



HUMAN BIOCULTURAL EVOLUTION: THE EVOLVING RELATIONSHIP BETWEEN HUMANS AND DOGS

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Abstract

This paper examines the biocultural evolution of humans and dogs, exploring how their long-standing relationship has influenced the biological, cognitive, social, and cultural development of both species. Beginning with the domestication of ancestral wolves during prehistoric times, the discussion highlights the mutual benefits that facilitated the establishment of this enduring partnership. Dogs contributed to human survival through hunting, transportation, protection, and adaptation to diverse environments, while human intervention through selective breeding shaped canine behaviour, physical characteristics, and specialized functions. The paper also explores how the relationship between humans and dogs varies across cultures, particularly regarding the influence of gender roles, social practices, and perceptions of animal personhood. Furthermore, it considers the potential biological and neurological dimensions of human–dog interactions, including communication, behavioural synchronization, and changes associated with increasingly settled human societies. By examining archaeological evidence, cross-cultural research, and studies of animal behaviour and evolution, this paper demonstrates that dog domestication represents more than a practical arrangement between two species. Rather, it illustrates a complex process of mutual adaptation and interdependence that has profoundly influenced human history and continues to shape contemporary relationships between humans and animals.

Keywords : Human–dog coevolution; Biocultural evolution; Dog domestication; Human–animal interaction; Selective breeding

Interactions between humans and other animals have been essential in the evolution of our biology, society, and culture. For example, the domestication of cows has changed our perception of them around the world as more than a source of meat and milk and now serves religious purposes in many cultures. Our domestication of canids has been extensive, such as that of the silver fox, and this domestication has allowed us to protect these animals and help keep them alive. Such animal interactions have also helped humanity in prolonging our own survival. For instance, our experimentation on rodents and modifying their genes helps us test drugs that have cured and could continue to cure diseases or conditions that plague humanity. Regardless, our evolutionary relationship with the *Canis Lupus* is larger and more unique than any other.

Dogs were one of the first organisms humans domesticated, even before that of crops. Starting in the upper paleolithic era, around 35,000 BC, genomic DNA suggests that dog domestication originated in the Middle East, where both *Homo sapiens* and Neanderthals resided. As early modern humans migrated to other parts of the globe

38 | Thank you to my mentor, Prof. Jodie G. Roure, JD, PhD, Associate Professor, Director & Project Investigator of the CUNY Black Male Initiative Research Scholars of Justice Program (RSJ), Department of Latin American and Latinx Studies (LLS) at John Jay College of Criminal Justice (JJC), for her mentorship and for creating a program that inspired me, supported my growth as a scholar, and allowed me to publish. Special recognition goes to Lorena Villavicencio, Supervisor of BMI Research Teams @ CUNY, and Parsva Shah, College Assistant for Undergraduate Research for RSJ, for their dedicated support of my undergraduate research and publication process, and to the Department of LLS for its continued support. I also recognize Research Scholars of Justice staff Anna Cepeda-Mays, Arpita Edke, Brandon Mathew, Christina Mitchell-Paris, Danielle Nwosa, Isabel Schroeder, Ishani Mehta, Joanna Marie Aguilar, Jonathan Beane, Josué González-Ortiz, Maria Guadarrama Flores, Mohammad Mustafa, Nicole Martinez, and Zhen Deng for their assistance. Funding was made possible by the New York City Council through the CUNY Black Male Initiative, with special thanks to Dr. Jonathan Quash, University Director of the CUNY Black Male Initiative, for his leadership, continued support, and commitment to creating opportunities for CUNY BMI scholars.

such as the Americas and Eurasia, domesticated dogs came with and hence the domestication of the species expanded, creating many breeds and varying phenotypes. Wolves became specialized due to selective breeding and as such became *Canis Lupus Familiaris*, a subspecies of grey wolves. We have coevolved to a point where we even, according to recent studies, synchronize our brains when we interact with each other. (Lamontagne and Gaunet) Why is our evolution with this canine so special that our brains changed? Human and dog coevolution and biocultural evolution reshaped not only canine and human biology, but fundamentally influenced human culture through hunting, mutual survival and transportation.

