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Differences in small-breed dogs' body language and vocalizations in a negative context

José Alfredo Zepeda[1,2]
0000-0001-6436-1831
Humberto Pérez-Espinosa[3]
0000-0002-2331-1800
Verónica Reyes-Meza[1*]
0000-0002-2745-4032
Mariel Urbina-Escalante[4]
0009-0007-1692-9569
Benjamín Gutiérrez-Serafin[5]
0000-0002-8841-1212
María de Lourdes Arteaga-Castañeda[1]
0000-0002-9678-9442

[1] Universidad Autónoma de Tlaxcala. Centro Tlaxcala de Biología de la Conducta, Tlaxcala, México

[2] Benemérita Universidad Autónoma de Puebla, Puebla, México

[3] Instituto Nacional de Astrofísica, Óptica y Electrónica (INAOE). Coordinación de Ciencias Computacionales. Puebla, México

[4] Universidad Autónoma de Tlaxcala. Doctorado en Ciencias Biológicas. Tlaxcala, México.

[5] Centro de Investigación Científica y de Educación Superior de Ensenada, Unidad de Transferencia Tecnológica Tepic (UT3), México

***Corresponding author**
Email address:
veronica.reyesm@uatx.mx

Abstract

A dog's emotional state is communicated primarily through body language, readily observable by humans and other animals. Additionally, dogs express visual and auditory signals differently according to the situation they are experiencing. However, there is a need for more research on smaller breeds since they tend to display more behavioral issues than larger breeds. The objective of the present study was to identify the behavioral characteristics of 25 dogs of three different small breeds (Chihuahua, Toy Poodle, and Miniature Schnauzer) in a negative context. We used a web-based tool called the Dog Actions Video Annotation Interface (DAVAI) to evaluate the movements of the tail, legs, snout, and vocalizations when the dogs were exposed to unfamiliar people. Our results showed no significant differences in dog behavior associated with breed. However, we identified variations in dog vocalizations explained by the sex, with male dogs whining more frequently than females. We highlight the importance of understanding dog body language and vocalizations, regardless of their breed. Our study is particularly relevant in negative contexts, where dogs may exhibit distress signals that require prompt intervention to alleviate their suffering.

Keywords: Behavior; Chihuahua; Poodle; Schnauzer; Visual communication; Unfamiliar person.

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Additional information and declarations can be found on page 13

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Study contribution

Dogs are the most common companion animals; they have intensive communication with their owners. However, small breeds tend to exhibit a very active behavior that needs to be accurately interpreted by owners every time. In this work, we evaluated specific behaviors and vocalizations in three different small breeds in a negative context. The results demonstrated no significant differences associated with breed but sex differences in vocalizations.

Introduction

Since the human-dog relationship exists, both species have learned to recognize body signals and behaviors to understand their social interaction better. Dog owners can perceive, interpret, and relate the behavior to psychophysiological stress conditions.(1) Many studies have shown that dogs respond to human actions as a part of domestication.(2–5) Dogs transmit messages that can inform us about their emotional state because their facial expressions are instinctive reactions that express their feelings to others.(6, 7)

In addition, dogs can provide valuable information about their behavior and emotions. For example, visual and auditory signals coming from body language and vocalizations are confident markers of the emotional and motivational state of the dog (body language,(8, 9) vocalizations(10, 11)) and let us know if the dog is expressing emotions with negative or positive valence.

This communication between dogs and humans depends on several acoustic and visual stimuli signals.(12, 13) For example, a posture of erection is related to domination. Other visual signals, such as the position of ears and lips, can also be associated with the aggressive, submissive, or attentive state.(14–16) Tail movement and general body posture are expressive social signals, from neutral to alert and attentive positions, and from aggression, fear, and play-solicitation states.(14, 17) Auditory signals, such as barks, are used to delimit territory, and in many other contexts, whine is a sound attributed to care soliciting.(16, 18, 19)

