CHAPTER

3

Concepts in Behavior

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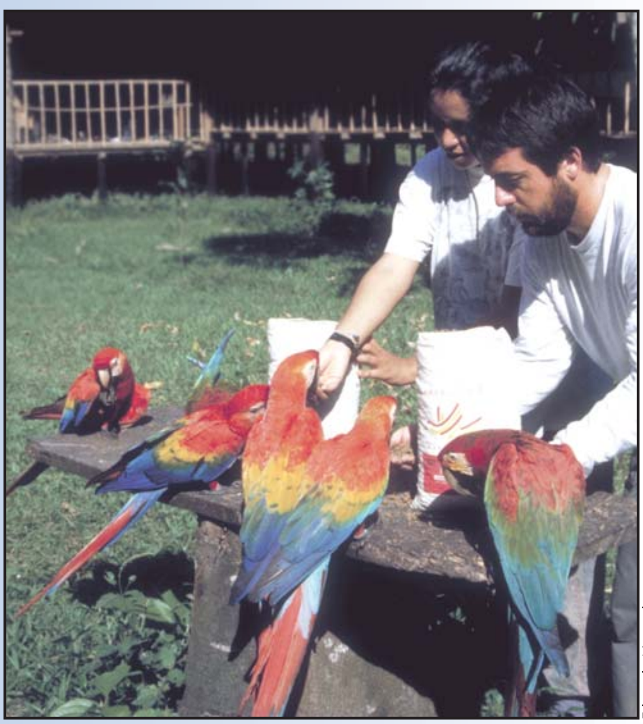

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Concepts in Behavior: Section I

The Natural Science of Behavior

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Of all the many facets of parrots' total wellness supported by veterinarians, perhaps the most challenging of all is behavior. Having adapted over eons for survival in the free-range environment, many parrot behaviors run counter to those necessary for success in our homes. This challenge is intensified by parrots' extraordinary ability to learn maladaptive behaviors from their often-unwitting caretakers. Veterinarians also face educational challenges as their pursuit of a comprehensive and cohesive knowledge of behavior often is made difficult by the fractured development of the science itself — the natural science of behavior historically crosses two disciplines, zoology and psychology, each with its own purpose and methods. Finally, among professionals and laypersons alike, there is a general lack of awareness that a science of learning and behavior exists within the field of psychology. A sound understanding of this science, known as behavior analysis, is critical to successfully keeping parrots as companions. These challenges contribute to the current state of affairs in which too many pet parrots unnecessarily fail to thrive due to behavior problems.

In this chapter, we provide the foundation for a comprehensive and cohesive understanding of behavior as it relates to facilitating the lives of companion parrots. To meet this goal, the following topics are discussed: free-range behaviors as a basis for predicting and interpreting the behavior of parrots in captivity, a simplified model for systematically analyzing the functional relationships between behavior and environmental stimuli, and the teaching technology based on the fundamental principles of learning and behavior. With this information, veterinarians will be able to better guide their clients to proactively teach their parrots successful companion behaviors and effectively analyze and resolve behavior problems that inevitably arise.

What is Behavior?

Fundamental to all science is the task of explaining phenomena by identifying observable, physical events that produce them. This is true with behavioral science as well, where the goal is to explain behavioral phenomena. In this scientific context then, behavior is anything an animal does that can be observed and measured. This includes overt behaviors that can be directly observed by others (such as preening and eating) as well as covert behaviors, which can only be directly observed by the individual so behaving (such as thinking and feeling). As a result, covert behaviors are of limited use in our work with parrots due to their inaccessibility. And, considering the difficulty most of us have guessing what members of our own species are thinking in the absence of direct measures, accurate interpretation of parrots' covert behaviors is all the more remote.

Similarly, the practice of describing what an animal *is* rather than what it *does* is an obstacle to understanding and changing behavior. Labels, such as "*is* territorial," "*is* dominant," and "*is* spoiled," do not describe behaviors, they describe ideas. These ideas, called hypothetical psychological constructs, are largely untestable theories about mental processes believed to explain behavior. Focusing on constructs often gets in the way of identifying straightforward behavior solutions. To change behavior, clients must work with behavior directly, and they should be encouraged to move past inferences of covert behaviors and construct labels to observe and describe what their birds actually do. For example, the frequently used label "is territorial" often describes a bird that bites; "is dominant" often describes a bird that does not step up; and "is spoiled" often describes a bird that screams for intolerable durations. Territoriality, dominance and the degree to which the bird is spoiled can't be changed directly because they have no tangible form; however, biting, stepping up and screaming are all behaviors birds *do*, which we can do something about.

Behavior is the result of the indivisible blend of heredity and learning. These two processes work toward the same end, ie, coping with environmental change through adaptation. Adaptation through heredity, phylogenetic adaptation, occurs slowly over generations at the species level. Through the process of evolution by natural selection, phylogenetic adaptation equips each species for common lifestyles in their natural habitat. Alternatively, adaptation through learning is an individual process that occurs within the short span of a lifetime. As defined by Chance, learning is a change in behavior due to experience.[8] Learning is the astonishing mechanism that equips each individual within a species to meet life's ever-changing circumstances with rapid modifiability.

Observations from the Field

Parrots are most brilliantly adapted for the free-range environment. For example, the physiology of wings, beaks and vocal structures prepares them well for the natural behaviors of flight, nest carving and long-distance contact calls. Clearly these and many other behaviors are supported by parrots' genes and are part of their natural history. From an evolutionary perspective, the genes that enable these behaviors likely serve survival functions related to food gathering, courtship and mating and protection from predators. It is worth noting, though, that the evolutionary origins of many behaviors often are easier to hypothesize than to prove.

Ethology, a discipline within zoology, is the field of behavior science most concerned with the study of behavior patterns characteristic of different animal species as they occur in their free-range environments. More complex than reflexes, ethologists call these species-specific behavior chains "fixed action patterns." Fixed action patterns are displayed by nearly all members of a species under similar environmental conditions, with very little variability in the way in which they are performed across individuals or instances. According to Gray, these behavior patterns are fixed in the sense that the "controlling mechanisms are 'fixed' in the animal's nervous system by heredity and are relatively unmodifiable."[12] In this sense, we call them innate behaviors.

There is some debate about how unmodifiable fixed action patterns actually are, as few, if any, behaviors can be said to be immutable or impervious to experience. Some researchers reason that "flexible action patterns" is a more accurate description of species-specific behavior chains.[21] For example, fledglings' flight skills certainly improve with practice, as does perching and climbing. Even simple reflexes can be modified through habituation[26] (eg, cats[28]) and through sensitization (eg, blowflies[9]). These studies add to the evidence that heredity and learning are inextricably entwined. Nonetheless, knowledge of the behavior patterns of free-range parrots, as well as the environmental conditions that elicit and shape them, greatly increases our ability to predict, interpret and manage many parrot behaviors in captivity. For these reasons, knowledge of the free-range behavior of parrots is important to improving the care of captive birds.

