CANINE AGGRESSION: UNDERSTANDING OWNER BELIEFS ABOUT THE BIOLOGICAL LOCUS OF ORIGIN FOR REHABILITATION OF AGGRESSIVE BEHAVIORS

by

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Abstract

The topic of canine aggression– threatening or hostile behavior involving actual and or potential harm to another – invokes many emotional responses due to the often violent connotations regarding aggressive canines. Research focusing on various methods of rehabilitation has indicated a range of success rates and statistical findings in regards to aggressive dogs. Using a survey form, a non-experimental study was conducted questioning canine owners' beliefs about the locus of origin, the malleability, and the owners' attitudes towards rehabilitation and non-rehabilitation practices in cases of canine aggression. This research outlines important implications about the sample population's opinions, understandings, stereotypes, and personal experiences with canine aggression. Significant correlations were found between biological and no-rehab variables (positive), as well as can-change and no-rehab variables (negative) resulting in support for the claim that owners who believe that canine behavior is not malleable and that canine aggression is biologically determined are likely to favor eliminating the troublesome dog rather than attempting rehabilitation.

Keywords: canine aggression, behavior, euthanasia, rehabilitation, owner beliefs

Canine Aggression: Understanding Owner Beliefs about the Biological Locus of Origin for Rehabilitation of Aggressive Behavior

CHAPTER 1: INTRODUCTION

Canine aggression, as claimed by the American Society for the Prevention of Cruelty to Animals, is not only the most prevalent behavior problem in dogs, but is also the most common reason for owners to seek advice from professionals such as veterinarians, animal behaviorists, and professional trainers ("Aggression," n.d. para. 1). Because the behaviors of canine aggression can often lead to concerns regarding physical harm to other dogs, owners, and children, extensive research has been conducted to identify, classify, and rehabilitate canine aggression. Additionally, concerns surrounding canine aggression have led to the growing animal training industry as well as legislative action across the United States (Moncton, 2013). In an attempt to understand canine aggression and how it can affect owners and the actions they may take to rectify aggressive behaviors, I conducted research regarding beliefs about the causes of canine aggression and attitudes about the rehabilitation of aggressive canines. Extensive research assesses the credibility of rehabilitation methods including behavior modification, drug related solutions, and even euthanasia; but the lack of research focusing on owners' beliefs regarding the causes of canine aggression and the success of various treatments makes it impossible to gauge whether owners' beliefs correlate with current research findings. By assessing owners' perceptions of biological versus environmental origins of canine aggression, a better understanding of the public's attitudes about canine aggression can be surmised. This will hopefully show whether the public has been adequately informed of the issues and treatments surrounding canine aggression or if there has been a deficit in knowledge of current research.

How to Deal with the Aggressive Canine Companion

When an owner is facing aggressive behaviors in his or her canine pet, research has found that successful rehabilitation may be achieved through a variety of methods; furthermore, because canine aggression itself can be caused by a variety of factors, research into the aggression as well as rehabilitation for that aggression has many facets. First, aggression itself needs to be addressed. A vague summation at best, the definition of aggression – as defined by the Merriam-Webster dictionary (n.d.) – includes "hostile, injurious, or destructive behavior or outlook especially when caused by frustration" (see http://www.merriam-webster.com/dictionary/aggression).

When specially referring to canine aggression, one generally considers the actions of dogs such as growling, charging, biting, etc. These displays can be directed toward humans (adults and/or children), other animals, other dogs, and/or objects. Eight types of aggression are listed in Beaver's 1983 study: pain-induced aggression, competitive (dominance) aggression, inter-male aggression, fear-induced aggression, protective aggression, developed/trained aggression, redirected aggression, and hormonal aggression; as well as non-affective aggression (aggression without automatic response): predatory aggression, playful aggression, medical aggression, and sexual aggression. The ASPCA, the American Society for the Prevention of Cruelty to Animals, similarly defines aggression in this way while additionally listing the types of aggression as territorial, protective, possessive, fear, defensive, and social ("Aggression," n.d. para. 6).

While Beaver's categories (1983), along with the ASPCA's categories of canine aggression ("Aggression," n.d.), focus on the motivation of the behaviors, Kaneko, Arata, Takeuchi, and Mori focused on the *target* of aggressive behaviors (2013). Kaneko and

colleagues (2013) list four types of canine aggression including owner, child, stranger, and dog-directed aggression and found correlated behavior traits with their four categories of aggression to develop an empirically-based classification system. Using a questionnaire administered to owners of the ShibaInu breed, they found that "specific behavioral traits are frequently simultaneously involved in several types of aggression" (Kaneko et al., 2013).

McGreevy and Calnon (2009) drew a parallel between canine aggression and human violent behavior regarding both biological (genealogical) and environmental factors. A single biological similarity or single environmental similarity between canines displaying aggression is not enough to predict aggressive behavior. For instance, the serotonin transporter activity found on a biological marker in canines displaying aggression, while prevalent, is not a defining factor or the "key" to defining canine aggression; rather, it is just one component in which canine aggression can culminate (McGreevy & Calnon, 2009). Because a wide variety of treatments can influence aggression, it is more reasonable to conceive aggression as having many antecedents that can be internal or external, biological or environmental.

