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Factors that Impact the Categorization of Dogs' Facial Expressions

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Submitted in partial fulfilment of the requirements for the degree of Bachelor of Arts, Honours

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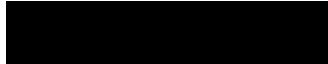### CERTIFICATE OF EXAMINATION

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Abstract

Dogs possess emotions, such as happiness, sadness, fear, surprise, anger, and disgust and studies have demonstrated that dogs use facial expressions to portray their states of emotionality (Anderson & Adolphs 2014 as cited in Bremhorst et al., 2021; Bloom & Friedman, 2013; Csoltova, & Mehinagic 2020; Kaminski et al., 2019; Kujala, 2018; Kujala et al., 2017; Siniscalchi et al., 2018). Researchers have also found that humans can accurately categorize dogs' emotions, using their facial expressions (Bloom & Friedman, 2013; Kujala et al., 2017). However, limited research has explored how factors like morphology and breed attitudes impact humans' categorization of dogs' facial expressions. Using stimuli pictures, this study examined how breed and morphology impacts our categorizations of dogs' facial expressions. Participants (35 female, 10 male, and 1 non-binary) met individually with the student researcher via ZOOM. During this session the participants first completed a demographic questionnaire and the Coleman Dog Attitude Scale (used to measure humans' attitudes towards dogs). Next, two sets of stimuli pictures were presented. For the first set of stimuli pictures individual photos of dogs' faces were shown on the screen, and participants were asked to indicate how likely they were to approach each dog. For the second set of pictures, the faces of two different dogs were presented on the screen at the same time, and participants were asked to choose which dog they would approach. Despite participants overall self-reporting that certain facial features are not important to them, results indicated that breed and morphology do play a role in humans' categorization of dogs' facial expressions. Participants indicated they were most likely to approach Cocker Spaniels (91.30%), Pugs (89.10%) and Beagles (87.00%) and least likely to approach Dobermans (with Pinned Ears) (43.48%), American Terriers (37.00%), and German Shepherds

(30.43%). Relaxed/Friendly expressions (open mouth and relaxed eyes) were also preferred over neutral expressions (no facial tension, closed mouth and relaxed ears, with eyes focused directly forward) with significant differences found between the Friendly Golden Retriever compared to the Neutral Golden Retriever, X^2 (1, $n = 46$) = 3.19, $p < .001$, Friendly German Shepherd and Neutral German Shepherd X^2 (1, $n = 46$)= 75.6, $p < .001$ and Friendly Rottweiler and Neutral Rottweiler X^2 (1, $n = 46$) = 12.1, $p < .001$ (See Table 7-9). As well, Friendly Golden Retrievers were perceived more positively than Friendly German Shepherds, X^2 (1, $n = 46$) = 18.9, $p < .001$, and Friendly Rottweilers, X^2 (1, $n = 46$), = 25.0, $p < .001$ (See Table 7). These findings indicate that humans may possess specific breed biases and additional research should explore the nature and origin of these attitudes. As well, human biases towards breed-related morphological differences could lead to significant welfare implications and potential differences in treatment and care of specific breeds.

Acknowledgments

      I would like to thank Dr. Catherine Ryan and Dr. Tracy Doucette for being my supervisors over the past year. I truly would not be the student I am today without your assistance and supervision. You have both pushed me academically, taught me to question everything and offered me guidance in all aspects of my life. I will take this experience with me throughout my postgraduate endeavors, and keep close to my chest the invaluable knowledge and skills I have learned throughout this project. I can safely say that being an honors student under your co-supervision has been the most challenging and rewarding experience of my undergraduate degree and for that I would not change a thing. I would also like to thank Mom and Dad for always being there to remind me that it's all going to be ok.

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Abbreviations

C-DAS = Coleman Dog Attitude Scale

DogFACS = Dog Facial Action Coding System

FACS = Facial Action Coding System

FGR = Friendly Golden Retriever

FGS = Friendly German Shepherd

FRT = Friendly Rottweiler

HAB = Human-Animal Bond

NGR = Neutral Golden Retriever

NGS = Neutral German Shepherd

NRT = Neutral Rottweiler

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1 Introduction

Csoltova and Mehinagic (2020) define emotions as *"An intense prompt and affective response to an outer stimulus that may create a shift in physiological states"*. Emotions have been studied extensively in humans, with many researchers focusing on the role they play in mental processes such as consciousness, motivation, and perception (Izard, 2009). Beausoleil, Stratton, Guesgen, Sutherland, and Johnson (2016) summarize the different components of an emotional response, all with the possibility for exploration:

> From a scientific perspective, emotion is defined as an innate response to an event or situation (internal or external) that comprises behavioral, physiological, subjective (the feeling) and cognitive (subsequent decision-making) components. (p. 63)

Researchers often recognize six primary emotions: happiness, sadness, fear, surprise, anger, and disgust (Prinz, 2004). It is believed that our primary emotions are controlled by the limbic system, a complex network of brain structures including the hypothalamus, thalamus and amygdala (Bekoff, 2000; Rajmohan & Mohandas, 2007; Stangor & Walinga, 2014). Primary emotions are thought to be a product of evolution, helping increase our survival by allowing us to make quick judgments about the stimuli in our environment (LeDoux, 2000 as cited in Stangor & Walinga, 2014). For example, fear as an emotion is thought to have evolved to help to cope with our environment, signaling to us to flee or fight in the presence of danger (Plutchik, 1980 as cited in Prinz, 2004). In summary, our primary emotions help guide our behavior and decision-making, producing internal states relevant to the environment around us. Humans also have the ability to experience a range of secondary emotions such as joy, satisfaction and shame. It is believed secondary emotions occur due to our brains ability to interpret emotional states across a wide range of contexts. This phenomenon, often coined cognitive appraisal, can lead to

individuals experiencing different emotions, even when exposed to the same stimuli. Secondary emotions are more diverse than primary and can vary in valence (positive or negative) and arousal (intense or mild). Due to this variance, humans often experience a myriad of secondary emotions (Stangor & Walinga, 2014). When examining primary and secondary emotions, two distinguishing brain pathways exist. Primary emotions utilize "fast pathways", in which messages travel directly to the limbic system, in order to quickly produce a relevant behavioral response. In contrast, secondary emotions utilize "slow pathways" that send signals to the frontal lobe first, in order to be interpreted and processed. This leads to slower behavioral responses (Stangor & Walinga, 2014). For example, it may be beneficial for fear to be processed using a "fast pathway", as we may be in immediate danger, and need to react quicker (Stangor & Walinga, 2014).

When an individual expresses an emotion, a physiological response also occurs such as an increase in heart rate, feeling flushed, or sick to the stomach (Stangor & Walinga, 2014). The link between emotions and physiological responses is often explained using one of three theories: Cannon-Bard Theory, James-Lange Theory and Schachter and Singer's Theory. The Cannon-Bard Theory argues that emotion and physiological arousal occur at the same time. In contrast, the James-Lange Theory argues that we experience emotion due to our arousal state being triggered. James and Lange state that depending on what type of arousal is occurring, we associate these patterns with different emotions. For example, first we cry, then we feel sad, first we tremble, then we feel fear (James, 1884, p. 190 as cited in Stangor & Walinga, 2014). Using a two-factor explanation, Schachter and Singer's Theory argues that all arousal states are identical, and using the context around us as well as cognitive processes, we interpret these arousal states as emotions (Schachter & Singer, 1962 as cited in Stangor & Walinga, 2014).

When a stimulus in the environment triggers an emotional state, it can also lead to behavioral response, such as a facial expression. Facial expressions are often key components of nonverbal communication between individuals (Correia-Caeiro et al., 2021; Stangor & Walinga, 2014). Contrasting the six primary emotions, anger as a facial expression is typically displayed via a furrow of the brow, tightening of the lips, and with teeth on display. Disgust is presented as an open mouth, wrinkles around the nose and a prominence of the tongue. When happiness occurs, wrinkles are produced under our eyes and the mouth becomes drawn back at corners. Surprise is expressed with the raising of the eyebrows, and an opening of the mouth, eyes and lips. Fear presents as wide eyes, elevated eyebrows, and an open mouth with the retraction of the lip. Contrasting this, the corners of mouth become depressed and inner corner eyebrows raise when someone is expressing sadness (Matsumoto et al., 2008). Facial expressions are often used as a method of communication, providing us with relevant social cues when interacting with each other (Ekman, 1993; Scherer, 1986 as cited in Matsumoto et al., 2008). Building on this, facial expressions are also thought to be universal, with all humans possessing the same facial anatomy to be able to express the six basic emotions (Gray & Goss, 1966 as cited in Matsumoto et al., 2008). Therefore, facial expressions are a key component of social interactions, helping us understand and respond appropriately to social situations.

Darwin was one of the first people to examine emotional expression between species in his book titled, *"The Expression of the Emotions in Man and Animals".* Observing animals' behavioral responses, Darwin argued that emotions are not unique to humans and that many animals such as dogs, cats, horses and primates experience/express them (Ekman, 2009). With dogs being a primary focus, he found many similarities between their emotional expression and that of other species. He documented a clear shift in tail, ear and lip positioning depending on the

type of stimuli in the environment. With this in mind, Darwin concluded that dogs experience a range of emotions, and express them in a similar fashion to other species, including humans (Darwin, 1872) (See Figure 1).