SOCIAL SIGNALS

Among the many things we can learn from the behaviors of free-range birds, perhaps the most important are those that serve a communication function among parrots. This is a language very unfamiliar to many caretakers, to the detriment of their birds and themselves. In an interesting study on cross-species communication, it was found that dog pups only a few weeks old were more skillful at reading human social cues (such as pointing, looking and touching) to locate hidden food than were chimpanzees and wolf pups.[13] The researchers theorize that dogs uniquely possess this skill due to the process of domestication in which communication skills with humans were selected.

Unfortunately, our parrots' current lack of domestication leaves them unprepared to innately interpret human signals. This puts the onus on us to accurately interpret their communications at the same time they are learning to interpret our signals. Observations from the field confirm that parrots have a rich and subtle communication system that involves nearly every feather on their bodies. Head, eye and neck movements, body posture, wings and tail and leg and foot gestures are all used as signals to communicate desires, intentions and general comfort or discomfort with current events and conditions.

Caretakers often misunderstand the behaviors used to communicate the boundaries of personal space, especially those that function to back intruders away. Most species of parrots use threatening stances rather than outright aggression to drive off perceived intruders in the wild, and many of these behaviors are seen in captivity as well. These behavior patterns are made up of various vocalizations and both overt and subtle movements and postures. Depending on the species, such warnings include raised nape feathers with wings slightly lifted, a raised foot held open at chest level, directed hacking motions with an open beak, and growling.[18] By not heeding these warnings, caretakers push parrots to escalate their message to serious biting. As a result, stress is unnecessarily increased and trust is decreased for both birds and humans. Learning to perceive, interpret and respond to these signals is essential for building relationships with captive parrots. Veterinarians can help caretakers become more astute observers of their parrots' "messages" by discussing social signals with them.

ACCOMMODATING INNATE BEHAVIORS

Other innate behavior patterns common to free-range parrots, such as loud contact calls, wood chewing, food flinging and territorial biting, can be challenging to deal with in the captive setting. Changing the environment to accommodate them to the greatest extent possible, rather than attempting to change the bird, often best manages these behaviors. For example, simply answering a bird's calls, even from another room, often deters parrots from screaming. Arranging challenging body and brain activities provides alternatives to chewing household woodwork. Offering smaller, more frequent food servings in cages fitted with aprons reduces the mess and waste of food flinging. Allowing birds to climb out of their cages when the door is opened, rather than insisting they step onto intruding hands, reduces the opportunity for biting. By keeping natural behavior repertoires in mind and arranging the environment to manage them, caretakers can focus on engaging appropriate behavior rather than disengaging problem behavior.

THE LIMITS OF LEARNING

Another important reason for clients to understand parrots' free-range behaviors is to guide the general limits of what our parrots can reasonably be expected to learn. A classic article on behavior, lightheartedly entitled "The Misbehavior of Organisms," reported the breakdown of novel trained behaviors in favor of fixed action patterns, even though food reinforcement was contingent solely on the performance of the trained responses.[3] The authors called this phenomenon "instinctive drift," as they observed that raccoons tended to rub coins with their paws in a characteristic washing motion rather than deposit them into a bank; pigs tended to toss coins with their snouts in a characteristic rooting motion rather than carry them in their mouths; and chickens tended to scratch the floor with their feet in a characteristic wiping motion rather than stand still.

Instinctive drift is consistent with Seligman's continuum of preparedness, described by Chance[6]: "An organism comes to a learning situation genetically prepared to learn (in which case learning proceeds quickly), unprepared (in which case learning proceeds steadily but more slowly), or contraprepared (in which case the course of learning is slow and irregular)." Too often, unknowing caretakers simply expect too many behaviors for which parrots are contraprepared. This occurs when, for example, caretakers insist that parrots be petted by strangers (or for some birds, petted at all), or when birds are left in cages for interminably long durations with nothing to do (from the birds' perspective). Of course, the particular limits of parrots' behavioral preparedness to learn vary greatly across species and between individuals within species; still, knowledge of species-typical behaviors observed in the free-range environment is an excellent starting point for predicting and interpreting the behavior of different species of captive parrots. It also is essential to helping clients set reasonable expectations for parrot behavior in their homes.

Applied Behavior Analysis

Ethology informs us about the behavioral norms of different parrot species in the free-range environment. While this information is important to successful companion parrot care, it is not sufficient to meet the challenges of living with captive parrots. It also is essential to have expertise in applying the fundamental principals of learning and behavior applicable to all species of animals. This is true for several reasons. First is the extent to which individuals of the same species are known to vary from one another and from expected behavioral norms: Any particular African grey (*Psitticus erithacus erithacus*) may exhibit the cuddly behaviors of the average umbrella cockatoo (*Cacatua alba*); and, any particular sun conure (*Aratinga solstitialis*) may be as quiet as the average dusky Pionus (*Pionus fuscus*). Second is the wide variability across captive environments in which companion parrots are challenged to live: Ranging from quiet, routine lives with a single caretaker to noisy, unpredictable lives full of kids and other pets, no two home environments are alike. Third, parrots' extraordinary longevity means most birds will be confronted with decades of changing circumstances for which they need to be extremely flexible learners.

When we change our focus from the species level to the individual level and from innate responses to learned responses, the natural science of behavior is (much like veterinary practice itself) a "study of one." The field of behavior science that most explicitly concentrates on the learned behavior of individuals is applied behavior analysis; it primarily is the applied science of teaching and learning, which is why it is so very relevant to companion parrots and their caretakers.

ACCOUNTING FOR BEHAVIOR

For lack of knowledge about the fundamental principles of learning and behavior, many people are utterly baffled by the things their parrots do. Caretakers often describe their birds as inscrutable creatures that behave in completely unfamiliar and unpredictable ways. People don't realize that many of their birds' behaviors are the direct result of the environments they provide and the pattern of interactions they have with their birds. A different problem is a general resistance to the idea of training animals. To some people, training carries the connotation of forcing an animal to succumb to the will of their human captors. They believe parrots should be taught as little as possible so they remain "natural." On the contrary, parrots' tendency to learn is as natural as their tendency to eat and sleep. Learning enables parrots to adapt to life in captivity and in the wild. It also is the mechanism through which we can provide enrichment activities to our birds to improve what might otherwise be a stultifying life in captivity. Concerns about force are immediately dispelled when people learn the teaching technology of applied behavior analysis, which facilitates positive-first learning solutions.

