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Separation anxiety in dogs: the implications of predictability and contextual fear for behavioural treatment

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Abstract

Separation anxiety (SA) is one of the most common canine behaviour problems and can have serious negative effects on dog welfare. Treatment of SA may include changing the environment around the dog, pharmacological treatment and behavioural therapy. The latter is considered the most important part of the treatment and is intended to habituate the dog to being alone and to reduce its dependence on the owner. The objective of this paper is to discuss two aspects of the treatment of SA that may be in contradiction with our current understanding of the stress response. Advice commonly given to owners of dogs with SA includes giving false departure cues to prevent the dog from anticipating the actual departure. Instead, we recommend increasing the predictability of the owner's departure by maintaining the cues that signal it. Animals suffering from anxiety disorders are likely to develop contextual fear, ie to be frightened by merely being exposed to the same location where they have experienced an aversive event. As a consequence, we suggest that whenever possible, fake departures done as part of the habituation exercises to being left are done in a place different from that where the dog is actually left alone.

Keywords: *animal welfare, contextual fear, dog, predictability, separation anxiety, stress*

Introduction

Separation anxiety (SA) or separation distress is one of the most common canine behaviour problems (McGrave 1991; Overall 2001, 2013; Bradshaw *et al* 2002; APBC 2005), accounting for 15% of canine behavioural cases seen by general practitioners and up to 20–40% of canine cases seen by behaviourists (Borchelt & Voith 1982; Mugford 1995). SA has a strong negative effect on animal welfare as it causes chronic stress (Dreschel 2010), and is associated with negative cognitive bias (Mendl *et al* 2010). Additionally, SA has negative consequences on the human-animal bond that may lead to owner relinquishment of healthy dogs or a decision to seek euthanasia (Salman *et al* 1998).

Typically, dogs with SA vocalise, eliminate and/or show destructive behaviour in the owner's absence or when the dog does not have direct contact with the owner (Borchelt &Voith 1982; Pageat 1998; Flannigan & Dodman 2001; Overall 2013). Although these signs are the most apparent and annoying for the owners, dogs with SA can also show other signs such as anorexia or changes in activity level when left alone (Simpson 2000; Overall *et al* 2001; Appleby & Pluijmakers 2003; Blackwell *et al* 2006; Sherman & Mills 2008).

Treatment of SA includes making changes to the dog's environment (mainly to increase the dog's level of stimulation through play and physical exercise, among other strategies), pharmacological treatment to reduce the anxiety level of the dog and behavioural therapy. The latter is considered the most important part of the treatment and has two main objectives: to habituate the dog to being alone and to reduce its dependence on the owner (Takeuchi *et al* 2000; Horwitz 2002; Bowen & Heath 2005; Sherman & Mills 2008; Butler *et al* 2011).

The objective of this paper is to discuss some of the elements that are commonly included in the behavioural therapy of dogs with SA and that may be in contradiction with our current understanding of the stress response. In particular, we will focus on the ability of dogs with SA to predict the owner's departure and on the role of contextual fear in the treatment of SA.

Predictability of the owner's departure

It has been suggested that one of the factors contributing to the anxiety response of dogs with SA is their anticipation of the owner's departure, which is based on the dog having learnt the association between the actual departure and several cues that precede it and that are given by the owner, often unconsciously, eg picking up house keys, putting on coat. One piece of advice commonly given to owners of dogs with separation anxiety is, therefore, to give false departure cues, ie to behave as if they were about to leave

when they are not. The objective of this strategy is to prevent the dog from anticipating the actual departure and so reduce its anticipatory anxiety (Takeuchi *et al* 2000; Horwitz 2002; Appleby & Pluijmakers 2003; Bowen & Heath 2005; Blackwell *et al* 2006; Sherman & Mills 2008; Overall 2013). As far as we know, the effectiveness of this strategy has never been tested and, in fact, it may be in contradiction with our current understanding of the importance of predictability in the stress response.

Predictability is one of the main psychological factors that modulate the stress response (Weinberg & Levine 1980; Sapolsky 2004; Lovallo 2005). For example, one of the earliest studies about predictability used laboratory rats (Weiss 1970) in which the authors compared the effects of electric shocks on two groups of rats. Both groups received the same number of shocks, but in one group shocks were signalled whereas in the other group they were not. The authors concluded that plasma corticosterone concentration and gastrointestinal lesions were significantly higher in rats in the unsignalled group.

