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Jessica Ellen Vester

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Jessica Vester

FACULTY MENTORS:
JANET BESTER-MEREDITH, CINDY BISHOP, ERIC LONG

HONORS PROGRAM DIRECTOR:
DR. CHRISTINE CHANEY

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Vesterj@spu.edu
3307 3rd Ave W, Seattle WA 98119

ABSTRACT

This study investigated whether stress responsiveness in dogs is more significant when the owner is present or absent during a veterinary examination. The study consisted of two experimental groups: "owner absent" and "owner present." Both groups consisted of 25 dogs each, totaling 50 dogs observed. A veterinarian and veterinary assistant recorded the dog's behavioral and physiological stress responses. Each group's behavioral and physiological stress-induced responses were compared using a Fischer Exact test and an Analysis of Covariance. The findings showed that dogs whose owners are present during the veterinary examination display fewer stress responses than dogs whose owners are absent because the owner-absent group showed significant differences in panting, heart rate, and respiratory rate. This study demonstrates that owner-dog interactions have positive impacts on stress experienced by dogs in veterinary clinics. The research aids in discussing stressors and stress-related behaviors in dogs because identifying these responses will allow veterinarians to mitigate stress, ultimately improving the accuracy of medical findings.

INTRODUCTION

Understanding dog behavior is essential for anyone who works with dogs, such as trainers, owners, and animal behaviorists. Dogs display various behaviors, such as tail wagging or licking, as a means of communication. Companion dogs also demonstrate social behaviors that support and reinforce the relationship that allows them and the human to feel connected (Hecht & Horowitz, 2015). With this sense of connection comes a concept initially introduced to describe the bond between an infant and a caregiver: attachment (Bowlby, 1958). Ethological studies suggest that attachment is formed in many species. A 'strange situation test' was conducted between dogs and their owners (Topál et al., 1998). The "strange situation test" is a behavioral experiment run in a new environment. Its purpose is to investigate specific behaviors from the test subject toward a known person instead of a stranger (Ainsworth & Bell, 1970). The test results showed that dogs demonstrated the 'secure base effect,' where dogs were more likely to explore their environment in the owner's presence than a stranger (Horn et al., 2013). The results suggest that dogs may feel more comfortable when in the presence of an owner versus a stranger.

The hospitalization experience is expected to include several factors that induce stress in veterinary species, such as the dog, including separation from the primary owner, new or different stimuli, increased noise levels, and a constrained environment (Herman, 2014). Animals interacting with veterinarians often show behavioral and physiological signs of stress due to unpredictable and uncontrollable conditions (Csoltova et al., 2017). Stress or stressors, for this research, is defined as anything that disrupts homeostasis and the accompanying adaptive responses (the stress response) that attempts to restore the disruption. Previous research has shown that 78.5% of dogs exhibited fear reactions on the examination table (Döring et al., 2008).

Recognizing and identifying stress in dogs is beneficial for their overall well-being. It also improves the safety of the veterinary staff and makes it easier to handle the dog during the exam. Proper management techniques and recognizing stress signs will also help improve the thoroughness of examination and accuracy of findings. Stress responses may affect baseline physiological parameters, which may cause misdiagnosis (Csoltova et al., 2017). Common fear and stress reactions include physiological behaviors such as panting and shaking and behavioral reactions such as vocalizing and tucking their tail.

Physiological Indicators of Stress

Animals, as well as humans, may react to stress by stimulation of the sympatho-adrenal-medullary (SAM) axis and the hypothalamic–pituitary–adrenal (HPA) axis (Moberg & Mench, 2000; Hekman et al., 2014). Activation of the systems causes changes in physiological parameters such as heart and respiratory rate (Srithunyarat, 2016). Physiological stress indicators include but are not limited to, tachycardia, increased core body temperature, and tachypnea.

Heart rate (HR) is a relatively accessible physiological measure. Heart rate gives essential information about an animal's health and gives information about their cardiovascular function overall. Measuring changes in heart rate has also been used to measure psychophysiological arousal in dogs (Csoltova et al., 2017). Many species encountering various stressful events have proven that body temperature is a physiological measure that stress can affect (Bouwknecht et al., 2007). Additionally, acute stressors can increase and decrease physiological functions such as heart and respiratory rates (Bodnariu, 2008). Therefore, rate increases above the resting rate can occur in dogs subjected to stressors, such as noise, shock, or unconventional environments. For example, a study showed that dogs who experienced administration of various stressors

experienced increased heart rates above the standard resting heart rate. The heart rate returned to normal within eight minutes after removing the stressor (Beerda et al., 1998).

