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Dog's Whining Effect on the Attention of Its Owner

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Abstract

This study aimed to discover whether it is possible to transfer attachment vocalizations theory to the human-dog relationship. This study looked at whether people who identified as pet parents showed higher distractions when performing an attention-related task than non-pet parents people with dogs. Also used were the sounds of a baby crying, a neutral dog voice (sniffing), another potentially distracting sound, and silence. 23 people with dogs were examined. A modified version of the Bourdon-Wiersma test and the Lexington Attachment to Pet Scale were used. The study found no significant statistical difference between the stimuli used and between the silence and the rest of the stimuli. Despite the lack of expected effects in the study, it is an important introduction to the subject of pet parenting. It also shows that the chosen way of measuring distraction with emotional stimuli may need to be more accurate. I also show possible future research directions.

Keywords: attachment vocalizations, dog's whining, infant's crying, pet parenting, attention, attachment theory

1. Introduction

1.1. Attachment theory and attachment vocalizations

The attachment theory was proposed by the psychoanalyst John Bowlby and assumes the formation of a particularly close bond between the child and the caregiver, very often the mother (Bowlby, 1969). The attachment vocalization theory refers to the attachment theory and assumes the existence of specific noises made by people (especially children), which significantly draw the at-

tention of the recipient, who is most often a caregiver or partner. Several attachment sounds stand out: crying, whining, and motherese (Chang and Thompson, 2010). Attachment sounds are thought to be more distracting (or cause stronger attention to the source of the sound) than other potentially unpleasant sounds or unemotional human speech (Morsbach et al., 1986; Fernald, 1992; Purhonen et al., 2001; Hechler et al., 2015; Li et al., 2018; Ng et al., 2021). Attachment sounds involve more attention resources from both parents and young and childless people (Chang and Thompson, 2011; Young et al., 2015; Hechler et al., 2015; Dudek et al., 2016). As early as 1986, attempts were made to show that newborn crying negatively affects maternal attention (Morsbach et al., 1986). Most studies on emotional responses to infant sounds until the early 21st century were based on the study of women, as they are considered more empathetic (Ng et al., 2021). As fathers are increasingly involved in raising offspring in developed countries, attempts have been made to find out whether men respond to attachment sounds similarly to women. FMRI studies have shown that both a father's and a mother's brain, while listening to the newborn crying, activate the same areas responsible for empathy, and a pattern of neuronal response is similar in both genders (Li et al., 2018). Studies using magnetoencephalography (MEG) have shown differences in the rate of neuronal responses at the level of 100-200 milliseconds after the presentation of the stimulus, while listening to infants cry, compared to control sounds (Young et al., 2015). These differences also occurred in childless people. This suggests that people, regardless of gender and having offspring, have a general predisposition to respond to the crying of babies. In behavioral studies, young and childless adults show more negative emotions when listening to a baby cry and also make more mistakes in a task related to working memory compared to the results when listening to other distracting sounds (Hechler et al., 2015).

1.2. Canine domestication

Pets, such as dogs and cats, also have specific communication with humans. One of the frequent dog noises is howling/whining. Whining is an indicator of stress arousal, but it can also mean a greeting and a desire to get the owner's attention (Handelman, 2008). It is also a vocalization of anxiety that is viewed negatively by people who own dogs as a baby's cry (Parsons et al., 2019). To better understand this phenomenon, it is necessary to take a closer look at the relationship between man and dog.

The process of dog domestication, as well as the formation of a close relationship between man and dog, began about 18-30 thousand years ago. Most likely, it was then that hunter-gatherers of the time began to interact with canids (Thalmann et al., 2013). The process of domestication of wolves thus began in the Pleistocene. As a result of impressive evolution, from the (now extinct) wolf of the late Pleistocene, a dog (*Canis familiaris*) evolved, which in appearance

and behavior differs from its ancestor, as well as modern wolves (*Canis lupus*). Due to this very close and interspecies contact, lasting for thousands of years, dogs have also evolved to some extent the ability to communicate with humans, which distinguishes them from other domesticated animals, or even chimpanzees that are evolutionarily closer to humans (Kaminski and Nitzschner, 2013). Pets, such as dogs and cats, now possess some of the physical and behavioral traits attributed to infants. The occurrence of infantile traits in adult dogs is most likely a side effect of their domestication (Belyaev, 1979; Frank and Frank, 1982) and selective reproduction of individuals reduced their aggressiveness towards humans (Belyaev, 1979). Domestication led to a reduction in the weight and size of canine bodies and the emergence of submissive and human-friendly behavior (Belyaev, 1979; Frank and Frank, 1982).