Differences in body language between dogs depend in part on their breed. This divergence is because the morphology of dogs, shaped by artificial selection, has led to the disappearance of specific components of their body language.(14) For example, breeds with brachycephalic characteristics, permanently erect ears, and short tails lose the behavioral repertoire associated with those anatomical structures.(14) Additionally, their amount of fur can impede seeing the individual's behavioral repertoire because it covers their face or piloerection.(20) In general, a dog's body size can predict variations in its behavioral traits, such as aggression, anxiety, and trainability.(21, 22) For example, small breeds tend to exhibit behavioral issues more frequently,(23) whereas larger breeds display a greater inclination towards training.(22, 24)

Another source of variation in behavior and body language between dogs is the sex and age of the individual. A review reported that, in general, male dogs tend to be more aggressive and bolder but show more social contact with humans than female dogs during human-dog play. In contrast, females are more sociable in cooperative tasks with humans.(25) About vocalizations when the dog is alone at

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home, studies found that males in multi-dog households show higher vocal activity than females.[26] Regarding age, dogs show behavioral differences during their life span; researchers affirm that young dogs are less prone to be aggressive than mature adult dogs, whereas these last tend to be dominant and protective and do more vocalizations like barks, growls, and whining.[27–29]

We can assume that a dog's body language, including visual and auditory cues, may vary depending on the breed and sex of the individual. Small breeds like the Chihuahua and Toy Poodle, are often kept as companions. Together with the Miniature Schnauzer, they have become favorite dogs in recent years because of their size and personalities. The American Kennel Club (AKC) describe these dogs such as charming, graceful, and intelligent. They are self-confident and friendly towards their owners but distrustful of strangers, also they have a strong character and are very useful as watchdogs.[30] However, these breeds commonly exhibit behavioral problems such as excessive barking at household noises or unfamiliar visitors, as well as heightened aggression towards their owner and other dogs, fearfulness, attachment, and attention seeking, and high excitability when compared with other breeds.[27, 31–33]

However, despite being among the top 30 most popular breeds as recognized by AKC, there are limited studies on small dog breeds like Chihuahua, Toy Poodle, and Miniature Schnauzer when it comes to their behavior when encountering a stranger. This is particularly noteworthy as such context could trigger aggressive[34] or fearful[35] reactions. Nevertheless, important indicators of such reactions such as leg posture, snout behavior, whining, and howling are frequently neglected.[36] In this study we hypothesized that there would be significant differences in the body language (visual and auditory signals) of three small breeds of dogs in the presence of a stranger that could indicate discomfort, and these differences would be associated with the sex or age of the dogs.

Materials and methods

Ethical statement

This study involving the observational analysis of canine behavior was conducted in accordance with ethical standards and guidelines for animal research. No invasive procedures or interventions were performed on the animals during the study. The research protocol was reviewed and approved by the Institutional Committee for the Use and Care of Animals of the Tlaxcala Center for Behavioral Biology, included with the official letter dated July 18th, 2020, ensuring compliance with ethical principles regarding the treatment and welfare of animals.

All observations were made from a distance without disturbing the natural behavior of the dogs. Prior to the commencement of the study, informed consent was obtained from the owners of the dogs involved, ensuring their voluntary participation and understanding of the study objectives. The welfare and comfort of the animals were paramount throughout the duration of the study, and every effort was made to minimize any potential stress or discomfort. Any unexpected adverse effects observed during the study were promptly addressed, and appropriate measures were taken to mitigate them.

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We affirm that this study was conducted with the utmost respect for the welfare of the animals involved, adhering to ethical standards and regulations governing research involving animal subjects.

Participants

We tested 25 small-size family dogs (13 females and 12 males). We included three small breeds: 11 Chihuahuas (six females and five males), seven Toy Poodles (three females and four males), and seven Miniature Schnauzers (four females and three males). Ninety-two percent (n = 23) lived in houses and 8 % (n = 2) in apartments, every dog lived with a family of two or more human members, and owners reported that dogs used to receive visitors. We asked owners about the health condition of the dogs and that all were neutered. We excluded those presenting illness or drug treatments that may prevent the normal development of dog behavior, and we asked whether their dogs exhibit an adverse reaction to the presence of a stranger. On average, the dogs were 4.51 years old (range: 10 months to 9.5 years old), and we divided them into young adults (< 2 years, n = 6), mature adults (2-6 years, n = 12), and seniors (7-11 years, n = 7).

