

Retrospective Study

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Correlates of Attention Deficit Hyperactivity Disorder (ADHD)-Like Behavior in Domestic Dogs: First Results from a Questionnaire-Based Study

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ABSTRACT

Introduction: The behavioral disorder, attention deficit hyperactivity disorder (ADHD) is typically associated with human children, but its clinical manifestation in dogs has recently been investigated indicating that certain gene variants (e.g., the *DRD4* gene) contribute to its expression.

Objectives: In this study, the aim is to strengthen the understanding of the causes of ADHD-like behavior in dogs by investigating the potential non-genetic correlates of the condition.

Methods: In particular, the presence of ADHD-like behavioral symptoms across different dog breeds and groups were examined with respect to various social and physical factors using a diverse set of questionnaires (ADHD, anamnesis, and personality and interview) given to the dog owners of two dog schools and one dog club (n=61) as well as an existing, unpublished database that was established previously (n=60).

Results: Our results showed that various social factors (e.g., degree of affectionate behavior, number of social contacts, and the duration of period of separation) and physical parameters (amount of play time as puppies as well as frequency and duration of walking, possibly castration) were associated with ADHD-like behavior across all the dog breeds, with the Akita breed being noticeably calmer than the other dog breeds.

Conclusion: Although, ADHD-like behavior does not appear to be a heritable trait in an evolutionary scale, the results reported in this study combined with existing genetic information about this trait indicated that the expression of ADHD-like behavior in dogs would appear to depend on a classical gene-environment interaction as is the case with many neurological disorders in humans. The conclusion is directed towards making recommendations to improve the social and physical situation that might minimize the potential for the development of ADHD-like symptoms in animals that are genetically predisposed to this condition.

KEY WORDS: ADHD; Dogs; Dog breeds; Environment; Phylogeny; Social bonds.

ABBREVIATIONS: ADHD: Attention Deficit Hyperactivity Disorder; DSM-5: Diagnostic and Statistical Manual of Mental Disorders.

INTRODUCTION

Attention deficit hyperactivity disorder (ADHD) is a behavioral disease that is most commonly associated with and investigated in humans and in children in particular.^{1,2} It is characterized by a suite of symptoms that include inattention, increased motor activity, and a tendency to show

an aggressive behavior or impulsivity³⁻⁵ and affected individuals often show poorly adjusted social behavior.⁶ The diagnostic and statistical manual of mental disorders (DSM-5) distinguishes three presentations of ADHD depending on the predominant symptom pattern for the past six months⁷: combined presentation (presence of the core features hyperactivity/impulsivity and inattention; presence of ≥ 6 symptoms/feature), predominantly inattentive presentation (≥ 6 symptoms of inattention, ≤ 6 symptoms of hyperactivity/impulsivity) and predominantly hyperactive/impulsive presentation (≥ 6 symptoms of hyperactivity/impulsivity, ≤ 6 symptoms of inattention). Existing research on ADHD has concentrated largely on its causes as well as on the prevention and treatment of its clinical expression.^{5,8,9,10} As is the case for most other human psychological diseases, ADHD has a genetic component such that specific genes increase the risks of developing the disease; however, it is also assumed that gene-environment interactions play an important role in this context.¹¹

The recent extrapolation of ADHD research to the domestic dog, which, like humans, is a social mammal on account of which some authors have argued that this species has the potential to display aspects of human social behaviour.¹² Humans and dogs also share prosocial qualities as well as maintain social bonds.^{13,14} Additionally, dogs and children also show some degree of similarity with regards to their association with the social environment and the behavioral responses related to it^{13,15}, which is of clinical relevance in the context of ADHD. Indeed, in contrast to rodent models and related laboratory experiments, dog models consider social relationship as a factor, one that was highlighted by Vas et al¹⁶ as an important factor in shaping human social relationships or in understanding the hyperactivity of children. Thus, altogether, dogs appear to provide an adequate model for (some) psychological diseases in humans, especially because the latter can affect different dog breeds.¹⁷

With regards to research on ADHD-like behavior in dogs, several studies have posited a genetic underpinning for this disease. For instance, increased activity/impulsivity values in German Shepherds are associated with a specific allele of the tyrosine hydroxylase gene *TH*.¹⁸ In addition, as in humans, polymorphism of the dopamine receptor gene *DRD4* has been associated with aggressive or inattentive behavior in dogs as well as general nervousness.^{15,19,20,21} Inattentive behavior has also been associated in Belgian Shepherds (Malinois) with a polymorphism of the dopamine beta hydroxylase gene *DPH* or the dopamine transporter gene *DAT*²² and might more generally also be influenced by variants of the oxytocin receptor gene or genes of the brain opioid system in addition to epigenetic effects, which appear to be associated with behavioral patterns that are directed towards humans.²³⁻²⁵

However, in addition to genetic factors, social and physical factors also appear to have an important influence on the origin of ADHD-like behavior in dogs. In a review article based on the findings from human and laboratory animal studies, Szyf et al²⁶ emphasized on the importance of diverse environmental factors for the brain and for triggering long-lasting be-

havioral changes. Social play, for example, helps juvenile mammals improve their mental and behavioral functions⁹ and, in their absence, a facilitation of ADHD must be assumed.²⁷ Even the simple act of dogs playing with other dogs can help reduce separation-related behaviour.²⁸ Moreover, early mental and physical activity helps provide shelter against neurological diseases.²⁹ Associated with this behavioral parameter, castration with its resulting decrease in testosterone values, can evoke ADHD-like symptoms in dogs^{30,31} such that the age at which castration is performed plays a significant role in determining the clinical manifestation of ADHD.³² Finally, Hense³³ describes the other factors closely related to hyperactivity in dogs, in particular the rearing conditions, treatment received from the owner, and the existence of stressful conditions.

In this study, a comprehensive examination of potential non-genetic factors that might influence ADHD-like behavior in dogs was undertaken. A combination of questionnaires was used which directly assessed ADHD-like behavior in dogs as well as the basic personality traits of animals (see Jones and Gosling³⁴; Turcsán et al³⁵) and other information from its current and past living conditions that might be relevant to the development of ADHD. Although, this study focussed on non-genetic factors, it is relevant to ask whether ADHD-like behavior was heritable on a longer, evolutionary timescale by examining the differences in its prevalence among breeds or groups of breeds (based on kennel club or genetic classifications). With a focus in particular on the breed Akita Inu, which, despite being characterized as calm,³⁶ was described as increasingly nervous by some of the owners. Specifically, the following hypotheses were tested:

1. Social and physical factors in the environment of individual dogs influenced the degree of ADHD-like behavior exhibited by the dog.
2. The factor of castration influenced the degree of ADHD-like behavior exhibited by the dog.
3. Scores of categories of behavior in the ADHD and Personality questionnaires (motor activity or inattention; different dimensions of personality) were correlated.
4. Groups of related dog breeds differed with respect to the degree of exhibited ADHD-like behavior.
5. ADHD-like behavior in dogs is a trait that is heritable over evolutionary timescales among different dog breeds.

METHODS AND MATERIALS

Data Collection

The degree of ADHD-like behavior in different dogs (Tables 1-3) was assessed using one or more different questionnaires. The ADHD questionnaire of Vas et al¹⁶ required the dog owners to score the everyday behavior of their dogs, allowing for the collection of information about the degree of motor activi-

ty and inattentiveness of the animal in different situations. The Personality questionnaire of Turcsán et al³⁵ measures the level of response with respect to the four distinct dimensions of the personality of the dog, namely calmness, trainability, dog sociability, and boldness, with the latter correlating to the factor

extraversion in the Five Factor Model.^{35,37} As with the ADHD questionnaire, the Personality questionnaire represented the behavior of the dog in the terms of a score (0=behavior was unincisive, 1=behavior was distinct at a maximum).

Table 1: Database Collection–main Sample Information.

Individual	Breed/mongrel	Age in years	Sex	Castration
1	Kromfohrländer	3	m	n
2	Mongrel	2	m	y
3	Nova Scotia Duck Tolling Retriever	2	m	n
4	Labrador Retriever	3.5	m	n
5	Pointer	2.5	m	y
6	American Hairless Terrier	1	m	n
7	Mongrel	4	m	y
8	American Pitbull Terrier	2.5	m	y
9	Entlebucher Mountain Dog	2.5	m	n
10	Boxer	3	m	-
11	Mongrel	2.75	m	y
12	Labrador Retriever	2	m	n
13	Leonberger	2	m	y
14	Mongrel	0.5	m	n
15	Great Swiss Mountain Dog	3.5	m	y
16	Labrador Retriever	1.5	m	n
17	Border Collie	1	m	n
18	Mongrel	3.5	m	y
19	Mongrel	9	m	y
20	Parson Russell Terrier	3.5	m	n
21	Mongrel	1	m	n
22	Vizsla	6	m	y
23	Mongrel	6.5	m	y
24	Mongrel	4	m	y
25	Mongrel	0.75	m	n
26	Australian Sheperd (miniature)	3.5	m	y
27	Labrador Retriever	1	m	n
28	Hovawart	1	m	n
29	Catalan Sheepdog	3	m	n
30	Mongrel	12.5	m	y
31	Mongrel	5	m	n
32	Mongrel	0.75	m	n
33	Doberman	2	m	y
34	Bull Terrier (miniature)	2	m	n
35	Poodle	3.5	m	y
36	Mongrel	1	m	n
37	Berger Blanc Suisse	2	m	n
38	Mongrel	2.5	m	y
39	Hunting Terrier	1.75	m	y
40	English setter	2	m	n
41	Yakutian Laika	2	m	n
42	German shepherd	4.5	f	n
43	Mongrel	1	m	n
44	Austrian Pinscher	3.5	m	y
45	Mongrel	3	m	y
46	Boxer	2	f	n
47	Parson Russel Terrier	3	m	n
48	Border Collie	1.5	m	n
49	Black Russian Terrier	1.75	m	y
50	Portuguese Podengo	4	f	y
51	Rhodesian Ridgeback	1.75	m	n
52	Australian Shepherd	4	m	n
53	Mongrel	1	f	n
54	Catalan Sheepdog	3	m	n
55	Catalan Sheepdog	5.5	m	y
56	Chihuahua	4	f	n
57	Mongrel	2	m	n
58	Border Collie	5.5	m	n
59	Mongrel	7	m	n
60	Mongrel	0.5	f	n