Treatments and success. Surveys, metadata research, experiments, and qualitative research have focused on a wide array of treatments and rehabilitation measures involving canine aggression with various levels of success. Within treatment and between treatment studies address the success of a rehabilitation measure itself while also comparing a rehabilitation measure to other known measures. Beaver found that training therapy sessions (with a professional) regarding the type of aggression displayed produced a 59.2% success rate, although success was primarily determined by owners where the reporting measures allowed for the influence of bias such as owners claiming any response to treatment being total success (1983). A non-confrontational behavior modification program was evaluated in the 1997 study by

Uchida, Dodman, DeNapoli, and Aronson, finding that 70% of the 20 dogs included in the study responded to treatment in varying degrees. Administered by the owners in-home, the treatment was outlined by seven owner requirements:

> … 1) avoid confrontations with the dog (any situation where the dog is likely to growl, snarl, snap, or bite), 2) limit spontaneous interactions with the dog, 3) provide valued resources and attention to the dog only when the dog has obeyed a command (sit, down, come, etc.): nothing in life is free program, 4) arrange daily obedience training based on positive reinforcement, 5) ensure the dog gets at least 20-30 min of sustained aerobic exercise daily, 6) prevent the dog from sleeping on beds or other furniture, 7) change to regimented feeding (the dog should be fed once or twice a day for 15 min each time). (Uchida et al., 1997)

Conducted over eight weeks, fourteen dogs showed improvements ranging from cured to slight improvement, and of the six that showed no improvements, two were rehomed, and one was euthanized mid study (Uchida et al., 1997). A similar owner-conducted treatment, a "modified avoidance-learning procedure" (safety training), resulted in a 100% rehabilitation of aggressive behaviors in the thirty-six dogs included in the study – rehabilitation was defined as the "complete and permanent elimination of aggression" (Tortora, 1983).

Medical treatments for aggressive behaviors have also been researched extensively. Fluoxetine treatments (a serotonin reuptake inhibitor used to treat anxiety and depression disorders in humans by affecting chemicals in the brain) were found by Dodman et al. (1996) to produce significantly positive reductions in reducing aggressive behaviors over three weeks (although the study also involved behavior modification treatments in regards to owner-canine aggression). A later study which combined fluoxetine, diazepam, and behavior modification

therapy treatments resulted in the improvement of 40 percent of dogs diagnosed with aggressiveness (Ibanez &Anzola, 2009). While the data may show a range of results, the variety and extent of rehabilitation treatments are relatively unfamiliar to the general public and/or dog owners.

Euthanasia practices. While evidence leads to successful rehabilitation tactics, **e**uthanasia practices remain a readily available solution to owners of an aggressive canine. The choice of euthanizing a pet can be influenced by a number of factors including but not limited to social, economic, cultural, political, religious, and practical influences.

Lofflen (2007) estimates euthanasia in U.S. shelters to be between three and four million each year. While Lofflin's (2007) estimate was not limited to aggressive dogs, or even dogs, Daye (2010) reports that "behavioral problems including aggression are … one of the leading causes for dog relinquishment to shelters and euthanasia." While shelters may euthanize for reasons different from owners, euthanasia is often an available option as presented by veterinarians; and because euthanasia may be the most inexpensive option, about $50 - $100 ("Pet Euthanasia Cost," n.d., para 2), compared to medical treatments such as fluoxetine, about $30 every three months (price retrieved from 1800petmeds.com), or training courses, $95 an hour at New Levels Dog Training in Greenville, North Carolina ("Fluoxetine", n.d.; "Private Dog Training," n.d, para 20), many owners may choose euthanasia over rehabilitation for economic reasons.

Past and current legislation can require the euthanization of aggressive canines that have attacked or otherwise harmed a person and in some cases another canine or animal. Broward County, Florida, amended legislation that required euthanasia after a first ~~offence~~ offense ~~attack~~ in 2011 (Wallace, 2011). The adapted legislation states that after the first offense, the owner

must register the dog, have it spayed or neutered, and require the canine to wear a muzzle in public; upon a second offense the owner will have to pay restitution, have the canine micro chipped, display aggressive animal signage, and hire a behaviorist (Wallace, 2011). Upon a subsequent offense, the animal can be forcibly euthanized if the owner fails to comply with the other requirements (Wallace, 2011). Such legislation hints at a positive social shift towards the understanding that aggressive canines can be rehabilitated (as determined by the multiple offenses, training, and assessment by a behaviorist). Additionally, research such as Medlin's 2007 article, "Pit Bull Bans and the Human Factors Affecting Canine Behavior" addressed the debate that owners have more impact in aggressive canine behavior than breed or other factors and the necessity for legislation to focus on owner responsibility rather than breed restrictions.

