Spring 5-15-2020

Shelter Dogs: The effects of Training on Proximity

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by

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Submitted in partial fulfillment
of the requirements for the degree of
Master of Arts in Animal Behavior and Conservation, Hunter College
The City University of New York

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Date	Thesis Sponsor
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Date	Second Reader

2019

Abstract

Almost 700,000 dogs are euthanized in U.S. shelters every year (ASPCA, 2017). In order to increase their adoptability, this study examined the use of positive reinforcement and shaping to train dogs to spend time in proximity to people. The experimenter selected 45 subjects who remained at the back of their kennels when she approached them. Fifteen of the subjects were trained with the use of a clicker marker and 15 without the use of any marker. Fifteen subjects were simply exposed to the presence of the experimenter. It was found that training significantly increased the number of dogs that reached proximity to the experimenter and decreased the average distance between them. Further, the number of dogs that reached proximity to the experimenter and the number that reached proximity to a novel person were identical, indicating that the trained behavior generalized. However, the use of a clicker did not increase the number of subjects that reached proximity or decrease the average distance between the dog and the person. These results indicate that a simple procedure that incorporates shaping and positive reinforcement can be utilized in a shelter setting to increase the number of dogs that will spend time in proximity to potential adopters.

Keywords: Shelter dogs, clicker training, positive reinforcement, shaping, adoptability

Shelter Dogs: The Effects of Training on Proximity to People

Despite the growing number of people choosing to adopt their pets from shelters, almost 700,000 dogs are euthanized in U.S. shelters every year (ASPCA, 2017). Many of the dogs that evade euthanasia via adoption still face extended periods of time in a shelter. This is concerning for several reasons. First, shelter dogs often experience less social interaction and more confinement than dogs in a home setting (Protopopova, 2016). These animals also have less control or choice in their day to day experiences (Tuber et al., 1999). Further, regular exposure to loud noises (which often occurs in the shelter environment) is correlated with behavioral and physiological problems for dogs later in life (Coppola, Enns, & Grandin, 2010). While the exact effects of these conditions on the welfare of shelter dogs are still unclear (Protopopova, 2016), many dogs that are exposed to shelter conditions for long periods of time develop behavior problems such as aroused or withdrawn behavior (Tuber et al., 1999). Therefore, it is important that we investigate how we can increase the adoptability of shelter dogs—not only so that we can reduce euthanasia but also so that we can decrease the length of time that the dogs are spending in shelters. This is particularly important for dogs that may thrive in a home but do not cope well in a shelter environment.

In order to increase the adoptability of these dogs we need to understand what factors potential adopters are considering when they choose a pet. Previous research indicates that age (Lepper et al., 2002), breed (Lepper et al., 2002), appearance (Wells & Hepper, 2002; Lepper et al., 2002; Weiss et al., 2012), quality of online photos (Lampe & Witte, 2015), health (Lepper et al., 2002), personality (Weiss et al., 2012) and social interactions (Wright et al., 2007; Weiss et al., 2012) are all important factors to adopters. While a dog's breed or physical appearance cannot be changed, it is possible to influence their behavior during interactions with adopters.

Further, sociability appears to best predict the adoptability of dogs (Sternberg, 2003). This is likely because adopters believe that dogs who display social behavior are more friendly and less aggressive (Wright et al., 2007). While there is still little knowledge of which specific social interactions affect adoption success, dogs that act withdrawn, asocial, or frightened are less likely to be adopted (Protopopova et al., 2012; Tuber et al., 1999). Additionally, dogs that ignored potential adopters when they tried to initiate play were less likely to be adopted (Protopopova & Wynne, 2014). Eye contact alone during social interactions did not increase adoptability (Protopopova et al., 2012), however engagement in playtime with potential adopters (Protopopova & Wynne, 2015; Protopopova et al., 2016) and proximity to adopters (Protopopova & Wynne, 2014) seemed to increase the likelihood of adoption. Therefore, it would be beneficial to identify shelter dogs who usually maintain their distance from people and then train them to spend more time in proximity to potential adopters. Not only could this help increase the dogs' adoptability, it may also improve their experience while they are in a shelter environment.

In order to develop an appropriate protocol for training dogs to spend time in proximity to adopters, we need to consider how consequences influence behavior. If you respond to a behavior with a punishment, you will likely see the behavior decrease over time (Reid, 1996). However, if you respond to a behavior with reinforcement, you will likely see that behavior increase in the future (Reid, 1996). Therefore, if the goal is to increase the likelihood that a dog will spend time in proximity to a person, that behavior should be reinforced when it occurs.

