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The Effects of Conspecifics on Dog (*Canis lupus familiaris*) Behavior during Behavioral
Rehabilitation Treatments

by

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of the requirements for the degree of
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Abstract

With high dog euthanasia rates increasing adoption is a significant animal welfare issue that finding methods to treat fearful animals from cruelty cases could help. This study examined the effects of conspecific presence on dogs in behavioral rehabilitation and found significant differences in boldness-fearfulness and solicitation and proximity behaviors.

Key words: Domestic Dog, *Canis lupus familiaris*, Rehabilitation, Conspecific, Helper Dog, Animal Welfare, Animal Cruelty, Shelter, Adoption, ASPCA

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The Effects of Conspecifics on Dog (*Canis lupus familiaris*) Behavior during Behavioral Rehabilitation Treatments

In the United States, an estimated four million dogs are relinquished to shelters each year (Coppinger & Zuccotti, 1999; Patronek & Rowan, 1995; Thorn, Templeton, Van Winkle & Castillo, 2006; ASPCA, n.d.). Due to space constraints or behavioral problems, many healthy dogs will be killed as studies estimate that more than 30 percent of dogs in U.S. shelters are euthanized (Coppinger & Zuccotti, 1999; Patronek & Rowan, 1995; Thorn et al., 2006; ASPCA, n.d.). Finding ways to make shelter dogs more adoptable to increase adoption rates and decrease euthanasia rates is an important animal welfare issue. Every year thousands of dogs are placed in the shelter system from cruelty cases, such as animal hoarding or canine commercial breeding establishments (CBE). Often the dogs that come from these cases have severe behavioral problems and are found in poor condition (Allan, 2010; K. Collins, personal communication, May 2, 2014). There are few published accounts of the behavioral problems and little scientific information on efficient ways of behavioral rehabilitation for dogs. With the majority of animal shelters already overwhelmed, the arrival of these animals -- usually in large numbers -- can force shelters to euthanize the sickly or skittish dogs because they are viewed as less adoptable (Allan, 2010).

One of the few studies that explored the type of behavioral problems that can occur from cruelty or neglect cases was conducted by McMillan, Duffy and Serpell (2011). It analyzed behavioral abnormalities through evaluations of dogs rescued from CBE's by comparing the evaluation results from a sample of domestic pet dogs. The results showed the CBE dogs displayed significantly higher levels of social and nonsocial

fears and phobias, as well as lower trainability and a difficulty in coping successfully in normal domestic environments. This evidence provides insight on how neglectful conditions in CBE's, and perhaps other similar cruelty cases such as hoarding, can impact the behavior and welfare of dogs.

Another study with a similar cross-sectional design looked more specifically at the differences in behavior of dogs that are bought as puppies from pet stores versus bought as puppies from noncommercial breeders (McMillan, Serpell, Duffy, Masaoud & Dohoo, 2013). The majority of puppies at a pet store come from CBE's and were in a neglectful environment for the formative beginning stage of their lives. Results showed that even dogs who are in CBE's for this short period of time displayed behavioral deficits, with significantly greater aggression towards humans, other dogs and greater fear of nonsocial stimuli. This provides further evidence of the behavioral problems that occur when dogs have any background involving impoverished environments or neglect.

Further research of these dogs' behavioral conditions and effective behavioral treatment plans can potentially decrease the high rate of euthanasia. The American Society for the Prevention of Cruelty to Animals (ASPCA) has opened the first center dedicated to research of behavioral rehabilitation to canines from CBE's, hoarding and other neglect cases. It implements customized behavior modification treatments to reduce fear and anxiety using scientifically sound techniques. The Center is also seeing adoption success with these fearful dogs through a post adoption survey. As of December 14, 2015 96% of their adopters say they are very satisfied with the dog after adoption and 95% say they are very satisfied with their decision to adopt the dog. The facility's findings will be

analyzed and eventually published to be shared with other shelters and rescue groups (ASPCA, 2013; K. Collins, personal communication, May 2, 2014).

Due to limited research regarding behavioral rehabilitation methods and their effectiveness, little is also known about the effects of conspecific social interaction during this process. Observations by staff at the ASPCA Behavioral Rehabilitation Center (ABRC) suggest that exposing fearful dogs to non-fearful “helper dogs” seems to decrease fear and stress behaviors during behavioral rehabilitation treatments (K. Collins, personal communication, May 2, 2014). The helper dogs are often paired based on strengths and weaknesses of each dog. For instance, if a dog is extremely fearful of unfamiliar people, it will be paired with a dog that is usually further along in the program and not fearful of unfamiliar people (K. Collins, personal communication, May 2, 2014). These observations are supported by research that has shown social interaction with conspecifics in a shelter setting increases a dog’s ability to cope in a stressful environment with a decrease in stress behaviors and behavioral problems (Mertens & Unshelm, 1996; Wells, 2004).

Other studies also report an increased risk in behavioral abnormalities in dogs that have very little conspecific social interaction within a shelter environment (Taylor & Mills, 2007). Belpedio et al. (2010) provided evidence that suggests dogs that participate in playgroups show fewer stress behaviors such as pacing and distress whining in a shelter environment. That study explored the effect of multi-dog playgroups on the behavior of dogs housed in a shelter and was conducted over a four-day period with 20 dogs assigned to the playgroup and 20 dogs assigned to the control group. Once the playgroup was completed, the behavior of the dogs from both groups was analyzed each

day through video surveillance for stress behaviors. Overall, there was a significant difference between groups: Dogs in playgroups showed fewer stress behaviors when compared to the dogs without playgroups.

Other studies have shown evidence of closer human-to-animal relationships for dogs that are in social housing when compared to those kept in individual housing (Mertens & Unshelm, 1996). The researchers explored the effects of group and individual housing on kennel dogs in animal shelters. They had two study groups with some dogs assigned to the individual housing group and the other dogs assigned to the social housing group. After adoption they followed up with the dog's owner and found that a higher percentage of dogs from the individual housing group suffered from behavioral problems (e.g. "disobedience" and aggression). Through a behavioral evaluation with the experimenter, they also found that the dogs in the social housing group displayed a closer bond to humans. The aforementioned studies, along with observations by the ABRC staff, suggests that conspecific social interaction within a shelter environment can positively impact the welfare and behavior of a dog while in the shelter and after adoption.

The objective of the present study was to further explore the effects of conspecific social interaction with helper dogs during behavioral rehabilitation treatments. The focus was on variables including boldness - fearfulness behaviors, and social solicitation (asking for social contact) and proximity to humans. These measures were compared between two treatment groups: One with a helper dog present and the other without a helper dog present in one treatment session during the early stages of behavioral rehabilitation. It was hypothesized that the group with conspecific social interaction

would exhibit less fear, and more solicitation and sustained proximity to humans when compared to the group without the presence of a helper dog.

Method

Subjects

The sample for this study was comprised of 15 ($N = 15$) domestic dogs (*Canis lupus familiaris*). However, there was a total of 17 dogs in the study since two were not subjects, but assisted in the study as a helper dog only. All animals in this study were in the ABRC program, which requires the group or shelter housing the dog to submit an application for acceptance. The application is a questionnaire that inquires about the dog's behavioral problems and assesses if the dog is appropriate for the program. The main criterion for admission is that the dog displays severe fearfulness that restricts its placement options and makes it difficult for the dog to function as a companion animal. Another important criterion for acceptance is that the dog does not display severe aggression toward other dogs. See Appendix F for more detailed criteria of a dog's acceptance into the ABRC program.

All dogs in this study were spayed or neutered, medically checked and up to date on vaccinations. None were on any medication that would alter their behaviors. In total there were 15 canine subjects in this study, and four helper dogs. It is important to note two dogs were canine subjects and then were later used as helper dogs (see Table 2). All known background and evaluation information on the 15 canine subjects in this study can be found in Table 2. The possibility that the subject's background was correlated with the first evaluation grade was explored and no correlation was found. A Spearman rank-order correlation was not significant with $r_s(13) = 0.09, p > .05$. All canine subjects were at the

beginning of their ABRC treatments for the program and you can find the number of treatment days for each subject in Table 1. Also, the breed, age, sex, weight, group and number of days at the Center at the time of data collection can be found in Table 1.

