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Breed & Pose: What Makes a Dog Adoptable?

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Submitted in partial fulfilment of the requirements for

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Departmental Distinction in Psychology

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Breed & Pose: What Makes a Dog Adoptable?

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Breed & Pose: What Makes a Dog Adoptable?

Assessing various behavioral tendencies in domesticated dogs is a popular area of interest for individuals interested in adoption. While it is clear that humans possess a variety of defining personality characteristics, research has shown that dogs too are capable of exhibiting behaviors interpretable as intellect, affection, and agreeableness. In a 2003 study, impartial observers rated dogs on a variety of traits including extraversion, agreeableness, neuroticism, and openness. After viewing photos of the animals and watching them interact with their owners, the ratings of the observers matched the owners' descriptions of their dogs quite accurately (Gosling, Kwan, & John, 2003). While such studies do not necessarily prove that dogs truly have personalities comparable to humans, observing certain characteristics may allow human interpretations of personality to predict certain behaviors. These predictions can be especially important when it comes to the likelihood of aggression. Impressions of aggression can be observed in a variety of ways, from simply looking at a dog's size, facial expression, and overall body language to performing medical exams to screen for physical and behavioral disorders (Frank, 2013). Other observational tests exist to evaluate aggressiveness in dogs, many focusing on disobedience, fearfulness, and stress reactions to distracting stimuli such as loud noises or sudden movements. Some evaluations, such as the Switzerland's "Halterprufung," are designed to assess how capable handlers are at controlling their dogs, while others, such as the test of the canton of Basel-Stadt, aim to protect humans and other dogs from aggressive behaviors, and may even have political power in determining where dogs can and cannot be in public areas (Bram et. al, 2008).

While it may be difficult to establish a standardized method of aggression evaluation, a dog's breed and genetic lineage can sometimes provide clues to its overall disposition. Duffy, Hsu, &

Serpell (2008) determined that different breeds vary on the type and degree of aggression typically displayed according to ratings from their owners. Breeds such as Akitas and Pit Bull Terriers showed the most aggression toward other unfamiliar dogs. Dachshunds, Chihuahuas, and Jack Russell Terriers conversely showed more aggression toward human owners and strangers (Duffy, Hsu, & Serpell, 2008). Research with aggressive-behavior "problem dogs" determined that stereotypical aggression may be intensified through a variety of external causes such as fear, pain, punishment, and possessiveness. These measures of aggression are often supplemented by a dog's environment or past experience (Borchelt, 1983). Hart & Miller (1985) attempted to digitally catalog behavioral profiles of 56 different dog breeds in order to observe correlations between 13 personality traits including excitability, affection demand, barking, and snapping at children. The researchers recruited veterinarians and obedience judges each to rate 7 randomly selected breeds on a scale of 1 to 7 for each characteristic based on their past experience with dogs as experts in the field. While these ratings may have been less statistically biased than ratings from dog owners on their own pets, asking raters to draw opinions from memory alone allows stereotypes to persist that may not necessarily be true of all individual dogs in a breed (Hart & Miller, 1985). Assumptions about "stereotypically aggressive" breeds such as Pit Bulls and Rottweilers can have a myriad of detrimental effects: an abundance of unwanted dogs in shelters, higher insurance premiums for owners of certain breeds, and often, irrational fears associated with dogs based solely on appearance (Cunningham, 2007; Doogan & Thomas, 1992).

While stereotypes about large breed dogs such as Pit Bulls still persist, largely due to excessive media coverage of documented violent attacks, owners and advocates for these breeds use a variety of strategies to combat negative assumptions (Medlin, 2007). In a case study

involving 28 Pit Bull owners, participants were asked to report their own personal methods of making outsiders more receptive of their dogs. The majority of the sample expressed their frustration and concern over public perception of their dogs, citing the ridicule and avoidance their pets are subjected to on a daily basis. Participants combatted the aggressive stereotype in a variety of ways, including the use of humor to pass their dogs off as different breeds, avoiding the use of stereotypical equipment such as spiked collars, and emphasizing their beliefs that the way in which a dog is raised has the greatest effect on its personality (Twining, Arluke, & Patronek, 2000). A proper upbringing is a major contributor to a well-behaved, friendly pet, and even putting dogs in clothing such as coats and sweaters in public may make large dogs more approachable (Becker, 2012). While a positive attitude can go a long way in promoting approachability, an owner's physical appearance may also play a part in making dogs seem more friendly and approachable. Gunter (2013) presented photos of a Pit Bull sitting alone or next to one of three different individuals: a "rough-looking" adult male, a male child, or an elderly woman. On average, participants rated the dog as more intelligent when pictured with a person. Additionally, the dog was rated significantly friendlier when sitting next to the child and the elderly woman, and significantly more aggressive when sitting next to the adult male.