Behavioral Indicators of Stress

There is high variability in stress-related behaviors between individuals. Stress-related behaviors typically overlap with those related to fear and anxiety. However, common stress indicators in dogs include but are not limited to vocalizations, ears pressed back, lip licking, yawning, lowered body posture, and tucked tails (Rooney et al., 2009). Distress vocalizations or high-pitched calls, whines, or yelps can arise due to anxiousness or to elicit attention (Yin & McCowan, 2004; Pongrácz et al., 2006). Ears pressed back are generally associated with greater fear, submission, and retreat. A tongue extended and retracted quickly is a tongue flick: it may be a reflexive reaction to discomfort.

Displacement behaviors are also important as they constitute normal behaviors but are often performed in an improper context. Displacement behaviors often indicate conflict or anxiety because the dog suppresses the urge to do something else by replacing it with another action (Falk, 1977). Yawning or licking are examples of displacement behaviors that may be associated with stress.

Dogs often communicate with their tails. Tails can assume a range of heights, positions, and swing speeds, providing different information (Hecht & Horowitz, 2015). Tucked tails often indicate some degree of fear, submission, or appeasement (Hecht & Horowitz, 2015). Lowered body position involves looking or leaning away from the engager and reducing perceived size. Lowered body position is often accompanied by a lowered tail and pressing ears back, which are postures affiliated with submission or conflict avoidance.

Several studies provide evidence of the positive effects of human social interactions on dogs' physiology, behavior, and welfare. Physical touch alone can decrease cardiovascular response and cortisol levels (Anderson & Gantt, 1966; Kostarczyk & Fonberg, 1982; Hennessy et al., 1998). Based on this, I hypothesized that dogs who are with their owners during veterinary examinations will display less stress-induced behaviors and physiological signs than those without; therefore, investigating how the owner's attendance with the dog at veterinary examinations can influence behavioral and physiological stress-associated parameters.

In summary, the research will further explore stress-induced behaviors in canines and can aid in addressing ways to mitigate dogs' stress levels during veterinary examinations.

METHODS

Subjects

Retrospective research occurred between September 2022 and February 2023. The study subjects consisted of privately owned dogs that are clients at Ballard Animal Hospital. The study group consisted of 50 dogs (Supp. Table 1), with twenty-five in each group. The group whose owners were present could interact with the owner, while the group whose owners were absent experienced no interaction with the owner during the examination. The following criteria determined canine selection for research: dogs between the ages of six months to 12 years old, dogs in good health, must have lived with the owner for at least two months before selection, not human aggressive, and have previous experience at the veterinarian. Random selection occurred in terms of breed, size, and sex.

Ethics Statement

Approval of data collection using past records was obtained from Ballard Animal Hospital.

Procedure

The study required retrospective data to compare canine vitals recorded pre-lockdown and during lockdown requirements due to the Covid-19 outbreak in the U.S. Pre-lockdown data (or in-person appointments) consisted of veterinary visits before March 2020. In contrast, post-lockdown data (curbside appointments) consisted of any visit between March 2020 and 2022, when most veterinary visits were still functioning via curbside appointments. Data collected included dogs familiar with the veterinary clinic due to multiple previous appointments.

In this study, two experimental conditions exist. The owner-absent group (N = 25) represented dogs whose owner was not in attendance during the veterinary examination (curbside appointments), and the owner-present group (N = 25) represented dogs with the owner present during the examination (in-person appointments). A doctor of veterinary medicine with whom the patient was familiar, and a veterinary assistant was responsible for examining and recording observations. When entering the clinic, the veterinary assistant checked the dog's weight, temperature, heart rate, and respiratory rate. The veterinarian then examined the dog under stationary conditions using minimal restraint. The standardized sequence of examination steps performed by the veterinarian included: checking of the eyes, the ears, the teeth, and the mouth mucosa, palpation of the mandibular and lymph nodes, manipulation of the joints, abdomen palpation, heart and lungs stethoscope examination. The amount of time with each dog averaged about one hour.

An ethogram was designed based on behaviors discovered through previous research that was proven to reflect stress in dogs. The behaviors within the ethogram were low tail movement,