Though there are many relatives to the grey wolf, the *Canis Lepophagus* was the first separation of grey wolves from other canids occurring around twenty-three to five million years ago in Eurasia. (Perri et al.) This partnership between man and dog was due to a natural competitive advantage both the wolf and humans had. The competition for survival in Eurasia around fifty thousand years ago was grim but not as much so for Homo Sapiens, who started to use complex tools. Homo Sapien diets were flexible unlike most of their competition such as woolly mammoths and saber tooth tigers, who quickly became extinct. ("Who Let the Dogs in? - Claremont Review of Books") During this time, wolves were also part of the top of the food chain and only several thousand years later did domestication begin.

Paleontologists have varied perspectives on when this collaboration began. Remains dating back to around 14200 years ago show dogs found at this burial with 2 humans. The dogs had varying characteristics compared to wolves, such as being smaller overall (15 kg and 0.45 m tall at the shoulder). Mitochondrial DNA analysis confirmed the dogs to be a clade C class domestic dog. The dogs were visibly given a proper burial and had dental abscesses, suggesting that the hominids cared for the animals, as they likely would not have survived on their own. (Janssens et al.) This finding depicts our mutual relationship with the essence of changing human cultural development.

Dogs gave humans the upper hand. They, along with humans, were able to track long distances to corner prey which humans would finish off with tools such as spears and rocks. With these weapons and other tools, humans were able to gather meat more efficiently and quickly.

This mutual bond was beneficial for the canids that were able to assimilate. Those who were too aggressive or too inefficient at hunting were slowly removed from the breeding pool. This process of early selective breeding eventually led to the modern dogs we have today, as such selective breeding patterns changed as human cultures diverged and bloomed.

Early domesticated dogs were also used for transportation, especially sledding. Invented by the Innuite and other native Arctic peoples, dog sledding has historically been a mutually beneficial relationship between humans and animals. Humans exchanged food for the dogs' labor. The earliest evidence documented for dog sledding is a complete dog traction kit, found in the Western Canadian Arctic, dated to 8000 BC, which suggests that dog sledding was also used to connect Arctic civilizations. Dogs' naturally better nasal senses gave humans more reliable transport during times of poor weather to get to civilization. (Harris et al.) The domestication of dogs led to the domestication of other animals, which assisted with human settlements. These organized human settlements then led to a decrease in human senses for prey and desperation for mates. This means that dogs also indirectly caused human biology to change.

When the ice began to melt, humans adapted to new environments along with their furry companions. With this, the domestication of wolves began to vary. Multiple different breeds of dogs came into existence with varying phenotypes. By the time the ice completely melted, humans took advantage of dogs adapting to their new environments. Larger dogs with taller and more bulky builds were beneficial in hunting prey like deer or wild boars. Smaller dogs were very useful for hunting small game like rabbits. However, hunting was far from the only use for dogs. For instance, shepherd dogs breeds like the Border Collie were created to help with herding sheep.

Interestingly, dogs have always adapted as well to their new climates. Studies have shown that dogs become less "energy efficient" in warmer climates, meaning they would be exhausted of their energy quicker than dogs in colder climates. Because studies show that hunting seems to improve the relationship between man and dog, it's confusing why dogs are still perceived as great pets in the warmer regions of the world? (Science Times, "Man's Best Friend No More"). In fact, the answer may lie within the unique relationship women have had with dogs.

As made clear by cross-cultural research, it seems likely that women had an incredible impact on the development of the human-dog relationship. Data from more than 844 ethnographers (cultural anthropologists) studied 144 traditional societies. Jaime Chambers, a Ph.D at Washington State University, found that "Humans were more likely to regard dogs as a type of person if the dogs had a special relationship with women. They were more likely to be included in family life, treated as subjects of affection, and generally, people had greater regard for them" (Chambers et al. 414). Though dogs are used similarly all over the world, the perception of them differs. For example, there may be a less elevated perception in the scale of Personhood, which is used to define their perception to humans as more human, in industrialized regions like New York City. However in locations that are more rural and less developed, having the dog serve a "greater purpose," like hunting game for its humans, will likely make them seem more human to their people.