Figure 1

Charles Darwin's Examples of Emotional Expressions
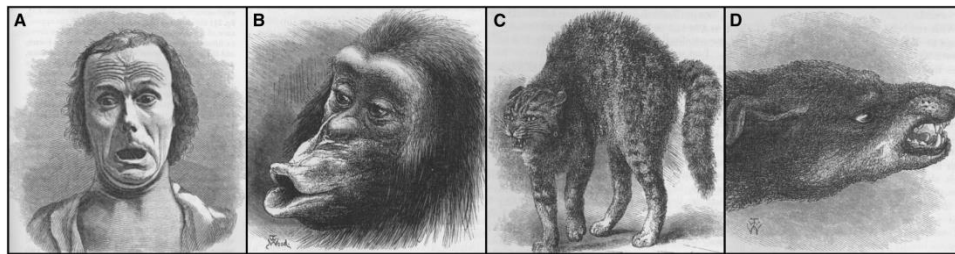
Note. (A) Expression of terror in a human. (B) Chimpanzee "disappointed and sulky." (C and D) hostility in a cat (C) and a dog (D). From Darwin, 1872 as cited in *A Framework for Studying Emotions across Species* by D. Anderson and R. Adolphs (2014). *Cell 157*. http://dx.doi.org/10.1016/j.cell.2014.03.003

Despite a waning of interest in the scientific study of emotions in animals post Darwin, in the mid-1970s, the study of animal emotions once again became a topic of scientific interest and debate. During this time, most research was centered around the question *"Do animals have emotions?"*(as referenced in De Waal, 2011; Paul et al., 2020 as cited in Beausoleil et al., 2016). Researchers such as Donald Griffin, Mariona Dawkins and Ian Duncan started using technical measures to examine the link between behavioral and physiological responses and animals' emotionality (Beausoleil et al., 2016). With these methods, the field began to grow, and animal sentience, emotion and welfare are now widely recognized as important scientific topics (Beausoleil et al., 2016).

To date, scientists have explored many different animals and their ability to possess emotion, with dogs being the main focus of comparative research (Anderson & Adolphs, 2014 as cited in Bremhorst et al., 2021; Csoltova & Mehinagic, 2020; Kujala, 2018; Morris et al., 2008). This focus is likely due to canines being one of the most popular companion animals in the world, and having had an extensive and long history of connections with humans (Hosey & Melfi, 2014; Smith, & Van Valkenburgh 2021; Stahl, 2016). Research suggests that dogs possess, and can experience the six basic emotions — happiness, sadness, fear, surprise, anger, and disgust (Anderson & Adolphs 2014 as cited in Bremhorst et al., 2021; Csoltova & Mehinagic, 2020; Kujala, 2018). It is believed that dogs display these emotions externally by means of behavioral manifestations and facial expressions. When dogs experience negative emotional states, their behaviors include an increase in overall activity, lip licking, panting, yawning, crouching, shaking, scratching, increased salivation and blinking of the eyes (Hetts et al., 1992; Beerda et al., 1997, 1998, 1999; Dreschel and Granger, 2005; Tod et al., 2005; Hennessy et al., 2006; Siniscalchi et al., 2008; Stracke et al., 2011; Hekman et al., 2012; Shiverdecker et al., 2013; Kuhne et al., 2014b; Csoltova et al., 2017 as cited in Csoltova & Mehinagic 2020). An increase in physical activity, tail wagging, lip licking and shake off behavior is thought to be indicative of positive-emotional states (McGowan et al., 2014; Rehn and Keeling, 2011; Takahashi, 2011; Westerback, 2011 as cited in Csoltova & Mehinagic 2020). Dogs are also thought to express a wide range of vocalizations in relational to negative and positive emotional states. Humans can correctly identify these states, with short, quick barks being perceived as aggressive, high, slow pitch barks indicative of happiness/playfulness and excessive barking being linked to the excitement, boredom, disturbances, anxiety, and pain (Yin

and McCowan, 2004; Pongrácz et al., 2005; Righetti, 2006; as cited Csoltova & Mehinagic 2020).

Dogs also utilize facial expressions, and manipulate aspects of their faces such as their mouth, eyes and ears, depending on the emotion (Bloom & Friedman, 2013; Csoltova, & Mehinagic 2020; Kaminski et al., 2019; Kujala 2018; Kujala et al., 2017; Siniscalchi et al., 2018). Negative expressions are presented as bared-teeth, wrinkled muzzle and erect/forward pointing ears. Positive expressions are thought to be manifested as a relaxed face, open mouth and protruding tongue and relaxed ears. Lastly, neutral expressions are viewed as a relaxed face and having no apparent facial muscle tension (Bremhorst et al., 2021; Kujala et al., 2017; Racca et al., 2012; Somppi et al., 2016). It is also thought that domestication has shaped dogs' facial anatomy, and has selected for certain facial muscles that aid in the communication with humans (Kaminski et al., 2019). For example, the *levator anguli oculi medialis*, a muscle responsible for raising the inner eyebrow intensely, has been reported in dogs, but not in wolves. This muscle aids in eyebrow movement, allowing dogs to produce a wider range of facial expressions. This may result in better social communication, with dogs being able to interact more effectively with humans by producing a wide range of expressions (Kaminski et al., 2019).

As well, research has demonstrated that dogs may be capable of processing, and are highly attentive to, human facial expressions (Müller et al., 2015; Albuquerque et al., 2016;Siniscalchi et al., 2018). When presented with visual and/or auditory stimuli, preliminary research suggests dogs may be able to tell the difference between happy and angry human faces (Müller et al., 2015; Albuquerque et al., 2016; Siniscalchi et al., 2018). For example, Albuquerque, Guo, Wilkinson, Savalli, Otta, and Mills (2016) paired a mixture of auditory (dog or human vocalizations) and visual inputs (dog or human faces), and examined dogs' abilities to

integrate this information. The results found that dogs looked significantly longer at the faces in which the expression and vocalization of the emotion matched (i.e a human face paired with a human vocalization etc.). This is a possible indication that dogs can process auditory and visual inputs and integrate them into a perception of emotional expressions.

Studies have also investigated human's abilities to read and interpret dog facial expressions. Seemingly, when presented with stimuli pictures, humans can classify positive emotional states with 88% accuracy, and negative emotional states with 70% accuracy. In preliminary studies, humans have reliably categorized the six basic emotions when interacting with dogs, and take into account their facial expressions when doing so (Bloom et al., 2021; Bloom, & Friedman 2013; Kujala et al., 2017). Interestingly, humans have more difficulty distinguishing more secondary emotions expressions like surprise and disgust. As well, when examining dogs' facial expressions, humans place the most emphasis on a dog's mouth, relevant to the rest of the face (Kujala, 2018).

Research has also indicated that humans are inflexible with their facial viewing strategies and may process and categorize human and dog faces similarly (Bloom, & Friedman 2013;Correia-Caeiro et al. 2021; 2021, Kujala et al. 2012; Desmet et al. 2017 as cited in Correia-Caeiro and colleagues, 2021). Kujala, Somppi, Jokela, Vainio, and Parkkonen (2017) found that humans categorize both Pleasant Dog and Human faces as happy, Neutral Dog and Human faces as presenting no emotion but as slightly sad, and Threatening Dog and Human faces as angry/aggressive. As well, Correia-Caeiro, Guo, and Mills, (2021) found that humans use the same gaze allocation pattern (in this case, primarily examining the head) when viewing pictures of both dogs and humans.

With dogs being human's closest social companions it is essential to examine what factors impact human's categorization of dog's facial expressions. This honors thesis will add to the limited research that explores the role of morphology and breed attitudes in humans' categorizations of dogs' facial expressions.

1.1 Human-Animal Relationship

Animals play a significant role in our daily lives, cohabiting with humans dating back 50,000 years (Hosey & Melfi, 2014). From hunter-gatherer societies to the agrarian era to modern-day, animals like dogs, cows, and horses have worked closely with humans, serving as agricultural aids and food sources (Hosey & Melfi, 2014). Adding to this, many animals help fulfill the role of companionship. Companion animals are defined as animals that owners share a close relationship with and are housed by people for pleasure. It is estimated that 60% of people in America live with a companion animal and consider them family (Applebaum, McDonald, & MacLean, 202, Eddy, 2003 as cited in Hosey & Melfi, 2014). Because companion animals are such an extensive part of our lives, humans frequently form connections with them. This relationship between a human and an animal, is commonly referred to as the human-animal bond (HAB) (Hosey & Melfi, 2014). HAB frequently exists between mammals and humans, as mammals' emotional capabilities have neural and anatomical systems that are similar to humans. This creates a basis for forming strong bonds with us (Applebaum, McDonald, & MacLean, 2021)[1]. As noted in Hosey and Melfi (2014), HAB is defined by the American Veterinary Medical Association as:

> A mutually beneficial and dynamic relationship between people and animals that is
>
> influenced by behaviors that are essential to the health and well-being of both. This

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[1] The neural and anatomical systems that support animals' emotional capabilities will be elaborated on in future sections.

includes, but is not limited to, emotional, psychological, and physical interactions of

people, animals, and the environment. (p. 8)

HAB is often viewed as a reciprocal and persistent connection that benefits the health and well-being of both parties. Some of these benefits include positive effects on physiological and psychological health, such as a reduction in stress (demonstrated by the lowering of physiological markers such as reduced cortisol, heart rate and blood pressure), and an improvement in mood, self-reported fear and anxiety (Alonso, 1999; Barker & Wolen, 2008; Barker, Krisely, McCain, Schubert, & Pandurangi, 2010; Beetz, Uvnäs-Moberg, Julius, & Kotrschal, 2012; Friedmann & Son, 2009; Virués-Ortega & Buela-Casal, 2006; Walsh, 2009a as cited in Hosey & Melfi, 2014). The human-animal bond can also be a source of social support for humans. These bonds often mirror the type of benefits we receive from human interactions such as a reliable and nonjudgmental source of companionship (Applebaum, McDonald, & MacLean, 2021).

