

## EFFECT OF A HUMAN CONTACT AND OBJECT-ORIENTED PLAY EXERCISES ON THE DEVELOPMENT OF BEHAVIOUR FEATURES, FAVOURABLE FOR SEARCH TRAINING, OF THE DOMESTIC DOG (*CANIS FAMILIARIS*)

Giedrė BALEVIČIŪTĖ

Frontier Police Department, Savanorių 2, 2009 Vilnius, Lithuania

**Abstract.** 15 adult German shepherd dogs were studied with a help of 7 tests on various behaviour patterns. The experimental animals were tested twice, before and after special object-oriented play exercises. The purpose of a three months' training was to develop the dogs' retrieval and searching abilities as well as self-confidence in various situations. The results showed that the dogs, human-isolated in the juvenile period, were incapable of playing a joint object-oriented game with the man, and a real bond between the animals and their masters could not be established in adulthood. In strange situations, besides, those dogs expressed unconfident and 'wild-like' behaviour, which could not be beneficially influenced by training in adulthood. A group of the dogs that had had enough human contacts in the juvenile period was studied. Their retrieval, searching abilities and confident behaviour in strange situations significantly improved after purposeful and intensive play exercises. In addition, according to the obtained results, it was concluded that infancy and capability to play object-oriented games with the man was inherited (particularly in German shepherds). An expression of that kind of behaviour and character of the play, however, was dependent on socialisation in the juvenile period and intensive retrieval play exercises in adulthood.

**Key words:** dogs, object-oriented play, behaviour, searching drive.

### INTRODUCTION

The domestic dog (*Canis familiaris*) has been domesticated from the wolf (*Canis lupus*) (Clutton-Brockm, 1995). Today these two species are still closely related, so many wolf behaviour patterns could be observed in the most of dog breeds. However, while the domestic dog diverged from the wolf, many elements of the 'lupine body-language' were lost. Behaviour studies of the domestic dog may provide useful information about the evolution of signalling and communication (Goodwin, 1996). On the other hand, dog behaviour studies are important practically, because this animal is not only a home pet, but also an animal trainable for various purposes. A. Dellaire (1991) also turns etologists' attention to the importance of the studies of a natural behaviour of the dog in its natural environment. It is indisputable that only the knowledge and analysis of the dog's natural behaviour may provide a successful and pleasant training process.

Dog training is really an amazing communicational process between two different species – the domestic dog

and human. However, intraspecific relational systems outside predatory relations are little known and studied. In this respect, the relational system between the man and dog constitutes a relevant area of investigation (Millot, 1994).

An indispensable condition for training success is the development of a strong bond between the dog and man. It is amazing that even in the presence of conspecifics the dog is searching for a human-master to accept as dominant animal in the pack. It is acknowledged that a social isolation in the juvenile period influences the dog's behaviour and makes difficulties in establishing a bond with the human (Freedman, 1961). In the study, we tried to investigate how and what particular behaviour features are originated in the dog by a social isolation and different housing conditions. What concrete behaviour patterns make the dog-human relationship appear? Those patterns could be supposed an effect of domestication, so they should be other than lupine ones. D. Goodwin (1996) states that 'high frequency of playful signalling supports the idea that domestication has encouraged the



ter). It is important to investigate that type of behaviour, as the working dog usually occurs in strange situations and meets strange living beings, thus it must show favourable (see the content of I-III tests) reactions in drug-searching or tracking work, unless it is unsuited to work in miscellaneous situations. We combined the 3 mentioned tests into one group and termed them situation behaviour tests.

With a help of the other group of tests (IV-VII), we tried to investigate the dog's capability to play object-oriented games with the man. Such type of behaviour contains many patterns of hunting behaviour of the wolf expressed in play activity of the dog. In this case, a prey could be any suitable object, while a dominant pack animal – the dog's master. An object-oriented game consists of various behaviour elements. We tried to describe and study them separately:

1. Search drive;
2. Drive to take up an article and bring it to the master;
3. Drive to fight with a prey;
4. Defensive instinct;
5. Instinct to hide an object.

Those and some other retrieval play behaviour features were explored by the 2nd group of tests, predatory-play behaviour tests.