Test procedure and behavioral measures

We tested the reaction to the presence of a stranger knocking on the door. Trials had a duration of 120 seconds and were video recorded (Sony HDR- CX130 ®) by two veterinarian students. One was recording the behavior inside the dog's house, always with the owner present, and the second was outside, knocking on the door, playing the role of a stranger. In an informal habituation period before the test started, the veterinary students who recorded the test stayed with the dog's owner and his dog, describing the trial. After that, even though there was a doorbell, the stranger only knocked on the door repeatedly for every trial, which elicited a response from the dogs.

Video Annotation Interface

Although static images can help interpret body language, analyzing video footage provides a more comprehensive understanding of the context in which interactions between dogs and their owners take place. However, annotating video data is a highly time-consuming task, even for a small number of videos. We designed a web-based tool called DAVAI (Dog Actions Video Annotation Interface) to annotate temporal changes in behavior that could be associated with specific quotidian contexts with negative valence. DAVAI allows us to annotate the temporal localization of dog actions for each behavior that, for this purpose, we called labels (legs, snout, tail, vocalization, description in Table 1). We implemented this tool using the Pybossa® framework (https://pybossa.com/) (Figure 1).

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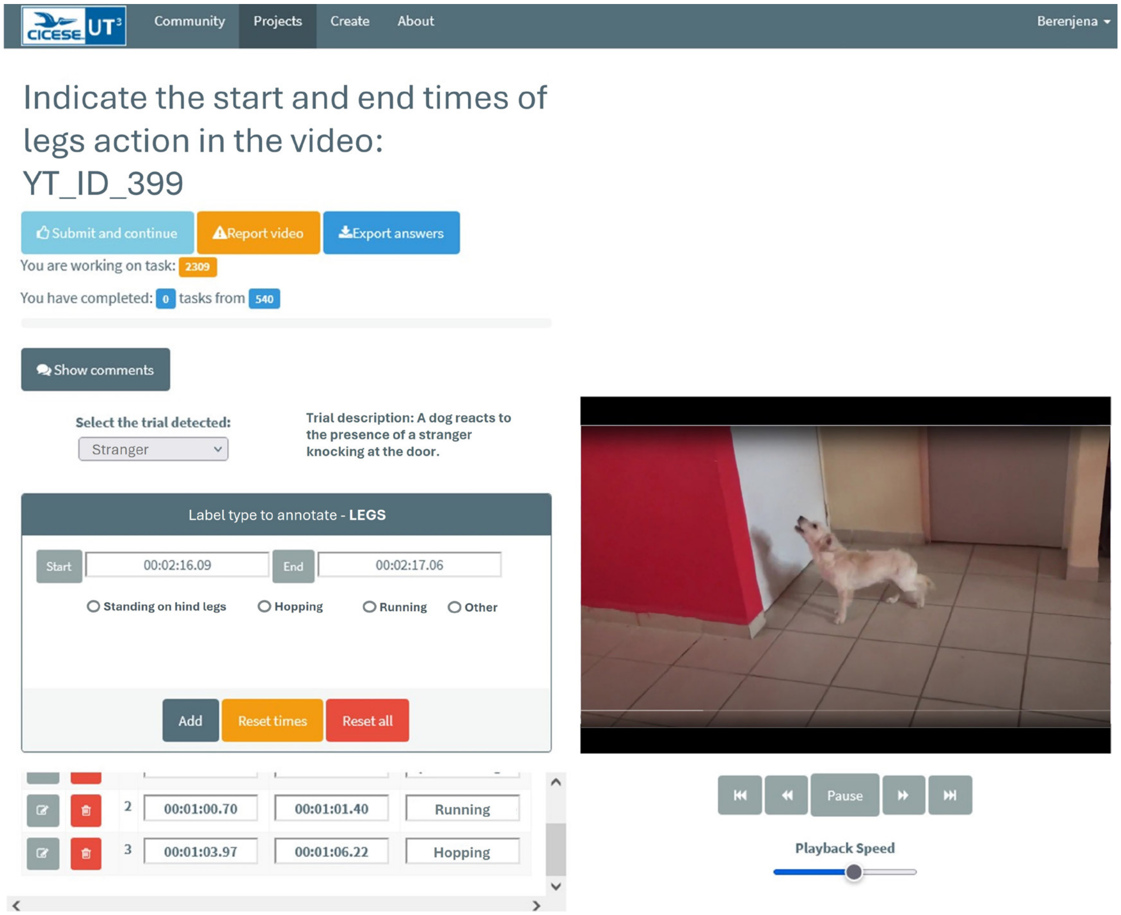