flattened ears, licking, yawning, vocalization, and lowered body posture. *Low tail movement* is the dog's tail tucked towards its legs. *Flattened ears* were defined as the dog's ears tucked towards its head, and licking is defined as the dog passing its tongue over its lips. The dog opening their mouth and inhaling deeply defined *yawning*. Lastly, *vocalization* was defined as whining, crying, or barking, and *lowered body posture* meant the dog was crouched. Physiological indicators of stress included: trembling, panting, elimination, tachycardia, and tachypnea. *Trembling* meant the dog shivered. *Panting* was where the dog breathed with quick, short breaths. *Elimination* represented the dog urinating or defecating. Lastly, I measured *tachycardia* and *tachypnea*, where the heart and respiration rates exceeded the standard resting rate. Both tachycardia and tachypnea refer to an abnormally quick heart or respiratory rate. Dogs' average standard resting rate is between 10 and 30 respirations per minute (Bodnariu, 2008; C. Bishop, pers. comm.). Any dog with a recorded respiration rate higher than the resting heart rate was considered to have tachypnea. The values for resting heart rate vary with the size of the dog. The average heart rate is 100 to 160 beats per minute for dogs weighing less than 15kg (33 lbs). The average heart rate for dogs weighing more than 15kg is 60 to 100 beats per minute (Bodnariu, 2008). Therefore, dogs weighing less than 15kg with a heart rate higher than 160 beats per minute and those weighing greater than 15kg with a heart rate higher than 100 beats per minute were considered tachycardia.

At the beginning of each examination, heart rate, respiratory rate, and temperature were recorded. Any time the dog spent engaging in a behavior or expressing a physiological indicator of stress was recorded. The physiological responses of heart and respiratory rate are measured as continuous variables (number of respirations per minute and number of heartbeats per minute).

Statistical Analysis

Using the Fisher Exact test, the amounts of stress-related behaviors and the physiological indicators of the dogs in both the owner-absent and owner-present groups, including any event of tachycardia and tachypnea were compared. I also compared the heart rate and respiratory rate of the two groups using Analysis of Covariance (ANCOVA) test where weight was the covariate and owner's presence or absence was the fixed factor.

RESULTS

Behavioral data collection and analysis

No significant difference (Fig. 1) was observed between the vocalization and low body posture behaviors in the owner-absent and owner-present groups. Four percent of dogs in the owner-absent group either vocalized or had a low body posture (N=50, Fisher's Exact P=1). All other behavioral indicators of stress mentioned in the ethogram- low-tail, flattened ears, licking, and yawning- were not observed.

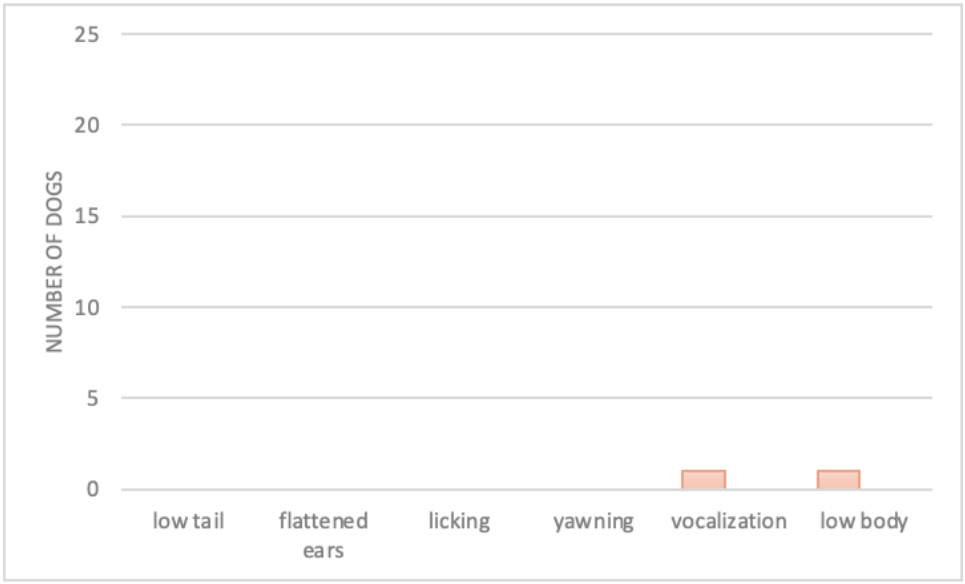

Fig. 1. Number of dogs (n=50) recorded performing each indicated stress-induced behavior in each group. Values at 0 show that no dogs were found to act in that specific behavior. Light red indicates the owner-absent group. No behaviors were observed within the owner-present group.

Physiological data collection and analysis

All physiological indicators of stress, except tachycardia and tachypnea, were recorded based on observations made by the veterinarian or veterinary assistant who worked with the canine.

