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BEHAVIOR MODIFICATION
USING DESENSITIZATION, COUNTER CONDITIONING, AND RESPONSE SUBSTITUTION IN BEHAVIOR THERAPY

Counter-conditioning and Desensitization

Counter-conditioning and desensitization are powerful ways to change behavior. They are usually used in combination. Desensitization provides a means of safely exposing the pet to the stimulus at a level at or below which fear is likely to be exhibited. Counter-conditioning is used to change the pet's attitude or emotional response to a stimulus. Response substitution is where the pet is taught using reinforcement based techniques to change the undesirable behavior into one that is desirable. Although counter-conditioning generally refers to the pet's mood (through positive pairings and associations), and response substitution refers to training the desired behaviors (through reinforcement), the treatment of fear and anxiety will focus on achieving BOTH the desired emotional state as well as the desired behavioral response. Therefore these terms may often be used interchangeably. Be certain to use our companion handout on settle exercises for practical applications as to how desensitization, counter-conditioning and response substitution can be achieved.

For most behavior problems, especially those associated with fear or anxiety, the use of punishment is contraindicated since, even if it suppresses the undesirable behavior, it may further aggravate the pet's fear and anxiety. Training must focus on getting the desired response and a positive mood, rather than trying to stop undesirable responses.

What is counter-conditioning?

Counter-conditioning is changing the pet's emotional response, feelings or attitude toward a stimulus. For example, the dog that lunges at the window when a delivery person walks by is displaying an emotional response of fear or anxiety. Counter-conditioning would be accomplished by pairing the sight, sounds and approach of the delivery person with one of the dog's favored rewards to change the emotional state to one that

is calm and positive. Similarly for cats that are anxious or fearful when exposed to a visitor or other cat in the home, we would want to pair the cats favored rewards with the presence of the visitor or other cat.

What is desensitization?
`Desensitization is the gradual exposure to situations or stimuli that would bring on the undesirable behavior, but at a level so low that there is no negative response. As the animal experiences the stimulus, but does not respond in the undesirable way, the animal becomes "less reactive" to the stimulus, and the pet can soon tolerate a somewhat more intense stimulus without exhibiting the undesirable response. The key to effective desensitization is to design a stimulus gradient so that the pet can be gradually exposed to progressively more intense levels of the stimulus without the undesirable behavior being elicited.

What is response substitution?
Response substitution is when the behavioral response to the stimulus or situation is changed to one that is desirable. The goal is to reinforce only those responses that are desirable. Reinforcement of a response that is incompatible with the undesirable response might be referred to as differential reinforcement of an incompatible response (DRI). The challenge is to get the desired behavior when exposing the pet to the stimulus while also getting the appropriate relaxed and happy emotional state. There are a number of techniques that can be used to help the owner turn the inappropriate response into one that is desirable. If the dog is trained through reward based techniques to immediately focus on the owners in response to commands (settle, watch) in the absence of any distracting or fear eliciting stimuli, the training might then progress (through desensitization techniques) to gradually more intense levels of the stimulus. (See our settle exercises handout for more details). Alternatively lure and target training or disruptive devices might be used to help more quickly and effectively achieve the desired outcome. For most dogs, the head halter and leash is often the safest, most effective and most immediate method to obtain the desired response (e.g. sit, focus, heel). In addition to the use of positive reinforcement, an immediate release of leash tension for each successful outcome also serves to reinforce the behavior. This is known as negative reinforcement because the behavior is being **reinforced** by **removal** of pressure and tension.

Regardless of the technique used, if the pet can be taught to display a new acceptable response instead of the undesirable response when exposed to a stimulus then response substitution has been achieved. Again, rather than attempting to overcome an intense response, the training should be set up to expose the dog with stimuli of gradually increasing intensity (desensitization) to ensure a successful outcome. By working with a gradient you are more likely to also associate the appropriate emotional state with the appropriate outward behavior. However, for fear and anxiety, the training is not complete if you merely get the desired behavioral outcome. A positive emotional state (relaxed, eating treats) must also be achieved (counter-conditioning). For counter conditioning and response substitution to be most effective you need to establish a reward gradient for your pet and for desensitization you need to design a stimulus gradient.

What is a reward gradient and how can it be used?
Each pet will have a different set of rewards that are the most motivating or stimulating. In most cases it will be novel pieces of food and treats but in some pets it might be a favored toy. Affection and praise can also be highly motivating rewards for most pets, but are seldom useful

for counter-conditioning because they cannot be used as a lure and are not a clear enough marker of the desired response. In addition, unless petting is withheld, except for counter-conditioning sessions, the pet will likely be unable to make the association that the petting is directly related to the presence of the stimulus. You can always pet an anxious or fearful dog, but it won't necessarily change its mood. Offering the most motivating food or toy reward however, may get your pet's attention and achieve a positive outcome. Determine the rewards that are most appealing for your pet and place them on a gradient from highly enticing to mildly enticing. Then by using the highest level reinforces exclusively for counter-conditioning exercises, the pet may soon learn to associate the presence of the stimulus with something good!