There are two ways that a behavior can be reinforced. You can either reinforce a behavior by removing something negative from the dog's environment (negative reinforcement) or by adding something positive to their environment (positive reinforcement) when they perform the

desired behavior (Reid, 1996). Previously, Katz (2016) attempted to train fearful dogs to spend more time at the front of the kennel in the presence of people using negative reinforcement. In this case, the negative stimulus was the experimenter herself because the subjects were fearful of people. Katz (2016) approached the dog's kennel and then rewarded the dog for moving closer to her by removing her presence. Katz (2016) found that the training resulted in the dogs spending more time at the front of the kennel in front of familiar people, however, this behavior did not generalize to novel people. Since most potential adopters are novel to the dogs, generalization is key to developing a protocol that will increase their adoptability. While little to no research has been done on the use of positive reinforcement to increase proximity between dogs and people, previous research has shown there are several benefits to using positive reinforcement with animals in general as compared to negative reinforcement. Horses trained with positive reinforcement were more likely to be engaged in the training sessions than those trained using negative reinforcement (Innes & Mcbride, 2008). Innes and Mcbride (2008) also note that negative reinforcement techniques have the potential to adversely impact animals' welfare, as these techniques require exposing the animals to stimuli that they have a bad association to. Additionally, more and more experimenters are turning to positive reinforcement and away from punishment or negative reinforcement techniques (Heindenreich, 2007). Therefore, using positive reinforcement (since it is inherently less aversive) may yield better results than Katz's study in 2016.

In order to reinforce a behavior, the trainer must be able to witness the behavior—but what can you do if the dog does not offer the behavior on their own? If the dog does not already perform the behavior or does so infrequently, the trainer should use luring (where the trainer uses a treat or toy to guide the dog to perform the desired behavior) or shaping to elicit the behavior

(Reid, 1996). Shaping is an operant training method in which successive approximations to the desired behavior are rewarded (Skinner, 1951). Many experimenters have successfully modified the behavior of animals using the combination of positive reinforcement and shaping (Chiandetti et al., 2016). Further, shaping is a great tool when working with fearful dogs because it is a more 'hands-off' approach than luring (Reid, 1996). Therefore, we chose to incorporate shaping into our protocol.

When trying to shape a behavior, it is important that the trainer effectively communicates the behavior that they are rewarding to the animal. In order to do this, the reward needs to follow the behavior as closely as possible so that the animal understand exactly what they are being rewarded for. Even a 1-2 second delay can inhibit learning (Reid, 1996). To buy time, many trainers use an event marker. An event marker is an auditory stimulus presented at the exact moment the desired behavior is performed (Pryor, 1984), thus allowing the trainer to tell animal exactly when the desired behavior was performed even if the reward cannot be delivered immediately (Breland & Breland, 1966; Pryor, 1984). Melissa Alexander (2003) points out that the event marker should be unique and consistent so that the trainer is less likely to confuse the animal. Since the tone and inflection of our voice often varies (Devito, 1994), many trainers will use a clicker instead. A clicker is a handheld device which emits a unique and consistent 'click' noise created by a piece of metal that is bent when the trainer pushes a button (Dory & Cox, 2018). Wood (2006) found that dogs trained with the use of a clicker marker learned the desired behaviors more quickly than dogs trained with the use of a verbal marker. Few other empirical studies have been able to demonstrate the benefits of using a clicker marker over simply providing a reward without the use of a marker (Chiandetti et al., 2016; Dorey & Cox, 2018; Feng et al., 2018; Smith & Davis, 2008).

Further, the studies that have examined the benefits of clicker training offer inconsistent results and generally focus on owned animals rather than those in a shelter setting. Consequently, further research is needed on the effects of markers on training different types of behaviors across different settings.

Therefore, the current study had three goals:

1. Examine if shelter dogs can be trained using shaping and positive reinforcement to spend more time at the front of the kennel in the presence of people.
2. Examine whether the use of a clicker marker during training will increase the amount of time the dogs spend at the front of the cage, as compared to dogs who are simply given a food reward without the use of a marker.
3. Determine if the trained behavior will generalize to a novel person.

Method

Subjects

The subjects were 45 dogs (*Canis familiaris)* at the Animal Care Centers (ACC), an open admissions animal shelter with five locations throughout the boroughs of New York. Subjects from this study were selected from the Manhattan and Brooklyn locations and consisted of 20 males and 25 females, ranging in age from 10 months to 15 years (M = 5.31, SD = 3.33). There were 37 small-breed dogs weighing under 30 pounds and eight dogs weighing over 30 lbs. The demographic information for each subject can be seen in Table 1.

All dogs housed at these ACC locations, except those housed in medical isolation rooms (the total number of dogs in these rooms was unknown to the experimenter), were

considered for selection as participants. Three subjects were adopted during the study and did not complete the study. These three dogs were replaced. The protocol used in this study (titled SC-clicker 12/19-01 Effect of clicker training on approach to experimenter) was reviewed and approved by the Hunter College Institutional Animal Care and Use Committee in December of 2016.

Setup and Housing

All subjects were housed in kennels located throughout six rooms at the Manhattan location and five rooms at the Brooklyn location. The number of kennels in each room ranged from 10 to 35. As shown in Figure 1 and Figure 2, the dogs were housed in various-sized kennels, with the smallest kennels measuring 71 cm x 86 cm and the largest measuring 152 cm x 89 cm, with solid walls between adjacent kennels.