Table 1

Subjects' Primary Characteristics, ABRC Assigned Onset of Treatment, Number of Days and Number of Treatment Days at the ABRC at Data Collection

Dog ID	Breed	Age (Year)	Sex	Weight (kg)	Days At ABRC	Treatment Days	Onset
No Helper Dog Group							
198	Mixed	1-7	F	20	22	0	Delay
202	Pit Bull	1-7	M	27.2	20	14	Immediate
201	Mix	1-7	M	17.2	26	0	Delay
203	Collie Mix	1-7	F	11.8	31	4	Delay
207	Terrier Mix	1-7	M	22.7	27	0	Delay
210	Chow Mix	1-7	F	20.4	35	8	Delay
212	Lab Mix	1-7	F	16.8	35	1	Delay
225	Lab Mix	1-7	F	18.6	27	0	Delay
Helper Dog Group							
194	Lab Mix	1-7	F	23.1	24	0	Delay
204	Hound Mix	1-7	M	24.5	15	10	Immediate
205	Aussie Mix	1-7	M	15.4	30	0	Delay
209	Chow Mix	1-7	F	16.6	27	0	Delay
211	Pit Mix	1-7	M	16.8	35	7	Delay
213	Lab Mix	1-7	F	17	35	1	Delay
223	Pit Mix	1-7	F	17.2	30	2	Delay

Note. Weight is defined in kilograms (kg), while days at the ABRC and treatment days were calculated at the time of data collection.

Upon intake to the ABRC all dogs are placed into a 15-day quarantine, which is an ABRC health protocol. During this time, the dog only leaves its kennel for behavior

evaluations and medical procedures. However, all dogs receive food and water and one daily treat for enrichment starting on Day One. All dogs entering the ABRC are randomly assigned to receive either immediate onset of treatment or delayed onset of treatment for the ABRC's research purposes. The difference between these two is solely when the dog starts the program's behavioral rehabilitation treatments. If the subject is assigned to immediate onset, the dog's treatments begin inside the quarantine kennel on Day Five until the quarantine period is over, then treatments outside the kennel can commence. If the subject is assigned to delayed onset of treatment, it starts treatment on Day 26, which is after the quarantine period is over. For the purpose of this study a mix of immediate and delayed onset dogs were included (see Table 1).

During the first week after intake to the program, an evaluation is performed to further assess the dog's behavioral state. Two behaviorists at the ABRC perform all evaluations with no knowledge of the dog's background. A grade between A and D is given: A no concerns, B mild concerns, C moderate concerns, and D severe concerns (see Appendix E). The breakdown of the first evaluation grade for the 17 dogs (canine subjects and helper dogs) in this study were: 53% received a D, 35% received a C and 12% received a B. The program then continues to perform evaluations approximately every three weeks to track the dog's progress, with up to six evaluations done before the dog leaves the program. All the canine subjects in this study had one or two evaluations at the time of participation. See more detailed information on evaluation grades, background and outcomes separated by treatment group in Table 2.

Table 2

First and Last Evaluation Grades, Known Background and Status of the Subject as of March 2016, Separated by Treatment Group

Dog ID	First Evaluation	Last Evaluation	Background	Status
No Helper Dog Group				
198 ^a	C	B	Cruelty/Neglect	Graduated
202	C	B	Hoarding	Graduated
201 ^a	D	B	Unknown	Graduated
203	D	D	Stray	Euthanized
207	D	B	Hoarding	Graduated
210	C	B	Cruelty/Neglect	Graduated
212	D	C	Cruelty/Neglect	In Program
225	C	B	Cruelty/Neglect	Graduated
Helper Dog Group				
194	B	B	Surrender	Disqualified*
204	C	B	Unknown	Graduated
205	B	B	Unknown	Graduated
209	D	C	Hoarding	Graduated
211	D	C	Cruelty/Neglect	In Program
213	D	C	Cruelty/Neglect	In Program
223	D	D	Dog Fighting	Euthanized
Helper Dogs				
171	C	B	Hoarding	Graduated
165	D	C	Unknown	Graduated
198 ^a	C	B	Cruelty/Neglect	Graduated
201 ^a	D	B	Hoarding	Graduated

Note. The evaluation grades are defined: B is mild concerns, C is moderate concerns, and D is severe concerns (see Appendix E).

^a These individuals were used as both Canine Subjects and then later as Helper Dogs.

*This subject was disqualified from the ABRC program after their participation in this study due to a leg injury which prevented him from participating in the treatments.

Four different helper dogs were in this study due to availability of qualifying helper

dogs at the time of data collection. These qualifications included the dog being in the final stages of the ABRC program, consistently displaying no aggressive behaviors toward other dogs, and able to be tethered to the leash used in the study without exhibiting fear or stress behaviors. All helper dogs were familiar with the experimenter, having had three or more previous interactions or ABRC treatments with the dog.

The helper dogs weighed between 8.6 kg and 20 kg with the average weight being 14.8 kg. They were of mixed breeds and adults (1 to 7 years old). Table 2 shows their last evaluation grade, which was performed before or near the time they were helper dogs in this study, as well their background. Three helper dogs were male and one was female. Also, all helper dogs were placed in delayed onset timing for treatments for the ABRC's research purposes. The average amount of time the helper dog had been in the ABRC program at time of use was 4.3 months. In Table 3 find the breed, age, sex, weight, time in program, number of times used as a helper dog and amount of time in the program at data collection.

Table 3

Helper Dogs' Primary Characteristics, Months in the Program at Time in Study and Number of Times a Helper Dog

Dog ID	Breed	Age (Year)	Sex	Weight (kg)	Months in Program	No. of Times ^a
171	Hound Mix	1-7	M	13.5	4.5	1
165	Terrier Mix	1-7	M	8.6	5.8	1
198*	Mixed	1-7	F	20	3.5	2
201*	Collie Mix	1-7	M	17.2	3.5	3

Note. Weight is defined in kilograms (kg).

^a Number (no.) of times they were a Helper Dog in this study.

* These individuals were used as both Canine Subjects and then later as Helper Dogs.

Research Design

This study was conducted at the ABRC, which is located in the suburban town of Madison, New Jersey, in Morris County USA. The facility is set on a remote piece of property with fields and forest trails that have little foot or vehicle traffic. The ABRC has 35 kennels in which each has a separate outdoor area accessed by a guillotine door which can open or close to control the dog's access. There also is a large indoor training ring, multiple fenced outdoor training areas and a courtyard with a turfed yard and digging pit used for treatments and enrichment.

This study took place in the ABRC courtyard in a specially-built outdoor kennel with dimensions of 3 m (W) x 3 m (L) x 1.8 m (H) and a roof to protect against elements such as rain or sun. A Petmate rolling crate that measured 0.6 m (W) x 1 m (L) x 0.7 m (H) was used to retrieve the canine subjects and left inside the kennel during all study sessions. A tethered run was set up along one side of the kennel using a cord secured to the kennel wall. Attached to this was a 61 cm wire rope made of lightweight vinyl coated galvanized metal with a rotating clip that attached to the collar of the helper dog. This was for the helper dog when staying in the kennel with the subject and allowed the helper dog to move around in only part of the kennel space. The subject was still able to interact with the helper dog, but the tether stopped the helper dog from pushing the canine subject away from the experimenter or boxing the subject out in competition (which was observed in a pilot study).

At the ABRC, and for this study the main behavior modification technique used was reward-based. Studies have shown that punishment during training may have negative effects (e.g. fear of new people and less trainability) on a dog, while reward

based training has shown more favorable long-term behavioral effects like increased learning ability (Rooney & Cowan, 2011). Therefore, all dogs in the program receive their daily food ration during treatment sessions as a reward for socialization, handling, leashing, walking, and exploration of novel environments. Food was similarly used in this study as a reward for the subject to solicit social interaction or to come into closer proximity to the experimenter. The food was Polly-O string cheese, Red Barn food roll and Science Diet kibble.

