Conditioning: Operant versus Classical

Operant conditioning is a form of learning in which responses that are usually voluntary (and thus emitted) come to be controlled by their consequences. It is also called Skinnerian conditioning after B.F. Skinner, who worked out its fundamental principles. Another name is instrumental conditioning, since the learned responses, which operate on the environment, are instrumental in either attaining some subsequent desirable reward or avoiding-escaping some subsequent aversive/punishing event.

Thorndike coined the name instrumental conditioning as a result of his research with cats, which were placed in puzzle boxes that they gradually learned to escape to obtain food. His research preceded Skinner's work on operant conditioning using rats and pigeons that were rewarded, respectively, for pressing bars or pecking at visual stimuli while inside what came to be called a "Skinner Box".

Thorndike formulated the Law of Effect as a result of his research: If a response in the presence of a stimulus leads to satisfying effects, then the association between the stimulus and response will be strengthened, and vice versa. This law was later elaborated in Skinner's Principles of Reinforcement.

Classical conditioning, in contrast to operant conditioning, is where responses that are usually reflexive (and thus elicited) are brought under the control of stimulus events that precede the response. This is also called Pavlovian conditioning after Ivan Pavlov, who worked out its fundamental principles through his studies of salivation in dogs, which he found could be elicited by neutral stimuli, such as a tone, that had been repeatedly presented before the presentation of food. Another name for this form of learning is respondent conditioning.

Elaboration on the Conditioning Distinction

In <u>classical conditioning</u> you are trying to increase the probability of a response (*the conditioned response,* CR)) to some neutral stimulus (*the conditioned stimulus,* CS) by pairing that stimulus with a following stimulus (*the unconditioned stimulus,* US) that already produces the response (*the unconditioned response,* UR): Initially US - - ->UR,   then CS, US - - ->UR,   finally CS - - -> CR

In <u>operant conditioning</u>, you are trying to increase the probability of a response (*the conditioned response,* CR) in the presence of some stimulus (*the discriminative stimulus,* DS, which is like a conditioned stimulus, CS) by <u>following the desired response</u> with a *reinforcing* stimulus (R, which is like an unconditioned stimulus). Alternatively, you might be trying to decrease the probability of a response (CR) in the presence of some stimulus (DS/CS) by following the undesired response with a *punishing* stimulus (P): DS/CS - - - -> CR -----> R or P

Note that in <u>operant conditioning</u>, unlike classical conditioning, there are *response consequences,* i.e., there are *reinforcement or punishment contingencies*--the reinforcement or punishment (R or P) being dependent/contingent upon the response (CR) occurring.

In contrast, in <u>classical conditioning</u> the unconditioned stimulus (US, which is like a reinforcement or punishment) follows the conditioned stimulus (CS) during training regardless of whether or not the conditioned response (CR) occurs. Here the CR, which is usually reflexive, is brought under the control of a stimulus event (CS) that <u>precedes the response</u>, rather than one that follows it.

A <u>reinforcer</u>, it should be noted, is anything that *increases* the probability of the response that it follows. A <u>punishment</u> is anything that *reduces* the probability of the response that it follows. Whether the reinforcement or punishment is <u>positive vs. negative</u> depends on whether it involves, respectively, the *presentation* vs. the *removal* of some stimulus.