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Scent-matching of olfactory samples via proxy by domestic dogs Canis lupus familiaris

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Abstract

The well known scenting ability of domestic dogs has been frequently harnessed by using olfactory sampling of items imperceptible to a human sense of smell. Two main applications exist, which are a) detection of a particular scent, and b) scent-matching of a reference scent to a target scent in the presence of scented decoys. Studies on scent-matching have been limited to humans, where the scent vector is a proxy onto which the scent donor has transferred scent, and two non-human studies, in which the scat of the target species was used as the scent vector. All of these studies of scent-matching have been limited to individual scent donors of the same species. The aim of my study was to explore whether dogs can be trained to match a scent-sample via proxy in the presence of scented decoy proxies from other species, i.e. whether dogs are capable of scent-matching via proxy among several scent donor species. The experimental apparatus was a unique circular device with modifications based on previous research and my personal experience. Proxies were scented by a total of 15 species, by transferring scent onto the proxy either via scent donor body contact or scent donor by-product contact (i.e. scat, dung or shed skin of the scent donor). Training progressed in nine stages over a period of 13 months with three training groups. Fifteen subjects were recruited, with 12 completing the training process. All subjects which completed training underwent 80 runs (i.e. attempts to match a reference proxy to a target proxy). All subjects were able to correctly match a scented target proxy in the presence of five scented decoy proxies from other species at levels significantly greater than chance with an overall success rate of 66%. No early training predictors of eventual success were observed. Sex, breed and training venue did not influence success rates. Age of the subject did influence success rates, with the older and younger subjects having a significantly greater match success rate than subjects in the middle-age range. Proxy scenting method (skin contact or by-product contact) did not influence success rates and species of scent donor was also not found to be associated with success rates. My study demonstrated the use of an inexpensive and simple tool which could provide researchers with the means to explore general olfaction theories as well as more specific questions relating to the scenting ability of dogs for academic, commercial or civil purposes.