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Evaluation of methods and results of training of ancient breed dogs kept by different owners*

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Summary

A comprehensive survey was disseminated to a diverse set of dog owners of both sexes and various age groups living in both small and large towns. The survey sought feedback from 653 owners of young and older male and female dogs of ancient breeds: Akita, Samoyed, Siberian Husky, Chow Chow, and Alaskan Malamute. The survey addressed various aspects of dog training, including basic self-control and focus, command execution, and undesirable behaviors. The data obtained were analyzed using Pearson's Chi-squared test ($P \leq 0.01$) and Parker's test. It was found that the methods and results of training for the ancient dog breeds were primarily influenced by the breed itself, and to a lesser extent, by the dog's age. The owner's sex, age, place of residence, and the dog's sex are not expected to have a significant impact on training outcomes. According to the survey, the Akita and Chow Chow breeds typically receive basic training and a maximum of one specialized training. On the other hand, the Alaskan Malamute commonly undergoes multidirectional training. Frustration is common, especially in the Samoyed breed. The ability to walk on a leash was mastered to a high degree, but was still insufficient, especially in adult animals of each breed. In particular, the Chow Chow and Alaskan Malamute breeds were reported to be disobedient when executing commands and lacked self-control. Separation problems were also often reported, especially for the Akita and Chow Chow breeds.

Keywords: dog, ancient dog breed, training, owner

Researchers are divided over the history of dog domestication. It is estimated that this process took place, depending on the geographical location, approximately between 135 and 12 thousand years ago (1-3). The domestic dog (*Canis familiaris*) is considered to be the first animal domesticated by man (14). Initially, early humans were often accompanied by dogs that were both aggressive and highly resistant to new living conditions (5). However, over the course of history, this situation changed dramatically. As far as contemporary domestic dogs are concerned, the most noteworthy are their original breeds, which have largely retained the characteristics of their ancestors, developed under the difficult conditions of independent living and the lack of special care from humans (27). These breeds are distinguished by the fact that their genetic material differs only slightly from the genome of the grey wolf (*Canis lupus*), which is considered to be the closest evolutionary relative of the present-day dog of the Canids (*Canidae*) family. A genetic study by Parker

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et al. (41) identified 14 dog breeds now considered to be ancient. In addition, breeds of ancient origin were separated from those with modern European genealogical lineage based on phylogenetic analysis. The breeds most closely related to the grey wolf's genotype were compared, showing high similarity of the Shiba Inu, Chow Chow, Akita, and Basenji breeds. Moreover, separate breed groups with common allele frequency patterns were separated, e.g. the Alaskan Malamute, the Siberian Husky, and the Samoyed from the Arctic, the Chow Chow, the Pekingese, the Shar Pei and the Shih Tzu from China, and the Akita and the Shiba from Japan.

With regard to the indigenous ancient breeds in Eastern Europe, the popular pet dogs include the Akita, Samoyed, Siberian Husky, Alaskan Malamute, and Chow Chow (data from the Polish Kennel Club; *ZKWP*) (64). The Akita, poised and loyal, but with an independent character, was originally used for hunting big game and guarding premises (65). The Samoyed, extremely calm, devoted to humans, and trustful, herded reindeer, pulled the sledge and "warmed its owners with its body". The Siberian Husky, characterized by a strong hunting instinct and a great need for movement, was also used as a sledge dog. The Alaskan Malamute, with an independent character as well as a strong herd instinct, also performed sledging functions. The Chow Chow, independent and sometimes mistrustful, worked in sledge teams, watched over homes and animal herds, and accompanied man when hunting. Nowadays, the dog is losing its utilitarian function in favor of that of a human companion (12). This has resulted in the emergence of numerous miniature breeds with specific conformation and aesthetic qualities (64).

The close bond between humans and dogs, often living together, requires humans to provide these animals with varying degrees of training (10, 12). At least basic training is necessary. Not only does the correct choice of training methods ensure the trainer's success, but it also ensures the dog's welfare by avoiding temporary frustration or discomfort (21). Frustration, that is, a momentary negative reaction or a persistent negative emotional state (8), is defined as an aversive emotional reaction experienced due to the inability to achieve a specific goal (15). Frustration is currently recognized as one of the more common canine behavioral disorders (2).

Dogs are mostly trained through operant conditioning (also known as instrumental conditioning) (21). A important role is played by the positive reinforcement (R+) and negative punishment (P–) methods. The positive punishment (P+) and negative reinforcement (R–) methods (21, 61) are less popular, as they threaten the maintenance of positive emotions. Individual methods involve different brain structures (40). For example, the R+ methods stimulate the cerebral cortex structures, the substantia nigra, and certain parts of the limbic system. However, in this case, a significant problem are the so-called self-rewarding behaviors that are difficult to eliminate in subsequent dog training (48). On the other hand, the aversive stimuli used in P+ and R– can elicit a fear response, involving primarily the amygdala. This leads to the production of glucocorticoids, which, when in excess, can hinder the cellular learning process. Some use a combination of different training methods, depending on the behavior they want to consolidate (58). Although R+ has been demonstrated to provide the best training outcomes (12), it is advisable to support it by the clicker method (17).

In addition to the choice of the method, the effectiveness of dog training is also determined by its intensity and the animal's age and breed, which, in this case, is a consequence of genetic isolation (57, 61). Dogs of ancient breeds are generally characterized by a lower learning ability than herding dogs and scent hounds. For example, the Alaskan Malamute is typically characterized by a high level of calmness, a lower level of trainability, a moderate level of sociability, and a lower level of boldness. On the other hand, the Siberian Husky is not a particularly calm or trainable dog, but its sociability and boldness reach a high level.

