THE INFLUENCE OF CEREBRAL LATERALISATION ON THE BEHAVIOUR OF THE DOMESTIC DOG (*Canis familiaris*)

A thesis submitted for the Degree of

DOCTOR OF PHILOSOPHY

by

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Declaration

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Abstract

Cerebral lateralisation was once thought to be unique to human beings, but has since been demonstrated in a number of non-human species. Lateralisation refers to the specialisation of each of the brain's hemispheres for the mediation of particular functions. Motor function is lateralised in many species, which is manifested by the preferential use of one limb over the other. It has been shown that increased usage of one hand or limb is associated with increased activity in the contralateral hemisphere. Limb usage can be compared with other variables in order to determine whether particular factors are associated with the left or right hemisphere of the brain.

The domestic dog (*Canis familiaris*) has featured in laterality research. The goal of the research reported in this thesis was to explore the ways in which brain lateralisation may influence dogs' abilities to perform particular roles. The first study investigated the relationships between the paw preferred by greyhounds on a task requiring them to obtain food rewards, and the behaviour exhibited on the greyhound racetrack. The findings from the study suggested that greyhounds exhibit preferences for the direction in which they exit the starting boxes at the beginning of each race and for the position in which they ultimately run on the racetrack. The results also suggest that increased usage of the left paw is associated with a greater frequency of running in the 'rail' position on the racetrack.

A second study investigated the relationships that exist between paw preference and various temperament traits in the dog. Two questionnaires were administered to dog

owners to obtain information relating to each dog's temperament, living conditions and its interactions. The findings indicated that there was a relationship between a left paw preference and stranger-directed aggression. The results also indicated that there were associations between various 'demographic' factors (e.g. frequency of exercise and attendance at training classes) and positive behavioural outcomes.

A third study investigated ocular laterality in a sample of competitive agility dogs to determine whether there were differences between the hemispheres' abilities to process visual information related to the perception of depth. Dogs negotiated a hurdle under the guidance of left monocular, right monocular, and binocular vision. The results indicated that limiting dogs to monocular vision influences several kinematics variables, including the dogs' limb preferences during the jumping behaviour, their velocity, angle of take-off, and total distance jumped**.** There were differences between the jumping kinematics variables when dogs were guided by left and right monocular vision. The findings indicate that the right hemisphere may be less proficient at processing visual information related to the perception of depth.

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