Pavlov's Parrots: Understanding and Extinguishing Learned Fear Triggers
By S.G. Friedman, Ph.D.

When it comes to behavior analysis, we usually focus on our learners' voluntary, or *operant,* behaviors because most of our teaching challenges lie there. Companion parrots voluntarily choose to step onto people's hands, forage for hidden treats, and sing "I Left My Heart in San Francisco." They also choose whom to bite, where to perch, and what to chew. Like all animals, parrots don't just toss out behavior willy-nilly. Operant behavior is a function of its consequences. That is, parrots choose to behave in ways that produce valued outcomes and they modify or suppress behaviors that produce aversive outcomes.

Antecedent stimuli are important too but they don't elicit or trigger operant behavior in any automatic sense. Antecedents convey information that a particular contingency is available: *If* you display the corresponding behavior, *then* reinforcement will follow. For example, an offered perch signals that stepping up will be reinforced. Still, in the presence of an offered perch, a bird may choose to step up or back away. This is why we describe operant antecedents as *setting the occasion* for, or promoting, a behavior rather than causing or triggering it. It is consequences -- strong positive reinforcers -- that build reliable antecedent cues and strong behavioral responses.

Based on an understanding of these basic operant principles, effective teachers teach new behaviors and decrease problem behaviors using the most positive, least in-

1

trusive, effective strategies such as shaping and differential reinforcement of an alternate behavior. The overriding goal is to thoughtfully arrange the environment so that the right behavior is easier to perform than the wrong behavior and more reinforcing.

A Different Process

Although operant teaching technology has widespread applicability, not all behaviors, or behavior problems, involve only operant processes. There is another category of behavior, called respondent behaviors, which involve a different kind of behavior-environment relation. Respondent behaviors are automatic, involuntary responses. They are part of an individual's genetic history and include simple reflexes (e.g., blinking, endorphin release, and rapid heart rate), and complex action patterns (e.g., nest building, bathing and mating patterns). Respondent behaviors are a function of *eliciting antecedent stimuli*, not consequences. Once the eliciting stimulus is presented, the corresponding respondent behavior is triggered automatically. For example, blinking is triggered by a puff of air, and complex mating patterns are triggered by a combination of antecedent stimuli, such as longer days, abundant food, and the presence of a potential mate.

Another important feature that distinguishes operant and respondent behavior is what is learned (see sidebar for a list of some distinguishing features). With operant learning new behaviors are learned but with respondent learning *new eliciting triggers* are learned. Respondent behaviors are "pre-wired" in the animal's nervous system thus they require no prior experience to be demonstrated. Whereas operant learning is described with a 3-term contingency, stimulus-response-stimulus (antecedent-behavior-

consequence, ABC), respondent learning is described with a 2-term contingency, antecedent stimulus-stimulus (S-S; since the behavior is not learned, R for response isn't usually included in the notation). You will sometimes hear people criticize operant learning, or behavior analysis, for its mechanistic, simplistic S-S scope. These are people not well informed about the field of learning and behavior, as S-S learning describes respondent behavior; and operant learning is far from mechanistic. As a result of this misunderstanding their information can be woefully misleading.

It is this process by which new triggers are learned for innate behaviors that is of utmost importance to parrot caregivers as it accounts for one of the most common and devastating behavior problems we face with our birds: Sudden, seemingly inexplicable, extreme fears.

Respondent Learning

There are several specialized terms and corresponding acronyms used globally to describe respondent learning (also known as classical and Pavlovian conditioning). Some terms are used to describe both operant and respondent processes. Like any new language, these terms take some practice but once mastered they improve our ability to communicate easily and precisely with one another. The main terms follow below.

A *stimulus* is any object or event capable of affecting behavior. Both antecedents and consequences are stimuli. Antecedents stimulate the behavior they immediately precede and past consequences stimulate future behavior. As discussed above, respondent antecedents are automatic elicitors, whereas operant antecedents are just oc-

casion setters or behavior promoters. The word *unconditioned* means innate or auto-matic (requires no prior experience). The word *conditioned* means acquired, as in some-thing that is learned (requires prior experience). With respondent behavior, an uncondi-tioned stimulus (US) automatically elicits an unconditioned response (UR) such as when a loud, sudden noise (US) elicits a startle response (UR). Animals don't learn to startle at sudden loud noises -- the relation is innate.

Respondent learning takes place when a neutral stimulus acquires the eliciting func-tion of an unconditioned stimulus (US). This is accomplished by the repeated, close temporal pairing of the neutral stimulus and the US. Once the neutral stimulus elicits the innate behavior, the neutral stimulus is called a conditioned stimulus (CS) and the in-nate behavior it elicits is called a conditioned response (CR; indicating that it is a re-sponse triggered by a CS, rather than a US). Thus repeated CS:US → UR pairings en-able CS → CR, as with the familiar example of Pavlov's dogs: As Pavlov demonstrated, meat-in-mouth (US) elicited salivation (UR). After repeatedly pairing the US with a preceding tone, the tone became a CS that elicited the CR salivating. This is the same process by which a clicker or other secondary reinforcers such as praise acquire rein-forcing strength. By tightly pairing the neutral sound with a food treat (or other well-established reinforcers), the sound quickly becomes a learned reinforcer (technically re-ferred to as a conditioned, or secondary, reinforcer).