Expanding upon Gunter's research, the current experiment sought to examine not only how stereotypically dangerous dogs are perceived when pictured next to people, but also how their body language affects perceptions about their personalities. Instead of focusing on the type of handler pictured next to dogs in photographs, different poses and breeds were used to see how they might affect perceptions of canine personality characteristics when pictured next to the same handler.

While Gunter's research focused predominantly on Pit Bulls, incorporating two additional stereotypically aggressive breeds could potentially reveal differences in perceived aggression between discriminated breeds. Three stereotypically dangerous breeds were used in this study: a Doberman Pinscher, Pit Bull, and Rottweiler, since stigmas surrounding these breeds have been shown to negatively affect adoption rates (Twining, Arluke, & Patronek, 2000). In addition, photos of a Golden Retriever were used as a control, since Retrievers are typically perceived as a friendly breed (Gunter, 2013).

I hypothesized that participants would rate dogs in four breeds (Pit Bull, Doberman Pinscher, Rottweiler, and Golden Retriever) as more friendly and adoptable, as well as less aggressive, if they were pictured next to a handler (either sitting or walking on a leash) rather than sitting or standing alone. I expected aggressiveness ratings to be highest in photos where dogs are pictured standing alone, as this pose could be perceived as the most dominant. I predicted that the Golden Retriever, acting as a baseline, would score highest overall in friendliness and adoptability, as well as lowest in aggressiveness. In order to give some insight into what exactly makes a dog appear to possess certain personality characteristics, I also wanted to examine the visual breakdown of certain areas of interest in each photo. Using an eye-tracking device, participants were recorded as they focused on the physical characteristics of each dog and handler. I hypothesized that viewers would pay the most attention to the facial features, such as the eyes and mouth, to help them judge each dog's personality. According to Guo, Tunnicliffe, & Roebuck (2010) humans exhibit preferential looking toward these facial features in many different species including other humans, monkeys, cats and dogs. Attention to these features may contain important information about social cues. The eyes, for example, reveal signals regarding attention while the mouth is a reliable and important indicator of different

facial expressions related to emotions like anger, happiness, and sadness (Heisz & Shore, 2008). Therefore, attention to these facial details may aid in human attention to perceived canine characteristics such as friendliness and aggression. Overall body posture may also be an important factor for distinguishing social cues. While humans are generally well-equipped to distinguish such cues among members of our own species, the brain mechanisms underlying human social cognition can be applied to other animals. Utilizing fMRI scans, Kujala, Kujala, Carlson, & Hari (2012) examined brain activity in dog experts versus a control group. Upon viewing images of human and dogs interacting with or facing away from a conspecific, they found that activity in the posterior superior temporal sulcus (pSTS) of dog experts, a brain region involved in social perception, was similar when viewing both human and dog pairs. This suggests that people who are familiar with dogs may be able to distinguish socially relevant body postures similarly in dogs and humans.

Understanding how visual interaction with humans affects the perceptions of these discriminated breeds may aid in helping more dogs in need of loving homes get adopted from overcrowded shelters. Comparing the effects of different poses on perceived personality traits may also help portray these dogs as happy, playful breeds that interact well with their handlers.

Method

Participants

I exposed a volunteer sample of 50 Albright College undergraduate psychology students, who were recruited in classes offering extra credit, to all levels of the stimuli. Because of insufficient eye-capture data, 8 participants were eliminated in the eye tracker portion of the study. Data from all 50 subjects was used in the personality ratings portion of the experiment.

The overall sample included 43 females and 7 males, with a mean age of 18.9. The demographic breakdown consisted of 35 Caucasians, 8 African Americans, 5 Hispanics, and 2 Asians.

