

Effect of classical music on dogs' behavior in the shelter

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A therapeutic effect of music has been known for several thousand years (Natanson, 1979), whereas the first scientific treaties on the therapeutic impact of music have started being written in the end of the 17th and the beginning of the 18th century. (Janiszewski, 1993). This issue has started being broadly discussed in the 20th century. Facilities promoting music therapy have started being created in many countries after the 2nd World War. A rapid development of technology accelerated the flow of information between the continents, so sharing the results of studies between the sites all over the world has become significantly quicker and easier. Appreciation of the possible effect of music on people was transferred to an interest in studies concerning the effect of music on other species, however the number of studies on the influence of music on animals is still limited. For example, this type of studies was conducted on dairy cattle (Uetake et al., 1997), pigs (De Jonge et al., 2008; Dudink et al., 2006), horses (Haupt et al., 2000) and gorillas (Blaney and Wells, 2004; Wells et al., 2006).

An issue of stray dogs has becoming more serious in many countries. Hungry, ownerless dogs pose a threat to both people and livestock (Dalla Villa et al., 2010), therefore stray individuals are captured and put in shelters for homeless animals. However, this is associated with a restriction of space, isolation and a change in lifestyle of dogs that used to be free-living. Shelter environment, even in case of staying there for a short period of time, is a potential psychogenic stressor for the majority of dogs, due to a new surrounding and isolation from the people to whom the animals have socially grown attached to (Beerda et al., 2000; Pullen et al., 2010). In dogs, social isolation or restrictions as well as severe stress may contribute to the development of both physiological and behavioral disorders. Behavioral disorders are a relative issue and may have different meaning for each dog owner, however, they correspond to a behavior that may pose a danger to an animal or anybody from its environment. It is assumed that the development of these types of behavior is affected by both genetic and environmental factors (Appleby et al., 2002; Overall et al., 2006). It should be remembered that dog is a very social species, able to broadly communicate with people, therefore human behavior has a huge impact on the occurrence of behavioral disorders in dogs (Hiby et al., 2004). The most serious and most commonly observed behavioral disorders mainly include various types of aggression, separation anxieties, all the manifestations of hyperactivity and neurotic behaviors (Millan and Peltier, 2012).

Anxiety demonstrated by physical and behavioral symptoms is a growing problem associated with welfare in veterinary medicine. Due to the above, human awareness and care for the welfare of dogs in shelters have increased and there has been also a development of potential strategies of improvement of their environment (Bergamasco et al., 2010; Dalla Villa et al., 2013). Dogs staying in the shelters are exposed to chronic stress that has a negative effect on both physical and mental welfare of animals and may evoke or contribute to the development of unwanted behaviors. These in turn cause difficulties in adoption of such dogs and are the main reason for returning them to shelters (Bowmann et al., 2017).

Welfare index of dogs living in shelters may be determined on the basis of physiological (Hennesy et al., 1997) and behavioral parameters (Tuber et al., 1996; Tyson, 2005). Behavioral indicators are non-invasive and easy to notice, so they can be a simple source of significant information on the

needs and preferences of dogs. Beerda et al. (2000) distinguished specific patterns of behaviour in dogs which were subjected to experimentally induced stress. Among others, various types of stereotypies, a decrease in activity and excessive vocalization were observed. Proper living conditions play a key role in maintaining welfare. Ideal environment provides a dog with a sufficient number of stimuli to motivate it for expression of its natural behavior.

In relation to this, studies on the improvement of welfare of dogs in a shelter appeared. One of the methods was the attempt to modify their environment, among others with the use of sensory stimulation (Newberry, 1995). This type of stimulation is a stimulus to involve one or more of the senses (i.e. sight, smell, and/or hearing). The minimum hearing range of dogs amounts to 16 to 20 Hz (20–70 Hz in humans), whereas in its maximum it reaches 70,000–100,000 Hz (20,000 Hz in humans). Moreover, dog ears are mobile and may indicate a precise location of sound in a short time. Additionally, they are able to capture sounds from a distance four-fold longer than humans. A total of eighteen muscles are responsible for the movement of ears consisting in turning, tilting, lifting up and lowering the hearing organ (Newberry, 1995).