Figure 1. Shows the screen of DAVAI with a dog during a separation anxiety test while labeling Legs position; in the screen, it is possible to see the buttons established for selecting the test, the kind of label (behavior), the speed for playing the video, time of starting and ending of a behavior.

Table 1. Label description for the body language and vocalizations used in the DAVAI

Label	Description
Legs-standing on hind legs	The dog lifts its front legs from the ground, possibly leaning against a person, object, or wall, with its body in a vertical position supported mainly by the hind legs.
Legs-running	The dog is moving quickly from one place to another.
Legs-hopping	Both hind and front legs momentarily leave the ground, causing the dog’s body to rise.
Snout-open and tongue	The dog’s muzzle is open, and the tongue is hanging out, visible from various angles.
Snout-open and showing all teeth	The dog’s muzzle is open, displaying both front and back teeth.
Tail-almost vertical	The tail is raised almost vertically.
Tail-wagging	The dog vigorously wags its tail from side to side.
Vocalizations-bark	Directs the head forward, keeps it still and opens the mouth emitting the characteristic sound of barking.
Vocalizations-whine	The mouth generally remains closed, the dog emits the characteristic, prolonged, and high-pitched sound of whining
Vocalizations-growl	Raises the head emitting the characteristic guttural sound of the growl, showing, or not showing teeth.

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Annotation task and labels

In order to accurately analyze the body language and vocalizations of the dogs, we required precise identification of the start and end times of their actions. To streamline this process, we divided the task into manageable parts and instructed our annotators to focus on one aspect of the dog's body language and vocalizations at a time. This involved reviewing each video multiple times and selecting a different set of actions for annotation during each pass based on the specific label type assigned to each action. Participants were asked to annotate as many actions as they could detect, and these were added to an event list. Once they finished annotating a video, they could submit their answers.

We constructed the labels with the operational definitions for the dog's body language, including the snout, tail, legs, and three dogs' vocalizations (Table 1). To determine the frequency of behavior in the trial, we added up the events for each label in the event list. Additionally, we calculated the duration of the trial by measuring the total time the dogs spent performing all the actions.

A group of five individuals trained in dog behavior were involved in the annotation process under the guidance of an expert. To measure the level of agreement in the quantitative data recorded, we used the intraclass correlation coefficient (ICC). We assessed the reliability of the data by recoding 48 annotation tasks from three separate dog recordings with the help of the R package irr.[37] The results indicated a strong level of agreement among the five observers, with a RICC value of 0.9 and a 95% confidence interval of 0.859–0.937.

Data treatment and statistical analyzes

We analyzed the statistical data using R version 4.1.3[38] and checked for normality distribution through visual inspection and the Shapiro-Wilks test on the raw data. We used nonparametric tests because our response variables did not follow a normal distribution. To test if the frequency and duration of body language and vocalizations depend on the dog's breed, age, and sex, we use the Kruskal Wallis and Mann-Whitney U tests; alpha was set equal to 0.05 as a significance criterion.

Results

The web-based tool to annotate the video recordings helped obtain specific data with high precision, enabling us to automatically get each body language and vocalization occurrence in each trial (See Table 2 and Table 3).