In another study with cichlid fish (*Oreochromis mossambicus*), it was observed that those individuals that were unaware of an impending aversive treatment (confinement) showed significantly higher cortisol levels than those individuals that were able to predict it (Galhardo *et al* 2011).

The majority of studies carried out in humans also conclude that people prefer predictability to unpredictability (Abbott & Badia 1979; Grillon & Davis 1997; Lejuez *et al* 2000) and that predictable negative events cause a higher physiologic activation than unpredictable ones (Miller 1979). It has to be emphasised, however, that the positive effect of predictability becomes apparent only when the negative stimuli are highly aversive.

In conclusion, it seems that predictability reduces the anxiety associated with highly aversive stimuli and this is likely to apply to dogs suffering separation anxiety, they perceive the owner's absence as a highly aversive situation (for a review, see Mineka & Zinbarg 2006).

The so-called 'safety hypothesis' is one of the most likely mechanisms explaining this effect. When an individual is exposed to an aversive predictable event (ie when the event is signalled by a cue), it knows when the stimulus will occur and, even more importantly, when it will not occur. Therefore, the animal knows when it is possible to relax and has the perception that it controls its environment. On the other hand, if the aversive event is not signalled, the animal may not be able to relax and feel safe at any time, and as a consequence may be in a state of chronic anxiety, that is, in sustained anxious anticipation (Seligman & Binik 1977; Grillon *et al* 2004; Shankman *et al* 2011).

Taking the above into account, we recommend increasing the predictability of the owner's departure by maintaining the cues that signal it and moreover by adding a novel cue (for instance a piece of white cardboard) that is placed by the exit door just before departure. This cue should be removed when the owner returns. This signal should be different from the others ones used in the fake departures that are used to habituate the dog to being left alone. When the dog is able to be left alone for 60 min without showing signs of anxiety, the novel cue for departure used during the training sessions can be used to signal actual departures as well.

Contextual fear

In a typical, conditioned-cued fear paradigm, the neutral or conditioned stimulus is followed by an aversive or unconditioned stimulus. After pairing both stimuli on several occasions, the conditioned stimulus will elicit an anticipatory fear response even in the absence of the unconditioned stimulus (Grillon 2002b). Also, a fear response may appear when the animal is placed in the same location where it has been previously exposed to the unconditioned stimulus even if neither the unconditioned nor the conditioned stimuli are present (Blanchard & Blanchard 1972). This latter phenomenon is called contextual fear and it is more pronounced in anxiety problems which are triggered by poorly defined stimuli (Davis 1998). Additionally, unpredictable aversive events cause more contextual fear than predictable ones (Marlin 1981; Grillon *et al* 2004, 2006) and patients with anxiety disorders are abnormally sensitive to contextual fear (Grillon 2002a,b; Fonteyne *et al* 2009). For example, in a recent study done in humans (Fonteyne *et al* 2009), subjects exposed to unpredictable aversive events showed significantly more anxiety and contextual fear than subjects exposed to the same aversive events but in a predictable way and both anxiety and contextual fear decreased when cues signaling the aversive events were introduced.

In the case of separation anxiety, the conditioned or neutral stimulus would be any cue given by the owner before departure, which would be the unconditioned or aversive stimulus. Very often dogs with SA are left alone in a particular place in order to reduce the inconveniences derived from their destructive behaviour and inappropriate elimination. In these cases, it seems very likely that dogs will suffer from contextual fear when placed in such a location. Moreover, contextual fear will be more pronounced if they cannot predict the owner departure. Therefore, whenever possible, we suggest that when habituating the dog to being left alone through fake departures that these are done in a location different from that where the dog is actually left alone.

Animal welfare implications and conclusion

Aspects of the treatment commonly recommended for dealing with SA are not in accordance with stress theory. We suggest that the predictability of the owner's departure should be increased and to highlight the importance of context in order to reduce in the dog chronic anxiety and contextual fear associated with the departure of the owner. Although these measures would be potentially beneficial for all dogs with SA, it is likely that they will be particularly useful for dogs with anticipatory anxiety. Further research is needed to validate the practical value of these recommendations.

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