Materials

Four individual male dogs between the ages of 2 and 4 acted as stimuli. A 49-year-old Caucasian male volunteered to be pictured as the handler, holding each dog on a leash or sitting beside them for half of the photos. An iPhone 4 camera photographed the dogs in each standardized pose (Figure 1). Participants first viewed the photo series on the monitor of an eye-tracking device Tobii T60 eye-tracking device running Tobii Studio. Then they evaluated the photos using a questionnaire on Surveymonkey.com. After viewing each photo, participants rated each dog for friendliness, aggressiveness, and adoptability from 1 to 7 on a Likert-type scale.

Procedure

Participants viewed 16 photos featuring dogs in four breeds (Doberman Pinscher, Rottweiler, Pit Bull, and Golden Retriever) in four different categories: dogs passively sitting alone, dogs passively sitting with a person, dogs standing alone, and dogs walking on a leash with a person (see Figure 1). In order to standardize the photographs, the same individual dog was pictured in all four categories for each breed. All dogs were featured in the same relative poses, and the same handler was present in the eight photos featuring dogs with a person. Participants viewed the photos in a randomized order for 5 seconds each on an eye tracking device to gather data about where they looked at each photo. Areas of interest were mapped out using the eye tracker's software (see Figure 2).

In the rating portion of the experiment, participants viewed each picture once again and rated the dogs on a scale of 1 to 7 in three categories: friendliness, aggressiveness, and

adoptability. Participants then filled out a demographic questionnaire to record their age, gender, and ethnicity. They were additionally asked if they or their immediate family members currently owned a dog of any breed, as well as if they had ever adopted a dog from a shelter of any kind. Finally, they were asked to respond to an open-ended prompt asking what the most important thing to consider is when adopting a dog. Answers would be evaluated to determine whether participants mentioned physical characteristics like breed and size, or personality characteristics like friendliness and agreeability.

Results

Eye Tracker

Upon analyzing heat maps of the areas of interest (see Figure 3 for one example), data was calculated on each pose and breed for five different areas: human head, dog face, dog body, dog eyes, and dog mouth. Each area was analyzed based on four criteria: time to first fixation (how long it took participants to focus on the selected area after the picture appeared onscreen), total fixation duration (the cumulative amount of time participants focused on the selected area), fixation count (how many separate times participants looked at the selected area), and percent fixated (the percentage of participants who fixated on the selected area at least once).

For the human head area, looking only at stimuli that contained a human head, a dependent *t*-test revealed a significant effect for pose in total fixation duration, $t(41) = 4.42$, $p < .01$, fixation count, $t(41) = 5.38$, $p < .01$, and percent fixated, $t(41) = 6.48$, $p < .01$, with the sitting alone position having the longest total fixation duration, highest fixation count, and largest percent fixated. The effects of pose on time to first fixation, as well as the effects of breed for all four criteria were not significant.

For the dog face area, a repeated-measures ANOVA revealed a significant effect for pose in time to first fixation, $F(3, 123) = 14.45$, $p < .01$, total fixation duration, $F(3, 123) = 32.20$, $p < .01$, fixation count, $F(3, 123) = 45.48$, $p < .01$, and percent fixated, $F(3, 123) = 9.80$, $p < .01$. The sitting alone position had the shortest time to first fixation, longest total fixation duration, and highest fixation count. The effects for breed were not significant.

For the dog body area, a repeated-measures ANOVA revealed a significant effect for pose in time to first fixation, $F(3, 123) = 3.13$, $p < .03$, total fixation duration, $F(3, 123) = 4.79$, $p < .01$, fixation count, $F(3, 123) = 13.86$, $p < .01$, and percent fixated, $F(3, 123) = 9.21$, $p < .01$, with the standing alone position having the longest fixation duration, highest fixation count, and the largest percent fixated. For breed, there was a significant effect in time to first fixation, $F(3,123) = 4.22$, $p < .01$, with the Golden Retriever attracting attention most quickly. There were no additional significant effects for breed in total fixation duration, fixation count, and percent fixated.

For the dog eyes area, a repeated-measures ANOVA revealed a significant effect for pose in time to first fixation, $F(3, 123) = 4.88$, $p < .01$, total fixation duration, $F(3, 123) = 10.96$, $p < .01$, fixation count, $F(3, 123) = 11.92$, $p < .01$, and percent fixated, $F(3, 123) = 8.05$, $p < .01$, with the standing alone position having the shortest time to first fixation, longest total fixation duration, highest fixation count, and largest percent fixated. The effects for breed were not significant.