The system of communication between a dog and a human is more highly organized than the system of communication with a chimpanzee (25). As far as communication with a dog is concerned, there are systems of gestures, facial expressions, and olfactory systems. These express the dog's understanding and adaptation to human communication. Considering its specific nature, this communication system can be divided into a transmitting channel and a receiving channel (18). In general, a dog must send more signs than a human can interpret, whereas a dog interprets more signs than a human consciously sends. It has been proven that the involvement of both the handler and the dog in training reduces the frequency of problematic behaviors (3). On the other hand, Meyer and Forkman (35) concluded that humans can predict undesirable dog behaviors due to fear. The role of the owner in dog training is, therefore, enormous.

The present study assumed that the sex, age and place of residence of the ancient dog breed owners would impact the methods and outcomes of training. Additionally, it was expected that training would depend on the breed and age of the dogs, but not on their sex. Therefore, the study's objective was to analyze and assess the results of a questionnaire addressed to a diverse group of ancient dog breed owners concerning the training of dogs of different sexes, ages and, breeds.

Material and methods

The diagnostic survey method was employed to acquire data. As part of this method, a survey questionnaire was developed: "The methods and outcomes of training ancient dog breeds: the Akita, the Samoyed, the Siberian Husky, the Alaskan Malamute, and the Chow Chow". The ques-

tionnaire included the sender's data, the aim of the study, the method of returning the questionnaire to the sender, instructions for completion, six items of the respondent's particulars (dog's owner's sex, age, and place of residence, as well as dog's sex, age, and breed). Its main part comprised 21 questions arranged in a logical order. In addition, the first part of the questionnaire assured the anonymity of the study results and called for honesty when completing the questionnaire.

The main part of the questionnaire grouped questions into four blocks: Block A "Dog training": 1) trainer's participation in training (possible answers: yes/no/sometimes); 2) regularity of training (at least once a week/more often than once a week; 3) use of a clicker during training (yes/no); 4) type of training (basic + a maximum of one specialized/basic + more than one specialized); Block B "Basic self-control and focusing the dog's attention": 1) behavior indicative of self-control (yes/no); 2) situation of no self-control (a question for the respondents who answered "yes" to the previous question (always/not always); 3) focusing attention on the owner (yes/no); 4) focusing attention without positive reinforcement: a question for the respondents who answered "always" to the previous question (always/not always); 5) ability to walk on a leash (yes/no), no ability to walk on a leash: a question for the respondents who answered "no" to the previous question (always/depending on the situation); Block C "Execution of commands by the dog": 1) execution of basic commands (yes/no), 2) number of commands executed (up to four/more than four), 3) execution of the command "Come" (yes/no) as a command for reliable recall, 4) situation of the execution of the command "Come": a question for the respondents who answered "yes" to the previous question (always/depending on the situation), 5) execution of the command "Heel" (yes/no) as a command for the dog to approach the owner and stay with him; 6) situation of the execution of the command "Heel": a question for the respondents who provided the answer "yes" to the previous question (always/depending on the situation), Block D) "Undesirable dog behavior": 1) occurrence of problematic behavior (yes/no); 2) occurrence of frustrated behavior during training (yes/no); 3) frequency of frustration occurrence: a question for the respondents who answered "yes" to the previous question (always/depending on the situation); 4) staying in a kennel cage (yes/no); 5) problems with staying at home without human presence (yes/no).

The survey was developed based on Microsoft Forms and published on social media in groups dedicated to specific dog breeds between 5 January 2022 and 5 April 2022. A total of 653 owners of dogs of the following selected ancient breeds responded to the questionnaire: Akita (173 people), Samoyed (142 people), Siberian Husky (94 people), Alaskan Malamute (152 people), and Chow Chow (92 people). The results concerned 310 female and 343 male dogs. Information was obtained on 349 dogs aged up to two years and 304 dogs aged over two years.

Statistical methods. The data were collated in a database using Microsoft Excel from the Microsoft Office 2019 package. Statistical analysis was performed using the Statistica software (StatSoft), version 13.3. The normal distribution of the test variables was assessed by the Shapiro-Wilk and Lilliefors tests. The analysis revealed that the dependent variables did not follow a normal distribution. To assess the significance of the relationship between the factors (the dog's breed, age, and sex, as well as the owner's sex, age, and place of residence) and the dependent variables, a Pearson's non-parametric chi-square test was used (significance at $p = 0.05$ and $p = 0.01$). The results were then analyzed only at $p \leq 0.01$. In addition, the values expressed as percentages were compared using Parker's test (42). Relationships between the characteristics were analyzed using Spearman's rank-order correlation.

Results and discussion

In the subsequent thematic blocks (Tab. 1), the following proportions of significant p-values were noted: Block A: 37.5%, incl. 16.7% at $p \leq 0.01$; Block B: 19.4%, incl. 11.1% at $p \leq 0.01$; Block C: 22.2%, incl. 13.4% at $p \leq 0.01$; Block D: 16.7%, incl. 10.0% at $p \leq 0.01$. However, significant p-values were noted within the following factors: "dog's breed": 57.1%, incl. 42.9% at $p \leq 0.01$; "dog's age": 47.6%, incl. 28.6% at $p \leq 0.01$; "dog's sex": 0; "owner's sex": 9.5%, incl. 0 at $p \leq 0.01$; "owner's age": 19.0%, incl. 4.8% at $p \leq 0.01$; "owner's place of residence": 4.8%, incl. 0 at $p \leq 0.01$.

The observed value for the characteristic "Use of a clicker in training" was most distant from the expected value for the Chow Chow and the Samoyed (Tab. 2). However, in the case of the answer "yes", the expected value for the Chow Chow was higher than the observed value. For the other breed, the situation was the opposite. A clicker was used more frequently than expected in Samoyed training. There are no records of clicker use with Chow Chow breed dogs. It was most often used for dogs of the Samoyed breed, for which 15.49% of respondents gave the positive answer. Similar proportions of "yes" responses were observed for the Alaskan Malamute (8.70%), Akita (9.83%), and Siberian Husky (10.53%) breeds. For each breed, the frequency of the negative answer was significantly greater than that of the positive answer. Significant differences between the breeds were noted only when comparing the Chow Chow with the other breeds.

