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COMPARATIVE BEHAVIORAL ASSESSMENT OF LABRADOR RETRIEVER, GERMAN SHEPHERD, AND BEAGLE USING THE C-BARQ STANDARDIZED QUESTIONNAIRE

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Abstract. *This study aimed to evaluate and compare the behavioral profiles of three dog breeds—Labrador Retriever, German Shepherd, and Beagle—using the standardized Canine Behavioral Assessment and Research Questionnaire (C-BARQ). Sixty adult dogs (20 per breed) were evaluated through owner responses scored on a five-point Likert scale (1 = absence of behavior; 5 = maximum intensity). The questionnaire included 101 items grouped into seven behavioral domains: obedience, aggression, fear and anxiety, separation-related behavior, excitability, attachment and attention-seeking, and miscellaneous behaviors. Results revealed distinct behavioral patterns among breeds. German Shepherds demonstrated superior obedience (mean 4.5–4.8) and rapid learning capacity, confirming their suitability for working, guarding, and service tasks. However, they also exhibited higher levels of protective and territorial aggression, particularly toward unfamiliar people and dogs. Labrador Retrievers achieved the highest scores in sociability, play motivation, and tolerance, reflecting their reputation as balanced and family-friendly companions, though they displayed moderate sensitivity to loud noises and mild separation anxiety. Beagles showed elevated excitability, dependency, and curiosity-driven distractibility, combined with frequent vocalizations and destructive behaviors when left alone, consistent with their strong exploratory and hunting instincts. Breed-specific behavioral trends corresponded closely to their historical functions—retrieving, guarding, and hunting—highlighting the genetic and functional bases of temperament variation. These findings emphasize the importance of breed-tailored behavioral management, structured socialization, and positive reinforcement training to mitigate potential behavioral problems. Overall, the C-BARQ proved to be a reliable, non-invasive, and quantitative tool for assessing temperament in companion dogs, contributing valuable insights for applied ethology, responsible breeding, and optimal owner–dog pairing.*

Keywords*: dog behavior, C-BARQ, Labrador Retriever, German Shepherd, Beagle, anxiety, aggression, obedience*

INTRODUCTION

Behavioral variability among dog breeds reflects a complex interplay between genetic selection, learning, and environmental shaping. Over centuries, artificial selection has produced not only morphological diversity but also behavioral specialization aligned with specific human needs such as guarding, herding, retrieving, and companionship (Scott and Fuller, 1965; Miklósi, 2015). These behavioral distinctions are deeply rooted in both heritable genetic factors and neurobiological adaptations, making the domestic dog an exceptional model for studying temperament and social cognition (MacLean et al., 2019; Dutrow et al., 2022).

Understanding these behavioral patterns is crucial for improving human–dog relationships, ensuring welfare, and optimizing breed suitability for specific functional and emotional roles, including assistance, therapy, and working contexts (Serpell and Duffy, 2014). While genetic lineage explains a significant portion of behavioral variance, individual factors such as sex, age, environment, and training experience also exert measurable influence (Karlsson and Morrill, 2022; Hopkin et al., 2022).

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The Canine Behavioral Assessment and Research Questionnaire (C-BARQ), developed by Hsu and Serpell (2003), is currently one of the most reliable standardized instruments for quantifying temperament traits in dogs. The tool allows owners to report observable behaviors across multiple dimensions such as obedience, aggression, fear and anxiety, separation-related behavior, excitability, and attachment (VetApps, n.d.; Wauthier and Williams, 2018). It has demonstrated strong construct validity and predictive reliability in studies assessing working dogs, shelter populations, and companion animals (Wilkins et al., 2024; Duffy and Serpell, 2008; Bray et al., 2019).

Comparative research confirms that breed-level differences align closely with historical selection pressures. For example, the German Shepherd has been selectively bred for vigilance, intelligence, and obedience, which support its effectiveness in police, rescue, and service tasks (Haskell et al., 2019; Friedrich et al., 2019). The Labrador Retriever, bred for retrieving game in aquatic environments, exhibits high sociability, cooperation, and tolerance, making it a preferred breed for therapy and family settings (Serpell et al., 2016). Meanwhile, the Beagle, developed for hunting small game, retains strong olfactory drive, independence, and vocal expressiveness (King et al., 2009; Arhant et al., 2010).