For the dog mouth area, a repeated-measures ANOVA revealed a significant effect for pose in total fixation duration, $F(3, 123) = 8.70$, $p < .01$, fixation count, $F(3, 123) = 17.36$, $p < .01$, and percent fixated, $F(3, 123) = 14.36$, $p < .01$, with the sitting alone position having the longest total fixation duration, highest fixation count, and largest percent fixated. The effects of

time to first fixation were not significant for pose. There were additional significant effects for

breed in total fixation duration, $F(3,123) = 9.98$, $p < .01$, fixation count, $F(3,123) = 21.43$, $p <$

.01, and percent fixated, $F(3,123) = 13.40$, $p < .01$, where the Pit Bull and Rottweiler had the

longest total fixation duration, highest fixation count, and largest percent fixated. The effects of

breed on time to first fixation were not significant.

Ratings

Three repeated-measures ANOVAs were performed to observe the effects of breed and

pose on perceived friendliness, aggressiveness, and adoptability. It was hypothesized that the

Golden Retriever would be perceived most favorably overall, scoring lowest in aggressiveness

and highest in the other four categories. Additionally, dogs pictured next to handlers, either

sitting or walking on a leash, were expected to score higher.

For friendliness, a repeated-measures ANOVA revealed a significant main effect for

breed, $F(3,147) = 14.13$, $p < .01$, with the Golden Retriever scoring highest, as hypothesized.

There was also a significant main effect for pose, $F(3,147) = 13.46$, $p < .01$, with sitting alone

being the highest-rated pose overall. There was also a significant interaction effect, $F(9,441) =$

13.85, $p < .01$, where the Golden Retriever and Rottweiler scored highest when sitting with the

handler (Figure 4).

For aggressiveness it was hypothesized that dogs standing alone would score highest.

There was a significant main effect of breed, $F(3,147) = 17.80$, $p < .01$, with the Golden

Retriever scoring lowest overall, and of pose, $F(3,147) = 17.95$, $p < .01$, with walking on a leash

scoring highest overall. There was also a significant interaction effect, $F(9,441) = 8.23$, $p < .01$,

where the Golden Retriever scored highest when standing alone and the Doberman scored

highest when sitting with the handler (Figure 5).

For adoptability, there was a significant main effect of breed, $F(3,147) = 20.21$, $p < .01$, with the Golden Retriever scoring highest, and of pose, $F(3,147) = 11.10$, $p < .01$, with sitting alone being the highest-rated overall. There was also a significant interaction effect, $F(9,441) = 7.22$, $p < .01$, where the Golden Retriever and Rottweiler scored highest when sitting with the handler (Figure 6).

Questionnaire data additionally revealed that 68% of participants were current dog owners, with 44% having previously adopted from a shelter. An additional repeated-measures ANOVA revealed a significant interaction effect, $F(6,288) = 2.47$, $p < .03$, between dog ownership, breed, and each of the three perceived canine personality characteristics. Among dog owners, the Pit Bull, Rottweiler, and Doberman Pinscher were all rated significantly higher for friendliness and adoptability. The Pit Bull and Rottweiler were also rated lower in aggression by dog owners, while the Golden Retriever was rated slightly higher.

In addition, 94% of participants mentioned personality characteristics as being most important when adopting a dog, while 38% mentioned physical characteristics, most commonly those associated with age and overall health. Because these groups were not mutually exclusive, with several participants mentioning both personality and physical characteristics, survey ratings were not compared statistically. Unequal distributions in gender and ethnicity also prevented further examination of potential differences between the ratings of these specific participants.

Discussion

As hypothesized, the Golden Retriever was perceived most favorably overall, scoring highest in friendliness and adoptability, as well as lowest in aggressiveness. The Pit Bull received the lowest ratings in friendliness and adoptability, as well as the highest aggressiveness rating. These results are similar to those in Gunter's study, where a Labrador Retriever was rated

higher than a Pit Bull for approachability, intelligence, friendliness, trainability, and adoptability

when pictured alone and next to several different handlers (Gunter, 2013).

For pose, it was predicted that dogs sitting next to a handler would be perceived more

favorably, which was ultimately disconfirmed; participants favored the dogs pictured sitting

alone most highly instead. This may be due to the nature of my chosen handler: a middle-aged

Caucasian male. In Gunter's study, dogs were rated as more aggressive when pictured next to a

"rough-looking" male. A certain degree of bias may have been present in my study, since I used

someone in my family, which may explain the difference between my expectations and results.