Despite humans and animals coexisting for thousands of years, the study of HAB is a relatively new and emerging field of research (Hosey & Melfi, 2014). The uptake in research was largely influenced by progress in veterinary medicine and the founding of several organizations such as the Joint Advisory Committee on Pets in Society (1977), Society for Companion Animal Studies (1979), and Center for the Human-Animal Bond (1982) (Hines, 2003). The push for research surrounding the human-animal relationship also birthed *Anthrozoos* (previously referred to as the *Journal of the Delta Society)*, the first scientific journal devoted to animal-human interactions (Hines, 2003).

1.1.1 Human-Dog Bond

The human-dog relationship is unique from other animals, often being noted as one of the strongest bonds that humans share with a specific species. Our relationship with dogs is rooted in domestication, or the process of manipulating a species for the benefit of the human. Canines were the first species humans domesticated, as hunter-gatherer societies used them to their advantage (Stahl, 2016; Smith & Van Valkenburgh, 2021). Beginning with wolves, they accompanied hunters during scavenging and humans benefited from wolves' abilities to chase, bark and corner prey. This led to the evolution of *"wolf-dogs"* as humans attempted to domesticate the tamest of wolves, eventually producing what most researchers today would call *"dogs"* (Stahl, 2016). The domestication of dogs led to better hunting methods, as dogs could guard carcasses, protect women and children and were able to hunt cooperatively with humans (Stahl, 2016). As dogs were domesticated, their physical traits began to differ from wolves, making them look more *"tame"* and possibly increasing our preference for them. The occurrence of *"tamer"* physical traits is a common phenomenon that occurs when animals are domesticated. It is frequently coined "domestication syndrome" and often the popular traits that are selected are miniature or gargantuan body proportions, floppy ears, or curly tails (Smith & Van Valkenburgh, 2021).

1.1.1.1 Formation, Maintenance and Strength of the Human-Dog Relationship

A common explanation for human-dog relationships is social dominance theory, with dominance being defined as one party asserting control over the other (Payne et al., 2015). Social dominance theory argues that dogs are often submissive to humans, viewing us as surrogate *"pack leaders,"* therein creating the basis for our relationships with them (Payne et al., 2015). It is thought that dogs view humans as *"other dogs"*, placing us within their hierarchy, with humans as *"superior dogs"*, and dogs as inferior. It is theorized that by categorizing humans as *"dominant"*, dogs are able to form better relationships with us, as well as strengthen their adaptability to the environment (using humans as an aid for their survival) (Payne et al., 2015).

However, social dominance theory may be a simplistic explanation within the context of the human-dog relationship. Recent research suggests that dogs categorize the bonds that we form with them differently than dog-dog relationships due to *"owner factors"* (Payne et al., 2015). These factors are not present in dog-dog relationships and can influence the strength of the bond between humans and dogs (Payne et al., 2015). For example, having a strong or weak affiliation towards a pet, the amount of attention an owner gives to their pets, and the ability to provide a safe environment are all examples of *"owner factors"* (Payne et al., 2015). Positive owner factors (i.e. strong affiliation, a large amount of attention, and a safe environment) can promote a strong and healthy HAB, however if the opposite occurs, it can often weaken this relationship (Payne et al., 2015).

Attachment theory, often used to describe a relationship between two humans (frequently a mother and a child), is defined as a specific type of reciprocal emotional bond that is developed over time (Payne et al., 2016). This theory has also been examined within the context of the

human-dog dyad, and offers a possible explanation to how our relationships with dogs are maintained. The four features of attachment (i.e. discussed below) that are commonly examined in the context of the human-dog relationship are (i) proximity seeking, (ii) secure base, (iii) safe haven, and (iv) separation distress (Payne et al., 2016). Proximity, the first attachment theme, involves a dog's willingness to seek out human contact. When dogs are coping with distress and threats, they may seek out their attachment figure (i.e. their owner). The affinity to seek out their owner in stressful situations is often defined as high proximity seeking, and failure to do so would be defined as low proximity seeking (Payne et al., 2016). Often, the characteristics of the owner, such as strength of attachment, and personality type, can influence the dog's motivation to seek them out (Payne et al., 2015; Payne et al., 2016). Adding to this, secure base and safe havens are two additional features that are examined within the context of attachment. The secure-base effect occurs when the presence of an attachment figure increases the likelihood of a dog exploring novel objects, and an increase in playing within novel environments (McGreevy et al., 2008). Differing from the secure-base, the safe-haven effect emphasizes the availability of the attachment figure, allowing the dog to return to them when distressed (Ainsworth and Bell, 1970 as cited in Payne et al., 2015). This effect also increases play and affiliation. Both secure-base and safe-haven effects highlight the importance of *"owner- presence"*. Owner-presence often fosters an environment for the dog to interact more with novel objects, and can decrease stress responses to strangers. The final attachment feature is separation distress. This occurs when dogs are separated from their attachment figure, triggering behaviors indicative of distress, such as vocalization, house-soiling, or hyperventilation (McGreevy et al., 2008; Payne et al., 2015; Payne et al., 2016,). These four features (proximity, secure-base, safe-haven and

separation distress) first identified in human caregiver–infant relationships, are also thought to be present in human-dog attachment bonds (Payne et al., 2015).

The degree of attachment can vary, and it is still unknown what factors influence the nature of attachment bonds between humans and dogs. However, it is thought that the amount of security within the relationship can play a role. When secure attachment is present, dogs increase play behaviors such as exploration, in novel situations (Payne et al., 2015; Topal et al., 1998). Some evidence also suggests that owners can possess negative or avoidant attachment styles within the human-dog relationship. Owners who have avoidant attachment styles have more negative expectations of their dogs' behavior, and these individuals tend to experience discomfort with emotional closeness. This can impact a dogs' well-being, with reports of dogs experiencing more stress and negative behaviors when subject to avoidant or negative attachment styles (Payne et al., 2015; Payne et al., 2016;Topal et al., 1998).

How humans perceive their relationships with dogs can also directly affect a dog's behavior and quality of life. Findings indicate that when people have a more positive view of their dog it can help moderate their dog's stress response (Payne et al., 2016). On the other hand, if a human projects high expectations of emotional support onto their dog and the dog can't provide it, this may lead to a negative experience for both the dog and human (Payne et al., 2015). The relationship that occurs between a dog and a human is also impacted by the level of a humans' emotional intelligence (EI), or someone's ability to regulate one's emotions, as well as read and interpret the emotions around them. A preliminary study suggests that relationship quality between a human and a dog is directly related to EI, with higher EI resulting in better relationships between humans and dogs (Payne et al., 2016). To summarize, many factors can impact and influence the relationship between a human and a dog, such as attachment theory,

owner factors and emotional intelligence (McGreevy et al., 2008; Payne et al., 2015; Payne et al., 2016; Topal et al., 1998).

1.2 Intra and Interspecies Expressions of Emotion

1.2.1 Dog Emotionality

Researchers support the idea that dogs experience emotion, discovering that the brain of the domestic dog possesses major structures and connections that support basic emotional functions such as the limbic system (Jensen 2007; de Lahunta & Glass 2009; Evans & de Lahunta 2013 as cited in Kujala, 2018). A dogs' limbic system includes several comparable structures to humans, such as the nucleus accumbens; the amygdala; the cingulate cortex and the insula. The limbic system it is thought to be the main area of the brain where many emotions such as primary (consisting of happiness, sadness, surprise, disgust, anger, and fear) and secondary (such as jealousy and pride) reside (Bekoff, 2000; Kujala, 2018; Morris et al., 2008).

Like humans, dogs also produce a physiological response to specific emotional states. With a close relationship existing between emotional states and physiology, physiological responses are a common method used to measure emotions (Csoltova & Mehinagic, 2020). Two common and measurable biomarkers used to examine dogs' emotions are heart rate (used to examine arousal and stress response) and blood flow/temperature change (Csoltova & Mehinagic, 2020). Hormones are also used to examine dogs' emotions. Oxytocin, often coined the "love-hormone", is a hormone that can be associated with positive-emotional states in dogs (Csoltova & Mehinagic, 2020). Vasopressin and cortisol are two other hormones that have been studied in dogs, and an increase in both is associated with a stress response in dogs (Csoltova & Mehinagic, 2020).

