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Behavior Fundamentals: Filling the Behavior-Change Toolbox

Susan G. Friedman, Ph.D.
Department of Psychology
Utah State University, Logan, UT

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Introduction

Applied behavior analysis (ABA) offers a practical model of behavioral support for veterinarians to help clients prevent and resolve behavior problems with their pets. This model divides behavior problems into two general categories: not enough of the right behavior and too much of the wrong behavior. Depending on which of the two problems we face, our goal will be to increase some behaviors and decrease others. Most often, we do both. Understanding the functional relations between behavior and environmental events is key to accomplishing these goals. Behavior is never independent of conditions, and, in the captive environment where we provide so many of the conditions, this is indeed good news.

Fortunately, nowadays there are many excellent, in-depth resources on science-based strategies for changing behavior effectively and humanely (for example, see www.behavior.org and www.goodbirdinc.com). The purpose of this paper is to highlight some of the pros and cons of several ABA strategies to sharpen the tools in your behavior-change toolbox.

Changing Behavior with Antecedent Strategies

Antecedents are the stimuli, events and conditions that precede a behavior and set the occasion for the behavior to occur. Antecedents don't cause the behavior; rather, they signal the contingency ahead: when antecedent A is present, if you do behavior B, then consequence C will follow. These are the ABCs of behavior. Antecedents are the signposts that give order to our behavior, in the sense that they tell us what to do when. There are three types of antecedents: cues, setting events, and motivating operations. Each type of antecedent can be an important tool for changing problem behavior.

Add or Remove the Cue

When clients report a behavior problem, ask: what cues the behavior?

A stimulus becomes a cue (discriminative stimulus) for a particular behavior if it is repeatedly present when the behavior is reinforced. A ringing telephone can become a cue for raucous vocalizations if raucous vocalizations result in petting when the phone rings. An offered hand can become a cue for lunging if lunging removes the hand when the hand is offered. The strength of a stimulus to cue a particular behavior is related to the strength of the reinforcer that follows the behavior. To build strong cues, deliver strong reinforcers in the presence of the cues.

Removing the stimulus that cues a problem behavior is one way to reduce it. For example, buttons and jewelry often cue chewing because chewing results in social and sensory reinforcers in the presence of those buttons and jewelry. By removing the cues (wearing T-shirts and removing jewelry), chewing necessarily decreases. Adding a cue for an alternative behavior is another way to reduce the frequency of a problem behavior. For example, opening the food door may cue lunging because lunging has been reinforced with the delivery of food.

Teaching a bird to station on a distant perch when cued prevents lunging.

Increase or Decrease Effort with Setting Events

When clients report a problem behavior, ask: how can the setting be changed to make the right behavior easier than the wrong behavior?

Setting events are the context, conditions or situational influences that affect behavior. For example, we can make coming out of the cage easier by selecting cages with large doors, which may ultimately reduce biting. We can make chewing the window-frame harder by locating the play-tree in the middle of the room. The relations between setting events and problem behavior should be considered carefully, as the setting is often one of the easiest things to change.

Strengthen or Weaken Motivation

When clients report a problem behavior, ask: what's the motivation? i.e., what consequence does the behavior produce?

Motivating operations (also known as establishing operations) temporarily alter the effectiveness of consequences. For example, a few sunflower seeds may be a highly motivating consequence to a bird that rarely has access to them but not motivating at all to a bird that has unlimited access to them every day. A bird may be more motivated to stay on a play gym after some quality time with a favorite caregiver; chasing the family cat may be less reinforcing after an energetic training session; stepping onto a hand may be more reinforcing when the bird is on the floor.

Antecedent behavior-change strategies are often preventative solutions rather than learning solutions. As a result, antecedent strategies are often the most positive, least intrusive, effective behavior-change procedures.

Decreasing Behavior with Consequences

Why Did He Do That?

When clients report a problem behavior, ask: what purpose does it serve the parrot? i.e., what does the parrot get, or get away from, by doing the behavior?

Reinforcement is the process by which behavior is maintained and increased. It is a natural process that, like gravity, is in effect whether we realize it or not. Behavior—even problem behavior—is repeated because it results in reinforcement. Clients often look in the wrong place, inside the bird, for answers to why animals do what they do (e.g., birds scream because they are hormonal, dominant, or neurotic). By focusing on the functional relations between observable behavior and consequences, clients consider causes for behavior they can do something about, namely the consequences and conditions they provide.

