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He Said, She Said, Science Says

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"Man masters nature, not by force but by understanding. This is why science has succeeded where magic has failed; because it looked for no spell to cast over nature." Jacob Bronowski, 1953.

"Never make a parrot do anything it doesn't want to do." No way, it's "Never allow a parrot to be in control." But I'm sure I read, "Parrots are partners not subordinates." Well, I was taught, "Humans must establish superior rank over their parrots." He said, she said, they said, we said. Will the real parrot behavior experts please stand up? The parrot owning community is in quite a state of confusion about how to best interact with our companion parrots. With all the contrary advice and argumentation, it's no wonder so many parrots fail to thrive in our homes while we tear our hair out searching for solutions to biting, screaming and remodeling. When push comes to shove, do we shove or do we empower our birds to choose? If we empower birds to choose do we face certain parrot anarchy? In the face of such disparate opinions, there is no better arbiter than science.

The Compass

It's not that science can be relied on to always provide the Truth. We've all been jerked and pulled by the capricious findings of science too many times to be so naïve. I mean, until they make up their minds about chocolate, coffee and red wine, count me in. Scientists themselves concede that a fact is only a fact until it's replaced by a better one. However, what science does offer, far better than common sense, conventional wisdom and other ways of knowing, is a process of *self-correction over time* that is achieved by two fundamental activities – public, peer-review and verification of findings across independent groups of researchers. Thus, although what is known today may indeed change tomorrow, it is the very best, most reliable information available at this moment.

Science also helps us navigate beyond politics. Political opinions are characterized by partisan interests motivated by self-serving objectives rather than the discovery of laws of nature. Not all differences of thought or practice should be trivialized as simply a matter of politics. Sometimes disagreements really are due to one person being right and another person being wrong. Science reminds us that personal opinion is not the only psychology we need. It also has a sharp eye for naked emperors.

Confusion sometimes prevails about the value of behavior science partly because people often incorrectly use the terms hypothesis, law and theory interchangeably. Without going too far off topic, it is important to understand what scientists mean by these terms in order to know how much weight, or credibility, any knowledge claim deserves as each term denotes a different level of surety. A hypothesis is an educated guess or rational explanation of a single event based on observation, which has not yet been proved. We make hypotheses about our birds' behavior whenever we answer the question, "Why does he do that?" Hypotheses are supported or refuted based on further observation and experimentation, which in our homes can be as straightforward as changing something we do and observing carefully what happens.

A scientific law is a statement of fact meant to explain an action or set of actions such as the law of gravity. Laws are generally accepted as valid because they have been repeatedly observed to be true. The most fundamental law of behavior is the law of effect that states *behavior is a function of its consequences*. This law is invaluable for exploring our behavior hypotheses and is discussed further below. A

theory is an explanation of a whole series of related phenomena that has been verified multiple times by independent scientists, like the theory of relativity. This is really important: People often misstate that something is "just a theory" meaning that it's an unproven guess and may even lack credibility. However, in science terminology, theories have been proven and are generally accepted to be valid by the scientific community as a whole. Scientists may continue to refine them but theories are rarely replaced entirely.

The crux of behavior theory is that learning is largely determined by external, environmental influences, and the laws of learning are general in nature, that is, they transcend species and situations. Behavior theory is not "just a theory." It is a *Theory* resulting from one hundred years of observation and experimentation across hundreds of species, independent researchers, and different situations.

Applied Behavior Analysis

There are many different scientific disciplines each with its own focus and methods that contribute to understanding different pieces of the behavior puzzle. There is ethology, ecology, animal science, zoology, social psychology, cognitive psychology and neuropsychology just to name a few. The science most closely associated with learning theory has come to be known as behavior analysis, the science of behavior change that studies functional relations between behavior and environmental events. Applied behavior analysis (ABA) is the behavior-change technology of behavior analysis. It is the implementation of behavior principles and methods to solve practical behavior problems. The hallmark of ABA is changing behavior by providing carefully arranged antecedents and positive reinforcement consequences. It's a simple, effective model based on the smallest, analyzable unit of behavior, the ABCs.