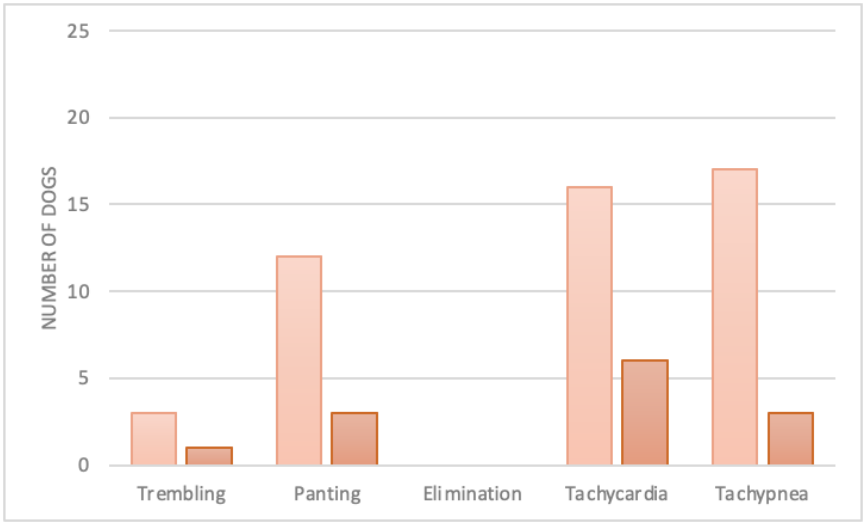

Fig. 2. Physiological responses from dogs (n=50) within each group. Values at 0 show that no dogs were found to act out that specific physiological stress-response. Light red color indicates the owner-absent group. The dark red color indicates the owner-present group.

As opposed to trembling (P=1), panting occurred more frequently in dogs where the owner was absent (Fig. 2). Based on the data, elimination did not occur in either group. Within the owner-absent group, significantly more dogs were found panting during their veterinary visit than in the group where the owner was present (P=0.0121). Among the 50 dogs tested for heart and respiratory rates, six showed signs of tachycardia, three showed tachypnea in the owner-present group while sixteen dogs presented with tachycardia in the owner-absent group, and seventeen showed tachypnea. The owner-absent group had significantly more dogs testing positive for tachycardia (P= 0.0096). Dogs who visited the clinic without their owners were significantly more likely to show tachypnea (P= 0.0001).

Temperature

No significant differences occurred within the temperature of either group. The owner present group had an average temperature of 101.53˚F (±0.15), and the owner absent group had an average temperature of 101.96˚F (±0.42).

Heart rate and Respiratory rate

After controlling for variation associated with weight, the results showed that dogs who experienced a veterinary visit without their owners showed a significantly higher heart rate than dogs with their owners ($F_{1,47}$=9.366, P=0.004).

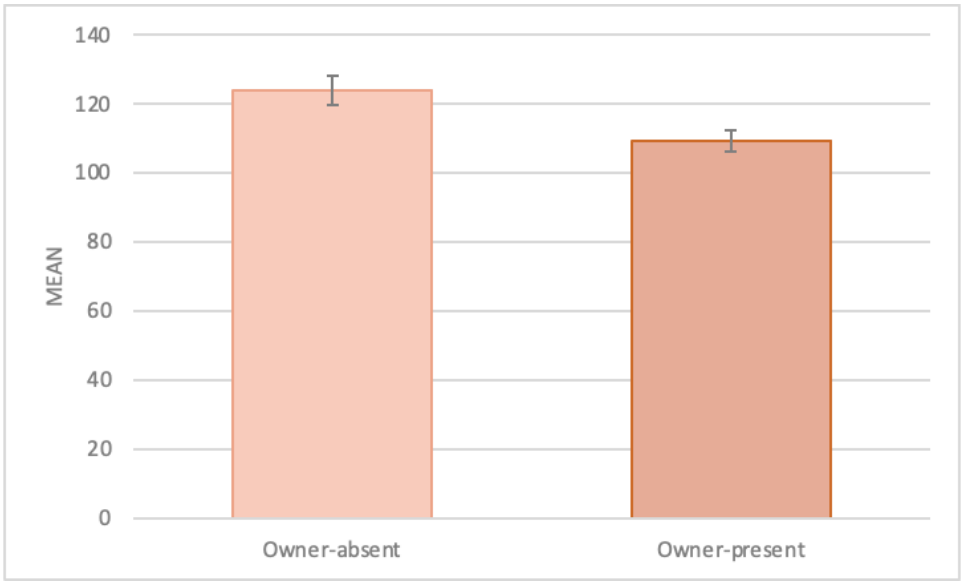

Fig. 3. The mean heart rate (±SE) for the owners-absent group was 123.7 bpm (±4.24). The mean heart rate for the owners present group was 109.2 bpm (±3.10).

Average heart rates are presented graphically in Fig. 3. The mean heart rate increased by 12.96% in dogs without their owners compared to dogs with their owners.