In the case of the "Type of training", the observed value was most distant from the expected value for the Akita, Chow Chow, and Siberian Husky breeds. The expected value was lower than the observed value for the Akita and Chow Chow breeds. However, for the Siberian Husky breed, the situation was the opposite. Most answers indicated basic training for each breed, possibly with a maximum of one specialized training. The spectrum of values ranged from 67.39% (for the Alaskan Malamute) to 97.87% (for the Chow Chow). Significant differences between the proportion of the two answer variants occurred for each of the breeds. A similar trend in the frequency of answers to the question was observed for the Akita and Chow Chow

Tab. 1. Effect of selected factors on the characteristics under analysis

Characteristic	Pearson's Chi², significance of relationship – p Factor					
	Dog's breed	Dog's age	Dog's sex	Owner's sex	Owner's age	Owner's place of residence
Block A "Dog training"						
Trainer's participation in training	p = 0.029*	p = 0.039*	p = 0.149	p = 0.034*	p = 0.082	p = 0.676
Regularity of training	p = 0.020*	p = 0.000**	p = 0.574	p = 0.742	p = 0.828	p = 0.755
Use of a clicker in training	p = 0.003**	p = 0.249	p = 0.578	p = 0.813	p = 0.013*	p = 0.089
Type of training	p = 0.000**	p = 0.004**	p = 0.814	p = 0.218	p = 0.268	p = 0.190
Block B "Basic self-control and focusing the dog's attention"						
Behavior indicative of self-control	p = 0.093	p = 0.008**	p = 0.879	p = 0.771	p = 0.541	p = 0.475
Situation of no self-control	p = 0.104	p = 0.066	p = 0.066	p = 0.963	p = 0.694	p = 0.310
Focusing attention on the owner	p = 0.037*	p = 0.005**	p = 0.655	p = 0.484	p = 0.405	p = 0.614
Focusing on the owner with no positive reinforcement	p = 0.291	p = 0.094	p = 0.754	p = 0.905	p = 0.235	p = 0.191
Ability to walk on a leash	p = 0.000**	p = 0.002**	p = 0.224	p = 0.700	p = 0.316	p = 0.465
No ability to walk on a leash	p = 0.081	p = 0.028*	p = 0.622	p = 0.066	p = 0.231	p = 0.019*
Block C "Execution of commands by the dog"						
Execution of basic commands	p = 0.880	p = 0.290	p = 0.325	p = 0.021*	p = 0.040*	p = 0.106
Number of commands executed	p = 0.000**	p = 0.759	p = 0.189	p = 0.311	p = 0.003**	p = 0.365
Execution of the command "Come"	p = 0.000**	p = 0.710	p = 0.514	p = 0.395	p = 0.541	p = 0.188
Situation of execution of the command "Come"	p = 0.135	p = 0.621	p = 0.881	p = 0.378	p = 0.708	p = 0.704
Execution of the command "Heel"	p = 0.000**	p = 0.022*	p = 0.631	p = 0.808	p = 0.681	p = 0.799
Situation of execution of the command "Heel"	p = 0.593	p = 0.007**	p = 0.098	p = 0.283	p = 0.321	p = 0.242
Block D "Undesirable dog behavior"						
Occurrence of problematic behavior	p = 0.857	p = 0.093	p = 0.199	p = 0.413	p = 0.792	p = 0.700
Occurrence of frustrated behavior during training	p = 0.000**	p = 0.508	p = 0.583	p = 0.919	p = 0.216	p = 0.257
Frequency of frustration occurrence	p = 0.903	p = 0.506	p = 0.862	p = 0.855	p = 0.198	p = 0.200
Staying in a kennel cage	p = 0.000**	p = 0.216	p = 0.741	p = 0.91	p = 0.041*	p = 0.553
Problems with staying at home without human presence	p = 0.000**	p = 0.017*	p = 0.311	p = 0.296	p = 0.564	p = 0.598

Explanations: * – $p \leq 0.05$, ** – $p \leq 0.01$

Tab. 2. A highly significant effect of the dog's breed on the characteristics analyzed in thematic block A, "Dog training"

Dog's bred	n	Index	Pearson's Chi² = 15.839 p = 0.00324 Use of a clicker in training		n	Index	Pearson's Chi² = 49.555 p < 0.0001 Type of training	
			Yes	No			Basic + one specialized	Basic + more than one specialized
Akita	173	Δt ON-EN	0.31	–0.31	173	Δt ON-EN	16.38	–16.38
		%	9.83^{ax}	90.17^{bx}		%	90.17^{ax}	9.83^{b}
Samoyed	142	Δt ON-EN	8.30	–8.30	142	Δt ON-EN	–4.60	4.60
		%	15.49^{ax}	84.51^{b}		%	77.46^{axz}	22.54^{b}
Chow Chow	94	Δt ON-EN	–9.06	9.06	94	Δt ON-EN	16.14	–16.14
		%	0.00^{ay}	100.00^{b}		%	97.87^{ax}	2.13^{b}
Siberian Husky	152	Δt ON-EN	1.34	–1.34	152	Δt ON-EN	–15.67	15.67
		%	10.53^{ax}	89.47^{b}		%	70.39^{axz}	29.61^{b}
Alaskan Malamute	92	Δt OB-EN	–0.87	0.87	92	Δt OB-EN	–12.25	12.25
		%	8.70^{ax}	91.30^{b}		%	67.39^{ayz}	32.61^{b}
Total	653 100	Number %	63 9.65	590 90.35	653 100	Number %	527 80.70	126 19.30

Explanations: Percentages marked with different letters (a, b) in the rows are significantly different at $p \leq 0.05$. Percentages marked with different letters (x, y, z) in the columns (use of a clicker in training: only the column with the answer "yes"; type of training: only the column with the answers: "basic training + one specialized training) differ significantly at $p \leq 0.05$. Δt ON-EN – The difference between the observed number and the expected number; ON – observed number; EN – expected number

breeds as well as for the Alaskan Malamute, Siberian Husky, and Samoyed.