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Table 2. Duration and frequency of the body language and vocalization measured among breeds

Body position and sounds		Breed	n	Mean duration (s)	SE	Median of the frequency	Min	Max
Panel A: Legs	Hopping	Chihuahua	11	0.32	0.32	0	0	2
		Toy Poodle	7	0.00	0.00	0	0	0
		Miniature Schnauzer	7	0.58	0.40	0	0	2
	Running	Chihuahua	11	2.10	1.26	0	0	7
		Toy Poodle	7	0.38	0.26	0	0	1
		Miniature Schnauzer	7	0.78	0.38	0	0	2
	Standing on hind legs	Chihuahua	11	0.11	0.11	0	0	1
		Toy Poodle	7	0.92	0.77	0	0	1
		Schnauzer	7	2.86	2.86	0	0	4
Panel B: Snout	Snout opening with visible tongue	Chihuahua	11	0.13	0.13	0	0	1
		Toy Poodle	7	0.12	0.12	0	0	1
		Miniature Schnauzer	7	0.00	0.00	0	0	0
	Opening with teeth visible and aggressive posture	Chihuahua	11	1.67	1.13	0	0	10
		Toy Poodle	7	0.09	0.09	0	0	1
		Miniature Schnauzer	7	0.00	0.00	0	0	0
Panel C: Tail	Almost vertical	Chihuahua	11	5.62	3.18	0	0	4
		Toy Poodle	7	2.20	1.74	0	0	3
		Schnauzer	7	2.56	1.68	0	0	4
	Wagging	Chihuahua	11	16.42	7.54	1	0	6
		Toy Poodle	7	16.09	8.26	2	0	8
		Miniature Schnauzer	7	13.85	12.82	0	0	7
Panel D: Vocalization	Bark	Chihuahua	11	22.84	8.86	4	0	13
		Toy Poodle	7	38.70	14.51	6	0	7
		Miniature Schnauzer	7	24.33	6.53	11	2	27
	Growl	Chihuahua	11	0.48	0.32	0	0	4
		Toy Poodle	7	3.84	2.60	0	0	5
		Miniature Schnauzer	7	8.61	5.89	1	0	9
	Whine	Chihuahua	11	0.99	0.78	0	0	2
		Toy Poodle	7	2.66	2.66	0	0	7
		Miniature Schnauzer	7	0.09	0.09	0	0	1

Table shows the mean and standard error (SE) of duration expressed in seconds (s) and the median of the frequency the minimum and maximum values.

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Table 3. Duration and frequency of the body language and vocalization measured between sex and all breeds combined

Body position and sounds		Sex	n	Mean duration (s)	SE	Median of the frequency	Min	Max
Panel A: Legs	Hopping	F	13	0	0	0	0	0
		M	12	0.63	0.35	0	0	2
	Running	F	13	1.81	1.02	0	0	7
		M	12	0.635	0.44	0	0	2
	Standing on hind legs	F	13	2.05	1.55	0	0	4
		M	12	0.08	0.08	0	0	1
Panel B: Snout	Snout opening with visible tongue	F	13	0	0	0	0	0
		M	12	0.18	0.13	0	0	1
	Opening with teeth visible and aggressive posture	F	13	0	0	0	0	0
		M	12	1.58	1.03	0	0	10
Panel C: Tail	Almost vertical	F	13	3.95	2.38	0	0	4
		M	12	3.64	2.00	0	0	4
	Wagging	F	13	12.07	6.88	1	0	7
		M	12	19.44	7.93	2.5	0	8
Panel D: Vocalization	Bark	F	13	20.76	4.84	3	0	27
		M	12	35.23	10.83	7	0	13
	Growl	F	13	2.31	1.14	0	0	5
		M	12	5.20	3.67	0	0	9
	Whine	F	13	0	0	0	0	0
		M	12	2.51	1.62	0	0	7

Table shows the mean and standard error (SE) of duration expressed in seconds (s) and the median of the frequency the minimum and maximum values for females (f) and males (m) dogs.