Table 2: Dog-School Subjects – Main Sample Information.				
Individual	Breed/mongrel	Age in years	Sex	Castration
1	Australian Shepherd	4	m	n
2	Cão da Serra de Aires	2	m	n
3	Mongrel	4.5	f	n
4	Irish Wolfhound	2.75	f	n
5	Mongrel	1.75	f	n
6	Mongrel	1	m	n
7	Mongrel	8	f	y
8	Mongrel	3	m	n
9	Mongrel	8.5	m	y
10	Mongrel	7	f	n
11	American Bulldog	6.5	f	y
12	Mongrel	9	m	y
13	Berger Blanc Suisse	4	m	y
14	Schnauzer	1.5	m	y
15	Mongrel	8	f	n
16	Bernese Mountain Dog	1.5	m	y
17	-	6	m	y
18	-	10	w	n
19	Jack Russell Terrier	3.5	f	y
20	Australien Shepherd	1.5	f	n

Table 3: Akita Dogs - Main Sample Information.			
Individual	Age in years	Sex	Castration
1	0.5	m	n
2	3	f	n
3	2	f	n
4	2.5	m	n
5	4	f	n
6	9	f	y
7	10.5	m	n
8	8	m	n
9	9	f	n
10	1.5	f	n
11	1.5	m	n
12	2.5	m	n
13	2.5	m	n
14	2	f	y
15	2	m	n
16	13	f	y
17	7	m	n
18	5	f	n
19	2	m	n
20	4	f	n
21	0.5	f	n
22	6.5	m	n
23	3	f	n
24	5	f	n
25	2	f	n
26	5	f	n
27	3	m	n
28	1.5	m	n
29	2	f	n
30	7	m	n
31	6	f	y
32	10.5	f	y
33	7	f	y
34	12	f	y
35	0.5	f	n
36	7	f	n

In addition, we also applied results from two questionnaires where, unlike the previous two, their scientific validity has not yet been established. The Anamnesis questionnaire (Ganslößer and Strodtbeck, unpublished records) mainly generated information about the earlier and current life situations of dogs. Finally, an Interview questionnaire was developed with the help of dog trainers as an extension of the Anamnesis questionnaire to try and detect ADHD -related factors about which

hardly or no information could be gathered. The questionnaire was divided into an introduction and three further sections with questions about the early environment and the mother-child-relationship of the animal, the current environment of the animal, and the level of physical exercise (e.g., training, play or the participation in dog schools and/or puppy hours). All the questionnaires have been included as the supplementary material (in below).

RESULTS

Dog Breed Groups

Figure 1: Comparison of Motor Activity Values for Four FCI Dog Groups. The Group "Spitz and Primitive Types" has been Represented by the Data Collected from Akita Dogs.

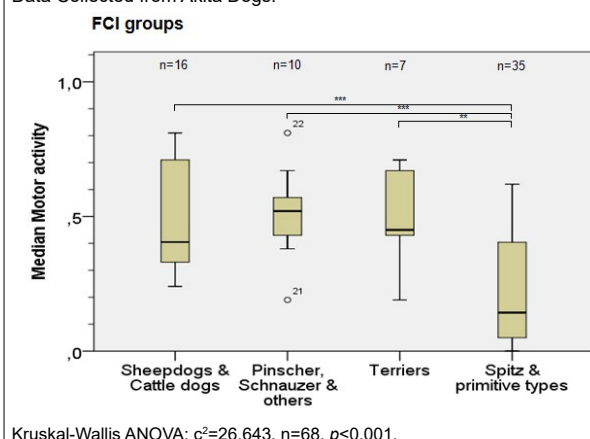


Figure 2: Comparison of Motor Activity Values for Four Molecular Genetic Dog Groups (after Parker et al³⁹). The Ancient-Asian group has been Represented by the Collection of Akita dogs.

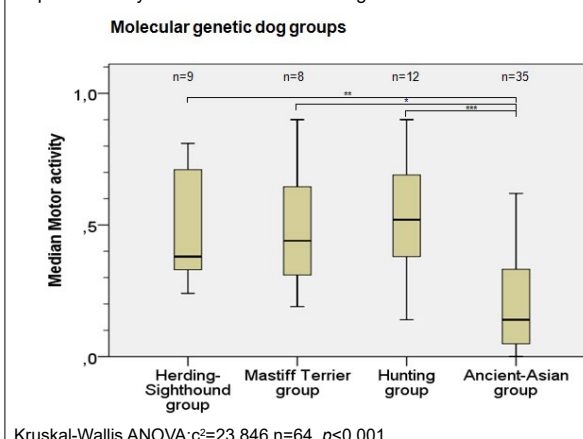
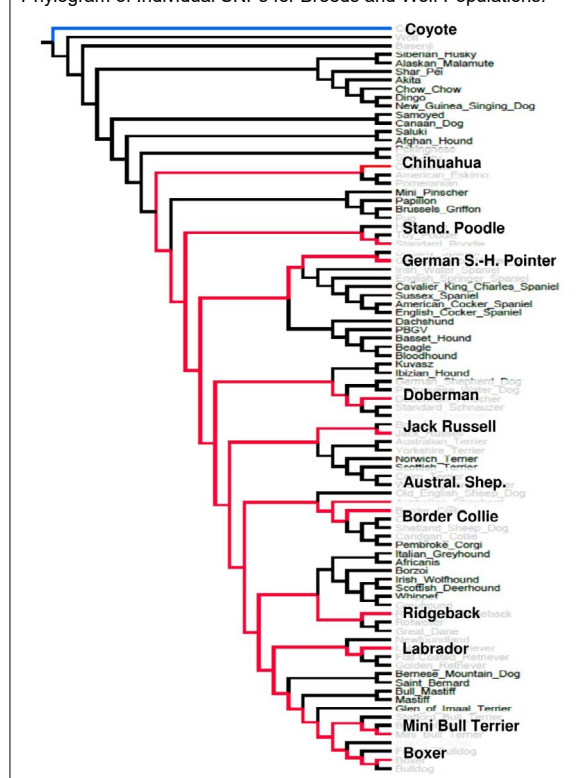


Figure 3: Neighbour-joining tree after vonHoldt et al.⁴⁰ Allele-sharing Phylogram of Individual SNPs for Breeds and Wolf Populations.



Data were then collected from different sources using one or more of the questionnaires. First, the “collective database” (Gansloßer and Strodtbeck, unpublished.; www.einzelfelle.de) comprised a data set with information from different dog breeds and mongrels ($n=60$) that was collated using the ADHD, Anamnesis and Personality questionnaires. The dogs being studied were heterogeneous with respect to their age, gender and breed. Secondly, a database of “dog school subjects” was compiled from the records of animals of different breeds

and mongrels ($n=20$) that belonged to collectives from two dog schools in the northern part of the German province of Lower Saxony. In these dog schools, the dog owners placed their pets into one of the two different personality categories: active and nervous *versus* calm and/or relaxed. Data were collected using the ADHD and Interview questionnaires. Again, the investigated animals presented with a heterogeneous character with respect to their age, gender and breed. Finally, an Akita-specific database ($n=36$) was compiled with the help of the Japan Akita e.V. dog

club in Germany and scores for motor activity and inattention were obtained using the ADHD questionnaire. For some analyses, not all questionnaires for a data set could be used because of missing answers and the sample sizes were adjusted accordingly.

Data Analysis

Statistical analyses were performed using the IBM SPSS Statistics v.24. All the tests used a nominal alpha value of 0.05 corrected for multiple comparisons using a Bonferroni correction. This procedure was employed on a per hypothesis basis for each factor that was involved in two or more correlations and in between-group comparisons (see below).

Social and Physical Correlates of ADHD-Like Behavior (Hypotheses 1 and 2)

Motor activity and inattention scores as well as scores for the questions 1 to 13 from the ADHD questionnaire) were correlated with factors from case-study questionnaires (i.e., Anamnesis and Interview questionnaires) to identify the social and physical correlates of ADHD-like behavior in dogs. Important social factors determined were the duration of petting bouts, the duration of periods of separation and the number of social contacts established. The latter was defined as a non-isolated dog-dog or dog-human contacts of at least a week-long duration. Physical factors included the duration and frequency of walks as well as the frequency of play time. In addition, nominal factors like castration (hypothesis 2) were also determined.

Comparing the ADHD and Personality Questionnaires (Hypothesis 3)

Both the ADHD and Personality questionnaires attempted to assess the degree of ADHD-like behavior in dogs, albeit using different criteria and perspectives, with the ADHD questionnaire representing a more direct assessment. Using Spearman rank correlation, it was tested how strongly each of the four personality dimensions in the Personality questionnaire correlated with the scores for motor activity and inattention scores in the ADHD questionnaire.