1.3. Human-canine interactions

Due to domestication, during interspecific interactions, the signals given by dogs may take on a different meaning than during intraspecific interactions (dog-dog), for example during eye contact. In intraspecific interaction, eye contact may be associated with a dog's dominance, whereas in interspecific interaction, dogs initiate eye contact for the same reasons as humans, for example by demanding attention (Topál et al., 2014) to satisfy some need, to play. It has also been observed that from an early age, dogs show spontaneous tendencies to stare at human faces and want to make eye contact with humans to get valuable information from them (such as the location of a toy or food) (Virányi et al., 2008). Eye contact in both humans and dogs increases oxytocin levels in the brain (Nagasawa et al., 2015). Oxytocin is responsible for the formation of social bonds and emotional reactions towards the other person, and may also reduce the stress response (Walter et al., 2021). The development of the habit of looking into the eyes of dogs is therefore beneficial in terms of maintaining a close bond with the caregiver. Importantly, wolves do not exhibit this habit (Nagasawa et al., 2015).

Other studies indicate that when people interact with dogs, they behave like that with a human infant (Mitchell, 2001). It was also found that dogs are more likely to pay attention when spoken to like speech directed at infants. This is the so-called pet-directed speech, which is similar to infant-directed speech, also described as "happy voices" (Jeannin et al., 2017). Speech is therefore the main way of human communication, including interspecies, and full language ability is something that distinguishes humans from other animals (Ghirlanda et al., 2017). In relationships with their dogs, women use speech more often than men, and their way of speaking is more like motherese (diminutive speech with a high tone), due to the greater predisposition among women to use language as a tool in relationships (Prato-Previde al., 2006). However, no gender

differences have been shown in the context of providing fun and physical comfort to their pets. The behavior of modern pet owners (especially those living in highly developed countries) resembling caring for human infants has been transferred to interaction with dogs. So this is the basis for the thesis that humans exhibit interspecific parental behavior.

1.4. Pet parenting

The bond between human and dog is therefore similar to attachment, as is the case, for example, in the relationship between an infant and a caregiver (especially a mother) (Siniscalchi et al., 2013; Topál et al., 1998). Currently, we can also see a significant increase in the phenomenon of pet parenting (Volsche, 2018), with a simultaneous decrease in the fertility rate around the world (OECD 2022). In the United States alone, spending on pets in 2017 was more than $69 billion (Volsche, 2018). People tend to anthropomorphize pets (Urquiza-Haas and Kotrschal, 2015), but despite this, dog owners focus primarily on species-specific needs. This means that the dog is a compromise (and not a substitute for parenthood) between having and not having children (Volsche, 2021). The needs of pets are also objectively simpler than those of children, making it easier to remain a "parent" to an animal than to a human child (Blouin, 2012). For some childless people, owning a dog is also a preparation before having human offspring (Owens and Grauerholz, 2018). In addition, childless people report greater attachment and higher emotional reactivity towards their pets than people with children (Volsche, 2021). Of course, not all pet caregivers define themselves as a parent, but there is a tendency. Women are twice as likely to describe themselves as a mother or parent to their pet, while men prefer to use the term "friend" (Ramirez 2006, Owens and Grauerholz, 2018).

There are additional reasons to assume that the attachment theory also applies to the relationship between humans and dogs. As with human children, dogs seek out a person (called "attachment figure") to help them cope with stress (Topál et al., 1998). With their owner, dogs also show freer exploration of new objects (Horn et al., 2013). In the absence of an attachment figure, dogs show stress reactions or separation anxiety (Topál et al., 1998). To be able to talk about attachment, the object of attachment should: 1. be a "secure base", 2. be a "safe haven", 3. result in the sense of pleasure and security ("proximity maintenance") and 4. induce separation anxiety in the absence (Kurdek, 2008). In the relationship between humans and dogs, it seems that the human is the object of attachment to the dog, and all 4 conditions are met to talk about attachment (Payne et al., 2015). People also show deep attachment to their dogs, especially when they feel fear of being rejected or not loved by other people

(which may suggest that a traumatic childhood and an abnormal pattern of attachment to humans causes attachment to be transferred to the pet) (Lass-Hennemann et al., 2022).

So far, no studies have been conducted to prove that the sounds of attachment and the resulting distraction occur in the human-dog relationship and whether this effect occurs more strongly in people who consider themselves to be pet parents. However, some premises form the basis for this study, because dogs can communicate with people through, for example, barking or whining, which has been explained earlier.

