CONSTRUCTIONAL FEAR TREATMENT FOR DOGS IN SHELTERS

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Of the approximately 3.9 million dogs that enter US animal shelters each year, many exhibit behaviors related to fear, which can affect their likelihood of adoption. Current dog training procedures to treat fear include counterconditioning and desensitization, which can often take months or years to show any behavior change and do not teach specific behaviors aimed to increase the dog's chance of being adopted. The current study used a negative reinforcement shaping procedure to teach fearful dogs to approach and and interact with people. The results showed that constructional fear treatment increased the amount of time the dog spent at the front of the kennel, and increased sniffing, tail wagging, and accepting petting for all 3 participants.

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INTRODUCTION

Approximately 2.1 million dogs are euthanized annually in shelters across the United States (ASPCA, 2011). Many of those dogs are euthanized for behavioral reasons, one being that they are too fearful to be placed for adoption. Although it is not always a death sentence, fearful behavior, along with several other factors, makes a dog less likely to be adopted.

Wells and Hepper (1992) attempted to identify what makes shelter dogs attractive to adopters. They asked 100 individuals to select one of two photographs depicting dogs in a shelter. Results showed that 73% of the people polled preferred dogs that were at the front of the cage as opposed to at the back of the cage. Protopopova (2014) extended Wells and Hepper's research to find that shelter dogs with longer stays were more likely to spend more time in the back of their kennel, and dogs that faced away from potential adopters increased their length of stay by approximately 15 days. Similarly, Weiss, Miller, Mohan-Gibbons, and Vela (2012) conducted a study in which dog owners reported that their newly adopted pet approached and greeted them during their first meeting, suggesting those behaviors played a role in their decision to adopt the dog. All of these results suggest that a dog that spends time at the front of the kennel, approaches and greets people, and orients toward potential adopters is more likely to be adopted. Unfortunately, current approaches for helping fearful dogs do not teach dogs these specific behaviors.

Common training procedures for treating fearful dogs among the dog training community include flooding (Baum, 1970; Pryor, 2009; Reid & Collins, 2015; Walker, Fisher & Neville, 1997), habituation (Pryor, 2009; Wright, Reid & Rozier, 2005), operant conditioning (Parsons, 2005; Pryor, 2009; Reid & Collins, 2015), and desensitization with counterconditioning

(Levine, Ramos & Mills, 2007; Martin & Martin, 2011; McConnell, 2002; Pryor, 2009; Reid & Collins, 2015; Walker et al., 1997; Wright et al., 2005). Veterinary behaviorists and some dog trainers believe that dogs can be genetically predisposed to be fearful, and often recommend long-term medication to supplement a behavior modification program (Houser et al., 1975; Ibáñez & Anzola, 2009; McConnell, 2002; Ogata & Dodman, 2011; Pryor, 2009; Reid & Collins, 2015). The idea that fearful behavior is a result of a dog's genetic makeup makes the problem inherently more difficult to treat. Other, less scientifically valid methods, include playing music or recorded sounds in the shelter (Simonet, 2005; Wells, 2009), releasing scents like lavender or chamomile (Graham, 2005), or diffusing dog-appeasing pheromones (DAP) (Tod, Brander & Waran, 2005).

Of all of the available behavior modification programs, the most commonly used program for fearful dogs is desensitization and counterconditioning (DSCC). DSCC focuses on changing the dog's emotional response to the feared stimulus (London, 2011; Martin & Martin, 2011; Reid & Collins, 2015; Wright et al., 2005). This is attempted by repeatedly presenting the stimulus at low levels, keeping fear to a minimum, while feeding the dog. It is based on the notion that eating in the presence of a mild version of the feared stimulus is incompatible with feeling fear (Horwitz et al., 2015; Tyron, 2005; Wolpe, 1958; Wright et al., 2005). Thus, to change the dog's emotional response, a DSCC protocol relies on finding a "powerful" reinforcer that will override the feeling of fear (Wright, Reid & Rozier, 2005). According to Wright et al. (2005), "the importance of identifying powerful reinforcement cannot be underestimated when it comes to treating distress disorders" (p. 171). However, the search for the right reinforcer is often by trial and error. A major drawback of the procedure is that it does not aim to teach the

dog specific behaviors. The goal is only to teach a dog to be "calm", and the assumption is that other friendly behaviors will follow. Ideally, a program would teach the dog specific behaviors that will increase the likelihood of adoption.

A DSCC program is based on the belief that to change the animal's behavior, one must first change the animal's emotional response to the stimulus. By focusing on changing the animal's emotion, DSCC treats fearful behavior as respondent. Alternatively, a dog's fearful behavior can be analyzed as operant, that is, reinforced by increasing the distance between the animal and the aversive stimulus or event (Goldiamond, 1975). The behavior is reinforced by the dog either removing himself, or behaving in a way that causes the aversive stimulus to move away. For example, an aversive person approaches a dog; the dog cowers and turns his head away from the person; and then the person moves away from the dog. The distance created between the dog and the person makes it more likely that the dog will behave in the same manner when the same or a similar situation presents itself again. An understanding of the relevant contingency allows us to more successfully create a program for behavior change.

Snider (2007) used Goldiamond's approach to develop a training procedure to teach aggressive dogs to engage in desirable alternative behaviors. Snider determined that aggressive behavior was maintained by providing distance between the dog and the aversive stimulus. Using negative reinforcement, she provided distance contingent on a more appropriate behavior, like turning the head, sitting or yawning. By focusing on building appropriate behavior, all five of the dogs that received treatment were successful in learning friendly or non-aggressive behavior. As a byproduct of the procedure, the rate of aggressive behavior was reduced to zero. Rentfro (2012) used a similar negative reinforcement shaping

procedure to teach friendly behavior to feral and domestic cats and kittens. The cats used in this study exhibited both fearful and aggressive behaviors in baseline, such as hissing, flaring whiskers, and distancing movements. Rentfro provided distance as a reinforcer contingent on desirable behavior. Once the cats were approaching the experimenter, she used positive reinforcement to maintain their interaction with her.