Beliefs about the Origins of Canine Aggression

Throughout the late 20th century, research conducted in regards to animal aggression focused on identifying, classifying, and understanding canine behaviors while beginning to assess treatment methods (Dodman et al., 1996; Tortora, 1983; Uchida et al., 1997). In the early 2000s, research focused on applications of aggression rehabilitation for the pets while attempting to address treatments that could be administered by the owner at home (Ibanez & Anzola, 2009; Reisner, 2003). This research failed to address the influence of human beliefs about canine aggression which could have important implications regarding the successful applications of treatment methods.

While the scientific information concerning canine aggression is sometimes misrepresented, oftentimes it is not represented at all. The ASPCA – a national organization that has gained momentum globally – makes an effort to understand, define, and explain canine aggression through discussions such as "What is aggression?" along with various articles

discussing the classification of types of canine aggression ("Aggression," n.d.), but oftentimes at the local level, such as in Greenville, North Carolina, a lack of public discourse surrounding canine aggression is prevalent. In the "Canine Control Ordinance," Animal Control Ordinance NO. 4, the Pitt County Board of Commissioners expresses that "citizens have the right to protect their persons and property from aggressive roaming dogs as may be reasonably necessary," and, while the document explicitly defines the terms: "at large," "keeper," "owner," "property," "restraint," and even "dog," it fails to define "aggression" or "reasonably necessary." (See http://www.pittcountync.gov/bcc/ordinance/amcontrol/4.pdf)

The general public's understanding of canine aggression affects many residents, including the individuals who do understand the scientific statistics and research. Individuals may be affected by court cases, ordinances, laws, and legislations. The public's beliefs about canine aggression can be very influential in court cases involving incidences of aggressive behavior by dogs. "Review of Court Cases Involving Canine Aggression" lists seven cases in which Beaver (1994) was called to participate in order to help interpret evidence on the actions of the dogs (primarily dog bite situations) regarding the responsibility of the owner. Beaver's factual knowledge of canine aggression which referenced the current research at the time was influential in the resolutions of those cases (1994). The more familiar the public is with current research, the more just our legislation and jurisdiction can be. Additionally, by understanding aggression, its causalities, and its manifestations, owners can become more responsible.

Still, the complexities of canine aggression, including biological and environmental antecedents, are often overlooked in breed restriction (McGreevy & Calnon, 2009). Whereas breed is relatively easy for people to categorize and link to aggressive behaviors, as discussed earlier, restrictions resulting from breed regulation are often unfounded.

Relating Origins of Canine Aggression to Methods of Dealing with Canine Aggression

In order to better understand attitudes regarding the rehabilitation of aggressive canines, this study was designed to explore the locus of origin for beliefs people hold for canine behavior, specifically canine aggression. To explore this concept, two previously developed scales have been adapted: the Mental Health Locus of Origin Scale (MHLO) (Hill & Bale, 2010) and the implicit person theory (IPT) scale (Levy, Stroessner, & Dweck, 1998). The Mental Health Locus of Origin Scale was developed to explore the relationship between expectations of the client and the potential acceptance of treatment methods in the mental health field (Hill & Bale, 2010). This scale was adapted to address the relationship between beliefs about aggressive canines, in regards to whether canine behavior is determined by inborn biological factors or by environmental factors.

Additionally, a scale used with the implicit person theory, a theory discussed and explored by Levy and colleagues (1998), was adapted to fit the goals of this study. The adapted implicit person theory was used to address the "fixedness versus malleability of human attributes" by analyzing participants' ratings of the following questions:

> "The kind of person someone is, is something basic about them, and it can't be changed very much"; "People can do things differently, but the important parts of who they are can't really be changed"; "Everyone is a certain kind of person, and there is not much that they can do to really change that." (Levy et al., 1998)

These questions were used to identify the belief that people held in regards to the participation of those individuals in stereotyping groups of other peoples. (Levy et al., 1998) Similar studies have been conducted that correlate with and support the findings in the 1998 study finding that understanding beliefs about humanity's fixed and malleable attributes can

correlate to participants' ideologies and even behaviors based on these stereotypical ideologies (Dweck, Chiu, & Hong, 1995; Levy et al., 1998). The adapted implicit person theory was used to assess beliefs about the fixedness of canine attributes as perceived by owners for further comparison to intrinsic/extrinsic locus of origin for canine aggression (Levy et al., 1998). An additional scale was used to measure respondents' attitudes about the rehabilitation of aggressive canines.

Statement of Purpose

The primary purpose of the research was to investigate the relationship between beliefs about the origin of canine aggressiveness and attitudes about the rehabilitation of aggressive canines. Three scales were developed. The Canine Locus of Origin Scale has items similar to those in the Mental Health Locus of Origin Scale (Hill & Bale, 2010) and the canine implicit person theory (CIPT) scale was developed from the implicit person theory developed by Levy et al. (1998). In consultation with my faculty advisors, I developed an additional scale, the canine disposal scale, intended to measure attitudes about the rehabilitation of aggressive canines.