1.4. Objective of the study

The study aimed to find out whether in the current times, characterized by the tendency of people to anthropomorphize animals and the increase in the phenomenon of pet parenting in highly developed countries, with a simultaneous decrease in the birth rate in the world, it is possible to notice the transfer of attachment vocalizations theory to the human-dog relationship. This study looked at whether people who identified as pet parents showed higher distractions when performing an attention-related task, compared to non-pet parents people with dogs. Also used were the sounds of a baby crying, a neutral dog voice (sniffing), another potentially distracting sound, and silence.

Although this study did not answer the questions asked, it is an equally valuable introduction to the subject matter. We also show potential directions for pet parenting research and possible modifications of this experiment.

2. Participants

The study involved 23 dog owners: 18 women and 5 men. The mean age was 26.3 years (standard deviation = 8.7). 8 people declared that they are parents of their dogs and treat them as their children and 15 volunteers denied this. Of the subjects, 4 were mothers of human children and 19 participants remained childless.

3. Materials and methods

3.1. Initial and final questionnaire

At the beginning of the study, each participant had to complete an initial questionnaire. The survey included questions about gender, age, and the number of "human children" they have. The subject also stated whether he considered himself a parent of his dog and whether he treated him as a son, daughter, or

child. The volunteer then completed the Lexington Attachment to Pets Scale (LAPS) which was translated into the Polish language.

The Lexington Attachment to Pets Scale was constructed in 1992 to assess people's emotional attachment to their pets (Johnson et al., 1992). This scale is suitable for examining dog and cat owners. The questionnaire contains 23 statements to which the participant must respond by choosing one of four answers (*I totally disagree; I disagree a little; I agree a little; I totally agree*.) Participants can achieve from 0 to 69 points. A higher score indicates a greater attachment to your pet. The average value for 322 respondents (animal owners) was 47.99 points. The authors of the scale determined 4 levels of attachment of participants to their animals and determined the average level of points scored for each level of attachment (along with standard deviations).

At the end of the study, each participant was asked to answer 2 questions designed to compare the volunteer's subjective and objective distraction. The questions were: *Which of the sounds accompanying the study distracted or annoyed you the most? Select one sound from the list*; *Which of the sounds accompanying the study distracted or annoyed you the least? Select one sound from the list*.

3.2. Stimuli

Five sounds were used as stimuli, and each of them lasted 1 minute and 10 seconds:

1. Whining of a 1.5-month-old puppy.
2. Neutral dog sound, in this case, the sound of sniffing is chosen.
3. Another distracting sound—the sound of a chainsaw working.
4. Crying of a baby.
5. Silence as a control stimulus and reference point.

To assess the adequacy of the sounds used, 5 listeners were asked to determine what sound they heard. Each person was able to easily recognize the stimuli after 10 seconds.

During the study, each participant had to listen to one of the sound sets from Table 1. The sets were randomly assigned to each participant to minimize the carryover effect (Brooks, 2012).

Sound set	Sound 1	Sound 2	Sound 3	Sound 4	Sound 5
No 1	Silence	Chainsaw working	Whining of a puppy	Crying of a baby	Sniffing of a dog
No 2	Whining of a puppy	Sniffing of a dog	Chainsaw working	Silence	Crying of a baby
No 3	Crying of a baby	Silence	Sniffing of a dog	Chainsaw working	Whining of a puppy
No 4	Sniffing of a dog	Crying of a baby	Silence	Whining of a puppy	Chainsaw working

Table 1. The order of exposure to a given stimulus depending on the sound set

3.3. Modificated Bourdon-Wiersma test

Each participant had to take a modified version of the Bourdon-Wiersma test, which is used as a measure of concentration and attention (Akinwuntan et al., 2005). The original test consists of 5 sheets, where on each sheet there are 10 rows of 25 figures containing three, four, and five dots. All figures containing four dots shall be crossed out. The time to make one sheet is 2 minutes (Boomsma and Bosch, 1978). This study used Arabic numerals instead of dot figures. The participants had to cross out all, for example, twos in the sheet presented to them. The sheet itself contained numbers from 0 to 9 written in 20 rows of 40 digits in each row. The numbers are listed in random order on each sheet. For each test repetition, the participant was asked to look for a different digit to minimize the practice effect (Duff et al., 2007).

A standardization test was conducted on 18 students aged 20 to 24. The average score of the selected digits is 39.90 (standard deviation 7.48). The average number of errors made is 4.56 (standard deviation 7.62). Within a minute, the smallest number of digits plotted was 24 and the largest was 53. In this group, only one person used the "fast and inaccurate" tactic – marking 43 digits and omitting 33 digits.

