Teaching Dogs the Clicker Way

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Clicker training has become synonymous with shaping. Thanks to the attention Karen Pryor brought to clicker training through the publication of her book *Don't Shoot the Dog*, many people use shaping to teach their dogs and other animals. Shaping is, of course, a unique feature of Skinner's operant conditioning that sets it apart from other behavioral learning theories that assume we learn by trial-and-error. Theories of "trial-and-error, and accidental success" (Thorndike, 1898) portray learning as a slow process that begins with many errors that are eliminated over time. The desired behavior occurs the first time largely by chance, and across trials, unwanted behaviors gradually drop until only the correct act is performed. According to Hull (1952), trial-and-error learning requires numerous repetitions to diminish the initial dominant reactions, especially if the desired response is not initially offered/successful. The animals are supposed to try and try, until they get it correct. Correct behavior is rewarded and incorrect extinguished (or punished e.g., the methods of reward-and-punishment, sticks and carrots, etc.). The picture of learning is shown as a descending curve of trying time or errors.

Behavior brought about in the trial-and-error way can be said that it was shaped by the consequences. But this is not what Skinner meant by shaping. In Skinner's view, trial-and-error learning obscured the possible contribution that differential reinforcement (paying a different quality of reward) could make, and he offered operant conditioning as its replacement.

"Operant conditioning shapes behavior as a sculptor shapes a lump of clay. Although at some point the sculptor seems to have produced an entirely novel object, we can always follow the process back to the original undifferentiated lump, and we can make the successive stages by which we return to this condition as small as we wish." (Skinner, 1953, p. 91)

The proposal is more than a refinement of the trial-and-error contingencies, it also carries with it a unique view of learning and an attitude towards teaching (Skinner, 1968), and later refined in Goldiamond's (1974) constructional approach. In an effort to differentiate Skinner's behaviorism from others' behaviorisms (or trial-and-error learning theorists), the field is now called behavior analysis and it members are called behavior analysts instead of behaviorists. The approach is implicit in clicker training and in this sense, these practitioners are also behavior analysts (which is why they are also sometimes called operant conditioners and Skinnerians). In what follows you will recognize some of your clicker methods and perhaps be made aware of other methods that you were not aware you were using.

The Shaper

In Skinner's system the shaper (experimenter, teacher, trainer, coach, etc.) takes a more active role. The shaper does more than set up the problem and watch how errors disappear or how long learners take to learn, if they learn. Rather than relying on accidents, behavior is systematically changed towards the correct behavior by changing the contingencies

of reinforcement. A contingency of reinforcement is the relation between the cue (S^D), the behavior and its consequence. In Skinner's words "Teaching is simply the arrangement of contingencies of reinforcement." (1968, p. 5). Although Skinner's idea of the shaper is sprinkled throughout his writings perhaps it was most incisive in his books *Walden II* and *The Technology of Teaching*. At the most practical level the shaper should approximate the characteristics of Skinner's teaching machine. The shaper then would:

1. Induce sustained activity.

2. Ask the student to take that step which he is at the moment best equipped and most likely to take.

3. Help the student to come up with the right answer, accomplished in part through the orderly construction of the program, and in part with techniques of hinting, prompting, suggesting, and so on, all derived from an analysis of behavior.

4. Reinforce every correct response immediately. This is why the clicker is so important.

Learning

For Skinner, the term "learning" did not have any useful reference and got in the way of the direct description of behavior environment relations. Saying that a learner learned how to swim says very little about the swimming. The term is also dangerous in that is biased towards the learner. Learning readily implies that it is something that happens to learners; and naturally the failure and success in turn is blamed on the characteristics of the learner, which gives rise to presumptions, such as intelligence and retardation. This is not to say that genes, brains and other physical and historical characteristics of the learner are not important. They are, and like any other variable related to behavior, the relation needs proof, and failure to teach and presumptions hardly constitute proof.

As Sidman (1985) points out, instead of thinking about learning curves, it is more productive to think of them as teaching curves involving the interaction of the learner, the teacher and the teaching program. Thus, learners that do not learn, or learn slowly with a given program, might learn quickly with another program, or a different teacher in the same program. In fact, if all the relevant variables are right, learning only requires one reinforcement.

In Skinner's experiments, learning did not need to be a continuous and slow gradual process, learning could be made to happen in an abrupt all-or-none fashion or without errors. In contrast to the learning curves of other behaviorists and cognitivists, Skinner's (1938) learning graphs showed a straight line of correct responding (i.e., lever pressing) and it often took one reinforcer to learn or at most a few of them. The rats learned from their success. There was no trial-and-error!