Results of studies concerning the application of auditory stimuli to improve living conditions of shelter dogs and the reaction of dogs to various kinds of music prove a soothing effect of classical music (Kogan et al., 2012; Mira et al., 2016). In the studies conducted by Bowmann et al. (2015), beneficial changes in behavior of dogs exposed to classical music were observed. The dogs spent more time sleeping or lying, fewer cases of barking and walking, which are common in case of acute or chronic stress in these animals, were observed. Properly applied therapy with the use of music can be one of the methods of control over animal's emotions. Due to high sensitivity of dog's hearing, many situations, e.g. being left by the owner in the flat, listening to loud music, a bang of New Years Eve's fireworks, may cause stress, discomfort and even pain in them. Therefore, CDs with specialist relaxation music composed especially for dogs has started appearing on the music market (<http://kakadu.pl/muzyka-relaksacyjna-dla-psow>). They may contain recorded works of classical and relaxation music as well as sounds of nature. They help animal relax in stressful situations. In the United States there are also available CDs with music composed specifically to make it easier for dogs to travel by car. A special device transforming human music into the music that is not irritating to dog's sensitive hearing is very popular as well. It serves for the removal of too high and too low frequency sounds, which cause the most discomfort to animals, from the tracks played from home speakers (http://www.zpazurem.pl/artykuly/muzyka_dla_psa). Studies indicating the beneficial effect of audiobooks on behavior of dogs in the shelter were also conducted (Brayley and Montrose, 2016).

Results of all the studies in animals indicate that auditory stimulation may have a very significant effect on their behavior as well as the level of both positive and negative stress. It follows that auditory stimuli can be used to increase animal welfare. In relation to the above, the aim of the present study was to analyse the possibilities of applying music therapy in the dog shelter and assess its effect on behavior of the animals.

Material and methods

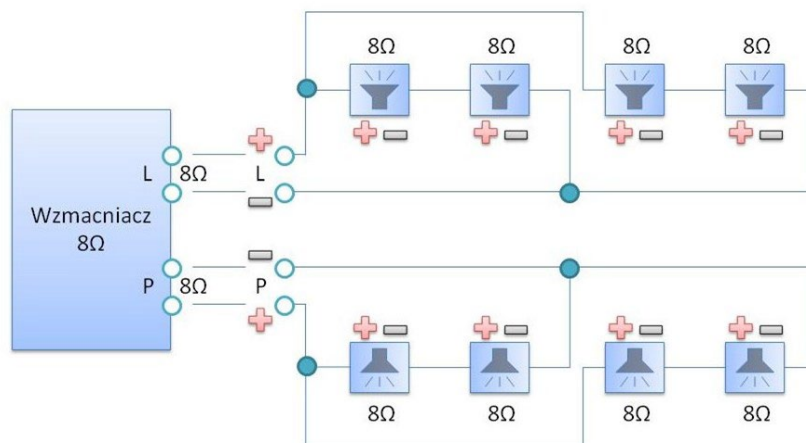
The study was carried out in the “Cichy Kąt” animal shelter created in Opatowice (a district of Tarnowskie Góry in Silesia province) in 1993. The experiment included 22 mongrel dogs living in the shelter (16 males and 16 females). The age of individuals participating in the study varied between 1.5–14 years (the majority within the range of 3–9 years). The so-called accompanying dogs were animals that were not included into the study, but due to the fact that they stayed in the same pens with problematic dogs, they were also taken into consideration in the analysis of the results. These individuals did not exhibit any behavioral problems, but only played a role of a companion and an element assisting in resocialization during the experiment.

The experiment lasted for 5 months – from July to November 2015. Music works were played every day at the same time, between 10:00 and 15:00 during daily duties associated with animal care. Musical works composed by the most eminent composers, such as: Vivaldi, Chopin, Bach, Mozart, Beethoven, Tchaikovsky were used in order to conduct the study. Due to the will to provide the dogs

with a wide variety of musical diversity, apart from individual songs, medleys of compositions of classical music works were played, which reduced the likelihood of repetition of the recordings several times during the day.

A sound system designed specifically for the needs of the experiment was used to perform it. The speakers were placed in plastic containers with special openings to protect them from the weather conditions. In the area of the shelter, a total of 8 speakers were fixed to the trees adjacent to dogs' pens or on the walls, using the existing installations. Sound equipment was started using a timer. Wiring diagram for sound system in the shelter is presented in figure 1. Volume of the music was set at the level of approx. 45-50 dB so that it did not cause discomfort to animals along with the so-called background noise (usually at around 40-45 dB) (Coppola et al., 2006).