The focus of applied behavior analysis is on the environmental elements that account for behavior. By changing what we do and the environments we provide, we can facilitate behaviors more suited to life in captivity and reduce problem behaviors. This is the way to protect captive parrots from lives locked in cages, multiple homes and eventual homelessness. To make the most of every teaching/learning opportunity, clients need to know how behaviors are learned, how to functionally analyze behavior, how to teach new behaviors, and how to reduce problem behaviors with effective, non-forceful behavior intervention plans. As veterinarians often are the first and only professionals parrot caretakers turn to for help, this information is critical to providing the gold standard of veterinary care and support to companion parrots.

THE ABCs OF BEHAVIOR

Behavior doesn't randomly spurt out of a behaving organism from some internal fount, nor is it performed in a vacuum or broadcast into a void. On the contrary, behavior has function. The function of any particular behavior is related to the environmental stimuli that precede and follow it, called antecedents and consequences. Antecedents are those events or conditions that immediately precede a behavior, which set the occasion for the behavior to occur. Not all preceding events or conditions are functionally related antecedents, just those specifically related to the ensuing behavior. For example consider three common parrot behaviors - screaming, stepping up and biting. Below are examples of antecedents that may be functionally related to these behaviors in many situations:

When I leave the bird room, then the bird screams.
When I offer an open hand, then the bird steps up.
When I pet the bird, then the bird bites.

In these examples, leaving the bird room, offering an open hand and petting are all antecedents that are functionally related to the specific behaviors that immediately follow them (eg, screaming, stepping up, biting). Antecedents signal to each individual which behavior to exhibit in any given circumstance. Without the relationship between antecedents and behavior, humans would indeed behave willy-nilly, tossing out behaviors without rhyme or reason; or we may just sit there doing nothing at all.

In day-to-day conversation, the word "consequence" often is used to mean something punitive, as in, "Suffer the consequences!" In behavior analysis, consequences are those events or conditions that affect the future rate of the behaviors they immediately follow. Consequences are outcomes produced by an individual's behavior and provide environmental feedback about whether the behavior just performed should be repeated or modified in the future, when similar circumstances (antecedents) next arise. Of course, consequences don't always come from people. For example, when a new fledgling bumps against a branch when it first takes flight, it will quickly adjust the angle of its wings. No behavior emitted goes without some consequence in return, and all learners actively sift through the feedback to discover how to make behavior "work." We can add the following consequences to our examples of bird behavior from the previous section:

When I leave the bird's room, if the bird screams, then I return.
When I offer an open hand, if the bird steps up, then I praise it.
When I pet the bird, if the bird bites me, then I remove my hand.

Behaviors that produce valued consequences (such as our return to the bird room, praise and the removal of an unwanted hand) tend to be repeated or increased. Behaviors that result in consequences of no value or negative value tend to be modified, decreased or abandoned. In this way, individuals learn to operate on their environment to produce certain outcomes. Skinner called this process "operant" conditioning to emphasize the learning process in which the learner is an *active participant*.[27] (This is in contrast to respondent or Pavlovian conditioning in which the animal is a passive participant, responding reflexively to eliciting stimuli.)

As can be seen in the examples above, consequences also strengthen the antecedent-behavior relationship.

For example, if stepping up consistently produces something of value to your bird, offering your hand will become a strong antecedent for stepping up, as it signals the availability of a valued consequence.

These three terms, *antecedent, behavior* and *consequence*, comprise the ABCs of behavior. Skinner called this three-term contingency the smallest meaningful unit of analysis. In other words, no behavior can be understood in isolation of its related antecedents and consequences. Focusing on our birds' behavior alone has no meaning because their behaviors are not performed in the absence of antecedents and consequences.

FUNCTIONAL ASSESSMENT/ANALYSIS

The process of hypothesizing the functionally related antecedent, behavior and consequence is called functional assessment. It is an important tool for understanding problem behaviors and for devising specific plans to teach new behaviors. With functional analysis, caretakers can determine exactly what leads to and maintains specific parrot behaviors by systematically making changes and evaluating the effect on behavior. Finally, caretakers can design new antecedents and/or consequences to facilitate successful behaviors — their own and their birds'. When caretakers consider behavior in light of this behavior-analytic approach, the causes of problem behaviors and workable solutions often become very clear. Functional assessment and analysis reduce the likelihood that caretakers will resort to unverifiable, hypothetical constructs to explain their parrots' behavior, which may lead them further astray from practical solutions.

There are six basic steps to conducting a functional assessment/analysis:

Step 1: Operationally define the target behavior. A target behavior is the response you want to maintain, increase or decrease. To operationally define the target behavior, describe it in clear, observable terms. Ask: What does the bird actually *do*?

Step 2: Identify the antecedents that set the occasion for the target behavior. Ask: What event or condition immediately precedes or "leads" the bird to exhibit this behavior?

Step 3: Identify the consequence that immediately follows the target behavior. Ask: What happens immediately after the behavior is exhibited? What do *you* do or how does the environment respond?

Step 4: Predict the probable future behavior that most likely will occur as a result of the current consequence. Ask: Will the behavior likely be repeated, increased or decreased?

Step 5: Devise and implement a new antecedent and/or consequence to facilitate a different behavior. Ask: What can we do instead?

Step 6: Evaluate the outcome, reanalyze and adjust the teaching program as needed. Ask: Was the desired outcome achieved?

Below are three examples of functional assessments for one very common problem, a bird that refuses to step up from the top of his cage:

Functional Assessment #1: Parrot Refuses to Step Up from Top of Cage

Antecedent: Caretaker says, "Up!" and offers hand to bird on top of cage.

Behavior: Bird performs evasive maneuvers running around the cage top.

Consequence: Caretaker gives up chasing bird and walks away.

Prediction: Bird will continue to run away from his caretaker's hand in the future to avoid being removed from cage top.

Many people ascribe to hypothetical constructs to explain such "misbehavior." One pervasive theory repeated in many popular parrot magazines is that birds are asserting dominance over their caretakers by refusing to step up from the tops of their cages and are vying for control of the human-parrot flock. Caretakers are told that to solve this problem, they need to increase their rank in the eyes of their birds and disallow them from making any important decisions about what they do and when, and never allow their birds higher than the caretaker's heart level. Alternatively, a functional assessment, which adheres to describing the observable relationships between antecedents, behaviors and consequences, suggests a more plausible hypothesis, as described below:

Functional Assessment #2: Bird Willingly Steps Up When Requested

Antecedent: Caretaker says, "Up!" and offers hand to bird on top of cage.

Behavior: Bird steps up.

Consequence: Bird is returned to cage.

Prediction: Bird will step up less in the future to avoid being returned to the cage.

This functional assessment suggests that this bird has learned to run away from the offered hand simply to avoid being locked in its cage. It seems an intelligent choice from the bird's point of view, given the consequences of complying with the request. Unlike the construct explanation, this behavior-analytic explanation meets the scientific criterion of a good hypothesis:

1. We can test it by changing the consequence and see if the behavior changes;
2. it is as simple as possible, but no simpler;

3. it allows us to predict future events; and,
4. it is useful, as it implies workable, positive alternatives. For example, most parrots would be very responsive to stepping up from their cage tops if they valued the consequence for doing so. A few moments of attention before being returned to the cage and a treasured food treat after entering the cage are usually all it takes.