Definitions

Because the vocabulary when discussing canine aggression, or aggression in general, can be vague or confusing, terms must be unequivocally defined. Specifically for developing the study hypotheses, the following terms are explained:

Canine aggression. For the purpose of this particular research, and because this research addresses owners' beliefs and opinions, canine aggression will be loosely defined as any unfavorable behavior from a dog that elicits fear or intimidation. Although there are more definite definitions used to define canine aggression, they may bias or confuse participants by implying motivations for the aggressive behaviors that for this study will be irrelevant. Because

the focus of this research is locus of origin, every effort will be taken to avoid context or jargon-based bias.

Rehabilitation. By defining rehabilitation as the methods used to modify a dog's unwanted behaviors, any context of success is avoided. Because this study is not measuring what methods an owner believes are more/less successful but rather what is the origin of the aggression (biological or environmental), a reference to the level of success of rehabilitation is not needed. Rehabilitation can be conducted by the owner, a trainer (a person with educational authority who is usually paid), a professional (this may include, but is not limited to a trainer), or a veterinarian (who implements or recommends a behavioral treatment, although a medical treatment will be referred to separately).

Medical treatments. Medical treatments may include spaying/neutering, drug administration, or euthanasia.

Canine Aggression Locus of Origin. Adapted from the Mental Health Locus of Origin scale (Hill & Bale, 2010), this scale focuses on two facets of canine aggression and its causes: the belief that biological factors cause canine aggression (endogenous) and the belief that environmental factors (interactions with a dog and its social environment) cause canine aggression.

Canine Disposal Scale. Non-rehabilitation avenues for addressing canine aggression include euthanasia, shelter surrender or abandonment, isolation, re-homing, or corporal punishment. The non-rehabilitation methods specifically explored by the canine disposal scale include euthanasia and shelter surrender.

Research Hypotheses

The current study analyzed pet owners' responses to survey questions and explored correlational evidence pertaining to the internal vs. external locus of origin for aggressive canine behaviors, fixedness vs. malleability of canine aggression, and rehabilitation vs. non-rehabilitation attitudes towards canine aggression.

Hypothesis 1. Owners' beliefs that causes of canine aggression are biological will have a positive correlation to beliefs that aggressive dogs should be disposed of rather than attempting rehabilitation.

Hypothesis 2. Owners' beliefs that canine behavior is malleable will have a negative correlation to beliefs that aggressive dogs should be disposed of rather than attempting rehabilitation.

Chapter II: METHODOLOGY

Participants

Participants were drawn from a database of former animal shelter adopters compiled from the Pitt County Animal Shelter in Greenville, NC. Via email, invitations to the study were sent to the approximately 300 eligible participants. The email included a link to an online Qualtrics survey including a participant information and agreement form. Polling former shelter adopters was predicted to increase the probability that participants have not only been acquainted with an aggressive animal, but have also personally owned one (Donaldson, 2000). As the sample was animal owners from one shelter in Greenville, North Carolina USA, this survey represents a narrow demographic of individuals defined by location, culture, and socio-economic constraints. While generalizability is limited, the sample represents a community of persons directly familiar with owning an animal.

Measures

For the measurements of the above hypotheses, adaptations from the MHLO and the IPT were created focusing on the biological versus environmental motivations for aggression. A five point Likert Scale format was applied to the original MHLO scale and was used for the CALO (canine aggression locus of origin) scale (Hill & Bale, 2010). The development of the survey scales used here involved generating a large number of items that were rated by two psychology professors (ECU faculty members: Dr. Wuensch & Dr. Curtindale) for face validity of each item (CALO items for biological vs. environmental origin of canine aggression, CIPT items for malleability vs. fixedness, Canine Disposal items for rehabilitation vs. no rehabilitation) – see Figures1, 2, & 3. These ratings were used to select the items for survey administration; the final items are shown in Appendix A: Canine Aggression Survey.

CALO Scale. Using the MALO scale as a template, thirty original items were developed and rated one to five by Drs. Wuensch and Curtindale in regards to the polarity of each item. Item scores are reflected in Figure 1. Faculty ratings of the thirty original CALO items resulted in ten remaining items administered in the Qualtrics survey.

Item	Dr. Wuensch	Dr. Curtindale	Mean	Type
1	5	5	5	Bio
3	5	5	5	Envir
5	5	5	5	Bio
6	5	5	5	Envir
7	5	5	5	Bio
10	5	5	5	Envir
13	5	5	5	Bio
18	5	5	5	Bio
23	5	5	5	Bio
29	5	5	5	Bio
30	5	5	5	Bio
2	5	4	4.5	Bio
8	5	4	4.5	Bio
12	4	5	4.5	Envir
20	4	5	4.5	Bio
22	4	5	4.5	Bio
4	5	4	4	Envir
21	3	5	4	Envie
26	4	4	4	Bio
27	4	4	4	Envir
19	3	4	3.5	
24	3	4	3.5	
25	4	3	3.5	
28	4	3	3.5	
16	2	4	3	
17	2	4	3	
9	1	4	2.5	
15	4	1	2.5	
11	1	3	2	
14	1	3	2	

Figure 1: CALO pro- and anti-euthanasia attitudes rated by psychologists

The ten item scale consisting of five biologically focused items and five environmentally focused items was administered to measure biological vs. environmental locus of origin for canine aggression.