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Table 4. Comparison among breeds and between sex for the legs posture

Position of legs	Frequency	df	P-value	Duration	df	P-value
Panel A: hopping	$X^2 = 2.6$	2	0.4356	$X^2 = 2.46$	2	0.4362
Panel B: running	$X^2 = 0.35$	2	0.8357	$X^2 = 0.4367$	2	0.8094
Panel C: standing on hind legs	$X^2 = 1.06$	2	0.7245	$X^2 = 1.06$	2	0.7164
Panel D: hopping	$Z = -1.87$	1	0.0943	$Z = -1.87$	1	0.0968
Panel E: running	$Z = 0.88$	1	0.4006	$Z = 0.91$	1	0.3724
Panel F: standing on hind legs	$Z = 1.04$	1	0.5302	$Z = 1.10$	1	0.3327

The table shows the chi-square statistic and Z statistic, degrees of freedom (df), and associated P-value for each comparison.

Differences in body language among breeds

Legs posture

Our Kruskal-Wallis test found no significant differences among dog breeds' frequency or duration of hopping, running, or standing on hind legs. (Table 4; Panels A, B, and C). Young adults, mature adults, and senior dogs did not differ statistically in the frequency and duration of hopping (Kruskal-Wallis test; frequency: $X^2 = 0.23$, $df = 2$, $P = 0.8901$; duration: $X^2 = 0.19$, $df = 2$, $P = 0.9098$), running (Kruskal-Wallis test; frequency: $X^2 = 0.52$, $df = 2$, $P = 0.7681$; duration: $X^2 = 0.29$, $df = 2$, $P = 0.8649$) or in standing on hind legs (Kruskal-Wallis test; frequency: $X^2 = 5.37$, $df = 2$, $P = 0.0680$; duration: $X^2 = 5.35$, $df = 2$, $P = 0.0686$). In addition, there were no significant differences in these behaviors between male and female dogs (Table 4; Panels D, E, and F).

Snout posture

Our analysis did not find statistically significant differences in the frequency or duration of visible tongue snout opening during sniffing or when exhibiting aggressive posture among the three breeds of dogs (Table 5, panel A and B). The snout position was not statistically different among the three age categories (Opening and with visible tongue: frequency: $X^2 = 0.86$, $df = 2$, $P = 0.6994$; duration: $X^2 = 0.80$, $df = 2$, $P = 0.6688$; Opening with teeth visible and aggressive posture: : frequency: $X^2 = 0.38$, $df = 2$, $P = 0.8236$; duration: $X^2 = 0.34$, $df = 2$, $P = 0.8396$); furthermore, we did not observe significant differences between male and female dogs in these behaviors (Table 5, panel C and D).

Table 5. Comparison among breeds and between sex for snout position

Snout position	Frequency	df	P-value	Duration	df	P-value
Panel A: opening with visible tongue	$X^2 = 0.96$	2	1	$X^2 = 0.91$	2	1
Panel B: opening with teeth visible and aggressive posture	$X^2 = 1.35$	2	0.6503	$X^2 = 1.39$	2	0.5544
Panel C: opening with visible tongue	$Z = -1.50$	1	0.2295	$Z = -1.50$	1	0.2150
Panel D: opening with teeth visible and aggressive posture	$Z = -1.87$	1	0.0961	$Z = -1.87$	1	0.0907

The table shows the chi-square and Z statistic, degrees of freedom (df), and associated P-value for each comparison.

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Tail posture

According to our findings, Chihuahua, Toy Poodle, and Miniature Schnauzer dogs have similar tail wagging frequency (X^2=1.70, df=2, P=0.4265) or durations (X^2=2.13, df=2, P=0.3513). We obtain the same result for the tail when it is almost vertical (frequency: X^2=0.01, df=2, P=0.9934; duration: X^2=0.07, df=2, P=0.9199). Neither wagging (frequency: X^2=2.65, df=2, P=0.2658; duration: X^2=0.75, df=2, P=0.6855) nor tail almost vertical postures were different between age groups (frequency: X^2 = 0.24, df = 2, P = 0.8832; duration: X^2 = 0.29, df = 2, P = 0.8622). Additionally, we did not find any significant differences between the sexes when dogs wagging their tails (frequency: Z= -1.08, P=0.2880; duration: Z= -0.68, P=0.5213) or when the tail is almost vertical (frequency: Z=0.06, P=0.9982; duration: Z = 0.10, P=0.9746).