The observed value of the characteristic "Ability to walk on a leash" was most distant from the expected value for the Akita and Samoyed breeds (Tab. 3). For the Akita breed, the expected value was lower than the observed value. For the Samoyed, the situation was reverse. The positive answer was significantly more frequent than the negative one for four breeds. There were no significant differences between the two possible answers for the Akita breed. The percentage of the answer "yes" ranged from 56.65% (for the Akita) to 79.58% (for the Samoyed). For the remaining breeds, the percentage of this answer fluctuated around 70%. Moreover, only the Akita differed significantly from the other breeds.

The observed value of the characteristic "Number of commands executed" was most distant from the expected value for the Samoyed and Chow Chow breeds (Tab. 4). However, for the Samoyed, the expected value was higher than the observed value, in contrast to the other breed. For all the ancient breeds under study, "more than four" was a significantly more frequent answer than "up to four". The percentage of the answer "more than four" ranged from 59.78% (for the Chow Chow) to 87.32% (for the Samoyed). The results for the Samoyed and Chow Chow breeds differed significantly from each other, as did from those for the other breeds. However, the results for the other breeds were similar to each another.

As far as the "Execution of the command 'Come'" is concerned, the observed values were most distant from the expected values for the Samoyed and Chow Chow breeds. The expected value was higher than the observed value for the Chow Chow. For the other breed, it was the opposite. The frequency of the answer "yes" was significantly higher for each breed than

Table 3. A highly significant effect of the dog's breed on the characteristics analyzed in thematic block B, "Basic self-control and focusing the dog's attention"

Dog's bred	n	Index	Pearson's Chi² = 19.70324 p = 0.00057 Ability to walk on a leash	
			Yes	No
Akita	173	Δt ON-EN	–20.42	20.42
		%	56.65^{ax}	43.35^{a}
Samoyed	142	Δt ON-EN	15.8	–15.8
		%	79.58^{by}	20.42^{a}
Chow Chow	94	Δt ON-EN	1.65	–1.65
		%	70.21^{by}	29.79^{a}
Siberian Husky	152	Δt ON-EN	2.95	–2.95
		%	70.39^{by}	29.61^{a}
Alaskan Malamute	92	Δt ON-EN	0.02	–0.02
		%	68.48^{by}	31.52^{a}
Total	653 100	Number %	447.00 68.45	206.00 31.55

Explanations: Percentages marked with different letters (a, b) in the rows are significantly different at $p \leq 0.05$. Percentages marked with different letters (x, y) in the columns (only the column with the answer "yes") are significantly different at $p \leq 0.05$. Δt – The difference between the observed number and the expected number; ON – observed number; EN – expected number

Tab. 4. A highly significant effect of the dog's breed on the characteristics analyzed in thematic block C, "Execution of commands by the dog"

Dog's bred	n	Index	Pearson's Chi² = 23.502 p< 0.0001 Number of commands		n	Index	Pearson's Chi² = 26.024 p < 0.0001 Execution of the command "Come"		n	Index	Pearson's Chi² = 22.045 p = 0.00020 Execution of the command "Heel"	
			≤ 4	> 4			Yes	No			Yes	No
Akita	172	Δt ON-EN	–1.47	1.47	173	Δt ON-EN	–6.35	6.35	173	Δt ON-EN	14.65	–14.65
		%	23.84^{ax}	76.16^{b}		%	76.88^{ax}	23.12^{b}		%	65.90^{ax}	34.10^{b}
Samoyed	142	Δt ON-EN	–17.06	17.06	142	Δt ON-EN	16.62	–16.62	142	Δt ON-EN	5.45	–5.45
		%	12.68^{ay}	87.32^{b}		%	92.25^{axy}	7.75^{b}		%	61.27^{ax}	38.73^{b}
Chow Chow	92	Δt ON-EN	14.28	–14.28	94	Δt ON-EN	–12.72	12.72	94	Δt ON-EN	–18.95	18.95
		%	40.22^{az}	59.78^{b}		%	67.02^{axz}	32.98^{b}		%	37.23^{ay}	62.77^{b}
Siberian Husky	151	Δt ON-EN	1.72	–1.72	152	Δt ON-EN	–1.44	1.44	152	Δt ON-EN	1.71	–1.71
		%	25.83^{ax}	74.17^{b}		%	79.61^{ax}	20.39^{b}		%	58.55^{ax}	41.45^{b}
Alaskan Malamute	91	Δt ON-EN	2.53	–2.53	92	Δt ON-EN	3.89	–3.89	92	Δt ON-EN	–2.83	2.83
		%	27.47^{ax}	72.53^{b}		%	84.78^{ax}	15.22^{b}		%	54.35^{ax}	45.65^{a}
Total	648 100	Number %	160 24.69	488 73.31	653 100	Number %	526 80.55	127 19.45	653 100	Number %	375 57.43	278 42.57

Explanations: Percentages marked with different letters (a, b) in the rows are significantly different at $p \leq 0.05$. Percentages marked with different letters (x, y) in the columns (number of commands executed: only the column with the answer "≤ 4"; execution of the command "Come": only the column with the answer "yes"; execution of the command "Heel": only the column with the answer "yes") differ significantly at $p \leq 0.05$. Δt ON-EN – The difference between the observed number and the expected number; ON – observed number; EN – expected number

the frequency of "no". The percentage of the positive answer ranged from 67.02% (for the Chow Chow) to 92.25% (for the Samoyed). The results for the Samoyed and Chow Chow breeds differed significantly from each other, yet no significant differences were demonstrated when compared to the other breeds, which were similar to each other in terms of the analyzed values.

For the Akita and Chow Chow breeds, the observed value of the characteristic "Execution of the command 'Heel'" was most distant from the expected value. However, the expected value was higher than the observed value for the Chow Chow. It was the opposite for the other breed. The positive answer was selected significantly less frequently than the negative one only for the Chow Chow. The percentage of this answer ranged from 37.23% (for the Chow Chow) to 65.90% (for the Akita). The results for the Chow Chow breed differed significantly from those for the other breeds.