Canine IPT Scale. Developed using the Implicit Persons Theory as a guide, the final CIPT scale consists of four surveyed items: two items highlighting beliefs that canine aggression

is fixed and two items highlighting the malleability of canine aggression. Figure 2 is an example of ratings for the six original CIPT items.

	Rating	Item
Fixed	5	As much as I hate to admit it, you cannot teach an old dog new tricks.
Malleable	5	An owner can change a dog's behavioral characteristics, no matter the breed.
Fixed	5	An owner can change a dog's behavioral characteristics, no matter the dog's behavioral history.
Malleable	4	An owner can substantially change a dog's characteristics.
Malleable	4	No matter what kind of dos an owner has, an owner can significantly change its behavior.
Fixed	5	Owners cannot much change even the most basic behavioral qualities in their dogs.

Figure 2: Canine IPT items with psychologist ratings

Canine Disposal Scale. Focusing on the participants' attitudes towards rehabilitation or canine disposal, eight items were included in the administered survey.

	Mean	Dr. Wuensch	Dr. Curtindale	Number	Item
No Rehab	4	4	4	6	If a dog bites a human, Animal Control should collect it and have it put down.
Rehab	4	4	4	22	Euthanasia (putting a dog down) would be my last choice if I owned an aggressive dog.
No Rehab	4	4	4	23	Euthanasia is the responsible solution for a dog that displays aggression.
No Rehab	3.5	3	4	18	If I felt threatened by my dog in any way, I would take it to the shelter.
No Rehab	3.5	3	4	15	If I was the owner of an aggressive canine, I wouldn't try training classes or medical treatments because they are too expensive and don't work.
Rehab	3.5	3	4	7	If a dog bites a human or another dog, it should be given a second chance before it is put down.
Rehab	3	3	3	4	Owners of dogs who show inappropriate aggressive behaviors should learn how to use behavioral therapy to train their dogs to behave better.
Rehab	3	3	3	5	Dogs that bite or threaten to bite humans should be referred to a professional trainer for therapy to teach them to be less aggressive.

Figure 3: Canine Disposal Scale rated by psychologists

Data Analysis

The items used in the survey defined three variables considered for correlational analysis including biological, can-change, and no-rehabilitation – the predictor variables were biological (a biological origin for aggressive behaviors in canines comprised of CALO items) and can-change (meaning the understanding that aggressive behaviors can be changed, comprised for IPT

items), while the outcome variable was no-rehab (the participants likelihood to not peruse rehabilitation for aggressive behaviors, comprised of owner response items).

Item analysis and Cronbach alpha were employed to investigate the psychometric properties of the three scales, while correlation analysis was used to investigate the relationship between Canine Disposal, Canine Locus of Origin, and Canine IPT. For an "objective measure of reliability," this study employed Cronbach' alpha as only one administration of this test was conducted (Tavakol & Dennick, 2011). In this regard, items of the CALO, CIPT, and Canine Disposal scales could be tested for internal reliability – the ability to measure information consistently (each scale analyzed for the alpha independently).

Chapter III: RESULTS

Demographics

Ages of participants ranged from 16 to 75 with a mean age of 43.62 (*SD* = 13.231). Additionally, participants were primarily female (87%) and Caucasian (88%). Of the total participants, 97% claimed to have owned a canine, and 92% had been in contact with an aggressive canine, with 36% having personally owned an aggressive canine.

Psychometric-analysis

CALO: For internal validation of each item in this survey, Cronbach's alpha was used. In this way, only one study is necessary to test validity. Cronbach's alpha was found for CALO items and IPT items separately. Initially the CALO items (all items correlated together) resulted in an alpha of .619. Several items were removed (Q1_1, Q1_4, Q1_6, Q1_7, and Q1_8) until the resulting alpha exceeded .7 (scoring .775). The final, analyzable items include: Q1_2, Q1_3, Q1_5, Q1_9, and Q1_10 – see Figure 4. High scores on the CALO indicate that the respondent believes that canine aggressiveness is biologically determined.

Canine IPT: Statistical computation of Cronbach's alpha for IPT items resulted in the retention of only two of the four items: Q1_12R and Q1_13R with an alpha of .725, while the two eliminated items had a poor reliability statistic of .484 (see Figure 5). The two items retained were, "an owner can change a dog's behavioral characteristics, no matter the breed," and "an owner can change a dog's behavioral characteristics no matter the dog's behavioral history." High scores on the Canine IPT indicate that the respondent believes that behavior in canines is malleable rather than fixed.

Canine Disposal Scale. Cronbach's alpha was .757 for the eight item scale, showing that all eight original items on this scale performed well and were retained (see Figure 6). High scores on this scale indicate that the respondent believes aggressive canines should be disposed of rather than making attempts to rehabilitate them.