Statistical analysis of the attention test was performed using Repeated Measures ANOVA in Jamovi (The jamovi project, 2024). Since each participant had only 1 minute to solve one test sheet, and the pace of solving this type of test depended on the predispositions and cognitive capabilities of a given person, the "distraction" factor was taken into account. This coefficient was calculated by dividing the number of unmarked targets by the number of overall targets processed (correctly marked targets + unmarked targets).

3.4. The course of the experiment

Before starting the study, each volunteer completed a declaration of informed consent to participate in the study and was informed about the possibility of resigning from participation at each stage of the experiment. After completing the initial questionnaire, the participant was informed that they would have to perform a task during which they would hear various sounds. In total, they will perform the task 5 times, and each time they will hear a different sound or not hear it at all. To familiarize the participants with the task, they were presented with a small fragment of a specially prepared test (visible in Figure 1). The participant was also shown the rules of completing the test and made sure that they understood what the rest of the experiment would consist of. The participant was instructed to perform this task accurately and not pay attention to sounds. The stimuli were presented through over-ear headphones, and the participant was not informed in advance what sounds they would hear. After 10 seconds of sound playback, the participant was handed a piece of paper, showing the task to be performed. These 10 seconds allow the person to familiarize themselves with the sound, prevent involuntary distraction, and interpret a new stimulus. Before the next task, there was 30 seconds of silence. This is the time it takes for working memory memories to be lost (Atkinson and Shiffrin, 1968). The experimenter then had time to prepare another sheet with the test. The procedure was repeated a total of 5 times, once for each type of stimulus. Participants did not have access to a counter that would inform them about the remaining time. Only the experimenter had access to a screen that displayed the remaining playback time of a specific stimulus and the name of the stimulus. The whole experiment is presented in graphic form in Figure 2.

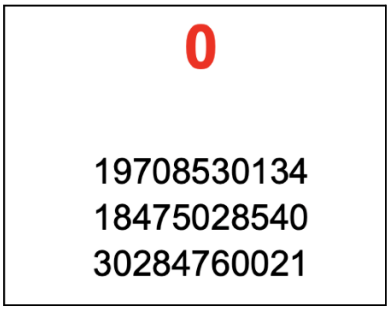

Fig 1. A mock test was prepared to show the participants how to complete the test.

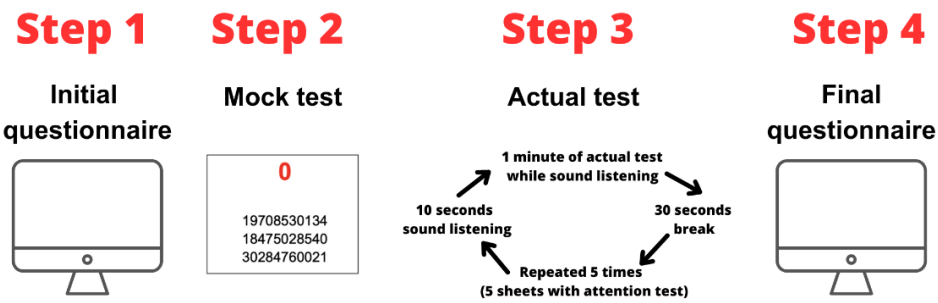

Fig 2. Graphical representation of the experiment.

4. Results

4.1. Lexington Attachment to Pets Scale

The mean score in this study group was 57.7 (standard deviation = 7.12). Analysis of the initial survey along with the LAPS scale showed that 21 people achieved the highest attachment score to their dog ("very attached" according to the LAPS scale). Two volunteers achieved a "somewhat attached" score, scoring 42 and 44 points out of a possible 69. The average attachment in the group can be described as very high. The study group achieved a higher average score than the group participating in the original LAPS standardization survey (47.99 points).

4.2. Attention test

The results of the attention test are drawn up in Table 2. For each of the conditions (stimulus), the number of correctly marked targets in the sheet ("correct answers") was assigned, as well as the number of omitted targets ("errors"). The results were assigned to digits from 1 to 23 so that the participants remained anonymous. The numbers marked in red (3,9,10,11,12,15,17,20) represent participants who identified as pet parents. Importantly, none of the volunteers accidentally marked a different number than they should when solving the sheets.