The observed value of the characteristic "Frustrated behaviors in training" was most distant from the expected value for the Samoyed and Chow Chow breeds (Tab. 5). The expected value was higher than the observed value for the Chow Chow. The results for the other breed were the opposite. No significant differences were noted between the answers "yes" and "no" for the Akita, Siberian Husky, and Alaskan Malamute breeds. The answer "yes" was significantly more frequent than the answer "no" for the Samoyed breed. The opposite was the case for the Chow Chow breed. The results for most breeds were similar, except for a significant difference between the Samoyed and the Siberian Husky breeds.

It was found that the observed value of the characteristic "Staying in a kennel cage" was most distant from the expected value for the Samoyed and Chow Chow breeds. The expected value was higher than the observed value for the Chow Chow. For the Samoyed breed, the situation was the opposite. The positive answer for all breeds was significantly less frequent than the negative answer and ranged from 5.32% (for the Chow Chow) to 34.51% (for the Samoyed). In terms of this characteristic, these breeds differed significantly from each other, as well as from the other breeds.

The observed value of the characteristic "Isolation problems" was most distant from the expected value for the Akita, Chow Chow, and Siberian Husky breeds. However, the expected value was lower than the observed value for the Akita and Chow Chow breeds. For the Siberian Husky, the situation was the opposite. For each breed, the answer "yes" was significantly more frequent than the answer "no". The proportion of the positive answer ranged from 75.0% (for the Siberian Husky) to 94.68% (for the Chow Chow).

For both age groups of dogs, the observed values of the characteristic "Regularity of training" were significantly different from each other (Tab. 6). It was noted that dogs aged up to two years had been trained more frequently than once a week, and this value was higher than expected. For older dogs, the opposite was true, i.e. it occurred less frequently than

Tab. 5. A highly significant effect of the dog's breed on the characteristics analyzed in thematic block D, "Undesirable dog behavior"

Dog's bred	n	Index	Pearson's Chi^2 = 19.335 p < 0.00068 Frustrated behaviors in training		n	Index	Pearson's Chi^2 = 34.609 p < 0.0001 Staying in a kennel cage		n	Index	Pearson's Chi^2 = 23.815 p < 0.0001 Isolation problems	
			Yes	No			Yes	No			Yes	No
Akita	173	Δt ON-EN	–3.58	3.58	173	Δt ON-EN	–5.12	5.12	173	Δt ON-EN	9.43	–9.43
		%	52.60^{ax}	47.40^{a}		%	16.18^{ax}	83.82^{b}		%	90.75^{ax}	9.25^{b}
Samoyed	142	Δt ON-EN	17.37	–17.37	142	Δt ON-EN	21.82	–21.82	142	Δt ON-EN	–1.12	1.12
		%	66.90^{axy}	33.10^{b}		%	34.51^{ay}	65.49^{b}		%	84.51^{axz}	15.49^{b}
Chow Chow	94	Δt ON-EN	–15.39	15.39	94	Δt ON-EN	–12.99	12.99	94	Δt ON-EN	8.82	–8.82
		%	38.30^{axz}	61.70^{b}		%	5.32^{az}	94.68^{b}		%	94.68^{ax}	5.32^{b}
Siberian Husky	152	Δt ON-EN	2.90	–2.9	152	Δt ON-EN	–2.10	2.10	152	Δt ON-EN	–15.65	15.65
		%	56.58^{ax}	43.42^{a}		%	17.76^{ax}	82.24^{b}		%	75.00^{ayz}	25.00^{b}
Alaskan Malamute	92	Δt ON-EN	–1.30	1.30	92	Δt ON-EN	–1.61	1.61	92	Δt ON-EN	–1.61	1.61
		%	53.26^{ax}	46.74^{a}		%	17.39^{ax}	82.61^{b}		%	83.70^{axz}	16.30^{b}
Total	653 100	Number %	357 54.67	296 45.33	653 100	Number %	125 19.14	528 80.86	653 100	Number %	557 85.30	96 14.70

Explanations: Percentages marked with different letters (a, b) in the rows are significantly different at $p \leq 0.05$. Percentages marked with different letters (x, y, z) in the columns (frustrated behaviors in training: only the column with the answer "yes"; staying in a kennel cage: only the column with the answer "yes"; isolation problems: only the column with the answer "yes") differ significantly at $p \leq 0.05$. Δt ON-EN – The difference between the observed number and the expected number; ON – observed number; EN – expected number

Tab. 6. A highly significant effect of the dog's age on the characteristics analyzed in thematic block A "Dog training"

Dog's age	n	Index	Pearson's Chi² = 21.796 p < 0.0001 Regularity of training		n	Index	Pearson's Chi² = 8.129 p < 0.00436 Type of training	
			≤ once a week	> once a week			Basic + one specialized	Basic + more than one specialized
≤ 2 years old	173	Δt ON-EN	–25.38	25.38	173	Δt ON-EN	14.34	–14.34
		%	16.62^{ax}	83.38^{b}		%	81.81^{ax}	18.19^{b}
>2 years old	142	Δt ON-EN	25.38	–25.38	142	Δt ON-EN	–14.34	14.34
		%	32.24^{ay}	67.76^{b}		%	75.99^{ax}	24.01^{b}
Total	653 100	Number %	156 23.89	497 76.11	653 100	Number %	527 80.70	126 19.30

Explanations: Percentages marked with different letters (a, b) in the rows are significantly different at $p \leq 0.05$. Percentages marked with different letters (x, y) in the columns (regularity of training: only the column with the answer "≤ once a week"; type of training: only the column with the answer "basic + one specialized") differ significantly at $p \leq 0.05$. Δt ON-EN – The difference between the observed number and the expected number; ON – observed number; EN – expected number

expected. The answers that reported training at most once a week were significantly less frequent than the answers indicating more frequent training. For younger dogs, training conducted at most once a week was reported significantly less frequently than it was for older dogs. The percentage ranged from 16.62% (for dogs aged up to two years) to 32.24% (for dogs aged over two years).