In order to measure proximity to the experimenter the kennel floor was marked with red duct tape and divided into three sections that were 101.6 cm deep (see Figure 1). Corrugated plastic white panels covered some walls to a height of 1.2 m to limit possible distractions in the testing area. The entire kennel area was captured and recorded on a Canon Vixia Mini Camcorder model number S/N 732684000326 using the wide-angle setting. An assistant was with the experimenter at all times to help manage the camera and handle the subject and when applicable, the helper dog. The experimenter used a stopwatch to track time. Printouts of the data collection worksheet and the ethograms for boldness - fearfulness and sociability ratings were used in every study session (see Appendices A, B and C).

Procedure

One of the main goals for data collection was to gather the data from the canine subjects during the early stages of treatment in the ABRC program. However, for health reasons, data collection had to occur after quarantine was completed. Times of day and days of the week when the data was collected for this study were based on the ABRC's schedule and the onset timing of treatments (immediate or delayed onset) to which the

dog was assigned. The two subjects assigned to immediate onset of treatment began treatments inside the quarantine kennel on Day Five, and for this study, data was collected on or around Day 15 after intake. Alternatively, the 13 subjects assigned to delayed onset of treatment started their treatments on Day 26, and for this study, data was collected on or around Day 26 after intake. Therefore, data collection was performed on all subjects between Days 15 and 35 after their arrival to the ABRC, with an average of three treatment days upon the date of data collection for this study. Refer to Table 1 for information on when the subjects had data collected, in relation to their time and treatments in the program.

Two groups were established for this study. Animals in the No Helper Dog Group did not experience a helper dog, thus only the experimenter and subject were in the study kennel. Alternatively, subjects in the Helper Dog Group experienced the presence of the experimenter and a helper dog. This was the only difference between the groups as all materials, even the tether that holds the helper dog, were kept in the kennel in the same area. However, in some instances the assistant or an ABRC staff member was present during some study sessions. Early on in the study, assistants stayed where they could see the subject in case there was a need to react quickly to their behavior to a new dog or the new environment. However, after a number of study sessions the design changed to have the assistant and any other individual besides the experimenter out of the subject's sight.

Subjects were assigned to the Helper Dog Group and the No Helper Dog Group using a systematic random assignment technique based on when they were ready to receive treatment and were evenly split between the two groups. However, due to one dog being eliminated from the study after showing aggressive behaviors toward the

helper dog, the Helper Dog Group had seven and the No Helper Dog Group had eight canine subjects. The two subjects who were immediate onset of treatment were separated and placed into each of the two study groups also by systematic random sampling. As you can see in Table 4, the average characteristics of the subjects and environmental conditions during the study were very similar across the two study groups.

Table 4

The Average Weight of Subjects, Days at ABRC, Number of Treatment Days, Data Collection Start Time, Temperature and Humidity for the Two Groups at Data Collection

Group	Weight	At ABRC	Treatment Days	Start Time	Environmental Temperature	Environmental Humidity
No Helper	19.3 kg	27.9	3.4	2:20pm	26.6 °C	46.9%
Helper	18.7 kg	28	2.9	1:59pm	25.7 °C	51.3%

Note. The measurement °C is defined as degrees Celsius, while days at the ABRC and treatment days were calculated at the time of data collection.

To avoid any bias while rating, the experimenter was not familiar with any of the subjects and did not know any background or evaluation information prior to data collection. Therefore, study subjects were not assigned to groups based on background or evaluation grades. See Table 2 for details of the subjects' backgrounds and evaluation grades by group. All subjects were withheld food prior to data collection that day. This helped to increase motivation to eat out of human hands during treatment. Data collection was done between 12 pm and 4 pm, with the average time of data collection for all study sessions at 2:09 pm. One pm to 2 pm is the ABRC's "Zen time," when the dogs stay inside their kennel with the lights dimmed and classical music playing while enrichment (e.g. stuffed Kongs, chews etc.) is given. Data collection was done during or around Zen time to avoid interfering with the ABRC's normal treatment routine.

Before each study session for both groups, the experimenter and assistant set up the

kennel depending on which group the subject had been assigned to. They also made sure there was enough food ready for the session and filled out the data collection worksheet including the time of day, subject identity, weather and any other information that could be added prior (see Appendix A). This worksheet was then verbally read and recorded on camera before retrieval of the subject to organize and keep track of identifying the subjects in the video.

For the Helper Dog Group, before the first study session the helper dog was leashed and brought to the testing kennel. Initially some of the helper dogs showed fear or stress behaviors from the novel feeling of the tethered leash. Therefore, for 5-10 minutes before the study session started, the helper dog was put in the area and permitted to explore and familiarize itself with the outdoor kennel. Once the helper dog was leashed to the tether, the experimenter allowed another 5-10 minutes for the helper dog to familiarize itself with the tether and its restriction of movement. The helper dog was then monitored until fear and stress behaviors subsided. There was only one instance where the stress and fear behaviors were so extreme that the experimenter had to replace the initial helper dog with a backup helper dog. As stated previously, all helper dogs in this study were familiar with the experimenter which allowed the experimenter to gauge the dogs' normal versus abnormal behavior. Once the helper dog was comfortable, the assistant stayed with them while the experimenter retrieved the canine subject. For the No Helper Dog Group, the experimenter and assistant retrieved the canine subject without setting up a helper dog.

Once the initial setup was complete, the canine subject was retrieved. A rolling crate was used and the subject was encouraged to go in it from their housing kennel using food lures or herding techniques. Based on extensive experience at the ABRC, this was

found to be the least stressful method to relocate the subjects. Leashing or other methods that include handling were observed to more likely increase stress behaviors. Once secure in the crate, the subject was rolled from its housing kennel to the outdoor test kennel. This relocation took on average two minutes and was approximately 31 m in distance. The crate was rolled carefully and slowly to avoid any extra stress to the subject, which has also been found by the Center if pushed too fast. One canine subject was so fearful of the rolling crate that the experimenter had to leash the dog to relocate it to the test kennel.

Once the subject and experimenter were securely in the outdoor test kennel, the assistant set up the camera on a crate at a height and angle that captured the entire area of the test kennel. Then the assistant began the video recording and moved out of the subject's sight, but stayed close enough to hear if the experimenter called for her. Once the assistant was in place, the experimenter removed the door of the rolling crate to permit the subject easy exit and entry. The rolling crate was left in the test kennel to allow subjects who might experience extreme fear a hiding place for relief. This is also often done in the early stages of treatment at the ABRC.

Once the assistant was out of sight, the experimenter sat in the designated area in the middle of Section 1 (see Figure 1). This placement allowed the experimenter limited interaction through touch and hand feeding with the tethered helper dog if needed. Figure 1 illustrates the placement of the rolling crate, the experimenter, the tape-demarcated sections, the camera placement and the tethered helper dog (Helper Dog Group only). The experimenter was seated on the floor in the same area and position for every dog, requiring little body movement when offering food to the subject while observing the subject and keeping track of time. Being at eye level to the subject, the experimenter

did not have to reach down or bend over when offering food. The ABRC has observed in their treatments that this bending movement causes higher stress behaviors in the dogs.

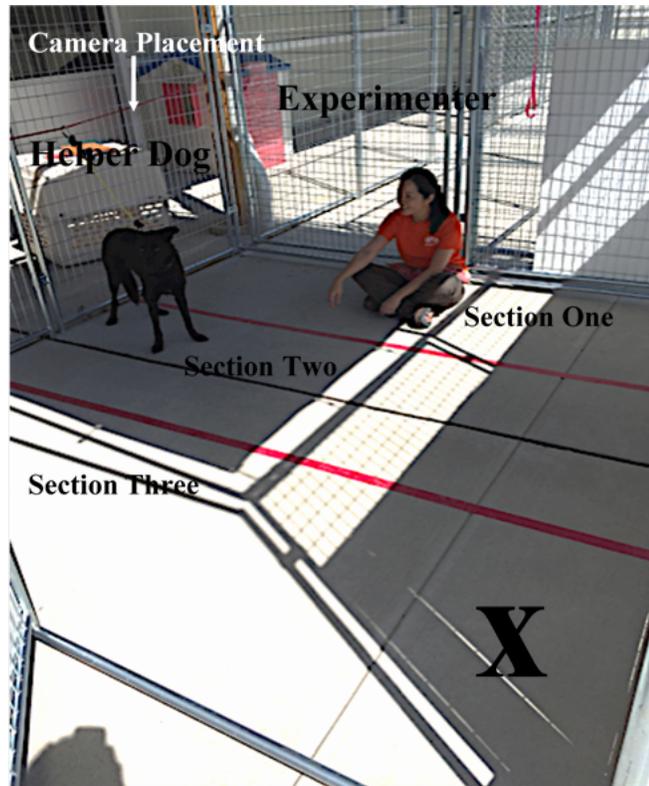


Figure 1. Inside the testing kennel. The X is the placement of the rolling crate. Labeled are the tape-demarcated sections, the experimenter, and the tethered helper dog. The camera placement is also labeled on a crate outside the outdoor kennel.

