

FEEDING BEHAVIOUR OF STRAY DOGS IN A MUNICIPAL SHELTER

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Feeding time of stray dogs on the first, second, third, fifth and seventh day of captivity in a municipal shelter was studied. The average value of the feeding time of dogs decreased from the first day (429.07±107.08 seconds) to the third day in captivity when it reached the lowest average value (229.53±95.18 seconds). The feeding time of dogs on the third day in captivity differs significantly from the same parameter on the first (429.07±107.08 seconds) and second day (372.73±100.58 seconds) in captivity ($p<0.01$). The highest average value of feeding time of stray dogs in the shelter was recorded on the first day. On the fifth and seventh day the feeding time of dogs increased compared to the third day. However, there were no significant differences of the average value of feeding time on the third day comparing with the fifth day (260.8±111.06 seconds) or the seventh day (301.33±119.89 seconds). Dogs ate their food more slowly on the fifth and the seventh day than on the third day, but more quickly than on the first and the second day (372.73±100.58 seconds). Significant differences were estimated comparing the feeding time of dogs on the first day with the third ($p<0.01$), fifth ($p<0.01$), and seventh day ($p<0.05$) of housing in the municipal shelter. Also, the feeding time of dogs on the second day differed significantly from the third ($p<0.01$) and the fifth day ($p<0.05$).

Key words: stray dog, feeding time, captivity, shelter

INTRODUCTION

Most people simply decide to purchase or adopt a dog. Later, some people who became irresponsible owners decide to abandon the dog because the animal is inconvenient or no longer suits their needs. In this manner a wanted dog becomes an unwanted dog. Some of them choose not to surgically sterilize their dog. The consequence of these decisions is dog overpopulation. Most people simply did not know about the resources available to them as alternatives to surrender their pets due to lack of knowledge about pet welfare or lack of adequate information (Irvine, 2003). Therefore, they leave unwanted pets at public

places where others may find and pick up abandoned animals or leave them in shelters. Most dogs in shelters are adult dogs that have had an owner who now does not want the dog. Relinquished dogs are not the result of overpopulation. Their existence cannot be prevented by birth control (neutering) programs. Owners either privately surrender or fail to reclaim the dog after it has been presented as a stray. The human-companion animal bond either never formed or has broken (Mondelli *et al.*, 2004), usually by the development of a dog behaviour problem that the owner cannot or won't address (Upton, 1992). Multiple factors can interfere with the successful or unsuccessful bond between dogs and humans but, once the bond is broken, the dog may end up on the street or may be taken directly to a shelter (Mondelli *et al.*, 2004). According to Feldmann and Carding (1991) in a number of communities, pet overpopulation and free-roaming pets have created a situation bordering on disaster, and such situations are occurring more frequently. A free-roaming dog or cat is a potential ecological, medical, and social threat in several ways: 1. Harboring diseases transmissible to man; 2. Inflicting bites; 3. Damaging property and wildlife; 4. Causing accidents and 5. Creating nuisances and pollution. According to Notaro (2004) shelter companion animals normally come from three main sources: (a) stray or lost companion animals impounded by animal control field officers or animals impounded for violations of humane care regulations; (b) stray companion animals brought to the shelter by a resident who happens across, and catches, a lost companion animal and delivers the animal to the shelter; and (c) companion animals relinquished by their caregivers. In most shelters today, the majority of dogs are not sickly strays or litters of puppies, but healthy, unwanted, adult pets. Most of these dogs do not find new homes. Instead, they are humanely killed (Irvine, 2003). Dogs entering shelters usually meet one of three fates: They are reclaimed, adopted, or euthanized (Lepper *et al.*, 2002; Marston *et al.*, 2004; 2005). However, there is another example as the one in Italy. Italian law does not permit euthanasia as a suitable method to control shelter dog population. So, many dogs spent most of their life in confinement (Dalla Villa *et al.*, 2008). Dogs housed in shelters cannot display their ethogram and show behavioural and physiological signs of distress (Verga and Michelazzi, 2009). According to Hennessy *et al.* (1997) dog confined in a public animal shelter experiences a whole array of psychogenic stressors, including not only social separation and exposure to novel surroundings, but also noise, restraint, alteration of light-dark cycles and probably of circadian rhythms, disruption of familiar habits, and more generally, unpredictability and loss of control. Most stressed and fearful dogs do not show an interest for novel objects, unknown persons or foods. Dogs entering rescue shelters encounter potentially stressful novel experiences, such as new surroundings; new routines, unfamiliar sights, sounds, and smells and unfamiliar people and other dogs (Stephen and Ledger, 2005). Serguson (2009) published an excellent paper on the importance of behavioural health in shelter dogs in which she described the evaluation of behavioural health, factors that reduce behavioural health, the consequences of poor behavioural health and manners of reducing stress in shelter animals. Important stress inducing factors in a shelter/kennel environment include: environmental change, noise (especially