For both age groups, the observed value of the characteristic "Type of training" was, to a similar extent, close to the expected value. In both age groups, basic training plus a maximum of one specialized training was significantly more frequent than basic training plus more than one specialized training. The percentage ranged from 75.99% (for dogs aged over two years) to 81.81% (for dogs aged up to two years). No significant differences were noted between the two age groups.

For both age groups of dogs, the observed value of the characteristic "Basic self-control" was, to a similar extent, close to the expected value (Tab. 7). The positive answer was significantly more frequent than the negative one, and it ranged from 87.68% (for dogs aged up to two years) to 93.75% (for dogs aged over two years). No differences were noted between the age groups for this characteristic.

For both younger and older dogs, the observed value of the characteristic "Focusing the dog's attention on the owner" was, to a similar extent, close to the expected value. For dogs aged up to two years, the answer "not always" was significantly more frequent than the answer "always", ranging from 59.87% (for dogs aged over two years) to 70.20% (for dogs aged up to two years). Significant differences were found between the two age groups.

For both age groups, the observed value of the characteristic "Ability to walk on a leash" was similar to the expected value. Respondents in both groups selected the positive answer significantly more frequently than the negative one. This value ranged from 62.50% (for dogs aged over two years) to 73.64% (for dogs aged

Tab. 7. A highly significant effect of the dog's age on the characteristics analyzed in thematic block B, "Basic self-control and focusing the dog's attention"

Dog's age	n	Index	Pearson's Chi² = 6.968 p < 0.00830 Basic self-control		n	Index	Pearson's Chi² = 7.664 p = 0.00563 Focusing attention on the owner		n	Index	Pearson's Chi² = 9.335 p< 0.00225 Ability to walk on a leash	
			Yes	No			Always	Not always			Yes	No
≤ 2 years old	349	Δt ON-EN	–9.86	9.86	349	Δt ON-EN	–16.79	16.79	349	Δt ON-EN	18.10	–18.10
		%	87.68^{ax}	12.32^{b}		%	29.80^{ax}	70.20^{b}		%	73.64^{ax}	26.36^{b}
>2 years old	304	Δt ON-EN	9.86	–9.86	304	Δt ON-EN	16.79	–16.79	304	Δt ON-EN	–18.10	18.10
		%	93.75^{ax}	6.25^{b}		%	40.13^{ay}	59.87^{a}		%	62.50^{ay}	37.50^{b}
Total	653 100	Number %	591 90.51	62 9.49	653 100	Number %	226 34.61	427 65.39	653 100	Number %	447 68.45	206 31.55

Explanations: Percentages marked with different letters (a, b) in the rows are significantly different at $p \leq 0.05$. Percentages marked with different letters (x, y) in the columns (basic self-control: only the column with the answer "yes"; focusing attention on the owner: only the column with the answer "always"; ability to walk on a leash: only the column with the answer "yes") differ significantly at $p \leq 0.05$. Δt ON-EN – The difference between the observed number and the expected number; ON – observed number; EN – expected number

up to two years). Significant differences were noted between the values for the two age groups.

The impact of the test factors on the analyzed characteristics was found to be statistically significant at a minimum level of $P \leq 0.05$ (23%), with a lower significance of only 13% at a level of $P \leq 0.01$. It was decided that the acquisition of data through a questionnaire survey would yield more reliable results if the significance level was kept at a maximum of 1% error. It is, therefore, worth highlighting at the outset that factors differentiating the results included primarily the dog's breed and, to a much lesser extent, the dog's age. The other factors, i.e. the dog's sex as well as the owner's sex, age, and place of residence, did not determine the results or did so only sporadically.

As mentioned in the introduction, the dog's breed proved to be the most important factor, even though the survey was addressed to the owners of dogs classified as ancient. Although it has been proven that a dog's personality is not strictly breed-related, many behaviors, such as sociability towards humans, are hereditary (38). Therefore, belonging to a breed generally determines most of a dog's relationship with humans (44). The breed should, therefore, be an absolute basis for choosing a particular animal. The mental characteristics of dogs and their natural behavioral needs have been pointed out as decisive in choosing the right individual, in addition to physical characteristics, such as the coat type or body size (7). For example, a dog's sociability is a prerequisite for its involvement in joint activities with the owner (3). On the other hand, Shih et al. (52) demonstrated that larger dogs caused pressure on the leash admittedly less frequently, but the pressure was greater than that exerted by smaller animals, which may also be worth considering when choosing a specific breed.

What is also interesting is that the dog's sex did not significantly affect virtually any of the characteristics included in the questionnaire. This may primarily be related to the fact that the study involved dogs of ancient breeds, which for centuries have been recognized as working dogs (32). Selection towards the utilitarian function, which involved individuals of both sexes, has shaped and consolidated numerous traits, not only physical, but also mental, for both male and female dogs. In the case of other breed groups, the results would most likely be determined specifically by the animal's sex, as, according to Lofgren (31), female dogs, for example, those of the Labrador Retriever breed, are less aggressive towards the owner than male dogs are. Studies on primitive dog breeds conducted by Wójcik and Powierża (62) showed that females exhibited aggressive behavior more often, but it was directed exclusively towards other dogs or animals. There was no evidence of a relationship between sex and any other determinant they examined. Similarly to our work, their studies also demonstrated that belonging to a specific breed defined behaviors related to locomotion and attitude towards humans.

Another issue of importance from the perspective of canine specialists is the effect of factors related to the dogs' owners, i.e. their sex, age and place of residence, which in the present study was usually completely insignificant or occasionally significant, but only at a level of $P \leq 0.05$. These days, the owner's awareness about choosing the right dog for themselves and those close to them is increasing (4, 5). This awareness is even greater when choosing pedigree dogs, especially those intended for breeding or a special use (9, 16). It is very probable that the selection of the target group, specifically the owners of certain dog breeds, influenced the results obtained in this study.