Vocalizations

According to our data, the frequency of barks, growls, and whines did not differ significantly between these three breeds (bark: X^2 = 3.37, df = 2, P = 0.1854; growl: X^2 = 3.04, df = 2, P = 0.2185; whine: X^2 = 0.09, df = 2, P = 0.9534) nor in duration (bark: X^2 = 2, df = 2, P = 0.3769; growl: X^2 = 3.32, df = 2, P = 0.1973; whine: X^2 = 0.09, df = 2, P = 0.8919). There was no significant difference in the frequency of barks and growls between male and female dogs (bark: Z = -1.45, P = 0.1525; growl: Z = 0.49, P = 0.6495) or in duration (bark: Z = -0.76, P = 0.4689; growl: Z = 0.39, P = 0.7193).

Young adults, mature adults, and senior dogs did not differ statistically in the frequency (bark: X^2=0.24, df=2, P=0.8619; growl: X^2=1.85, df=2, P=0.3956; whine: X^2=1.87, df=2, P=0.3916) and duration of any vocalization (bark: X^2=0.69, df=2, P=0.9547; growl: X^2=2.36, df=2, P=0.3071; whine: X^2=1.87, df=2, P=0.3919). However, the whines showed a statistically significant difference between male and female dogs, with males showing a higher frequency (Z= -2.21, P=0.0267, see descriptive statistics in Table 3, panel D) and longer duration (Z= -2.21, P=0.0371) of the whines compared to females (Figure 2).

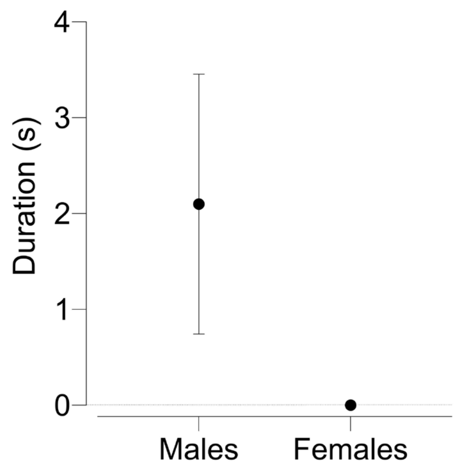

Figure 2. Comparison between males and females for the duration (s) of whine sounds emitted for the three breeds. Mean with SEM are plotted, see text for test statistics.

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Discussion

Based on the present results, small dogs' body language and vocalization show no differences among Chihuahua, Toy Poodle, and Miniature Schnauzer. Contrary to our hypothesis, the visual and auditive signals did not vary between age groups. However, we find an effect of sex over the vocalization, specifically the whining, but not in the barks or growls.

Our results support previous finding. Breeds like Chihuahua, Toy Poodle, and Miniature Schnauzer exhibit similar behavioral responses in stressful situations, such as intensive barking. Various studies have been conducted on behavioral problems in dogs of different sizes, and they have found that small dogs with similar genetic markers and brain sizes tend to exhibit more behavioral disorders.(22, 24) Previous research has classified these breeds as belonging to similar categories and possessing similar behavioral repertoires. For instance, Chihuahua and Poodle have been identified as non-working dogs that exhibit higher levels of direct social fear, as assessed by the C-BARK.(35)

We expected to find differences in vocalization because it has been reported that at least chihuahua dogs tend to vocalize more than other breeds.(39) However, we did not find differences between breeds in the frequency and duration of barking, growling, and whining emitted. The similarity in behavioral responses aligns with studies done by Duffy(32) and Serpell(31) that compare various dog breeds' reactions to strangers or household noises and show that Chihuahua, Toy Poodle, and Miniature Schnauzer tend to have high scores on all aggression factors evaluated (included barking). They argued that it is partly motivated by the fear (vulnerability) emphasized by their small size.