Studies using the C-BARQ have shown that retriever breeds tend to score highest in sociability and play motivation, herding breeds demonstrate higher obedience but also more territorial alertness, and hound breeds display increased excitability and separation-related stress (Farhoody et al., 2018; Clay et al., 2020). These findings underline the need for breed-specific behavioral management, emphasizing early socialization, positive reinforcement, and training approaches adapted to the breed's inherent predispositions (Serpell and Duffy, 2014).

Therefore, the present study aims to evaluate and compare the behavioral profiles of Labrador Retriever, German Shepherd, and Beagle breeds using the C-BARQ instrument. By analyzing obedience, aggression, fear and anxiety, excitability, attachment, and separation-related behaviors, this research seeks to identify distinct patterns that may guide practical recommendations for training, socialization, and responsible ownership.

MATERIAL AND METHODS

The study involved 60 adult dogs (20 per breed), each evaluated by their primary owner using the C-BARQ standardized questionnaire. The instrument includes 101 items, rated from 1 (absent) to 5 (strongly expressed), grouped into seven categories: training and obedience, aggression, fear and anxiety, separation-related behavior, excitability, attachment and attention-seeking, and miscellaneous behaviors. For each breed and category, mean scores were calculated, and graphical representations (Figures 1–6) illustrate behavioral trends. Comparative analysis emphasized practical implications for training, adaptability, and emotional stability.

RESULTS AND DISCUSSIONS

Training and Obedience

The results from the C-BARQ questionnaire highlight marked differences in obedience and learning aptitude among the three breeds. German Shepherds obtained the highest mean scores (4.5–4.8) for obedience, focus, and response time (Figure 1). Their performance confirms exceptional trainability and attentiveness, traits derived from their long history as working and service dogs. They respond rapidly to verbal cues, maintain concentration under distraction, and demonstrate strong motivation for task completion.

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Labrador Retrievers showed moderate obedience but high enthusiasm and cooperation. Their responsiveness is enhanced by positive reinforcement methods, reflecting their social and playful nature. Although prone to mild distractibility, especially in stimulating environments they remain eager learners, performing best in friendly, reward-based training contexts.

Beagles, on the other hand, recorded the lowest obedience scores (≈2.8–3.2), consistent with their independence and exploratory instincts. Their behavior is influenced more by scent stimuli than by verbal commands, making them less predictable in controlled training. Patience and brief, engaging training sessions are essential for improving compliance in this breed.

Overall, these results demonstrate that obedience and learning styles are closely linked to each breed's genetic selection and functional heritage, structured training suits the German Shepherd, social reinforcement benefits the Labrador, and adaptive, stimulating tasks are necessary for the Beagle.

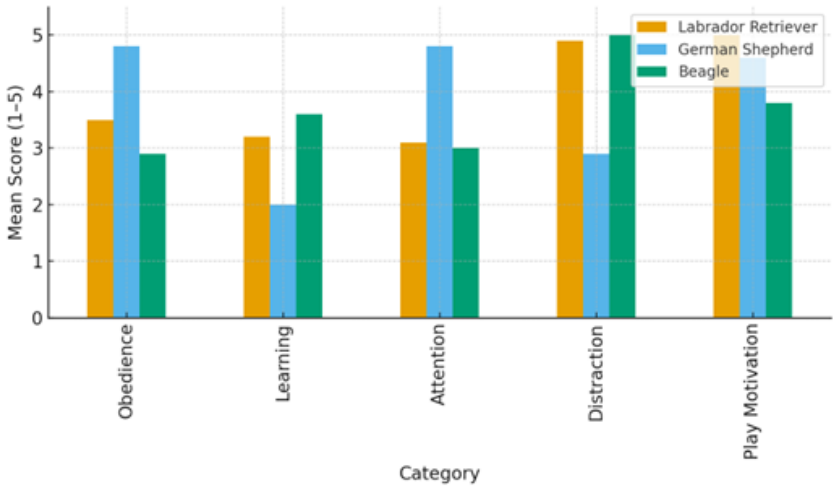

Figure 1. Obedience and Training

Aggression Profiles

The comparative analysis of aggression reveals distinct behavioral tendencies among the studied breeds. German Shepherds exhibited the highest scores for protective and territorial aggression (up to 4.8), reflecting their strong guarding instincts and heightened vigilance toward unfamiliar people and animals. These reactions, although controlled, indicate a predisposition toward assertive defense behaviors, which can be beneficial in working or protection contexts but require early socialization and consistent leadership to prevent excessive reactivity.