Constructional fear treatment (CFT) is an extension of the procedure used by Snider (2007) and Rentfro (2012) that aims to teach friendly behavior to fearful dogs in shelters. CFT is a shaping procedure that uses a natural reinforcer, distance, to build new behavior, thereby addressing the existing negative reinforcement contingency. The trainer carefully selects behaviors that are prerequisites to approach and reinforces those behaviors by providing distance. The intensity of the aversive stimulus is gradually increased only when the dog is consistently displaying the prerequisite behavior at each shaping step. This allows the dog to learn to control the environment by changing its behavior. The goal of the shaping program is a dog that approaches and interacts with the previously aversive stimulus.

The current experiment aims to extend the work by Snider (2007) and Rentfro (2012) to teach friendly behavior to fearful shelter dogs. It seeks to determine if constructional fear treatment is an effective procedure for teaching approach behaviors to dogs in a shelter environment.

METHODS

Subjects

The subjects were three domestic dogs being housed at the SPCA of Texas in Dallas, Texas. The SPCA of Texas is a non-profit shelter that acquires its dogs through owner surrenders, transfers from other local shelters, and rescue and investigation seizures.

Lane was a 2-year-old Border Collie/Catahoula Leopard Dog mix that was 1 of 15 dogs seized as a result of a hoarding warrant in Dallas County. According to reports, the dogs were living in unsanitary conditions without regular access to food or water. Lane was described by shelter staff as "very shy" and reportedly spent most of the time hiding under the bed prior to participation in this study. Lane arrived at the shelter on January 22, 2016, and her treatment occurred on February 15, 2016.

Saffron was a 2-year-old Chihuahua mix that arrived at the shelter as a result of a hoarding compliance case in which the owner surrendered Saffron and 11 other dogs to the SPCA of Texas. According to reports, the dogs were living in unsanitary conditions without regular access to food or water. Saffron was observed by shelter staff to be "barking and growly when her kennel was approached, but if you open her kennel door she retreats to the back and continues growling." After 10 days in the shelter, a "Use Caution" tag was placed on her kennel and it was noted by shelter staff that she was "not considered sociable or adoptable." Saffron arrived at the shelter on December 1, 2015, and her treatment occurred on January 1, 2016.

Chocolate was a 3-year-old Pit Bull mix that was rescued with one other dog from a neglectful situation in Dallas. Shelter staff described her as timid and quiet in her kennel, and noted that she did not walk on leash. Chocolate arrived at the shelter on May 4, 2016, and her treatment occurred on May 17, 2016.

Each subject spent various amounts of time in the shelter before participating in this study (25 days for Lane, 32 days for Saffron, and 14 days for Chocolate). The dogs continuing to show fearful behavior after spending time in the shelter suggests that habituation to the new environment did not occur, and further training was necessary to teach approach behaviors to the dogs in the shelter environment.

Setting

Training was conducted in the dog holding area at the SPCA of Texas. The room consisted of a long hallway with four kennels on either side. Each kennel consisted of two sides separated by a guillotine door. One side was 5ft x 6ft and another side that was 3ft x 6ft. Each kennel had a glass door on the front, sheet metal on either side, and cinder block along the back. During training, the guillotine door was closed, and the dog was positioned on the smaller side of the kennel without any bedding or toys present.

A Samsung HMX-F80 video recorder was positioned on a tripod in an open kennel directly across from the participant. A small, laminated piece of paper was placed on the ground in the middle of the hallway and centered in front of the participant's kennel to serve as a marker.

Other dogs were present in neighboring kennels during training. No other people were present, although volunteers and staff periodically walked in and out of the holding areas to

remove dogs or to return dogs to their kennels. If a person entered the holding area during training, the experimenter stopped the current trial and walked out of sight of the participant. The training step was repeated once the person had exited the holding area.

Measurement

The cumulative number of occurrences of six behaviors across trials and the cumulative number of seconds spent at the front, middle, and back of the kennel across trials were measured for each dog. The behaviors recorded included approach, sniffing, tail wagging, accepting petting, and retreating.

Approach was defined as any movement toward the experimenter in which the dog's body weight shifts forward toward the experimenter. It began with the dog sitting, lying or standing in a resting position, and ended when the dog's body rested again. Examples include the dog shifting body weight from the hind end to the front feet when sitting down such that the hind end lifts off the ground slightly, either front paw moving forward in the direction of the experimenter, and stepping or walking toward the experimenter.

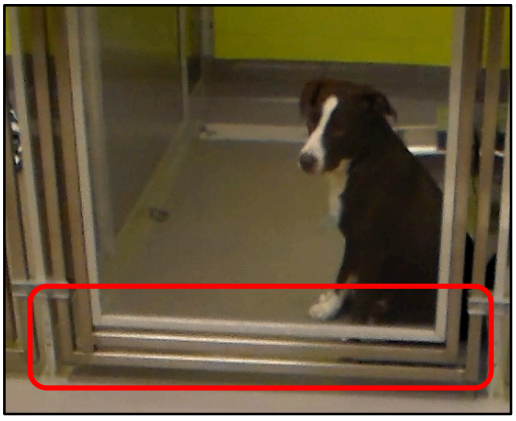
Sniffing was defined as the dog outstretching the neck in the direction of the experimenter and flaring the nostrils to cause air to move into the nose. Because it can be difficult to see the details of the nostrils, an instance of sniffing was counted when the other parts of the definition alone were fulfilled. Sniffing began with the dog sitting, lying or standing in a resting position, continued as the dog outstretched the neck to lower the nose toward the experimenter or pointed the nose forward/upward in the direction of the experimenter and ended with the dog moving the nose away from the experimenter and returning to a resting position.

Tail wag was defined as any side to side movement of the tail, whether the tail carriage was high or low in relation to the dog's body. A tail wag began when the dog's tail left its resting position and moved at least an inch to either side in a side to side motion, and ended when it returned to a resting position. Examples include a slow, gentle and wide side to side motion and fast, short side to side movements.

Accepting petting was defined as the dog standing, sitting or lying near the experimenter and remaining still, leaning into, or moving closer to the experimenter as the experimenter reached to pet. It began as the experimenter reached her hand toward the dog to pet, and ended when the experimenter moved her hand away from the dog.

Retreat was defined as any movement away from the experimenter in which the dog's body or a part of her body moved toward the back of the kennel. It began when the dog's body moved backward from where it started and ended when the dog's body returned again to a resting position. Examples include the dog turning one or both shoulders toward the back of the kennel so that the body moves backward, either front paw moving away from the experimenter, and stepping or walking away from the experimenter.