In addition, when controlling for weight, a significant difference between respirator rates between owner-absent and owner-present groups also occurred ($F_{1,47}$ = 8.657, P=0.005), where the owner-absent group showed greater respiratory rates overall. The mean respiratory rate for the owners-absent group was 38.84 bpm (±2.78), while the mean respiratory rate for the owners-present group was 27.68 bpm (±2.21).

DISCUSSION

The current study supported the hypothesis that dogs with their owners during veterinary examinations will display less stress-induced behaviors and physiological signs than those without owners. The current research differs from previous research on canine stress responses because it addresses the effect of familiar human presence on a dog's stress.

Behavioral and Physiological Responses

The results indicate that more activities or postures indicative of stress transpired in the owner's absence. Earlier studies about stress signals in dogs have reported increased vocalizing, panting, paw lifting, and trembling (Corson, 1971; Schwizgebel, 1982; Solomon & Wynne, 1953). Anecdotal evidence from veterinarians and veterinary assistants suggests that dogs who are with their owners are less visibly stressed than those who are not with their owners. Some dogs showed increased trembling, vocalization, low body posture (P=1), and panting (P=0.0121) in the group where the owner was absent. Furthermore, the increased heart rate found in the owner-absent group can indicate higher stress levels from dogs not near an owner. Conversely, there was no indication that temperature changes signaled acute stress in dogs from either group.

Behavioral, Physiological, and heart rate responses: An integrative approach

Behavior that tended to occur concurrently with cases of tachycardia, tachypnea, or both, i.e., panting, is likely to indicate a more severe state of acute stress in dogs. Other behaviors, such as vocalization and trembling, were not associated with tachycardia and tachypnea responses and may be shown when stress is less tense and applied in a social setting.

Limitations

As a retrospective study, the data collected was not initially intended for research purposes but for record-keeping purposes. As a result of this factor, some data, such as behaviors pertinent to the study, were not included in the records.

Lastly, behavioral parameters may help to identify acute stress in the dog. Nevertheless, misinterpretation may occur because behavioral responses may differ between dogs depending on the type of stimulus and individual characteristics. When coupled with physiological measures, however, misinterpretation may be prevented.

Future Research

The study aimed to identify and analyze physiological and behavioral indicators of acute stress in canines where the owner is either present or absent. Future research directions include comparing signs of stress in dogs in a clinic versus during in-home appointments. Moreover, researchers can look at stress responses in different environments or with different types of stimuli.

The results suggest that dogs with their owner during veterinary appointments display fewer signs of stress. In addition, recognizing signs of stress leads to the implementation of mitigation techniques which help the canine feel more comfortable in veterinary settings. In addition, if stress signals are recognized and managed accordingly, then the advancement of animal care procedures can occur in veterinary clinics to achieve more accurate information regarding canine health.

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APPENDIX

Supplementary Table 1

Descriptive demographic of the population of dogs used in this study. F=female, M=male, FS=female spayed, MN=male neutered, Group A= assigned to "owner absent", Group B=assigned to "owner present", BAR/QAR= represents canine attitude, Notes= represents behaviors observed by veterinarian and/or veterinary assistants.

