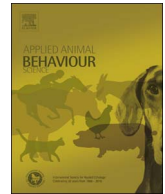




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Research Paper

Should I whine or should I bark? Qualitative and quantitative differences between the vocalizations of dogs with and without separation-related symptoms

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ABSTRACT

Separation-related disorder (SRD) is one of the most common behavioral problems of companion dogs, causing inconvenience and stress for dog owners and others living close by, as well as being considered as a major contributor to poor animal welfare. Although excessive vocalization is considered as one of the typical symptoms of SRD, until now there were no attempts to analyze and compare the vocal output of affected and non-affected dogs in a systematic, empirical test. In a three-stage outdoor separation experiment we investigated the vocal response of 25 family dogs with, and 20 family dogs without, owner-reported SRD symptoms to the (1) departure; (2) absence; and (3) return of the owner. After the analysis of the occurrence and onset latency of barks and whines, we found that contrary to the commonly held view of excessive barking being one of the trademarks of SRD, dogs with owner-reported SRD symptoms can be reliably characterized by the early onset and high occurrence of whines during the departure and 2 min long absence of the owner, while barks were affected mainly by the age of the dogs. Breed and neuter status may modify the vocal reaction to separation, we found that more purebred dogs barked sooner, while breed and neutering status affected the whines only during the departure of the owner, showing that more mixed breeds and intact dogs whined in this phase. This is the first study that targeted directly the vocal response of family dogs to separation from the owner, and according to the results, whines and barks reflect potentially different motivational/inner states of dogs during a short isolation episode. Although the effect of other factors, such as sex, neuter status and breed cannot be ignored, the owner reported SRD status of dogs showed a high coincidence with the early onset of whining, which in turn proved to be a good indicator of high stress levels of dogs in this situation.

1. Introduction

Dogs became increasingly popular as pets/companion animals in the urbanized world in the last few decades (McConnell et al., 2011). The benefits of having a dog are well documented from the side of recreational and emotional aspects (Archer, 1997), as well as the safety and health of the owner (Cutt et al., 2007; Friedmann et al., 1983). However, with a relatively large proportion of the population involved directly or indirectly in coexisting with dogs, demands of both human and animal welfare arise as well. As it is more and more common that companion dogs spend longer periods of time alone while their owners are not at home, the way dogs cope with situations of separation draws growing interest (Sherman and Mills, 2008). The apparent behavioral extremities in particular dogs accompanying the shorter-longer absence of the owner, form a rather coherent system of symptoms

(destructiveness (King et al., 2000); inappropriate and unprovoked soiling in the building (Overall et al., 2001); hypersalivation (Sherman, 2008); and excessive vocalization (Schwartz, 2003)) which have been called ‘separation anxiety’ (Flannigan and Dodman, 2001; Simpson, 2000), or more recently separation-related disorder ‘SRD’ (Appleby and Pluijmakers, 2004). Such symptoms are not only burdening the co-existence between dogs and humans (Lindell, 1997), but represent a serious problem for the welfare of the animal, requiring veterinary (e.g. Gruen and Sherman, 2008; Herron et al., 2008; Simpson et al., 2007) or therapeutic intervention (King et al., 2000; Podberscek et al., 1999; Sherman et al., 2008; Takeuchi et al., 2000), and often resulting in the relinquishment of the dog to a shelter (Flannigan and Dodman, 2001; Marston et al., 2004; Takeuchi et al., 2001).

Based on the theory of dog-human attachment, being separated from the owner causes a manageable level of distress in each dog that

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belongs to a particular person or family (Topál et al., 1998). During the diagnosis of SRD one should be able to distinguish between milder cases of symptomatic behavior and the signs of ‘ordinary’ attachment (e.g. Flannigan and Dodman, 2001; Parthasarathy and Crowell-Davis, 2006). Veterinarians, behavioral therapists and researchers often base their decision on surveying the owners with questionnaires, as it is usually the owner who experiences the response of his/her dog to separation (e.g. Overall et al., 2001; Podberscek et al., 1999; Takeuchi et al., 2000). Especially for reasons of confirming the presence of separation anxiety in particular canine patients, long-term video recordings may be taken in the home of the dog and evaluated later (e.g. Palestini et al., 2010). Meanwhile this type of observation provides a valuable wealth of information about the occurrence of various behavioral elements of affected dogs, the process is somewhat awkward to perform and these studies usually lack the involvement of control groups of non-SRD dogs (e.g. Lund and Jørgensen, 1999; Palestini et al., 2010). A different approach to testing of separation-related behaviors concentrates on inducing experimentally separation-related stress with a short isolation of the dog from the owner in a controlled environment (e.g. van der Borg et al., 1991; Konok et al., 2011). There are promising results where simple behavioral tests (such as the ‘separation & greeting’ paradigm of Konok et al., 2011) could validate the reliability of owner-based questionnaires about SRD in dogs. On the other hand, the evaluation of these tests can be rather complicated because the observer/evaluator must record and analyze a rather high number of behavioral variables, which may be rather subtle and hard to distinguish (see for example Konok et al., 2011; Palestini et al., 2005; Palmer and Custance, 2008; Prato-Previde et al., 2003). Vocalizations on the other hand theoretically offer a rather straightforward method for evaluating the status of dogs regarding their response to separation. Dogs often vocalize when they are isolated from or left alone by their owner (Kobelt et al., 2003), and there is ample evidence that SRD can be characterized by ‘excessive’ vocal behavior (Juarbe-Diaz, 1997).