Once the experimenter was seated the timer and study session started. Food and verbal coaxing was offered to the subject and the helper dog (if applicable) in one-minute intervals. Every minute starting from the beginning of the study session the phrase “Here puppy, puppy, puppy, come here puppy” was said by the experimenter and the same amount and mixture of food was offered. This was one piece of kibble, one piece of string cheese and one piece of food roll. The experimenter had a container of this mixture precut in her lap.

If the subject was in reaching distance or approached the experimenter when offered food, the experimenter tried to hand feed the subject. To encourage proximity to the experimenter, if the subject was not in reaching distance or did not take the food by hand, the experimenter would toss the food in the section closest to her depending on which tape-demarcated section the subject was in. For example, if the subject was in the furthest section (section 3), the food was tossed into section 2, if the subject was in the middle section (section 2) the food was tossed into the experimenter's section (section 1), and if the subject was in section 1 and not taking from the experimenter's hand, the food was tossed into section 1 in closer proximity to the experimenter. To judge what section the subject was in, the subject's front paws was used as a guide. For the Helper Dog Group, the experimenter gave the same amount of food at the same timed intervals to the helper dog by hand only (no tossing). The helper dog was only handfed because it was observed in ABRC treatments and the pilot study that close human social interaction with the helper dog encouraged closer proximity to the experimenter by the subject.

Each data collection session was 15 minutes. Once the time was complete, the assistant was called over to stop the recording on the camera. The experimenter then immediately filled out the data collection worksheet writing down any pertinent notes and filling out the ratings (see Appendix A). The ABRC's boldness - fearfulness ethograms that helped to interpret the subject's behavior were referenced when the subject was rated (see Appendix B). On the worksheet, the best and worst ratings were recorded because while the subject might start out very fearful, it can also show times of neutrality, play or other signs of increasing boldness (see Appendices A and B). Collecting the two ratings allowed assessment of the range of the dog's behavior throughout the study session.

Solicitation and proximity were also rated using the sociability scale created by the ABRC (see Appendix C). This rating system was based on whether or not the subject showed social solicitation and had no, short or sustained proximity. After the experimenter completed the worksheet, the subject was brought back to its housing kennel. If the helper dog was present and study sessions were done for the day, it was also brought to its housing kennel. However, if more study sessions needed to be done, the helper dog received a break from being leashed to the tether and was given water.

For the analysis of subjects' interaction toward the experimenter the dependent variables were ratings of solicitation - proximity and boldness – fearfulness toward the experimenter during the study session. The independent variable was the presence of a helper dog. For sociability, one rating was given using the six-point sociability scale (see Appendix C). The average of each rating was calculated for each group; a two tailed independent samples *t*-test was run to test for differences between groups.

For boldness - fearfulness, two ratings were given using a 5-point scale (see Appendix B). One rating was the best and the other rating was the worst behavior observed during the study session. Both ratings were averaged and between-group differences were tested using a two tailed independent samples *t*-test. Next, the difference between the best and worst ratings was determined for each subject. The averages for these differences were compared between groups (*t*-test). The ratings for each subject in all areas separated by group can be found in Table 5.

Table 5

Subjects' Solicitation Rating, Best and Worst Boldness – Fearfulness Rating and the Boldness – Fearfulness Range of Behavior toward the Experimenter Separated by Group

Dog ID	Solicitation Rating	Best Boldness – Fearfulness	Worst Boldness – Fearfulness	Boldness – Fearfulness Range ^a
No Helper Dog Group				
198	4	2	3	1
202	4	2	3	1
201	5	2	4	2
203	5	3	4	1
207	6	4	5	1
210	4	3	4	1
212	4	2	4	2
225	4	3	4	1
Helper Dog Group				
194	1	1	2	1
204	1	1	2	1
205	2	1	3	2
209	5	3	4	1
211	4	2	3	1
213	4	2	3	1
223	1	2	4	2

Note. The solicitation and the boldness – fearfulness rating ethograms are located in Appendices B and C.

^a The boldness – fearfulness range is defined by subtracting the subjects worst score with their best score.

For the analysis of the Helper Dog Group subject's interaction toward the helper dog, separate analyses were done to further explore the interaction the subjects had with the helper dog. Utilizing the same scales of sociability, proximity, boldness - fearfulness to study the behavior toward the experimenter, these ratings were also made for their

behavior toward the helper dog using video footage (see Appendices B and C). Similarly, one rating was given using the sociability scale and two ratings (best and worst) were given using the boldness - fearfulness scale. These results can be found in Table 6. Three separate two tailed dependent sample *t*-tests were run to see if there were any differences between the subject's ratings of solicitation and proximity, as well as the boldness - fearfulness toward the helper dog when compared to the experimenter. These ratings were also used to further explore potential correlations with the subject's background and evaluation grades using the Spearman's rank-order correlation.

Table 6

The Helper Dog Group Subject's Background, First Evaluation Grade and the Solicitation Rating and Best and Worst Boldness – Fearfulness Ratings toward the Helper Dog

Dog ID No.	Background	Evaluation Grade	Solicitation Rating	Best Rating	Worst Rating
194	Surrender	B	1	1	3
204	Unknown	C	1	1	2
205	Unknown	B	1	1	3
209	Hoarding	D	1	3	4
211	Cruelty/Neglect	D	1	2	3
213	Cruelty/Neglect	D	1	1	2
223	Dog Fighting	D	2	2	3

Note. The evaluation grades are defined: B is mild concerns, C is moderate concerns, and D is severe concerns (see Appendix E). The solicitation and boldness – fearfulness rating scales are given in Appendices B and C.

Results

Analysis of Subjects' Interaction toward the Experimenter

Solicitation - proximity rating. The Helper Dog Group did show more solicitation and proximity toward the experimenter than the No Helper Dog Group with an

independent two tailed samples *t*-test showing a significant difference in solicitation and proximity for the Helper Dog Group ($M = 4.50$, $SD = 0.76$) compared to the No Helper Dog Group ($M = 2.57$, $SD = 1.72$) conditions $t(13) = 2.88$, $p = 0.01$ (see Figure 2).