Materials

Each dog's behavior was recorded during all sessions using a Samsung Gallery Note 8 mounted to a tripod using a phone adapter. A Karen Pryor iClick was used to mark the desired behavior of subjects in the Clicker Group.

Procedure

All data were collected over 11 non-consecutive days in March and April of 2016, between the hours of 9 a.m. and 5 p.m. While the exact times varied slightly from day to day, the typical timeline can be seen in Figure 3. Before the experiment, the researcher had no previous affiliation with NYC-ACC and, therefore, never interacted with the dogs before data collection.

Initial selection of subjects. In order to identify dogs that may be appropriate candidates for this study, the experimenter walked slowly past each dog's kennel without stopping or orienting toward the dogs at all. She was four to five feet away from the front of the kennel. All dogs that did not reach the front of the kennel when the experimenter was in sight were selected for baseline testing to determine if they would approach a novel person if given more time or encouragement. Dogs were not rejected if they simply appeared to be sleeping as it was difficult to determine if the dogs were actually sleeping or feigning sleep due to fear of the experimenter. Between one and seven dogs were selected each day. The experimenter was not blind to experimental hypotheses.

Final selection of subjects and baseline testing. After the initial selection phase, a baseline test was conducted to select the final subjects for inclusion into the study as well as to make a possible comparison of the dog's behavior in the presence of a novel person prior to and following training. Baseline testing took place approximately 30 minutes after initial selection for the study. The baseline test and all subsequent training for all subjects was conducted by the same experimenter who had one year of formal training on learning theory but no professional experience training dogs. During the baseline test, the experimenter knelt or stood in front of the kennel door with her body oriented sideways to the kennel as this is considered less threatening body language as opposed to direct orientation (Yin, 2011). The kennel door remained closed throughout the entire test. As shown in Figure 4, the experimenter then greeted the dog using soft tones and extended a hand toward the dog to mimic the behavior of potential pet adopters (keeping her hand outside the kennel at all

times). Dogs who came to the front of the kennel during baseline testing were excluded from the study. Four out of 49 dogs excluded for this reason.

Assignment to conditions. The first 30 dogs selected for this study were randomly assigned to one of two training conditions (the *Clicker Group* or the *Treat Only Group)* using a number generator, with the restriction that 15 dogs were assigned to each group. Assignment to the *Control Group* followed completion of training for the *Clicker Group* and the *Treat Only Group*. This was done so that average session length for the *Control Group* of dogs could be based on the average session length revealed by the dogs in the training conditions.

Dogs in the *Clicker Group* were exposed to the presence of the experimenter and received positive reinforcement for approach behavior with the use of a clicker to mark the moment the desired behavior occurred. Dogs in the *Treat-Only Group* were exposed to the presence of the experimenter and received positive reinforcement for approach behavior without the use of a clicker. Dogs in the *Control Group* were simply exposed to the presence of the experimenter for the same average amount of time as the other two groups but did not receive any reinforcement for behavior. The differences between conditions are outlined in Figure 5.

Pre-training. During pre-training, the experimenter "charged the clicker" for the dogs in the *Clicker Group.* This is a standard procedure used in clicker training intended to develop an association between the sound of the click and subsequent delivery of the treat (Pryor & Ramirez, 2014). While some experimenters will pair the clicker and the food an extensive number of times when 'loading the clicker,' this is not always practical in real-world settings (such as shelters where workers have limited available time). Consequently, the experimenter chose to follow the protocol outlined in the book *Clicking to Calm*, in which only five pairings of the food and clicker are used to charge the clicker (Parsons, 2005). Thus, during pre-training,

dogs in the *Clicker Group* experienced five trials during which a click was followed by delivery of a treat at varying intervals without regard for the dog's behavior. Small squares of mozzarella cheese were used as the food reward. The dogs in the *Treat-Only Group* were simply given five treats at varying intervals without the use of a marker. The dogs in the *Control Group* were simply exposed to the experimenter's presence for the average amount of time that was spent in pre-training with the *Clicker Group* and *Treat-Only Group*. All pre-training sessions took place approximately one hour after baseline testing.

Training sessions. The experimenter then conducted four training sessions over the course of one day, with approximately one hour in between sessions. During training, the dogs in the training conditions received rewards contingent upon their behavior. The difference between re-training and training is outlined in Figure 5.