Differences in eyebrow, ear and lip movements can also be used to assess dog's emotional states. (Bloom & Friedman, 2013; Correia-Caeiro et al., 2021; Kujala et al., 2017; Racca et al., 2012; Somppi et al., 2016).[2] For example, dogs have the ability to portray menacing expressions (i.e. negative states) by manipulating their upper and lower lips (Mota-Rojas et al., 2021). In humans, a popularized system called Facial Action Coding System (FACS) is used to code for these movements. In recent years, this system has been adapted to explore dogs' facial expressions. Named Dog Facial Action Coding System (DogsFACS), researchers use this to code for several different dog facial movements, linking certain muscle displays with different states of emotionality (Mota-Rojas et al., 2021).

It is believed that dogs' facial muscle engagement (i.e. facial expressions) reflect their emotional states (Mota-Rojas et al., 2021; Kujala et al., 2017). Using DogFACS as a tool, researchers have speculated that muscle engagement such as flattened ears, nose wrinkles, nose licking, jaw dropping, and lip parting are associated with negative emotional states in dogs, and ear adductor action (i.e. when ears move closer to the midline of the head) are associated with positive emotional states (Bremhorst et al., 2019; Bremhorst et al., 2021; Mota-Rojas et al., 2021). Positive and negative emotions are also thought to be influenced by primary facial muscles such as the inferior adductor auris, frontoscutilaris, and the retractor anguli oculi lateralis muscles manipulating the ears, and the levator nasolabialis and levator labii maxillaris controlling the ability for dogs to wrinkle their noses (Mota-Rojas et al., 2021).

Building on this, when an external stimulus is present, relevant neural mechanisms in a dog's brain (such as the amygdala during an aversive stimuli) will react, and project to different

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[2] It is important to note that these conclusions are being drawn about dogs' expressions by humans, and may be subjective to our inherent biases, which will be addressed in future sections.

pathways such as the motor cortex. The motor cortex and its fibers will modify a dog's facial expression based on the stimuli present (See Figure 2) (Mota-Rojas et al., 2021).

Figure 2

Neurobiology of Facial Expressions in Dogs
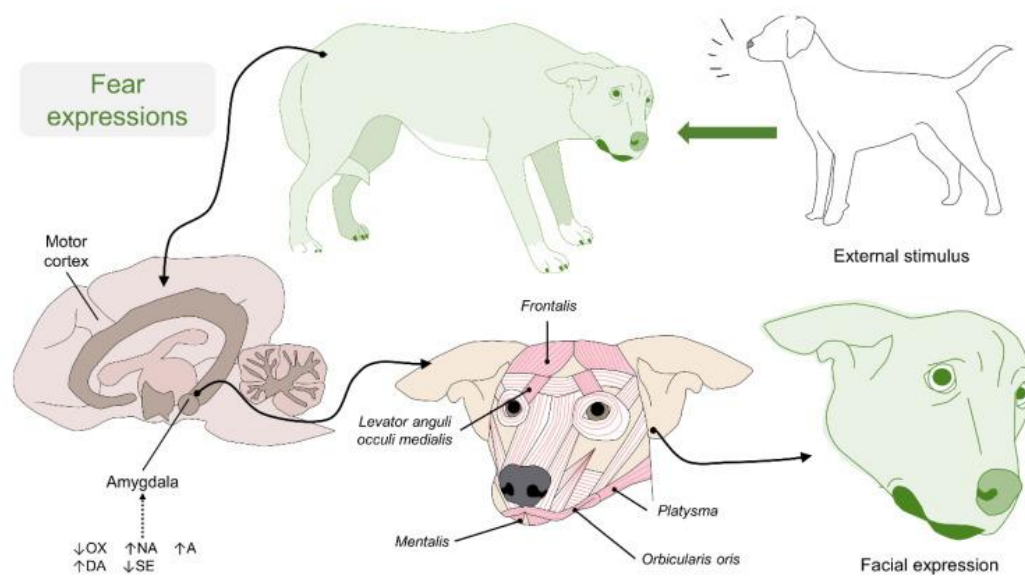
Note. Neurobiology of facial expression in dogs. During a threat exposure, such as another dog, unfamiliar person, or a dispute over territory, the neural mechanism in the amygdala reacts to catecholamine secretion (A and NA). The catecholamines stimulate the motor cortex and its efferent fibers to modify a facial expression. Movements such as flattening the ears to the side (EAD105) and lifting the upper eyelids to have a wider field of vision (AU101) are characteristic of an expression of fear. OXT: oxytocin; NA: noradrenaline; A: adrenaline; DA: dopamine; SE: serotonin. From *Current Advances in Assessment of Dog's Emotions, Facial Expressions, and Their Use for Clinical Recognition of Pain* by D. Mota-Rojas, M. Marcet-Rius, A. Ogi, I. Hernández-Ávalos, C. Mariti, J. Martínez-Burnes, P. Mora-Medina, A. Casas, A. Domínguez, B. Reyes, A. Gazzano (2021). *Animals 11*(11), 3334. https://doi.org/10.3390/ani1113334

Researchers have focused on replicating positive and negative emotional states within dogs as these states are thought to elicit different types of facial expressions (Bremhorst et al., 2019; Bremhorst et al., 2021). A common paradigm used is anticipation and frustration trials.

This is because anticipation is thought to be linked to positive emotional states, and frustration is thought to elicit negative emotional states. In the study conducted by Bremhorst, Mills, Würbel, and Riemer (2021) dogs' facial expressions were examined using this paradigm (positive anticipation and frustration) by manipulating the appearance of a reward. Examining 28 dogs, they contrasted between a positive (receiving reward) and negative (denial of reward) condition. In order to ensure dogs were reacting to the positive and negative condition and not the reward type, they utilized both toys and food as stimuli. They hypothesized that if a dog's facial expression differed between the positive and negative condition, they were reacting to the receival or denial of the reward and possibly experiencing positive or negative emotional states. Prior to the test intervals, they performed a selection test for preference to ensure that the dog would be motivated by each reward. Afterwards, they ran five positive trials, one negative trial and another five positive trials. The positive trial included the release of the reward (i.e. toy or food), whereas during the negative trial, the reward was not released; however, it was left within the dog's visual field. After the tests, researchers analyzed the results using DogsFACS. Their results found that when using this system as a coding method, ears adductor action was associated with the positive condition and ears fattener, blink, lips part, jaw drop, and nose lick with the negative condition (See Figure 3).

Figure 3

Example of DogsFACS Variables
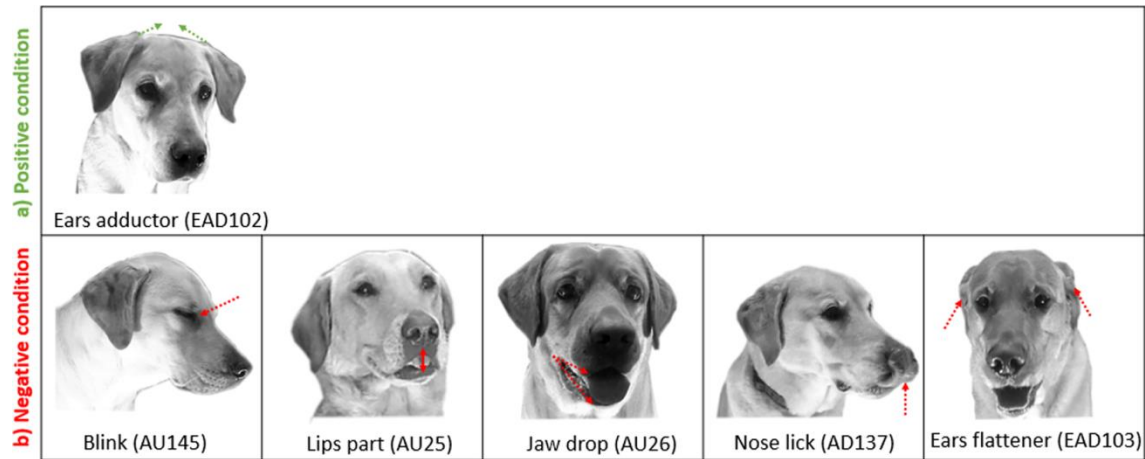
Note. DogFACS variables more common in (a) the positive and (b) the negative condition. From Bremhorst, A., Sutter, N.A.,Würbel, H., Mills, D., & Riemer, S.(2019). Differences in facial expressions during positive anticipation and frustration in dogs awaiting a reward. Scientific Reports. 9. 1-13. 1038/s41598-019-55714-6.

Differing muscle action occurred between the positive condition (assumed to generate positive emotional states), and the negative condition (assumed to generate negative emotional states). With this in mind, authors concluded that dogs may be producing different facial expressions dependent on their emotional states. These results are identical to a previous study, also conducted by Bremhorst, Sutter, Würbel, Mills, and Riemer (2019) , providing more support for the theory that dogs produce different facial expressions depending on the emotional state they are experiencing.