From the above-mentioned data, the "distraction" factor was calculated. The results are shown in Table 3. The results were calculated separately for each participant and collectively. Importantly, the number of people identifying as the parent of their dog was too small (8 people) to be able to analyze the results of these people tested separately. Since almost all (21) participants received a very high level of attachment towards their dog, it can be assumed that this group anthropomorphizes their dog enough to be able to place everyone in one group. Importantly, for the silence condition, the average number of selected

targets was 44.7 (standard deviation = 11.8), and the average number of errors was 5 (standard deviation = 8.0). These results are similar to those obtained when performing the standardization test.

Volunteer number	Whining of a puppy		Crying of a baby		Sniffing of a dog		Chainsaw working		Silence	
	Right answ.	Errors	Right answ.	Errors	Right answ.	Errors	Right answ.	Errors	Right answ.	Errors
1	30	1	23	0	27	0	35	0	28	0
2	42	2	36	1	41	0	38	0	49	0
3	58	9	45	7	41	8	45	9	33	0
4	45	38	44	4	71	4	57	17	50	28
5	52	0	50	2	39	7	45	0	33	3
6	41	5	43	6	48	4	57	3	45	4
7	70	7	57	9	48	9	48	19	67	7
8	60	0	48	0	73	3	65	1	41	3
9	58	1	55	5	44	3	43	4	44	1
10	46	0	34	0	42	2	53	0	47	4
11	40	0	34	0	47	0	40	0	34	0
12	57	1	52	30	38	3	54	3	75	1
13	60	2	58	0	39	3	46	3	39	7
14	34	0	40	0	37	0	46	0	41	0
15	34	9	31	0	59	1	39	0	30	2
16	59	0	56	2	50	7	45	1	38	2
17	58	2	55	0	43	0	42	0	39	2
18	32	0	32	0	32	1	29	0	34	1
19	39	1	37	0	35	2	37	1	50	0
20	33	6	40	4	36	2	53	1	46	4
21	53	0	45	2	75	1	70	4	58	3
22	50	20	41	28	48	22	37	44	60	15
23	69	4	59	17	50	31	53	23	47	28

Table 2. Results of the attention test in individual volunteers.
Green indicates correctly marked targets and red – missed targets

For dog whining, the distraction was 7.38%, baby crying 7.78%, dog sniffing 8.19%, saw sounds 8.31%, and silence 8.02%. In this case, a high p-value, p=0.994, means the results are not statistically significant. The results of the statistical analysis are included in Table 4. The post hoc analysis also did not show statistical significance. This means that there is no specific distracting correlation between all conditions individually. The p-values between all conditions are shown in Table 5.

Volunteer number	Whining of a puppy	Crying of a baby	Sniffing of a dog	Chainsaw working	Silence
1	0,03225806452	0	0	0	0
2	0,04545454545	0,02702702703	0	0	0
3	0,1343283582	0,1346153846	0,1632653061	0,1666666667	0
4	0,4578313253	0,08333333333	0,05333333333	0,2297297297	0,358974359
5	0	0,03846153846	0,152173913	0	0,08333333333
6	0,1086956522	0,1224489796	0,07692307692	0,05	0,08163265306
7	0,09090909091	0,1363636364	0,1578947368	0,2835820896	0,09459459459
8	0	0	0,03947368421	0,01515151515	0,06818181818
9	0,01694915254	0,08333333333	0,06382978723	0,08510638298	0,02222222222
10	0	0	0,04545454545	0	0,07843137255
11	0	0	0	0	0
12	0,01724137931	0,3658536585	0,07317073171	0,05263157895	0,01315789474
13	0,03225806452	0	0,07142857143	0,0612244898	0,152173913
14	0	0	0	0	0
15	0,2093023256	0	0,01666666667	0	0,0625
16	0	0,03448275862	0,1228070175	0,02173913043	0,05
17	0,03333333333	0	0	0	0,0487804878
18	0	0	0,0303030303	0	0,02857142857
19	0,025	0	0,05405405405	0,02631578947	0
20	0,1538461538	0,09090909091	0,05263157895	0,01851851852	0,08
21	0	0,04255319149	0,01315789474	0,05405405405	0,04918032787
22	0,2857142857	0,4057971014	0,3142857143	0,5432098765	0,2
23	0,05479452055	0,2236842105	0,3827160494	0,3026315789	0,3733333333
"Distraction" factor (in %)	7,38	7,78	8,19	8,31	8,02

Table 3. Results of the "distraction" factor for each condition.
Individual results and mean percentage of distraction for every condition

Repeated Measures ANOVA

Within Subjects Effects

	Sum of Squares	df	Mean Square	F	p	η^2_G	η^2
distraction factor	0.00124	4	3.11e−4	0.0549	0.994	0.001	0.001
Residual	0.49830	88	0.00566				

