlled outcomes are not just outcomes that happen to be stable against disturbances; they are outcomes that are perceived. What constitutes an outcome can no longer be determined arbitrarily by the external observer. The nature of an outcome is defined by the way the organism perceives the environment, and the particular outcome within the range of possible forms it might take is determined by the reference signals inside the organism. The perceptual apparatus of the organism determines the kind of thing that will be seen as an outcome, and the reference signal determines the particular state of the perceived outcome that will be sought.

So when the PCT researcher and the S-R researcher look at a particular behavior, they see different things. The S-R researcher sees an act like answering a question as a response, something that comes out of the organism as a result of a question that went into the organism. The PCT researcher sees the question as part of a controlled relationship between a perception of the person's own utterances and a perception of the utterances of another person. The answer is not caused by the question; it and the question, together, form a controlled pattern. This pattern can be disturbed, resulting in corrective action by either party; one might say "Will you please stop answering my questions with questions?" or the other might say "When I answer your questions, I want some sort of acknowledgement that you heard me." The controlled pattern spans more than one question and one answer.

In the PCT view there is no single locus of behavior. Behavior is a controlled pattern of perceptions, and includes not only what the behavior is doing but what the environment is doing. To understand behavior under PCT, it is necessary to understand the entire action-environment relationship as a continuing pattern under control by the organism and continually maintained near a state preferred by the organism.

This means that behavior can no longer be thought of as "caused." It is maintained. If the environment changes in some way that tends to alter the controlled pattern of perceptions, the motor activities of the organism shift in the way required to maintain the controlled pattern in the same form, the form intended by the organism. This relationship between changes in the environment and changes in motor activities explains the appearance that the environmental changes caused the changes in action, but PCT shows that this is an incorrect interpretation. The focus of this changing relationship between actions and the environment is the constant pattern of outcomes being maintained by the organism.

The meaning of "collecting data about behavioral regularities" is now completely different. On the way to finding such data, it may be useful to record apparent cause-effect relationships between changes in the environment and changes in motor activities. But that is not the data desired; what is desired is to find the constant patterns of outcomes that are maintained as a result of these shifts and countershifts. Those constant patterns of outcomes are the regularities of interest under PCT, the regularities that tell us what the organism is really doing.

Hierarchical PCT, or HPCT, introduces another dimension into data gathering. At one level of understanding, we see behavior as a controlled pattern of consequences in which both actions and environment play a part. But at another level, we can see that these controlled patterns can shift from one form to another, and in doing so help to maintain controlled patterns of a more general kind. So the data-gathering process expands; we now recognize regularities that are maintained by changes in lesser regularities. We see how some controlled patterns are maintained as they are, and maintained near changing reference conditions, as a means of establishing and maintaining higher-level patterns, more general ones.

Somewhere in the higher levels of control, these patterns explicitly involve other people. The organism, by altering the behavioral patterns at lower levels, presents other organisms with environmental changes that become incorporated into the controlled patterns of the other organisms, and in that

process all organisms become part of each other's controlled patterns. This is how social phenomena arise from the fundamental properties of individual organisms. The data we gather about such phenomena remains the same: we want to find the outcomes that are under control by each organism. But now the outcomes are defined partly in terms of how each organism affects and perceives the behavior of other organisms, and what intentions each organism has for the desired states of those perceptions.

So under PCT, as one would expect from any new universal principle, the same object of study takes on a completely new appearance, and both the objectives and the methods of scientific investigation become something entirely new. We are looking at exactly the same phenomena that the S-R theorist sees. But in those phenomena we discern entirely new relationships.

Best, Bill P.