

The effect of environmental enrichment on the behaviour of captive wolves (*Canis lupus*)

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Abstract

Environmental enrichment is an animal husbandry technique for providing sensory stimulation for captive animals, which can improve welfare for animals through promoting natural behaviours and reducing stress. Scent and food based environmental enrichments are frequently used to provide psychological and physiological stimulation for large carnivores housed in zoos and wildlife parks. This study tested the effect of scent and food enrichments on the behaviour of 10 grey wolves (*Canis lupus*) in four packs living in captivity at the UK Wolf Conservation Trust. The first enrichment was olfactory based, which consisted of cardboard boxes containing straw covered with a novel scent (lemon juice, *Citrus limon*). The second was food based, using pieces of beef and chicken. To identify any changes in behaviour before and after enrichment conditions over a four week period, wolf behaviours were categorised into an ethogram which was used to observe and record individual behaviours of the wolves in each pack. Statistical analysis was performed using the Kruskal-Wallis test, in which behaviour during enrichment conditions were compared to baseline controls. The results showed that 'state' type behaviours such as 'walking/running' did not change significantly over the study period, whereas the occurrence of 'resting' ($P=0.008$) and 'alert' ($P=0.007$) behaviour were seen to decrease after the scent enrichment condition. Event type behaviours such as 'sniffing' ($P=0.002$), 'interaction' ($P=0.004$) and 'vocalising' ($P=0.026$) increased significantly with enrichment suggesting that scent and food enrichment are successful in promoting species-specific behaviours in the wolves. Generally the wolves' initial reactions to the enrichment boxes decreased quickly, which suggested that they habituated rapidly to the novel scent and food. An opportunity for further study could focus on exposing the wolves to different types of scent such as those associated with potential prey and other types of food enrichment such as carcass feeding. In addition, a longer study period and bigger sample size would also be beneficial for better understanding of the effect of environmental enrichment of behaviour of wolves in captivity.

Keywords: wolves, captivity, olfactory enrichment, feeding enrichment, behaviour