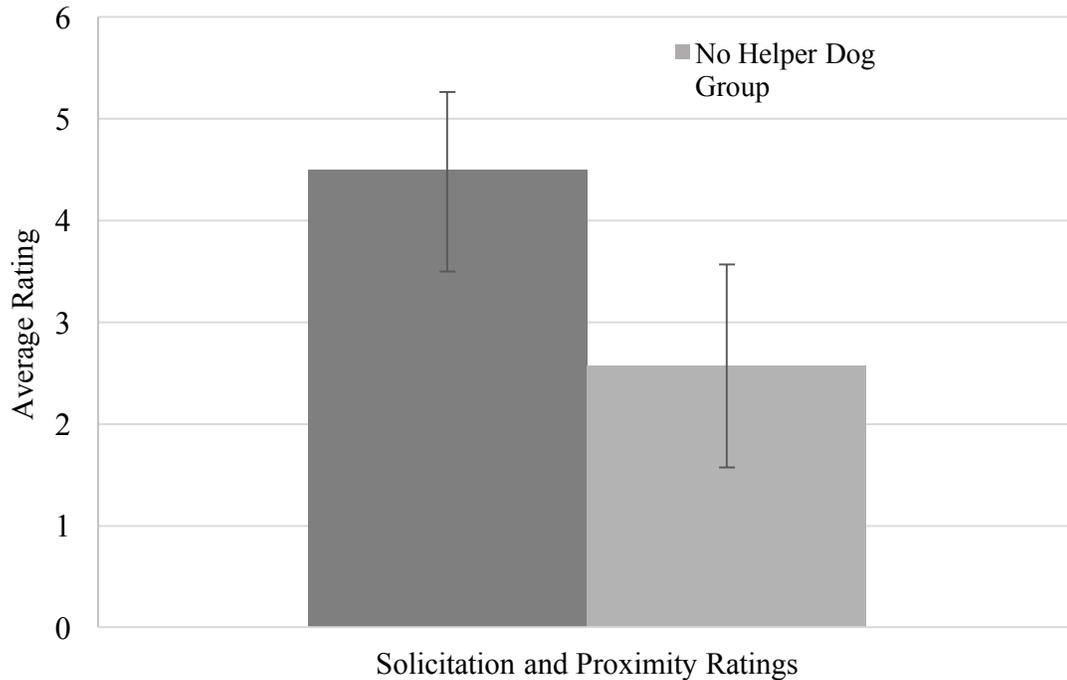


Figure 2. These are the differences of the average ratings between groups taken from all study sessions used for solicitation and proximity. Lower ratings indicate more solicitation and proximity than higher ratings. More specific scoring descriptions can be found in Appendix C.

Best boldness - fearfulness rating. An independent sample two tailed *t*-test showed significant differences in the average boldness-fearfulness rating between the subjects assigned to the Helper Dog Group who averaged a lower rating of boldness - fearfulness ($M = 2.63$, $SD = 0.74$) when compared to the No Helper Dog Group ($M = 1.71$, $SD = 0.76$) conditions $t(13) = 2.35$, $p = 0.04$, which shows that the Helper Dog Group had less fear behaviors toward the experimenter (see Figure 3).

Worst boldness - fearfulness rating. The worst boldness - fearfulness ratings were higher in the No Helper Dog Group when compared to the Helper Dog Group which means less fear behaviors toward the experimenter with a conspecific presence. Ratings were compared using an independent sample two tailed *t*-test showing significant differences between the No Helper Dog Group ($M = 3.88$, $SD = 0.64$) when compared to the Helper Dog Group ($M = 3.00$, $SD = 0.82$) conditions $t(13) = 2.32$, $p = 0.04$ (see Figure 3).

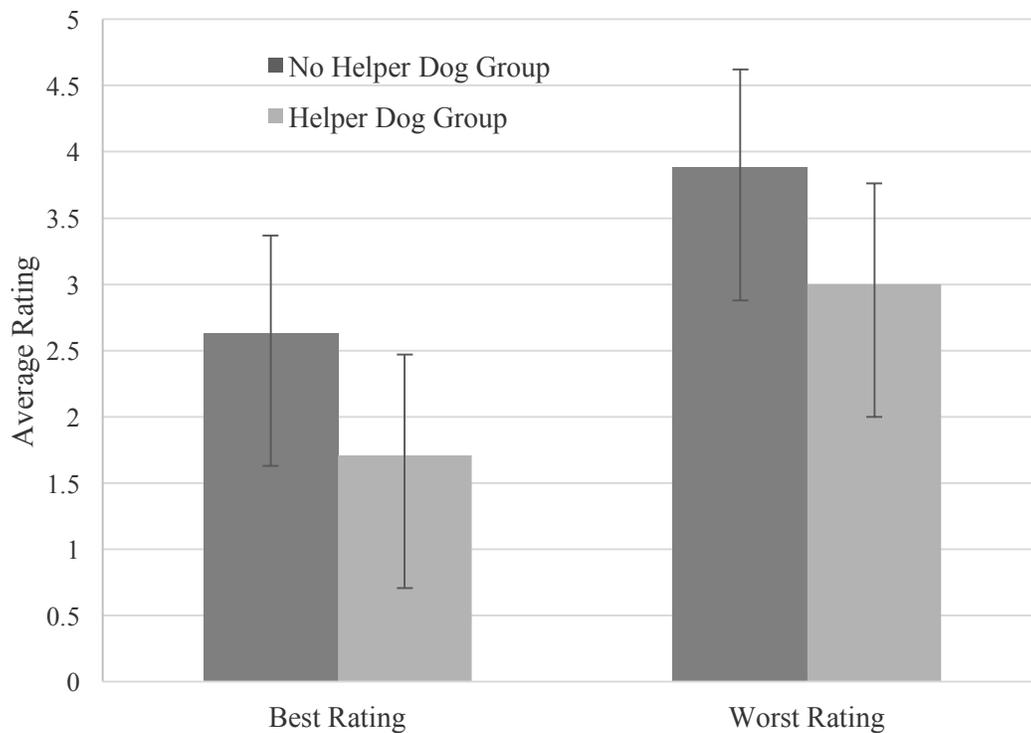


Figure 3. These are the average rating differences between groups taken from all study sessions for their best boldness - fearfulness rating and their worst boldness - fearfulness rating. Lower ratings indicate more boldness and less fear than higher ratings. More specific scoring descriptions can be found in Appendix B.

Best and worst boldness - fearfulness rating range. No significant differences were found when testing the difference between the best and worst rating or the range of

the boldness – fearfulness ratings. The range was compared using an independent sample two tailed t -test which showed no significant differences between the No Helper Dog Group ($M = 1.25$, $SD = 0.46$) when compared to the Helper Dog Group ($M = 1.29$, $SD = 0.49$) conditions $t(13) = 0.15$, $p = 0.89$.

Analysis of the Helper Dog Group Subjects Interaction toward the Helper Dog

Solicitation and proximity rating. To compare the solicitation ratings to the solicitation ratings toward the experimenter a dependent sample t -test was performed showing no significant differences between solicitation ratings toward experimenter ($M = 2.57$, $SD = 1.72$) when compared to solicitation ratings toward the helper dog ($M = 1.14$, $SD = 0.38$) conditions $t(6) = 1.99$, $p = 0.09$. Also, any different possible correlations with these ratings with background or the first evaluation grade was analyzed. However, regardless of evaluation grade and background the solicitation rating was all rated at one with one exception (rated two).

Best boldness - fearfulness rating. To compare the average best boldness - fearfulness rating toward the helper dog to the best boldness – fearfulness ratings toward the experimenter another dependent sample two tailed t -test was performed showing no significant differences between the ratings toward experimenter ($M = 1.71$, $SD = 0.76$) when compared to the ratings toward the helper dog ($M = 1.57$, $SD = 0.79$) conditions $t(6) = 1.00$, $p = 0.36$. Different potential correlations with these ratings were also explored with the subject's background and first evaluation grade. A Spearman rank-order correlation was performed to examine the relation between the best boldness – fearfulness rating and the subject's background. The relation between these variables was not significant, $r_s(5) = 0.55$, $p > .05$. The same test was run to look at any correlation

between the subject's best boldness – fearfulness rating and the evaluation grade. There was also no significant correlation found $r_s(5) = 0.70, p > .05$.

Worst boldness - fearfulness rating. To compare the average worst boldness - fearfulness rating toward the helper dog to the ratings toward the experimenter, another dependent sample two tailed *t*-test was performed showing no significant differences between the ratings toward experimenter ($M = 3.00, SD = 0.82$) when compared to the ratings toward the helper dog ($M = 2.86, SD = 0.69$) conditions $t(6) = 0.55, p = 0.60$. Any possible correlation with these ratings and the subject's background and first evaluation grade was also analyzed. A Spearman's rank-order correlation was performed to examine the relation between these worst boldness – fearfulness ratings and the subjects background. The relation between these variables was not significant, $r_s(5) = 0, p > .05$. Similar results were found when the same test was run to look at any correlation between these ratings and the evaluation grades. There was no significant correlation with $r_s(5) = 0.10, p > .05$.