Tests of Hypotheses

A multiple regression predicting Canine Rehabilitation from Canine Locus of Origin and Canine IPT was statistically significant, $F(2, 224) = 7.735$, $p = .001$, $R = .254$. As shown in Table 1, Canine Disposal was significantly, positively related to Canine Locus of Origin and significantly, negatively related to Canine IPT. Both of these predictors had significant partial effects in the multiple regression.

Table1. *Canine Disposal Related to CALO and IPT*.

Predictor	β	*r*	95% CI for ρ
Canine Locus of Origin	.158*	.212*	.085, .333
Canine IPT	-.150*	-.207*	.-.328, -.079

*$p < .05$

Although not the focus of this research, age was found to be significantly correlated with a preference for canine disposal over rehabilitation ($r = .169$, $p = .012$) and women were more

likely to believe that canine aggression is biologically determined (M = 2.85, SD = .57) than were men (M = 2.55, SD = .65, $t(36.1) = 2.339$, p = .025).

Chapter IV: DISCUSSION

Hypothesis 1

A significant positive correlation was found between biological and no-rehab variables. Because the data supports H^1, the evidence leads to the understanding that people who believe that canine aggression is biologically determined rather than environmentally determined are inclined to choose disposal rather than rehabilitation to resolve aggressive canine behavioral problems. The small to medium size correlation between belief in biological determination and preference for disposal rather than rehabilitation suggests that there are important determinants of the preference for disposal aside from belief in biological determination.

Hypothesis 2

Acceptance of alternative hypothesis^2 shows that the owners who believe that canine aggression is malleable do not believe that dogs should be disposed of. Owners who think that aggressive behaviors can be changed are also less likely to pursue canine disposal resolutions for dogs displaying aggressive behaviors. Again, the strength of the association was small to medium in magnitude.

As shown in the multiple regression analysis, combining belief in biological determination with belief that canine behavior is not malleable produced a variate that had a medium sized correlation with preference for disposal over rehabilitation.

Limitations and Future Directions

Due to the inability to adequately measure the public in its entirety, and the failure, though it is a common failure, to randomly sample all people, local factors may have moderated the results. Additionally, problems with the creation of the CIPT scale which could be addressed

by additional research directed towards developing a scale to measure belief that canine behavior is malleable should be conducted for stronger confidence in the results of this survey.

Final Conclusion

The evidence that owners who believe canine aggression is biological, while also claiming that they would not pursue rehab, shows a relationship between thought and action. Although more research is necessary to more fully understand the relationship between owner's beliefs and canine aggression, the support for both hypotheses in this research can justify exploration of these concepts in further depth, including the theory that changing a person's beliefs will affect the likelihood that the person will participate in certain correlating actions.

Additionally, if beliefs of a particular group can be changed, then the actions taken by legislators may similarly be affected. As discussed earlier, legislation based in prejudicial beliefs not reflecting current research creates problems for families and dog owners around the world, such as Montreal, Canada's pit bull ban requiring owners to register "pit bull type dogs" with a $150 permit (Hanson, 2016). Fortunately, this legislation has been suspended due to efforts from organizations like the SPCA which advocates behavioral modification techniques for canines displaying aggressive behaviors; see the full article entitled "Aggressive Behavior in Dogs" at (http://www.mobilespca.org/Portals/0/downloads/documents/Aggressive%20Behavior%20in%20Dogs.pdf). Although this legislation was overturned forcibly, if beliefs held by legislators can be changed to reflect current research findings regarding canine rehabilitation, then changes in legislation should follow.

While impacting legislation would be a valuable product of this and similar research, the ultimate focus remains in identifying beliefs about canine aggression held by the general public and the resulting implications of such findings. Once a solid understanding of the public's

opinions and beliefs has been compiled, experiments in influencing people's understandings of canine aggression should be addressed. Because significant correlations were found in the participant group for this research, a more diverse sample should be targeted to develop a better understanding of how the public perceives canine aggression, rather than only considering adopters from the Pitt County Animal Shelter. Most importantly, research that asks, "how do people's beliefs, assumptions, and prejudices impact people's actions, behaviors, and legislation," must continue to be explored by groups and organizations such as Medlin (2007), the ASPCA, and the SPCA in order to find the most ethical and fair treatment of canines and canine owners.

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Appendix A

Canine Aggression Survey

1) What is your age? _____

2) What is your gender?
   - Male
   - Female

3) What race do you identify with?
   - Caucasian
   - Hispanic
   - African American
   - Asian
   - Native American
   - Other

4) Have you ever owned a dog?
   - Yes
   - No

5) Have to ever come in contact with an aggressive dog?
   - Yes
   - No

6) Have you ever owned an aggressive dog?
   - Yes
   - No

For each of the below items, select the response which most closely matches the degree to which you agree with the statement using a scale from 1 to 6 (1 = strongly disagree, 2 = disagree 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree.