Of course, human behavior also is a function of its consequences. Below is a functional assessment of the caretaker's behavior whose bird refuses to step up:

Functional Assessment #3: Caretaker Leaves Bird in Cage

Antecedent: Bird is playing on cage top.

Behavior: Caretaker says, "Up!" and offers hand to bird on top of cage.

Consequence: Bird runs away.

Prediction: Caretaker asks bird to step up less often to avoid refusal.

Chances are, in the long run, this caretaker either will leave his bird in its cage more and/or become more forceful when retrieving the bird. As a result, many birds escalate their initial refusal to biting. All this caging, force and refusal are unnecessary when a simple positive strategy like offering a food treat or a few minutes of uninterrupted attention before being returned to the cage can solve the problem of birds refusing to step up from their cage tops.

Before considering how to change a behavior, caretakers should conduct a functional assessment to determine the function the behavior likely serves for the parrot. The question is not, "Why is the bird behaving this way?" but rather, "What valued consequences result from performing the behavior for this particular bird in this situation?" By changing antecedents and consequences, we change target behaviors. As antecedents and consequences most often are stimuli or conditions we control, changing our birds' behavior always is the direct result of first changing our own behavior.

INCREASING AND MAINTAINING BEHAVIOR

When you think about it, consequences influence behavior in one of two basic ways: Consequences function to maintain/increase the frequency of a behavior or they function to eliminate/decrease the frequency of a behavior. In this section, we are concerned with consequences that function to increase behavior, called reinforcers, and with the process of delivering reinforcers, called reinforcement.

The relationship between behavior and reinforcers is clear, as we see the effect of this principle all around us. When we fasten our seat belts and the buzzer stops, we learn to fasten our seat belts more often to stop the buzzer; when the cat sits in front of the door and we let it out, the cat learns to sit at the door more often to be let out; when the parrot steps up and we take it out of its cage, the parrot learns to step up more often to be removed from its cage.

Characteristics of Effective Reinforcement

Less well considered are the characteristics of effective reinforcement, the most important of which are clear contingency, close contiguity and attention to individual differences. Contingency refers to establishing the dependency between a behavior and its reinforcing consequence. Some people refer to it as "Grandma's Law," which states, "*If* this is your behavior, *then* this is your consequence." Thus, reinforcement is the process of delivering a reinforcer *contingent* upon the performance of a particular behavior. Consistency is important to establishing clear contingency between a behavior and a reinforcer.

Contingency also is clearer when reinforcers are delivered with close contiguity, the second characteristic of effective reinforcement. Contiguity refers to immediacy; that is, the shorter the interval of time between the behavior and the reinforcer, the more effective it will be in increasing the future rate of that behavior. Lattal demonstrated the importance of contiguity in an interesting study with pigeons.[19] In an effort to teach a pigeon to peck a disk, Lattal arranged to deliver a food pellet each time the pigeon moved toward the disk. However, he purposely delayed the delivery of the pellet for just 10 seconds after the target behavior was exhibited. After 40 days of 1-hour training sessions, the pigeon never learned to peck the disk. Subsequently, when the delay between the behavior and the reinforcer was reduced to 1 second, the bird learned to peck the disk in less than 20 minutes.

Reinforcers also are highly individual. Some people are not reinforced by the cessation of the car buzzer and so do not increase the behavior of buckling their seat belt; some cats are not reinforced by going outside, thus, they do not sit by the door; and some parrots are not reinforced by coming out of their cages, preferring instead to drive away the caretaker with a serious bite. Reinforcers are not what we think "should" increase the frequency of a particular behavior; rather, reinforcers are those consequences that actually do increase the frequency of a particular behavior they contingently follow. The only way to know for sure which consequences will be reinforcing for any particular bird is to try them and then observe the future frequency of the behavior.

Developing New Reinforcers

Some consequences such as food, water and warmth are inherently reinforcing to all animals from the moment they are born. These consequences are called unconditional reinforcers (also called unconditioned or primary reinforcers); they are unconditional in the sense that they are not dependent on prior experience (learning), but they do require certain conditions or "establishing operations" to function as reinforcers, eg, hunger, thirst and cold. Surely these unconditional reinforcers are part of nature's clever plan to kick-start behavior at birth for survival.

As soon as an animal starts to interact with its environment, learning begins, and many different consequences become reinforcing by being paired with existing reinforcers. These learned reinforcers are called conditional reinforcers (also called conditioned or secondary reinforcers); they are conditional in the sense that their reinforcing properties are acquired and maintained by being paired with existing reinforcers. Praise, petting and toys are examples of conditional reinforcers for many companion parrots and have become reinforcing though association with food or other valued stimuli.

The more reinforcers an individual parrot has, the more tools we have to influence its behavior, as novelty and variety are essential to effective reinforcement.[30] New reinforcers can be conditioned throughout the lives of all animals, and caretakers can make use of this process by pairing existing reinforcers with new stimuli to build a rich pool of reinforcers with which to teach and enrich their parrots' lives. Providing a constant supply of new treats, toys and activities allows our birds to sample new stimuli that may prove to be reinforcing.

Caretakers often complain that they have no way to teach their bird desirable behaviors because the bird has no reinforcers. Of course if that were the case, their bird would have no behavior. It sometimes takes sharp powers of observation to notice what reinforces a particular bird's behavior. Subtle outcomes like being set down or returned to the cage, or a caretaker's retreat, are often conditional reinforcers for poorly socialized birds. We can use even these reinforcers to increase their adaptive behavior, and condition more positive ones by association. For example, to teach a fearful bird to remain calm in our presence, we might start by withdrawing ourselves from its cage for a few seconds contingent on quiet, still behavior. If our removal functions as a reinforcer, we will see calm behavior increase over several repetitions. Again, if our removal functions as a reinforcer, saying "Good!" at the same moment we retreat will result in the word "good" acquiring reinforcing properties for this bird. Eventually, we can advance one small step at a time, reinforcing calm behavior with the word "good."

Positive and Negative Reinforcement

Admittedly, distinguishing two types of reinforcement with the terms "positive" and "negative" is at best esoteric and at worst utterly confusing. It is tempting just to avert the discussion, define reinforcement precisely and leave it at that. The distinction is pursued here because these terms are so commonly misunderstood and misused, and because positive reinforcement is the preferred strategy for changing behavior, as explained below.