Number	Group	Sex	6m-12yrs Age (yr)	Breed	Weight	Temperature	HR	RR (bpm)	Tachycardia (Y/	Tachypnea (Y/	Attitude	Notes
1	A	MN	6.5	Beagle Mix	40.4	101	110	28	Y	N	BAR	
2	A	FS	2	Golden Retriever	67	101.8	100	60	N	Y	BAR	Pant
3	A	MN	4	Golden Retriever	81.5	100.8	104	26	Y	N	BAR	
4	A	FS	12	Toy Fox Terrier	7.7	100.1	100	24	N	N	BAR	
5	A	FS	2	Australian Cattle Dog Mix	103.3	110	121	40	Y	Y	BAR	
6	A	MN	4	Australian Cattle Dog Mix	48		120	20	Y	N	BAR	Very shy but no aggression; low posture
7	A	MN	6	Labrador Retriever mix	78.3	101.8	100	60	N	Y	BAR	Pant
8	A	MN	8	Labrador Retriever mix	52.2	100.8	126	40	Y	Y	BAR	
9	A	MN	11	Miniature Poodle	23.8	103.5	122	35	N	Y	BAR	Vocalization+ pant
10	A	FS	8	Shin Tzu	7.9	101.9	132	32	N	Y	BAR	
11	A	MN	2	Poodle mix	20.7	100.7	120	60	N	Y	BAR	Pant
12	A	M	8.5	English Bulldog	64.4	101.7	120	36	Y	Y	BAR	Pant
13	A	MN	4	Clumber Spaniel	76.6	100.6	148	28	Y	N	QAR	
14	A	MN	6	Boxer mix	61.8	101	132	32	Y	Y	BAR	
15	A	FS	7	Labradoodle	38.7	103.9	140	32	Y	Y	BAR	Very nervous
16	A	FS	8	Golden Retriever	81.3	100.9	105	30	Y	N	BAR	Pant
17	A	M	7	Siberian Husky	46.8	102.1	110	32	Y	Y	BAR	
18	A	FS	1	Labrador Retriever	51.65		136	60	Y	Y	BAR	Very bouncy, panting
19	A	MN	2	Catahoula Leopard Dog Mix	91	102.1	128	60	Y	Y	BAR	Pant
20	A	FS	12	Tibetan Spaniel	13.7	100.2	140	32	N	Y	BAR	Pant + nervous
21	A	MN	5	Australian Shepherd	67.9	102.2	110	24	Y	N	BAR	
22	A	FS	10	Greater Swiss mountain dog mix	54.9	102.5	140	60	Y	Y	BAR	Panting
23	A	F	1	German Shepherd Mix	39.6	101.7	200	60	Y	Y	BAR	Panting
24	A	MN	11	Terrier Mix	17.5	100.75	119.5	40	N	Y	BAR	Panting
25	A	FS	2	Dachshund (long haired)	14.6	103.1	110	20	N	N	BAR	Shivering, extremely nervous, trembling
26	B	MN	12	Golden Retriever	78	102	110	28	Y	N	BAR	
27	B	MN	10	Yorkshire Terrier Mix	16.8	102.4	128	24	N	N	BAR	
28	B	FS	3	German Shorthaired Pointer	68.2		110	24	Y	N	BAR	
29	B	MN	10	Labradoodle	79.2	100.4	100	24	N	N	BAR	
30	B	FS	6	Pit Bull Mix	67	100.3	105	16	Y	N	BAR	
31	B	MN	8	Labrador Retriever mix	61.1	102.5	100	24	N	N	BAR	
32	B	MN	7	Mastiff Mix	102.4	101.5	120	28	Y	N	BAR	
33	B	MN	7	Standard Poodle	59.4	101.4	88	24	N	N	BAR	
34	B	FS	4	Chihuahua mix	15.6	101.3	122	24	N	N	BAR	
35	B	MN	3	Spaniel mix	24.7	100.5	120	28	N	N	BAR	
36	B	FS	4	Australian Cattle Dog	58.2	102.2	138	50	Y	Y	BAR	Pant
37	B	MN	11	Pekingese mix	18	101.9	128	30	N	N	BAR	
38	B	MN	8	Poodle mix	14	101.8	120	20	N	N	BAR	
39	B	FS	5	Labradoodle	38.2	102.4	100	60	N	Y	BAR	Pant
40	B	M	9	Rottweiler	109.3	100.9	80	24	N	N	BAR	Very nervous, no growling
41	B	MN	10	Chihuahua mix	7.1	101.3	120	20	N	N	BAR	
42	B	MN	8	Chihuahua	9.1		120	24	N	N	BAR	
43	B	MN	2	Terrier Mix	14	100.9	120	24	N	N	BAR	
44	B	FS	1	Goldendoodle	43	101.4	90	20	N	N	BAR	
45	B	FS	7	Jack Russell Terrier	31	101.9	110	20	N	N	BAR	
46	B	MN	9	Labrador Retriever	69.4	101.4	80	20	N	N	BAR	
47	B	FS	12	Labrador Retriever mix	39.5		110	24	Y	N	BAR	
48	B	MN	6	Coton De Tulear	9	101.2	120	28	N	N	BAR	
49	B	FS	3	Newfoundland Mix	73.4		90	24	N	N	BAR	
50	B	FS	1	French bulldog	22	102.6	100	60	N	Y	BAR	Pant

Honors Presentation Speech, Presented May 20, 2023

A Tail of Interdependence: Animal Communication, Companionship, and Community

Using many disciplines -- including biology, art, and performance poetry -- this session examines intra- and interspecies interdependence. Through an exploration of canine behavior, elephant societies, and multispecies mourning, the panelists will consider the social interactions of non-human animal communities and how they can help us care for our world.

Let me share a story with you. One day, A man walks into a bar with a talking dog.

And He tells the bartender, “My dog can talk!”

The bartender says, “Oh yeah? Let’s hear him!”

He asks the dog, “What is on top of a house?”

The dog says, “Roof!”

The bartender does not buy it, so the guy says, “What is the outer covering of a tree called?”

The dog responds, “Bark!”

The bartender gets really mad and kicks the guy and his dog out of the bar.

Sitting on the curb, the dog turns to the guy and says, “What was that all about?”