The experimenter used a method called shaping to train the dogs in the *Clicker Group* and the *Treat-Only Group* to approach the front of the kennel and interact with the experimenter. The general pattern of steps that were rewarded can be seen in Table 2, starting with eye movement towards experimenter and ending with interactive behavior at the front of the kennel. The steps were not necessarily followed in order, but rather served as a guide to the experimenter in selection of behaviors to be rewarded. In order to encourage new behaviors leading to the final step, each dog received no more than three rewards in a row for the same behavior. For the *Clicker Group* and *Treat-Only Group*, training sessions were kept short (under five minutes) to mimic the time constraints that many shelters experience. Training sessions ended when the dog earned up to 10 treats or presented no rewardable behavior for a minimum of 30 seconds. Time intervals were measured with a standard wristwatch. Sessions varied in length from 45 seconds to 3 minutes and 10 seconds (M = 1 minute and 40 seconds). Dogs in the *Control Group* were

exposed to the experimenter's presence for 1 minute and 40 seconds during each training session. The experimenter did not attempt to interact with them or offer them any treats.

Familiar-Person Test and Novel-Person Test. Approximately one hour after completing the fifth training session, two final tests were conducted. Each test repeated the protocol of the baseline test but were conducted by different people. The familiar-person test was conducted by the experimenter and the novel-person test was conducted by an employee of ACC whom the dogs had either very little or no previous exposure to. The two tests varied in order between subjects in order to counterbalance their effects.

Analysis & Results

Number of Subjects That Reached Proximity to People During Testing

The experimenter reviewed the videos of the final tests-and simply recorded the number of dogs that reached proximity to the person conducting the test. Proximity was defined as the dog's front paws being in the front 1/3 of the kennel.

Comparison of Training vs. No Training

To address whether shelter dogs can be trained to reach proximity to people, the number of dogs that successfully reached proximity to the experimenter from either type of training condition (the *Clicker Group* and *Treat-Only Group* combined) was compared to the number of dogs in the *Control Group*. As shown in Figure 5**,** 11 out of 30 dogs in the two training groups reached proximity during the test with the experimenter, while 0 of the 15 dogs in the control group reached proximity to the experimenter. Using a Fisher's exact test, the difference was

found to be significant ($p = 0.008$). This indicates that positive reinforcement and shaping can be used to train dogs to reach proximity to people who approach their kennels.

Comparison of Clicker Group vs. Treat-Only Group

To address whether the use of a clicker would increase the number of dogs that reached proximity to the experimenter, the experimenter compared the number of dogs that approached during the test with the experimenter between the *Clicker Group* and the *Treat-Only Group*. Five out of 15 dogs in the *Clicker Group* and six out of 15 dogs in the *Treat-Only Group* came to the front of the kennel during the test with the experimenter. A Fisher's exact test was used to determine that this difference was not significant ($p = 1.00$). The lack of significant difference between the two groups indicates that the use of a clicker marker did not increase the number of dogs that reached proximity.

Comparison of Test with Familiar Person vs. Test with Novel Person

To address whether the dogs that successfully reached proximity to the familiar person would generalize the behavior to novel people, the experimenter compared the number of dogs that reached proximity during the test with the familiar person (Clicker Group: N = 5; Treat Only Group: N = 6) with the number of dogs that reached proximity during the test with the novel person (Clicker Group: N = 5; Treat Only Group: N = 6) and found no significant difference (no statistical test was needed as the scores for both tests were identical). This indicates that the trained behavior did generalize to novel people since every dog that reached proximity to the familiar person also reached proximity to the novel person.

Average Distance Score Between the Dogs and People During Testing

The experimenter reviewed the videos of the baseline test, the final test with the familiar person, and the final test with the novel person. She then scored the dog's average distance from the respective person for each of the first 15 seconds of the test. Distance was scored on an interval scale of 1 to 3 (with 1 being the closest and 3 being the furthest from the person). To receive a score of 1, the dog's front paws had to reach the front 1/3 of their kennel. To receive a score of 2, the dog's front paws had to reach the middle 1/3 of their kennel. To receive a score of 3, the dog's front paws had to remain in the back 1/3 of their kennel. The experimenter chose to measure the first 15 seconds as the lengths of the final tests with the novel person varied in time from subject to subject (with the minimum time being 15 seconds). The experimenter then found the sum of the scores given for each of the 15 seconds, so that each subject received a final score ranging from 15 to 45 (with 15 indicating that the dog's front paws were always in the front 1/3 of their kennel during testing and 45 indicating that the dog's front paws were always in the back 1/3 of their kennel during testing).

Comparison of Baseline vs. Final Testing

The experimenter compared the difference in scores between the baseline test and the final tests for the subjects in both training conditions. These results were used to determine if training influenced the average distance between the dog and the respective person. The distance between the dogs and the experimenter was greater during baseline testing than in final testing (The average scores can be seen in Table 4). A non-parametric Friedman test rendered a Chi-square value of 7.23, demonstrating that this change in distance was significant ($p = 0.027$). This indicates that training did decrease the average distance between the dog and the experimenter or novel person.