1.2.2 Recognizing Emotions Using Facial Expression

To summarize, researchers have concluded that non-humans, such as dogs, can experience a range of emotions (Kujala, 2018; Anderson & Adolphs, 2014 as cited in Bremhorst et al., 2021). The literature also indicates that dogs outwardly express these emotions, using several mechanisms such as their teeth, nose, and ears (Bremhorst et al., 2021; Csoltova & Mehinagic, 2020; Racca et al., 2012). With dogs being able to experience and express emotions, researchers believe dogs also have the ability to recognize facial expressions. Seemingly, they concentrate primarily on the ears, mouth and eyes when examining other dogs' facial expressions (Somppi et al. 2016; Correia-Caeiro et al., 2020).

Using a wide range of stimuli pictures, Somppi, Törnqvist, Kujala, Hänninen, Krause, and Vainio (2016) have explored dog's ability to recognize each other's facial expressions (conspecific emotional recognition) and human expressions (heterospecific emotional recognition). They utilized human and dog faces as visual stimuli, contrasting between threatening, neutral and pleasant expressions. Then using eye-tracking technology, they examined dogs' gaze patterns towards the inner face area (eyes, midface and mouth combined) as well as the eyes, midface and mouth independently. Their results demonstrated that dogs focus primarily on the eyes, regardless of the species or expression present. Dogs may also possess similar overall gaze patterns to humans and chimpanzees, focusing the eyes and midface, compared to mouth areas. Building on this, researchers also found that dogs' gaze patterns were dependent on the facial expression present. Seemingly, dogs examine the inner face area longer when viewing threatening expressions, in comparison to pleasant or neutral ones. As well, when

examining the eyes, midface and mouth independently, dogs looked longer at the mouth of threatening dog expressions in comparison to neutral or pleasant.

1.2.3 Dog's Abilities for Heterospecific Emotional Recognition

Dogs may also be able to discriminate the emotional expressions of other species, humans included (Müller et al., 2015). A study by Müller, Schmitt, Barber, and Huber (2015) quantified this, finding that dogs can distinguish between different human facial expressions. They concluded that dogs recognize and remember emotional human faces, and that they pay attention to subtle facial cues. Their results align with previous studies that show dogs excel at reading human behavioral cues, adding to the evidence that supports dogs' abilities for heterospecific emotional recognition (Hare et al., 2002; Hare & Tomasello, 2005; Brauer et al., 2006 as cited in Müller et al., 2015).

When processing a human's emotional expression, dogs use visual information from the face and head (Huber et al., 2013 as cited in Siniscalchi et al., 2018). In general, they take into account the eyes, nose and mouth, focusing on the eye region the most (Somppi et al., 2016 as cited in Siniscalchi et al., 2018). However, depending on the valence of the emotion, they focus on different regions of the face (Correia-Caeiro et al., 123456789; Correia-Caeiro et al., 2021). When examining negative emotions, dogs fixate on either the mouth or midface, but consistently the eyes. As well, they avoid angry human faces while focusing stronger on fearful ones (Correia-Caeiro et al., 2020; Correia-Caeiro et al., 2021).

Additionally, dogs produce a behavioral and physiological response when they process human's facial expressions (Siniscalchi et al., 2018; Csoltova, & Mehinagic 2020; Kujala 2018). For example, Siniscalchi, d'Ingeo, and Quaranta (2018) found that dogs showed the strongest

stress-related behaviors (i.e. *ears held in tension, tongue way out, salivating, look away of avoidance, flattened ears, head vocalization, freezing, lips licking, blinking*) in response to angry and happy compared to neutral faces. In terms of physiological response, researchers found differences between heart-rate values and cortisol levels (a stress hormone), depending on the emotional stimuli present (Siniscalchi et al., 2018; Csoltova & Mehinagic, 2020).

A major difference between how dogs and humans process emotion is how dogs use the whole body as a variable, not just the face. Furthermore, dogs may use the face as a secondary source of information, with the body being the primary source (Correia-Caeiro et al., 2021).

A study done by Gácsi, Miklósi, Varga, Topál, and Csányi (2004) , focused on dogs' abilities to perceive the attentional state of the human in different contexts. Using three different situations, a ball-fetching game, fetching objects on command, and begging from humans, they elicited different experimental situations. In each paradigm, they manipulated the position and presentation of the human (i.e. getting some to face backward or forward, or covering their eyes with a blindfold) and investigated the dog's ability to take into account this orientation.

In Experiment #1 Test 1, the dog had to retrieve an object and bring it back to the owner. The following conditions were manipulated: the owner was facing forward and non-blindfolded, facing backwards and non-blindfolded, forward and blindfolded, and backwards and blindfolded. In Test 2 and 3 they repeated the measures but their owners were placed in a chair (Test 2) or sitting on the ground (Test 3). Results indicated worse performance if the blindfold covered the owner's eyes in the facing condition, in comparison to the back position. As well, dogs behaved more hesitantly (i.e. stopped mid-delivery of the object, or did not bring the object to the owner within 20s etc.) when the eyes were covered. In regards to body position as a whole, the dog fetched the ball reliably in all situations when comparing facing and backwards trials.

In Experiment #2 researchers examined begging behavior while manipulating the human's body. Begging behavior was defined as a dog approaching and looking while a human is eating. In Test 1, two women who were familiar to the dogs mimicked eating with their eyes covered or uncovered (via blindfold) throughout the trials. In Test 2, the head position of two unfamiliar women was manipulated during the trials. The results indicated that dogs showed a preference and were more attentive when the humans were looking at them. They begged more from the attentive person, preferring the facing human, and that the visibility of the face played a key role in their begging behavior. By using different natural situations and varying humans, body positions and attentiveness, the principal conclusion was that dogs use the face as a source of information, with a hyper focus on the eyes when interacting with humans.

Contrastingly, in a study conducted by Correia-Caeiro, Guo, and Mills (2021) , researchers suggested we may be biased by only examining the face when understanding human-dog interactions. In this relatively new study, authors believe bodies are able to convey certain emotional states better than faces because they provide larger cues. The researchers used eye tracking methods to examine gaze allocation (i.e. the time spent examining specific parts of the face or body). 100 dogs watched 10 videos (2 for each emotion). These videos contained humans and dogs responding to five emotionally-competent stimuli that related to fear, happiness, positive anticipation and neutral situations.

The results indicated that dogs looked more at the human body when compared to the head, and researchers concluded that human bodies are the primary source of social cues for dogs. Depending on if the video contained a dog or a human, the dog's gaze allocation shifted, referencing the body of humans more frequently and the head for dogs. These results challenge

Gácsi et al. (2004) whose research indicates that dogs focus on the face and not the body of humans.

Comparing these two studies, Gácsi et al. (2004) espouse a face centric view of a dog's attentiveness to human facial cues. On the other hand, Correia-Caeiro et al. (2021) chose to investigate the body instead, using gaze allocation methods. A major difference between them is the paradigm used, with Correia-Caeiro et al. (2021) , consisting of stimuli videos, while Gácsi et al. (2004) , using a real-time paradigm, using live dogs and humans. In Gácsi et al. (2004), the dog fetched the ball reliably in all situations when comparing forward-facing and backward-facing trials. Seemingly, their results indicate that body position is not a factor in dog perceptions of humans, directly contradicting Correia-Caeiro et al. (2021). The contrasting results drawn from these studies make it clear that more investigation must be done in respect to whether dogs are paying attention to facial cues, bodily cues or both when examining humans and their expressions.

With dogs being attentive to facial and bodily expressions, within and between species, the question arises if they can interpret and process this information correctly. As highlighted in previous sections, Albuquerque et al. (2016), discovered that dogs may be able to integrate auditory and visual inputs in order to differentiate between positive and negative emotions. Using pictures of human and dog faces, their results indicated that dogs looked significantly longer at the faces in which the expression and vocalization of the emotion matched. This may be an indication that dogs can process auditory and visual inputs and integrate them into a perception of emotion. Researchers note that this may be adaptive, giving dogs the ability to process social intentions, motivations and allows them to respond with the correct behavioral

response, contributing to the maintenance of long-term relationships (Albuquerque et al., 2016;
Correia-Caeiro et al., 123456789; Müller et al., 2015).

1.2.4 Human's Classifications of Dog's Facial Cues

When observing dog's emotions, studies have shown humans may be able to interpret
dogs' facial expressions. In a study conducted by Kujala et al. (2017) participants were asked to
categorize humans and dogs in the context of positive and neutral facial expressions. The authors
hypothesized that humans evaluate dogs' pleasant and threatening facial expressions similarly to
how they examine human facial expressions. Thirty dog and thirty human photographs were pre-
categorized into 3 conditions: threatening expressions (10), neutral expressions (10) and pleasant
expressions (10). The photographs were sourced from the internet and were manipulated only to
contain the face (as well as the fur around the face and ears for dogs). The dog photographs
consisted of 24 different breeds and 2 mongrels, with the human photographs consisting of 15
females and 15 males. Participants were asked to rate the valence/arousal of each photo, using a
scale ranging from Very Negative-Very Positive (Valence) and Not Arousing - Highly Arousing
(Arousal). As well they were asked questions related to the expression of the six primary
emotions (e.g. How much happiness does the image contain?).

The results had some interesting findings:

1) Human faces were rated more positively than dogs, except with neutral
   expressions.

2) Pleasant dogs were rated more positively than neutral or threatening dogs.