Heritability of ADHD-Like Behavior (Hypotheses 4 and 5)

Two analyses were performed to determine ADHD-like behavior in dogs which had a heritable component over the evolutionary timescales, potentially resulting from its potential genetic underpinnings. First, the thorough bred dog subjects from the collective and Akita databases were pooled into groups following the grouping systems of the Fédération Cynologique Internationale, Thuin, Belgium³⁸ and that of Parker et al³⁹ which was based on a cluster analysis of molecular genetic information. For both the systems, it was assumed that the groups roughly reflected the degree of relatedness between the different breeds. Breeds that were not listed in either system were excluded from

the analyses, with the exception of Akitas, which were included among the Spitz and primitive types (FCI) or Ancient-Asian (molecular genetic) groups. FCI groups or molecular genetic dog groups were compared among themselves for motor activity and inattention scores from the ADHD questionnaire using a Kruskal-Wallis ANOVA test. Only groups with $n \geq 6$ were used in the analyses: FCI groups – Sheepdogs and Cattle dogs ($n=16$), Pinscher, Schnauzer and associated dogs ($n=10$), Terriers ($n=7$), Spitz and primitive dogs ($n=35$); and molecular genetic groups – Ancient-Asian Group ($n=35$), Herding-Sighthound Group ($n=9$), Mastiff Terrier Group ($n=8$), Hunting Group ($n=12$).

Next, it was determined if ADHD-like behavior showed phylogenetic signals in so far as its presence was significantly clustered in the molecular evolutionary tree of the different dog breeds in vonHoldt et al.⁴⁰ For these analyses, the presence of ADHD-like behavior was coded as a present/absent categorical variable based on the motor activity and inattention scores from the ADHD questionnaire responses for the collective database. Breeds for which any ADHD-like behavior was indicated were scored as (1=present); all other breeds, including those for which no information was available, were scored as 0. For the latter, it was assumed that ADHD-like behavior represented such an obvious disorder that the absence of any information in this regard for the breed meant that no symptoms for it were obviously present. Significant clustering of ADHD-behavior among the dog breeds was determined using the D measure of Fritz and Purvis⁴¹ as was implemented using the caper package v0.5.2 in R.⁴² Briefly, if D was not significantly different from 0, the trait was not randomly distributed within a tree and was assumed to have a phylogenetic implication, whereas there was no phylogenetic signal if D was not significantly different from 1.

DISCUSSION

Social and Physical Correlates of ADHD-Like Behavior

The results of the present study indicated that specific ADHD-like behavior in dogs indeed correlate with numerous social and physical factors (Table 4). In particular, social factors including the duration of affectionate behavior following adoption, the number of social contacts, the duration of period of separation, and dogs that slept alone at night, all correlated significantly with increased ADHD-associated symptoms (Table 4). A negative correlation was also observed for the physical factor of the frequency of play time, whereas increase in either the frequency or duration of walks correlated significantly with increased inattention (as was measured by ADHD question 11). Castration also had an effect so far as castrated dogs displayed a significantly higher motor activity value relative to the uncastrated ones (Table 4).

Although, existing literary records of this condition on dogs is often lacking in this regard, an analysis of the human and mammalian literature supports the findings of many results, even if only at a more general scale. For instance, in their re-

Table 4: Summary of the Statistical Analyses Yielding Significant Correlations for Hypotheses 1 to 3 from the Introduction.

Hypothesis	Factor - Factor / Group comparison	Database	Spearman's rank correlation coefficient (r_s) / Test statistics	p-value (a after Bonferroni correction)
1 – Social factors	Duration of affectional behavior (after adoption) – inattention	Dog school subjects	-0.56 (n=19)	0.013 (0.025)
1 – Social factors	Number of social contacts – values for ADHD question 2 (Velocity for gaining or losing interest)	Collective database	-0.525 (n=20)	0.017 (0.025)
1 – Social factors	Number of social contacts – values for ADHD question 3 (Concentration problems in tasks or games)	Collective database	-0.522 (n=20)	0.018 (0.05)
1 – Social factors	Duration of separation period – values for ADHD question 5 (Problems to keep calm)	Collective database	-0.328 (n=49)	0.023 (0.025)
1 – Social factors	Duration of separation period – motor activity	Collective database	-0.29 (n=49)	0.044 (0.05)
1 – Social factors	Sleeping situation (alone/not alone) – inattention	Collective database	Mann-Whitney U=71,5 (n=37 and n=8)	0.023 (0.025)
1 – Physical factors	Frequency of play time (until 6 months) – motor activity	Dog school subjects	-0.561 (n=17)	0.019 (0.025)
1 – Physical factors	Frequency of walks – values for ADHD question 11 (Hectic or Problems in solving tasks)	Collective database	0.297 (n=52)	0.034 (0.05)
1 – Physical factors	Duration of walks – values for ADHD question 11 (Hectic or Problems in solving tasks)	Collective database	0.29 (n=54)	0.035 (0.05)
2 – Castration	Castration (yes/no) –motor activity	Collective database	Mann-Whitney U=594,0 (n=59)	0.005 (0.025)
3 – Personality	Calmness –motor activity	Collective database	-0.52 (n=60)	0.00002 (0.0125)
3 – Personality	Calmness –inattention	Collective database	-0.499 (n=60)	0.00005 (0.0125)
3 – Personality	Sociability – inattention	Collective database	-0.326 (n=59)	0.012 (0.025)
3 – Personality	Trainability – inattention	Collective database	-0.334 (n=59)	0.01 (0.017)

view article on human and laboratory studies, Szyf et al²⁶ clearly indicated that factors existing in the social environment can indeed evoke long-lasting brain and behavioral changes. It is also known that mammals have a so-called panic-grief system⁴³ that promote the development of social bonds,⁹ and also make them vulnerable to depression *via* social rejection or loss.^{9,43} These symptoms are closely related to the synthesis of receptors involved in the development of the emotional system of the dog before the onset of sexual maturity.³³ Dogs possessing a well-developed receptor system tend to achieve a feeling of social security more quickly than others.³³ Additionally, existing literature emphasizes on the possible stress effects on dogs resulting from restrictions in their social (or spatial) settings.⁴⁴

In this regard, the negative correlation between many of the social factors and inattention values as outlined above becomes understandable. For instance, longer phases of affectionate behavior towards a (young) dog can release high amounts of oxytocin in it,⁴⁵ with oxytocin being an important regulator of social dynamics.⁴⁶⁻⁴⁸ Not only does oxytocin influence the developing brain of humans it also plays a role in establishing the mother-child relationship,⁴⁹ towards supporting the regulation of negative emotional states as well as to enhance the motivation

for building and facilitating new social interactions.⁵⁰ However, oxytocin is only one such compound; it should be noted that many other chemical substances in addition to it (e.g., opioids, prolactin, corticoliberin or glutamate) have affect the origin of social relationships.⁵¹

The implied social situation of the dog can also influence its behavior as was shown by both the sleeping situation and the duration of the period over which the dogs were left unattended. Dogs that slept alone or were left unattended for longer periods were considered to be undergoing different forms of social isolation, something that was shown to increase stress levels in humans,⁵² mammals in general⁵³ and guinea pigs and chickens⁵⁴ and could contribute towards the higher inattention values in the former group and decreased motor activity scores in the latter (Table 4). Both the variables indirectly impacted the number of social contacts.⁵⁵⁻⁵⁷ Thus, dogs might have preferred sleeping near the owners or other pets, just as Rütten and Fleißner⁵⁸ observed that pack mates in African wild dogs were close to one another when resting or sleeping. Furthermore, although dogs generally remain calm during the period of separation from their owners (regardless of the duration of this period),⁵⁹ those separated over a longer time show greater physical

activity when their owners returned,⁶⁰ potentially reflecting on their increased perceived social isolation during the prolonged separation period. Thus, although short periods of separation did not seem as detrimental—and might have positive benefits if the results of Raineke et al⁶¹ showed that short periods of separation in rats from the mother could decrease anxiety or stress-related behavior in young rats (so-called neonatal handling) which could also be explained with respect to dogs—long-lasting, repeated periods of isolation impaired the welfare of the dog.⁶⁰

Perhaps less obvious is that the physical environment of the dog also contributes to its psychological well-being. Although many studies have documented the general positive effects of physical activity (e.g., Mattson⁶²), it remains undisputed that recovery phases will also be needed. Thus, the positive correlations that were observed between the walking activity and ADHD-like symptoms might have been derived following an overstimulation of the dogs compared to their natural behavior, with many studies indicating that dogs were largely inactive over their daily schedules. For instance, feral dogs invest only 12% of the day in travel activity.⁶³ Further details were provided by Bloch⁶⁴, who stated that dogs spend 71.4% of the day in inactivity, with the active hours (3.3 to 4.7 hours; 1.6 hours more in juveniles) being dominated by territorial behavior, feeding, or vigilance. Analogous results have been observed for guard dogs, which were found to be inactive for 70±23% of an eight-hour period⁶⁵ and free-ranging Indian dogs, that spent only 15.7% of the day walking and more than half being inactive.⁶⁶ In the light of these results, different walking opportunities and the pleasant anticipation associated with them could result in a permanently elevated level of arousal or unrest in some dogs and could be problematic if the dogs were already overtly active.³³ In contrast, more playing opportunities for young puppies (<six months of age) appear to have a positive effect in that such individuals show less motor activity and so are less hyperactive. It is well accepted that juvenile play, which is widespread among mammals, has a positive influence on the development of the juvenile mammalian brain and the developmental process in general.^{9,67,68} Furthermore, it is assumed that the inadequate play opportunities in childhood can contribute to the development of ADHD and depression in humans.⁹

Finally, castration in dogs correlated with increased motor activity values, as was explained by the findings of Salmieri et al⁶⁹. In association with this observation, Farhooody and Zink⁷⁰, Lisberg and Snowdon⁷¹ and Zink et al⁷² established a link between castration and an increase in the risk for the development of fear, anxiety, uncertainty and hyperactivity, possibly because stress and fear symptoms were more difficult to regulate because of the decrease in testosterone levels.³⁰ However, other studies have found castrated dogs to be less hyperactive than uncastrated ones,^{31,73} therefore, it is possible that other factors might be involved here as well.