Although I don't personally think he is "rough-looking," the participants in this study may have

perceived him as such, which would explain why dogs were rated less favorably in photos where

he was present. However, the sitting with handler pose was still more well received that either

the standing alone or walking on a leash poses. This pose may have been perceived as more

relaxed and happy than the standing dogs, and possibly more characteristic of an adoption photo.

It may be that the pose of the dog, sitting versus standing, has a larger effect on favorability

ratings than the presence of a handler. This was supported by the eye-tracker data, which

revealed that participants paid the most attention to canine features such as the eyes, total face

area, and body when the dog was sitting or standing alone. While this may, in part, be due to the

fact that the dogs take up more space in the photos where they are pictured alone, the presence of

a handler in this case may have distracted attention away from the dog.

It was also hypothesized that dogs would be perceived as most aggressive when standing

alone, perhaps due to appearing more dominant. This was ultimately disconfirmed, with the

walking on a leash pose garnering the most aggressive ratings. While the standing alone pose

was also perceived as fairly aggressive when compared to the sitting poses, perhaps the leash

poses seemed the most aggressive due to size comparison with the handler.

        The results of the eye-tracking data show that the effects of pose were more significant

than the effects of breed on time to first fixation, total fixation duration, fixation count, and

percent fixated. It was hypothesized that participants would pay the most attention to the facial

features present in the photos, which was ultimately supported by heat mapping and statistical

data. On average, 92.71% of participants fixated on the dog face region across all poses. Dog

faces also attracted the fastest time to first fixation, longest total fixation duration, and highest

fixation count across all poses. Within the face area, the eye region had the fastest time to first

fixation, while the mouth area had the longest total fixation duration, highest fixation count, and

largest percent fixated. While previous studies (Guo, Tunnicliffe, & Roebuck, 2010; Heisz &

Shore, 2008) have observed the highest fixation count and duration on the eye region, the mouth

was frequently observed as well, more so in unfamiliar faces (Heisz & Shore, 2008).

When working with animals, it is difficult to get them to do exactly what you want them to do.

While I attempted to standardize the poses to the best of my ability, small differences still existed

within the photographs. The dogs' mouths, for example, were open in some photos and closed in

others, which I think could have influenced participants' perceptions. The increased size of the

mapped area in photos featuring open mouths may also explain the increased attention to average

mouth area across pose. This is supported by the eye-tracking data examining differences in

attention across breed. For the dog mouth area, the Pit Bull and Rottweiler attracted significantly

longer total fixation duration, higher fixation count, and larger percent fixated compared to the

Doberman and Golden Retriever. More attention may have been paid to these breeds due to their

open-mouthed expressions, with the Rottweiler's mouth hanging open in three out of four

pictures, and the Pit Bull's in two out of four (see Figure 1). It is unclear how exactly these open-mouthed expressions were perceived, but they have the potential to be interpreted in a wide variety of ways, ranging from a "smiling" expression to a sign of aggression. In canids, an open-mouthed expression is often a sign of aggression, particularly if the lips are pulled back and the teeth are showing, which may explain the higher aggressive ratings for the Pit Bull and Rottweiler (Fox, 1970). The facial expression of the handler was also inconsistent, ranging from smiling to scowling depending on the photo. While much of this was due to fatigue and lighting conditions during photoshoots, standardizing the facial expression of a human subject should have been easier to manage, and the differences in the photos could have possibly skewed my results as well

One final issue that could be improved upon is sampling technique. Subsequent research might instead target potential pet parents looking to adopt, as it is their opinions that matter most when analyzing the adoptability of shelter dogs. Placing questionnaires in shelters might be a good strategy to accomplish this, and may also even out the gender ratio, which was overwhelmingly female-dominated in this study. Obtaining a more balanced sample would also be beneficial during statistical analyses of gender, the effects of which were inconclusive in this study.

Future studies might address various other independent variables that may have an influence perceived canine characteristics, especially adoptability. Previous research has shown that physical characteristics such as size, sex, and coat color may have an effect on the adoptability of certain breeds (Lepper, Kass, & Hart, 2002). Although these particular characteristics are somewhat static, there are a wide variety of other possible traits that may possibly improve adoptability as well. I would be particularly interested in putting Becker's

claims to the test, possibly designing an experiment to test if canine clothing has any empirical effect on positive perceptions (Becker, 2012).