The front of the kennel was recorded when the dog was standing in or moving into the area of the kennel where visibility was blocked by the metal bars at the bottom of the kennel door. Recording duration began when any part of the dog's body was in the designated area and ended when the dog's body left the area and moved to the middle of the kennel.



The middle of the kennel was recorded when the dog was standing in or moving into the part of the kennel that began where the front ended, and continued to the back edge of the stainless steel water bowl that was positioned along the right side of the kennel. Recording duration began when the dog's body entered the designated area (or at the beginning of the trial) and ended when the dog's body left the area and moved either to the front or back of the kennel (or at the end of the trial).

The back of the kennel was recorded when the dog was standing in or moving into the area between the back edge of the water bowl and the back wall of the kennel. Recording duration began when the dog's body entered the designated area (or at the beginning of the trial) and ended when the dog's body left the area and moved into the middle of the kennel, or when the trial ended.

Recording and Reliability

Sessions were videotaped using a video camera positioned as described in the settings section. Data were recorded while reviewing the video recorded sessions on a laptop computer. Recording for each trial began as the experimenter entered the frame. Recording ended as the experimenter began to walk away from the dog.

A trained observer collected inter-observer agreement data (IOA). The observer was provided with a list of behavioral definitions and was allowed to ask the experimenter questions about them. To record occurrence of approach, sniff, tail wag, accept petting, and retreat, the observer used the data sheet shown in the appendix which lists the possible behaviors for each trial. The observer recorded whether or not each behavior occurred during each trial. To record duration at the front, middle and back of kennel, the observer used the second data sheet in the appendix. Using the timer along the bottom of the video, the observer noted the time that the dog entered the front, middle, and back of the kennel and the time that the dog left the same area of the kennel. The observer was allowed to pause, rewind, and fast-forward the video throughout the recording session.

IOA for the occurrence of behaviors was calculated using the formula *A/(A+D)*100*. For this measure, IOA was 85.7% over 38.2% of trials for Lane, 81.3% over 30.2% of trials for Saffron, and 88.2% over 54.8% of trials for Chocolate. IOA for duration spent in the front, middle, and back of the kennel was calculated using the formula *Smaller Duration/Larger Duration*100*. For this measure, IOA was 95.2% over 38.2% of trials for Lane, 81.2% over 30.2% of trials for Saffron, and 97.1% over 54.8% of trials for Chocolate.

General Procedures

Constructional fear treatment (CFT) consisted of 7 shaping steps: eye contact (Step 1), head movement toward the experimenter (Step 2), body movement toward the experimenter (Step 3), approach to the front of the kennel (Step 4), duration of being at the front of the kennel (Step 5), opening the kennel door (Step 6), and petting/leashing the dog (Step 7). Eye contact and head movement were shaped with the experimenter standing on a marker located

approximately two feet in front of the kennel door. To shape body movement, the experimenter stepped forward toward the dog's kennel to elicit more movement. Approach to the front of the kennel, increasing duration of being at the front of the kennel, opening the kennel door, and petting/leashing the dog were shaped with the experimenter standing at the kennel door. However, if the dog came to the front or middle of the kennel while the experimenter was still training from the marker (i.e. a spontaneous approach while shaping head movement), to prevent the dog from retreating, the experimenter remained on the marker to shape duration at the front of the kennel before moving herself up to the kennel to continue shaping duration.

During each trial, the experimenter walked toward the dog's kennel and stood at the designated location. Each time there was a successful approximation to the training step, the experimenter walked away from the dog's kennel and waited out of sight of the dog for 10 s before beginning the next trial. A successful approximation to the training step included any of the target behaviors outlined in that specific step, or any behavior outlined in a later step. Behaviors targeted in previous steps were no longer considered correct. If the experimenter had been standing on the marker for longer than 15 s with no correct approximation by the dog, she moved herself back to the last place the dog was successful, but the contingency requirement for the dog remained the same. On the next trial, she stood somewhere in between the unsuccessful trial and the last successful trial. Errors included any behavior related to fear including cowering, averting eye contact or moving away from the experimenter. Errors also included behaviors related to aggression including growling, barking or lunging

toward the experimenter. If errors occurred, the experimenter held her position until the dog made quiet eye contact and/or an approximation to the current step.

In order to prepare the dog for any movement that a potential adopter or shelter staff member might do in front of the kennel, the experimenter varied her body position throughout each step; she varied the direction in which she faced, she swung her arms from side to side and over her head, she bent at the waist or knelt all the way to the ground, she extended her hand toward the dog, etc. If an error occurred as a result of the experimenter's movement, she held the position that elicited the error until the dog made calm eye contact with the experimenter or until the dog made an approximation to the current training step.

Baseline

The experimenter approached the dog's kennel and stopped in front of the kennel door. She knelt down to greet the dog, extending her hand in the dog's direction. If the dog retreated or cowered away from the experimenter, the experimenter waited for the dog to stop retreating, and then walked away from the kennel. If the dog stayed in place or began to approach the front of the kennel, the experimenter opened the kennel door and extended her hand toward the dog inside the kennel. If the dog retreated or cowered away from the experimenter, the experimenter waited for the dog to stop retreating, and then walked away. If the dog continued to approach the front of the kennel, the experimenter interacted with the dog for 5 s, and then walked away. The experimenter waited for 10 s out of sight of the dog then repeated the trial. This was completed three times for each participant.

Constructional Fear Treatment

Constructional fear treatment was carried out only for those dogs that did not approach the front of the kennel and interact with the experimenter during baseline. It consisted of the seven shaping steps detailed below.

Step 1: Eye contact with the experimenter. The experimenter approached the kennel and stood on the marker (placed in the middle of the hallway directly in front of the dog) looking at the dog. If the dog froze, cowered, averted his eyes or moved away from the experimenter, the experimenter remained standing on the marker. If the dog's gaze moved to the experimenter, the experimenter retreated in the direction from which she came. After three consecutive trials of the dog looking in the direction of the experimenter, the experimenter changed the criterion to head movement toward the experimenter.