Discussion

The goal of this study was to explore the effects that conspecific social interaction during behavior modification treatment can have on the behavior of a fearful dog. More specifically, we explored how the presence of helper dogs in behavioral rehabilitation treatment effects boldness, fearfulness, solicitation and proximity toward humans. Informal ABRC observations indicated that the behavior of dogs just beginning the treatment program showed a beneficial effect of the use of helper dogs during treatments. The present study results support this with significant effects of the helper dog on all behaviors that were measured. Not only were ratings better for solicitation - proximity in

the Helper Dog Group, but the boldness - fearfulness ratings were also significantly better. Results agree with prior studies that have reported beneficial behavioral effects of conspecific social interaction in a shelter environment (Belpedio et al., 2010; Mertens & Unshelm, 1996; Taylor & Mills, 2007; Wells, 2004). These results can be applied in other animal shelters where fearful dogs are treated, to improve treatment techniques to help dogs show less fearful behavior and, as a result, become more adoptable.

Every study must be analyzed for design and experimenter effects that could impact results (Orne, 1981; Rosenthal & Rosenthal, 1966). Although this research was designed to minimize these effects, there are always possibilities for them to be present. For instance, the design was set up to keep the experimenter blind to dogs' background information that could cause experimenter bias. Before data collection the experimenter had no access to the subject's evaluation grade(s), background or other information that the ABRC keeps records of. However, the experimenter could not be blind to which study group the subject was in based on the presence of the helper dog. Therefore, there is the chance of an experimenter bias effect (Barber & Silver, 1968). However, the design of the ethograms used to rate the canine subjects mitigated this potential effect (see Appendices B and C). Using very detailed rating definitions likely reduced interpretative bias from the experimenter as rating behaviors were clearly defined with specific examples. Due to the fact that experimenters must know which group each subject is in, if this study is replicated it is imperative to use these well-defined ethograms and rating systems to minimize experimenter bias influences on results.

Another part of the design that may have had unintended effects is the difference in the subject variables between groups. The research design was set up to have no or

small differences between groups where possible. Table 4 shows that the group averages of the subject's weight, number of days at the Center, number of days of treatment sessions, the time of day and weather were all similar. Even sex ratio was similar between the two groups (see Table 1). Some of this was controlled for (e.g. number of treatment days and time), but some of the other variables (e.g. sex and weight) could not be controlled due to the design of systematic random assignment. It is also because of certain variables the experimenter had to be blind to. For example, the first evaluation grade of the canine subjects is different between groups. The Helper Dog Group has two subjects who received a grade of B (defined as mild concerns), where the No Helper Dog Group had only subjects who received C (defined as moderate concerns) and D (defined as severe concerns) grades (see Appendix E). Table 2 shows that the Helper Dog Group actually had 57% graded D where the No Helper Dog Group had 50%. This could mean that the results of this study are rather conservative, since the ratio of the grade that had the severe concerns was higher for the Helper Dog Group in their first behavior evaluation. However, for future research it would be important to look at evaluation grades and their potential influence on results, perhaps by controlling for them while still keeping the experimenter blind to them.

A lack of consistency in the study with the placement of the assistant in a small number of early study sessions could have also influenced results. In the sessions where the assistant was present, distraction or unwitting cues could have transpired through any slight positive or negative reactions they had. Unwitting cues could be given by subconscious eye movement, body movement, breathing etc., similar to the Clever Hans phenomenon in which an animal may respond to very subtle unconscious signals from

the experimenter (Orne, 1981). Balancing the safety and welfare of the subjects with possible implications for results is always a challenge when working with live animals. However, once a number of study sessions were complete it was apparent that moving the assistant out of visual sight -- but still nearby to quickly help -- was the best compromise to control for potential influences on results. For future studies, this would be important to discover in pilot sessions versus actual study sessions where data is collected.

Another potential influence on results was the timing of data collection. Specifically, looking at how long the dog was at the ABRC and how many treatment days the subjects had received before data collection. A number of different factors went into this decision. An important one was the ABRC quarantine protocol of 15 days (no treatments outside of kennel until complete), as well as treatment onset timing restrictions. As previously stated, immediate onset subjects start treatments in their kennel on Day 5 until Day 15 (quarantine completion). Alternatively, delayed onset treatments start on Day 26, pushing this study's data collection to Day 26 or after. Therefore, data collection date varied between subjects and slightly between groups potentially influencing results (see Table 1 and 4). The number of treatment days were between zero and 14 and the days at the ABRC varied between 15 and 35.

However, these potential issues were considered in this study's design. Waiting to collect data until quarantine was complete was not only for the dogs' health, but it also gave the subjects time to settle in at the ABRC. This made it more unlikely that the subjects would completely shut down from fear of the new environment, which has been found through observations at the ABRC when dogs first arrive. Also, using subjects with

both immediate and delayed onset timings provided variation in this study's population by having some subjects with a few treatments already completed and some with none. This makes the results more generalizable to most fearful dogs in the shelter system, as it is common that some will have had treatment, while others will have had none. With the goal that the results of this study can be applied to other animal shelters in the United States, making the results generalizable was important.

Another thing to note is that this study focused on understanding the effects of conspecific interaction when the dog's behavior was not heavily influenced or changed by prior treatments at the Center. The dogs in this study had an average of 3.4 treatment days for the No Helper Dog Group and 2.9 treatment days for the Helper Dog Group. The subjects were therefore expected to display greater levels of fearfulness than dogs further along in the program. To further support this are the subject's first evaluation grades. The majority were lower when this study's data was collected than after (see Table 2). It was important to measure fear behaviors when the subject was most strongly displaying them. However, if further research is done on this topic, it would be interesting to look at conspecific interaction and the effects it has on the subjects at different stages of treatment. When in the rehabilitation process does using conspecifics in treatment have the strongest benefits to the canine subject and when is there the least?

These present study's results can lead into other areas of exploration. For instance, what is it about the helper dog that reduces the fear behaviors and increases solicitation and proximity behaviors? Is it just the presence of the conspecific or does it require social interaction between them? If so, it would be important to look further into the body placement, movements and social cues between the dogs and comparing these with the

ratings and other background information available. This study analyzed helper dog-directed fear and social proximity, although there were limitations on what could be analyzed due to the placement of the camera. If this study were done again, it would be beneficial to gather more information on the interaction between the subject and the helper dog by using multiple cameras.

Another relevant thing to explore is if there are different effects when using an experimenter that is familiar with the canine subjects. In this study the experimenter was not familiar to the study subjects. At the ABRC, most of the staff who are present in treatments are familiar to the dogs since they are there every day working with and taking care of them. It would be interesting to see if using helper dogs with a familiar experimenter showed similar or different behavioral effects. Also, another study should explore if using conspecifics in a behavioral rehabilitation setting shortens the length of time the canine subject is in the program before it is ready to graduate. This study's results show there are behavioral improvements, but do these improvements help the dogs become more adoptable more quickly? The potential results of these future studies could help to tailor programs that use helper dogs to be more efficient as they would provide more information and understanding on the topic.

This study provided insight and awareness about the potential benefits of conspecific interaction in a rescue or shelter environment and about successful techniques for behavioral rehabilitation of extremely fearful animals. There are many conservation centers worldwide devoted to mammal behavior rehabilitation for wild and domesticated animals. There is also a wide range of species in behavioral rehabilitation programs such as multiple species of birds, African penguins, Cape gannets, cheetahs, golden lion

tamarins and even reptiles (Le Flohic, Motsch, DeNys, Childs, Courage & King, 2015).

One noted problem is that while there are many studies focusing on outcomes upon the animal's release or graduation of these programs, there are few published accounts on the methods used in the rehabilitation process (Guy, Curnoe & Banks, 2013). This study is an attempt to help fill this informational gap while bringing awareness to the benefits of the animal's welfare in using this technique.

It is important to note that after participation in this study, the subjects continued through the rehabilitation program at the ABRC. The results of the study session were recorded in the ABRC program treatment records. Additional data will be collected from these dogs to examine any long-term relationship with eventual outcome for the dogs (including graduation or euthanization), amount of time it took to graduate and success in a home after adoption. Therefore, even after the thesis is completed, further work will continue to explore and build on this study.