Labrador Retrievers maintained consistently low aggression scores (below 2.0) across all contexts, confirming their reputation as one of the most stable and tolerant breeds. They showed high tolerance toward children, strangers, and other animals, demonstrating emotional balance and reduced territoriality, qualities that make them highly suitable for family and therapy environments.

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Beagles displayed moderate levels of alertness and vocal defensiveness, rather than true physical aggression. Their tendency to bark or growl in response to unfamiliar stimuli reflects a form of expressive vigilance typical of scent hounds. While these vocal reactions are common, they rarely escalate into aggressive encounters, provided the dog receives adequate social exposure and behavioral guidance (Figure 2).

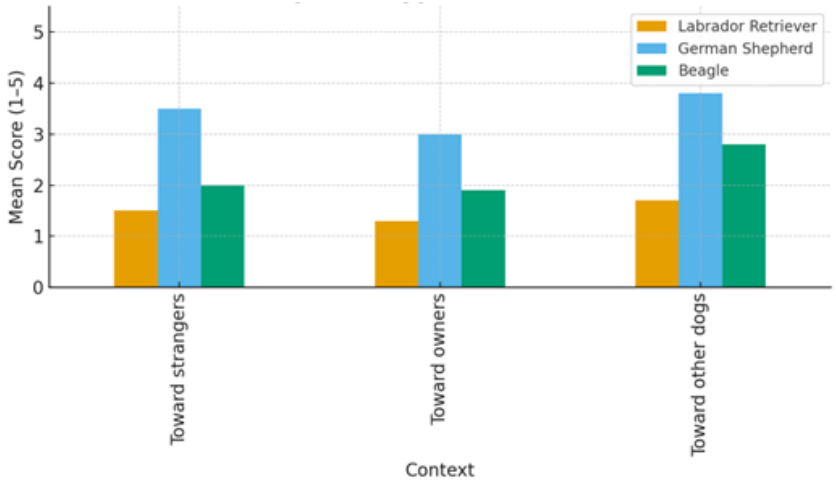

Figure 2. Aggression Profiles

Fear and Anxiety

The results from the fear and anxiety section of the C-BARQ highlight notable differences in emotional stability and stress responses among the three breeds. Beagles exhibited the highest reactivity to sudden or intense stimuli, with mean scores between 4.2 and 4.6. They were particularly sensitive to loud noises such as thunder or fireworks, as well as to unfamiliar environments and handling procedures. This heightened responsiveness indicates a lower threshold for stress, often manifested through vocalization, restlessness, or avoidance behaviors. Consistent exposure and gradual desensitization are essential to reduce anxiety in this breed.

Labrador Retrievers showed moderate sensitivity (around 4.0), especially toward auditory stimuli, but maintained overall composure in familiar contexts. Their emotional resilience and social confidence help buffer stress reactions, although some individuals may exhibit mild nervousness during grooming or veterinary manipulation. With proper socialization and positive reinforcement, these dogs adapt quickly to new experiences.

German Shepherds, by contrast, demonstrated strong emotional control (average ≈2.8), indicating calmness and confidence even in unfamiliar or potentially stressful situations. Their balanced responses reflect both genetic selection for stability and effective learning capacity. Nevertheless, untrained or under socialized individuals may still develop situational fear or defensive behavior under high pressure. (Figure 3).

Separation-Related Behavior

The analysis of behaviors associated with separation from the owner revealed significant breed-specific differences. Beagles recorded the highest scores for vocalization, agitation, and destructive actions (mean 3.5–4.0), reflecting a strong emotional dependency and

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sensitivity to isolation. Typical reactions included excessive barking, whining, scratching doors, or chewing objects. This pattern indicates a pronounced separation anxiety, which can be mitigated through gradual desensitization, environmental enrichment, and consistent daily routines.

Labrador Retrievers displayed moderate anxiety when left alone, manifested primarily through temporary restlessness or mild vocalization. Their social nature makes them responsive to human absence, but they generally recover quickly once accustomed to regular patterns of departure and return. With adequate exercise and mental stimulation, most Labradors maintain calm behavior during short periods of solitude.

German Shepherds demonstrated the highest adaptability to owner absence, with the lowest average scores across all indicators. Their self-control and confidence allow them to remain composed during isolation, though some individuals may develop stress responses if deprived of physical activity or cognitive engagement for extended periods. (Figure 4).

