Methods to Train New Behaviors

There are a number of various techniques that can be used to train a behavior from start to completion. In many cases, you may use a combination of the techniques:

1) Modeling
2) Distraction
3) Social Learning
4) Bribing, Baiting, or Luring
5) Capturing
6) Shaping with Successive Approximations
    1) Selective or Differential Reinforcement

Shaping through Successive Approximations will be the technique most often used as it has many advantages over reliance primarily on the others. All techniques are described below with advantages and disadvantages listed.

1. Modeling

Modeling involves physically moving or manipulating the animal or parts of the animal's body into the correct position or behavior. The trainer must physically contact the animal and manipulate him/her into position. This technique has very few benefits and significant drawbacks.

One advantage is that the animal may learn to relax and allow the trainer to physically manipulate him/her into position.

Disadvantages include:

- Obvious keeper safety issues when physically manipulating an animal
- Physically manipulating an animal may trigger resistance to being moved or forced into position. This could lead to aggression if the animal feels threatened.
- Very little learning about the actual behavior occurs when using modeling.
- It may be difficult and time-consuming to move from modeling to having the animal make the movement on his own.

2. Distraction

Distraction involves giving the animal enough good food so he/she does not pay attention to what is happening; for example, give an injection while animal eats preferred food items and is inattentive to the injection.

Advantages:

- May reach end goal quickly if animal is not fearful and food motivated
- Learns to ignore human activity

Disadvantages:

- During procedure animal may decide the food is not good enough and break position
- Erodes trust – animal may become more aware or suspicious of human activity

- No behavior is learned; only a situation that isn't as easily transferrable
- No steps to retrace if regression occurs

3. Social Learning

Social or observational learning involves animals learning by observing and mimicking each other.

Advantages:

- This can be an effective initial step in the training process because it repeatedly exposes animals to behaviors or behavioral sequences. For example, it has been documented that young marine mammals who follow adults during a show, will learn the show sequence of behaviors more quickly than those who have not had that experience. Another example involves urine collection training with chimpanzees – chimps who watched videos of other chimpanzees doing the urine collection behavior and receiving their reinforcement, learned significantly quicker than those who didn't have any observational learning opportunities.
- This technique will be most effective on social animals as they are predisposed to functioning within a social context and learning from group members is a normal behavior.

Disadvantages:

- It's unlikely that reliance upon social learning can replace the need to actually train the behavior but it may help to accelerate progress.
- Animals who learn a sequence of behaviors through social learning may require re-training individual components of the sequence.
- The learning will be highly contextual and transferring it to another set of circumstances can be challenging.

4. Bribe vs. Reinforcement – It's all about the timing!!!

- Reinforcement occurs IN CONJUNCTION WITH (e.g., bridging), and immediately following (e.g., delivering primary reinforcement), the desired behavior
- A bribe is offered BEFORE the behavior occurs, and is used with the purpose of eliciting the desired behavioral response
- Bribing and reinforcing are not mutually exclusive.
- Example #1: You want to teach the tortoise to touch a target, so you smear some strawberries on the target to entice him to move towards it and touch it.
- Example #2: You want to teach the elephant to move backwards so you toss a piece of food between his front legs to encourage backwards movement.
- Bribes can be an effective way to initiate movements necessary for a new behavior as long as eliminating the bribe is a part of the process.

Advantages:

- Animals can learn quickly to make a particular movement

Disadvantages:

- Animals are good trainers of people and can quite easily learn that if they hold out and don't do the behavior being bribed, that the human will increase the bribe value to encourage the behavior. Thus, the animal gets more for behaving worse.
- If you don't quickly replace the bribe with a cue and proper reinforcement, it can be more difficult to as the behavior becomes more tied to the bribe.

Therefore, when using bribes to teach a new behavior, it's helpful to adhere to the following guidelines:

- Establish a cue from the onset of the bribe. For example, shift training – put food down in adjacent cage, say "shift" and point in the direction the animal should move
- Bridge and reinforce the behavior as it occurs. Animal moves to get the food bribe, bridge as he/she makes the movement
- Provide a reinforcer of greater value than the bribe. Animal prefers banana over carrot – use carrot as bribe and when animal moves to get the carrot, bridge, and give banana as primary reinforcer
- Once animal will move or do the behavior for the bribe, reduce the magnitude of bribe (size or yumminess) which allows you to begin to 'fading out the bribe'.
- When you cue with no bribe, this is a big step – Be sure to reduce criteria/expectation (e.g. elephant backs up 1 step with no bribe = good response to cue), then build behavior with no bribe to expected criteria (e.g., elephant backs up 15 steps on cue only). In other words, reinforce animal for making partial move or doing part of the behavior with no bribe, and gradually work up to doing the full behavior with no bribe.

5. Capturing Behavior

Capturing involves reinforcing a behavior when it naturally occurs. Although there are some behaviors that can only be trained by capturing (urination, vocalization), it isn't as strong a method as Shaping.

<u>Advantages:</u>

- Learning to respond can happen quickly. For example, if an animal leans against the caging with his arm, you can easily assign a cue "arm" and touch it, bridge and reinforce. This may establish the behavior of 'arm' quickly.