Each dog could earn maximum 3 points during one test. Point 3 was the best score, describing the most favourable (for searching work training) trait. Two spectators participated at the testing, two judges made the scoring as objective as possible.

The first testing was carried out with the dogs that had not been specially trained before. Each dog was tested at least 3 times, and the average score was put down on Table 1.

The same fifteen animals were tested again, after 3 months' special training. During that period the dogs acquainted with strange people, conspecifics, were constantly taken into strange environment with or without their masters, under urban conditions, in the presence of vehicles, strange sounds, deep places. Object-oriented games were played with each dog under the mentioned conditions and in normal environment. The play exercises included retrieval games with a ball or another suitable object, 'a fight with a prey' using a toy for a 'prey', search for a hidden object.

## Tests

### I. Behaviour with species companions

- 1 point. Confused, tail between the legs, hair reaction, barking, humility posture.
- 2 points. Aggressive, dominant, attacking.
- 3 points. Friendly, ears in stand position, tail raised, joyful or indifferent.

### II. Communication with strange humans

- 1 point. Nervous, hair reaction, attacking, barking, avoiding strange people.
- 2 points. Friendly, humility posture, extremely infantile behaviour.
- 3 points. Self-confident, balanced, calm, joyful, confidential, indifferent.

### III. Behaviour in strange environment

- 1 point. Frightened, barking, nervous, trying to escape, indifferent to the master's encouragement, trembling, does not eat.
- 2 points. Attentive, exploration behaviour (sniffs, glances), accepting human assistance.
- 3 points. Calm, noiseless, behaviour at high altitude and deep places, balanced, ready to accept human support.

### IV. Behaviour in a retrieval game, retrieval ability

- 1 point. Indifferent to moving objects, just a certain article is retrieved and in particular environment only, hides or digs the article.
- 2 points. Retrieves only for the master and just a particular article. Indifferent to an unmoving object. Does not play in strange places.
- 3 points. Retrieves for strange persons, agility, appropriate contact with the article, retrieves any suitable object, initiates a retrieval game in the presence of suitable articles.

### V. Search drive

- 1 point. Slow, indifferent search, in facing an obstacle search is given up.
- 2 points. Gets easily tired during search. Vision is used while searching. Uses air-pockets at search in particular environment only. Refuses human support.
- 3 points. Intensive and long-lasting search, uses air-pockets at search, path-finding activity is strong, accepts human assistance.

### VI. Behaviour in finding the article

- 1 point. Leaves the found article and continues searching. Does not handle the object.
- 2 points. In finding the article over-agitated and aggressive, runs away from the master with the found article and hides it.
- 3 points. Instinctive handling of the article, not aggressive, retrieves an article of any material and brings it to the master.

### VII. Exploratory behaviour

A handler puts the dog on a leash, then walks around in the field (for about 20 m). Then the trainer returns and the dog is unleashed.

- 1 point. Does not show any interest to where the handler has gone.
- 2 points. Runs to the field and sniffs, yet search is slow and short. Uses vision at exploration.

3 points. Runs to the field and sniffs footprints of the master. Searches using olfaction, but not a vision.

**Statistics**

Statistic analysis was carried out using the non-parametric Mann-Whitney U test (SAS, 1995) for a comparison between the groups and Wilcoxon matched pairs sign-ranks test (SAS, 1995) for a comparison within groups.

**RESULTS**

1. Testing results before special training

Each dog was scored during the first testing. There was an obvious difference between the groups, the animals of which had been housed under different

conditions (Table 1). The 1st group (socially isolated dogs) earned the worst score, 10.0 points (1.55 S.D.) The result significantly differed (Mann-Whitney U test,  $p = 0.04$ ) from that of the 3rd group (dogs with purposefully trained retrieval and searching abilities from puppyhood), 18.33 points (0.58 S.D.) (Fig. 1). The 2nd group of dogs (housedogs) occupied the position between the above two, the difference from the both being insignificant, though (Fig. 2).

To note the differences between the three groups of dogs in situation and predatory-play behaviour we compared the results of I-III and IV-VII tests, separately. The three groups of dogs were dissimilar in their situation behaviour features. As it could be seen from Table 1, the worst score was gained by the 1st group of dogs, while the 2nd one achieved better results and 3rd – the best.