Comparison of Clicker Group vs. Food-Only Group

The experimenter compared the difference between the scores of the Clicker Group and the Treat Only group to determine if training with the use of a marker decreased the average distance between the dog and the experimenter. A Mann-Whitney test indicated that the average distance between the dog and the experimenter during final testing was not significantly different between the Clicker Group and the Food Only Group, $U = 120.50$, $p = 0.747$ (the average scores can be seen in Table 4). This indicates that the use of the clicker did not affect the average distance between the dog and the experimenter or novel person during testing.

Discussion

To increase the adoptability of shelter dogs who do not spend time in proximity to potential adopters, we asked:

1. Can shaping with positive reinforcement be used to train dogs to spend time in proximity to people?
2. Does the use of a marker increase the number of dogs who successfully learn to reach proximity to people?
3. Does the trained behavior generalize to novel people?

First, it was found that shelter dogs can be trained to reach proximity to people using positive reinforcement and shaping as significantly more dogs reached proximity to the experimenter after training. There was also a significant decrease in the average distance between the dog and the experimenter after training. This supports the results found by Katz (2016) who successfully trained fearful dogs to approach the front of their kennel in her presence

using negative reinforcement. These results also support previous studies that found shaping and positive reinforcement to be an effective means for training new behavior (Chiandetti et al., 2016; Reid, 1996). Future studies could examine whether this was actually a trained behavior or simply a result of classical conditioning to a novel person by including an additional group that simply received treats at varying intervals from the experimenter with no contingencies on their behavior. If so, this would reduce the difficulty of the protocol for staff or volunteers to implement as they could simply toss treats to the dogs whenever the person approaches the dog's kennel. Additionally, future studies could examine if longer or more frequent training sessions would increase the efficacy of training.

Secondly, it was found that the clicker did not significantly increase the number of dogs that reached proximity to the experimenter or the novel person. Additionally, the clicker did not significantly decrease the distance between the dog and the person. This supports the research that clickers are not always advantageous when training animals (Chiandetti et al., 2016; Dorey & Cox, 2018; Feng et al., 2018; Smith & Davis, 2008). Future research could determine if the clicker was more advantageous in Wood's (2006) study due to the makeup of the population. While fearful behavior was not a requirement for selection of subjects in this current study, it is likely that fear was a large reason that the dogs did not initially approach. Therefore, the population of this study was likely made up of more fearful dogs than Wood's (2006) population. Perhaps clicker training is less effective for fearful dogs than confident dogs. Alternatively, the clicker may be more effective when training certain types of behaviors over others. Additionally, the dog's may be picking up on social cues or other body movements from the experimenter (such as moving her hand towards the treat pouch) to indicate when they are going to receive a

treat. Future research could use a mechanical tool, such as a *Manners Minder,* to deliver the treat, thus removing some of the social aspects.

Finally, it was found that the trained behavior did successfully generalize to a novel person. Each of the dogs that approached the experimenter in the familiar person test also approached the novel person. This indicates that shelter dogs who are successfully trained to reach proximity to one of the staff members or volunteers will likely generalize that training to potential adopters. Therefore, training this behavior with positive reinforcement may be more beneficial than using negative reinforcement for several reasons. First, the results of Katz's (2016) protocol did not generalize to novel people. Secondly, the work by Innes and Mcbride (2008) indicates that positive reinforcement is more engaging for animals than negative reinforcement. Finally, Heindenreich (2007) notes that positive reinforcement is less stressful for the animals than negative reinforcement protocols which inherently expose them to stimuli that they have adverse associations with. Future studies could determine if the difference in the generalizability of the results was due to the smaller sample size in Katz's (2016) study or the fact that her subjects were exclusively selected for being fearful.

To develop a training protocol that will realistically impact the adoptability of shelter dogs, it is important to consider the practicality of the protocol. First, many shelters are aware of the benefits of training programs but are not able to implement these types of programs due to time restraints (Prescott et al., 2005). One way to increase the practicality of training programs in shelters is to create a protocol that is both simple and efficient. Additionally, it would be beneficial to create a protocol that can be implemented by volunteers so that staff can allocate their time elsewhere. While most volunteers do not have experience training dogs, Howard and Reed (2014) found that volunteers were able to implement training techniques properly when

given instructions and that these training sessions with the dogs increased desirable behavior. Another study implemented a training program using volunteers that was purposefully unsystematic and they still noticed a decreased length of stay for the dogs at the shelter (Braun, 2011). Therefore, even if the volunteers make small variances in the protocol, they are likely to still improve the adoptability of the dogs they are working with. Overall, the results of this study indicate that it is possible to implement a simple training protocol to encourage shelter dogs to reach proximity to novel people. Since the experimenter had no formal dog training experience, the methods used in this study could be implemented by volunteers or employees with no dog training experience. Additionally, these methods would not require extensive amounts of time to implement, since each dog only received an average total of about 10 minutes of training over the course of five sessions. Further, high value treats are the only required equipment since the clicker did not make a difference in the number of dogs that reached proximity to the experimenter or novel person.

