PAW DOMINANCE IN DOGS

ENG W230: FIRST PLACE

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Abstract

The most well-known example of laterality is humans' preference in the use of their right or left hand. While other species have been known to exhibit symptoms of laterality, we do not know why this phenomenon occurs or what species may have a unique preference in one side of their body over the other. In this experiment, I observed the paws used in 19 dogs who participated in two tests: the first, stepping over a wall of cans, and the second, walking down a set of stairs.

Introduction

Laterality is defined as the "preference in use of homologous parts on one half of the body over those on the other" (Merriam-Webster). Handedness is one of the most common references to laterality. Though the majority of the human population is right-handed, the reason for this remains unknown. Even though many studies have been conducted, scientists have been unable to find the cause of laterality. While there have been significantly fewer studies done on laterality in animals, some researchers have also attempted to discover whether animals experience preferences in paws, hands, eyes, and even fins (Manns et al., 2021; Amano et al., 2021; Poindexter et al., 2018; Lilley et al., 2020).

Though no one knows for sure, there are theories on what causes our preference for hand use. Scientists have presented theories found in genetics, womb trauma, environmental factors, and birth month/sex (Marcori & Okazaki, 2019). There's not enough evidence to overwhelmingly support one theory over another. It's likely handedness is a result of a mixture of factors.

A study on a Dutch population examined the connection between cerebral dominance of language function and left-handedness. The lack of significant linkage between the two argues against a major gene coding for both traits. Rather, the lack of evidence has led researchers to believe that hand preference and language function are two independent traits affected by both genetics and the environment (Somers et al., 2015).

In animals, scientists have hypothesized that an asymmetrical cerebral hemisphere function causes a left bias in social behavior and a right bias in feeding behavior. Right-based laterality in foraging cetaceans, such as whales and dolphins, can be explained by the dominance expressed by the right eye and left cerebral hemisphere in prey recognition (Amano et al., 2021). However, there may be other contributing factors. In a 2021 study, researchers found that in most of their observations, foraging finless porpoises turned counterclockwise with their right side facing down when they chased fish. This seems to indicate the presence of laterality in foraging finless porpoises; however, more studies are needed (Amano et al., 2021).

Another study, however, found that while some individuals showed preferences, there was no significant side preference for New Zealand rails. Researchers did find that those who use their feet to feed less have a stronger preference for their foot. This contrasts with the extensively researched parrot, which shows a strong laterality preference (Rodgers & Cain, 2019).

A study on domesticated cats found a preference for paw use when completing three activities. There were three unforced activities, stepping down a stair, laying down and stepping over an object, and one forced activity, using their paw to reach a treat. Researchers found the cats were split by sex in their paw preference, but not necessarily by the strength of their paw preference. Males were more likely to use their left paw, while females were more likely to use their right paw.

However, there was no significant preference for the side used to lie down (McDowell et al., 2018).

I hypothesized that dogs will show a preference in use of one paw over the other because of previous studies often showing laterality in other species. To test this, canine participants performed two tests to demonstrate potential paw preferences.

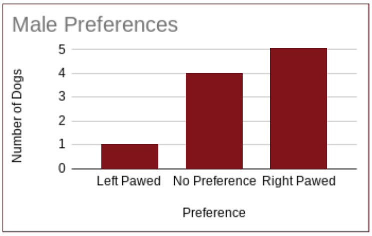
Materials & Methods

Nineteen dogs, nine females and ten males, were put through two tests. The dogs came from eight different owners and were between the ages of 2-14. The breeds of the dogs ranged from small dogs, like Yorkshire Terriers, to large dogs, like Labrador Retrievers. Each dog performed each test in two sets of five, with each set being on a separate day. Per each trial, a treat was used to lure the dogs through the tests. During the object test, dogs were asked to step over a wall of cans. Small dogs stepped over 2.25 oz cans, medium dogs stepped over 15 oz cans, and large dogs stepped over the 2.25 oz and 15 oz cans stacked together. For the stairs test, dogs were lured down a set of stairs. Because dogs can often get excited and move quickly, each trial of both tests were video recorded for accuracy, and the first paw used to step over or down was marked.

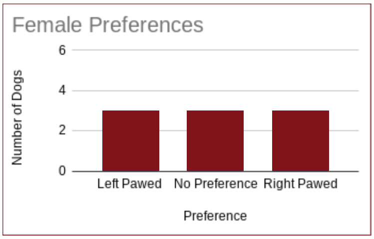
Results & Analysis

Dogs were considered to have some sort of paw preference if they used a paw at least 13 times, or 65% of the time, during the 20 total trials. This percentage was chosen in order to reduce the effect of slightly skewed results on the overall data trends. It also makes sense given the fact that no preference can be observed. It is logical to view the results as a spectrum and give each label equal theoretical probability.

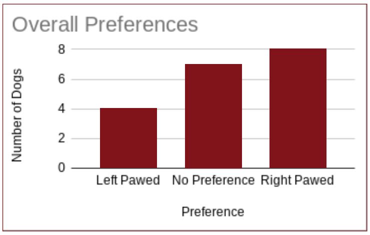
Overall, almost 2/3 of the dogs tested showed a preference for one of their paws. Specifically, 40% of male dogs and 33% of females showed no preference. Male dogs predominantly showed a preference towards their right paw, while female dogs were split evenly between the two.



(Figure 1. Male dog paw preference.)



(Figure 2. Female dog paw preference.)



(Figure 3. Overall dog paw preference.)

Discussion

The results of the experiment were inconclusive. Though almost two-thirds of the dogs showed signs of paw dominance as seen in Figure 3, I believe the results are inconclusive because there were several significant holes in the experiment design.

The first flaw was allowing dogs to complete the tests in an excited state. When dogs are excited, they tend to just fling themselves around. During the experiment, dogs who were overly excited appeared to exhibit more inconsistencies in their paw use.

The second flaw in my experiment design was an error in recording the correct paw. When four legged animals jump, the leading front leg lands after the following front leg. However, when they step over or off an object, the leading front leg lands first. I failed to take this into consideration when noting the leg used in each test. Because of this, the data is highly inaccurate.

In conclusion, this data was inconclusive in aiding our understanding of paw dominance in dogs. Further studies are needed to draw a more definitive conclusion. In knowing more about laterality across species, we can further our understanding of how the brain is connected and wired, which can lead to new discoveries that could help aid in the treatment of neurological abnormalities.

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Katherine Kauffman is a first-year student from New Paris, Ohio. She has been an avid reader, musician, and animal lover for as long as she can remember. Her love of writing stories began when she discovered Power of the Pen in 7th grade. Over the last four years, however, Katherine has been focusing mainly on songwriting and poetry as an emotional outlet with the intent to glorify God and to “describe the indescribable” so that others may know they’re not alone in their struggles.