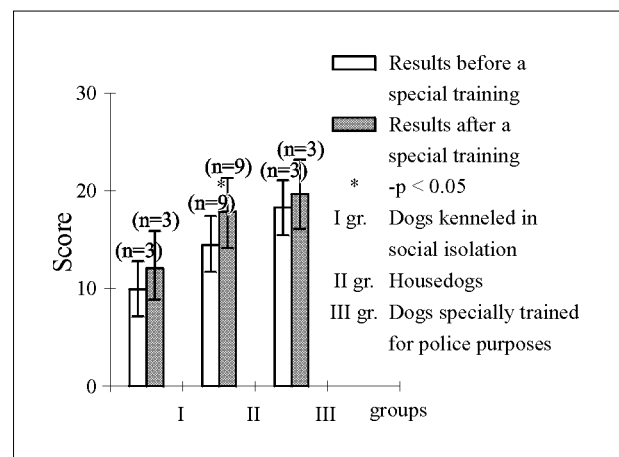
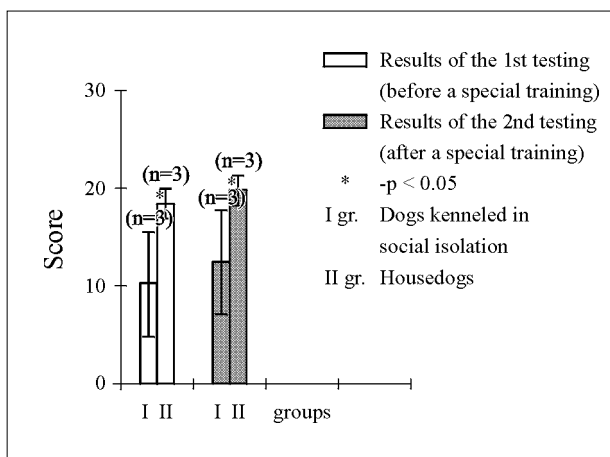


Figure 1. Results of the first and second testing (comparison of socially isolated (group I) and purposefully trained dogs (group III))

Figure 2. Testing results before and after a special training

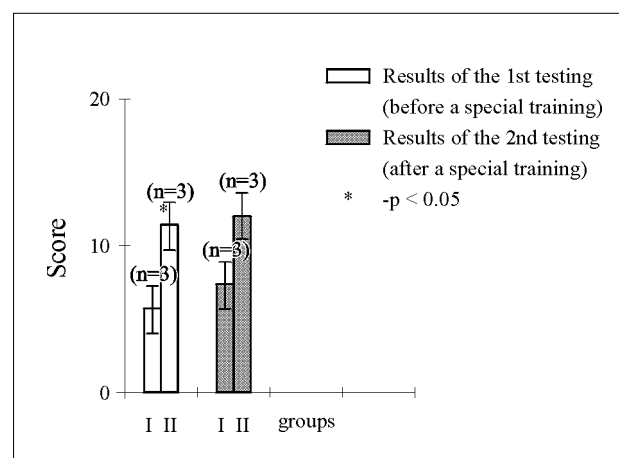
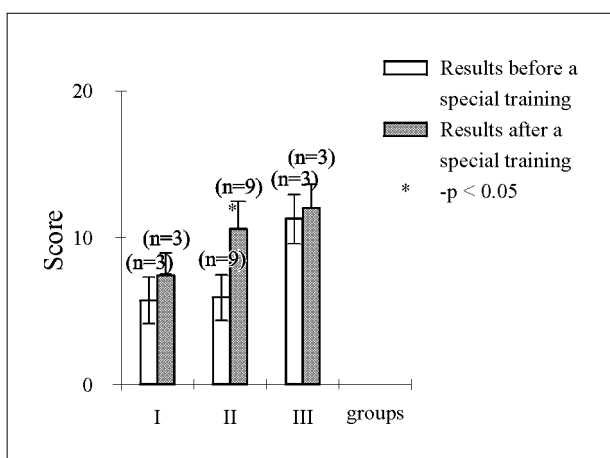