Because of this Skinner sometimes is called a one-trial learning theorist to contrast him with the trial-and-error theorists. One trial learning was possible because Skinner did not let the rats learn by themselves, he helped them by systematically controlling the relevant variables. In his words, "Prompted by Pavlov's emphasis on the control of conditions. I made sure that all Thorndike's "errors" were eliminated before a successful response could be made." (1987). Teaching rats to press the lever proceeded as follows:

First, the rats were introduced to the Skinner box until the rats were moving about the box with no signs of emotional behavior that may be produced by an unfamiliar environment. (They looked comfortable in the box). Skinner made sure that the food pellets were familiar to the rats by mixing the pellets with the rats' regular food (familiarity). He then introduced the food by delivering a food pellet into the tray in the Skinner box. This was repeated until the sound of the dispenser (which clicked) became discriminative for approaching the tray. He said:

"In order to obtain maximal reinforcement of the first response to the lever, the discriminative response to the sound of the magazine (dispenser) must be well established." (1938, p. 66)

"If reinforcing power is not first given to the sound of the magazine through the establishment of a discrimination, a certain

interval of time will elapse between the response and the stimulation from the food, and the effectiveness of the reinforcement will be severely reduced." (p. 72)

Once the magazine/sound-approach/feeder behavior was established, the lever was introduced and lever pressing was captured by reinforcement.

Clicker teachers are familiar with one-trial learning and capturing, and might be wondering why Skinner did not shape lever pressing by reinforcing movements (approximations) relevant to lever pressing. In 1938, he was perhaps constrained by being able only to operate the feeder by the action of the lever or other parts of the apparatus and thus shaping was mainly done by gradually changing the apparatus and capturing. Although fully aware of the importance of the sound for shaping and the notion of approximations, it was not until later that he could reinforce freely occurring approximations when he was able to operate the feeder with a hand switch. Skinner recollects:

> "It was only later, on Project Pigeon, that we [Skinner & the Brelands] discovered how much more expeditiously we could shape complex behavior by operating a food dispenser with a hand switch." (Skinner, 1989).

Nonetheless in 1938 Skinner was also able to teach a dark-light discrimination without errors.

These ideas were later on pursued by Terrace (1961), who among other things, trained pigeons a vertical-horizontal line discrimination with very few errors. This approach was called "errorless learning" or "errorless training," which influenced the field of Programmed Instruction, Keller's Personalized System of Instruction, Mathetics (the science of learning) in the early '60s. The ideas were further refined and conceptually advanced by Goldiamond in what is known as the Constructional Approach (Goldiamond, 1974).

Error vs Correct

Skinner was concerned with constructing, or building repertoires, not with eliminating errors. It is not an accident that the cumulative records of Skinner emphasized the desired (i.e., target) behavior and early learning curves emphasized the errors. Although he recognized that we might learn something from our errors, he pointed out that "correct behavior is not simply what remains when erroneous behavior has been chipped away." For Skinner, the term "error" (and "correct" for that matter) says very little about behavior, and discourages the direct description of behavior-environment relations (i.e., what the organism is doing instead of the correct behavior). In his system, errors are not necessary for learning to occur. Errors are not a function of learning or vice-versa, nor are they blamed on the learner. Errors are a function of poor analysis of behavior, a poorly designed shaping program, moving too fast from step to step in the program, and the lack of the prerequisite behavior necessary for success in the program (Skinner, 1968).

The choice of whether a behavior is correct or an error, is not trivial or just a matter of perspective, it may also dictate the type of procedures used in practice. In shaping, there are no errors to correct, only behavior to shape. In trial-and-error there are errors to be reduced and reduction techniques are likely to be used to this aim.

Examples of this proliferate in "traditional" obedience training:

A: To teach a dog to walk closely to heel, all errors are rigourously punished. The dog may be too far forward, too wide, or lagging behind, if the dog is not in the correct heel position, the lead is jerked. The dog is left with overwhelming anxiety, during which it must try to puzzle out what the solution is—what I am supposed to do to avoid punishment?

B: Teaching a dog a sit and stay is exactly the same program: the dog is punished for all errors, movement, changing position, barking, etc., and left to puzzle the correct behavior.