With this background, it is easy to connect the dots between the process of learning new triggers for respondent behaviors and the distressing advent of a beloved parrot's sudden, extreme fear reactions to stimuli that have never frightened them in the past

and cannot hurt them in any case. The vast majority of birds demonstrating these extreme fears are not neurotic, psychotic or any other reified, hypothetical diagnostic construct. These birds have learned to fear specific items or events due to the process of respondent learning, which unfortunately often occurs below the radar of our every-day awareness of our birds' lives in captivity.

For example, when a suddenly darkened veterinary exam room precedes being grabbed (US), it is not the parrot's fear responses (UR) that are learned but rather, potentially, a new trigger for fear, i.e., suddenly darkened rooms (CS). Neutral stimuli can also become a CS by being paired with other well-established CSs. This is known as higher-order conditioning. In this way, pairing neutral stimuli with suddenly darkened rooms (CS) can result in a cascade of new CSs for fear such as towels, scales, white lab coats, eye glasses, tall men, etc., all of which were closely paired with an existing CS, the suddenly darkened room.

A Robust Solution

Systematic desensitization is a type of behavior therapy known as counterconditioning that is used to reverse the effects of prior respondent learning. It is a long-standing treatment that has proven to be highly effective for helping individuals to overcome a wide variety of extreme fears and anxieties. The basis of systematic desensitization is *respondent extinction*, the procedure of repeatedly presenting a CS without the US, until the CS no longer elicits the CR. With systematic desensitization, this is accomplished by gradually exposing the fearful individual to the fear-eliciting stimulus in small, incremental steps. The criterion for advancing to the next step is calm behavior and the in-

crements should be sufficiently small as to never trigger more than the very mildest anxious response. At the final step, exposure to the CS no longer triggers fear responses. To implement systematic desensitization effectively, one needs to be knowledgeable about what fear and calm behaviors look like, not only for the species in general, but the particular individual they are working with as well. In the case of parrots, this requires very keen observation of the subtlest changes in feathers, torso, eyes, legs, feet, head positions and activities.

In contrast to systematic desensitization, a procedure known as flooding consists of presenting the feared stimulus in full strength, all at once. The animal is blocked from escaping until the respondent trigger is extinguished. With parrots, this often takes the form of forcefully restraining a struggling parrot in a gloved hand until it exhausts itself. Few, if any, educated practitioners consider flooding an acceptable form of behavior therapy, especially given the more positive, less intrusive, effective alternative of systematic desensitization.

A Hybrid Solution

In a previous section, I made the point that not all behaviors involve only operant processes and we have seen the way in which respondent processes can account for learning new triggers for automatic fear responses. Now it's time to flip the coin to make the point that not all fear responses involve only respondent processes. Since escaping a fear-eliciting stimulus reduces anxiety, the behaviors used to escape it (e.g., shrieking, moving away, flailing, and biting) are strengthened through the operant process called

negative reinforcement (i.e., the strength of an escape behavior is increased by contingently removing an aversive stimulus).

By pairing systematic desensitization with negative reinforcement we can boost the effectiveness of our intervention. For example, consider a bird who responds fearfully to a particular family member approaching its cage. Starting at the closest distance that is comfortable for the bird, the person should advance only as many steps as the bird remains calm, perhaps two feet, and then hold still at that distance. When the bird shows any sign of relaxing further (e.g. preening, rousing, eating), the person can take one-half step back, thereby negatively reinforcing the behavior. In this way, the relaxed behaviors will increase as the automatic fear responses decrease. After a few seconds the person can advance another two feet, and again retreat one-half step contingent on an increase in relaxed behaviors. Once the person can stand close to the bird's cage without triggering fear and escape behaviors, a food treat can be dropped into a food cup to positively reinforce calm behaviors (i.e., the strength of a behavior is increased by contingently adding a positive consequence). By repeatedly pairing the food treat with the person delivering it we once again rely on respondent conditioning of a new trigger, the caregiver, but this time she is a CS for positive automatic responses because her close proximity to the cage has been repeatedly paired with the food treat (US). Further, we expect to see an increase in the birds voluntary approach behaviors, at which time contingency learning can begin: When I approach the cage, if you come forward, then I deliver a treat.

Conclusion

Although operant and respondent behaviors are often presented as a sharp dichotomy, they more accurately represent a continuum. Clearly, both processes are involved in the production of all behavior. And all behavior is flexible to some degree. Simple reflexes can be modified with sensitization and habituation, and complex action patterns can be modified with experience. At the same time, as Bob Bailey has often said, "Pavlov is always on your shoulder." Bailey further explains that our job is to reduce fears and other respondent behaviors to the greatest extent possible, in order to maximize our animals' operant learning potential.

From an evolutionary or survival perspective, the process by which new fear triggers are conditioned makes so much sense. One only needs to get stung (US) by a bee one time for a buzzing (CS) sound to trigger fear responses (CR) and set the occasion for escape behaviors, which are negatively reinforced whenever the bee is successfully evaded. Yet, this same behavioral flexibility works against an animal's quality of life when new triggers are in fact harmless. By understanding both operant and respondent learning processes, we are much better prepared to understand, predict and prevent benign neutral stimuli from becoming fear triggers. We can also resolve the problem more effectively and humanely when it unexpectedly arises.

Side Bar - Distinguishing characteristics of operant and respondent behavior.

Operant Behavior S-R-S (A-B-C)	Respondent Behavior S-S-R (US-CS-CR)
Environmental Basis	Genetic Basis
Learned Behavior	Innate Behavior
Voluntary Behavior	Automatic Behavior
Behavior that is a function of its consequences.	Behavior that is function of its antecedent stimuli.
What is learned: New behavior.	What is learned: New antecedent eliciting stimuli.