Foremost, reinforcement is reinforcement. That is, regardless of type, positive or negative, reinforcement results in an overall increase in the behavior it follows when next the occasion (antecedent) is set for the behavior to be performed. A positive reinforcer is something that an individual behaves in a particular way to produce (+, add to its environment). It is gaining the reinforcer that functions to increase the behavior with positive reinforcement. Alternatively, a negative reinforcer is something that an individual behaves in a particular way to remove (-, subtract from its environment). It is the removal or escape from the reinforcer that functions to increase behavior with negative reinforcement. The example of increasing a bird's calm behavior contingent upon the caretaker's withdrawal is an example of negative reinforcement, functionally analyzed below:

Antecedent: Caretaker approaches cage.
Behavior: Bird flails.
Consequence: Caretaker remains near cage.
Antecedent: Caretaker remains near cage.
Behavior: Bird stops flailing for an instant.
Consequence: Caretaker steps back 5 paces from cage.
Prediction: Perching calmly will increase to remove caretaker from cage.

Below are additional examples of positive and negative reinforcement to make this distinction clear. Notice two things:

1. In all cases, the target behavior is increased or maintained as these examples all describe reinforcement;
2. With negative reinforcement, an aversive stimulus has to be present in the environment in the first place in order to increase behavior by its removal.

Examples of Positive and Negative Reinforcement #1:

Background: Beaker is a parrot that lunges at Grace's hand every time she puts her hand in or near Beaker's cage. Grace has decided to teach (increase) Beaker's behavior of perching on the branch farthest from the food cups so she can replenish them without Beaker's lunging.

Positive reinforcement solution:
Antecedent: Grace says, "Perch!"
Behavior: Beaker perches.
Consequence: Grace puts food and the food bowl in cage.
Prediction: Beaker will go to the perch more often to add (+) the food to the environment.

Negative reinforcement solution:
Antecedent: Grace herds Beaker to a particular perch in his cage with a stick.
Behavior: Beaker perches.
Consequence: Grace puts down stick.
Prediction: Beaker will go to the perch more to remove (-) the stick from the environment.

Examples of Positive and Negative Reinforcement #2:

Background: Of course, Grace also has a problem getting Beaker to step up from inside the cage without lunging.

Positive reinforcement solution:
Antecedent: Grace offers her hand.
Behavior: Beaker steps up.
Consequence: Grace praises Beaker enthusiastically and sets Beaker on top of the cage.
Prediction: Beaker will step up more to result in Grace's attention and cage-top location.

Negative reinforcement solution:
Antecedent: Grace holds a towel in one hand while offering her free hand.
Behavior: Beaker steps up on free hand.
Consequence: Grace sets down towel.
Prediction: Beaker will step up more to result in the removal of the towel.

As can be seen with these examples, a condition of negative reinforcement is the presence of an aversive stimulus in order for the animal to have something to work to escape. Indeed, another name for negative reinforcement is escape/avoidance learning. Research over decades with many different species of animals has shown that procedures that rely on aversive stimuli, such as negative reinforcement and punishment, tend to be associated with negative behavioral side effects. As you read the common types of side effects, consider how well they describe the behavior of many unfortunate parrots in captivity:

1. escape/avoidance behavior,
2. aggressive behavior,
3. response suppression, and,
4. fear of people or things in the environment in which the aversive stimuli are presented.[2]

The fact that these four general side effects are common descriptions of captive parrots suggests that many birds experience their environments as negatively reinforcing or outright punishing. Caretakers are encouraged to be analytical about the approaches they employ when interacting with their birds, so that they can deliberately decrease their use of aversive procedures. Positive reinforcement occasions none of this "aversive fallout," clearly making it the preferred behavior change strategy.[30]

SHAPING NEW BEHAVIOR

So far, we have discussed using positive reinforcement for maintaining or increasing the frequency of behaviors that a bird already performs. Shaping, also called Differential Reinforcement of Successive Approximations, is a procedure to teach new behaviors. To shape a new target behavior, start by contingently reinforcing the response already exhibited by the bird that most closely resembles (approximates) the target behavior. Once mastered (ie, performed without hesitation), reinforcement then is withheld for that behavior. Withholding reinforcement for a previously reinforced behavior is called extinction. Extinction results in an initial increase in responding and effort, which offers natural variability in the way the behavior is offered. Careful observation of this variability allows us to "catch" the next closer approximation with reinforcement. This process of ignoring one behavior (the mastered approximation) and subsequently reinforcing another behavior (the next closer approximation) is called differential reinforcement of successive approximations. Differential reinforcement of successive approximations is continued until the final target behavior is displayed and reinforced.

Many new behaviors required of successful companion parrots can be simply shaped and different dimensions of existing behaviors can be shaped, too. For example, proximity to a feared person or object can be increased; duration staying on a play gym or under a shower can be increased; and latency in responding to the requests "step up" or "off there" can be reduced. With shaping, an endless number and variety of adaptive behaviors can be taught and problem behaviors solved, all with positive reinforcement, thus avoiding the negative side effects that occasion more forceful or coercive methods.

Here's an example of the approximations that can be differentially reinforced to teach a parrot to play with foot toys:

1. Look at toy;
2. move toward toy;
3. touch toy with beak;
4. pick up toy with beak;
5. hold toy with foot;
6. hold toy with foot and manipulate with beak;
7. hold toy with foot and manipulate with beak for longer durations;

Table 3.1.1 | Intermittent Schedules of Reinforcement

	Fixed (set)	Variable (on average)
Ratio (number)	FR - reinforcement occurs after every "nth" response. FR 3 means that every third response will be reinforced.	VR - the number or responses required before reinforcement varies unpredictably around some average. VR 3 means the number or responses required will average around 3 but will vary.
Interval (time)	FI - reinforcement occurs after a fixed period of time elapses. FI 6" reinforcement will occur after 6 seconds elapse.	VI - the period of time that must elapse before a response is reinforced varies unpredictably around some average. In a VI 10" schedule, the average period required before the next response is reinforced is 10".

8. repeat with other toys until the behavior is generalized to all toys.

Unfortunately, negative behaviors can unwittingly be shaped as well. We inadvertently teach our birds to bite harder, scream louder and chase faster through the subtle mechanism of shaping. For better or worse, shaping is endlessly applicable to teaching our birds, limited only by our imagination and our commitment to practicing its use.

SCHEDULES OF REINFORCEMENT

Schedules of reinforcement are the rules we follow to determine when a particular instance of the target response will be reinforced out of the many responses that occur. Several so-called simple schedules are relevant here, as research demonstrates that different ratios of "behavior-to-reinforcement" result in remarkably different, but extremely predictable, patterns of behavior.

A continuous reinforcement schedule (CRF) is one in which each and every occurrence of the target behavior is reinforced. With CRF, the ratio of "behavior-to-reinforcement" is 1:1. Generally speaking, continuous reinforcement is the best reinforcement schedule to use with our birds, especially when the goal is to teach a new behavior or increase the rate of an existing behavior.[30] CRF is the clearest way of communicating exactly what behavior we want to see again. Research also has demonstrated that individuals behave in proportion to the reinforcement available for a given response.[15] There is little doubt that the more you positively reinforce your bird's desirable behavior, the more frequently your bird will exhibit desirable behavior. We get what we reinforce.