Note. Type 3 Sums of Squares

[3]

Between Subjects Effects

	Sum of Squares	df	Mean Square	F	p	η^2_G	η^2
Residual	0.932	22	0.0423				

Note. Type 3 Sums of Squares

Assumptions

Tests of Sphericity

	Mauchly's W	p	Greenhouse-Geisser ε	Huynh-Feldt ε
distraction factor	0.369	0.016	0.711	0.827

Table 4. Results of statistical analysis using repeated Measures ANOVA. Statistical significance p = 0.994

Post Hoc Tests

Post Hoc Comparisons - Distraction factor

Comparison						
Distraction factor	Distraction factor	Mean Difference	SE	df	t	p
whining	- crying	−0.00395	0.0269	22.0	−0.1467	0.885
	- sniffing	−0.00807	0.0274	22.0	−0.2949	0.771
	- chainsaw	−0.00925	0.0242	22.0	−0.3822	0.706
	- silence	−0.00640	0.0201	22.0	−0.3176	0.754
crying	- sniffing	−0.00412	0.0178	22.0	−0.2314	0.819
	- chainsaw	−0.00529	0.0191	22.0	−0.2772	0.784
	- silence	−0.00244	0.0257	22.0	−0.0950	0.925
sniffing	- chainsaw	−0.00117	0.0171	22.0	−0.0686	0.946
	- silence	0.00167	0.0184	22.0	0.0912	0.928
chainsaw	- silence	0.00285	0.0220	22.0	0.1292	0.898

Table 5. Post hoc test results

4.3. Final questionnaire

The subjects had divided opinions about the sound that was the most distracting for them. 7 people were most distracted by the crying of a child, 6 people by the yelping of a dog, and 5 people by dog sniffing and saw sounds (data are included in the graphs, in Figure 3). In terms of the least distracting sound, the volunteers responded as follows: 11 people were least distracted by dog sniffing, 8 people by the sound of a saw, 3 people by a baby crying, 1 person by a dog yelping (data are included in the graphs, in Figure 4).

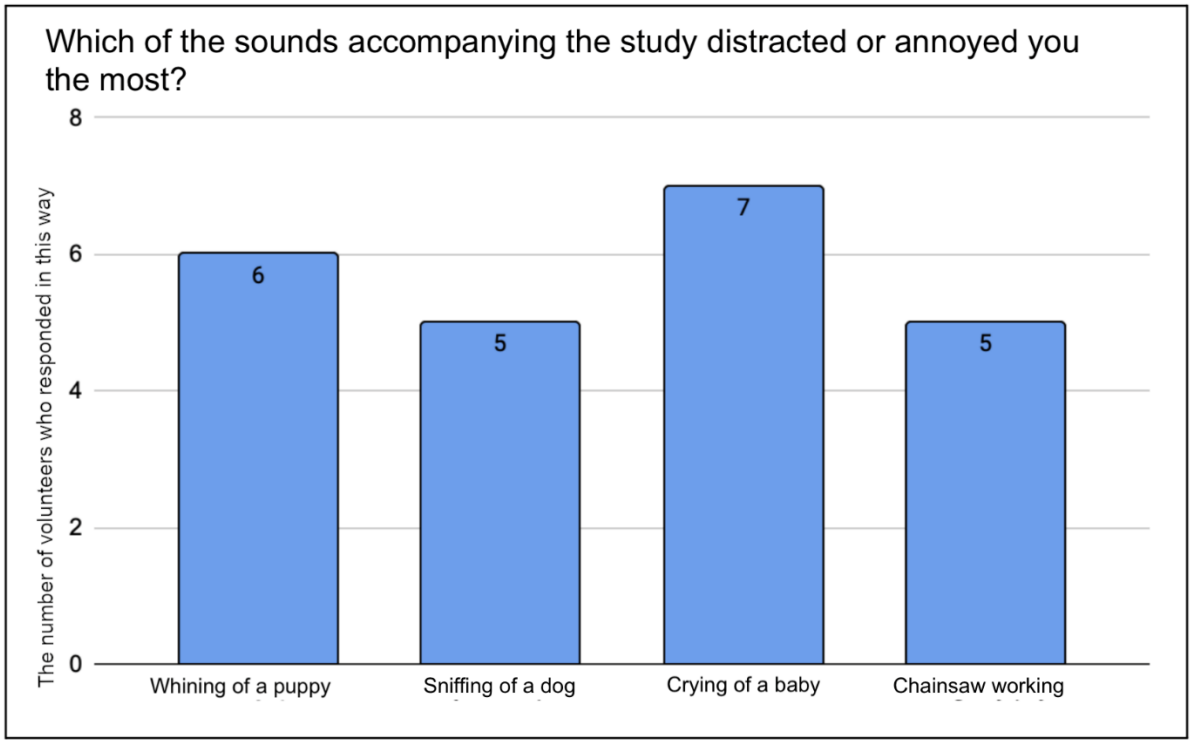

Figure 3. Summary of the choices of the respondents in response to the question: Which sound distracted you the most?