C: Spray water at the dog, hit the dog with a projectile, or produce a loud sound when the dog approaches something (e.g., food, livestock, etc.). Again all errors are punished.

Alternatively, you can use a shaping program to teach alternative behavior:

A: Teach the dog how to move close and maintain the position.

B: Teach the dog how to sit quite still.

C: Teach the dog to turn away and follow, a "come this way."

In traditional obedience training, the emphasis on the erroneous, inappropriate, undesirable, and maladaptive behavior is characteristic of PATHOLOGICAL approaches and the emphasis on the desired target behavior is characteristic of CONSTRUCTIONAL approaches.

Goldiamond (1974) describes the distinctions between the constructional and pathological approaches as follows:

> "The orientation to be proposed is a constructional one. This is defined as an orientation whose solution to problems is the construction of repertoires (or their reinstatement or transfer to new situations) rather than the elimination of repertoires.

> Help is often sought because of the distress or suffering that certain repertoires, or their absence, entail. The prevalent approach at present focuses on the alleviation or the elimination of the distress through a variety of means which can include chemotherapy, psychotherapy, or behavior therapy. I shall designate these approaches as pathologically oriented (pathos, Greek, suffering, feeling).

> Such approaches often consider the problem in terms of a pathology which—regardless of how it was established, or developed, or is maintained—is to be eliminated. Presented with the same problem of distress and suffering, one can orient in a different direction. The focus here is on the production of desirables through means which directly increase available options or extend social repertoires, rather than indirectly doing so as a by-product of an eliminative procedure. Such approaches are constructionally oriented; they build repertoires."

As you can see, shaping and the constructional approach go hand in hand because their main purpose is to build desired behavior-environment relations and, like a shaping program, the constructional approach is

guided by the answers to the following four questions (Goldiamond, 1974; Skinner, 1968):

- Where do you want to go?

- Where are you now?

- What steps are going to take you to your destination?

- What is going to keep you going?

Goldiamond pointed out that the answers to these questions further distinguished pathological vs constructional approaches. I will consider his arguments in the context of teaching dogs.

1. Outcomes or targets

Although similar outcomes may be produced by the two orientations, when viewed in terms of distress alleviated, the outcomes of the two approaches are not necessarily similar when viewed in terms of repertoires established.

Where do you want to go?

Shaping programs have an explicit target. Imagine that your dog jumps on people at the door and that makes it a problem to answer the door. If shaping, you will teach the dog to go to its mat when you answer the door. You could also teach the dog to remain sitting by your side until you release him. These behaviors are unlikely to happen by trying to decrease the jumping.

Similarly, with leash walking, the issue is not about reducing leash pulling, it is about teaching the dog to maintain self control whilst level at your side.

2. Current usable (relevant) repertoires

One can focus on (and try to describe) what is wrong, or is lacking, in order to make correction(s). In the other case, since one is trying to construct new repertoires, one must focus on what repertoires are available, are present, and are effective. Accordingly, different databases are required.

Where are you now?

What does your dog already do that can be used to begin shaping and during shaping?

It might be the case that the dog that jumps on people, already goes to its mat on cue, or responds to other commands relevant to the behavior you want to shape. You can begin your shaping program there. Or, it might be the case that you begin with the fact that your dog really likes a certain kind of treats and you have to first establish the click-food relation, before you proceed to shape the desired behavior. All of these are good places to begin, as long as they provide a means to immediately begin shaping with frequent clicks and treats.

3. Sequence of change procedures

Given different target outcomes and different starting points selected for their relevance to the outcome, the mediating procedures which convert entry repertoire to target repertoire must also differ. The data which are considered as designating progress will differ, as must assessment of therapeutic effectiveness.

What steps are going to take you to where you want to go?

This is what it is usually called the "shaping program." The final behavior is broken down into teachable units or shaping steps necessary for the correct performance. Like Chinese nesting boxes, each shaping step is a mini-program and is also guided by the four questions. For example, staying on the mat and getting up on command can also be further divided in shaping steps and those steps further subdivided and so on. Only one thing at a time is taught. The shaper either maintains the stimulus and setting constant and changes the response, or maintains the response constant and changes the stimuli or the setting, or maintains the behavior–environment relation and change the schedule of reinforcement.

Usually the response is trained first, then the cue and lastly the settings. At each step of the program, the learner has a reasonable chance of success. Periods of extinction are invitations for analysis of the program steps, the sequence, and

the environmental arrangements. Good shaping is characterized by high rates of reinforcement and low use of extinction (or minimal frustration).