A questionnaire was prepared to determine the results of the experiment. Employees and volunteers who spend most of the time with dogs included in the questionnaire were asked to fill it in. Each copy of the questionnaire contained dog's name and its aim was to briefly describe the animal. The document consisted of 15 questions which had to be answered by choosing one of the presented options (questions 1-15). At the end of the experiment, dog carers were asked to answer the questions summing up the effects of therapy during which some aspects of animal behavior were assessed (on a scale from 1 to 5) as well as visibility of the effects of the experiment (on a scale from +1 to -1). The results are presented in tables 1-3 and on the diagrams.



Amplifier

Pict. 1. Wiring diagram for sound system in the shelter

Results and discussion of results

Analysis of the data presented in Table 1 demonstrates that 22 individuals included into the study were mongrel dogs, which confirms the common notion that pure breed dogs are found in dog shelters very rarely. This is probably due to the fact that these animals are much more valuable, and their purchase is often associated with breeding plans that bring financial benefits. In addition, the owner who purchases a pure breed dog expects from it mental and physical features characteristic of the given breed, which cannot be guaranteed by offspring resulted from mating of mongrel individuals. Therefore, unwanted pups as well as old and ill dogs are the most numerous groups living in shelters for homeless animals.

All the studied individuals were sterilized and castrated after the admission to the shelter. The aim of this top-down requirement is to prevent dog reproduction in the already crowded shelters. A vast majority of dogs (68%) participating in the experiment had been straying on the streets of the nearby towns and villages before being placed in the shelter. Their average age indicates that in general they were mature and older dogs. The remaining percentage originated from private houses (32%). In such

cases, the animals are usually placed in shelters as a result of interventions organized in order to collect an animal from scandalous living conditions.

Dogs with the most severe behavioral problems were selected to participate in the experiment. Most common disorders in shelter dogs include manifestations of aggression as well as fearfulness and hyperactivity. Destroying objects is a common behavior. Numerous stereotypes – mainly running around the kennel or along the pen, occur as well (Meadows and Flint, 2012; Millan and Peltier, 2011, 2012). All these symptoms of disorders were exhibited during daily duties performed by carers in the shelter. As much as 72% of the studied individuals had problem with walking on a leash, almost half of which unwillingly left the gate of the shelter and lagged behind. This shows a deep-rooted fear and lack of self-confidence. However, a significant part of dogs (27%) demonstrated the opposite behaviour. During the walk, they pulled forward with all their strength. Apart from stating the lack of education and accumulation of inexhaustible energy, it can also be concluded that these individuals are too self-confident and lack respect for the guide (Meadows and Flint, 2012; <http://psychologiapsa.manifo.com/lek-separacyjny>).

Both of the phenomena discussed above may lead to manifestations of aggression, but each case may be evoked by different type of stimulus. Fearful dogs may perceive every contact with a man as an attack and interference in their personal space, hence attacking the guide takes the form of self-defense. Reasons for attacks in dogs with high self-confidence are different. These individuals often treat their pens as their territory and do not let anybody cross its border. Such a strong territorialism often results in attacks on shelter employees, usually at the time of feeding. Dog's temper may be easily assessed, even by the way it behaves in its pen. Fearful individuals usually bay nervously close to their kennel, while those self-confident ones attack each passer by an aggressive barking (Paśiek et al., 2015).

On the basis of the data presented in Table 1, a graph showing the comparison of aggression against employees and other dogs was prepared (graph 1). Based on this graph it can be concluded that manifestations of aggression were not very frequent in the shelter and usually occurred once or only occasionally. Only barking was common among the dogs. Moreover, it should be mentioned that other dogs were attacked more often than the employees. This is consistent with the studies conducted by Dąbrowska et al. (2011), who observed that aggression of mongrel dogs towards people was lower than towards other dogs. Therefore, the decision to place dogs in group pens is preceded by three tests, after which it can be determined whether the animals will be able to live together in harmony and there will be no manifestations of aggression. The first test is a general trial. It consists in placing two or more dogs in one pen and observing whether any of the individuals is aggressive towards the other one. After completion of the first stage, den trial and feeding trial are conducted. Both tests consist in observing whether none of the dogs is too greedy and respects the space and the bowl of the companion. These actions are aimed to reduce the signs of aggression within one pen, however, it does not affect the relationships between all the dogs in the entire shelter.