References

- Allan, C. (2010, August/July). Rescued from Squalor. *All Animals*, 26 – 33.
- American Society for the Prevention of Cruelty to Animals. (n.d.). *Pet Statistics*. Retrieved May 5, 2016, from <http://www.asPCA.org/animal-homelessness/shelter-intake-and-surrender/pet-statistics>
- American Society for the Prevention of Cruelty to Animals. (2013). ASPCA Opens Behavioral Rehabilitation ABRC to Help Animal Victims of Cruelty. [Press release]. Retrieved from <http://www.asPCA.org/about-us/press-releases/asPCA-opens-behavioral-rehabilitation-Center-help-animal-victims-cruelty>
- Barber, T. X., & Silver, M. J. (1968). Fact, fiction, and the experimenter bias effect. *Psychological Bulletin*, 70(6, Pt. 2), 1-29. doi:10.1037/h0026724
- Belpedio, C., Buffington, L., Clusman, C., Prete, F., Sadler, A., Whittemore, L., & Mungre, S. (2010). Effect of multidog play groups on cortisol levels and behavior of dogs (*Canis lupus familiaris*) housed in a humane society. *Journal of Applied Companion Animal Behavior*, 4(1), 15-27.
- Coppinger, R., & Zuccotti, J. (1999). Kennel enrichment: Exercise and socialization of dogs. *Journal of Applied Animal Welfare Science*, 2(4), 281-296. doi:10.1207/s15327604jaws0204_3
- Guy, A. J., Curnoe, D., & Banks, P. B. (2013). A survey of current mammal rehabilitation and release practices. *Biodiversity and Conservation*, 22(4), 825-837. doi:10.1007/s10531-013-0452-1
- Le Flohic, G., Motsch, P., DeNys, H., Childs, S., Courage, A., & King, T. (2015). Behavioural ecology and group cohesion of juvenile western lowland gorillas

- (*Gorilla g. gorilla*) during rehabilitation in the Batéké Plateaux National Park, Gabon. *PloS one*, 10(3), e0119609. doi:10.1371/journal.pone.0119609
- McMillan, F. D., Duffy, D. L., & Serpell, J. A. (2011). Mental health of dogs formerly used as 'breeding stock' in commercial breeding establishments. *Applied Animal Behaviour Science*, 135(1), 86-94. doi:10.1016/j.applanim.2011.09.006
- McMillan, F. D., Serpell, J. A., Duffy, D. L., Masaoud, E., & Dohoo, I. R. (2013). Differences in behavioral characteristics between dogs obtained as puppies from pet stores and those obtained from noncommercial breeders. *Journal of the American Veterinary Medical Association*, 242(10), 1359-1363. doi:10.2460/javma.242.10.1359
- Mertens, P. A., & Unshelm, J. (1996). Effects of group and individual housing on the behavior of kennelled dogs in animal shelters. *Anthrozoos: A Multidisciplinary Journal of the Interactions of People & Animals*, 9(1), 40-51. doi:10.2752/089279396787001662
- Orne, M. T. (1981). The significance of unwitting cues for experimental outcomes: Toward a pragmatic approach. *Annals of the New York Academy of Sciences*, 364, 152-159. doi:10.1111/j.1749-6632.1981.tb34469.x
- Patronek, G. J., & Rowan, A. N. (1995). Determining dog and cat numbers and population dynamics. *Anthrozoos*, 8(4), 199-205. doi:10.2752/089279395787156590
- Rooney, N. J., & Cowan, S. (2011). Training methods and owner-dog interactions: Links with dog behaviour and learning ability. *Applied Animal Behaviour Science*, 132(3), 169-177. doi:10.1016/j.applanim.2011.03.007

Rosenthal, R. (1966). *Experimenter Effects in Behavioral Research*. New York: Appleton-Century-Crofts.

Taylor, K. D., & Mills, D. S. (2007). The effect of the kennel environment on canine welfare: a critical review of experimental studies. *Animal Welfare, 16*(4), 435-447.

Thorn, J. M., Templeton, J. J., Van Winkle, K. M., & Castillo, R. R. (2006). Conditioning shelter dogs to sit. *Journal of Applied Animal Welfare Science, 9*(1), 25-39.
doi:10.1207/s15327604jaws0901_3

Wells, D. L. (2004). The facilitation of social interactions by domestic dogs. *Anthrozoos: A Multidisciplinary Journal of the Interactions of People & Animals, 17*(4), 340-352. doi:10.2752/089279304785643203

Appendix B
Boldness-Fearfulness (People, Objects & Dogs)

1. Excited, playful or actively interested

Body: Tail wags at or above neutral position. Ears are forward or relaxed. Body is not lowered/crouched and appears relaxed, not tense.

Behavior: Dog does not move hesitantly, startle or display signs of fear. Dog is excited about or interested in the stimulus. Dog is playful, actively seeks proximity to or investigates the person/object/other dog.

2. Neutral – Not excited or interested, not fearful

Body: Tail wags a bit or is held at or above neutral position. Ears are forward or relaxed. Body is not lowered/crouched and appears relaxed, not tense.

Behavior: Dog does not move hesitantly, startle or display signs of excitement or fear. Dog is aware of person/object/other dog but shows little interest in it. Does not show signs of fear and does not actively avoid the stimulus. Dog may sit or lie down in a comfortable position with muscles relaxed, walk or trot around the room, stand and look around, or air scent. May look at or approach the exit once or twice but does not focus on it for the majority of the subtest.

3. Mildly fearful/anxious

Body: Body is somewhat or intermittently tense. Tail is low, ears may be back. Posture may be lowered. May sit or lie down with tensed muscles. Dog may assume submissive posture (ears back, low fast tail wag, may lick lips, may lift paw or paw person, may submissively urinate).

Behavior: Dog seems aware of person/object/dog and may show some interest but does so from a distance (may be unwilling to approach but may watch or air-scent towards stimuli) or may show approach/avoidance behavior. Shows vigilance, mild hesitation, cautious slow movement and/or brief moments of immobility/inactivity. May startle but recovers quickly. May yawn, lip lick, fidget, pace or scratch self.

4. Moderately fearful/anxious

Body: Dog's body is tense/rigid. Tail is low or tucked, ears are back, and eyes are wide. May crouch, sit in a hunched position, lie down with tense muscles and/or tremble.

Behavior: Dog seems aware of but does not approach or actively avoids person/object/dog. Dog may remain immobile or may move with significant/prolonged hesitation.

Alternatively, dog may pace, look for an escape route, or move in a very vigilant, nervous (but not panicked) manner.

May be focused on the exit. May startle, showing poor recovery afterwards, becoming more tense or agitated.

5. Extremely fearful/anxious

Body: Dog's body is very tense/rigid. Tail is very low or tucked, ears are back, and eyes are wide. May crouch, flatten body against the ground, tremble or pant heavily.

Behavior: Dog may be completely immobile for the majority of the time. May try to hide underneath or behind objects or cram body against wall or into a corner. May seem "stuck" in a position (sitting, standing in place or lying down). May stare into space or appear to "fall asleep," especially when forced into close proximity with the person/object/other dog. May be catatonic (seeming completely unaware or unresponsive, standing, sitting or lying in an expressionless, motionless state).

Alternatively, dog may show active avoidance, pacing, fleeing, or persistently seeking an escape route. May show extreme agitation or vigilance.

May startle, showing no recovery afterwards, becoming more tense or agitated. May scream. May crawl along the ground. May lose control of bladder or bowels, or blow its anal glands. May vigorously scratch at or jump up on the exit door, attempting escape. Person may not be able to complete the activity with the dog.