ADHD and Personality Traits

Existing literature based on human findings, where Parker et al⁷⁴

and Nigg et al⁷⁵ reported a certain degree of association between some basic personality dimensions and ADHD, the results of the present study showed several personality traits in dogs that could be correlated with ADHD-like behavior. In particular, the ADHD-like trait of inattention correlated negatively with each of the personality traits of calmness, sociability, and trainability (Table 4), such that motor activity and calmness also showed a negative correlation to each another (Table 4).

Indeed, many of the correlations that were found were hinted at on studies conducted on human subjects. For instance, Nigg et al⁷⁵ established a correlation between increased aggression (which was linked to lower agreeableness or, in the current context, sociability) and heightened hyperactivity-impulsivity (here, potentially inattention). Moreover, calmer individuals showed fewer symptoms of negative emotional states.⁷⁶ The latter included anxiety and depression, which was linked to increased inattention⁷⁵ and, in the context of this study, perhaps decreased trainability in dogs because their ability to concentrate on specific tasks was considerably affected. Naturally, one cannot conclude too much from these results because it is yet to be understood how many of these traits would be applicable for dogs given that it remains unknown whether similar personality traits in humans and dogs underlie the same psychological (e.g., emotional) mechanisms. In addition, dogs themselves are heterogeneous with respect to behavioral parameters which often differ between the conventional (e.g., FCI) or genetic dog groups (e.g., Ancient-Asian group).³⁵

Heritability of ADHD-Like Behavior

Although, the present study highlights on the possible non-genetic determinants of ADHD-like behavior in dogs, numerous studies also point to a genetic predisposition for this condition (e.g. Faraone et al⁷⁷; Burt⁷⁸). Being aware that many psychological diseases find their origin in gene-environment interactions (as in humans¹¹), it was of great interest to observe if certain breeds or groups of closely related breeds were more disposed to develop ADHD-like behavioral traits in comparison to the others, reflecting on the heritability of this trait on an evolutionary timescale. In this context, differences between the breeds concerning the occurrence of certain alleles linked to ADHD-like behavior have been documented,²⁰ which have also been assumed to lead to differences on the behavioral level.^{20,79} It is also known that certain breeds are more vulnerable towards developing anxiety relative to the others⁸⁰ which could lead to ADHD-like behavior (e.g., inattentive behavior caused by increased anxiety).

Following the comparison of groups of different dog breeds to one another, the results indicate a significant difference among groups, with significantly lower motor activity values for Akitas compared to all other groups, whether with the FCI Spitz and primitive group (Figure 1 and Table 5; Kruskal-Wallis ANOVA $c^2=26.643$, $n=68$, $p<0.001$) or with the molecular genetic Ancient-Asian group (Figure 2 and Table 6; Kruskal-Wallis ANOVA: $c^2=23.846$, $n=64$, $p<0.001$). Similarly, significant differences between the groups with respect to their

Table 5: Comparison of Motor Activity Values for the FCI Groups – Summary of the Significant Results.

Group – Group comparison	Corrected <i>p</i> -value
Sheegdogs & Cattle dogs – Spitz & primitive types	0.001
Pinscher, Schnauzer & others – Spitz and primitive types	0.001
Terriers – Spitz & primitive types	0.010

Table 6: Comparison of Motor Activity Values for the Molecular Genetic Dog Groups – Summary of the Significant Results.

Group – Group comparison	Corrected <i>p</i> -value
Herding-Sighthound group – Ancient-Asian group	0.009
Mastiff Terrier group – Ancient-Asian group	0.022
Hunting group – Ancient-Asian group	0.001

inattention scores were found for both the FCI (Kruskal-Wallis ANOVA: $\chi^2=9.239$, $n=68$, $p<0.05$) and molecular genetic groups (Kruskal-Wallis ANOVA: $\chi^2=8.637$, $n=64$, $p<0.05$), although pairwise comparisons only revealed one difference and that between the Ancient-Asian and Hunting groups for the latter ($p=0.043$). Together, these results support the idea that motor activity and inattention values are positively correlated for some dog breeds (groups), which, in turn, depend on personality traits as discussed above.

In addition, these results also fit well with the general description of Akitas as “calm”,³⁶ but do not match the statements of some Akita owners who have evaluated their dogs as becoming increasingly nervous. However, it must be remembered that the statements of the Akita owners about their dogs’ behaviour must be viewed somewhat critically because of their potential subjectivity. An owner normally has a special relationship to his/her dog and therefore could overestimate the severity of any apparent behavioural changes. It is also conceivable that the impression of some owners has more to do with the fact that Akitas might be acting more “nervously” at club meetings, where the animals are often kept closely to each other. Nevertheless, the opposite perspective is also worth considering in that other groups do have significantly higher motor activity values than do Akitas. Bradshaw et al⁸¹ indicated that herding dogs (e.g., the FCI Sheep and Cattle Dog group) tend to show an increasingly aggressive behavior, which could result in higher motor activity values; the same reason might apply for the molecular genetic Hunting group. Similarly, the Terrier group is characterized by traits such as high energy level, excitement, reactivity, but also boldness,^{35,82-84} which could also translate into higher motor activity.

However, these differences do not translate more generally across dogs with respect to the D-value of Fritz and Purvis⁴¹ for the presence of ADHD-like behavior based on the phylogeny as was observed in Figure 3 was 0.94, which was significantly different from 0 ($p=0.01$), but not from 1 ($p=0.36$). Thus, this trait was distributed randomly on the phylogenetic tree indicating a lack of any phylogenetic signal/heritability at this scale. The slight difference in these two sets of results might be derived from Akitas being noticeably calmer than other groups of dog

breeds, but also because the phylogenetic analyses were more fine-grained so far as the different dog breeds were not lumped together in a limited number of categories. Moreover, although the breed groups created by kennel clubs (e.g., American Kennel Club, NY, USA or Fédération Cynologique Internationale, Thuin, Belgium) showed some behavioral differences among themselves, these were established on the basis of external similarities or undefined scientific criteria⁸⁵ rather than evolutionary relatedness. In addition, because our questionnaire sampling is “opportunistic” (i.e., data are only generated for those dogs suspected of having ADHD-like behavior), it does not represent a random sample of information from all dog breeds. Thus, ADHD-like behavior might be underrepresented in both hyperactive or rare breeds because it is either held as being “normal” for the breed in the former case or there are simply not enough animals to obtain a positive result in the latter case.

CONCLUSIONS

In the present study, numerous non-genetic (social and physical) factors that might correlate with ADHD-like behavior in dogs have been indicated. Our initial findings naturally are subject to the limitations associated with any questionnaire study (e.g., representativeness of the sample, potential perceptual bias on the part of the owners, and, for two of the questionnaires in this case, scientific validity the questionnaire itself). In addition, as with any correlation study, the possibility of an unknown, third causal factor (e.g., Baron and Kenny⁸⁶) cannot be excluded; however, it seemed clear that ADHD-like behavior in dogs, as with many neurological diseases in humans¹¹, could be derived from a gene-environment interaction. As such, this study indicates the possible actions that could be implemented for those animals or breeds that possess a genetic predisposition to ADHD-like behavior to minimize the likelihood of its manifestation in these animals. Generally, these actions revolve around providing a stable, affectionate, and enriching social environment for the animal together with adequate (but not excessive) exercise and play time, particularly in the case of younger animals. Although many breeds have been bred to possess traits that might underlie or facilitate ADHD-like behavior (e.g., terriers with their high energy levels, excitement, reactivity, and also boldness), it is not necessary that the individual animals actually display symptoms

of this disease given the right social and physical environment.

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CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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Supplementary Material

The following shows the questionnaires (English and German versions), which were used for the study (order: ADHD, Anamnesis, Interview and Personality questionnaire).

(English Version)

Einzelfelle ANAMNESIS QUESTIONNAIRE

Owner

Name	
Address	
E-mail	

Dog

Name							
Breed							
Age							
Size							
Weight							
Coat colour							
Gender	<table><tr><td>Dog</td><td> </td><td>Bitch</td><td> </td></tr></table>	Dog		Bitch			
Dog		Bitch					
Castrated?	<table><tr><td>No</td><td> </td><td>Yes</td><td> </td><td>When</td><td> </td></tr></table>	No		Yes		When	
No		Yes		When			
Reason							

Origin

Origin	
Previous owner	

Litter number of the dam? (if known)

Composition of the litter? (Number of dogs / bitches, if known)

Environment and daily schedule

How many people live in the household?

Adults

Children

Do other dogs live in the household?