To conclude the conducted experiment, shelter employees answered the questions concerning an improvement in behavior of the animals they were taking care of. Results of the questionnaire were presented in table 2.

The first observable change in dogs' behavior was an increased willingness to cooperate with people. Animals began to establish contacts with people more easily and willingly, while the level of anxiety towards the employees and people visiting the shelter significantly decreased in three dogs. An improvement in behavior during the walks occurred in half of the dogs. These changes were minor, but observable in the period of almost half a year. Results concerning the manifestations of aggression, both when feeding and a general aggression towards humans and other dogs, are similar.

After collecting all the information and analysing the questionnaires, a table 3 was constructed in order to show the results of the experiment. The presented data indicate that the majority of dogs included in the five-month study showed an improvement in behavior. A slight behavioral improvement occurred in 45% of all the individuals, whereas a significant improvement took place in as much as 27% of the animals. In 14% of dogs included in the study there was no reaction to the played music, and the remaining 14% were accompanying dogs. Worsening of behavior was not observed in any of the individuals participating in the experiment.

Table 1. Results of questionnaire survey

No.	Question	Answer	No. of answers	Percentage share
1	Dog's breed	<i>mongrel</i>	22	100
		<i>pure breed</i>	0	0
2	Dog's gender	<i>castrated male</i>	16	73
		<i>non-castrated male</i>	0	0
		<i>sterilized female</i>	6	27
		<i>non-sterilized female</i>	0	0
3	Dog's age	<i>below a year</i>	0	0
		<i>1–2 years</i>	2	9
		<i>3–5 years</i>	7	32
		<i>above 5 years</i>	13	59
4	How old was the dog when it got to the shelter?	<i>below a year</i>	1	4
		<i>1–2 years</i>	5	23
		<i>3–5 years</i>	11	50
		<i>above 5 years</i>	5	23
5	In what environment was the dog maintained before it got to the shelter?	<i>in a private home</i>	7	32
		<i>was homeless</i>	14	64
		<i>was found</i>	1	4
6	Does the dog exhibit behavioral problems?	<i>no</i>	3	14
		<i>yes</i>	19	86
7	If so, what are the problems?	<i>fearfulness</i>	10	45
		<i>aggression</i>	11	50
		<i>hyperactivity</i>	10	45
		<i>excessive vocalization</i>	1	4
		<i>stereotypies</i>	7	32
		<i>damaging things</i>	7	32
8	Is the dog's past known?	<i>no</i>	13	59
		<i>yes</i>	9	41
9	How does the dog behave on a walk?	<i>goes on a loose leash</i>	6	27
		<i>pulls forward</i>	6	27
		<i>stays behind</i>	10	45
10	How does the dog behave when feeding?	<i>inactive</i>	11	50
		<i>fearful</i>	7	32
		<i>aggressive</i>	4	18
11	How does the dog behave in its pen?	<i>barks, standing at the front wall of the pen</i>	7	32
		<i>barks hiding near the kennel</i>	7	32
		<i>lies peacefully in its place</i>	8	36
12	Has it happened that the dog snarled at employees?	<i>never</i>	8	36
		<i>once</i>	5	23
		<i>occasionally</i>	8	36
		<i>commonly</i>	1	4
13	Has it happened that the dog bit/tried to bite one of the employees?	<i>never</i>	8	36
		<i>once</i>	6	27
		<i>occasionally</i>	7	32
		<i>commonly</i>	1	4
14	Has it happened that the dog snarled at other dogs?	<i>never</i>	3	14
		<i>once</i>	5	23
		<i>occasionally</i>	7	32
		<i>commonly</i>	7	32
15	Has it happened that the dog bit/tried to bite other dog?	<i>never</i>	10	45
		<i>once</i>	5	23
		<i>occasionally</i>	5	23
		<i>commonly</i>	2	9

Table 2. Analysis of therapy effects

Therapy effects	Points					
	0	1	2	3	4	5
Reduced aggression during feeding	19	1	1	1	–	–
Reduced fearfulness	14	2	3	–	3	–
Reduced vocalization	22	–	–	–	–	–
Increased willingness to cooperate with human	7	6	1	6	2	–
Improved behavior during walk	11	3	4	4	–	–
Reduced aggression towards human	13	3	3	3	–	–
Reduced aggression towards other dogs	16	3	2	–	1	–