Step 2: Head movement toward the experimenter. The experimenter approached the kennel and stood on the marker, looking at the dog. If the dog froze, cowered, averted his eyes or moved away from the experimenter, the experimenter waited for the dog turn his head in her direction. If he moved his head or features of his head (including his ears, eyes and mouth) toward the experimenter, with or without eye contact, the experimenter retreated in the direction from which she came. If after standing on the marker for 5 s, the dog still did not make any movements of his head, the experimenter took a step closer to the dog to elicit movement. When the dog moved his head back in the direction of the experimenter, she retreated. The experimenter repeated this step until the dog no longer cowered or moved away when she approached the front of the kennel. Next, the experimenter changed the criterion to body movement toward the experimenter.

Step 3: Body movement toward the experimenter. The experimenter approached the dog's kennel and stood on the marker, then stepped forward to the kennel door. If the dog froze, cowered, averted his eyes or moved away from the experimenter, the experimenter waited for the dog to look back at her. If the dog looked at the experimenter alone without moving any other part of his body for longer than 5 s, the experimenter stepped forward to the front of the kennel to produce movement from the dog. If the movement produced was away from the experimenter, she waited until the dog moved toward her, and then retreated. If the movement produced was toward the experimenter, she retreated in the direction from which she came. If the dog moved any part of his body other than his head toward the experimenter, including any movement or lifting of a front or back paw, any forward movement of the body or any shift in the dog's weight, the experimenter retreated in the direction from which she came. After three consecutive trials of the dog offering overt, forward movements, such as shifting weight to stand in the direction of the experimenter or stepping toward the front of the kennel, the experimenter increased criterion to approaching the front of the kennel.

Step 4: Approach the front of the kennel. The experimenter approached and stood in front of the dog's kennel, looking at the dog. If the dog froze, cowered, averted his eyes or moved away from the experimenter, the experimenter remained standing in front of the kennel. If the dog stepped toward the front of the kennel, if the dog stood from a sitting position with movement toward the experimenter, or if he lifted a paw and moved it in the direction of the experimenter, the experimenter retreated in the direction from which she came. After one trial of the dog stepping toward the experimenter from the back of the kennel, the experimenter retreated only if the dog walked to the middle of the kennel. After one trial of the dog

approaching the middle of the kennel, the experimenter waited until the dog began to approach the front of the kennel before retreating. After three consecutive trials of the dog approaching the front of the kennel, the experimenter began to increase duration of the dog staying at the front.

Step 5: Increase duration at the front of the kennel. The experimenter approached the dog's kennel and stood in front of it, looking at the dog. She varied the position of her body; she swung her hands from side to side and over her head, she knelt down and reached toward the dog, etc. If the dog remained at the front, the experimenter retreated after 1 s If the dog froze, cowered, averted his eyes or moved away from the experimenter, she held her position until the dog returned to the front of the kennel, then the experimenter retreated. Duration of the dog staying at the front of the kennel was increased to 5 s, with three consecutive successful trials at 2 s, 3 s, 4 s, and 5 s.

Step 6: Open kennel door. The experimenter approached the front of the kennel and faced the dog. If the dog remained at the front of the kennel, the experimenter reached toward the kennel latch. If the dog remained at the front or moved closer to the experimenter, the experimenter retreated. If the dog began to retreat or looked away from the experimenter, she held her position until the dog looked up at her and/or approached her for 1-2 s, and then retreated. After three consecutive successful trials of reaching toward the kennel latch, the experimenter repeated the previous steps, this time manipulating the kennel latch so that it made an audible sound. After three consecutive successful steps, the experimenter opened the kennel door 1 in. If the dog retreated, the experimenter held her position until the dog came back to the front, waited 1-2 s, and then retreated. If the dog remained at the front of the

kennel while the door was opened, the experimenter gently shut the door and retreated. After one consecutive trial of opening the door 1 in., the experimenter repeated the above step, this time opening the door to the width of her body. After a successful trial of opening the door to the width of her body, the experimenter moved to Step 7.

Step 7: Pet and leash the dog. The experimenter approached the front of the kennel and opened the kennel door. If the dog remained at the front of the kennel, she reached her hand out to touch the dog. If the dog remained at the front, the experimenter retreated. If the dog retreated or turned away from the experimenter, she held her position until the dog returned to the front or stepped toward the experimenter, and then retreated. After a successful trial of touching the dog, the experimenter repeated the above step, this time touching the dog with the leash. After a successful trial of touching the dog with the leash, the experimenter repeated the above step, this time clipping the leash to the dog and walking outside.