Although vocal behaviors are often mentioned among the symptoms of SRD (see for a review Ogata, 2016), the detailed analyses of the vocal responses of dogs to separation are surprisingly rare, especially from the aspect of their possible applicability for diagnostic purposes regarding SRD. Authors mostly list different types of vocalizations (howls, barks, whines) as typical behaviors during separation (e.g. Horwitz, 2000), and in some cases they also provide a temporal analysis of the onset of vocal responses to separation. Lund and Jørgensen (1999) found for example that (along other SRD-related behaviors) whining reaches its peak intensity shortly after the owner’s departure. However, until now by our knowledge no attempt was made for the qualitative comparison of vocal patterns in SRD and non-SRD dogs, with a specific interest towards the possible differences between the communicative content of different types of canine vocalizations. It is already known that dogs that were left alone by their owners either in a room (Yin, 2002) or on the street tied to a tree (Pongrácz et al., 2005, 2006, 2014) emit barks with clearly distinguishable acoustic structure (high fundamental frequency, high tonality, low pulse). Human listeners can recognize these barks significantly above chance level (Molnár et al., 2010; Pongrácz et al., 2005, 2011); and they also characterize the barks of isolated dogs as showing high levels of despair and fear (Pongrácz et al., 2005, 2006). Recently it was also found that barks that show the acoustic characteristics of the vocalizations recorded during separation cause especially strong nuisance effect among human listeners (Pongrácz et al., 2016). However, it has not been investigated yet whether patterns of isolation-related barking would differ between dogs with or without SRD. Besides the barks that can be considered as medium-to-long distance calls and if emitted in isolation, there are also other vocalizations that can be relevant in the analysis of SRD. In an earlier comparative work, Cohen and Fox (1976) listed whines and howls in addition to barking, as vocalizations typical to dogs being left alone. Although barks and howls definitely possess the intensity and duration to be detectable from larger distances, one could hypothesize that the more

elusive (i.e. less intense, and/or short distance) whines could specifically signal the higher levels of distress in a dog affected by SRD. Some authors characterize whines as a typical form of vocalization in dogs that experience frustration and other negative inner states (Custance and Mayer, 2012; Palestini et al., 2010). Moreover, the similarity of their acoustic structure to the general pattern of infant distress calls (Lingle et al., 2012) suggest that these vocalizations can be the remnants of infant contact calls functioning in the adult dogs as a distress vocalization signaling the negative inner state of the dog to the owner. Accordingly, Lund and Jørgensen (1999) considered whines of SRD-dogs as “attention-soliciting” behavior, which fits well to our hypothesis that meanwhile a large proportion of dogs vocalizes during a separation episode, the emotional background of this may differ between SRD and non-SRD dogs. According to this, subjects with separation-related symptoms would emit mostly fear and distress-related vocalizations (including a higher proportion of whines), non-SRD dogs could be rather characterized by vocalizations related to protest and frustration (higher prevalence of barks).

In this paper we present the results of an experiment in which we compared the vocal responses of dogs with or without owner-reported separation related problems during a short outdoor separation episode. For the assessment of the SRD status of dogs, we used the validated questionnaire of Konok et al. (2011). In that study, authors set up a short indoor separation situation for the assessment of whether the owners are able to recognize (via the completion of a questionnaire) their dog’s separation related problems. The questionnaire contained questions about the emotions of the owner when the dog is left alone and about the general opinion of the owner about the stress level of the dog when it’s left alone. It was found that dogs with owner-reported SRD showed more stress-related behavior (e.g.: vocalizing, physical contact with the door, rearing on the wall or the door), they spent less time near the owner’s chair during separation, and showed more intense greeting activity than dogs without SRD. Non-affected dogs’ activity decreased with increasing separation duration, but dogs with SRD did not show this change in their separation behavior. Based on these results, in agreement with Konok et al., we can conclude that the owners can report reliably their dog’s separation related problems.

Our question was whether the vocalizations of dogs with owner-reported SRD show qualitative and quantitative differences compared to the vocalizations of dogs that do not show SRD symptoms at home. We hypothesized that dogs with SRD will not only bark and whine more abundantly than non-affected dogs (which could be expected based on the literature (e.g. Lund and Jørgensen, 1999)), but we expected that whines will be the more prevalent vocalization of SRD (compared to barks), because we hypothesized that whining is the vocal manifestation of the negative inner state evoked by the absence of the attachment figure of the dogs. We also tested for the possible effect of age, sex, neuter status and breed (mixed or purebred) of dogs on their vocal responses. Although there are sporadic reports that the dogs’ breed may affect their response to separation (i.e. mixed breed dogs more often show SRD symptoms – Takeuchi et al., 2001), and behavioral problems are in general more common in intact males than in female dogs (Takeuchi et al., 2001), there are also other indications that occurrence of SRD is independent of breed and dogs’ sex (i.e. Flannigan and Dodman, 2001; Wright and Nesselrote, 1987). Therefore we hypothesized that the actual SRD status of a dog will have a stronger effect on the vocal responses to separation than the dogs’ sex or purebred status.

2. Materials and methods

2.1. Subjects

The subjects (N = 45) were adult family dogs (older than one year, mean age: 4 ± years). Table 1 shows the breed and sex of the subjects. Dog owners were contacted and invited to the test on the basis of an online questionnaire about the vocal habits of dogs (<https://goo.gl/>

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