Hunting, transportation, and other utilities are not the only ways that the domestication of dogs impacted humans. In fact, human brains changed in very different ways than other species due to domestication. When humans

created settlements, naturally less adaptation was needed. Humans needed to rely less on hunting and gathering in these settlements and when they hunted, they used dogs. Due to this, our natural sensory abilities were no longer needed as much, and brain areas like the thalamus decreased. (Groves 1-12) This shift allowed room for more complex thinking.

Cognitive evolution in hominids stemmed from this change in brain structure. Surprisingly, a few wild traits remained, which are often perceived as detrimental to the advancement of society. A few examples of this are the variations in circadian rhythms that humans have. Humans are social animals that work in groups; as such, being vigilant of predators is a necessity. Differing circadian rhythms allowed early humans to have increased survival rates, as those who slept during the day would defend their tribe during the night from nocturnal predators and vice versa. Another example is Attention Deficit Hyperactivity Disorder, which was useful during the hunting-gathering era for hominids, as it allowed for fast reaction times and heightened awareness of change. (Sultan Lab Mental Health Informatics)

Despite humans and dogs being very different species with very distinct biology, hormones played a huge role in how we communicate with dogs. Though dogs are unable to understand verbal human language, they are able to communicate with us through expressions and gestures, a common characteristic in primate communication. According to Yong Zhang, a professor at Hubei University and the Institute of Genetics and Developmental Biology, "Dogs have evolved to read, understand, and respond to a wide range of human emotional states and communicative signals through behaviors, facial expressions, and even vocal tones, offering an extraordinary level of active companionship that is not often seen in other domesticated or companion animals". This study interestingly not only unearthed cross-species communication between humans and dogs but also found that during such interactions, dogs act more as "followers" and humans more as "leaders" (Ren et al.). This discovery has shown how dramatic changes in our coevolution allowed humans to have a confirmed biological communication with dogs.

The history of humanity's coevolutionary relationship with *Canis Lupus*, though very mysterious, depicts one of the most enduring partnerships in human history. From the Middle to Upper Paleolithic Era to the present day, it is very clear that our coexistence and later relationship became useful for several reasons to both species. The survival of *Homo Sapiens* led us to develop settlements across the globe. This allowed us to have highly differing cultures and have unique physical evidence. Human skeletons and muscles physically evolved to adapt to a more sedentary lifestyle regardless of where humans settled also being indirectly linked to humans domestication of dogs shows how modern industrialized societies would likely have not existed until way later if at all due to *Canis Lupus*'s contribution.

Although most dogs are close descendants of *Canis Lupus*, they still differ in many ways unique to even domesticated animals. Dogs, despite not being their wild counterparts, contrary to assumption, are easier to wake than wolves and are more vigilant of their surroundings, whereas humans have deep REM cycles, proving dogs usefulness in warning humans of danger as in contrast humans have deep sleep cycles. (Chambers et al. 414)

Our ability to forge a mutually beneficial relationship sparked a connection that now no longer requires utility within the traditional sense. Guide dogs serve as blind people's eyes.

Emotional support dogs help people regulate their emotions and potential actions in public.

Dogs have done more for humanity than potentially all other species humans have domesticated. Their resilience to the changes that we have exposed them to have been greater than any other animal or plant, as our time together has exceeded them all.

This ongoing evolution reflects a fundamental aspect of human nature: our unique capacity to form meaningful bonds across species boundaries that transform both human and external parties involved. Perhaps more than any other human-animal relationship, our coevolution with dogs shines light on how deeply our humanity is intertwined with the broader biological world, challenging simplistic notions of human exceptionalism and demonstrating that our evolutionary story is not solely our own.

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