barking dogs), confined living conditions, diet change, exposure to aggressive animals, separation from the "family", lack of exercise, boredom, physical trauma, infection, acute/chronic disease, and intense heat/cold (Serguson, 2009). It is well known that dogs are social animals which like to roam freely over a large area. Therefore, it may be expected that housing a dog in a small cage will influence the behaviour of the dog (Wells and Hepper, 1992). Caged dogs may lose interests for social interactions, for novel and unknown dogs, for people and for food. The most stressful for dogs is the first day in the shelter environment. Therefore, we examined the feeding behaviour of stray dogs during the 7 days spent in a municipal shelter in Belgrade.

MATERIAL AND METHODS

The survey was conducted in the municipal shelter in Belgrade in May, 2006 using the same methodology as Wells and Hepper (1992). Fifteen adult stray dogs were included in the survey. Dogs were randomly chosen on the first day on their admittance to the shelter. In order to assess a dog response to a food each dog was observed for 7 days by the same observer. Three observers were involved in the survey. Each week from Monday to Saturday three dogs were examined for their feeding behaviours. Immediately after unloading from a lorry dogs were examined on their health status and temperament characteristics and than individually housed in kennels of the same shape and dimensions (outside: 2.2 m long, 1.0 m wide and 1.5 m high; inside: 1.8 m long, 1.0 m wide and 1.5 m high). Feeding of each dog was conducted in an inside part of the kennel from a metal vessel. All dogs in the survey were fed from vessels of identical shape and dimensions, with the same commercial food and at the same time (17⁰⁰h), according to the shelter standard feeding procedure. The feeding behaviour was assessed by recording the time taken by the dogs to eat their meal. The observation started when the dish with the food was placed inside the kennel. The time recorded by a stopwatch started when the dog first ate from the vessel, and lasted until the dog finished or when the 10 minute (600 seconds) trial was over. The hidden observer recorded the time taken by the dog to eat its food. The feeding behaviour was assessed on the dogs' first, second, third, fifth and seventh day of their housing in the shelter.

Data were analyzed by descriptive statistics, analysis of variance (ANOVA) and Tukey HSD test. All statistical computations were performed in the program VassarStats©Richard Lowry 1998-2009.

RESULTS

The results of the survey are shown in Table 1. It is clear that dogs took longer to eat food on their first day of housing in the shelter compared to all other days observed during the survey. On the first day in the shelters dogs took 429.07 ± 107.08 seconds to eat their meal. On the second, third, fifth and seventh day dogs took 372.73 ± 100.58 , 229.53 ± 95.18 , 260.8 ± 111.06 and $301.33 \pm$

119.89 seconds, respectively. The average value of the feeding time of dogs decreased from the first day (429.07 ± 107.08 seconds) to the third day in captivity when it reached the lowest average value (229.53 ± 95.18 seconds). On the fifth and seventh day the feeding time increased comparing to the third day. Dogs ate their food more slowly on the fifth and the seventh day than on the third day, but more quickly than on the first and the second day. The lowest value of feeding time was 276 seconds, 266 seconds, 150 seconds, 115 seconds and 163 seconds on the first, second, third, fifth and the seventh day of captivity in the shelter. The highest value of feeding time was 600 seconds, 600 seconds, 452 seconds, 540 seconds, 517 seconds on the first, second, third, fifth and the seventh day of captivity in the shelter.