There are several limitations of the current study. First, the small-sample size limits the generalizability of the results to normal populations. Secondly, the generalizability of the results is also reduced by the fact that most of the subjects selected were small-breed dogs and not reflective of normal shelter populations. Thirdly, the experimenter was not blind to the experimental conditions, leaving potential room for bias. Also, the experimenter did not do any preference testing for treats. Consequently, dogs that were unsuccessful at learning to approach the front of the kennel during this study may not have been motivated by the treats offered and may have been successful if a more desirable treat or toy had been offered as a reward. Additionally, the experimenter was not able to adjust the feeding times of the dogs included in this study. Therefore, the dogs were often fed prior to training, thus reducing their motivation to

work for a food reward. Finally, the clicker may have been scary for fearful dogs. Fearful dogs may have been more successful if a “soft” clicker or a verbal marker was used in this experiment.

In conclusion, the results of this study indicate that it is possible for shelters to implement a simple training protocol to increase proximity between shelter dogs and potential adopters. The implementation of such a protocol may increase the adoptability of dogs who normally remain at the back of their kennel when adopters approach. Increasing the adoptability of these dogs will likely result in shorter length of stays and/or a decrease in euthanasia rates.

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Table 1

Descriptive Characteristics of Subjects

Subject #	Experimental Group	Sex	Age (years)	Breed
1	Clicker	MN	6	Shih Tzu mix
2	Clicker	FS	4	Maltese mx
3	Clicker	MI	7	Chihuahua mix
4	Treat-Only	FI	4	Terrier mix
5	Treat-Only	FI	2	Terrier mix
6	Clicker	FI	0.8	American Pit Bull Terrier mix
7	Treat-Only	MN	4	American Pit Bull Terrier mix
8	Treat-Only	FS	2	Maltese/Toy Poodle mix
9	Treat-Only	MN	5	Miniature Poodle mix
10	Treat-Only	FS	6	Chihuahua/Rat Terrier mix
11	Clicker	FI	3	Chihuahua
12	Treat-Only	MI	3	Havanese/Shih Tzu mix
13	Clicker	FS	10	Norwich Terrier mix
14	Treat-Only	FS	5	Shih Tzu mix
15	Treat-Only	FI	4	Chihuahua
16	Clicker	FI	3	Maltese mix
17	Treat-Only	FI	2	Chihuahua mix
18	Treat-Only	FS	6	Shih Tzu mix
19	Treat-Only	FI	5	Shih Tzu/Yorkshire Terrier mix
20	Treat-Only	FI	7	Chihuahua
21	Clicker	MN	8	Chihuahua mix
22	Clicker	FS	4	American Pit Bull Terrier mix
23	Treat-Only	MN	12	Yorkshire Terrier mix

Subject #	Experimental Group	Sex	Age (years)	Breed
25	Clicker	MI	4	Chihuahua mix
26	Clicker	FS	5	Staffordshire Terrier mix
27	Clicker	FI	2	American Pit Bull Terrier mix
28	Clicker	MN	5	American Pit Bull Terrier mix
29	Clicker	MI	3	Miniature Poodle mix
30	Treat-Only	FI	8	Shih Tzu mix
31	Control	MI	10	Golden Retriever
32	Control	MN	3	Shih Tzu mix
33	Control	FI	1.5	Maltese mix
34	Control	MI	16	Miniature Poodle mix
35	Control	MN	1.5	Yorkshire Terrier/Maltese mix
36	Control	MN	9	Chihuahua mix
37	Control	FI	7	Chihuahua mix
38	Control	FI	2	Parson Russell Terrier
39	Control	MI	5	Chihuahua mix
40	Control	MI	4	Shih Tzu/Maltese mix
41	Control	MI	7	Shih Tzu mix
42	Control	MI	4	Shih Tzu mix
43	Control	FI	6	Shih Tzu/Maltese mix
44	Control	FI	5	Chihuahua mix
45	Control	FS	15	German Shepherd mix

Note. MI represents intact males. MN represents neutered males. FI represents intact females. FS represents spayed females.

Table 2

Successive Steps for Reward During Training

Step 1	Eye movement towards experimenter
Step 2	Head, ear, or paw movement
Step 3	Leaning toward experimenter
Step 4	Sitting or standing up
Step 5	Walking toward experimenter
Step 6	Interactive behavior at the front of kennel (i.e. sniffing, licking, or touching the experimenter's hand).

Note. Dogs were not required to proceed sequentially through each step but were generally expected to follow this progression.

Table 3

Number of Dogs that Approached During Testing

	Clicker Group	No Clicker Group	Control Group
Approached during training	8	9	0
Approached during the test with the experimenter	5	6	0
Approached during the test with the novel person	5	6	0
Total # of Subjects	15	15	15

Table 4
Average Distance Score from People During testing

	Average of Sum	Std Dev of Sum
Clicker Group Overall Average	37.49	11.52
Baseline	42.00	6.21
Test with Novel Person	35.20	13.39
Test with Experimenter	35.27	12.91
Treat-Only Group Overall Average	36.11	12.85
Baseline	44.00	3.87
Test with Novel Person	32.33	13.54
Test with Experimenter	32.00	14.86
Grand Total	36.8	12.16

Figure 1. Smaller kennels were used to house small-breed dogs. The majority of subjects were housed in these small kennels.