Antecedents (A) are the stimuli, events and conditions that occur immediately before a behavior (B) occurs. Antecedents function to set the stage for or promote particular behaviors. For many companion parrots, an offered hand is the antecedent for stepping up. For other parrots, an offered hand is an antecedent for running away. We would say that offering a hand is functionally related to step up behavior for some birds and running away behavior for others. Consequences (C) are the stimuli, events or conditions that immediately follow a behavior. They are functionally related to the behavior they follow if their appearance depends on the behavior occurring first. Consequences influence the frequency of future behavior, that is, behaviors that resulted in valued consequences in the past are repeated in the future; behaviors that resulted in aversive consequences in the past are modified or suppressed in the future. Consequences are nature's feedback loop that allows all animals to sensitively adapt our behavior moment by moment, throughout our lives. The consequence for a behavior today forms the motivation for doing, or changing, the behavior tomorrow.

Taken together, we have the ABCs (antecedent, behavior, consequence) to analyze the behaviors we want to understand, predict and change. After careful observation of the target behavior, the one you want to change, ABC analysis is the next step in solving behavior problems. Identifying antecedents and consequences related to specific behaviors can lead to important clues about what currently reinforces the behavior as well as changes you can make to modify it or teach a new one. ABC analysis, also known as functional assessment/analysis is an important topic in its own right but to give you a quick idea of the power of this simple tool here is one example.

Grace wants to understand why Sam, her parrot, suddenly refuses to step up from the top of his cage. Her hypothesis is that he is displaying height dominance and her solution is to establish herself superior in rank by throwing a towel over him to make him come down. Let's see what insights functional assessment offers about the situation before Sam started refusing Grace's request:

Setting events: Sam is playing with his bell on top of his cage.

- Antecedent: Grace offers her hand to Sam.
- Behavior: Sam steps up.
- Consequence: Grace returns Sam to his cage.
- Prediction: Sam will step up less in the future to avoid his cage.

There are two important points to consider about this assessment. First, behavior is a function of its consequences; that is, past consequences explain current behavior. Therefore, this analysis suggests a strong alternative hypothesis to rival height dominance: Sam currently resists stepping up to avoid the past consequence of being returned to his cage. Second, to change behavior we can 1) change the antecedents to make the right behavior easier, and/or 2) change the consequences so that doing the right behavior is more valuable to the bird than not doing the behavior.

There's usually more than one way to solve a behavior problem and each solution should be customized to the needs and learning history of each individual learner, as each bird is truly a study of one. In this case, even a couple of small changes will likely improve Sam's response to this request. For example, one possible antecedent change is to only offer the cage top play area to Sam when there is ample time for him to tire of playing with the bell before requesting that he step up. One possible consequence change is to change the association between stepping up/going into the cage, to stepping up/enjoying a small treat or head scratch. A special treat or foot toy planted in the cage ahead of time, one that is only available after returning to the cage, will add incentive to performing the desired behavior as well. Behavior change strategies are limited only by our imagination and our commitment to using the most positive, least intrusive, effective strategies.

The Proof for Empowerment

With this foundation then, we are ready to turn back to the questions posed at the beginning of this article, which comes down to this: Does science have an answer to the current disagreement about empowerment vs. subordination? If we allow parrots control over their environments will they succeed better in captivity or will we suffer certain parrot anarchy? The answers: First, yes science has an answer – to the greatest extent possible all animals should be empowered to exercise personal control over significant environmental events. Second, yes parrots' ability to thrive in captivity is improved when they are empowered; and no, we don't need to suffer certain parrot anarchy or lower our standards for good companion parrot behavior if we become more knowledgeable about learning and behavior and skilled at implementing the teaching technology of applied behavior analysis. These assertions are firmly based on the results of several lines of scientific inquiry that span many decades, species, situations and independent researchers.

One fascinating demonstration of the emotional gain that comes from having control over one's environment comes from experiments with human babies only 3 months old (Watson, 1967, 1971). In these experiments, the babies were lying in their cribs with their heads resting on pillows. Under the pillows of the first group was a switch that operated a mobile whenever the infants turned their heads. The babies in the second group had no control over their mobiles although their mobiles automatically moved as much as the first groups' did. Positive reinforcement theory predicts two outcomes: 1) Frequency of head movements in the first group will increase since doing so is reinforced by the mobiles' movement (the mobiles' movement is dependent on what the babies do). 2) The frequency of head movements in the second group will not increase since doing so is not reinforced (the mobiles move independently of what the babies do). Indeed both hypotheses were confirmed. However, other differences were observed in the two groups of babies that were very surprising. Initially, both groups of babies responded to the moving mobiles by

cooing and smiling, a reasonable measure of well-being. These happy responses continued throughout the experiment for those babies who controlled their mobiles. For the babies who did not control their mobiles, the cooing and smiling quickly stopped. Apparently, one part of what makes consequences reinforcing is the power to control one's own outcomes.