Name	Dog	Bitch	Castrated	Age	Breed

Do other animals live in the household. If yes, which and how many?

Describe where you live (e.g., City or town; house or apartment; with or without garden)

Does your dog enjoy eating or is it finicky?

Current food (Analysis and ingredients to be found on the packaging) For a BARF diet, please give approximations.

How and how often do you feed your dog?

Exercise/Training (what and how often):

(Household) rules:

--

Does your dog enjoy affection/cuddling?

--

Daily schedule (general outline):

--

Pre-existing conditions

Pre-existing conditions / health problems (Please include any results):

--

Does your dog have chronic health problems? If so, which?

--

Does your dog regularly take medication? If so, which? (Dosage?)

--

Probleme

Why did you seek our assistance?

Questions about castration

--

Multi-dog household

--

Epilepsy

--

Thyroid gland

--

Breeding advice

--

Stress/ Insecurity

--

Panic

--

Hyperactivity

--

Aggression

--

Other

--

Marking behaviour (specifically for bitches, does she (often) lift her leg?)

What problems exist in the co-existence with your dog (describe the problem as precisely as possible and any situations that trigger it):

How has this behaviour developed? Are there specific triggers for it?

When did you first notice this behaviour?

What have you previously undertaken in this regard?

Was your dog previously in a dog school?

If yes, what did you learn there?

Where does your dog sleep at night?

How many hours per day is your dog normally alone?

Does your dog follow you everywhere in the house?

Or does it like to sleep during the day in its favourite spot?

Are there situations during which your dog appears to be stressed?

If so, which:

Is your dog comfortable alone at home?

If not, what does it do in such situations?

How often and how long per day do you take your dog for a walk:

How often does your dog have contact with other dogs?

often

rarely

Is your dog scared during walks or does it show aggressive behaviour?

Have you observed any of the following behaviours in your dog at least once?

Restlessness / unable to relax

Does not get tired, but plays until it drops

Disproportional nervous or aggressive behaviour

Appears distracted

Trembling

Panting without previous exertion or warmth

Exaggerated licking or scratching of the fur

Stereotypy (constantly repeated behaviours like pacing)

Destructive behaviour

Barking / baying, whimpering, etc.

Housebreaking issues

Constant pulling of the leash

Attention-demanding behaviour

Aggression against other dogs

Aggression against people

Aggression against people in the same household

Other aggressive behaviour:

Scared of (and in which situations):

Hunting behaviours (and in which situations)

How would you assess the obedience of your dog? Please mark the box according to the current situation with your dog when some form of distraction (e.g., other dogs, bicycles, or other people or animals) is present.

	Functions reliably	Often functions	Rarely functions
Walking on a leash			
"stay"			
"sit"			
"no"			

Allgemeines

How do you find out about us?

Comments or additional information that could be useful:

We will contact you as soon as possible should further questions on our side.

Thank you for your application!

We will process your application as quickly as possible, but please understand that it can take up to a few days until you receive our recommendations because we both are often out of the office.

Interview Questions (English Version)

Introduction

- Where did you get your dog from (Shelter, private breeder, etc.)?

- How old was your dog when you got it?

() unknown / no answer () 1-7 weeks old () 8 - 12 weeks old () >12 weeks old

- Where do you live (e.g., city, town, or farm; house or apartment; with or without garden; etc.)

Previous environment and dam-offspring relationship

In the case that you do not have any information in this regard, please continue with the next section.

- What is the litter number of the dam for your dog?

() unknown / no answer () 1 () 2 () 3 () 4 () 5 () >5

- How large was the litter in which your dog was born (number of puppies)?

() unknown / no answer () 0 () 1-2 () 3-4 () 5-6 () >6

- What percentage of the litter of your dog comprised (male) dogs?

() unknown / no answer () 0-49% () 50-100%

- How old was your dog when it was separated from the dam?

() unknown / no answer () 1-7 weeks old () 8 - 12 weeks old () >12 weeks old

- How would you describe the environment in which your dog was born (e.g., problematic or chaotic, quiet, sheltered, etc.)?

- How many previous owners has your dog had?

() unknown / no answer () 0 () 1 () 2 () 3 () 4 () 5 () >5

- How many opportunities were there for your dog to obtain positive social and physical interactions as a puppy (e.g., interaction with other dogs (through walks or a dog school, among others), playing with the owner(s) or other dogs, meetings with friends and family)?

() unknown / no answer () none () almost none () isolated () some () many () very many

• How often in the first weeks after obtaining your dog / puppy did it receive affectionate behaviour from you?
() unknown / no answer () never () <1x/ week () 1x/ week () several times / week () daily

• If daily, how long did the episodes of affectionate behaviour last?
() unknown / no answer () 0-29min () 30-60min () 61-90min () 91-120min () >120min

• How often was your dog as a puppy (until six months of age) played outside of a dog school?
() unknown / no answer () never () <1x / week () 1x / week () several times / week () daily

• How long were the playtimes with the puppy on average for these play days?
() unknown / no answer () 0-59min () 60-120min () >120min

• How long was your puppy nursed by the dam?
() unknown / no answer () 0-3 weeks () 4-7 weeks () 8 weeks or more

• How often did the dam show disproportionally aggressive behaviour toward the puppy?
() unknown / no answer () never () < 1x/ week () 1x/ week () several times / week () daily

Current environment

When you first got your dog:

• How often did it have contact to people that did not belong to your household (friends and other family, etc.)?
() unknown / no answer () never () <1x/ week () 1x/ week () several times / week () daily () several times daily

• How many other dogs / other pets (e.g., cats) live in your household?

- Other dogs:

() unknown / no answer () 0 () 1-2 () 3-4 () 5-6 () >6

-Other pets:

() unknown / no answer () 0 () 1-2 () 3-4 () 5-6 () >6

• What are the other pets (including numbers; e.g., cats: 3x, birds: 2x, etc.)?

• How often does your puppy have contact to other dogs outside of those in your household or its dog school?
() unknown / no answer () never () <1x/ week () 1x/ week () several times / week () daily

• How often does your puppy have contact to other people outside of those in your household or its dog school?
() unknown / no answer () never () <1x / week () 1x / week () several times / week () daily

• Do other dogs or animals in your household display disproportionately aggressive behaviour towards your puppy / dog?
() unknown / no answer () never () <1x / week () 1x / week () several times / week () daily

• Do you have (house) rules? Which (e.g., the dog must not lie in the bed, the dog cannot beg, etc.)?

• How does your dog react to affectionate behaviour?
() unknown / no answer () aversion () varies () fondly

• How often does your dog receive affectionate behaviour from you?
() unknown / no answer () never () <1x / week () 1x / week () several times / week () daily

• How long do these episodes last in total?
() unknown / no answer () 0-29min () 30-60min () 61-90min () 91-120min () >120min

• Are there problems in the co-existence with your dog (e.g., aggressive behaviour toward strangers, nervous behaviour when alone)?
Please describe these briefly:

• Do concrete triggers exist for these behaviours (e.g., castration, attacks from other dogs, etc.)?

• Where does your dog sleep at night?

• How often is your dog alone on average over the day?
() unknown / no answer () 0-59min () 60-120min () >120min

• Does your dog show problematic behaviours when it is alone (e.g., nervousness, aggression, uncertainty, etc.)?
() unknown / no answer () never () rarely () sometimes () often () very often () always

• Are there situations when your dog behaves aggressively?
() unknown / no answer () never () rarely () sometimes () often () very often () always

• Brief description of the situation(s):

• Are there situations when your dog appears to be stressed?
() unknown / no answer () never () rarely () sometimes () often () very often () always

• Brief description of the situation(s):

• Are there situations when your dog appears to be scared?
() unknown / no answer () never () rarely () sometimes () often () very often () always
• Brief description of the situation(s):

Auslastung Ihres Hundes:

(Training, playtime, walks, dog schools)

• How often do you train your dog?

☐ unknown / no answer ☐ never ☐ <1x / week ☐ 1x / week ☐ several times / week ☐ daily

• How many different types of training activity does your dog receive (e.g., obedience training, dexterity training, etc.)?

☐ unknown / no answer ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ >5

• How often do you play with your dog?

☐ unknown / no answer ☐ never ☐ <1x / week ☐ 1x / week ☐ several times / week ☐ daily

• How many different types of playtime activities do you undertake with your dog (e.g., searching for food, romping about, rough and tumble play, locomotor play, etc.)?

☐ unknown / no answer ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ >4

• How often do you walk your dog each day??

☐ unknown / no answer ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ >4

• How long do your daily walks last in total (min / day)?

☐ unknown / no answer ☐ 0-29min ☐ 30-60min ☐ 61-90min ☐ 91-120min ☐ >120min

• How often does your dog have contact to other dogs?

☐ unknown / no answer ☐ never ☐ rarely ☐ sometimes ☐ often ☐ very often ☐ always

• At what age (in years) did your dog first attend dog school?

☐ unknown / no answer ☐ 0 to <1 ☐ 1 to <2 ☐ 2 to <3 ☐ 3 or older

• How often do you currently attend dog school with your dog?

☐ unknown / no answer ☐ never ☐ <1x / week ☐ 1x / week ☐ several times / week ☐ daily

• How often were you previously with your dog in a dog school (i.e., visits that were set off from current set of visits by a break of a few weeks or more)?

☐ unknown / no answer ☐ never ☐ <1x / week ☐ 1x / week ☐ several times / week ☐ daily

• Over what time period did your dog take part in puppy training or young dog training (times can be overlapping)?