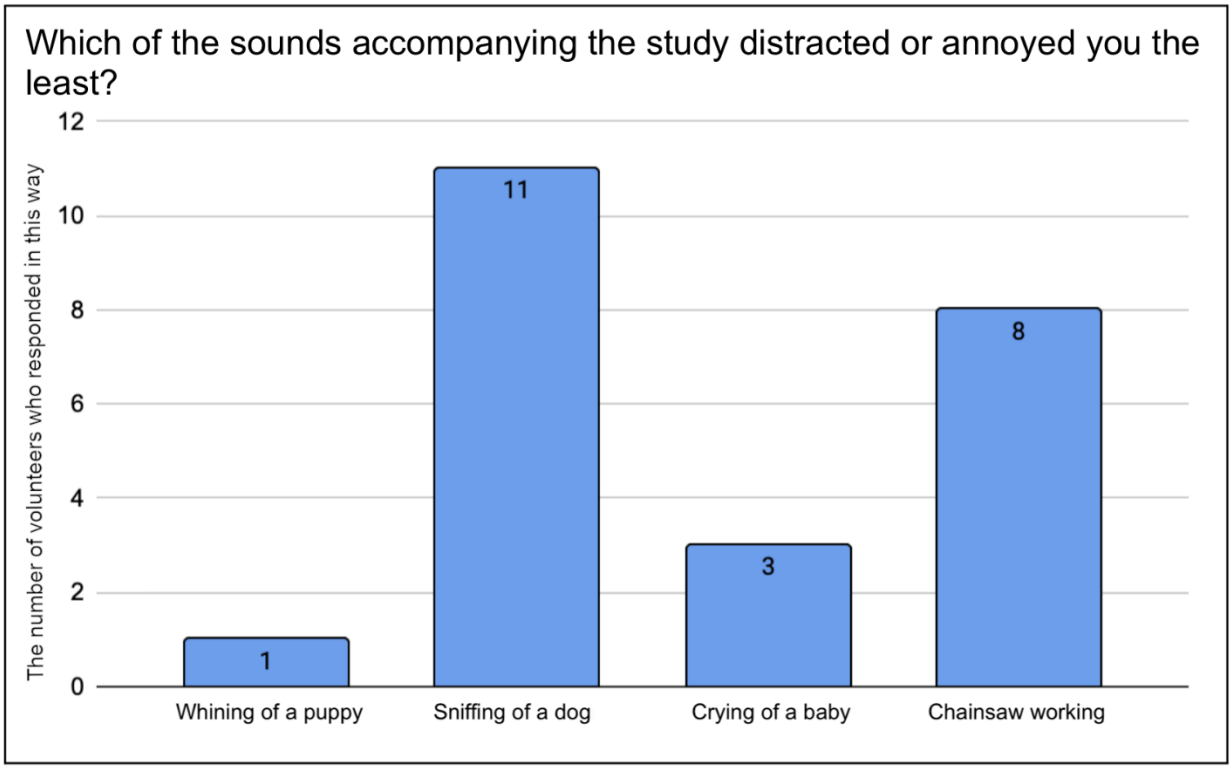

Figure 4. Summary of the choices of the respondents in response to the question: Which sound distracted you the least?

5. Summary, discussion, and future research directions

The question that this study sought to answer was, "Does a dog's whining affect the attention of people who own a dog?". Taking into account the analysis of the results obtained, it can be concluded that this particular study did not show any significant differences in distraction due to listening to the dog's whining, compared to other control sounds, including listening to the cry of a child. The research group consisted of 23 people, which made it impossible to divide the subjects into two groups: a group of dog parents and a group of dog owners. However, the results of the LAPS scale suggest that regardless of "parental status", the volunteers showed very high attachment to their animals. It can therefore be assumed that the study involved people who care about pets and show respect towards them. Especially since 22 people strongly agree that they treat their dog as a family member (this was one of the questions of the LAPS). It could turn out that if more dog owners were studied, the effects would turn out

to be statistically significant. In similar studies that took into account attachment sounds (Chang and Thompson, 2011; Chang and Thompson, 2010) the number of volunteers involved was 57 and 39.