Figure 3. Results of IV-VII tests (predatory-play behaviour) before and after a special training

Figure 4. Results of the first and second testing (predatory-play behaviour (IV-VII)). Comparison of socially isolated (1st group) and purposefully trained (3rd group) dogs

A difference between the three groups of dogs in predatory-play behaviour (IV-VII tests) was obvious too (Fig. 3). The 1st and 2nd groups of dogs differed insignificantly in predatory-play behaviour (Mann-Whitney U test,  $p = 0.06$ ). The contrast between the 1st and 3rd groups was, however, remarkable (Mann-Whitney U test,  $p = 0.04$ ) (Fig. 4). There was no notable distinction in predatory-play behaviour between the 2nd and 3rd groups.

The best score, 11.33 points (1.15 S.D.), in predatory-play behaviour tests showed the dogs that had been specially trained from puppyhood applying social retrieval games. The 1st group (human-isolated dogs) expressed weak retrieval abilities, poor search drive, unfavourable behaviour in retrieval games and search. Consequently, they gained the worst score, 5.66 points (1.55 S.D.). The results of the 2nd group (housedogs), again, were between those of the 1st and 3rd, i.e. 5.88 points (1.96 S.D.) (Table 1). Accordingly, the arrangement of the groups according to their testing results was the same as in the case with situation and predatory-play behaviour.

2. Testing results after special training

As we expected, after 3 months' intensive exercises the results of the second testing improved to compare with those of the first one (Wilcoxon,  $p = 0.00098$ ) (Fig. 5, Table 2). The improvement was

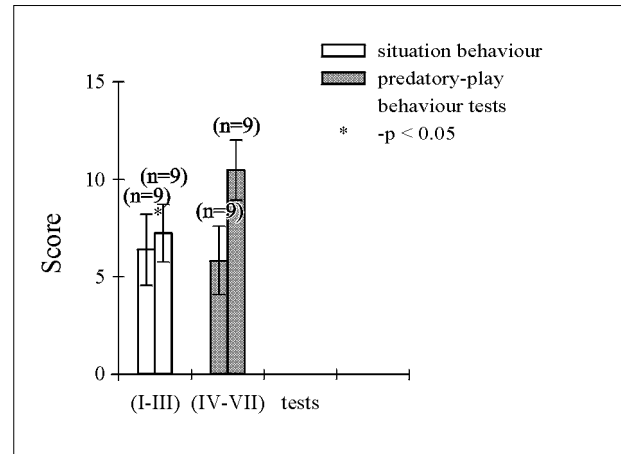


Figure 5. Improvement in the testing results (situation and predatory-play behaviour) in the second group of dogs

Table 2. Group information and testing results after a special training.

Group information and animals (No)	Situation behaviour tests			Average score of situation behaviour	Predatory-play behaviour tests				Behaviour score of predatory play	Summarized score of the tests	The average scores of all the tests	
	I	II	III		IV	V	VI	VII				
I Kenneled in social isolation. The only contact with humans lasted ~0.5 min while feeding	1	0	1	4.33 ± 3.21	1	1	2	1	7.33 ± 3.21	7	12.33 ± 6.14	
	2	2	1		2	1	1	2		2		11
	3	3	3		3	3	3	2		3		19
II House dogs. Had had enough contacts with humans, but their retrieval and searching abilities were not specially trained in puppyhood	4	3	2	7.22 ± 1.2	3	3	1	3	10.55 ± 2.0	17	17.77 ± 3.03	
	5	3	1		2	3	3	2		3		17
	6	3	3		3	3	3	3		3		21
	7	3	3		2	3	3	2		3		19
	8	2	3		3	2	2	2		3		16
	9	1	1		3	1	1	2		2		11
	10	2	2		3	3	3	3		3		19
	11	2	3		3	3	3	3		3		20
	12	2	3		3	3	3	3		3		19
	III Kenneled in Police Dog Training Centre. Retrieval and searching abilities had been purposefully trained from a puppyhood	13	1		2	7.66 ± 1.52	3	3		3		3
14		3	2	3	3		3	3	20			
15		3	3	3	3		3	3	21			