☐ unknown / no answer ☐ 0 to 1 year ☐ 1 to 2 years ☐ >2 years

• How often does / did your puppy take part in puppy training in a dog school?

☐ unknown / no answer ☐ never ☐ <1x / week ☐ 1x / week ☐ several times / week ☐ daily

• How long does / did the puppy training in your dog school last?

☐ unknown / no answer ☐ 30-60min ☐ 61-90min ☐ 91-120min ☐ >120min

• How many playtimes are / were there per puppy training episode of your dog?

☐ unknown / no answer ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ >5

• How long is / was a single playtime during the puppy training?

☐ unknown / no answer ☐ a few minutes ☐ 15min ☐ 30min ☐ 45min ☐ 60min ☐ >60min

• How many different types of playtime activities are / were present during the puppy training of your dog (e.g., searching for food, romping about, rough and tumble play, locomotor play, etc.)?

☐ unknown / no answer ☐ 1 ☐ 2-3 ☐ 4-5 ☐ >5

• Are / were the playtimes for the puppies interrupted when they became too rough?

☐ unknown / no answer ☐ never ☐ almost never ☐ sometimes ☐ often ☐ always

• Are / were actions in the puppy training taken to prevent your dog from being bullied by the other dogs?

☐ unknown / no answer ☐ never ☐ almost never ☐ sometimes ☐ often ☐ always

• How many puppies are / were there in the puppy training of your dog?

☐ unknown / no answer ☐ 1-5 ☐ 6-10 ☐ 11-15 ☐ 16-20 ☐ >20

• Are / were the puppy training sessions for your dog comprised of the same animals?

☐ unknown / no answer ☐ never ☐ rarely ☐ sometimes ☐ often ☐ very often ☐ always

• How often do / did new puppies take part in the puppy training?

☐ unknown / no answer ☐ never ☐ rarely ☐ sometimes ☐ often ☐ very often ☐ always

• Do / did adult dogs also take part in the puppy training?

☐ unknown / no answer ☐ never ☐ rarely ☐ sometimes ☐ often ☐ very often ☐ always

• How many adult dogs take / took part in the puppy training?

☐ unknown / no answer ☐ 0 ☐ 1-2 ☐ 3-4 ☐ 5-6 ☐ 7-8 ☐ 9-10 ☐ >10

• How often do / did non-adult dogs take part in the puppy training?

☐ unknown / no answer ☐ never ☐ rarely ☐ sometimes ☐ often ☐ very often ☐ always

• What is / was the sex ratio among the puppies in the puppy training?

☐ unknown / no answer ☐ single sex only ☐ predominantly one sex ☐ small majority from one sex ☐ balanced

• How large is / was the age difference between the participating puppies in the puppy training?

☐ unknown / no answer ☐ a few weeks ☐ a few months ☐ up to ½ year ☐ >½ year

• How large is / was the complete group of participating puppies and their owners (number of puppies + number of people)?

☐ unknown / no answer ☐ 4-6 ☐ 8-10 ☐ 12-14 ☐ 16-18 ☐ 20-22 ☐ 24-26 ☐ 28-30 ☐ >30

EINZELFELLE (German Version)

Fragebogen Aufmerksamkeit und Aktivität

Hund (Name / Geschlecht):

Kastriert ja ☐ nein ☐

Alter bei Kastration:

Rasse:

Alter/Geburtstag:

Halter:

Name:

Fragen:

	Nie	Manchmal	Oft	Sehr oft
1. Hund lernt schwer weil er achtlos ist oder sich durch andere Dinge leicht ablenken lässt	☐ 0	☐ 1	☐ 2	☐ 3
2. Man kann ihn schnell interessieren, aber er verliert auch schnell wieder Interesse	☐ 0	☐ 1	☐ 2	☐ 3
3. Kann sich auf Aufgabe oder Spiel Schwer konzentrieren	☐ 0	☐ 1	☐ 2	☐ 3
4. Verlässt seinen Platz wenn er bleiben soll	☐ 0	☐ 1	☐ 2	☐ 3
5. Kann nicht ruhig bleiben oder nicht leicht beruhigt werden	☐ 0	☐ 1	☐ 2	☐ 3
6. Zappelt ständig	☐ 0	☐ 1	☐ 2	☐ 3

	Nie	Manchmal	Oft	Sehr oft
7. Er scheint nicht zuzuhören, wenn er angesprochen wird	☐ 0	☐ 1	☐ 2	☐ 3
8. Reagiert überdreht, ist schwer zu kontrollieren, beim Nach – vorn – gehen kaum zu halten	☐ 0	☐ 1	☐ 2	☐ 3
9. Rennt und spielt ständig	☐ 0	☐ 1	☐ 2	☐ 3
10. Kann einfache Aufgaben leicht lösen hat aber mit schwierigen Aufgaben selbst dann Probleme, wenn er sie kennt und oft getan hat	☐ 0	☐ 1	☐ 2	☐ 3
11. Reagiert hektisch und scheitert deshalb beim Aufgaben lösen	☐ 0	☐ 1	☐ 2	☐ 3
12. Leicht ablenkbar	☐ 0	☐ 1	☐ 2	☐ 3
13. Kann nicht warten, hat keine Selbstkontrolle	☐ 0	☐ 1	☐ 2	☐ 3

Hat der Hund Training/Ausbildung/Prüfung

Obedience ☐ Schutzhund ☐ Agility ☐ Jagd ☐
 Übungen zu Hause: Sonstiges: Kein Training ☐

German Version

Einzelfelle

ANAMNESEBOGEN

Besitzer

Name	
Adresse	
email	

Hund

Name			
Rasse/Mix			
Alter			
Größe			
Gewicht			
Fellfarbe			
Geschlecht			
	Rüde	Hündin	
Kastriert?			
	Nein	Ja	Wann
Grund			

Herkunft

Herkunft	
Vorbesitzer	
Wievielter Wurf der Mutter? (falls bekannt)	
Wurfzusammensetzung? (Anzahl Rüde / Hündin falls bekannt)	

Umgebung und Tagesablauf

Wie viele Personen leben im Haushalt?

Erwachsene

Kinder

Leben noch weitere Hunde im Haushalt?

Name	Rüde	Hündin	Kastriert?	Alter	Rasse

Leben in Ihrem Haushalt noch andere Tiere? ja Falls, ja welche und wie viele?

In welcher Wohngegend leben Sie? (Stadt Dorf, Whg., Haus, Garten)

Frisst Ihr Hund gerne oder is(s)t er mäkelig?

Aktuelle Fütterung (Analyse und Zusammensetzung, steht auf der Verpackung!)

Bei BARF bitte ca-Angaben.

Wie oft und wie füttern Sie?

Auslastung / Training (was und wie oft):

(Hausstands-)Regeln:

Genießt Ihr Hund Streicheleinheiten?

Tagesablauf (grob skizziert):

--

Vorerkrankungen

Vorerkrankungen / gesundheitliche Probleme (Befunde bitte beilegen):

--

Leidet Ihr Hund an einer chronischen Erkrankung? Falls ja, an welcher?

--

Bekommt Ihr Hund regelmäßig Medikamente? Falls ja, welche? (Dosierung?)

--

Probleme

Was ist der Grund, dass Sie sich an uns wenden?

Kastrationsanfrage	
Mehrhundehaltung	
Epilepsie	
Schilddrüse	
Beratung zur Zucht	
Stress/Unsicherheit	
Panik	
Hyperaktivität	
Aggression	
sonstiges	

Markierverhalten (spez. bei Hündin hebt sie – oft – das Beinchen?)

--

Welche Probleme gibt es im Zusammenleben mit Ihrem Hund (genaue Schilderung des Problems / der auslösenden Situationen):

--

Wann ist Ihnen dieses Verhalten zuerst aufgefallen?

--

Was haben Sie bisher dagegen getan?

Waren Sie schon einmal in einer Hundeschule?
Falls ja, was haben Sie dort gelernt?

Wo schläft der Hund nachts?

Wie viele Stunden ist der Hund normalerweise allein?

Folgt Ihnen der Hund in der Wohnung gerne auf Schritt und Tritt?

Oder döst er auch tagsüber gerne auf seinem Lieblingsplatz?

Gibt es Situationen, in denen Ihr Hund gestresst erscheint?
Wenn ja, welche:

Bleibt Ihr Hund problemlos allein zu Hause?
Falls nein, was tut er dann?

Wie oft und wie lange gehen Sie täglich mit dem Hund spazieren:

Wie häufig hatte der Hund dabei Kontakt zu anderen Hunden?

häufig selten

Zeigt er beim Spaziergang Angst oder reagiert er aggressiv?

Haben Sie folgende Verhaltensweise schon einmal bei Ihrem Hund beobachtet?