Some studies by other authors have shown different results. For example, Shih et al. (53) assessed the effect of the dog carer's sex on the behavior of shelter dogs during a walk. It was demonstrated that male dogs under the care of men were more likely to pull on the leash and were stressed, as shown by a low tail or lip-licking. Under women's care, dogs showed such behavior much less frequently. Bennet and Rohlf (3) demonstrated the effect of demographic differences between dog owners on the occurrence of problematic behaviors, such as disobedience, aggression, nervousness, restlessness, and excitability. Moreover, Meyer and Forkman (35) found that a person who had a good relationship with their dog could predict the occurrence of anxiety and problematic behavior in the animal as a consequence of inappropriate actions.

As far as the statistically significant factors are concerned, it is worth emphasizing that they are related primarily to the training of a dog of a specific breed. Therefore, the results obtained in the current study may facilitate the selection of a dog of a particular breed or the optimal training regime. Pearson's test, indicating possible differences between specific percentage values, proved useful in differentiating between characteristics of particular breeds. The use of a clicker in training, for which especially the Chow Chow stood out, was found to be much less common than expected, with very few owners using this tool in training.

Strychalski et al. (56) proved that the Chow Chow, although it is considered to be a dog with low intelligence, can be successfully trained given considerably more time and repetitions. Although clicker-assisted training is recommended for dogs, it is unclear why the survey results differed in this respect from those obtained by other authors (45, 46).

Interestingly, most individuals of each breed had received only basic training plus a maximum of one specialized training. This was the case especially for the Akita and Chow Chow breeds, for which the expected values were higher than the observed ones. Significantly different was the Alaskan Malamute, for which basic training plus a minimum of two specialized trainings were reported by the owners in more

than 30% of cases. These results are not, therefore, consistent with those published by Turcsan et al. (57), who determined a low level of learning ability for this breed. Turcsan (57) and Walkowiak (61) reported that dogs of ancient breeds are generally characterized by a lower learning ability than, for example, herding dogs or scent hounds. Therefore, the type of training should be determined by the breed-specific learning ability, which is a consequence of genetic isolation (61). This fact results, for example, in herding dogs being the most trainable and terriers being bolder than scent hounds or herding dogs (57). As reported by Howell et al. (22) and Jędrzejczak and Pęzińska-Kijak (24), today's handlers are increasingly choosing forms of training for their dogs through a personal choice of methods and the intensity of their application, which ultimately makes it possible to prevent mental problems in dogs.

The ability to walk on a leash, another characteristic analyzed in this study, is considered essential and it is related to legal requirements and the control of the dog in everyday situations (64). The survey results appear to be partly predictable in this regard. It was found that for four out of the five breeds, animals who could walk on a leash were significantly more numerous than those could not. Only in the case of the Akita were the positive and negative answers distributed equally, which was unexpected, especially since the study involved dogs of large body sizes. It is also worth emphasizing that, for this breed, the expected value was lower than the observed one. Shih et al. (52) demonstrated that larger dogs exerted a greater tension on the leash but did so less frequently than smaller individuals. On the other hand, dogs of the ancient breeds might be expected to pull on the leash, since many of these breeds can be used in sledge teams, which is associated with over-reactivity and increased motor activity (30, 47). The present study, however, showed that almost 80% of Samoyeds and 70% of Chow Chows, Siberian Huskies, and Alaskan Malamutes had no problems walking on a leash. In addition, the expected value was higher than the observed one for the Samoyed breed, whereas the situation was the opposite for the Akita breed. The dogs of the Samoyed breed also had most problems walking on a leash. On the other hand, Huson et al. (47) reported that, due to the innate instinct of Alaskan Malamutes, they tend to be at the front, and thus pull on the leash during walks. Moreover, dogs of the ancient breeds are more prone to frustrated behaviors, which has an adverse effect on their walking on a leash. Therefore, these findings are not entirely consistent with the current results. It is generally reported that male dogs, regardless of breed, tend to pull harder and stronger when walking on a leash, especially with male owners. This behavior is often attributed to stress (53). It is also emphasized that dogs exhibiting stress often have a problem walking on a leash and can even bite it when frustrated. Most dogs pull on the leash when they notice another dog or animal. It is not entirely clear what led to the specific distribution of the results in the current study. When compared to the above reports, the present results can be considered surprisingly positive. Perhaps the specific nature of the breeds under study is linked to keeping them at home with free access to paddocks, which reduces the need for walks with a leash in favor of free and, occasionally, unrestricted movement.

The predominant answer to the question about the number of commands executed was "more than four" for all breeds. In the case of the Samoyed and Chow Chow breeds, the statistically expected values were higher than those observed. However, the answer "more than four" was significantly least frequent for the Chow Chow breed. The majority of dogs of each breed executed the command "Come". Another command that differentiated the results was "Heel". The Akita, Samoyed, and Siberian Husky responded to it much more often than not. The situation was the opposite for the Chow Chow breed, whereas for the Alaskan Malamute, the numbers of positive and negative answers were similar. Thus, already at this stage of the discussion, the Chow Chow appears to be distinctly different from the other four ancient breeds, especially since the expected values differed significantly from the observed ones. In this respect, the Alaskan Malamute is also noteworthy, as the commands in question are important for safety, and the owner should be able to provide the dog with information about the environment (34). Could it be suggested that these two breeds may be problematic in this respect? For example, can Chow Chow be dangerous to tracked game? The Chow Chow is generally characterized by independence and difficulty in training, which means that it needs an experienced owner (11). Without proper socialization, it can grow into an aggressive dog. The Alaskan Malamute, as well, is considered independent and stubborn, which makes it very difficult to train.