On the other end of the spectrum is a schedule called extinction (EXT), discussed previously as it applies to shaping. With an extinction schedule, no instances of the behavior are reinforced, ie, the ratio of behavior-to-reinforcement is 1:0. As the name suggests, when the particular reinforcer that maintains a behavior is withheld, the rate of that behavior will predictably decrease to prereinforcement levels. When human attention is the reinforcer maintaining a particular behavior, extinction is synonymous with ignoring, ie, we withdraw attention. Using extinction for the purpose of decreasing an unwanted behavior is not a simple procedure to properly implement. There is much to learn about the correct use of ignoring, which is briefly discussed in a subsequent section.

Somewhere between continuous reinforcement (1:1) and extinction (1:0) is another category of simple schedules of reinforcement known as intermittent reinforcement schedules. With intermittent schedules, only some (as opposed to all or none) of the target behaviors are reinforced. There are two basic dimensions along which intermittent schedules can be arranged: The first dimension regards what is being counted, either frequency of responses (called ratio schedules) or time elapsed (called interval schedules). The second dimension along which intermittent schedules can be arranged regards the predictability of reinforcement, either fixed or variable. With fixed schedules, the ratio (frequency of responses) or interval (length of time) that must occur for reinforcement to be delivered is predetermined and unchanging, ie, it remains the same throughout the program. With variable intermittent schedules, reinforcement fluctuates around a preset average and the learner never knows how many responses, or how long they must wait, for each reinforcer.

Crossing the two dimensions of intermittent reinforcement schedules results in four basic types of intermittent schedules of reinforcement: Fixed ratio (FR), variable ratio (VR), fixed interval (FI) and variable interval (VI). Numbers follow these acronyms to indicate the exact value of the unit of measure (Table 3.1.1). For example, FR 3 means every third response will be reinforced; VR 3 means the number of responses required for reinforcement will vary unpredictably around an average of every third response. An FI 6" means 6 seconds must elapse between the first reinforced response and the next. In a VI 10" schedule, the average period required before the next response is reinforced is 10 seconds.

Intermittent schedules of any kind are known to cause more persistent behavior than continuous schedules under conditions of extinction or very lean reinforcement. For example, many birds try to clamber out of their cages when the door is opened. Every once in a while they make it to the top of the cage. This intermittent reinforcement maintains their persistent effort to "escape" every time the door is opened.

The now classic analogy of the different rates of putting coins in machines observed with a coke machine vs. slot machines is a sound demonstration of the effects of different schedules of reinforcement: With the continuous reinforcement provided by the typical coke machine, most of us do not keep putting money in the slot if nothing comes out. Yet, many people continue to drop coins into slot machines with a very lean schedule of reinforcement. All things considered, our birds benefit most from our ability to "catch them being good" at as high a rate as possible and reinforcing them for it. One important benefit of this approach is that people who deliver dense schedules of reinforcement are more likely to become valued reinforcers themselves.

OBSERVATIONAL LEARNING

Observational learning describes the process of learning by observing the experience of another individual. As described in Chance,[7] it was not until the 1960s that research on observational learning really took off after initial results with monkeys were reported.[32] Since that time, research has demonstrated observational learning takes place with many different species including cats,[14] octopi,[10] bats,[11] children and adults.[16,17]

Irene Pepperberg's work with Alex, the African grey parrot, suggests the effectiveness of observational learning.[24] Her work also confirms that observational learning has enormous relevance to increasing adaptive behaviors with parrots that display limited companion repertoires or seriously maladaptive behaviors.

BEHAVIORAL MOMENTUM

Nevin hypothesized that the physics principle of momentum is a good metaphor for behavior.[22] He asserts that compliance to demanding or undesirable tasks can be increased by first requesting a series of easy or high-probability behaviors. He calls this procedure behavioral momentum. Behavioral momentum appears to be an effective positive strategy for increasing parrots' compliance to requests they initially balk at doing. For example, one author observed master trainer Phung Luu using this approach with a kea (*Kea nestor*) learning the husbandry behavior of entering a crate. Having a known negative history with crates (learned during the initial transport to the zoo), the kea ignored the cue to crate several times. Rather than forcing the bird into the crate or accepting that it wouldn't enter the crate, the trainer cued bird to several different perches in rapid succession, something the kea did without hesitation. Once the kea built up behavioral momentum by complying with the easy cues, the trainer asked it to crate at which point the bird actually leaped into the crate where a jackpot of food reinforcers was delivered. Caretakers can use the same procedure to build behavioral momentum with fun, easy behaviors before asking their birds to do something they are less than willing to do. Behavioral momentum is a positive and effective solution to overcoming behavioral resistance, much preferred over force.

Decreasing Behaviors

Scientifically speaking, punishment is the process by which a consequence decreases the behavior it follows and the consequence itself is called a punisher. As you can see, this simple, functional definition is quite different from common use, which often has more to do with venting anger than actual behavior change. Just like reinforcement, the effect of punishment depends on contingency and contiguity between the behavior and the consequence, as well as the schedule with which the punisher is delivered. Also, just like reinforcement, punishment is a very individual matter. A consequence that is punishing to one bird may not be punishing to the next bird. As always, the function of a consequence can be demonstrated only by observing the future rate of the behavior. If the behavior doesn't decrease over time, the procedure is not punishment.

There also is a distinction between positive (+) and negative (-) punishment. Positive punishment is the process of adding an aversive stimulus to the environment to decrease behavior; negative punishment is the process of removing something of value (ie, a reinforcer) from the environment to decrease behavior. Negative punishment includes relatively mild behavior-decreasing techniques such as extinction and time out from positive reinforcement, both of which are further discussed below.

Unfortunately, positive punishment is all too commonly applied to birds. To reduce unwanted behaviors, people rely on what they know, their "cultural knowledge," which is learned over a lifetime of personal experience with punishment. For lack of alternative information and skills, people often force their birds out of cages in towels, squirt them with water to move them off unapproved perches, and cover their cages to stop them from screaming. They are unaware or skeptical that positive reinforcement solutions are readily available to influence these behaviors.

NEGATIVE SIDE EFFECTS OF PUNISHMENT

As with negative reinforcement, people must be made aware of the predictable side effects occasioned by punishment. These devastating side effects are most likely to result from positive punishment procedures in environments with little opportunity for positive reinforcement. The negative fallout of all aversive strategies is important enough to repeat here:

1. escape/avoidance behavior,
2. aggressive behavior,

3. response suppression, and,
4. fear of people or things in the environment in which the aversive stimuli are presented.