Everyone knows the saying, “A dog is a man’s best friend.” If this is true then it should be easy to tell when our best friend is feeling stressed, right? Wrong.

The difficult thing about a dog being a man’s best friend is that they do not speak like humans do. We both communicate through noises and body language, yet our sounds and bodily cues appear and sound quite different from one another. As a result, we exhibit

emotions differently, such as happiness or nervousness. Today, I will describe my research project, where I studied canines' behavioral and physiological stress responses in the veterinary clinic. Over the last four years, I have worked hard to obtain a bachelor's degree in physiology with a focus on pre-veterinary medicine. I have experience as a pet owner, a dog walker, and a veterinary assistant. In addition, I have been a lifelong animal advocate (you can ask my parents if you want proof). So, I hope you'll enjoy hearing about dogs and how we can understand them as much as I have enjoyed preparing for this speech.

The Main Question of the Honors program asks: What does it mean to be human? I will articulate why this research topic is essential by addressing how a particular non-human species communicates, why it is important for us to interpret and understand their methods of communication, and how this inter-special interaction can improve our world.

At some point in our lives, we have all dealt with and felt what every college student goes through almost daily… I'm talking about stress. We may sweat or have shaky hands. Our voice may fluctuate, causing us to speak really quietly or super loud! I was stressed just thinking about presenting in front of all of you. As you may or may not know, stress is a universal feeling. Every being on this earth experiences it in their own way. Though not the most pleasant feeling in the world, feelings of stress are essential for survival and adaptation, motivation and performance, learning and growth, and decision-making.

Chronic or excessive stress is detrimental to one's health, but acute, short-term stress means that our body is functioning correctly.

Dogs display various behaviors, such as tail wagging or licking, as a means of communication. Though dogs experience anxiety, their capacity to perceive and interpret pressure may differ from humans. Animal stress responses are primarily driven by instinct and evolutionary adaptations rather than conscious cognitive processes. Additionally, the ability to cope with anxiety and recover from it varies across individuals within a species. In my research, I investigated whether stress responsiveness in dogs is more significant when the owner is present or absent during a veterinary examination. For the sake of this research, stress or stressors was defined as anything that disrupted homeostasis and the accompanying adaptive responses (the stress response) that attempt to restore the disruption. Previous research has shown that 78.5% of dogs exhibited fear reactions on the examination table. Several studies also provide evidence of the positive effects of human social interactions on dogs' physiology, behavior, and welfare. Physical touch alone can decrease cardiovascular response and cortisol levels. Based on this information, I hypothesized that dogs with their owners during veterinary examinations would display less stress-induced behaviors and physiological signs than those without; therefore, investigating how the owner's attendance with the dog at veterinary examinations can influence behavioral and physiological stress-associated parameters.

So, what do we do with this information? Before we dive into the results, we'll focus on why it is important to us to interpret a dog's methods of communication at all.

In his book, On interpretive conflict, John Frow said, "Interpretation is endemic to the human condition, to our apprehension of otherness, our need to make sense of a world that exceeds and constantly frustrates our ability to predict and control it." In this quote, Frow suggests that interpretation is an inherent and pervasive aspect of being human. We have theories, questions, and professions centered around the world's origins. We ask questions about the purpose of humanity. Frow argues that we constantly encounter "otherness" in the world, which refers to experiences, perspectives, or phenomena different from our own. He contends that our natural inclination is to try to make sense of this otherness and understand and interpret it within the frameworks and systems of meaning we possess.

However, Frow also acknowledges that the world is complex and often unpredictable, surpassing our ability to comprehend, predict, or control it fully. This intrinsic limitation creates constant frustration in our attempts to achieve complete understanding and mastery over the world. Consequently, interpretation becomes an ongoing and integral part of the human condition as we continuously seek to make sense of reality's multifaceted and elusive nature.

Frow's statement suggests that interpretation is an inherent part of being human because it addresses our innate need to make sense of the world, understand others, and find meaning in our experiences. As an essential component of human existence, interpretation is rooted in our cognitive processes and our search for knowledge in a complicated and unpredictable world.

For example, we use a variety of knowledge sources to try to understand animals. We have veterinarians, psychologists, trainers, and behavioral analysts that are interested in learning how animals relate to one another, to their environment as a whole, and how they are act similarly or different from humans.

In a veterinary setting, we use means of interpretation to comprehend what messages dogs are transmitting through their body language and physiological changes.

Earlier, I spoke about ways in which dogs communicate via behavioral avenues. Stress responses can affect behavior and baseline physiological parameters. There is high variability of stress-related behaviors between individuals, though they typically overlap with those related to fear and anxiety. Common indicators of stress in dogs include but are not limited to vocalizations, ears pressed back, lip licking, yawning, lowered body posture, and tucked tails.