4. Maintaining consequences

The consequences in one case may be progressive relief, diminution of aversive control, or gradual progression to such relief. Alternatively, they may be explicit reinforcement of units in a progression, or gradual progression toward the repertoire to be established. In the latter case, assessment concentrates on reinforcers in the natural environment.

What is going to keep you going?

What reinforcers are going to be used during training? Are these the same reinforcers that are going to maintain the behavior outside of training? In the case of the dog jumping on people, the reinforcer could be a treat during training and praise and a pleasant physical interaction after training or the opportunity to greet the visitor or eating a treat.

The constructional approach is directly derived from Skinner's experimental analysis of behavior and does not only apply to the teaching of dogs but also to other organisms such as rats, pigeons, horses and humans. Unfortunately, it is not the dominant approach. Trial-and-error learning, the attention-to-erroneous-behavior strategy and the derived teaching technology are still very much alive. One such approach in dog training is what is called "reward" training (loosely, the use of food to lure and reward correct behavior). Unfortunately, this approach can also claim the use of positive reinforcement (i.e., food). But, the very word "reward" should give us a hint that they shape more like Thorndike than like Skinner. No wonder it is often said that reward training does not work all the time, it is not for all dogs, and works best when combined with leash/collar training. It can be said that these methods involve the elicitation of behavior with food or aversive stimulation, and food and "correction" as consequences. Such an elicitation is not necessary in Skinner's system. In fact, he argued against it with Miller and Kornosky in 1937. You do not have to make the organisms do

anything or put them through anything, as was done by Miller and Kornosky (e.g., elicit the dog's foot withdrawal with electric shock and offer food). Operant conditioning only requires an active organism and an environment that favors the occurrence of the desired behavior or some other relevant behavior to the terminal behavior. Fortunately, these trainers recognize that reward training is an old technique predating Skinner. Unfortunately, they cannot tell the difference between these methods and Skinner's. But, there is still hope, and clicker training offers a strong alternative. It is also nice to see that the targets for clicker training have been evolving from teaching dogs tricks to obedience and competition to every day life skills. This is certainly well beyond typical "dog training" and falls within the constructional approach, in that the concern is switched to teach dogs behavior necessary to make the most of the dogs' quality of life and the dog-human-world interactions.

Like clicker training, the constructional approach has been criticized as being unrealistic in its almost exclusive use of positive reinforcement. But, the constructional approach, like clicker training, is more than blind faith in positive reinforcement. Clearly, the goal is to teach with positive reinforcement only and minimize extinction. We know very well that this consistently produces happy learners and better learning. We also know that what makes possible the exclusive use of positive reinforcement is the program. Every time that we find ourselves correcting or waiting too long for the response, it is time to reconsider the shaping program. Take loose leash walking, for example. Some training procedures that might be considered "positive" still produce a fair amount of pulling during extinction and the reinforcement for loose leash walking. This extinction, of course, can be minimized by systematically introducing the leash and teaching prerequisite behavior such as the heel position, walking by the teacher's side in a straight line, at the teacher's pace, turning, stopping, etc. Thus, instead of a blind faith and political or ideological alliance to positive reinforcement, shapers should be characterized as constructional trainers, as they are always looking for what to reinforce, which inevitably leads to the almost exclusive use of positive reinforcement.

References

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Teaching your dog to do tricks is a fun extension of basic obedience training. Indeed, similar principles apply to teaching tricks. Dogs thrive on the one-to-one attention they get from an owner during...Â A popular way to mark good behavior is to use a clicker. When the dog is learning a new action, the clicker works better than offering praise or a treat. Dogs are used to hearing us talk, so he may not associate your talking with his action. However, the clicker is a novel sound that your dog will hear only during training sessions, so it will help him know what he is supposed to do.[5] X Trustworthy Source American Society for the Prevention of Cruelty to Animals Leading organization dedicated to the prevention of animal cruelty Go to source. Clicker training is a fun and effective way to communicate with your pets. You can train almost any kind of pet â€" including cats, birds, dogs, rabbits, rats, and horses â€" to respond to the clicker. For example, you can teach your dog to sit or your bird to hop onto a stick using clicker training. The only thing you need is a clicker, some treats, and an animal friend. Clicker training is gentler than traditional training methods. According to Karen Pryorâ€™s clickertraining.com website, â€œIn traditional training, you tell an animal or person what to do, make that behavior happen (using force if n