Table 1. Descriptive statistic of shelter dogs' feeding time (N=15 dogs)

Parameter of feeding time (in seconds)	Day of housing in shelter				
	1 st	2 nd	3 rd	5 th	7 th
$\bar{x} \pm SD$	429.07 ± 107.08	372.73 ± 100.58	229.53 ± 95.18	260.8 ± 111.06	301.33 ± 119.89
Minimum	276	266	150	115	163
Maximum	600	600	452	540	517
Range	324	334	298	425	354

Analysis of variance disclosed significant differences ($F=8.73$, $p<0.0001$) in the duration of the feeding time that was depended on the day in captivity (Table 2).

Table 2. ANOVA Summary

Source	Sum of square SS	Degree of freedom DF	Mean of square MS	F	P
Treatment (between groups)	400576.6133	4	100144.1533	8.73	<0.0001
Error	802875.3333	70	11469.6476		
Total	1203451.9467	74			

Dogs ate their food most quickly on the third day in captivity (229.53 ± 95.18 seconds). The feeding time of dogs on the third day in captivity differed significantly ($p<0.01$) from the same parameter on the first (429.07 ± 107.08 seconds) and second day (301.33 ± 119.89 seconds) (Table 3). The highest average value of feeding time of stray dogs was recorded on the first day in the shelter. However, there were no significant differences of the average value of feeding time on the third day comparing with the fifth day (260.8 ± 111.06 seconds) or the seventh day (301.33 ± 119.89 seconds). Significant differences

were estimated comparing the feeding time of dogs on the first day with the third ($p < 0.01$), fifth ($p < 0.01$), and the seventh day ($p < 0.05$) of housing in the municipal shelter. Also, the feeding time of dogs on the second day differed significantly from the third ($p < 0.01$) and the fifth day ($p < 0.05$).

Table 3. Tukey HSD Test for feeding time of dogs on different days in captivity

Day in captivity	Mean \pm Standard deviation (In seconds)	P
	$\bar{x} \pm SD$	
1 st : 2 nd	429.07 \pm 107.08 : 372.73 \pm 100.58	Non significant
1 st : 3 rd	429.07 \pm 107.08 : 229.53 \pm 95.18	<0.01
1 st : 5 th	429.07 \pm 107.08 : 260.80 \pm 111.06	<0.01
1 st : 7 th	429.07 \pm 107.08 : 301.33 \pm 119.89	<0.05
2 nd : 3 rd	372.73 \pm 100.58 : 229.53 \pm 95.18	<0.01
2 nd : 5 th	372.73 \pm 100.58 : 260.80 \pm 111.06	<0.05
2 nd : 7 th	372.73 \pm 100.58 : 301.33 \pm 119.89	Non significant
3 rd : 5 th	229.53 \pm 95.18 : 260.80 \pm 111.06	Non significant
3 rd : 7 th	229.53 \pm 95.18 : 301.33 \pm 119.89	Non significant
5 th : 7 th	260.80 \pm 111.06 : 301.33 \pm 119.89	Non significant