CALO Adapted Items

4. Bad training greatly increases the likelihood of aggression in dogs.

5. Aggressive behaviors are primarily a result of traumatic events in a dog's life.

6. Aggressive behaviors in some canines are caused by bad training by the owner.

7. By exposing a puppy to negative experiences with other dogs or people, the dog is more likely to display aggressive behaviors later in life.

8. Any dog in an extremely threatening situation would display aggressive behaviors.
9. Canine aggressiveness is caused by some imbalance in the body or the brain.
10. Some dogs are naturally aggressive and will display aggressive behavior regardless of how they are raised.
11. If a dog displays aggressive behaviors, it is most likely that they were born with aggressive traits.
12. A specific gene may be the primary cause of canine aggression.
13. Aggressive dogs have some kind of physical, hormonal, or chemical imbalance that makes them behave that way.

IPT Adapted Items

14. As much as I hate to admit it, you cannot teach an old dog new tricks.
15. An owner can change a dog's behavioral characteristics, no matter the breed.
16. An owner can change a dog's behavioral characteristics no matter the dog's behavioral history.
17. Owners cannot much change even the most basic behavioral qualities in their dogs.

Canine Disposal Scale

18. If a dog bites a human, Animal Control officers should collect it and have it put down.
19. Euthanasia (putting a dog down) would be my last choice if I owned an aggressive dog.
20. Euthanasia is the responsible solution for a dog that displays aggression.
21. If I felt threatened by my dog in any way, I would take it to the shelter.
22. If I was the owner of an aggressive canine I wouldn't try training classes or medical treatments because they are too expensive and don't work.

23. If a dog bites a human or another dog, it should be given a second chance before it is put down.
24. Owners of dogs who show inappropriate aggressive behaviors should learn how to use behavioral therapy to train their dogs to behave better.
25. Dogs that bite or threaten to bite humans should be referred to a professional trainer for therapy to teach them to be less aggressive.
26. Dogs that bite or threaten to bite humans should be referred to a professional trainer for therapy to teach them to be less aggressive.
27. Dogs that bite or threaten to bite humans should be referred to a professional trainer for therapy to teach them to be less aggressive.

28. If you have any comments, concerns, or personal experiences you would like to share please leave them here.

Item	Dr. Wuensch	Dr. Curtindale	Mean	Type
1	5	5	5	Bio
3	5	5	5	Envir
5	5	5	5	Bio
6	5	5	5	Envir
7	5	5	5	Bio
10	5	5	5	Envir
13	5	5	5	Bio
18	5	5	5	Bio
23	5	5	5	Bio
29	5	5	5	Bio
30	5	5	5	Bio
2	5	4	4.5	Bio
8	5	4	4.5	Bio
12	4	5	4.5	Envir
20	4	5	4.5	Bio
22	4	5	4.5	Bio
4	5	4	4	Envir
21	3	5	4	Envie
26	4	4	4	Bio
27	4	4	4	Envir
19	3	4	3.5	
24	3	4	3.5	
25	4	3	3.5	
28	4	3	3.5	
16	2	4	3	
17	2	4	3	
9	1	4	2.5	
15	4	1	2.5	
11	1	3	2	
14	1	3	2	

Figure 1: CALO psychologist rated Items with scores

	Rating	Item
Fixed	5	As much as I hate to admit it, you cannot teach an old dog new tricks.
Malleable	5	An owner can change a dog's behavioral characteristics, no matter the breed.
Fixed	5	An owner can change a dog's behavioral characteristics, no matter the dog's behavioral history.
Malleable	4	An owner can substantially change a dog's characteristics.
Malleable	4	No matter what kind of dos an owner has, an owner can significantly change its behavior.
Fixed	5	Owners cannot much change even the most basic behavioral qualities in their dogs.

Figure 2: Canine IPT items with psychologist ratings

	Mean	Dr. Wuensch	Dr. Curtindale	Number	Item
No Rehab	4	4	4	6	If a dog bites a human, Animal Control should collect it and have it put down.
Rehab	4	4	4	22	Euthanasia (putting a dog down) would be my last choice if I owned an aggressive dog.
No Rehab	4	4	4	23	Euthanasia is the responsible solution for a dog that displays aggression.
No Rehab	3.5	3	4	18	If I felt threatened by my dog in any way, I would take it to the shelter.
No Rehab	3.5	3	4	15	If I was the owner of an aggressive canine, I wouldn't try training classes or medical treatments because they are too expensive and don't work.
Rehab	3.5	3	4	7	If a dog bites a human or another dog, it should be given a second chance before it is put down.
Rehab	3	3	3	4	Owners of dogs who show inappropriate aggressive behaviors should learn how to use behavioral therapy to train their dogs to behave better.
Rehab	3	3	3	5	Dogs that bite or threaten to bite humans should be referred to a professional trainer for therapy to teach them to be less aggressive.

Figure 3: Canine Disposal Scale rated by psychologists

Table1. *Canine Disposal Related to CALO and IPT*.