### *How do I design a stimulus gradient for desensitization?*
Stimuli for desensitization will need to be arranged from mildest to strongest and a positive non-fearful response achieved at the milder levels before gradually proceeding to more intense levels. This means, that for a starting point, you will need to determine the threshold at which your pet does not react or can be easily settled. You will need to identify all stimuli; avoid stimulus exposure in the interim; and devise a gradient of intensity for exposure. Do not rely on real life experiences for exposure exercises as these cannot be adequately controlled. Set up exposure exercises in controlled environments so that you can achieve a positive endpoint at each session.

Since multiple stimuli may combine to evoke the fearful or anxious response, ideally you should first identify each individual stimulus, and expose separately before combining. For example, the pet with a storm phobia might first be exposed to a CD of rain, thunder and wind sounds. The pet that is anxious when the doorbell rings might first be exposed to varying intensity of the doorbell, before practicing with family member arrivals and then visitor arrivals. The pet that is threatened by bicyclists or children on skateboards might first be desensitized to stationary bikes or skateboards, then familiar people on slow moving skateboards or bikes before proceeding to more speed and noise and unfamiliar people. One method of reproducing and controlling the intensity of stimuli is to use videotapes or CD's for initial exposure training.

There are many ways in which a stimulus gradient and stimulus control can be accomplished. In the example of the delivery person or letter carrier, the stimulus gradient was to begin the training with a family member and then progress to actual delivery people at gradually closer distances. A stimulus gradient might be established through:

a) **Distance:** Begin desensitization from a distance and move progressively closer as the pet is successfully counter-conditioned.
b) **Volume:** Sound stimuli can be presented in varying intensities from quiet to loud.
c) **Movement / activity:** Begin with the stimulus standing, before walking slowly, jogging or running. Similarly for vacuum cleaners, you might begin with the stimulus off and standing still, before turning on the motor, or beginning to move the vacuum back and forth. Combine with distance gradient.
d) **Characteristics / similarity:** A pet that is fearful or aggressive toward a man with a beard might be desensitized to young boys, older boys, men with no beards, a family member with a costume beard, familiar men with beards and finally strangers with beards. Distance can also be varied.
e) **Familiarity:** Begin with family members arriving, then familiar strangers then strangers
f) **Location:** Begin in situations in which there is minimal anxiety and move to situations where the anxiety becomes more intense

In order for desensitization and counter-conditioning programs to be successful, it is necessary to have good control of the pet, a strongly motivating reward, good control of the stimulus, and a well-constructed desensitization gradient. A leash and head halter is often the best way of insuring control for exposure exercises for dogs. A leash and harness or a carrying cage might work to maintain a distance gradient for cats. Each session should be carefully planned. Pets that are punished for inappropriate behavior (fear, aggressive displays) during the retraining program will become more anxious in association with the stimulus. If the owner is fearful, anxious or frustrated this further adds to the pet's anxiety. As mentioned, whenever a pet can successfully threaten and the stimulus (person, other animal) retreats, the behavior is further reinforced.
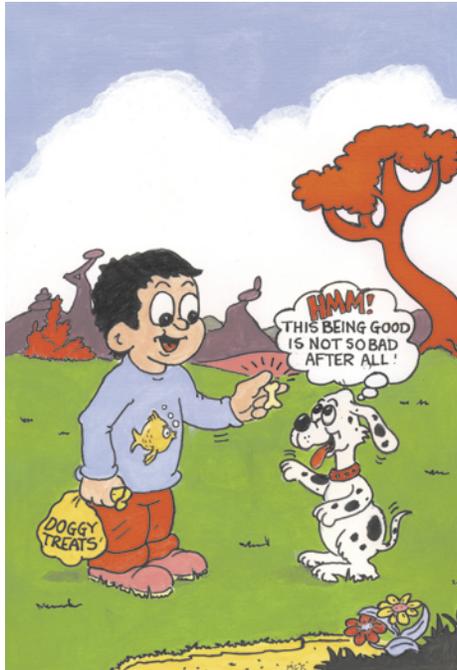
How might these techniques be used in a training situation?

