Ecological Perspectives on Learning

While studying various procedures in learning, such as classical and operant conditioning, some scientists have questioned the role of artificial laboratory models and have thus assumed a more ecological perspective in understanding the learning process. Some behaviors that are more complex than Pavlov's simple reflexes appear to require no learning at all, such as beavers building dams or birds building nests. Other behaviors appear to be extremely easy or difficult for a given species to learn (Seligman, 1970). Still other behaviors can be demonstrated to develop, and sometimes very quickly or easily (Seligman, 1971), with some developing at any time while other developing only during "critical periods" of an organism's development.

Such variations call into question a key assumption of early learning theorists: that all forms of behavior are governed equally by the broadly applicable principles of learning (Seligman, 1970) -- whether those principles are based on classical, operant, or even cognitive procedures and interpretations. Those taking a more ecological perspective on learning focus on the effects of environmental context as well as the characteristics of a given species being conditioned. As such, ecological researchers assert that the generalized principles of learning must be contextually interpreted and are thus more limited in how, and to what behaviors, such principles apply.

For example, early operant scientists (Breland |_2 Breland, 1961) noticed that when shaping or training organisms to do complex tasks, many would revert to natural (that is, apparently unlearned) behaviors seen in all members of the species. Thus when teaching pigeons to pull a string for food, many would sporadically peck the string instead of pull it. From a review of such literatures Seligman (1970) concluded that this is due to the fact that a pigeon is much more biologically "prepared to learn" (thus defining what Seligman calls "preparedness") to peck at something than to grasp and pull it with its beak when food is the consequence. Reasoning much as the ethologists might, Seligman also asserts that in addition to preparedness there are certain biological constraints in the pigeon's natural environment and physiology that make a pigeon's use of its beak more successful for finding food by pecking than by pulling. Seligman's concept of behavioral preparedness thus includes the notion that an organism can be prepared, unprepared and even contra-prepared for learning a specific form of behavior.

Another ecologically effected learning phenomenon is bait shyness, or conditioned taste aversion. For example, Garcia and his colleagues (Garcia, Kimeldorf, Hunt, |_2 Davies, 1956; Garcia, McGowan, |_2 Green, 1972) found that a rat stops eating a given type of food if it later experiences nausea. In other experiments thirsty rats were given saccharin-sweetened water to drink. All animals were presented combinations of external stimuli that accompanied their drinking. These stimuli included a click and a flash of light as well as the taste of saccharin-flavored water each time the rat licked at the water dispenser. One group of Garcia's rats received a painful shock after the presentation of the click, the light and the water independently. The other group of rats received X-irradiation that would elicit nausea after experiencing each of the stimuli independently.

When Garcia tested for associations, he made a surprising discovery. The rats that were given the shock after each of the stimuli displayed aversion only to the click and the light, not to the flavored water. Those rats that received x-rays after each stimulus only

displayed aversion to the flavored water and not to the click or the light. Garcia concluded that organisms are biologically predisposed to develop certain associations between stimuli and that these take precedence over other relations. The rats in his study were prepared for the association between click/light and shock as well as taste and nausea. These associations are successful for survival in the natural environment and are easier to make because the organism is biologically constrained or prepared to do so.

Ethologists are behavioral biologists who study complex behavior patterns specific to a given species. In some cases, such patterns are consistent from one member of the species to all other members of the same species. But in other cases, there may be slight or even dramatic variations in either the behavioral pattern or the stimuli which elicit the pattern. Ethologists thus also take an ecological perspective on learning because they seek answers to questions regarding genetic contributions to complex behaviors that are clearly impacted by learning as well. For example, Thorpe studied how European chaffinche birds acquire unique dialects in their otherwise species specific songs. He raised some hatchlings where they could hear the natural songs of their species, and another group in complete auditory isolation. He found that the song patterns in each group had some components in common, but that the group exposed to natural examples of their species had other components to their songs that their isolated cohorts lacked (Thorpe, 1956).

Other ethologists, such as Konrad Lorenz (1935/1970), explored the role of critical stages of maturation and development in the phenomena of imprinting. Imprinting involves learning to stay close to or to follow movements of a mother figure rather than other adult members of a group. Lorenz even discovered that recently hatched geese goslings would attach and follow an adult chicken rather than their real mother if they experienced that chicken as a dominant substitute for their mother. He also found that hatchlings would follow him everywhere as a surrogate version of their mother if he had been the dominant figure in their environment at a critical stage of their young lives. Both Thorpe (1956) and Lorenz (1955) illustrate the complex interaction between phylogenic predispositions to acquire behaviors and ontogenic associations between behaviors and discriminative stimuli that make genetically shared behaviors for all members of a species nevertheless unique in their form of expression for individuals of that species.