Rastlosigkeit, Hund kann nicht zur Ruhe kommen	
Hund wird nie müde, will spielen bis zum "Umfallen"	
Unangemessen nervöses oder aggressives Verhalten	
Hund wirkt abwesend	
Zittern	
Hecheln ohne vorherige Anstrengung oder Wärme	
Übertriebenes Lecken oder Kratzen des Fells	

Stereotypien (sich immer wiederholende Verhaltensweisen)	
Gegenstände zerstören	
Bellen, Winseln usw.	
Stubenunreinheit	
Er zieht störend an der Leine	
Starkes Fordern / Aufmerksamkeits-heischendes Verhalten	
Aggressionen gegen andere Hunde	
Aggressionen gegen Menschen	
Aggressionen gegen Menschen des gleichen Haushalts	

Aggressionen gegen sonstiges:

Furcht vor (In welchen Situationen):

Jagt Ihr Hund? (In welchen Situationen)

Wie beurteilen Sie den Grundgehorsam Ihres Hundes? Bitte setzen Sie Ihre „Kreuzchen“ so, wie der aktuelle Stand Ihres Hundes ist, wenn eine Ablenkung z.B. andere Hunde, Fahrradfahrer, Menschen oder Tiere vorhanden sind!

	klappt sehr zuverlässig	klappt oft	klappt selten
Leinenführigkeit			
„platz“			
„sitz“			
Verbotswort			

Allgemeines

Wie / durch wen sind Sie auf uns gekommen?

Bemerkungen / wichtige Informationen, die für uns wichtig sein könnten:

Sollten weitere Fragen auftauchen, melden wir uns umgehend.

Vielen Dank für Ihren Auftrag!

Wir werden Ihre Anfrage schnellstmöglich bearbeiten, aber bitte haben Sie Verständnis dafür, dass es einige Tage dauern kann bis unsere Empfehlungen getippt sind, weil wir beide viel unterwegs sind.

Interviewfragen (German Version)

Einführung

- Woher stammt Ihr Hund (Heim, Zucht im privaten Haushalt, usw.)?

- Wie alt war der Hund, als Sie ihn bekamen?
() k.A. () 1-7 Wochen () 8 - 12 Wochen () >12 Wochen

- In welcher Wohngegend leben Sie (Stadt, ländlich, Haus, Wohnung, Garten usw.?)

• Frühes Umfeld & Mutter-Kind-Beziehung

Falls Sie keine Informationen zu den folgenden Fragen haben, machen Sie bitte mit den Fragen des nächsten „Themenblocks“ weiter.

- Zum wievielten Wurf der Mutter gehörte Ihr Hund?
() k.A. () 1 () 2 () 3 () 4 () 5 () >5

- Wie groß war der Wurf, aus dem der Welpe stammt (Anzahl der Welpen)?
() k.A. () 0 () 1-2 () 3-4 () 5-6 () >6

- Wie hoch war der Anteil der Rüden im Wurf Ihres Hundes?
() k.A. () 0-49% () 50-100%

- Mit wie viel Wochen wurde der Hund von der Mutter weggegeben?
() k.A. () 1-7 Wochen () 8 - 12 Wochen () >12 Wochen

- Wie würden Sie das Umfeld beschreiben, in das der Welpe hineingeboren wurde
(z.B.: problematisches, unruhiges Umfeld; ruhiges Umfeld; behütetes Umfeld o.ä.)?

- Wie viele Vorbesitzer hatte Ihr Hund?
() k.A. () keine () 1 () 2 () 3 () 4 () 5 () >5

- Gab es Möglichkeiten für den Welpen, positive soziale und physische Erfahrungen zu machen (z.B.: Treffen mit anderen Hunden (Spaziergänge, Hundeschule o.ä.), Spielen mit Besitzern und/oder anderen Hunden, Zusammentreffen von Hund und Bekannten/Freunden der Familie)?
() k.A. () gar nicht () fast nicht () vereinzelt () einige () viele () sehr viele

- Wie häufig hat Ihr Welpe/Hund in den ersten Wochen *nach der Übernahme* Streicheleinheiten von Ihnen bekommen?
() k.A. () nie () <1x/Woche () 1x/ Woche () mehrmals/ Woche () täglich

- Falls täglich: Wie lange dauern/dauerten die Streicheleinheiten insgesamt an?
() k.A. () 0-29min () 30-60min () 61-90min () 91-120min () >120min

• Wie häufig wurde mit Ihrem Hund im Welpenalter (bis 6 Monate) außerhalb der Welpenstunde gespielt?
() k.A. () nie () <1x/ Woche () 1x/Woche () mehrmals/ Woche () täglich

• Wie lang waren hier durchschnittlich die Spieleinheiten mit dem Welpen (an den jeweiligen *Spieltagen*)?
() k.A. () 0-59min () 60-120min () >120min

• Wie lange wurden die Welpen von der Mutter mit Milch versorgt?
() k.A. () 0-3 Wochen () 4-7 Wochen () 8 Wochen und mehr

• Zeigte die Mutter im Kontakt mit dem Welpen übermäßige Aggressionen: Falls ja: wie häufig?
() k.A. () nie () < 1x/Woche () 1x/ Woche () mehrmals/ Woche () täglich

Aktuelles Umfeld

Als Sie den Hund bekamen:

• Wie häufig hatte er von Beginn an Kontakt zu Personen, die nicht aus Ihrem Haushalt stammen (Freunde, Bekannte, usw.)?
() k.A. () nie () <1x/Woche () 1x/ Woche () mehrmals/ Woche () täglich () mehrmals täglich

• Wie viele andere Hunde/Haustiere (Bsp.: Katzen) leben noch in Ihrem Haushalt?

Andere Hunde:

() k.A. () 0 () 1-2 () 3-4 () 5-6 () >6

• Sonstige Haustiere:

() k.A. () 0 () 1-2 () 3-4 () 5-6 () >6

• Welcher Art sind die anderen Haustiere (mit Angabe zur Anzahl, z.B.: Katzen: 3x, Vögel: 2x, usw.)?

• Wie häufig hat der Welpen Kontakt zu anderen Hunden, die nicht aus Ihrem Haushalt oder aus der Hundeschule stammen?
() k.A. () nie () <1x/ Woche () 1x/Woche () mehrmals/ Woche () täglich

• Wie häufig hat der Welpen Kontakt zu anderen Menschen, die nicht aus Ihrem Haushalt oder aus der Hundeschule stammen?
() k.A. () nie () <1x/ Woche () 1x/Woche () mehrmals/ Woche () täglich

• Zeigen andere Hunde bzw. Tiere Ihres Haushalts übermäßige Aggressionen gegenüber Ihrem hier vorgestellten Welpen/Hund?
() k.A. () nie () <1x/Woche () 1x/ Woche () mehrmals/ Woche () täglich

• Haben Sie (Haus-) Regeln? Welche sind das (z.B.: Hund darf nicht ins Bett, Hund darf nicht betteln usw.)?

• Wie reagiert Ihr Hund auf Streicheleinheiten?
() k.A. () Abneigung () Verschieden () Zuneigung

• Wie oft bekommt Ihr Hund aktuell von Ihnen Streicheleinheiten?

() k.A. () nie () <1x/Woche () 1x/ Woche () mehrmals/ Woche () täglich

• Wie lange dauern die Streicheleinheiten insgesamt?

() k.A. () 0-29min () 30-60min () 61-90min () 91-120min () >120min

• Gibt es Probleme im Zusammenleben mit Ihrem Hund (z.B.: aggressives Verhalten gegenüber Fremden, nervöses Verhalten bei Alleinsein)? Bitte beschreiben Sie dies kurz:

• Gab es konkrete Schlüsselauslöser für genannte Verhaltensweisen

(z.B.: Kastration, Angriffe durch andere Hunde o.ä.)?

• Wo schläft der Hund nachts?

• Über welchen durchschnittlichen Zeitraum täglich ist der Hund allein?

() k.A. () 0-59min () 60-120min () >120min

• Zeigt der Hund ein Problemverhalten, wenn er alleine ist

(z.B.: nervöses Verhalten, aggressives Verhalten, unsicheres Verhalten o.ä.)?

() k.A. () nie () selten () manchmal () häufig () sehr häufig () immer

• Gibt es Situationen, in denen Ihr Hund aggressiv reagiert?

() k.A. () nie () selten () manchmal () häufig () sehr häufig () immer

• Kurze Beschreibung der Situationen:

• Gibt es Situationen, in denen Ihr Hund gestresst reagiert?

() k.A. () nie () selten () manchmal () häufig () sehr häufig () immer

• Kurze Beschreibung der Situationen:

• Gibt es Situationen, in denen Ihr Hund sich fürchtet?

() k.A. () nie () selten () manchmal () häufig () sehr häufig () immer

• Kurze Beschreibung der Situationen:

Auslastung Ihres Hundes

(Trainings, Spiele, Spaziergänge, Erfahrungen durch Hundeschule und Welpenstunden)