Between 5 and 17 million cats and dogs are euthanized in the United States each year (Lepper, Kass, & Hart, 2002). By keeping the community informed of these issues, I hope that this study and any future research in the area of increasing the adoption rate of dogs aids in keeping more animals out of shelters, lowering the frequency of euthanasia, and placing more pets in loving homes.

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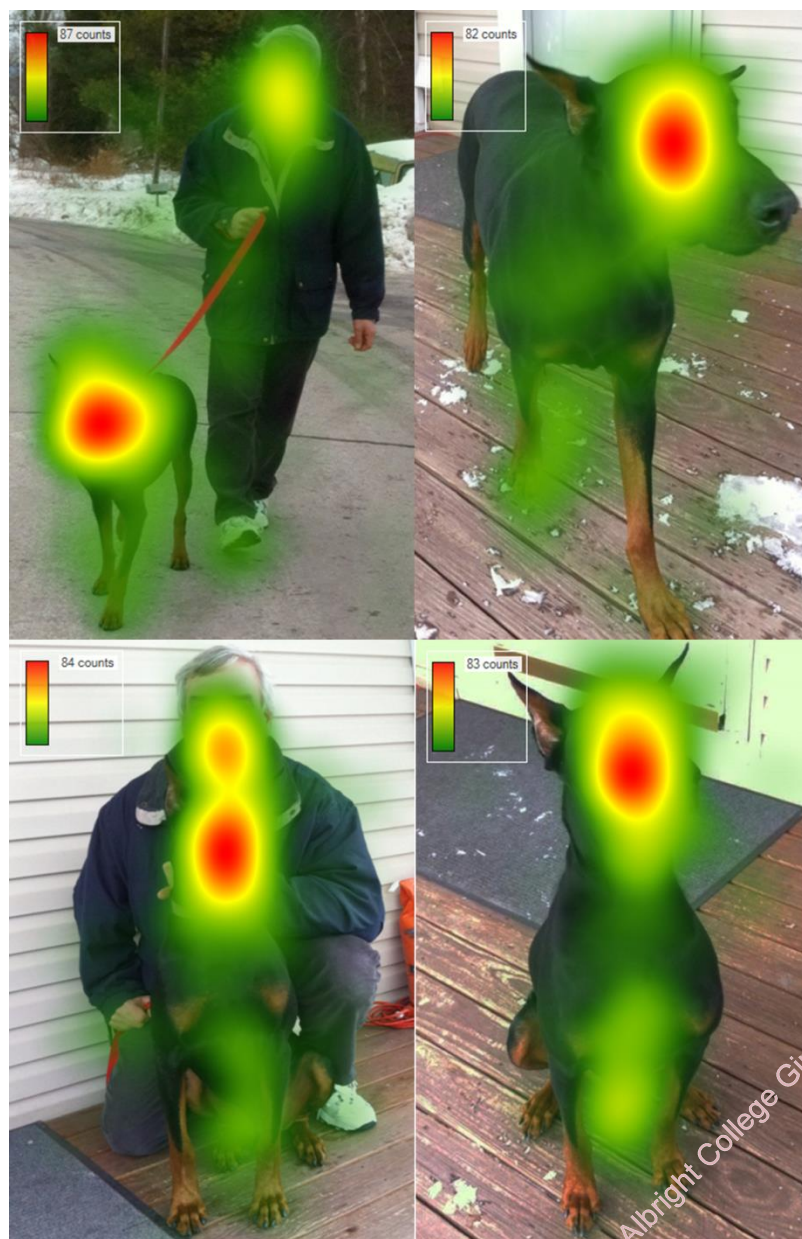study of pit bull owners. *Society & Animals, 8*(1), 25-52

Figure 1. From left to right: Doberman Pinscher, Golden Retriever, Pit Bull, and Rottweiler in four standardized poses: sitting alone, walking on a leash, standing alone, and sitting with handler

Figure 2. Key areas of interest mapped out using the eye tracker software.