Appendix C
Sociability Scale

1. Solicitation, sustained proximity: Dog stays in same quadrant as person a total of at least 50% of the time AND actively solicits social interaction: looks at person while wagging, leans on person, play bows, paws at person, climbs into person's lap, nudges person's hand, playfully mouths on person, bounces and playfully barks at person and/or licks person's face.
2. Solicitation, short proximity: Dog stays in same quadrant as person a total of < 50% of the time AND actively solicits social interaction: looks at person while wagging, leans on person, play bows, paws at person, climbs into person's lap, nudges person's hand, playfully mouths on person, bounces and playfully barks at person and/or licks person's face.
3. Solicitation, no proximity: Dog does not enter same quadrant as person BUT looks at person while wagging, playfully barking, play bowing and/or wiggling body. These behaviors may be brief or sustained, but are clearly directed at person.
4. No solicitation, sustained proximity: Dog stays in same quadrant as person a total of at least 50% of the time but does not actively solicit social interaction. May show some investigatory behavior towards person (sniff person's body or clothing), sit or lie down near person and/or show food-seeking behavior (sniffing or pawing at bait bag/pockets, etc.). Does not wag or show other signs of solicitous, social behavior.
5. No solicitation, short proximity: Dog stays in same quadrant as person a total of < 50% of the time but does not actively solicit social interaction. May show some investigatory behavior towards person (sniff person's body or clothing), sit or lie down near person and/or show food-seeking behavior (sniffing or pawing at bait bag/pockets, etc.). Does not wag or show other signs of solicitous, social behavior.
6. No solicitation, no proximity: Dog does not enter same quadrant as person and does not actively solicit social interaction. May show some investigatory behavior towards person from a distance (air-scenting and/or looking at person), but does not wag or show other signs of solicitous, social behavior.

Appendix D
Letter of Research Approval

November 2, 2015

RE: Graduate student research project approval, Breanna Schultz

To Whom It May Concern,

Brenna Schultz has proposed to conduct her Master's research project at the ASPCA's Behavioral Rehabilitation Center in Madison, NJ. The study is designed to examine the behavioral effects of a non-fearful "helper dog" being present during behavior modification treatments for fearful dogs at the Center.

Breanna worked closely with me and the director of the Center, Kristen Collins, to create her proposal and design the study. The research team that oversees all research at the Center, which consists of myself, Ms. Collins; Dr. Pamela Reid, Ph.D., CAAB; Dr. Margaret Slater, DVM, Ph.D.; and Christina Lee, M.S., have provided approval for Breanna to carry out her study. We look forward to her results and anticipate that her project will help to inform treatment decisions and protocols at the Center.

Please feel free to contact me with any questions or concerns.

Sincerely,



Katherine Miller, Ph.D., CAAB, CPDT-KA
Director, Anti-Cruelty Behavior Research
ASPCA
katherine.miller@aspca.org
347-545-0524

Appendix E Dog Behavior Evaluation Key

A: No concerns. Dogs exhibit no significantly concerning behavior. These dogs show no aggressive behavior during the evaluation, and they show no fear or anxiety for the majority of the evaluation. Some appear nervous during the first few minutes of the evaluation but quickly relax and show no further signs of significant anxiety. Some exhibit mildly fearful responses to a situation or stimulus during the evaluation, but such responses are temporary-the dog recovers in just a few seconds. In our opinion, A Dogs are ready for the adoption floor and require no special treatment or adopter counseling.

B: Mild concerns. Dogs exhibit mild fear, anxiety or aggression. Some of these dogs show signs of mild fear or anxiety throughout the evaluation. Others show mild fear in response to a certain situation or stimulus and do not recover immediately. Some show mild aggressive behavior, such as growling or freezing in response to a person touching them while they eat or yelping and mouthing or orienting to a person's hand during uncomfortable handling. However, B Dogs do not bite or attempt to bite during the evaluation. Some B Dogs may not show any behavior problems once they adjust to a new home. Others would benefit from behavior modification sessions before or after placement. Foster care may be beneficial for some fearful B Dogs. Adopter counseling before placement and/or placement restrictions (no young children, no other dogs, experienced owner, etc.) may be appropriate.

C: Moderate concerns. Dogs exhibit moderate fear, anxiety or aggression. Fearful C Dogs show signs of moderate fear or anxiety for the majority of or during the entire evaluation. If startled, they do not recover-they remain fearful and may attempt to hide or become immobile. Most do show at least some sign of social behavior towards people during the evaluation, however some are undersocialized to people and only show social behavior toward them when in the presence of other dogs. Aggressive C Dogs may (1) show aggression during the majority of the evaluation, in response to multiple situations or stimuli, (2) bite or attempt to bite at some point during the evaluation or both. C Dogs may need long-term behavior modification and/or management. Foster care may be necessary for some fearful C Dogs. Adopter counseling before placement is strongly recommended. Placement restrictions (no young children, no other dogs, experienced owner, etc.) are often appropriate.

D: Severe concerns. Dogs exhibit severe fear or aggression. They fall into two categories: (1) dogs that are too aggressive toward people or other animals to place in an adoptive home or (2) dogs that are suffering from an extremely poor quality of life due to extreme fear or anxiety. If D Dogs fall into the second category, they show no social behavior toward people during the evaluation. They may exhibit feral behavior. In our opinion, prognosis is poor in either case, and euthanasia is the most appropriate outcome.

Appendix F Program Inclusion Criteria

Origin

The dog was rescued from one of the following environments or displays behavior typical of dogs with the following backgrounds:

- Puppy mill
- Large-scale breeding operation
- “Sanctuary”
- Hoarding situation
- A situation where the dog likely experienced neglect or abuse

Health and reproductive status

The dog is in good health and has no illnesses, injuries or chronic conditions that require veterinary treatment or ongoing management.

Because we don't have an isolation area and because the dogs in our program have frequent direct contact with each other, any contagious infections must be treated and completely resolved before transport.

The dog must be spayed or neutered before transport.

If you have a dog who seems like an excellent candidate for the program but doesn't meet our health requirements for some reason, please let us know.

Placement difficulty

The dog's fearful behavior is severe enough to restrict placement options and/or impair the dog's ability to function comfortably as a companion animal.

Behavior

Fearful behavior

The dog exhibits fearful body language AND one or more of the following (please see Definitions on next page):

- Inhibited movement
- Frenetic movement
- Approach/avoidance behavior
- Escape behavior
- Catatonia
- Defensive aggression
- Contexts for fearful behavior and body language

The dog exhibits fearful behavior and body language in one or more of the following contexts:

- When a person approaches or is in close proximity to the dog
- When a person reaches toward the dog (to touch, to feed a treat, etc.)
- When a person tries to attach a leash and walk the dog on a leash
- When a person touches the dog
- When the dog is in unfamiliar environments
- When the dog encounters novel objects
- When the dog hears sudden or novel sounds

Other behavior

Our program currently focuses only on rehabilitating fearful, undersocialized dogs. We are unable to accept dogs with additional behavior problems, such as aggression toward other dogs, separation anxiety and resource guarding.

Definitions

Fearful body language:

Signs of fear include a crouched posture, cowering, ears back, eyes wide, tail tucked/down, panting, drooling, trembling, repeated startling, defecating/urinating and expressing anal glands.

Inhibited movement:

The dog seems reluctant to move, hesitates, moves slowly or cautiously, or is immobile. If immobile, he may appear “shut down,” but he remains aware of his surroundings, which distinguishes him from a catatonic dog. When experiencing extreme stress, he may even close his eyes and appear to be falling asleep in a strange context and/or awkward physical position.

Frenetic movement:

The dog is extremely active and moves around in a disorganized, seemingly directionless way. His movements are usually rapid and may appear to have no obvious purpose.

Approach/avoidance behavior:

The dog approaches a person or thing but then quickly moves away. He may repeat the approach/avoid sequence numerous times. He might seem conflicted—friendly or interested but fearful or defensive at the same time.

Escape behavior:

This type of behavior includes panicked flight and attempts to retreat from a person or area, hide or retreat to a “safe zone” (e.g., a familiar kennel, a hiding spot). If indoors, the dog may focus on or position himself near exit points. He may jump up on windows and/or scratch at doors.

Catatonia:

The dog is completely immobile. His body may or may not look rigid. He seems disconnected from the context and unaware of his surroundings. He may stare at the wall, into space or at an object. He does not alert to obvious stimuli, like sudden noises or the appearance of novel objects. If touched, he stays still and seems to ignore the contact, as though completely unable to register or deal with it.

Defensive aggression:

Behaviors may include stiffening/freezing, prolonged, direct eye contact (“hard eye”), giving a wide-eyed, sidelong look with the whites of the eyes showing (“whale eye”), showing teeth, growling, snarling, lunging, snapping, muzzle punching (forcefully hitting/jabbing a person with the snout, mouth closed), attempts to bite and/or biting. Aggression occurs when the dog perceives that retreat is not an option. He shows fearful body language and may alternate between aggression and the behaviors described above.