Another relevant line of research is the free food phenomenon, also known as contrafreeloading. With contrafreeloading, animals choose to perform a learned response to obtain reinforcers even when the same reinforcers are freely available. For example, given a choice between working for food and obtaining food for free, animals tend to choose to work, often quite hard, with a bowl of free food placed right next to them. This phenomenon has been replicated with rats, mice, chickens, pigeons, crows, cats, gerbils, Siamese fighting fish, and humans (Osborne, 1977); starlings (Inglis & Ferguson, 1986); Abyssinian ground hornbills and bare-faced currasows (Gilbert-Norton, 2003); and *captive parrots* (Colton, et al., 1997). There are several interesting hypotheses explaining why this phenomenon occurs. For example, contrafreeloading behavior may be motivated by innate foraging behaviors that are otherwise frustrated in captivity; animals may be engaging in information seeking behaviors as they work to predict the location of optimal food sources; or they may be responding to the additional reinforcement provided by stimulus changes when one works for food such as the sound of a hopper. None-the-less, animals' preference to behave in ways that impact their environment is demonstrated once again. Animals are built to behave not to be passive.

A third area of scientific inquiry, called learned helplessness, adds additional support to the theory that personal control over significant environmental events motivates animals to behave healthfully. This phenomenon further demonstrates that a lack of control can have pathological effects including depression, learning disabilities, emotional problems (Maier & Seligman, 1976), and suppressed immune system activity (Laudenslager, et al., 1983). Learned helplessness occurs when an animal is at first prevented from escaping aversive stimuli. Later when escape is possible the animal continues not to respond as if helpless, choosing instead to give up and remain passively in the presence of the aversive stimuli. This research has been replicated with cockroaches (Brown, Hughs & Jones, 1988), dogs, cats, monkeys, children and adults (Overmier & Seligman, 1967). Further, Seligman's (1990) research suggests that we can "immunize" learners from the effects of lack of control by providing them with experiences in which their behavior is effective. In this way, the effects of exposure to uncontrollable outcomes, which is inevitable in all our lives to some degree, can be minimized.

From the confluence of these three related research areas, it seems obvious that parrots who are empowered to make important decisions, such as when to exit or enter their cages or go on and off their caregiver's hands, will indeed experience greater behavioral and emotional health in captivity than those who are prevented from being so empowered. Additionally, there is every reason to hypothesize that a lack of control explains some, if not many, of the pathological behaviors we see in parrots such as self-mutilation, mate killing, and phobias.

Positive Reinforcement Training

Animal trainers often refer to positive reinforcement training as reward training or operant conditioning (OC). The very word *operant* denotes choice, that is, the animal is the *operator* of its environment and operates in whatever way it chooses. Animals' biology organizes our choices such that we operate to get valued consequences (positive reinforcers) and to avoid aversive ones (negative reinforcers and punishers). When we add to OC the additional steps of careful behavior observations, functional assessment and databased decision making we have all the elements that comprise ABA.

With positive reinforcement training we teach by offering contingencies for behavior. For example, *if* you step on my hand (B), *then* you get a consequence (C) of value to you such as a treat, activities outside of your cage, and

attention. When a parrot refuses to step up, it chooses not to get the consequences that result from stepping up. When this happens it's evidence that the current consequences for stepping up are not sufficiently reinforcing for this individual at this time. The next step is to consider how you can rearrange the antecedents and offer different consequences so that they are motivating (reinforcing) to this individual bird. Maybe you are asking for too big of a behavior and need to reinforce smaller approximations such as tiny movements toward your hand; perhaps what you think is a positive reinforcer really isn't one for this individual and you need to try something else. The most important question any teacher can answer before asking a learner to do something is, "Why should he?" In other words, effective teaching is not the result of rank or entitlement ("Because I said so!"). These sources of power too often result in forcing birds with towels or leather gloves. The power to teach effectively comes from controlling the antecedents and consequences, not the bird.