obvious in situation behaviour (I-III tests) (Wilcoxon,  $p = 0.007$ ) and predatory-play behaviour (IV-VII tests) (Wilcoxon,  $p = 0.005$ ). No significant improvement was observed in the results of the 1st and 3rd groups (Wilcoxon  $p = 0.1$ ) (Fig. 2). However, a progress in the testing score was obvious in the 2nd group of dogs (Wilcoxon,  $p = 0.01$ ) (Fig. 2). Social play and environmental enrichment exercises made a great influence on housedogs (2nd group) in both situation and predatory-play behaviour patterns (Wilcoxon,  $p = 0.04$ ) (Fig. 5).

Despite the results of the second testing being markedly better than of the first one, the arrangement of the groups remained unchanged (Table 2, Fig. 2): the worst score, 12.33 points (6.14 S.D.), gained the 1st group, while the best one, 19.64 points (1.53 S.D.), 3rd group, and the 2nd group occupied the position between those two with 17.77 points (3.03 S.D.) (Table 2).

Predatory-play behaviour features (IV-VII tests) remained dissimilar between the experimental groups of dogs. The reason for this was a great difference between the 1st (human-isolated) and 3rd groups (trained from puppyhood) (Mann-Whitney test,  $p = 0.036$ ) (Fig. 4). The difference between the 1st and 2nd groups was inconsiderable (Mann-Whitney U test,  $p = 0.06$ ). In the latter case, though, a real tendency of difference between the two groups could be seen (Table 2). The dissimilarity between the 2nd and 3rd groups disappeared after special training (Mann-Whitney U test,  $p = 0.12$ ) too.

## DISCUSSION

The dogs housed under different social and physical conditions in juvenile period turned out to be different in various aspects of behaviour (see results before training). That confirms and fulfils the early studies of social and physical enrichment influence on dogs' behaviour (Hetts, 1992; Dehasse, 1992; Hubrecht, 1993; Hubrecht, 1997). Many authors stress benefits of both canine and human social contacts, particularly in puppyhood (Fox and Stelzner, 1967; Fox, 1986; Campbell et al., 1988; Wolfle, 1987, 1990). We can only add to this that the mentioned contacts in puppyhood and, particularly, retrieval games are an indispensable condition for making the dog useful in searching work.

A retrieval play is not only the essence of dog search training but also a communication means between the dog and human. Therefore, as it was expected, the dogs human-isolated in a sensitive juvenile pe-

riod could not play with the masters in adulthood because of the lack of contacts with humans. They showed a frustrated, confused, fearful or extremely aggressive reaction in strange situations (I-III tests), especially in the presence of strange people. The reason of that, to my consideration, is the lack of the dogs' confidence in their master-humans. Wild wolves are fearful and unconfident of people and in urban environment, so the dogs of the 1st group were much the same. After the 3 months' training, behaviour features in those dogs remained practically unchanged. It should be pointed out that two of three dogs in the 1st group did not enjoy a retrieval game with the man at all. It implies that social isolation has made an irreversible effect on their behaviour, so they are unable to establish a bond with the human and be self-confident in human environment. There was one individual in the 1st group, housed in a family until 4 months of age. The dog was able to play with the human and after purposeful training its retrieval and searching abilities, behaviour in strange situation equalled the score of the 2nd (housedogs) group. We trained the animal for explosive-searching work later. We suppose that the reason of such success was that this individual had received suffice human attention in the life-period sensitive for socialisation (3-12 weeks). Because of a small dog group set, the presence of that dog should be considered on analysing the results.

After special training the difference between the 1st and 2nd groups of dogs became insignificant ( $p = 0.08$ ) as far as predatory-play behaviour was concerned. That insignificance could be considered effected by the score of the atypical animal from the 1st group.