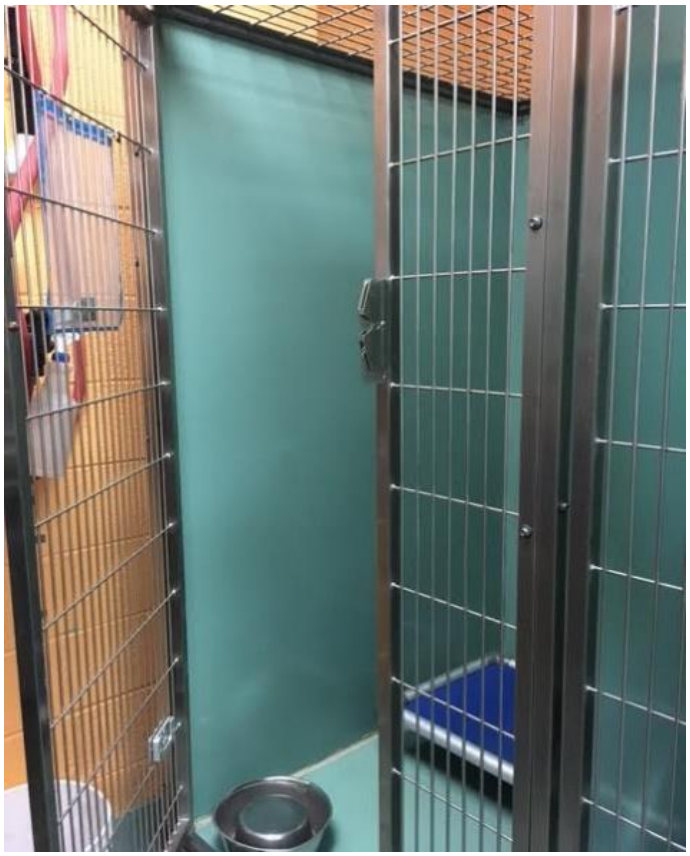

Figure 2. Larger kennels were used to house the few number of subjects that were considered large-breed dogs.

Figure 3. This figure outlines the typical timeline that was followed each day. However, the exact times varied slightly from day to day.

Figure 4. The trainer approached the dogs with a sideways orientation.