Extinction

Once the reinforcer for a problem behavior is identified from a functional assessment, the reinforcer can be permanently withheld to reduce the behavior. When the contingency between a behavior and its consequence (if B, then C) is broken, the behavior serves no function and eventually weakens or dies out. This process is called extinction. There are really very few problem behaviors that are well suited to extinction due to the problems cited below. Extinction is most effective the very first time a problem behavior occurs, i.e., don't give the behavior a function in the first place.

- Extinction can be a slow process, especially with behaviors with an intermittent reinforcement history, which is usually the case with problem behaviors.
- There is often an intolerably sharp increase in the frequency and intensity of the problem behavior (extinction burst) before it eventually decreases, which may result in clients reinforcing even worse behavior.
- Extinction can result in frustration-elicited aggression.

- Uncontrolled or inadvertent reinforcement can undermine the procedure (bootleg reinforcement).
- Behaviors that were previously extinguished in the past can resurge when a new extinction procedure is started.
- Over time, the problem behavior can recover and the extinction procedure will need to be implemented again.
- Other animals may imitate the problem behavior.

Punishment

Punishment is the process by which consequences decrease and suppress behavior. Behavior can be punished by contingently adding an aversive stimulus, called positive punishment (or "discipline," in casual language), or by contingently removing positive reinforcers, called negative punishment ("fines" or "penalties," in casual language). For example, when a client passes through a doorway with her bird on her hand (A), if the parrot bites (B), then the client shakes her hand sharply (C). In this scenario, biting will likely decrease (punishment) given the addition (positive) of the sharp shake of the hand. Alternatively, when a client installs a seed cup through a cage door (A), if the parrot bites the cage bars (B), then the client temporarily removes the seed cup (C). Biting cage bars will likely decrease (punishment), given the removal (negative) of the seed cup, a reinforcer.

Decades of scientific studies demonstrate the problems with positive punishment listed below. As a result of these problems, and the efficacy with which alternative strategies can be used, positive punishment should only be used to solve behavior problems when more positive, less intrusive procedures have failed (indeed, an uncommon occurrence among experienced practitioners).

- Punishment is associated with four detrimental side effects:
    - increased aggression
    - generalized fear
    - apathy
    - escape–avoidance behaviors.
- Additional considerations before using punishment:
    - Punishment doesn't teach learners what to do instead of the problem behavior.
    - Punishment doesn't teach caregivers how to teach alternative behaviors.
    - Punishment is really two aversive events—the onset of a punishing stimulus and the forfeiture of the reinforcer that has maintained the problem behavior in the past.
    - Punishment requires an increase in aversive stimulation to maintain initial levels of behavior reduction.
    - Effective punishment reinforces the punisher, who is therefore more likely to punish again in the future, even when antecedent arrangements and positive reinforcement would be effective.

Time Out from Positive Reinforcement

Time out from positive reinforcement ("time out") is a negative punishment procedure that can effectively reduce problem behavior with fewer detriments than positive punishment. Time out is the temporary removal (or reduction) of access to positive reinforcers contingent on a problem behavior. The example of negative punishment above is a time out procedure: when a client installs a seed cup through a cage door (A), if the parrot bites the cage bars (B), then the client temporarily removes the seed cup (C). Biting cage bars will likely decrease due to the process of negative punishment in which the seed cup, a positive reinforcer, was removed. Time out can be a relatively unintrusive behavior-change procedure if it is implemented correctly. It should be implemented consistently, with close contiguity (immediacy) between the behavior and the consequence; it should be short (only a few seconds is usually effective with parrots); the animal should be quickly brought back into the situation to do it again better and earn positive reinforcement; and the client should let the procedure do the job (no emotional responses).

Increasing Behavior with Consequences

Without question, the two sharpest behavior-change tools are variations of differential reinforcement. Differential reinforcement is the process of reinforcing one class of behaviors and not others.

Differential reinforcement of alternative behavior is used to replace problem behavior with a more appropriate behavior, and differential reinforcement of successive approximations is used to teach new skills. Both procedures avoid the problems and side effects of positive punishment and result in high rates of positive reinforcement that is vital to behavioral health. This is why both procedures are close to the top of the ethical hierarchy of behavior-change strategies.

Differential Reinforcement of Alternative Behavior

When clients report a behavior problem, ask: what behavior does your parrot already know that you would like it to do instead?