Figure 3. Heat maps for the 4 poses featuring the Doberman Pinscher breed. Key areas of interest include the face and body regions of the dog, as well as the human handler's face.
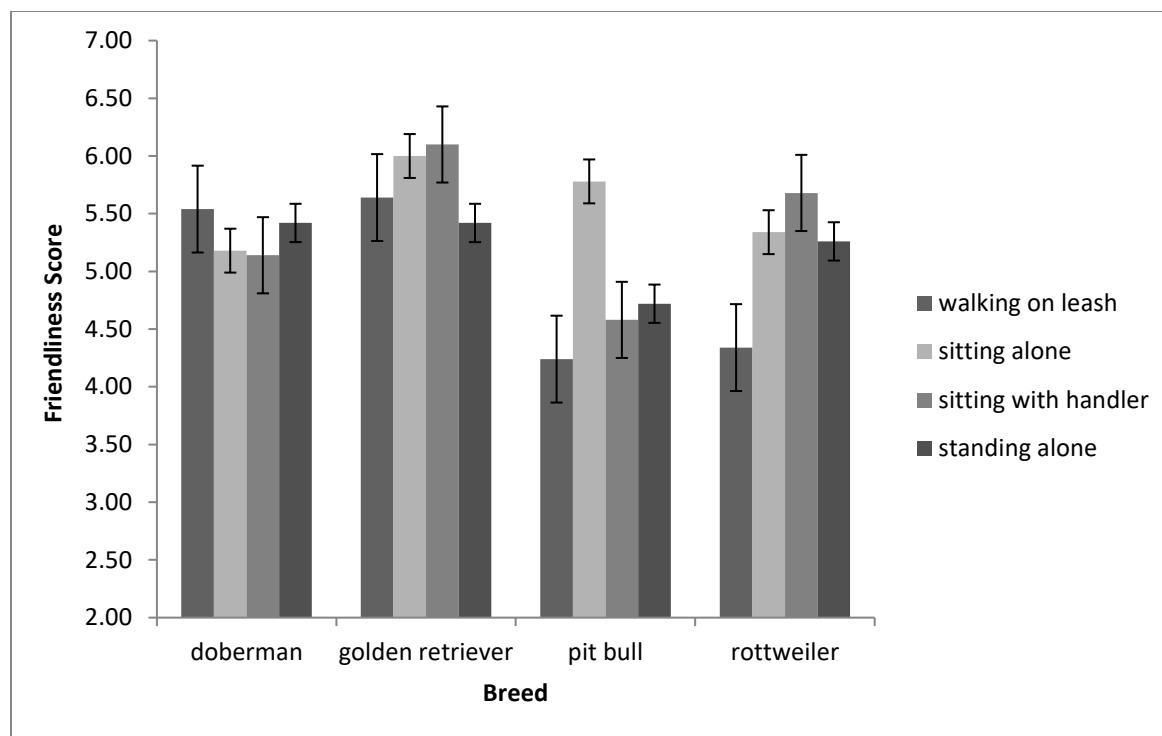
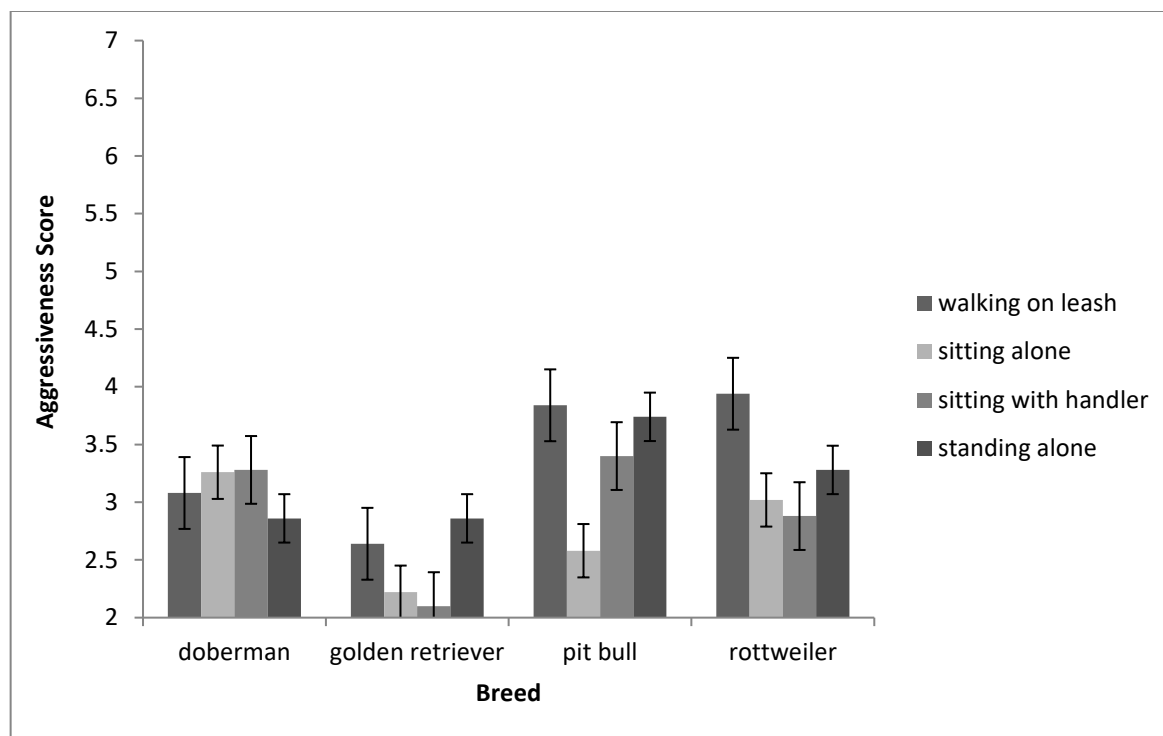*Figure 4*. Perceived friendliness for breed and pose. Error bars denote standard error.