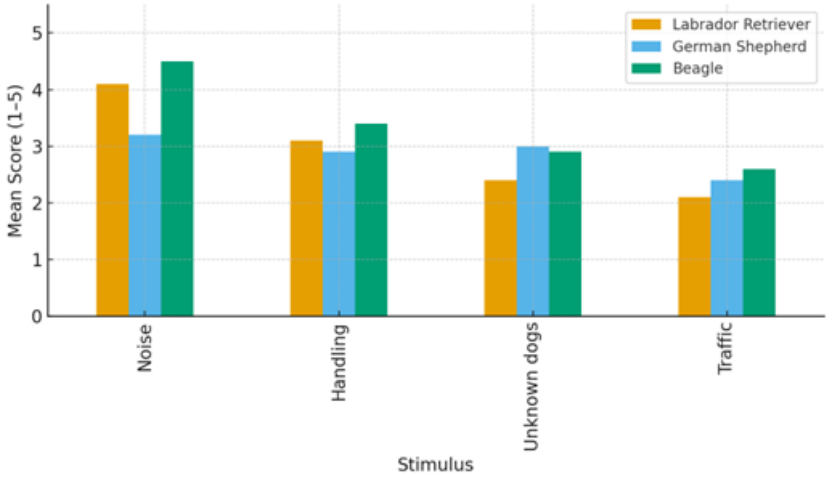

Figure 3. Fear and Anxiety

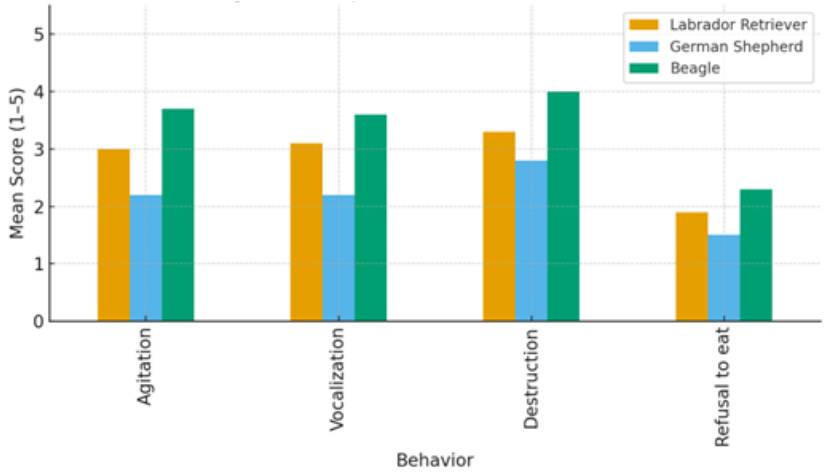

Figure 4. Separation-Related Behavior

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Excitability and Attachment

The results from the excitability and attachment section indicate clear behavioral contrasts among the three breeds. Beagles and Labrador Retrievers recorded the highest scores (approximately 4.5–5.0), reflecting their enthusiastic and affectionate temperament. Both breeds responded intensely to familiar stimuli such as the owner's return, playtime, or the presence of visitors. Their heightened excitability is closely linked to a strong emotional attachment and desire for social interaction. While these traits make them highly engaging companions, they can also lead to excessive vocalization or jumping behaviors if not managed through consistent training and structured routines.

German Shepherds, by contrast, exhibited a more controlled emotional profile (mean ≈3.5), maintaining composure during stimulating events. Their excitement levels remained moderate and situation-dependent, consistent with their working-dog background, where focus and restraint are essential. Although less demonstrative than the other two breeds, they still form deep bonds with their owners, expressed through loyalty and steady attentiveness rather than exuberant physical display (Figure 5).