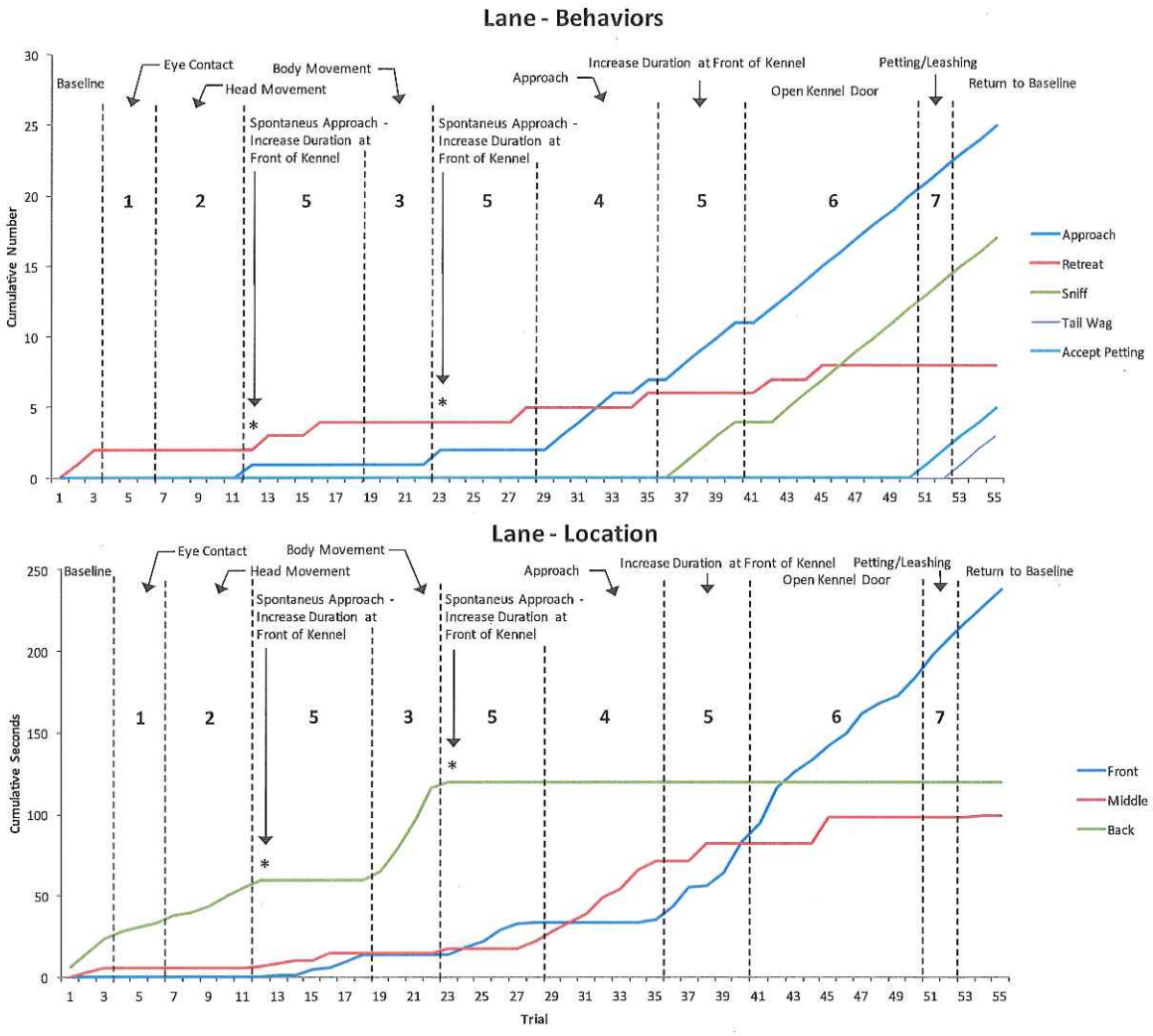


Figure 1. Cumulative number of occurrences of behaviors (top) and cumulative number of seconds spent in the front, middle, and back of the kennel (bottom) for Lane.

Figure 1 (top) shows the cumulative occurrences of approach, retreat, sniff, tail wag, and accepting petting during all of the shaping steps of the program for Lane. Figure 1 (bottom) shows the cumulative number of seconds spent at the front, middle, and back of the kennel. During baseline, Lane retreated during 2 out of 3 trials, and spent 0 s at the front, 6 s in the middle, and 24 s at the back of the kennel. During Steps 1 and 2, Lane remained at the back of the kennel for 10 s and 31 s respectively. None of the recorded behaviors were observed.

Training moved to Step 5 after Lane's approach on trial 12. On trials 13-18, Lane spent 14 s at the front and 9 s in the middle of the kennel. She retreated on trials 13 and 16, and on trial 19 she moved to the back of the kennel, so the experimenter resumed the original shaping plan with Step 3. On trials 19-22, none of the recorded behaviors were observed and Lane spent 56 s in the back of the kennel. She approached the front of the kennel on trial 23, and the experimenter returned to Step 5. During trials 23-28, Lane spent 20 s at the front of the kennel. On trial 28, Lane retreated, and the original shaping plan resumed with Step 4. During trials 29-35, Lane approached on 5 out of 7 trials, and spent 49 s in the middle of the kennel. On trial 36, Lane moved to the front of the kennel, and the experimenter resumed Step 5. During Step 5, Lane approached and sniffed during 4 out of 5 trials. She spent 48 s at the front and 11 s in the middle of the kennel. During Step 6, Lane approached on 9 out of 10 trials, sniffed on 8 out of 10 trials, and retreated on 2 out of 10 trials. She spent 101 s in the front and 16 s in the middle of the kennel. During Step 7, Lane approached, sniffed and accepted petting on 2 out of 2 trials. She spent 24 s at the front of the kennel. Lane was removed from the kennel on trial 52. During the return to baseline condition, Lane approached, sniffed, wagged her tail, and accepted petting on 3 out of 3 trials. She spent 30 s at the front, 1 s in the middle, and 0 s in the back of the kennel. The total training time for Lane was 14 min. and 17 s across 49 trials.