Notice that one of the problems with punishment is *not* that it doesn't work. Punishment works to decrease behavior when executed correctly. This fact results in perhaps the most detrimental side effect of punishment — whenever punishment works to decrease an unwanted behavior, the person delivering the punishment is reinforced for using it. Therefore, s/he is more likely to use punishment in the future. This is not only disconcerting, it explains at least one reason punishment is so pervasive in our society, punishment often is reinforcing to the punisher.

DIFFERENTIAL REINFORCEMENT OF INCOMPATIBLE/ALTERNATIVE BEHAVIORS

Fortunately, there are effective alternatives to punishment for decreasing unwanted behaviors, which make use of differential reinforcement. Differential reinforcement first was introduced in the section on shaping, where continuous reinforcement was combined with extinction to advance from one approximation to the next closer approximation of the target behavior. In this section, two differential reinforcement strategies to decrease an unwanted behavior in favor of a desirable alternative are discussed.

With differential reinforcement of an incompatible behavior (DRI), we reinforce a behavior that is incompatible or mutually exclusive with the unwanted behavior, which we ignore. For example, if continuous screaming is targeted for reduction, we can reinforce talking because the two behaviors cannot occur at the same time. If biting people is targeted for reduction, we can reinforce chewing a foot toy because chewing a toy and biting a person are incompatible. DRI allows us to decrease the frequency of the undesirable behavior by increasing the frequency of an incompatible behavior with positive reinforcement. In this way, we take a positive reinforcement approach to decreasing undesirable bird behaviors.

Differential reinforcement of alternative behavior (DRA) is another way to indirectly decrease an unwanted behavior using positive reinforcement. With DRA, the behavior that is reinforced is not necessarily incompatible with the unwanted behavior, but is a more acceptable alternative. For example, a bird that bites to get you to remove your hand instead can be reinforced for a vocalization to make its protests known. Differential reinforcement is a highly effective approach to decreasing unwanted behavior without negative side effects and with all the benefits that positive reinforcement affords.

FUNCTIONAL MISBEHAVIOR

The example of a bird biting its caretaker's hand to result in the caretaker removing her hand from the cage brings up an interesting point: Problem behavior is often a misguided attempt by our birds to communicate a need and/or to get desired reinforcers such as our attention. For example, birds sometime display more raucous vocalizations and increased nippiness communicating that they are tired and ready for sleep. If we teach our birds more acceptable ways to communicate with us, we can decrease their undesirable behavior. This strategy has been validated in several studies with children who were self-injurious, aggressive to others and otherwise disruptive.[5] The problem behaviors the children exhibited served a valid communication function as evidenced by the significant decrease in the problem behaviors after the children learned more acceptable alternatives to gain objects, activities and attention.

With this hypothesis in mind, Alberto and Troutman[1] developed three criteria for selecting incompatible and alternative behaviors for DRI and DRA strategies that can be applied to solving behavior problems with our birds:

1. Always first analyze the inappropriate behavior to determine if it serves an important function for the bird. If it does, then a replacement behavior should be found that serves that function, but in a more appropriate way.
2. The alternative behavior should give the bird the same amount or more reinforcement than the unwanted behavior or it will just revert back to the inappropriate behavior in the long run.
3. DRI and DRA strategies work best if the incompatible or alternative behavior already is something the bird knows how to do. In this way, the effort the bird expends can be on replacing an unwanted behavior with a desirable behavior, rather than learning something new.

EXTINCTION

Extinction as it relates to shaping and differential reinforcement of alternative behavior already has been discussed, but it also can be used as a procedure to decrease an unwanted behavior by *permanently* withholding the reinforcement that has maintained it in the past. When human attention is the reinforcer maintaining a behavior, extinction is in effect when the behavior is ignored. Ignoring an unwanted behavior sounds easy enough, however, it actually is one of the most difficult techniques to use effectively.

First, many problem behaviors just cannot be ignored, such as extreme biting, screaming or chewing on woodwork. Second, extinction initially produces a reliable but temporary increase in both frequency and intensity of the unwanted behavior during the beginning stages of the procedure, called an extinction burst. Extinction bursts give new meaning to the phrase, "It's going to get a lot worse before it gets any better." Therefore, when considering using extinction, the critical issue is not whether you can ignore current levels of the behavior, but whether you can ignore significantly escalated levels of the behavior until it finally begins to decrease. Extinction is a relatively slow process and people often inadvertently reinforce unwanted behaviors at these escalated intensities, resulting in worse problems than before they began extinction.

Another challenge using extinction is that we are not always in control of the source of reinforcement that maintains unwanted behaviors. Parrots can derive reinforcement from the feeling they get when they bite our skin and from the reaction of other birds, pets or children in the environment; even an echo in a particular room can reinforce screaming. In these cases, where "bootleg" reinforcement is available to the bird, our efforts to pay no attention to the behavior will have no effect.

Finally, even after a behavior is successfully extinguished, we can count on its sudden reappearance over time. If we prepare caretakers for this "spontaneous recovery," they will more likely reinstitute extinction immediately rather than conclude the initial procedure failed. The good news is that with each reapplication of extinction the behavior is less likely to reappear in the future. Nonetheless, for these reasons, our best strategy for reducing unwanted behavior is differential reinforcement, ie, the combination of extinction of the unwanted behavior and reinforcement of a more adaptive behavior alternative. A sound axiom to guide caretakers in their choice of managing difficult behavior is, "Replace rather than eliminate." By following this rule, we teach the bird what to do instead of solely what not to do, we maintain a higher level of reinforcement and we preserve the function for the bird that was served by the original unwanted behavior.

TIME OUT FROM POSITIVE REINFORCEMENT

Time out from positive reinforcement (TO) is another negative punishment procedure used to decrease unwanted behavior. With TO, behavior is decreased by *temporarily* removing access to desired reinforcers. For example, birds can be taught to leave shirt buttons alone by setting the bird down for a few seconds contingent on the bird moving toward or touching a button. If being with the caretaker is reinforcing, removal from the caretaker will decrease the biting behavior given good delivery of the consequence (ie, contingency and contiguity).

A functional analysis of this program might look like this:
Antecedent: Caretaker is holding bird.
Behavior: Bird puts beak on button.
Consequence: Caretaker removes bird to the nearby counter for several seconds.
Prediction: Bird will bite button less to stay with caretaker.

The most common way people fall short with this strategy is by not really removing access to reinforcement at all.

For example, consider the following analysis:
Antecedent: Caretaker is busy preparing dinner.
Behavior: Bird flies to newly reupholstered couch.
Consequence: Caretaker gets bird and walks down the hall, up the stairs, steps over the sleeping dog, passes the ringing phone, passes through the door of the bird room and returns bird to its cage.
Prediction: Bird will fly to newly reupholstered couch to get more time with the caretaker on the way to a distant cage.

At that point, the bird hardly could be aware of the contingency between the misbehavior and the consequence meant to reduce it.