Predictor	β	*r*	95% CIforρ
Canine Locus of Origin	.158*	.212*	.085, .333
Canine IPT	-.150*	-.207*	.-.328, -.079

**p*< .05

CALO Items

Reliability Statistics

Cronbach's Alpha	N of Items
.619	10

Case Processing Summary

		N	%
Cases	Valid	227	97.4
	Excluded[a]	6	2.6
	Total	233	100.0

Reliability Statistics

Cronbach's Alpha	N of Items
.775	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q1_2	10.13	7.785	.528	.740
Q1_3	9.98	6.358	.555	.742
Q1_5	10.57	7.853	.533	.740
Q1_9	10.27	7.515	.559	.730
Q1_10	10.26	7.364	.602	.716

Figure 4: Cronbach's alpha testing of CALO items

IPT Items

Reliability Statistics

Cronbach's Alpha	N of Items
.632	4

Case Processing Summary

		N	%
Cases	Valid	230	98.7
	Excluded[a]	3	1.3
	Total	233	100.0

Reliability Statistics

Cronbach's Alpha	N of Items
.725	2

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q1_12R	2.4935	.703	.569	.
Q1_13R	2.1861	.761	.569	.

Figure 5: Cronbach's alpha testing of Canine IPT items

Canine Disposal Survey

Reliability Statistics

Cronbach's Alpha	N of Items
.757	8

Case Processing Summary

		N	%
Cases	Valid	230	98.7
	Excluded[a]	3	1.3
	Total	233	100.0

Figure 6: Cronbach's alpha testing of Canine Disposal Scale

Correlations

		Biological	CanChange	NoRehab
Biological	Pearson Correlation	1	-.353**	.212**
	Sig. (2-tailed)		.000	.001
	N	229	229	227
CanChange	Pearson Correlation	-.353**	1	-.216**
	Sig. (2-tailed)	.000		.001
	N	229	231	229
NoRehab	Pearson Correlation	.212**	-.216**	1
	Sig. (2-tailed)	.001	.001	
	N	227	229	230

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 7: Correlational testing between variables

Correlations

		Ever owned an aggressive dog
Biological	Pearson Correlation	.039
	Sig. (2-tailed)	.556
	N	229
Can Change	Pearson Correlation	-.013
	Sig. (2-tailed)	.841
	N	231
No Rehab	Pearson Correlation	-.128
	Sig. (2-tailed)	.053
	N	230

*. Correlation is significant at the 0.05 level (2-tailed).

Figure 8: Correlational testing between variables and owners of aggressive canines

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	30	12.9	12.9	12.9
	Female	203	87.1	87.1	100.0
	Total	233	100.0	100.0	

Ethnicity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Caucasian	205	88.0	88.7	88.7
	Afric_Amer	3	1.3	1.3	90.0
	Hispanic	8	3.4	3.5	93.5
	Asian	2	.9	.9	94.4
	Other	13	5.6	5.6	100.0
	Total	231	99.1	100.0	
Missing	System	2	.9		
Total		233	100.0		

Ever Have Dog

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	6	2.6	2.6	2.6
	Yes	226	97.0	97.4	100.0
	Total	232	99.6	100.0	
Missing	System	1	.4		
Total		233	100.0		

Ever contacted an aggressive dog

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	18	7.7	7.8	7.8
	Yes	214	91.8	92.2	100.0
	Total	232	99.6	100.0	
Missing	System	1	.4		
Total		233	100.0		

Ever owned an aggressive dog

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	148	63.5	63.5	63.5
	Yes	85	36.5	36.5	100.0
	Total	233	100.0	100.0	

Figure 9: Demographic Statistics

Correlations

		Gender
Biological	Pearson Correlation	.168*
	Sig. (2-tailed)	.011
	N	229
Can Change	Pearson Correlation	-.080
	Sig. (2-tailed)	.226
	N	231
No Rehab	Pearson Correlation	-.081
	Sig. (2-tailed)	.221
	N	230

*. Correlation is significant at the 0.05 level (2-tailed).

Correlations

		Age
Biological	Pearson Correlation	.010
	Sig. (2-tailed)	.881
	N	220
Can Change	Pearson Correlation	.004
	Sig. (2-tailed)	.947
	N	222
No Rehab	Pearson Correlation	.169*
	Sig. (2-tailed)	.012
	N	221

*. Correlation is significant at the 0.05 level (2-tailed).

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Biological	Male	30	2.5533	.64900	.11849
	Female	199	2.8462	.57232	.04057

Figure 10: Age and Gender Analysis 1

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
Biological	Equal variances assumed	1.975	.161	-2.567	227
	Equal variances not assumed			-2.339	36.126

Independent Samples Test

		t-test for Equality of Means			
		Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower
Biological	Equal variances assumed	.011	-.29290	.11412	-.51777
	Equal variances not assumed	.025	-.29290	.12524	-.54687

Independent Samples Test

		t-test for Equality of Means 95% Confidence Interval of the Difference Upper
Biological	Equal variances assumed	-.06803
	Equal variances not assumed	-.03892

Figure 11: Age and Gender Analysis 2