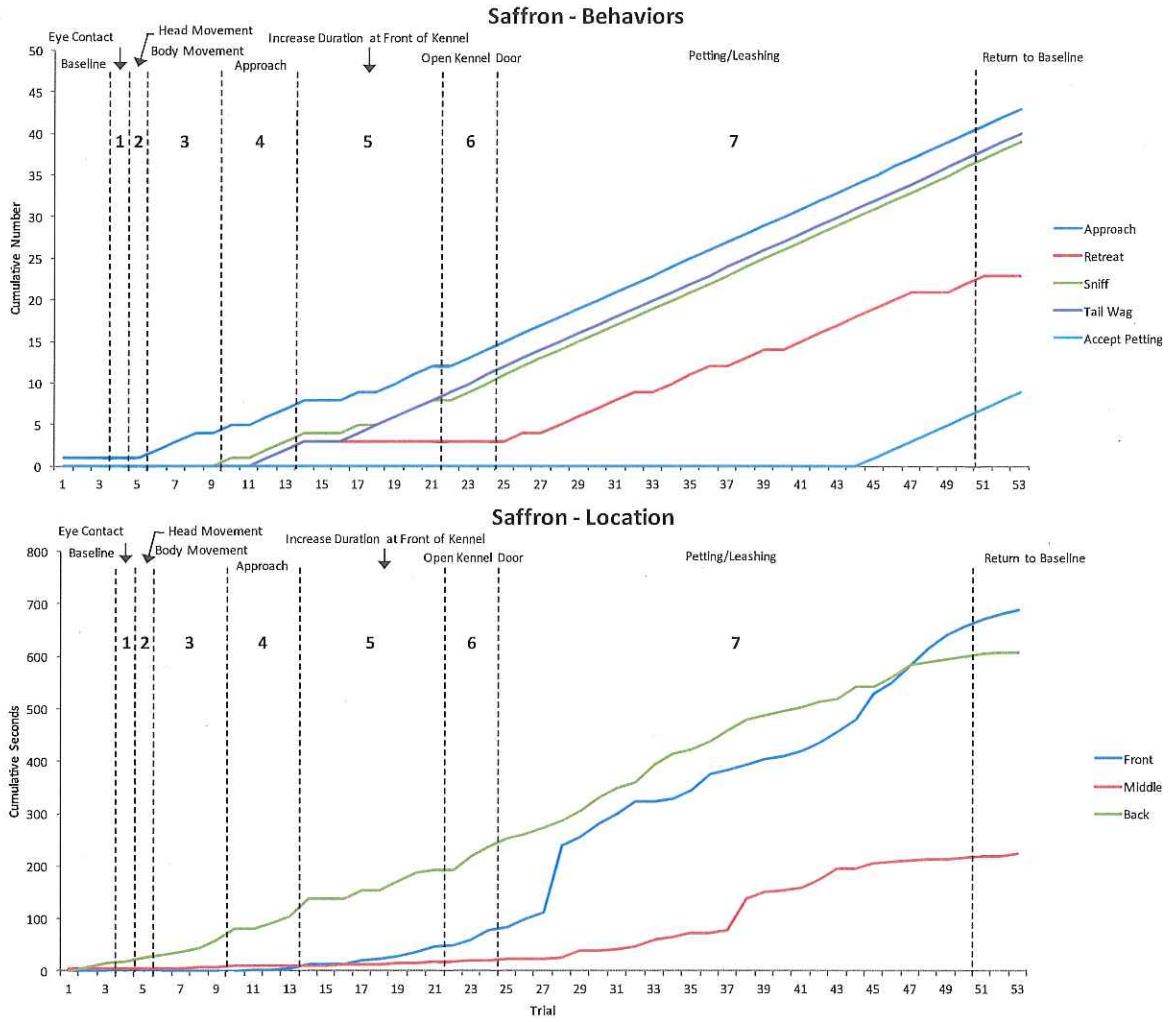


Figure 2. Cumulative number of occurrences of behaviors (top) and cumulative number of seconds spent in the front, middle, and back of the kennel (bottom) for Saffron.

Figure 2 (top) shows the cumulative occurrences of approach, retreat, sniff, tail wag, and accepting petting for Saffron. Figure 2 (bottom) shows the cumulative number of seconds spent in the front, middle, and back of the kennel. During baseline, Saffron approached the front of the kennel during 1 out of 3 trials, and she spent 0 s at the front, 4 s in the middle, and 15 s at the back of the kennel. During Step 1, Saffron spent 4 s at the back of the kennel, and none of the recorded behaviors were observed. During Step 2, Saffron spent 6 s at the back of the kennel, and none of the recorded behaviors were observed. During Step 3, Saffron

approached on 3 out of 4 trials, and spent 4 s in the middle and 36 s at the back of the kennel. During Step 4 Saffron approached during 3 trials, sniffed during 3 trials, wagged her tail during 2 trials, and retreated during 2 trials. She spent 5 s at the front, 2 s in the middle, and 45 s at the back of the kennel. During Step 5, Saffron approached and sniffed on 5 out of 8 trials, wagged her tail on 6 out of 8 trials, and retreated on 1 out of 8 trials. Saffron spent 42 s at the front, 8 s in the middle, and 87 s at the back of the kennel. During Step 6, Saffron approached and sniffed on 2 out of 3 trials and wagged her tail on 3 out of 3 trials. She spent 31 s at the front, 3 s in the middle, and 87 s at the back of the kennel. During Step 7, Saffron approached, sniffed and wagged her tail on 26 out of 26 trials, accepted petting on 6 trials, and retreated on 19 trials. She spent 488 s at the front, 196 s in the middle, and 363 s at the back of the kennel. Saffron was removed from the kennel on trial 50. During the return to baseline condition, she approached, sniffed, wagged her tail, and accepted petting on 3 out of 3 trials. She spent 30 s at the front, 7 s in the middle, and 7 s at the back of the kennel. The total training time for Saffron was 33 min. and 23 s across 47 trials.