Table 3. Analysis of the experiment based on questionnaire results

Behavior improvement		No behavior improvement	Behavior deterioration	Accompanying dogs
large (+1 point)	small (+0.5 point)	(0 point)	(- 1 point)	–
6	10	3	0	3

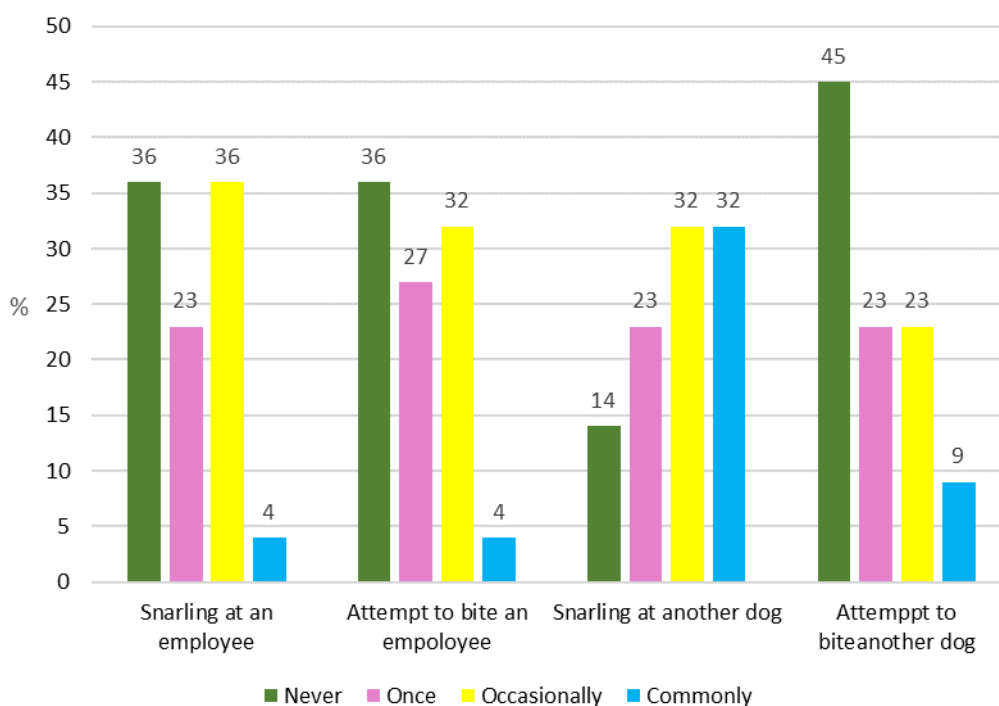


Figure 1. Symptoms of dogs' aggressiveness in the shelter (%)