HSD[0.05]=109.53; HSD[0.01]=132.49

DISCUSSION

During the study we estimated that dogs ate their food more slowly on the first and the second day than on the third, fifth and seventh day of captivity in the municipal shelter. Similar results were obtained by Wells and Hepper (1992). However, our results differ slightly from their results. We recorded some higher values for the feeding time of dogs than they did. Moreover, the changing pattern of the feeding time of dogs from the first to the fifth day of housing in the shelter in our survey is similar to the changing pattern of Wells and Hepper (1992). They estimated that dogs ate more quickly their foods on the third and on the fifth day of captivity as we did, too. We confirmed their finding that the dogs' behaviour in response to food changed over the course of 7 days in captivity. Wells and Hepper (1992) postulated that dogs ate their food more slowly on the first day of captivity due to unfamiliarity of the shelter environment and possibly the food. Wells and Hepper (1992) studied the feeding time of stray and unwanted dogs abandoned in the shelter by their owners. These authors stressed that one may have expected stray dogs to show a more immediate response to the food than their unwanted counterparts especially on the first day, since they were found roaming the streets and hence may have been hungrier than unwanted dogs. They did not observe such differences. We included only adult stray dogs in our survey and were not able to confirm that stray dogs ate more quickly than unwanted dogs. Moreover,

our results are slightly higher than the results of these authors. Wells and Hepper (1992) recorded 388 seconds for the feeding time of dogs on the first day of the captivity. Our dogs ate their food more slowly on the first day (429.07 ± 107.08 seconds) than their dogs. Also, dogs in our survey ate more slowly on the third and fifth day of captivity than dogs in their survey. We were not able to confirm that the commercial food in the shelter stimulated stray dogs to eat more quickly. Also, we were not able to estimate that stray dogs displayed enhanced preferences for the commercial food due to the so-called "novelty effect" (Bradshaw, 2006). We postulated that the shelter environment in our survey was more unpleasant and stressful than in the survey of Wells and Hepper (1992). It is well known that feeding inhibition may be the result of anxiety and stress reaction (Lichtenstein, 1950). Stress reaction in dogs housed in the shelter environment was confirmed previously by many investigators (Hennessy *et al.*, 1997; Hennessy *et al.*, 2001; Stephen and Ledger, 2006). Among them, Hennessy *et al.* (2001) estimated that in those dogs remaining in the shelter for 9 days, plasma cortisol levels declined from day 2 to 9. Also, it is well known that many of dogs in shelters lost weight after a few weeks, and some even become noticeably thin. There is a belief that the weight loss is caused by the stress of shelter life. Dogs that are stressed may indeed require more food than recommended by the manufacturer or by the shelter standard operating procedure.

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HRANIDBENO PONAŠANJE PASA LUTALICA U JAVNOM PRIHVATILIŠTU

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SADRŽAJ

U radu su prikazani rezultati proučavanja brzine unošenja hrane kod pasa lotalica u javnom prihvatilištu u Beogradu prvog, drugog, trećeg, petog i sedmog dana boravka. Prosečna brzina unošenja hrane je opadala počev od prvog dana ($429,07 \pm 107,08$ sekundi) do trećeg dana boravka pasa u zatočeništvu kada je ovaj pokazatelj dostigao najnižu vrednost ($229,53 \pm 95,18$ sec). Brzina unošenja hrane trećeg dana se statistički značajno razlikovala u poređenju sa prvim danom ($429,07 \pm 107,08$ sec) i drugim danom ($372,73 \pm 100,58$ sec) boravka pasa u prihvatilištu ($p < 0,01$). Najveća prosečna vrednost brzine unošenja hrane zabeležena je prvog dana boravka u prihvatilištu. Petog i sedmog dana boravka u prihvatilištu brzina unošenja hrane se povećala u poređenju sa trećim danom. Međutim, nisu uočene statistički značajne razlike u poređenju brzine unošenja hrane između trećeg i petog ($260,8 \pm 111,06$ sec) i trećeg i sedmog dana ($301,33 \pm 119,89$ sec). Psi su mnogo sporije unosili hranu petog i sedmog dana nego trećeg dana, ali brže nego prvog i drugog dana boravka u prihvatilištu ($372,73 \pm 100,58$ seconds). Značajne razlike su utvrđene u brzini unošenja hrane između prvog i trećeg ($p < 0,01$), petog ($p < 0,01$), sedmog dana ($p < 0,05$) boravka pasa u prihvatilištu. Takođe, brzina unošenja hrane se značajno razlikovala i drugog dana u poređenju sa trećim ($p < 0,01$) i petim danom ($p < 0,05$).