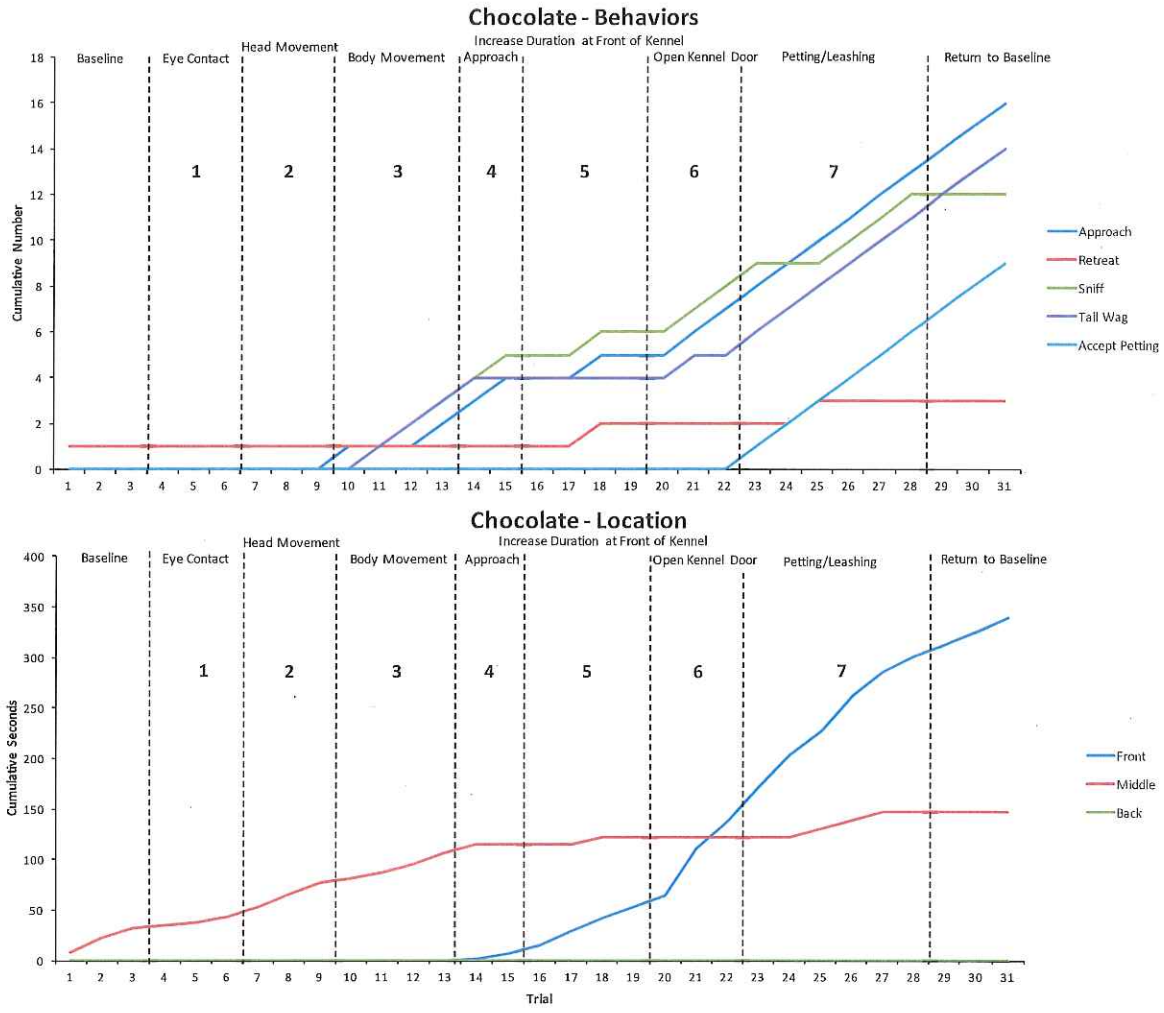


Figure 3. Cumulative number of behaviors (top) and cumulative number of seconds spent in the front, middle, and back of the kennel (bottom) for Chocolate.

Figure 3 (top) shows the cumulative occurrences of approach, retreat, sniff, tail wag, and accepting petting for Chocolate. Figure 3 (bottom) shows the cumulative number of seconds spent at the front, in the middle, and at the back of the kennel. During baseline, Chocolate retreated during 1 out of 3 trials, and spent 0 s at the front, 33 s in the middle, and 0 s at the back of the kennel. During Step 1, Chocolate spent 10 s in the middle of the kennel, and none of the recorded behaviors were observed. During Step 2, Chocolate spent 34 s in the

middle of the kennel, and none of the recorded behaviors were observed. During Step 3, Chocolate approached on 2 out of 4 trials, sniffed and wagged her tail on 3 out of 4 trials, and retreated on 1 out of 4 trials. She spent 29 s in the middle of the kennel. During Step 4, Chocolate approached on 2 out of 2 trials, sniffed on 2 out of 2 trials, and wagged her tail during 1 out of 2 trials. She spent 7 s at the front and 9 s in the middle of the kennel. During Step 5, Chocolate approached, sniffed and retreated on 1 out of 4 trials. She spent 46 s at the front and 7 s in the middle of the kennel. During Step 6, Chocolate approached and sniffed on 2 out of 3 trials and wagged her tail on 1 out of 3 trials. She spent 85 s at the front of the kennel. During Step 7, Chocolate approached, wagged her tail and accepted petting on 6 out of 6 trials, sniffed on 4 out of 6 trials, and retreated on 1 out of 6 trials. She spent 164 s at the front and 25 s in the middle of the kennel. Chocolate was removed from the kennel on trial 28. During return to baseline, Chocolate approached, wagged her tail, and accepted petting on 3 out of 3 trials, and spent 38 s at the front of the kennel. The total training time for Chocolate was 11 min. and 7 s across 25 trials.

DISCUSSION

The results show that constructional fear treatment successfully increased the amount of time the dog spent at the front of the kennel, and increased sniffing, tail wagging, and accepting petting for all 3 participants. The results were accomplished in a short amount of time, showing that the procedure is both effective and efficient. Results are consistent with those of Snider (2007) and Rentfro (2012), suggesting that CFT is a viable procedure for increasing friendly behaviors in fearful dogs, even in the constrained environment of an animal shelter.

The most practical feature of CFT is that it produced the desired results in a short amount of time. Training time ranged from 11 min. and 7 s for Chocolate to 33 min. and 23 s for Saffron. In contrast, commonly recommended desensitization and counterconditioning (DSCC) protocols for fearful dogs can last anywhere from several months to several years, requiring hundreds of repetitions at each training step (McConnell, 2002). DSCC is described as a slow process in which the intensity of the aversive stimulus is increased gradually during many sessions over a period of weeks, months, or years (Donaldson, 1996; London, 2011). Dunbar (2001) and Horwitz, Ciribassi, and Dale (2015) state that the key to desensitization is to work slowly, as it is a process that is meant to be gentle and gradual. Because the protocols span over a long period of time, the dog's progress can often only be detected when viewed long-term, over years or sometimes even the dog's entire life (London, 2011). A dog in a shelter does not have years, months, or sometimes even weeks to learn new, friendly behaviors, which is why the efficiency of CFT is so important.

The difference in length between CFT and DSCC is likely due to the different reinforcers and program steps used in both protocols. DSCC attempts to use positive reinforcement to reinforce calm behavior or a calm emotional response to the aversive stimulus. The dog is exposed to the stimulus at a mild level and is continuously fed for remaining calm. If the dog continues to take the food calmly, the intensity of the aversive stimulus is increased. If the dog behaves fearfully, the intensity of the stimulus is decreased. Usually, the only behavioral requirement of the dog is to remain "relaxed." Alternatively, CFT is a shaping procedure that uses negative reinforcement to teach observable, friendly behavior. It uses distance, the natural reinforcer that is already maintaining the fearful behavior, to shape new behavior. During each trial, the dog is required to exhibit an acceptable, alternative behavior to fear that is a prerequisite of approach. The alternative behavior is reinforced by removing the aversive stimulus. The intensity of the aversive stimulus is increased only when the dog is consistently displaying the approximation to approach. Because CFT works within the contingency that already exists, the dog is likely to learn appropriate behavior quickly. Also, the focus on shaping approach behaviors contributed to the efficiency of the procedure, as the trainer only spent time training one behavior.