The 2nd group of dogs (housedogs) was in the position between the 1st and 3rd groups according to the testing score. They, seemingly, had had enough human contacts and special training made a great impact on them. As a mathematical analysis revealed, the beneficial improvement in the testing scores after special training ( $p = 0.0009$ ) was defined by changes and improvement in behaviour features, meaningful for search training, in the 2nd group of dogs. After the 3 months' training of retrieval, exploratory, searching skills in adulthood they made an immense progress ( $p = 0.01$ ). Their results became better as in the case with situation (I-III tests) and predatory-play behaviour (IV-VII test). Moreover, that group was the one showing markedly better results in situation behaviour after the training than before it. It could be stated, then, that a strong bond with the master (established by playing social (retrieval) games) develops self-confidence in the dog in strange situations

with the presence of the master. In other words, the dog socialised with humans adapts to human environment. Then the behaviour patterns that have developed for about 12000 years of domestication, patterns different from the wolf ones, come to light: infancy and drive to play object-oriented games with the man, courage and self-confidence in urban environment, willingness to enjoy communication with humans. Presuming that a retrieval (social) game strengthens a bond between the dog and human, the results obtained by us could be interpreted in the following way. After a stronger bond with the masters has developed housedogs adapted to strange situations, and they became more self-confident in behaviour with conspecifics and humans than before the establishment of that bond and a relative special training.

The dogs specially trained from puppyhood gained the best score before the 3 months' training in adulthood. No dispersion in the results of the individuals of that group was left after the training ( $x = 12 \pm 0$  (S.D.)). Before the special training, the results were close to the maximum ones. It could be considered that purposeful training in puppyhood using object-oriented games establishes behaviour features favourable for search training.

According to the data collected by Italian police dog-breeders, only five of the ten German shepherd puppies specially bred and trained for searching work become suitable for police purposes in adulthood. Champness (1996) made some research with drug searching Labrador retrievers bred for that purpose. The result was similar and the ratio (of suitable-unsuitable dogs) was 5 : 10. Feasibly, if the set of the 3rd group of dogs has been bigger, we would have got the same ratio or at least a greater dispersion. However, all 3 dogs from the 3rd group were from working letters, and their parents and grandparents were perfect working dogs with excellent retrieval, exploratory and searching abilities. Besides, puppies were chosen and trained by expert dog-trainers. Our data confirms the Champness' (1996) point of view that careful genetic selection and purposeful training using retrieval games provides the best results. Besides, such dogs are able of establishing a strong bond with their handlers, have stable psychical health, are playful, have a strong retrieval and search drive, motivation towards objects under different conditions.

Hetts (1992) states that social isolation is more harmful for the dog's psychological wellbeing than environmental conditions, i.e. the place of housing, its dimensions and environmental enrichment. The animals of the 2nd group had been housed in human

(sometimes – urban) environment. Dogs of the 1st and 3rd groups had been kennelled in similar dog pens. Irrespective of that, the testing results before and after the special training were quite different in the two groups. The differences in their behaviour patterns, seemingly, were determined by differences in social communication rather than environment. On the other hand, housedogs and the animals specially trained from puppyhood had had, certainly, higher social and environmental enrichment than those housed without human contacts in dog pens (the 1st group).

This study pertains to a rarely studied behaviour phenomenon of the domestic dog, i.e. its social play with a different species, the human. Many behaviour patterns in the dog, inherited from its closest ancestor, wolf (*Canis lupus*), are expressed in predatory-play behaviour. It is also possible that some behaviour patterns have arisen de novo but have escaped biologists' attention on measuring wolf-type signals (Goodwin et al., 1996). Those 'de novo arisen' behaviour signals should be searched for, and particularly in the dog-human social play behaviour. It is a large area for investigation.

#### ACKNOWLEDGEMENTS

I thank Assist. D. Malickienė, A.I. Šveistytė for their helpful comments on the manuscript of this paper and for assistance with the statistic analyses. I also express my thanks to commissioner A. Zaleckas for his aid with the dogs and in providing the experiment.