<u>Disadvantages:</u>

- Capturing behavior as a primary means of training doesn't provide the animal with the strong learning history that's associated with shaping.
- When regression occurs, there are no small steps to be retraced. Therefore, waiting for the behavior to be offered again is the trainer's best and sometimes only option. This can be time consuming and frustrating if the animal doesn't offer the behavior.
- Behaviors can be tied to a very particular set of conditions such as location, position, etc. This can make generalizing the behavior to other locations or situations difficult.
- When training body parts, it's easy to train animal to sit still while you touch the body part, rather than teaching the animal to bring body part to you on cue
- When comparing capturing to shaping, there's no opportunity to "learn to learn" and no generalization.

6. Shaping with Successive Approximation – Best technique to use

Shaping involves the use of successive approximations, which are small steps that build on each other and together make up the final behavior.

- The steps become a series of intermediate goals
- Learning happens by repetition
- Shaping involves many steps and many repetitions that build on each other
- Because there is a learning history associated with every behavior trained through shaping, regression is easily addressed
- Once one behavior is trained, similar behaviors are easier to train (see Generalization in terminology list)
- Once an animal "learns to learn" (i.e. understands how training works), it's easier for him/her to learn more difficult and complicated behaviors

Once a behavior is learned, differential or selective reinforcement (see terminology list) is used to continue to 'raise the bar' of the behavioral performance or quality.

- Identify what aspects of the behavior need to be improved (e.g. duration – how long holds position; intensity – how hard animal presses hip into mesh, etc.) = Define "higher quality"
- Lower quality or a lesser response should not be reinforced. If you reinforce a range of responses, how will the animal sort out what it is you actually want? This is really about consistency in what the trainer actually reinforces.
- Selective reinforcement can be used to improve the response time, duration, or intensity or any other aspects of a behavior.
- Example: You want the tamarin to move into the crate with all 4's, so when the last foot is raised from the floor towards the crate, he is reinforced.

Karen Pryor's Laws of Shaping (from <u>Don't Shoot the Dog</u>) - read detailed description in book

- Raise criteria in small increments
- Train one aspect of the behavior at a time; don't shape two criteria simultaneously
- *During shaping, put the current level of response on a variable schedule before adding or raising the criteria (Author's note: you can use magnitude of reinforcement rather than variable schedule to achieve same result)
- When introducing a new criterion, or aspect of behavior, temporarily relax the old ones.
- Stay ahead of your subject: Plan your shaping program completely so if the animal makes a sudden leap in progress you're prepared
- One primary trainer per behavior. Can have multiple trainers per animal.
- If a shaping plan doesn't yield progress, try another; there are many ways to train.
- Don't interrupt a training session gratuitously; that constitutes punishment.
- If behavior deteriorates, "go back to kindergarten".
- End each session on a positive note when possible. At least quit while ahead.

Note: *this 'rule' is not one that we've found to be essential or necessary when shaping behaviors

Use of targets in training of new behaviors – Why Use Targets?

- Associated only with PRT and have a powerful influence over behavior. Animals pay attention to the stimulus
- Allows extension of arm which is helpful when positioning an animal, and increases safety
- Safety – keeps hands safe from grabbing, trapping, biting by animals
- Helpful when teaching new behaviors
- Once behavior is trained, can be used to cue behaviors, or can transition to hand cue. If behavior deteriorates, use targets to regain behavior as it was originally trained
- Watch what you do with target when not using it – giraffe A to B example.
- Animals pay close attention to the target, so when you're not using it, hold it down or away from animal
- Holding the target or carelessly waving it in front of the animal can cause confusion

When teaching the target, you may see these common responses to the target:

1) Curious – approach and sniff, investigate or touch. This is a wonderful starting point.
2) Fear – animal may retreat when target is presented. Be cognizant of how it's presented/oriented (may look like dart gun). Try changing orientation of target, smaller target head or shorter target pole
3) Aggressive – bite, hit, grab target – usually a result of fear. May be necessary to desensitize to target before actually using it as a target
4) Ignore – Look away, pretend not there. This may also be mild fear response. Find opportunity to reinforce animal for looking in direction of target, shifting weight towards it, etc for any small steps towards target. You can bait the target in this case, but prefer for animal to learn this early behavior without bribe as it forms a better foundation of learning compared to teaching reliance on bribe as first behavior in newly developing PRT program

In the real world . . . . It's likely you'll use a combination of shaping and capturing, but shaping should be the primary way to teach new behaviors.

- Be opportunistic – if the animal presents the behavior, capture it! But you'll also want to shape to avoid some of the drawbacks of capturing.
- Have a shaping plan even if you use some capturing – the learning that occurs with shaping is more flexible and therefore transferrable. Having a shaping plan helps avoid pitfalls of capturing
- Use tools like targets (face/hand and body); consider enclosure features that can help achieve a particular position to help shape the behavior
- Look at how animal is situated before beginning a behavior – how is he/she bearing weight, can animal easily do the desired behavior, etc. Set animal up for success and make the new behavior as easy as possible for animal to do