Interestingly, toward the end of the procedure, there was a point at which the dog's behavior began to be controlled by positive reinforcement. It seems that the contingency switched from negative reinforcement to positive reinforcement once the dog stepped forward to be pet by the experimenter. Further research is necessary to determine at what point this switch occurred, and to understand the process of switching more clearly. It may be that the focus on shaping approach was responsible for the switch from negative reinforcement to

positive reinforcement. For all three participants, once the dog began to consistently approach the front of the kennel, other friendly behaviors (sniffing, tail wagging, accepting petting) began to occur.

Ideally, CFT would be implemented errorlessly, that is, with only minor fear responses. To be errorless, the trainer would need to have visual access to the dog during the entire training session. Visual access allows the trainer to stop approaching the dog at the point where the fear is minor and just beginning. However, in a shelter environment, it can be difficult to create such a set-up, as most shelters have kennels lining both walls of the dog holding area with little space between them. In order to handle this difficulty, it was determined that a marker would be placed at the farthest possible point that still allowed both the experimenter and the video camera visual access to the dog. Approaching the same location throughout the training allowed the trainer to clearly and consistently gauge the dog's progress. While the marker serves as an acceptable compromise, it is possible for dogs to have one or more of the three following responses: the dog appears frozen at the beginning of training; the dog progresses through several trials of shaping but becomes frozen once the trainer moves closer to the dog; or the dog retreats to the back of the kennel at the beginning of every trial. These three possible outcomes are discussed below.

If the marker is too close, the dog may exhibit a variety of fearful behaviors, including hiding in the back of the kennel, turning its back to the experimenter, or appearing frozen. Training these dogs will require keen observation, as the first several trials will involve reinforcing very small behaviors that can be difficult to detect. Training for these dogs may begin more slowly as some of the fearful responses are extinguished. However, once the dog

begins making small approximations to acceptable behaviors, the shaping process will progress more quickly.

Similarly, it is possible that the dog has successfully completed several trials, but appears frozen or stuck when the trainer steps closer to the dog. In this case, the trainer should step back to where the dog was last successful, but the criteria for the dog should remain the same. On the following trials, the trainer can take smaller steps forward until reaching the original location that caused the dog to freeze.

Lastly, the dog might retreat to the back of the kennel at the beginning of every trial. Most dogs will be able to see or hear the experimenter approaching before she reaches the marker. If the dog retreats when upon hearing the trainer approaching, the loop of retreating at the begin of every trial is reinforced. For Saffron, this was demonstrated by the cumulative number of seconds spent in the back of the kennel being significantly higher than the other participants. In most cases, Saffron ended a trial at the front of the kennel, spent the entire inter-trial-interval at the front, and then retreated to the back as the experimenter approached to begin the next trial. As a result, Saffron began nearly every trial at the back of her kennel. If the trainer had visual access to Saffron, she could have stood further away from the kennel to shape Saffron to stay at the front of her kennel. Using the marker, the experimenter was still able to shape Saffron to approach the front of the kennel and interact, but she did spend significantly more time at the back of her kennel than the other 2 participants.

For each dog in this experiment, the training was completed in one session. However, this might not be feasible during a typical day in a busy shelter environment. The procedure will still be effective if the trials are split up throughout the day, or even across several days.

The most important thing is that the contingency remains consistent so the dog is learning a more appropriate behavior in any situation involving an aversive stimulus. Every interaction that ends with the dog displaying a behavior that a prerequisite to approach is a successful interaction.

Similarly, the training in this experiment was conducted by one person. The procedure will still be effective, and generalization will likely occur more quickly, if multiple people are active in the training. However, each trainer should follow the shaping steps and the progress that the dog makes from trial to trial in his/her own training sessions. For example, Trainer A has been working with a dog for 3 days and has made it to shaping duration at the front of the kennel. On day 4, Trainer B begins with work with the dog, but the dog retreats to the back of the kennel when Trainer B approaches. Trainer B should begin working at the beginning of the procedure, while Trainer A continues to shape at the front of the kennel.

Generalization was not explicitly trained in the current experiment. While no data were collected, one generalization probe with a novel person was conducted immediately following treatment for Lane. Anecdotally, Lane began the trial sitting in the back of her kennel, stood up and approached the middle of the kennel as the novel person opened the door and greeted her, then retreated to the back of the kennel as the novel person stood with the kennel door open. This anecdotal result suggests that additional training would be necessary for Lane to approach and greet novel people. Lane approaching the middle of the kennel rather than remaining the in back, however, suggests that the training necessary for approach and interaction to generalize to novel people may be shorter than the original training. Ultimately, a training procedure needs to actively program generalization, rather than passively to expect it

as an outcome (Stokes and Baer, 1977). Further research is necessary to determine what specific training is necessary to allow the dog to generalize approach and interaction to novel stimuli.

While the current procedure was not programmed for generalization across novel stimuli, it was programmed for generalization across movements of the experimenter. The experimenter varied her movement throughout the entire training process. Every new position or movement from the experimenter was a different stimulus condition in which the dog learned the appropriate response. The goal of the experimenter varying her movements on every trial was to expand the stimulus control as much as possible. If she approached the dog in the same manner on every trial (e.g. bent down and extended her arm), she would have created very specific stimulus control. In this case, the dog would have only approached and exhibited friendly behavior when the experimenter bent down and extended her arm. However, by standing in a different position and varying her movements on every trial, the dog learned to approach and exhibit friendly behavior no matter how the experimenter behaved.

The current experiment aimed to show that a negative reinforcement shaping procedure can effectively and efficiently teach fearful dogs in shelters to approach the front of the kennel and interact with people. Additionally, it aimed to clearly describe the procedures in a step-by-step outline so that it can be easily replicated in shelters. The results suggest that CFT is a valuable tool for shelter staff and volunteers that will make a significant difference in the lives of fearful dogs. Before participating in this study, all three dogs exhibited fearful behavior that prohibited their move to the adoption floor. After 33 min or less of training, all participants were moved to the adoption floor and successfully adopted.

APPENDIX

DATA SHEET

Data Sheet – Occurrence of Behaviors

Participant name: _____ Observer name: _____

TRIAL	START TIME	APPROACH	RETREAT	SNIFF	TAIL WAG	ACCEPT PET

Data Sheet – Location in Kennel

Participant name: _____ Observer name: _____

	FRONT		MIDDLE		BACK	
TRIAL	START TIME	END TIME	START TIME	END TIME	START TIME	END TIME

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