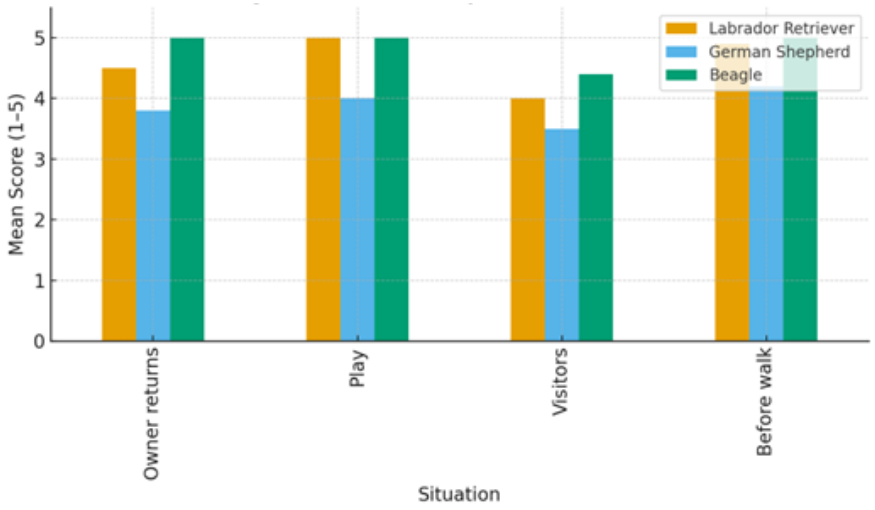

Figure 5. Excitability and Attachment

Miscellaneous Behaviors

The miscellaneous behavior section encompassed a range of instinctual and spontaneous actions, including play, exploration, and undesirable habits. Beagles demonstrated the strongest hunting-related and impulsive tendencies, such as chasing small animals, escaping from confined spaces, and stealing food. These behaviors reflect their natural predisposition for scent tracking and exploration. While these traits underline the breed's intelligence and curiosity, they also require careful supervision, environmental control, and cognitive enrichment to prevent problem behaviors.

Labrador Retrievers exhibited pronounced social playfulness and friendly interaction with humans and other dogs. Their behavior was characterized by enthusiasm and physical expressiveness, such as rolling, licking, or retrieving objects. These traits highlight their cooperative temperament but may occasionally lead to excessive attention-seeking or overexcitement if not properly managed.

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German Shepherds maintained balanced behavioral control, showing fewer impulsive or compulsive actions. Their reactions were typically goal-oriented and context-dependent, indicating good emotional regulation and adaptability. This equilibrium supports their effectiveness in structured working tasks and controlled social settings.

Beagles showed hunting and impulsivity tendencies, Labradors social playfulness, and German Shepherds balanced control (Figure 6).

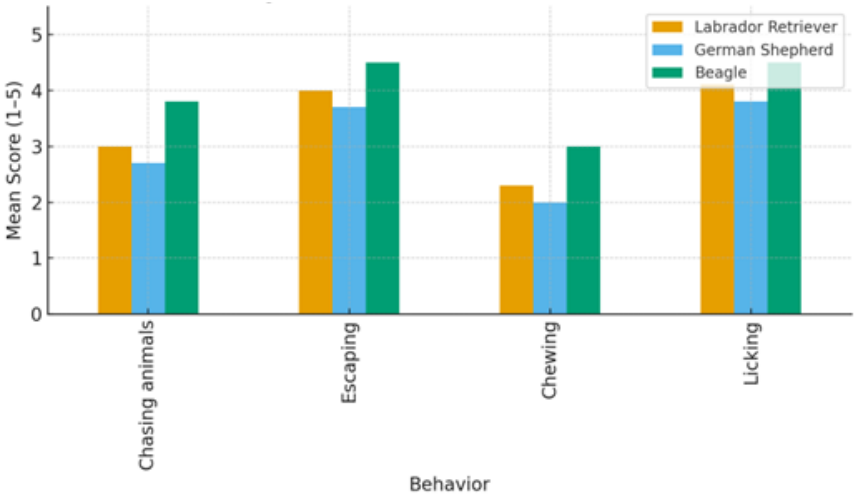

Figure 6. Miscellaneous Behaviors

CONCLUSIONS

The comparative behavioral evaluation conducted through the C-BARQ questionnaire highlights clear, breed-specific tendencies that align closely with each breed's genetic background and functional history.

Labrador Retriever individuals demonstrated a temperament characterized by friendliness, tolerance, and high sociability, confirming their reputation as ideal family companions and therapy dogs. Their behavior was marked by playfulness, responsiveness, and emotional stability. However, a moderate level of distractibility and mild sensitivity to sudden noises was observed, aspects that can be effectively mitigated through consistent positive reinforcement training and controlled exposure to external stimuli. With proper guidance and socialization, Labradors maintain remarkable adaptability and emotional balance in a variety of environments.