3) Comparing dog and human faces, pleasant humans were rated more positively than pleasant dogs; neutral dogs were viewed more positively than neutral humans and threatening dogs more negatively than threatening humans.

The researchers also found that humans categorize dog and human facial expressions in a similar pattern, with subjects observing the Pleasant Dog and Human faces as happy, Neutral Dog and Human faces presenting no emotion but as slightly sad, and Threatening Dog and Human faces as angry/aggressive. This idea has been supported in a previously referenced study done by Correia-Caeiro et al. (2021) who used videos of humans and dogs to investigate gaze allocation. Their results also indicated that humans categorize dog and human expressions in the same fashion, focusing on the head compared to the body region for both species.

A similar study conducted by Bloom and Friedman (2013) also used pictures to examine dog's facial expressions. A stark difference in this study compared to Kujala et al. (2017) is how researchers captured these pictures. In contrast to sourcing them from the internet, they used a single dog named Mal and created different behavioral conditions thought to elicit Ekman's six basic emotions: happiness, sadness, surprise, disgust, anger, and fear, in dogs. To elicit happiness, Bloom and Friedman (2013) described what conditions were put in place (See Figure 4):

Mal's handler told him to sit and stay. Then his handler told Mal, "Good boy. We are going to play soon." Mal had thousands of repetitions of these words meaning that his handler would pull a ball from his pocket and play with him. Once the picture was taken, Mal was released and given his ball as a reward. (pg.2)

Figure 4

Mal during the "happiness" condition
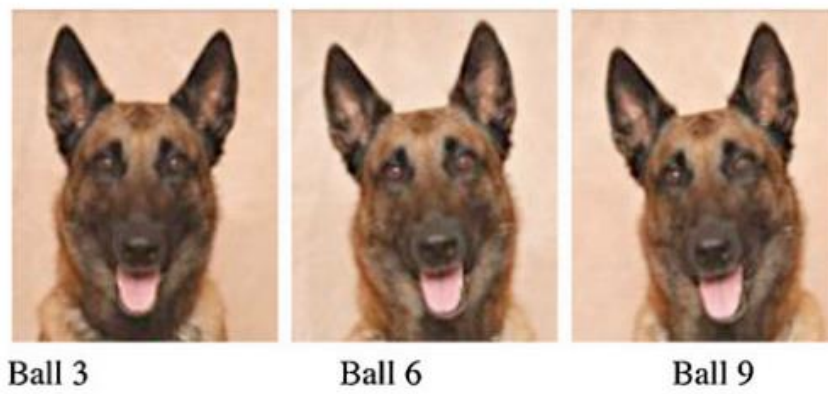
Note. Sample of three stimuli pictures chosen for the "happiness condition" From *Classifying Dogs' (Canis Familiaris) Facial Expressions From Photographs* by T. Bloom and H. Friedman (2013), *Behavioural Processes, 96,* 1-10. 10.1016/j.beproc.2013.02.010

Overall, researchers collected 21 photographs, consisting of 6 elicited emotions: happiness, sadness, surprise, disgust, anger, and fear. Out of all the photos taken, the 21 decided upon were chosen by experts who have prior experience categorizing dogs' emotions. When presented with the photographs, participants (who consisted of experts and non-experts) were asked to rate them from 0-4 in relation to the six basic emotions. In a second task, the participants were asked to match the 21 pictures to the behavioral situation they believed was used to elicit the emotion. Demonstrated by this study, it seems plausible that humans are able to consistently categorize dog's emotions:

> We found that humans were able to classify, well above chance responding, the emotions conveyed by photographs of facial expressions of a dog that was experiencing emotion-evoking situations. (pg 7)

Both Bloom and Friedman (2013) and Kujala, et al. (2017) produced comparable results, demonstrating that humans may have the ability to categorize dogs' facial expressions. However, it remains unclear which part of the dog's face we focus on when categorizing their emotional expressions. When examining human faces, the eyes are our strongest focal point, but when interacting with dogs, the mouth may be more relevant to humans (Correia-Caeiro et al., 2021). As well, noted previously, humans are inflexible in their viewing strategies and examine human and dog facial expressions in a similar fashion (Bloom, & Friedman 2013; Correia-Caeiro et al. 2021; Kujala et al. 2012; Desmet et al. 2017 as cited in Correia-Caeiro and colleagues, 2021). Our limited capacity to examine dogs' emotions could be due to our facial recognition patterns being strongly influenced by human features and contexts and this may create a human tendency to inspect any species as if they were one of us (Correia-Caeiro et al.,2021 Konok et al., 2015; Kujala et al., 2017).

1.3 Factors that Impact Human Categorizations of Dog's Emotions

Darwin was the first scientist to argue that facial expressions between species follow basic rules (Walsh et al. 2014, pg.186). In the years after Darwin, researchers have built on this argument and explanations have been offered surrounding how dog's "possess emotions", "perceive emotions" and "think" about humans. As well, researchers have investigated the ability of humans to accurately describe and categorize these "emotions" (Bloom, & Friedman 2013; Kujala et al., 2017). With numerous studies offering explanations for these concepts it seems like there is sufficient data to conclude the following: dogs have the ability to not only think, but they can feel and perceive emotions (Anderson & Adolphs 2014 as cited in Bremhorst et al., 2021; Correia-Caeiro et al., 2020; Kujala, 2018; Racca et al., 2012), and humans can accurately categorize these outward expressions (Bloom, & Friedman 2013; Kujala et al., 2017). Right?

Well, maybe wrong. Some researchers support the idea that dogs can express emotions (Bloom, & Friedman 2013; Csoltova & Mehinagic, 2020; Kujala 2018) and humans can accurately categorize them (Bloom & Friedman, 2013; Kujala et al., 2017). However, others feel that humans are quick to attribute mental and emotional states to dogs and that our attributions can be confounded by human psychological characteristics (Wynne, 2006; Konok et al., 2015). This has led to a divide between researchers with some skeptical of our abilities to accurately interpret dogs' emotions while others claiming that humans are capable of performing such a task (Bloom & Friedman, 2013; Kujala et al. 2017; Wynne, 2006; Konok et al., 2015).

1.3.1 Anthropomorphism

The risk for humans attributing their own perceptions and ideas onto nonhuman entities is high due to animals not being able to use language to communicate (Beausoleil et al., 2016). The act of perpetuating our own feelings/ideas onto non-human entities is often referred to as anthropomorphizing (Konok et al., 2015). With the inability to separate our own beliefs from the objective entity at hand we often reflect on them in the context of our ideas and attributions.

In comparative research, anthropomorphism can occur and is often reflected on in a negative light and to be avoided at all cost. The caution to avoid anthropomorphism can be demonstrated by Broadhurst (1964) as cited in Lockwood (1986):

> The animal may seem sad or happy, but we cannot infer that this is the case from the way that we ourselves might feel in the same situation. To do so is to indulge in anthropomorphism — seeing man's shape in all things — and this is the cardinal crime (emphasis mine) for the animal observer. (p. 12)

Wynne (2006) emphasized some key issues with anthropomorphism in comparative research. She argues that giving animal behavior an anthropomorphic label does not offer a real explanation and has no place in objective scientific research. Projecting emotions onto animals is not an educated way to predict and control future behavior; it is mere speculation. Unlike concepts like Pavlov conditioning, which offers a scientific basis of behavior, she argues anthropomorphism cannot accomplish the same objectivity. Instead of clouding our judgments with anthropomorphic explanations, she believes we must focus on objective science that works to explain animal behavior.

To contrast this negative view of anthropomorphism, in recent years scientists have begun to explore what is referred to as "critical anthropomorphism." This approach views anthropomorphism as a tool and when used appropriately, can help drive research in a positive way (Lockwood, 1986). With the introduction of behaviorist approaches in the mid-20th century (which are rooted in learning theory and behavioral explanations), animal research has strived to remain objective and precise (Fraser, 2009). The positivist view that animals' emotions were unobservable led theorists like Watson and Skinner to investigate the "behaviour" of animals. Watson proposed that *"psychologists should not attempt to study inner, mental ("subjective") experience in either humans or other species, but rather that they should limit their research to observable behaviour"* (Fraser, 2009). However, Burghardt (1991) as cited in Wynne (2006) believes that the use of critical anthropomorphism has a place in research if it is applied with caution. This can be demonstrated by the example of the taste aversion research done by Garcia (1981) noted by Lockwood (1986):

I always use anthropomorphism and teleology to predict animal behavior because this works better than most learning theories. I could rationalize this heresy by pointing to our

common neurosensory systems or to convergent evolutionary forces. But, in truth, I

merely put myself in the animal's place. I cannot think in the cryptic jargon of learning

theory. (p. 151)

This demonstrates that if anthropomorphism is applied with a rigid understanding of an animal's

ecological and evolutionary history, it can be used to make and test predictions (Lockwood,

1986). Despite most researchers being wary of anthropomorphizing, perhaps it is equally as

dangerous to argue that animals can not feel or experience any emotions. By arguing animals do

not have any emotions, we may lean towards mechanistic and rigid explanations for their

behavior. This reduces animals to machines, who do not possess emotions, making the

examination of concepts like pain management, conditions of care and treatment irrelevant. With

such core concepts linked to their welfare and treatment, disregarding any state of emotionality

may be extremely problematic (Lockwood, 1986).