#### REFERENCES

- Beaver B.V., Fidcher M., Athinson C.E. 1992. Determination of favourite components of garbage by dogs. *Appl. Anim. Behav. Sci.* 34: 129-136.
- Campbell W.E. 1975. Behaviour Problems in Dogs. *American Vet. Pub. Inc.*: Santa Barbara, USA.
- Champness K., Beilharz R. 1996. Breeding and rearing drug detector dogs. *Thurcen-Animal Interaction IX.*
- Dellaire A. 1991. Behaviour in dog. *Red. Med. Vet. ec.* Alfort. Paris, 167: 7-7.
- Dehasse J. 1992. Sensory, emotional and social development of the dog. *Cah. Ethol.* 12: 443-446.
- Fox M.W., Stelznev D. 1967. The effect of early experience on the development of inter and intraspecies social relationship in the dog. *Anim. Behav.* 15: 377-386.
- Fox M.W. 1986. Laboratory animal husbandry. State Uni-

- versity of New York Press. Albany, NY, 267 pp.
- Freedman D.G., King J.A., Elliot O. 1961. Critical period in the social development of dogs. *Science* 133: 1016-1017.
- Goodwin D., Bradshaw J.S., Wickens S.M. 1997. Paedomorphoses affect agonistic visual signals of domestic dogs. *Anim. Behav.* 53: 297-304.
- Hetts S., Clark J.D., Calpin J.P. et al. 1992. Influence of housing conditions on beagle behaviour. *Appl. Anim. Behav. Sci.* 34: 137-155.
- Hubrecht R.C. 1993. A comparison of social and environmental enrichment methods for laboratory housed dogs. *Appl. Anim. Behav. Sci.* 37: 345-361.
- Hubrecht R.C., Sales G., Peyvandi A. et al. 1997. Noise in dog kennels, effects of design and husbandry. In *Elsevier Science B.V. Animal Alternatives, Welfare and Ethics*. Ed. Van Zutphus L.F.M., and Balls M. 215-220 pp.
- Millot J.L. 1994. Olfactory and visual cues in the interaction systems between dogs and children. *Behav. Proc.* 33: 177-188.
- SAS Institute Inc. 1985. *SAS Users Guide: Statistics*, Version 5. Cary, N.C.: SAS Institute Inc.
- Wolfe T.L. 1987. Control of stress using non-drug approaches. *J. Am. Vet. Med. Assoc.* 191: 1219-1221.
- Wolfe T.L. 1990. Policy, program and people: The treep's to wellbeing. In: J.A. Meuch and L. Krulisch (Editors). *Canine Research Environment Scientists Centre for Animal Welfare*. Bethesda, MD, 41-47 pp.
- Zoltan Sr. et al. 1996. Training of explosives reaching dogs. Dunakesci.

**BENDRAVIMO SU ŽMOGUMI IR MANIPULIACINIŲ ŽAIDIMŲ ĮTAKA KAI KURIOMS ŠUNS (CANIS FAMILIARIS) ELGSENOS SAVYBĖMS**

*G. Balevičiūtė*

**SANTRAUKA**

15 suaugusių vokiečių aviganių veislės šunų buvo tirti 7-nių elgsenos testų pagalba. Eksperimentiniai gyvūnai testuoti 2 kartus – prieš ir po specialaus treniravimo. 3-jų mėnesių treniravimo metu buvo lavinamos šunų aportiravimo ir paieškos savybės, jie buvo pratinami prie įvairios aplinkos, situacijų. Rezultatai parodė, kad izoliuotai nuo žmonių auginti juveniliniame laikotarpyje šunys vėliau nebesugebėjo žaisti su žmogumi aportiravimo žaidimų ir nebeužsimezgė tikras ryšys su šeimininku. Šie gyvūnai neįprastose situacijose elgėsi bailiai, tarsi “laukiniai” ir pratinimas prie tokių situacijų suaugusiame amžiuje nepakeitė šios elgsenos. Šunų, turėjusių pakankamai kontaktų su žmogumi juveniliniame laikotarpyje aportiravimo ir paieškos savybės buvo geresnės, negu izoliuotų, jie buvo labiau pasitikintys įvairiose situacijose. Aportiravimo žaidimų pagalba šios eksperimentinių gyvūnų savybės dar labiau pagerėjo. Pagal mūsų gautus rezultatus, galima daryti išvadą, kad infantilumas ir sugebėjimas žaisti aportiravimo žaidimus su žmogumi yra įgimtas vokiečių aviganiams, bet šiai elgsenai pasireikšti reikalingos sąlygos – socializacija su žmogumi juveniliniame laikotarpyje ir tokių žaidybinių pratimų buvimas suaugusiame amžiuje.