With differential reinforcement of alternative behavior (DRA), a desirable replacement behavior is reinforced (increased), while the problem behavior is extinguished (not reinforced). For example, screaming for attention can be replaced with chewing wood toys for attention. To use DRA, a functional assessment is necessary to identify the reinforcer that has been maintaining the problem behavior in the past, in order to withhold it. There are three things to consider when selecting an alternative behavior. First, although the behavior targeted for reduction is a problem to people, it serves a legitimate function for the parrot or the parrot would not continue to exhibit the behavior. The function is either to gain something of value, e.g., screaming to gain attention (positive reinforcement), or to remove something aversive, e.g., lunging to remove intruding hands (negative reinforcement). An alternative or incompatible behavior should be selected that replaces the function served by the problem behavior but in a more appropriate way. If the alternative behavior is incompatible with the problem behavior (i.e., if both behaviors can't physically be performed at the same time), the behavior-change program can proceed more quickly. This variation of DRA is called differential reinforcement of an incompatible behavior, DRI. For example, talking is incompatible with screaming, and standing on a far perch is incompatible with lunging at the feed door.

Second, the alternative behavior should produce even more reinforcement than the problem behavior in order to successfully compete with and replace it. According to the principle called the matching law, "... the distribution of behavior between alternative sources of reinforcement is equal to the distribution of reinforcement for these alternatives" (Pierce & Cheney, 2004). Thus, given a choice between two alternative behaviors, animals tend to exhibit the behavior that results in the greater reinforcement. The matching law is itself a powerful tool for managing behavior. For example, if staying on a perch produces double the reinforcement as flying off, birds tend to stay on the perch.

Third, the alternative behavior should be one the bird already knows how to do. During extinction of the problem behavior, a well-established alternative behavior is more likely to be performed than one that is newly acquired. When alternative behaviors are strengthened and maintained, differential reinforcement can provide long-lasting results. As this method relies on positive reinforcement to reduce problem behaviors by teaching birds what to do, it offers a positive, constructive, and practical approach to managing parrots in captivity that meets a high ethical standard.

Shaping

When clients report a behavior problem, ask: what skill does your parrot need to learn?

Differential reinforcement of successive approximations, also known as shaping, is another DR procedure. Shaping is used to teach new behaviors by the process of successively reinforcing subtle variations in responses (approximations) along a continuum that leads to the final behavior.

Shaping starts by reinforcing the closest approximation the animal already does. Next, an even closer approximation is reinforced, at which time reinforcement for the first approximation is withheld. Once the second approximation is performed without hesitation, an even closer approximation is reinforced while withholding reinforcement for all previous approximations. In this way, the criterion for reinforcement is gradually shifted incrementally closer and closer to the target behavior. Finally, every instance of the target behavior is reinforced. For example, to teach a parrot to play with a toy, the following approximations can be reinforced in turn: looking at toy, leaning toward toy, moving a foot in the direction of toy, taking one step toward toy, taking several steps to arrive beside toy, touching toy with beak, touching toy with foot, holding toy with foot while manipulating it in beak, and longer durations of toy play. If the learner experiences difficulty at any approximation, the teacher can back up and repeat the previous successful step, or reinforce even smaller approximations. Ultimately, it is the learner who determines the pace, number of repetitions, and size of the approximations in a shaping procedure.

Implementing a shaping procedure requires keen observation of the subtle, natural variation in the way behaviors are repeatedly performed. For example, each time a parrot lifts its foot, it is naturally done differently from the last time (left or right, high or low, fast or slow, with toe movement or without, etc.). In daily life, these variations are unimportant and simply classified as one behavior, or operant class, called "lifting a foot." However, this subtle variation in foot lifting is exactly what allows us to shape new behaviors such as offering a steady foot for nail trims.

With shaping, we can theoretically teach any behavior within the biological constraints of the learner. Husbandry, medical and enrichment behaviors can be shaped to reduce stress and increase physical and mental stimulation. Birds can learn such behaviors as going in and out of crates, staying calm wrapped in towels, flying to designated perches, and playing basketball. Shaping can also be used to change different dimensions of existing behaviors such as duration, rate, intensity, topography, and latency (response time).

A Final Word about Gamblers

One mystery that often surrounds problem behavior is its very persistence. Clients may have a litany of failed behavior-change programs by the time they turn to you for help. As they wade through the personal recipes of one Internet charlatan after another, clients don't realize that, with each failed attempt at behavior change, the window of opportunity closes a little bit more because the problem behavior is intermittently reinforced. Intermittent schedules of reinforcement build persistent gamblers, willing to behave again and again and again, without reinforcement, for that one jackpot that inevitably arrives. There should be nothing casual about intervening on an animal's functional "misbehavior." Each intervention should start with a careful functional assessment, and the intervention should be designed to meet the needs of the bird using the most positive, least intrusive methods. The plan should also be feasible for the client to implement. The greater our knowledge of the scientific principles and procedures of learning and behavior, the more effectively we will meet these goals.

References

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