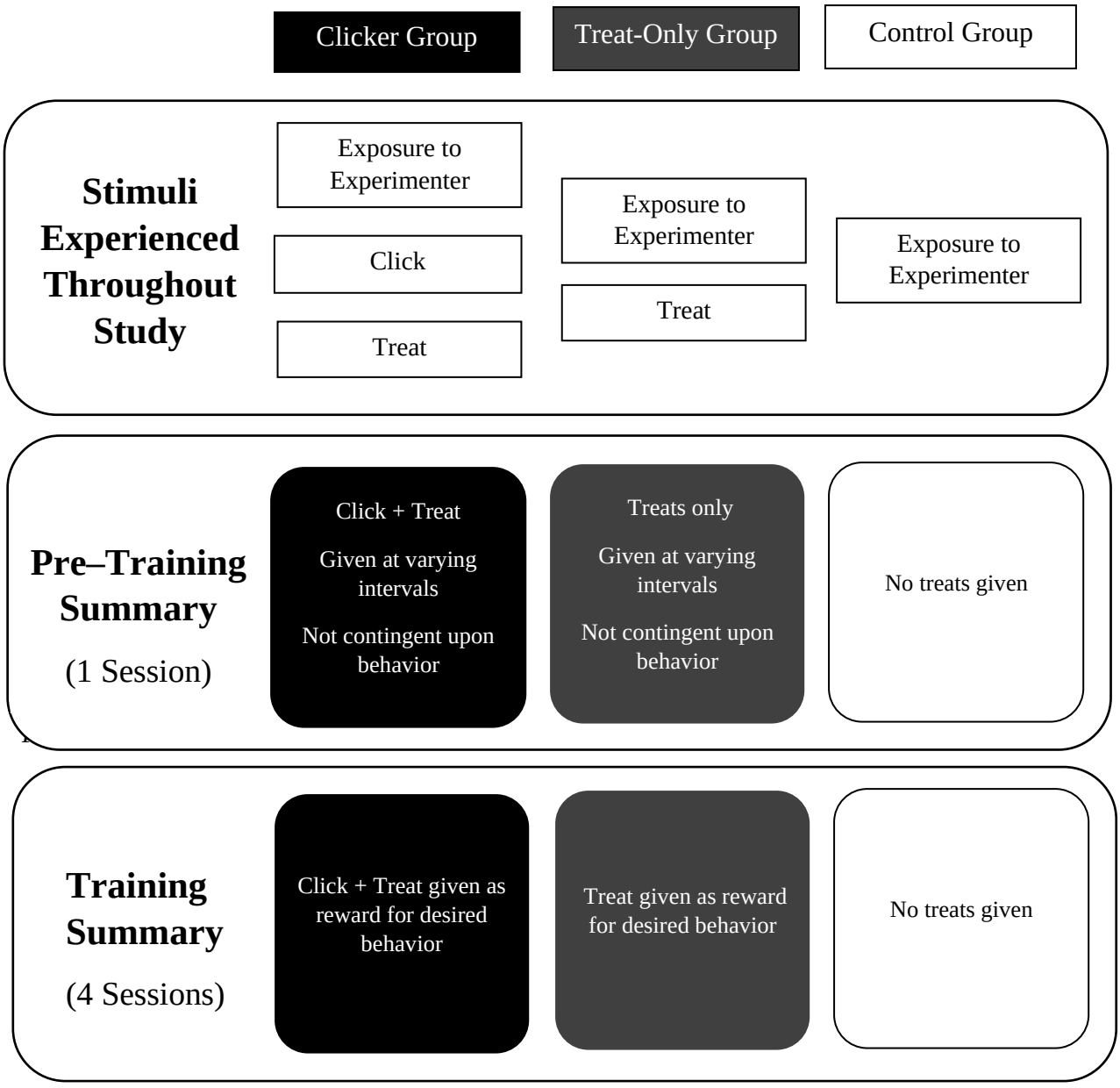

Figure 5. The subjects were assigned to one of three different conditions. Top section of this figure outlines the different stimuli that each group was exposed to. The middle and bottom section outline the difference between the pre-training and the training sessions for each group.

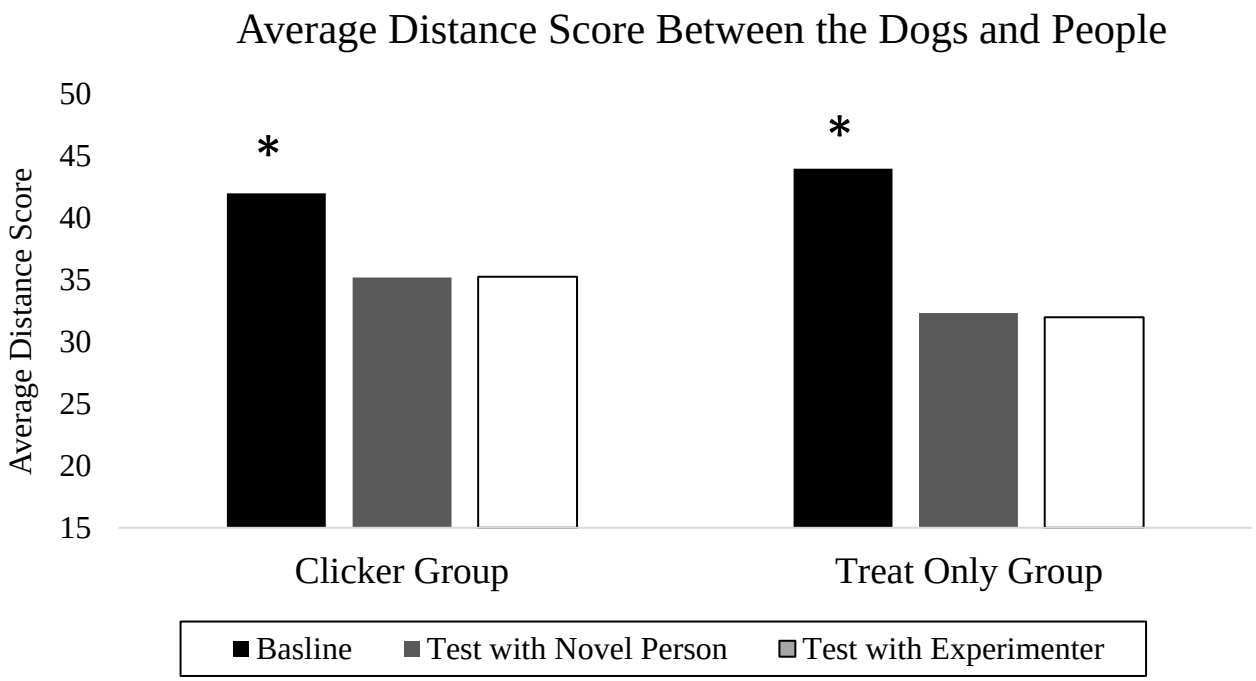

Figure 6. This figure illustrates the average sum of the distance scores between dogs and the experimenter or novel person. Note: Possible scores ranged from 15 to 45 (with 15 indicating that the dog's front paws were always in the front 1/3 of their kennel during testing and 45 indicating that the dog's front paws were always in the back 1/3 of their kennel during testing).