Displacement behaviors are also important as they constitute normal behaviors but are often performed in an improper context. Displacement behaviors usually indicate conflict or anxiety because the dog suppresses the urge to do something else by replacing it with another action. Yawning or licking are examples of displacement behaviors that may be associated with stress.

Dogs often communicate with their tails. Tails can assume a range of heights, positions, and swing speeds, providing different information. Tucked tails often indicate some degree of fear, submission, or appeasement. Lowered body position involves looking or leaning away from the engager and reducing perceived size. Often, Lowered body position is accompanied by a lowered tail and pressing ears back, which are postures affiliated with submission or conflict avoidance.

Common physiological fear and stress reactions include but are not limited to, tachycardia, panting, increased core body temperature, and tachypnea. Acute stressors alone can increase and decrease physiological functions such as heart and respiratory rates. Therefore, rate increases above the resting rate can occur in dogs subjected to stressors, such as noise, shock, or unconventional environments.

I used scientific analysis and statistics to interpret the behavioral and physiological stress responses of dogs between the owner-absent and the owner-present groups. The

results showed that some dogs showed increased trembling, vocalization, low body posture, and panting in the group where the owner was absent. Furthermore, the increased heart rate in the owner-absent group can indicate higher stress levels from dogs not near an owner. Conversely, there was no indication that temperature changes signaled acute stress in dogs from either group. The results of the behavioral actions indicated that more stress-related activities or postures transpired in the owner's absence. Anecdotal evidence from veterinarians and veterinary assistants also suggested that dogs who are with their owners are less visibly stressed than those who are not with their owners.

Now that we've covered how dogs communicate and why it matters to humans, let's focus on how interspecies interactions can improve our world.

Ethological studies suggest that many species form attachments. For example, companion dogs demonstrate social behaviors that support and reinforce the relationship allowing them and the human to feel connected. We've all seen videos of dogs greeting their person when they come back home. Interactions such as that not only positively impact the dog, but it impacts the human too. As a panel, we discussed how, for the most part, all creatures are social and seek companionship in one form or another. Humans are social creatures. Companionship and community play a vital role in a human's life by providing emotional support, fostering social connection, increasing happiness and well-being, offering support during challenges, facilitating personal growth, boosting resilience,

and enhancing physical health. Nurturing meaningful relationships and cultivating companionship are essential for leading a fulfilling and balanced life.

It is important to note that dogs are a companionable species known to provide unconditional love and emotional support. Interacting with dogs can help reduce stress, anxiety, and depression in humans. This improved emotional well-being can have a positive ripple effect, leading to healthier individuals and happier communities. In many ways, the role a dog plays in life helps the owner to live a healthier lifestyle and have a sense of community, as the presence of a dog is often a conversation starter. Responsible dog ownership can also raise awareness about environmental stewardship, cleanliness, and waste management, contributing to a cleaner and healthier environment.

Interacting with dogs teaches humans valuable qualities such as empathy, compassion, patience, and responsibility. Caring for a dog involves meeting its physical and emotional needs, which can help foster empathy and a sense of responsibility towards other living beings. These qualities can extend beyond the dog-human relationship, leading to more compassionate and caring societies.

Recognizing and identifying stress in dogs is beneficial for their overall well-being. Comprehension of the stress responses of dogs can improve the veterinary staff's safety and make it easier to handle the dog during the exam. Perception of stress-associated actions can lead to implementing mitigation techniques that help the canine feel more

comfortable in veterinary settings. In addition, if stress signals are recognized and managed accordingly, then the advancement of animal care procedures can occur in veterinary clinics to achieve more accurate information regarding canine health.

In a more personal context, discerning when a dog is stressed can help people be more understanding when their dog acts differently in a new environment or around new people. Also, knowing these signs can help owners avoid triggers or find ways to relax their dogs if the anxiety-inducing environment is unavoidable.

In conclusion, I identified and analyzed physiological and behavioral indicators of acute stress in canines where the owner is present or absent. I first addressed how a dog communicates, then I touched on why humans interpret what dogs are articulating, and we ended by talking about how interspecies interaction can improve our environment.

Whether or not you have a dog, everyone has or most likely will interact with one at some point. As I mentioned, the relationship between humans and dogs can improve the world by enhancing emotional well-being, encouraging physical health, aiding in therapy and assistance roles, building communities, promoting environmental awareness, and fostering empathy and compassion. If we take the time to understand their language and choose to listen actively, dogs have a unique ability to bring out the best in us, making the world a better place for humans and animals.

Additional Sources:

https://jokojokes.com/bark-jokes.html

“On Interpretive Conflict” by John Frow