Here is one example of using ABA strategies to teach an intractable bird to willingly exit her cage with positive reinforcement. Skyler is Deb Olson-Hill's young Amazon parrot who refused to come out of her cage for months after having been scared by a high-energy dog. After attempts to force her to come out taught her to become more aggressive, Deb learned some basic positive reinforcement training skills. Recalling that her play gym was one of Skyler's favorite play spots before this incident, Deb set to the task of teaching Skyler that coming out of the cage was more reinforcing then staying in it. This was just the first step in her training program.

- Setting Events: Deb placed the play gym in front of Skyler's cage and opened the door.
- A: Deb put some favorite treats in the play gym dish.
- B: Skyler climbed out of her cage onto the play gym.
- C: Access to favorite treats was provided.
- Prediction: Skyler will continue to come out of cage more to get treats.

By providing Skyler with many opportunities to *choose* to come out to the play gym for treats that were not otherwise available, Skyler quickly learned that the consequence for coming out of her cage was reinforcing. With each repetition, her confidence to leave the cage grew. Soon, Deb began raising the criterion for reinforcement by moving the play gym incrementally further from the cage, allowing Skyler to master each step along the way. Eventually, the play gym was far enough away from the cage that she needed Deb's hand to get to it and to return to her cage after play. Now Deb's offered hand had value as a reinforcer for stepping up.

Soon they began walking around the house generalizing Skyler's behavior to other locations and people for treats, praise, and head scratches. At all times, Skyler was empowered to choose and positive reinforcement was delivered for the right choice. Now, after several months of empowering Skyler in this way, Deb recently reported, "My 'angry,' 'psycho-Amazon' will now go anywhere with anyone. On her first real trip to the vet, she remained very calm. Her eyes weren't even pinning when the Dremel tool came out to file her nails!" Deb and her family did more than teach their parrot to step up. By giving Skyler the power to control environmental events and delivering positive reinforcement they taught her to be confident, bold and resilient.

Yeah But…and Other Distractions

I am reminded of a cartoon that depicts a shattered fish bowl on the floor and the mother goldfish is saying to her baby, "There are no limits, honey – you can be anything you wish to be." Of course there are always limits of acceptable behavior both in the wild and in our homes. Parrots should not be empowered to bite, decimate the furniture or scream for hours. If the house catches on fire, you will of course get your birds to safety in whatever way you can.

The issue under debate is not *what* behavior parrots should do – it's *how* we teach them to do it. With a sound knowledge of the tools of applied behavior analysis it is a reasonable goal to facilitate, rather than force, all behavior.

Another common distraction is the claim that positive reinforcers are nothing more than bribes. If that is the case, nature herself stands at the front of the line of offenders as consequences shape the behavior of *all* animals. Learning is defined as behavior change due to experience. The experience that changes behavior is interaction with the environment. In the case of captive parrots, it is simply a fact that we control most of the antecedents and consequences and should therefore do so in ways that positively reinforce the behaviors we want to see more. Not to mention that bribes are typically intended to induce corrupt or nefarious behavior. Stepping on and off hands, remaining on play gyms, chewing approved items and communicating in pleasant tones hardly fit that description.

Conclusion

There is a Turkish proverb that says, "No matter how far you have gone on the wrong road, turn back." There is an alternate road before us that leads to a validated teaching technology based on empowerment through choice and positive reinforcement. There are currently several popular belief-systems regarding how to best manage parrot behavior. When opinions differ, and emotions are strong, and the stakes are high, science should hold a higher value than conventional wisdom. Science demonstrates that there is a reliable correlation between behavioral health and environmental control. In fact, control is what makes behavior effective. Further, it is quite possible that by empowering parrots throughout their lives we actually immunize them against depression and other behavioral pathologies associated with captivity.

When we understand how behavior works we don't need to choose between empowered birds and birdy bedlam. We *can* never make a parrot do something it doesn't want to do and still have parrots who exhibit reasonable companion bird behaviors. People should view forceful and coercive training methods as stealing behavior that can be given to us instead by skillful use of positive reinforcement and facilitative antecedents. Keeping parrots offers us this opportunity and this responsibility to educate ourselves about teaching and learning. It's fortunate for parrots and people that we are empowered to choose a more humane and effective road.

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