However, can we assume that regardless of the type of distractor, there is no difference in the levels of distraction when performing tasks such as visual scanning of objects? Since there are not many studies using different types of distractors (including attachment sounds) in the same type of test (modified Bourdon-Wiersma test), one should be cautious about drawing such conclusions. All the more so because the previously cited studies (Morsbach et al., 1986; Fernald, 1992; Purhonen et al., 2001; Hechler et al., 2015; Li et al., 2018; Ng et al., 2021) show that crying and whining as attachment sounds attract the recipient's attention more than other sounds (e.g., neutral human speech).

The choice of digits for the study turned out to be problematic because the number "1" was chosen as one of the targets. This digit turned out to be very simple in its form, which made it very easy to see without any problem, despite the presentation of sound stimuli. Some of the participants, after taking the test, reported that this digit was the easiest for them to look for and, despite the distractor in the form of sound, it did not cause them any difficulty in finding and marking it. Digit 1" as a target appeared as the third in the order each time. Thus, it was paired with sound stimuli such as the whining of a dog, the sounds of a saw, the sniffing of a dog, and silence. The phenomenon of finding 1" easily can be compared to a phenomenon called the visual crowding effect. It is a significant interference of neighboring objects in target identification, or in other words, it is an adverse effect of nearby objects on target identification (Coates et al., 2018). This means that it is easier for us to recognize a certain visual object when it is not surrounded by other visual objects. In the case of the digit "1" it is so simple in its form that in the sequence of other digits the space around it is larger than in the case of the digit e.g. "4". The visual crowding effect is visually illustrated in Figure 5. This task is very difficult to perform in case the letter is surrounded by other letters.

Visual crowding effect. The task is to focus on the dot and then try to identify the number "4". This task is very difficult to perform in case other numbers surround the digit.

The final survey itself did not include the option to mark the answers "No stimulus distracted me more" or "No stimulus distracted me less". This may have suggested to the study participants that one of the sounds must have distracted them more or less. A good solution would be to use a scale (e.g. subjective noise nuisance") so that each sound stimulus would be rated on a point scale by each of the study participants.

From this analysis, very important conclusions can be drawn for future experiments. When performing a similar study, it would be necessary to choose a test that has been widely used in similar studies so the results of experiments could be compared with each other. Data analysis would be facilitated by creating an algorithm and presenting a test in the form of a computer program (for example, as a GO/NO-GO paradigm or reaction time paradigm).

Editing of sound stimuli should also be considered. One of the participants in this study could not recognize the dog's whining. Three participants, who were mothers, also reported that the sound of the baby's cry was not as distracting for them. The sound used in the study was the sound of a newborn baby crying. Perhaps women, who have been mothers for a long time, have become accustomed to the gentle whimpering of their babies, knowing that it does not portend danger. One of the participants also reported that she was a synesthete and that the work of the saw was the most distracting for her, due to the additional olfactory stimulation that began to occur (she reported that the smell of exhaust fumes was distracting at that time).

The very form of the test (behavioral experiment) could be replaced by the examination of the electrophysiological activities. A very interesting form of studying human electrophysiological activity is electrodermal activity (EDA). The EDA device measures changes in skin conduction, under the influence of sweat secretion, which is produced under the influence of activation of the autonomic nervous system (Amin and Faghih, 2022). Activation of the ANS in this case means emotional arousal (Amin and Faghih, 2022). This makes it possible to investigate, for example, whether attachment noises along with a dog's whining increase emotional arousal. A similar study on attachment sounds has already been done (Chang and Thompson, 2010), which may also help to design a similar experiment using dog's whining.

Summarizing the information and results collected in this paper: the issues themselves, as well as the direction of research, are interesting and promising for the future. Predicted fertility trends around the world show that fewer and fewer children will be per woman—by 2100 there will be 1.4 children per 1 woman (Statista Research Department, 2022). This may suggest that more and more people will become interested in caring for a pet (such as a dog), to meet their needs (for example, caregiving). Due to the constant process of evolution and the ability of dogs to adapt their way of communication (as far as it is bio-

logically possible) to that of humans, it is worth looking at this, as well as observing and describing how this communication affects humans. Therefore, this study is an introduction to the discussed subject and shows which direction of research may be wrong.

The author takes to provide the digital materials necessary to reproduce this experiment to interested parties, after prior email contact.

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