

Jealousy? or just hostility toward other dogs? The risks of jumping to conclusions

Commentary on [Cook et al.](#) on *Dog Jealousy*

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Abstract: Cook et al. (2018) provide a fascinating demonstration of amygdala activation in dogs when they witnessed their owners giving food to another (fake) dog, but not when they placed food in a bucket. Dogs' neurological responses were positively correlated with their reported levels of 'dog-directed aggression' as measured by the C-BARQ, and dogs with initially strong amygdala responses habituated on subsequent trials. The authors interpret their findings as possible evidence for an emotion akin to jealousy in dogs. However, alternate interpretations involving either dog aggression/fear or emotional responses to food seem more plausible and avoid the welfare risks associated with attributing higher-order cognitive capacities to animal companions.

Keywords: dog, brain imaging, amygdala, arousal, jealousy, aggression

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From a functional perspective, it certainly appears likely that domestic dogs might have evolved the capacity for emotional responses analogous to jealousy. Given the importance of positive relationships with human caretakers to the survival and biological fitness of dogs during their evolutionary history, it makes sense that they might experience negative emotions when these vital relationships are threatened in some way, for example, by the intercession of a rival dog. However, for a number of reasons, I am not persuaded that Cook et al.'s brain imaging experiment provides convincing evidence for the existence of such emotions. First, as the authors acknowledge, their subjects may have been reacting simply to the fake dog itself. Dog-directed aggression and fear are relatively widespread in pet dogs (Duffy et al., 2008) and have been shown to be reliably elicited by surprisingly unrealistic representations of dogs (Barnard et al., 2016). Cook et al. point out that amygdala activation is only seen when the owner interacts with the fake dog, but this could reflect the subject dog's emotional response to a perceived threat to the owner rather than jealousy. Dog-directed aggression might also explain the rapid habituation of the more aroused dogs since, due to their higher arousal level, they would be less likely to discriminate initially between a fake dog and a real one.

Second, it is possible that the dogs' arousal is a response to the food or the loss of food to another dog. Many dogs are extremely food-oriented and are accustomed to getting food rewards from their owners. It seems plausible that the sight of the owner giving food away to another dog would excite negative emotions in some dogs that would not be triggered by the owner placing food in a bucket (where it could potentially be retrieved by the dog later on). One obvious test of this possibility would be to repeat the experiment with the owner making a fuss over the fake dog rather than giving it food (as in the study by Harris & Prouvost, 2014). Another test would be to look for associations between levels of arousal and the dogs' C-BARQ scores for 'food-begging' and 'food-stealing', both of which are superficial indicators of food orientation in pet dogs.

Finally, a stronger case for the jealousy hypothesis might have been made had the authors been able to demonstrate a correlation between amygdala responses and dogs' scores on the 'attachment/attention-seeking' scale of the C-BARQ, since components of this scale are designed specifically to measure 'agitation' when the owner gives attention to third parties, including other dogs (Duffy & Serpell, 2012). Without this sort of confirmatory evidence, the most parsimonious explanation for Cook et al.'s findings is aggression/anxiety elicited in some dogs by the sight of another, unfamiliar dog interacting with their owner.

Also, we should be cautious about the use of labels such as 'guilt' and 'jealousy' when describing the emotional responses and behavior of companion animals because these kinds of attributions can influence the ways in which owners/guardians respond to their pets. Dog owners are notoriously anthropomorphic and only too ready to believe that the 'guilty look' or the 'jealous rage' displayed by the pet reflects a level of cognitive and moral awareness and culpability that probably doesn't exist (Horowitz, 2009; Serpell, 2003). Too often, the consequence of such misunderstandings is that the animal gets punished for a crime it is unaware of committing.

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