Take the example of dog that is aggressive to visitors; but in particular delivery people. Begin by getting the dog to sit calmly by the window. You can use a head halter to insure success or you might want to use food as an inducement to the dog to respond, and as a reward for performance or both. When the dog anticipates a food reward, the "mood" of the dog has generally changed to one that is happy or relaxed (and not anxious or aggressive). Having the pet sit and focus on you and the food reward are behaviors that are incompatible with the behavior you wish to change, in this case lunging at the window at the delivery person. In this example, you will have achieved the desired emotional state (counter-conditioning) and the desired behavioral response (response substitution). It may take days or weeks for the dog to learn how to perform this task reliably on command. During that time phase out food rewards so that the dog does the task equally well with or without food.

Next, you will need to train your pet to perform the desired behavior in the presence of delivery people. Desensitize the dog, by presenting the stimulus, a delivery person at a low enough level so that the dog will still remain sitting, relaxed, happy and focused on your commands and food rewards. Progress very slowly and insure success at each level of the stimulus before proceeding. If the pet will not take the food, and exhibits any signs of anxiety or aggression, you are moving too fast and usually the stimulus is too intense!. Back up a few steps, using a more enticing reward, a more positive enthusiastic tone or a pull on the leash and head halter before you end the session. A final option, if you have progressed too quickly is to use your let's go command (see our handout on social fear and anxiety to people and other pets for details). Similarly the session should end and the stimulus should leave only when the dog is calm. If the stimulus departs or is withdrawn while the dog is anxious or aggressive, at the very least you have made no progress and at the very most, the dog may learn that threatening behavior is successful at removing the perceived threat. (This too is negative reinforcement since the dog's before is being **reinforced** by the **removal** of the stimulus). The goal is to always end on a positive note. If you are unable to control the stimulus intensity then you must find another way to work with your pet.

For desensitization, you need to begin with low levels of stimuli in which you can achieve the positive outcome. Therefore, it might be best to start the exposure exercises with someone the dog knows, (NOT A DELIVERY PERSON), walk by the window. The dog gets to practice the good behavior when it is easy. Repeat this many times so that the dog does it reliably. Remember that the person should not leave and the session should not end when the dog is anxious or aggressive. Therefore, be sure to set up the training session properly because if the stimulus is too intense the pet may never relax. Gradually progress to stimuli that more closely resemble the real life situation. Perhaps have someone the dog knows practice the exposure exercises while wearing the uniform of a delivery person. Then have the dog sit calmly by the window for rewards when the delivery person is across, or further down the street. If your dog can do this well several times, try when the delivery person is at the edge / boundary of your property. It may be less threatening to take your dog outside to meet the person, rather than have them approach the front door. Again proceed slowly, so that the dog learns that delivery people are associated with favored rewards and so that you can insure that you get the proper behavioral response (e.g. sit / focus, down / settle) over and over before being challenged with the real thing, the delivery person bringing a package to the door. It is extremely important that the dog be calm and quiet both at the end of the session and at the beginning. Attempting multiple training sessions without allowing the dog to relax and be calm in between may result in the dog becoming more sensitive to the stimulus rather than learning to be less sensitive.

How might response substitution be used?

For counter-conditioning to be successful each exposure must have a relaxing or positive result. This means that ideally exposure to the stimulus must be prevented unless a desirable outcome can be insured. Desensitization, beginning with exposure below the threshold allows for effective counter-conditioning. However when the exposure is slightly above the threshold for fear the options are to a) keep the pet in the situation until it habituates or b) to use any available method (that does not cause fear) to interrupt the undesirable response and achieve the desirable response (command, lure, disruptive device, head halter) so that an alternative acceptable behavior can be reinforced. If at the end of the session the pet is calm and relaxed and has received favored rewards in the presence of the stimulus, then counter-conditioning may have also been achieved.

How might flooding and exposure techniques be used?

Another technique for reducing fearful behavior is to continuously expose the pet to the stimulus until it settles down (habituates). This technique will only work if the stimulus is not associated with any adverse consequence, and the pet is exposed for as long as is needed until the pet calms down. Once the pet is exposed, the stimulus must not leave or be removed until the pet calms down. Similarly the pet must not be removed or allowed to retreat until the pet habituates. Once the pet settles, reinforcement can be given to ensure that the ultimate result is a positive association with the stimulus. The pet must not be rewarded until it calms and settles down as this would serve to reward the fearful behavior. Owner intervention or punishment must not be utilized as this would lead to an unpleasant association with the stimulus. Since exposure must continue until the pet settles down, flooding is most successful for fears that are not too intense. Beginning with a somewhat lower or muted stimulus may be best. In practice, keeping the pet in a cage or crate or keeping a dog on a leash and halter during exposure to the stimulus, will prevent escape and prevent injury to the stimulus (person or pet). However, it is often difficult to tell if the pet is sufficiently calm and relaxed and premature removal of the stimulus or pet may result in reinforcement of the fearful or anxious response.