Relating this back to the investigation of dogs' facial expressions, anthropomorphizing is

present in many of the studies examined throughout this paper. For example, in the experiments

that involve humans' categorization of animals' emotions, it is unavoidable (Bloom, & Friedman

2013; Kujala et al., 2017). By asking participants to categorize animals' emotions, one is

inherently using anthropomorphic language and principles to gather assumptions about dogs'

facial expressions. This fact combined with a human's inability to process dogs' emotions

differently than a human's may be a strong indication that anthropomorphism is likely to occur

(Bloom, & Friedman 2013; Correia-Caeiro et al. 2021). As highlighted by Kujala et al. (2017),

when studies examine dogs' emotions, it can be difficult to pick apart what is

anthropomorphized by humans and what the dog's actual state of emotionality may be.

Therefore, the question remains, *"Is there a connection between a dog's facial expression and*

their state of emotionality and what role does anthropomorphism play in answering this

inquiry?"

1.3.2 Structural Differences Between Breeds

As highlighted in previous sections, faces often communicate important emotional

information and expressions (Correia-Caeiro et al., 2021; Kujala et al., 2017). Often, humans use

dogs' faces to infer their state of emotionality, and draw conclusions about how it is "feeling"

(Bloom & Friedman, 2013; Kujala et al., 2017; Racca et al., 2012). However, while facial

features/expressions can provide us with useful information, they may not always be accurate for

drawing conclusions about how someone is feeling, dogs included (Albohn & Adams, 2020). A

phenomenon called emotional overgeneralization demonstrates this problem. Defined by Albohn

and Adams (2020) emotional overgeneralization can be explained as:

> We are so tuned to reading expressive information from the face that even when there is
>
> no expressive information present, individuals base their beliefs about others' emotional
>
> dispositions on emotion-resembling appearance cues in the face. (pg 3)

Emotional overgeneralization may be impacted by facial morphology, with people drawing false

conclusions based on different facial structures. For example, humans who have shorter vertical

differences between the eyes and the mouth may be perceived as angrier compared those those

with a longer vertical distance (Zebrowitz et al., 2010).

When examining dogs, there is evidence that morphology can impact our overall

perceptions of them. Coined "Big Black Dog Syndrome", and a documented phenomenon, dogs

that are primarily black and large have harder times finding long term homes (Woodward et al.,

2012). It is believed that because black dogs lack facial contrast, it makes their expressions

harder to read leading to more negative perceptions of them (Woodward et al., 2012). This phenomenon may also extend to dogs' facial expressions as a whole since an extensive number of different facial morphologies exist between dogs. Some possess brachycephalic features (e.g. pugs), others are black (e.g. Labrador Retrievers), and some are multi-colored (e.g. Australian Shepherds). Certain dogs have distinct eyebrows (e.g. Bernese Mountain Dogs), or erect ears (e.g. German Shepherds). As well, some dogs have neotenic features with faces that consist of having widely spaced eyes, a small nose and chin and puppy-like features such as big eyes and mouths (Borgi et al., 2014; Furnham & Reeves, 2006). It is believed that dogs who possess neotenic features may be viewed as more attractive or happier (Borgi et al., 2014). However, factors like emotional overgeneralization, "Big Black Dog Syndrome" and neoteny have not been explored within the context of humans' categorizations of dogs' facial expressions. Therefore, it remains unclear what role these factors play, if any, in our attributions.

1.3.3 Breed Attitudes/Biases

Another important factor to discuss is the attitudes we possess about certain breeds of dogs — more specifically, the negative ones. The public's perception/biases towards different breeds of dogs is often clouded by the media, large organizations and policy making (Clarke et al., 2016). There have been several bans on specific breeds due to their "aggressive tendencies" but with little research to support these claims (Clarke et al., 2016). Often the victims of bad press, Pitbulls have been the target of the media and policy making in recent years. The negative perceptions of these dogs have led to several countries implementing certain "ban acts" in order to regulate and control these breeds (Clarke et al., 2016).

Kennel Clubs around the world and other societies also work to perpetuate perceptions of dogs, including which ones are coined as "aggressive." In one of the Kennel Club's reference books, *Kennel Club Breed Standards,* they compare the difference between toy-breed dogs (e.g. dogs breeds weighing less than 15 lbs when full grown) and Terriers (e.g .Staffordshire Bull Terrier, Pitbull, etc.). When highlighting differences between them they allude to toy-breed dogs as "charmful" and "family pets" (The Kennel Club, 2011, p. 17 as cited in Clarke et al., 2016) while contrasting terrier breeds as "courageous", "possessing tenacity" and as "hav(ing) a bad way(s) with other dogs" (The Kennel Club, 2011, pp. 156, 157, 166, 168, 174, 176, 189, 190, 196, 202 as cited in Clarke et al., 2016). Building on this, one study found that if a dog was classified as a terrier (regardless of the actual nature of the breed) this attracted high scores in aggressiveness, in contrast to being classified as a toy dog (Clarke et al., 2016). This indicates that the mere label a human places onto a dog can have a strong effect on people's perceptions surrounding behavioral traits. These unsubstantiated claims also fail to address the many confounds and issues surrounding attributing behavioral characteristics to dogs. Often, there is little scientific evidence to support breed-based aggressiveness, and these attitudes are influenced by other sources (Clarke et al., 2016). Relating this back to the emotional expression of dogs, breed expectations may have a direct effect on what emotions we attribute to which kind of dogs. Dogs that are believed to be more "aggressive" (i.e. Pitbulls) may in turn be categorized as "angry" or "unhappy" when compared to dogs who are often promoted as "family/friendly dogs" (i.e. toy dogs).

1.4 Study

The human-dog dyad is influenced by many factors such as emotions, attachment and facial expressions. Throughout this paper we have addressed humans' abilities to draw conclusions about dogs' facial expressions using pictures and videos (Bloom & Friedmann; Kujala, et al., 2017). However, researchers have been concerned with our basic ability to explore and understand dogs' facial expressions, neglecting any other factors that may come into play such as morphology, biases and breed attitudes (Bloom & Friedmann; Clarke et al., 2016; Kujala, et al., 2017).

The two primary objectives of this study were as follows: to examine how breed and physical traits impact the categorization of the facial expressions of dogs; and to investigate how the interaction between breed and facial expressions may also impact human's interpretation of the facial expressions of dogs. The secondary objectives of this study were to examine how gender, age and prior experience with dogs, may impact these attributions. Contrasting between breed and facial expression, we hypothesized that participants would be more likely to approach the stereotypically "friendly" dog breeds, such as Golden Retrievers, Pugs and Beagles, and would be less likely to approach "aggressive" dog breeds such as American Terriers, Dobermans and Boxers. As well, when making comparisons between breeds and facial expressions we predicted that Golden Retrievers would be chosen over German Shepherds and Rottweilers and that relaxed expressions would be more favorable than neutral expressions.

2. Methods

2.1 Recruitment

Participants were recruited from the University of Prince Edward Island campus using a combination of media options, including several Facebook groups such as UPEI Campus Life, UPEI Psychology Society, and UPEI International Students. A recruitment poster was also placed around the UPEI campus on bulletin boards in popular hubs such as the Atlantic Veterinary College, W.A Murphy Center and the Robertson Library. As well, participants were recruited from the PSY-1020 class taught by Dr. Phillip Smith with the recruitment poster, and a summary of the project was posted on the PSY-1020 Moodle Page. In order to be recruited, participants had to meet the following criteria: were over the age of 18, proficient in English, and had access to a computer, internet, and the online video platform Zoom. Compensation was provided in the form of an entry into a draw to win a $50.00 gift card to the UPEI Bookstore or Amazon.ca and students enrolled in PSY-1020 had the option to be entered into the draw to win the $50.00 gift card or receive one bonus point towards their final course grade.

Participants initiated all communication with the student researcher via email. Upon receival of the initial email, participants were sent the information letter, and were asked to respond to confirm their participation. Afterward, a time and date was scheduled to meet via the online platform Zoom. All Zoom meetings were conducted from Room 114, the Behavioral Neuroscience Lab, located in Memorial Building at the University of Prince Edward Island. When participants entered the Zoom meeting, they were asked if they had any questions prior to commencing the study. Following this, the experimenter's screen was shared with the participant for the remainder of the study.

The study began with a brief overview of the information letter (See Appendix F for Google Slides Presented to Participants). Following this, the consent form was explained and when consent was obtained verbally, the time and date were noted by the student researcher. Following this, Phase 1 of the study began wherein participants were asked a variety of demographic related questions, as well as dog-specific questions such as *"Do you currently live with a dog?"* and *"If yes, how many dogs?".* For the purpose of this project, all responses were given orally and recorded via pen and paper, by the student researcher (See Appendix C for Demographic Questionnaire).

In Phase 2 of the study, the participant's attitudes towards dogs was assessed using the Coleman Dog Attitude Scale (C-DAS). The C-DAS is a 24-item measure used to assess attitudes towards dogs (Coleman et al., 2016). Participants were asked to respond to each item using a 5-point scale ranging from Strongly Disagree to Strongly Agree (See Appendix C for The Coleman Dog Attitude Scale).