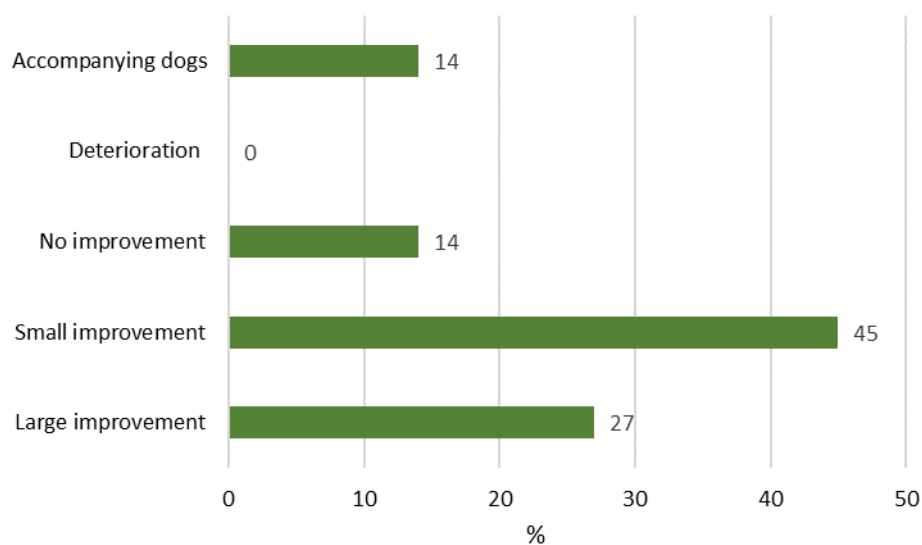


Figure 2. Percentage of dogs' behavior changes after the experiment

A beneficial effect of classical music on animals confirmed by numerous studies was proved in the present experiment as well. Behavioral changes were slight, although compared to other animal studies with the use of auditory stimulation, this experiment raises a slightly different issue. The previous experiments consisting in playing music to animals of different species were aimed to observe an immediate reaction of the individuals to various kinds of sound. Examples of such a study may be, among others, an experiment conducted on dogs in the shelter in North Colorado (Kogan et al., 2012) or on gorillas in the zoo in Belfast (Wells et al., 2006). In both of the above-mentioned studies, a subject of observation was behavior of the individuals when playing the music. Due to the fact that the observations were simple reactions evoked by the specific stimulus, the effects were visible immediately after the beginning of the study. A short time of exposure of dogs to music was a certain limitation of many conducted studies, because it did not allow to draw conclusions about the long-term changes in their behavior, related to, for example, a reduction in stress level. It is also worth noting that in a 7-day study conducted by Bowmann et al. (2015), the dogs got used to the music quickly, which was determined by heart rate and behavioral data, such as: position, location or vocalization. Getting used to the music was noticed already after the first day of observation, whereas the effects were not visible until the seventh day.

In the presented studies, immediate reactions were not observed, but long-term effects of the therapy were noted. Therefore, not all the dogs achieved the same level of behavioral improvement. Animals differ between themselves in the tendencies and predispositions for different behaviors, and that is why a five-month study is actually just an introduction to the further rehabilitation process using music therapy. For some individuals, this period was long enough to notice an improvement in their behavior. On the other hand, the other ones most probably would need a longer period of therapy to achieve more satisfactory effect. However, the results of the experiment show an increasing tendency.

A soothing effect of music in people has been known for a long time. Numerous studies suggest that classical music may reduce agitation as well as calm down and put in a good mood (Cooper and Foster, 2008). Therefore, it is worth noting that not only animals were subjected to a beneficial action of classical music. Shelter employees were exposed to the effect of music to

the same extent as the animals included in the study. Their relationships and also the relationships of people visiting the shelter are reflected in the literature.

Apart from creating a more positive working environment for people taking care of dogs, classical music may help potential adoptive caregivers feel more comfortable in the shelter, which increases the possibility that they will find the proper animal for adoption. This is in accordance with the studies, which demonstrated that relaxation music may increase the amount of time the people spend doing shopping (Milliman, 1982). In addition, the studies conducted on people indicate that music raises the spirits, it may have a positive effect on behaviours aimed to help other people (North et al., 2004), and adopting an animal from the shelter is considered as the most sincere kind of help.

Summary and conclusions

Results of the present study indicate that auditory stimulation has the effect on the behavior of dogs in the shelter and the level of stress in them. Thus, it may be certainly concluded that auditory stimulation can be applied in order to increase the welfare of dogs in the shelters. Moreover, a soothing effect of music may be also used in other stressful environments (e.g. in veterinary clinics) in order to alleviate the symptoms of stress and improve the mental condition of patients.

Classical music evokes positive reactions both in animals and in humans. It has the effect on their physical and mental state as well as the decisions made by them, which is very important in such a place as a shelter for stray animals. The employees are put in a good mood, become less prone to the depressing effect of the shelter, have more energy and are also more relaxed. Volunteers visit the shelter more willingly and more often make a decision to adopt an animal.

An experiment carried out in shelter dogs demonstrated an improvement in behaviour of the majority of individuals included into the study. This is associated with an increasing interest in these animals and, as a consequence, make them more prone to be adopted after completion of the therapy.

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EFFECT OF CLASSICAL MUSIC ON DOGS' BEHAVIOR IN THE SHELTER

Abstract

The aim of the study was to analyze the possibilities of music therapy application in a dog shelter and its impact on animal behavior. The experiment included 22 non-breed dogs staying at the Homeless Animal Shelter in Tarnowskie Góry. The age of the individuals ranged from 1.5 to 14 years. The research lasted for five months, during which selected works of the greatest classical music composers were played. A questionnaire was prepared for the needs of the experiment, including questions related to the behavior of dogs and possible symptoms of aggression and it was filled in by the employees of the shelter and volunteers. The study demonstrated an improvement in behavior for most dogs in the experiment.

Key words: dog, shelter, behavioral problems, music therapy



Fot. D. Dobrowolska