Three additional ways TO is commonly used ineffectively is when:
1. birds are removed from reinforcing activities for too long,
2. birds are not given another chance to behave appropriately soon after the "infraction," and,
3. the caretaker adds reinforcing emotional reactions including brusque movements, strained voices and angry faces.

The effectiveness of TO is greatly increased by following these suggestions:
1. Ensure clear contingency and contiguity by selecting a nearby TO location.
2. Keep TO short, no more than a few minutes or the bird likely will forget the connection between his behavior and the consequence.
3. After a short TO, bring the bird right back to the "scene of the crime" to earn reinforcement for doing it right.
4. Let TO do all the work for you. There is no need for other consequences or histrionics, which likely will reinforce the unwanted behavior.

Although TO is a punishment procedure, there is some evidence with children that suggests it can be used without producing the negative side effects of positive punishment.[25] In this sense, well-executed TO is a relatively mild strategy for reducing negative behavior. Even so, antecedent arrangements and positive reinforcement strategies should always be tried first before using any other strategy. If strategies such as extinction or TO are used, special attention should be paid to arranging and reinforcing positive behaviors at a high rate to maintain a positive total environment.

Conclusion

Were it not for parrots' extraordinary ability to adapt on an individual level, one might conclude that at the species level they are genetically ill equipped for the captive environment. Indeed, this may well prove to be the case for some species of parrots. Their high-decibel shrieking, ratchet beaking, food flinging, exclusive bonding, wood remodeling and long-distance flying ways make them demanding animals to care for in our homes. Ensuring parrots' success as companions will require an increased awareness of their species tendencies to set the behavioral context, and a sound working knowledge of how animals learn in order to teach them behaviors well adapted to our homes.

For years, the pervasive approach with companion parrots has been little more than a reflection of cultural beliefs about behavior. The application of scientific information has been scarce. Based on these beliefs, many people assume that behavior is caused by invisible forces originating inside the bird rather than the perpetual interaction between the individual and the environment. For example, one commonly advanced theory is that parrots are driven by a desire for dominance. This is not a benign theory, as it predisposes people to interpret behavior as a struggle for position in some supposed hierarchy and, therefore, to advocate management practices designed for caretakers to win the struggle. Such practices often are forceful and coercive, relying heavily on negative reinforcement and positive punishment, both of which are defined in part by the presence of aversive stimuli.

As a result of this dominance-drive theory, caretakers have been endlessly instructed how to take charge of their birds' behavior, issue commands and establish their superior rank. They've been encouraged to establish control by prying their bird's toes off perches, threatening their birds with towels and ignoring their bird's bites of protest. One of the most disturbing aspects of this dogma is the repeated use of an analogy to sound parenting practice so described: "You wouldn't allow a small child to decide whether or not to take a bath, now would you?" No, we would not; however, the method of choice to facilitate children's bathing would not be to pry, threaten or ignore cries of protest to get them into the tub. The first step in solving behavior problems is to identify the stimuli in the environment that set the occasion for and reinforces resistance to a reasonable request. The next step is to create an environment that sets the occasion for and reinforces adaptive, cooperative behaviors.

A common criticism voiced by advocates of negative reinforcement and punishment is that positive reinforcement results in increased permissiveness. On the contrary, the skills we want our captive parrots to exhibit do not have to change with this urgent call to change the strategies we use to teach them. For example, with positive reinforcement, parrots can quickly and easily be taught to step up from *all* perching areas; with differential reinforcement of an alternative behavior, parrots can be taught to voice their displeasure rather than bite; and with shaping, parrots can be taught to play independently for a reasonable duration rather than scream incessantly for attention.

Over the course of decades researching and teaching about positive reinforcement, we have heard many unfounded trepidations. Countless times caretakers have asked if teaching with positive reinforcement solutions diminishes intrinsic motivation, results in reward addictions, suppresses the root causes of behavior while addressing mere symptoms, exchanges one symptom for another, promotes bribery, works only with intelligent learners, works only with simple behaviors, requires massive amounts of treats and takes too much work. We are confident to report that given the extensive experimental research base, combined with decades of successful application in schools, zoos and other settings, it is clear that positive reinforcement increases our teaching efficacy in myriad ways and that these concerns are unfounded. And, we are heartened to observe among the parrot-owning public that more and more people are questioning the drawbacks and limitations of using punishment.

Foremost among the many benefits of positive-first teaching is that parrots are taught what *to do* rather than *not do*, and they are empowered to operate on their environment in ways that result in competence and self-reliance. These benefits are especially important in light of the extensive research on learned helplessness, a class of behaviors that results from having little effect on one's own outcomes when repeatedly exposed to aversive events.[20] Not only does learned helplessness result in a loss of motivation to improve one's condition when improvement is possible, it is also associated with deficits in learning, performance, and emotional problems. As this research has been replicated with cockroaches,[4] dogs, cats, monkeys, children and adults,[20,23] we have every reason to believe that these effects also are common among parrots.

Finally, applied behavior analysis not only empowers parrots but caretakers as well. Caretakers learn that behavior is functionally related to environmental antecedents and consequences, not some immutable force within. They know where to look to affect behavior directly with positive-first solutions, one behavior at a time, and they understand that to change their birds' behavior, they must change what they do. With a beginning knowledge of the principles of learning and behavior, caretakers also are better able to make reasoned, informed decisions about alternative, less positive approaches, as needed.

Veterinarians often are in the position of being the first and most credible authority parrot owners turn to for guidance on the behavior of their birds. We could do no better than to turn to the dual sciences of ethology and applied behavior analysis to lead us into a new era of understanding and skill with behavior. In this way, realistic expectations for companion parrots will emerge, as will the commitment to apply scientifically validated, positive-first behavior management strategies. Veterinarians who are knowledgeable about species-level behavior and individual learning will dramatically change the future of companion parrots and their caretakers.

Web Sites Recommended by the Author

1. www.avi-train.com
2. www.naturalencounters.com
3. www.thegabrielfoundation.org
4. www.groups.yahoo.com/group/Bird-Click
5. www.parrottalk.com

Books Recommended by the Author

1. Animal Training: Successful Animal Management through Positive Reinforcement, by Ken Ramirez (1999).
2. Clicking with Birds: A Beginners Guide to Clicker Training Your Companion Parrot by Linda Morrow (available at www.avi-train.com/manual.html).
3. Clicker Training with Birds, by Melinda Johnson.
4. Don't Shoot the Dog: The New Art of Teaching and Training (revised edition), by Karen Pryor.
5. Good Bird! A Guide to Solving Behavioral Problems in Companion Parrots! by Barbara Heidenreich. 2004, Avian Publications, Minneapolis, MN, www.avianpublications.com.
6. The Power of Positive Parenting A Positive Way to Raise Children, by Glen Latham.

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