- Wie häufig trainieren Sie mit Ihrem Hund?
() k.A. () nie () <1x/Woche () 1x/Woche () mehrmals/Woche () täglich
- An wie vielen verschiedenen Arten von Trainings nimmt Ihr Hund teil
(z.B.: Gehorsamsübungen, Geschicklichkeitsübungen o. ä.)?
() k.A. () keine () 1 () 2 () 3 () 4 () 5 () >5
- Wie häufig spielen Sie mit Ihrem Hund?
() k.A. () nie () <1x/Woche () 1x/Woche () mehrmals/Woche () täglich
- Wie viele verschiedene Arten von Spielen Sie mit Ihrem Hund
(z.B.: Futtersuchspiele, *Freies Toben*, Beweglichkeitsspiele o. ä.)?
() k.A. () keine () 1 () 2 () 3 () 4 () >4
- Wie häufig gehen Sie mit Ihrem Hund am Tag spazieren?
() k.A. () 0 () 1 () 2 () 3 () 4 () >4
- Wie lange dauern die Spaziergänge insgesamt pro Tag (Min./Tag)?
() k.A. () 0-29min () 30-60min () 61-90min () 91-120min () >120min
- Wie häufig hat der Hund dabei Kontakt zu anderen Hunden?
() k.A. () nie () selten () manchmal () häufig () sehr häufig () immer
- Ab welchem Alter (in Jahren) nahm der Hund an der Hundeschule teil?
() k.A. () 0 bis kleiner 1 () 1 bis kleiner 2 () 2 bis kleiner 3 () 3 und älter
- Wie oft sind Sie aktuell mit Ihrem Hund in der Hundeschule?
() k.A. () nie () <1x/Woche () 1x/Woche () mehrmals/Woche () täglich
- Wie oft waren Sie früher mit Ihrem Hund in der Hundeschule (Hundeschulbesuche vor aktuellem Besuch einer Hundeschule, mit Abstand von mind. ein paar Wochen Pause dazwischen)?
() k.A. () nie () <1x/Woche () 1x/Woche () mehrmals/Woche () täglich
- Über welchen Zeitraum war Ihr Hund in Welpenstunden bzw. Junghundegruppen in etwa eingebunden (kann beides in einander übergehen)?
() k.A. () 0 bis weniger als 1 Jahr () 1 bis 2 Jahre () >2 Jahre
- Wie häufig nimmt/nahm Ihr Welpen an Welpenstunden teil?
() k.A. () nie () <1x/Woche () 1x/Woche () mehrmals/Woche () täglich
- Wie lange dauert/ dauerte eine Welpenstunde in Ihrer Hundeschule in etwa?
() k.A. () 30-60min () 61-90min () 91-120min () >120min
- Wie hoch ist/war die Anzahl an Spieleinheiten pro Welpenstunde Ihres Hundes?
() k.A. () 1 () 2 () 3 () 4 () 5 () >5
- Wie lange dauert/dauerte eine Spieleinheit in der Welpenstunde im Schnitt in etwa?
() k.A. () wenige Minuten () 15min () 30min () 45min () 60min () >60min
- Wie viele unterschiedliche Arten von Spielen gibt/gab es in der Welpenstunde Ihres Hundes (z.B.: Futtersuchspiele, *Freies Toben*, Geschicklichkeitsspiele o.ä.)?
() k.A. () 1 () 2-3 () 4-5 () >5
- Werden/wurden die Spiele zwischen den Welpen abgebrochen, wenn zu *ruppig* gespielt wird/wurde?
() k.A. () nie () fast nie () manchmal () häufig () immer

- Wird/wurde in den Welpenstunden verhindert, dass Ihr Hund von anderen Hunden *gemobbt* wurde?
() k.A. () nie () fast nie () manchmal () häufig () immer

- Wie viele Welpen befinden/befanden sich in der Welpenstunde Ihres Hundes?
() k.A. () 1-5 () 6-10 () 11-15 () 16-20 () >20

- Setzen sich die Welpenstunden jedes Mal aus den gleichen Hunden zusammen?
() k.A. () nie () selten () manchmal () häufig () sehr häufig () immer

- Wie häufig nehmen/nahmen neue Welpen an den Welpenstunden teil?
() k.A. () nie () selten () manchmal () häufig () sehr häufig () immer

- Sind/waren auch erwachsene Hunde in den Welpenstunden dabei?
() k.A. () nie () selten () manchmal () häufig () sehr häufig () immer

- Wie viel erwachsene Hunde sind/waren im Schnitt in den Welpenstunden dabei?
() k.A. () keine () 1-2 () 3-4 () 5-6 () 7-8 () 9-10 () >10

- Wie häufig nehmen nicht-erwachsene Hundehalter an den Welpenstunden teil?
() k.A. () nie () selten () manchmal () häufig () sehr häufig () immer

- Wie ist/war in etwa die Geschlechterverteilung der Welpen in den Welpenstunden?
() k.A. () nur ein Geschlecht () überwiegend ein Geschlecht () leichte Mehrheit eines Geschlechts () ausgeglichen

- Wie groß sind/waren die Altersunterschiede der teilnehmenden Welpen in etwa maximal?
() k.A. () wenige Wochen () wenige Monate () bis ½ Jahr () >½ Jahr

- Wie groß ist/war in der Regel die Gruppe aus teilnehmenden Welpen und ihren Besitzern (Anzahl Hundeteilnehmer + Anzahl Personen)?
() k.A. () 4-6 () 8-10 () 12-14 () 16-18 () 20-22 () 24-26 () 28-30 () >30

Mein Hund...

1. ... wirkt manchmal deprimiert und niedergeschlagen. (E, 4)
n trifft zu (0) n trifft zum Teil zu (1) n trifft nicht zu (2)

2. ... ist eher zurückhaltend und reserviert, wenn eine fremde Person in unsere Wohnung kommt. (E, 6)
n trifft zu (0) n trifft zum Teil zu (1) n trifft nicht zu (2)

3. ... lässt sich auch in turbulenten Situationen nicht aus der Ruhe bringen. (Ä, 9)
n trifft zu (2) n trifft zum Teil zu (1) n trifft nicht zu (0)

4. ... steckt voller Energie und Tatendrang. (A, 11)
n trifft zu (2) n trifft zum Teil zu (1) n trifft nicht zu (0)

5. ... ist oft in Streitereien mit anderen Artgenossen verwickelt (G, 12).
n trifft zu (0) n trifft zum Teil zu (1) n trifft nicht zu (2)

6. ... reagiert leicht angespannt. (Ä, 14)
n trifft zu (2) n trifft zum Teil zu (1) n trifft nicht zu (0)

7. ... ist begeisterungsfähig und animiert andere Hunde zum Spielen. (G, 16)
n trifft zu (2) n trifft zum Teil zu (1) n trifft nicht zu (0)

8. ... ist überhaupt nicht nachtragend, geht immer wieder unvoreingenommen auf Menschen zu. (G, 17)
n trifft zu (2) n trifft zum Teil zu (1) n trifft nicht zu (0)

9. ... ist eher der stille Typ, hält sich im Kontakt zurück. (E, 21)
n trifft zu (0) n trifft zum Teil zu (1) n trifft nicht zu (2)
10. ... ist anderen Hunden gegenüber eher Misstrauisch. (Ä, 22)
n trifft zu (2) n trifft zum Teil zu (1) n trifft nicht zu (0)
11. ... ist leicht für neue Spielideen zu begeistern. (A, neu)
n trifft zu (2) n trifft zum Teil zu (1) n trifft nicht zu (0)
12. ... ist emotional ausgeglichen und nicht leicht aus der Fassung zu bringen. (Ä, 24)
n trifft zu (0) n trifft zum Teil zu (1) n trifft nicht zu (2)
13. ... ist durchsetzungsfähig und energisch. (E, 26)
n trifft zu (2) n trifft zum Teil zu (1) n trifft nicht zu (0)
14. ... kann sich kalt und distanziert verhalten. (G, 27)
n trifft zu (0) n trifft zum Teil zu (1) n trifft nicht zu (2)
15. ... ist erfinderisch und einfallsreich, wenn es darum geht verstecktes Futter oder Spielzeug zu finden oder zu erreichen. (A, 25)
n trifft zu (2) n trifft zum Teil zu (1) n trifft nicht zu (0)
16. ... wirkt manchmal schüchtern und gehemmt. (E, 31)
n trifft zu (0) n trifft zum Teil zu (1) n trifft nicht zu (2)
17. ... bleibt selbst in Stresssituationen ruhig und gelassen. (Ä, 34)
n trifft zu (0) n trifft zum Teil zu (1) n trifft nicht zu (2)
18. ... versteht in Spielsituationen oft nicht, was von ihm verlangt wird. (A, neu)
n trifft zu (0) n trifft zum Teil zu (1) n trifft nicht zu (2)
19. ... kann sich schroff u. abweisend anderen Hunden gegenüber verhalten. (G, 37)
n trifft zu (0) n trifft zum Teil zu (1) n trifft nicht zu (2)
20. ... wird leicht nervös und unsicher. (Ä, 39)
n trifft zu (2) n trifft zum Teil zu (1) n trifft nicht zu (0)
21. ... hat außer Fressen und schlafen nicht viele Interessen. (A, 10)
n trifft zu (0) n trifft zum Teil zu (1) n trifft nicht zu (2)
22. ... ist sehr selbstbewusst. (E, 45)
n trifft zu (2) n trifft zum Teil zu (1) n trifft nicht zu (0)
23. ... hat oft Streit mit anderen Hunden. (G, 48)
n trifft zu (0) n trifft zum Teil zu (1) n trifft nicht zu (2)
24. ... hat eine gute Auffassungsgabe und lernt schnell. (A, neu)
n trifft zu (2) n trifft zum Teil zu (1) n trifft nicht zu (0)

HUNDNAME und RASSE:

The references concerning i) the ADHD and ii) the personality questionnaire:

- i. Vas J, Topál J, Péch E, Miklósi Á. Measuring attention deficit and activity in dogs: A new application and validation of a human ADHD questionnaire. *Appl Anim Behav Sci.* 2007; 103(1): 105-117. doi: [10.1016/j.applanim.2006.03.017](https://doi.org/10.1016/j.applanim.2006.03.017)
- ii. Turcsán B, Kubinyi E, Miklósi Á. Trainability and boldness traits differ between dog breed clusters based on conventional breed categories and genetic relatedness. *Appl Anim Behav Sci.* 2011; 132(1): 61-70. doi: [10.1016/j.applanim.2011.03.006](https://doi.org/10.1016/j.applanim.2011.03.006)