Figure 5. Perceived aggressiveness for breed and pose. Error bars denote standard error.
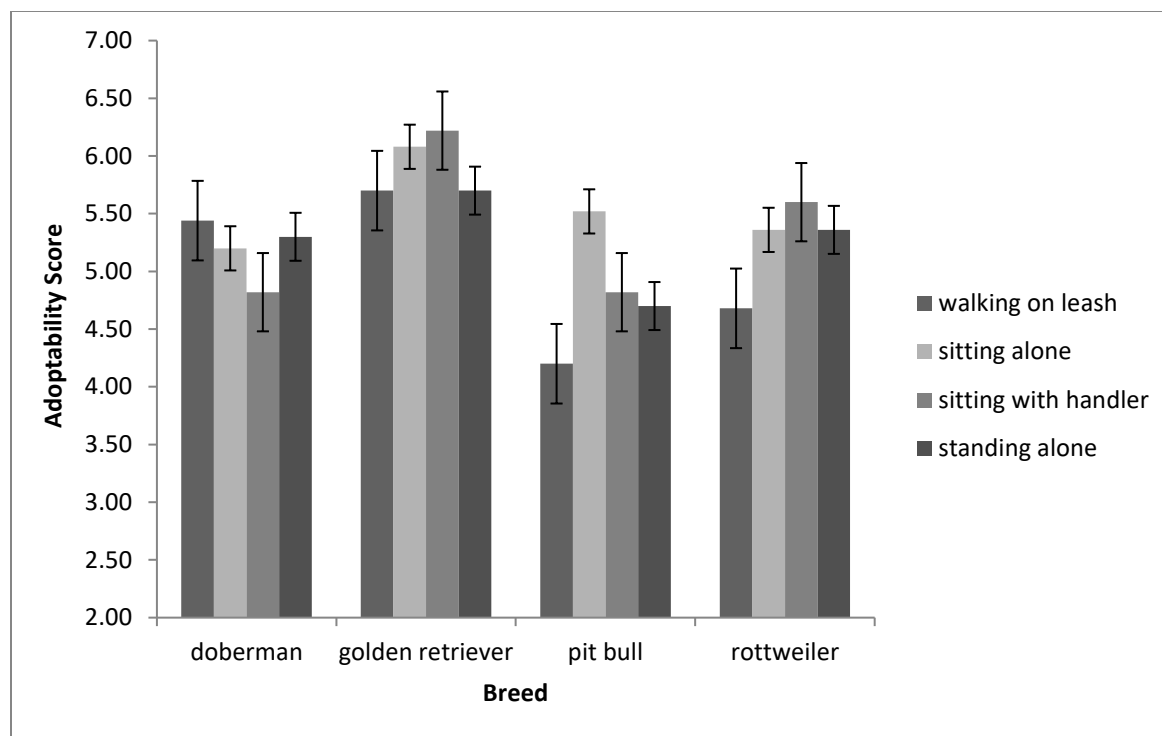
Figure 6. Perceived adoptability for breed and pose. Error bars denote standard error.