With regard to undesirable dog behaviors, highly significant relationships were demonstrated between the dog's breed and frustrated behaviors in training, staying in a kennel cage, and separation problems. Regarding frustrated behaviors, the results were rather surprising. Only for the Samoyeds and Chow Chows did the percentages of positive and negative answers differ significantly. However, the expected values differed from the observed ones in both cases. However, the Samoyeds responded to training with frustration most frequently, whereas the Chow Chows did so least frequently. Authors of studies on canine intelligence point out that, since the Chow Chow was developed as a meat breed, these dogs were supposed to move slowly, so as to reduce fat burning and be easier to catch for slaughter (11). Thus, acuity and vigor had to be eliminated. The fact that the Chow Chow used to be a meat breed resulted in these dogs forming no bond with humans. It has been reported that Chow Chows

do not tolerate violence-based training techniques, are very territorial, and have a strong hunting instinct, which is why they are called the Asian Spitz (56). They were ranked 11th among the 13 best guard dog breeds when aggressiveness was considered. According to Coren (11), the Chow Chow ranks as the worst working and least obedient dog breed, resulting in its 76th position out of 131 breeds in the relevant ranking. A dog of this breed needs more than 80 repetitions to learn a new command. As far as the execution of commands is concerned, it obeys a command for the first time in fewer than 30% of cases. Therefore, an individual owner's approach to a dog of this breed can dramatically change its image.

Frustration is generally defined as an aversive emotional reaction due to the inability to achieve a specific goal (8, 33). It can result from failure to achieve a desired goal or from a delayed or insufficient reward (1, 15, 23). A dog's owner should avoid frustration-generating situations by observing calming or distancing signals (49). At this stage of research, however, it can be assumed that the dog's frustration in training was due to the interaction of multiple factors and not only the effect of the dog's breed.

Upon further analysis, it was found that most dog owners opted not to use kennel cages, a practice that has gained increasing popularity in recent times, as reported by Transparency Market Research Inc. (54). This was the case with the Chow Chow to the greatest extent and with the Samoyed to the least extent, again indicating a notable dissimilarity between these two breeds. Unfortunately, separation problems affected most breeds under analysis, which was particularly evident for the Akitas and Chow Chows. In this respect, the results of the present study are not entirely consistent with those published by Coren (11), who noted that Chow Chows are considered solitary animals who often become irritable, aggressive, and fearful when surrounded by many people or when given excessive social attention. People choosing a specific dog breed to suit their lifestyle should be aware of these issues. According to Storengen et al. (55) and Parthasaratha (43), separation anxiety is manifested by excessive vocalization, destroying various objects in the house, and excessive motor activity, including jumping on doors, which can be a major problem for the dog's owner.

The current study also obtained interesting results concerning a dog's age. In young dogs, the regularity of training was significantly higher than expected, whereas the opposite was true for older dogs. According to more than 80% of the answers concerning individuals aged up to two years, dogs were trained more frequently than once a week. The training frequency for older dogs was similar, but it was less regular than it was for young dogs. It is worth noting, however, that frequent training only concerned basic obedience and a maximum of one type of specialized training. These results were more pronounced for dogs aged up to two years, which is reassuring. Young dogs should not be trained intensively; obedience training should be supplemented with socialization activities to avoid future mental disorders, including aggression (28, 54). The effectiveness of canine learning is affected to a large extent by whether it is carried out intensively or extensively, i.e. less frequently (13, 61). Training intensity limited to two sessions per week is most effective. An equally important fact is that dogs can learn even at a mature age. It has been proven, however, that young dogs acquire new skills much faster, becoming confident and emotionally stable.

With regard to the self-control of dogs of different ages, there were generally few problems. Admittedly, self-control problems were reported less frequently for dogs aged up to two years, but this should not be surprising, since this age group may include puppies, and not even basic forms of self-control can be expected of them, which is also confirmed by a study by Bray et al. (6). Thus, the results of the present study are consistent with findings of other authors. According to Miller et al. (39), a dog's effort associated with self-control triggers more impulsive and risky actions. On the other hand, self-control affects an animal's working memory (37).

With regard to focusing attention on the owner, problems in this respect were reported far more frequently for young dogs, which is unsurprising. However, the result for older dogs may come as a surprise. Fewer than 60% of these dogs always focused on the owner, which is unfortunately typical of the breeds under study (26, 36). According to Clark and Boyer (10), the failure to focused attention on the owner may be due to insufficient or ineffective obedience training. Since no influence of a specific breed was observed, the source of these problems may lie in the nature of dogs from the entire group of ancient breeds (particularly working dogs) or in their improper training. Another source of these problems, however, are the owners, who often choose these particular breeds for typical amateur maintenance. It is worth considering how such choices cast a bad light on certain dog breeds. The situation can be likened to incidents involving irresponsible owners of defense dogs, often commented on in the media (50).

The current study also highlighted the issue of the ability to walk on a leash. The lack of this ability in almost 40% of dogs over two years of age is a matter for concern and, from the dog handling perspective, difficult to explain, especially since only the Alaskan Malamute is known for having problems with this task (19, 30). What is happening, therefore, to the other breeds? What is happening to their owners? Various reasons for the lack of self-control are reported. According to other studies, younger individuals (mostly those aged 8-11 months) pull on the leash more often, and smaller and lighter dogs pull more frequently than larger and heavier individuals, although the latter do so with greater force (51-53).

The methods and outcomes of training ancient breed dogs are determined mainly by their breed and, to a lesser extent, their age. Factors associated with the owner's age, sex, and place of residence, as well as the dog's sex, are not expected to have a considerable effect on the outcome of training these animals. Frustrated behavior in training, noted especially for the Samoyed breed, appears to occur quite commonly in ancient breed dogs. Walking on a leash is mastered to a high degree, but still insufficiently, by each breed. Frequent lack of this ability in adult dogs is a cause for concern. Executing commands and self-control should not usually be a problem in dogs of the breeds under analysis, although the Chow Chow and Alaskan Malamute may be disobedient. A problem, however, is social isolation, especially in the Akita and Chow Chow, and although a kennel cage is helpful in this case, it is not readily used by owners.

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