German Shepherds exhibited the highest scores in obedience, alertness, and self-control, confirming their strong potential for professional or protective work. Their disciplined behavior and loyalty make them reliable service animals. However, their protective and territorial instincts may predispose them to over-vigilance in unfamiliar situations. For this reason, structured socialization during early developmental stages and firm, consistent leadership are essential to ensure emotional balance and prevent exaggerated defensive reactions. Their intelligence and work motivation make them one of the most versatile and trainable breeds when properly managed.

Beagles presented a markedly different behavioral profile energetic, affectionate, and curious, but also impulsive and prone to separation-related distress. They display heightened

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excitability and vocalization, consistent with their historical role as hunting hounds selected for alertness and endurance. While their strong attachment to owners makes them loving companions, their independence and exploratory drive demand structured routines, mental stimulation, and consistent training to prevent behavioral problems such as excessive barking or destructiveness when left alone.

Overall, the results demonstrate that behavioral tendencies in domestic dogs reflect a combination of genetic selection, historical function, and environmental experience. Understanding these differences provides valuable insights into breed-appropriate training methods, welfare optimization, and responsible ownership. The C-BARQ instrument proved to be a robust, non-invasive, and quantitative framework for assessing canine temperament, offering practical applications in both applied ethology and companion animal management.

BIBLIOGRAPHY

ARHANT, C., TROXLER, J., & SCHWEIZER, M. (2010). Behavioral differences among hunting and companion Beagles. Applied Animal Behaviour Science, 124, 80–88.

BRAY, E.E., LEVY, K.M., KENNEDY, B.S., DUFFY, D.L., & MACLEAN, E.L. (2019). Predictive models of assistance dog training outcomes using the C-BARQ. Frontiers in Veterinary Science.

CLAY, L., PATERSON, M.B.A., & PHILLIPS, C.J.C. (2020). Aggression toward familiar people, strangers, and conspecifics in gonadectomized and intact dogs. Frontiers in Veterinary Science, 5, 18.

DUFFY, D.L., & SERPELL, J.A. (2008). Predictive validity of a temperament evaluation in guide dogs. Applied Animal Behaviour Science, 114, 441–460.

DUTROW, E., SERPELL, J.A., & OSTRANDER, E.A. (2022). Domestic dog lineages reveal genetic drivers of behavioral diversification. Cell, 185, 4737–4756.

FARHOODY, P. ET AL. (2018). Aggression toward familiar people, strangers, and conspecifics in gonadectomized and intact dogs. Frontiers in Veterinary Science, 5, 18.

FRIEDRICH, J., ARVELIUS, P., & WIENER, P. (2019). Genetic dissection of complex behaviour traits in German Shepherds. Heredity, 123, 43–56.

HASKELL, M.J. ET AL. (2019). Behavioural traits and management in German Shepherds. Applied Animal Behaviour Science, 211, 67–76.

HOPKIN, J. ET AL. (2022). Breed versus personality and demographic factors in canine chasing behaviour. Applied Animal Behaviour Science, 253, 105639.

HSU, Y., & SERPELL, J.A. (2003). Development and validation of the C-BARQ. Journal of Veterinary Behavior, 1(2), 81–102.

KARLSSON, E.K., & MORRILL, K. (2022). Dog study shows there's a lot more to behavior than just breed. Nature, 605, S12–S14.

KING, T., MARSTON, L.C., & BENNETT, P.C. (2009). Describing the Beagle: Personality and reactivity. Animal Welfare, 18, 107–117.

MACLEAN, E.L., SNYDER-MACKLER, N., VON HOLDT, B.M., & SERPELL, J.A. (2019). Highly heritable and functionally relevant breed differences in dog behaviour. Proceedings of the Royal Society B, 286, 20190716.

MIKLÓSI, Á. (2015). Dog Behaviour, Evolution, and Cognition. Oxford University Press.

SCOTT, J.P., & FULLER, J.L. (1965). Genetics and the Social Behavior of the Dog. University of Chicago Press.

SERPELL, J.A., & DUFFY, D.L. (2014). Dog breeds and their behavior. In Domestic Dog Cognition and Behavior (pp. 31–57). Springer.

SERPELL, J.A., DUFFY, D.L., & JAGOE, J.A. (2016). Labrador Retriever behaviour and genetics. Applied Animal Behaviour Science, 174, 41–48.

VETAPPS (n.d.). About the C-BARQ. University of Pennsylvania.

WAUTHIER, L.M., & WILLIAMS, J.M. (2018). Using the mini C-BARQ to investigate the effects of puppy farming on dog behavior. Applied Animal Behaviour Science, 206, 52–60.