The dog's behavior is influenced by age, as in previous studies.(27–29) However, our sample needed to be more significant and representative to look for differences because all were adults, and it is reported that young and geriatric dogs vocalize less and have different behavioral problems. However, our findings support the work of Yamada(27) done in Japan because, as they sample, our Toy Poodle and Chihuahua bark at noises inside the house and unfamiliar visitors. Moreover, Yamada reports that dogs living in apartments bark less than dogs living in houses. Nevertheless, we could not examine it because of our unbalanced sample.

However, there was a statistically significant difference in the frequency and duration of whining; males displayed a higher duration of whine compared to females; this result corresponds with the work of Stephan et al,(26) where male dogs showed more vocal activity than female dogs when they were alone at home. Furthermore, a study shows that male dogs are more likely to display behavioral issues than female dogs, additionally, aggression towards humans is more common in smaller dogs.(23)

Concerning the position of the tail, previous findings showed that tail wagging correlates with emotion and personality.(40) Despite our efforts, we did not find significant differences in tail position between dog breeds in our study. This may be due to the fact that wagging is an instinctive and prevalent behavior in this species and can be displayed as both a positive signal of excitement and a negative signal of anxiousness and nervousness, as reported by Handelman & Sloan,(41) as cited in Siniscalchi et al.(42) Previous studies have found that tail wagging is associated with an emotional valence of the stimulus experienced by the dog, with right-biased

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tail wagging occurring in positive and neutral contexts and left-biased wagging in situations that could represent negative contexts.[42, 43]

Our work is limited to motor behavior (including vocalizations); however, it is necessary to analyze other kinds of responses associated with negative context, for example, measures such as physiological changes of dogs during tests. Thermography has shown its efficiency as a cheap and noninvasive method for registering emotional changes in several animal species.[44–46] Another measure that could be registered is heart rate variability (HRV), which has been used as a valuable indicator of emotional state in domestic animals.[47–49]

In future works, it is highly recommended to integrate the physiological measures cited above with other auditory features of the vocalizations; for example, the frequency of the bark, the bark interval, and the average peak frequency.[34, 50–52] Other factors that could help us to find differences in behavior and vocalizations are the early experience. For example, Appleby[53] found that dogs without the maternal domestic environment in early life and the lack of urban environment experience during the first six months tend to show more behavioral problems like aggression towards unfamiliar people and avoidance behavior.

Our study confirms no differences among our three evaluated breeds and contributes to identifying visual and auditory signals emitted by the dog in a situation associated with negative emotions. This study suggests that small dog breeds' body language and vocalizations, including Chihuahua, Toy Poodle, and Miniature Schnauzer, can offer crucial insights into their emotional state and well-being, particularly in adverse context. Furthermore, the study found that breed-specific differences in behavior may not be significant in small breeds, but there are differences associated with the sex in whining. This research highlights the importance of understanding dogs' body language and vocalizations, regardless of their breed, to assess their emotional well-being better and improve their quality of life. Tools like DAVAI can also provide an objective, standardized method for evaluating dog behavior.

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Data availability

The original datasets used in this research and if applicable, supporting information files, are deposited and available for download at the SciELO Dataverse repository.

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Conflicts of interest

The authors have no conflict of interest to declare in regard to this publication.

Author contributions

Conceptualization: H Pérez Espinosa and V Reyes Meza.
Data curation: M Urbina and JA Zepeda
Formal analysis: JA Zepeda and B Gutierrez Serafín.
Funding acquisition: H Pérez Espinosa and V Reyes Meza
Methodology: ML Arteaga Castaneda, V Reyes Meza and M Urbina.
Project administration: H Pérez Espinosa and V Reyes Meza
Software development: B Gutierrez Serafín
Supervision: ML Arteaga Castaneda and V Reyes Meza
Validation: H Pérez Espinosa
Writing–original draft: V Reyes Meza and JA Zepeda
Writing–review and editing: V Reyes Meza and JA Zepeda

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