In Phase 3, participants were assessed on their likeliness to approach an unfamiliar dog. To do this, participants were presented with two sets of stimuli pictures, consisting of a wide range of dog faces excluding the body. The pictures were collected via websites accessed via Google photos (See Appendix H for Stimuli Picture Sources). Each picture consisted of only the dog's face and any relevant background was removed using https://www.remove.bg/. For Part 1, 18 breeds were separated into 3 categories with six breeds per category. *1) Perceived Family Dogs:* Golden Retriever; Beagle; Pug; Border Collie; Yellow Lab; Black Lab *2) Perceived Neutral Dogs*: German Shepherd; Black German Shepherd; Dachshund; Poodle; Husky; Cocker Spaniel and *3) Perceived Non-Family Dogs*: American Terrier; Chihuahua; Doberman (pinned); Doberman (unpinned); Rottweiler; Boxer. These three categorizations were based on information

taken from websites such as the American Kennel Club and Canadian Kennel Club — generally accepted credible sources on information on dogs (https://www.akc.org/expert-advice/dog-breeds/the-most-popular-dog-breeds-of-2020/; https://www.akc.org/expert-advice/lifestyle/best-family-dogs/; https://www.akc.org/dog-breeds/best-guard-dogs/; https://petkeen.com/aggressive-dog-breeds/).

Family dogs were defined as those that are often presented as friendly, approachable and happy. Non-family dogs were categorized as those that typically present as aggressive, bold and unapproachable. Neutral dogs were defined as those that were fluid, and their categorization often falls into family, or non-family depending on the narrative, and one's own personal breed attitudes. For the first set of stimuli pictures, neutral expressions were utilized. Neutral expressions consisted of no facial tension, closed mouth and relaxed ears, with eyes focused directly forward.

Participants first received a situational prompt, in order to provide context: *"You are alone, walking on the Confederation Trail, when you see a dog starting to approach you. It is alone, unleashed and unfamiliar to you. As it comes closer to you have the option to approach the dog, or back away. After each picture is presented please indicate using a 7 point scale how likely you are to approach the unfamiliar dog."* Then, one by one, pictures of dog faces with neutral expressions were presented, twice (one picture acting as a control) for a total of 36 stimuli pictures (See Figure 5).

Figure 5

Example of Stimuli Pictures Used for Part 1

Note. (Left) Neutral Expression Golden Lab (”Family”) (Right) Neutral Expression American Terrier (”Non-Family”).

Participants used a 7-point scale ranging from 1) Extremely Unlikely 2) Very Unlikely 3) Unlikely 4) Neutral 5) Likely 6) Very Likely 7) Extremely Likely to indicate how likely they would be to approach the unfamiliar dog. This type of approach was utilized in order to explore the impact that breeds have when making a decision to approach an unfamiliar dog.

Part 2 was conducted to explore what role breed and also facial expressions play when deciding to approach an unfamiliar dog. To do this, comparisons were made between not only breed, but neutral expressions and relaxed expressions as well. Neutral expressions were defined as no facial tension, closed mouth and relaxed ears, with eyes focused directly forward. Relaxed expressions were defined as an open mouth and relaxed eyes. Participants were given a second situational prompt: *“You are alone, walking on the Confederation Trail, when you see two dogs starting to approach you. They are both unleashed and unfamiliar to you. As they come closer to*

you, you must choose to approach one of them. After being presented with the two pictures,

please indicate which dog you would approach, the dog on the left, or the dog on the right."

Then, the following three breeds, one from each of the categories in Part 1 ("Family", "Neutral"

and "Non-Family") were compared: Golden Retriever, German Shepherd and Rottweiler. Two

pictures per breed were included, one with a neutral expression and one with a relaxed

expression. A total of 6 pictures were included: a Neutral Golden Retriever, a Relaxed Golden

Retriever, a Neutral Rottweiler, a Relaxed Rottweiler, a Neutral German Shepherd and a Relaxed

German Shepherd (See Figure 6).

Figure 6

Example of Stimuli Pictures Used for Part 2

Note. Top Row (Left-Right): Neutral Expression, Golden Retriever ("Family"), Neutral Expression, German

Shepherd ("Neutral"), Neutral Expression Rottweiler ("Non-Family"). Bottom Row (Left-Right): Friendly

Expression, Golden Retriever ("Family"), Friendly Expression, German Shepherd ("Neutral"), Friendly Expression

Rottweiler ("Non-Family")

These pictures were compared to each other for a total of 36 comparisons. Neutral Golden Retriever comparisons were also made between Neutral Golden Retriever and Neutral Golden Retriever (i.e. the same picture) to serve as a control. Participants were asked which dog they would approach: either the dog on left of the screen or the dog on right of the screen. In order to control for left and right preference, the series of pictures was presented twice, with the pictures on the right and left reversed.

After the second set of stimuli pictures were presented participants were debriefed on the true purpose of this study (See Debriefing Script in Appendix D). They were then presented with a final opportunity to withdraw consent, after which the Zoom meeting was concluded.

2.2 Analysis

Upon completion of the testing, all data obtained from participants was entered into an Excel spreadsheet and then imported into Jamovi for statistical analyses. As appropriate, descriptive statistics and Chi-square analyses were conducted on the data collected.

3 Results

3.1 Demographics

The majority of participants were female students (76.09%, $n = 35$) at the University Prince Edward Island (63.00%, $n = 29$). The remainder were staff, (6.52%, $n = 3$), or not affiliated with the University of Prince Edward Island. (30.40%, $n = 14$). Almost all participants were of White European descent (82.60%, $n = 38$) with the others identifying as Black (4.35%, $n=2$), East/Southeast Asian (2.17%, $n = 1$) or South Asian (6.52%, $n=3$). Half of the participants

ranged in age from 18-24 (50.00%, *n = 23*) (See Table 1) and over three-quarters of the

participants currently lived with a dog, (78.26%, *n = 36*). Interestingly, all participants had lived

with a dog at some point in their life (100.00%, *n =46*) (See Table 2).

Surprisingly, when asked to list their Top 3 favorite dog breeds, there was a wide range

of preferences, with no specific breed being widely chosen (See Figure 7).

Figure 7

Participant responses to "Please list your top three favorite dog breeds."
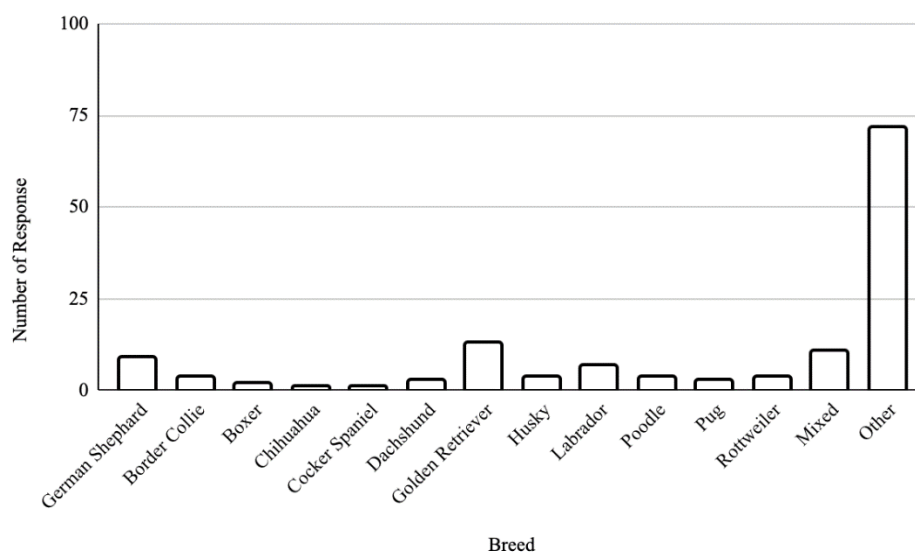
Note. Responses were grouped in relation to the stimuli pictures used, as well as "mixed" and "other".

This is contrary to what may have been expected based on the publications of the

American Kennel Club. However, consistent with what was the American Kennel Clubs, the

dogs that were picked were as expected. Participants showed a preference for Golden Retrievers

(9.42%, *n = 13*), German Shepherds (6.52%, *n = 9*) and Labradors (5.07%, *n =7*) when asked to

list their Top 3 Favorite Dog Breeds. There were similarities between participants' responses and

the 2021 Most Popular Dog Breed List published by American Kennel Club with Labrador being

ranked #1, Golden Retriever highlighted as #2, and German Shepherd #4. As well, there was some preference for mixed breeds (7.97%, n = *11*) (See Table 4).

When deciding to approach an unfamiliar dog, participants indicated they were more likely to approach a dog who possessed the following physical traits: *"Furry of Fluffy"* (15.50%, *n =13*), *"Floppy Ears"* (13.10%, *n=11), "Small Size"* (8.33%, *n = 7*), and *"Medium Size"* (10.70%, *n =9*). When examining physical features that influenced a participant's decision not to approach an unfamiliar dog, *"Large Size"* was the most popular (20.70%, *n = 12*). However, the most common response for features that impacted approach (35.70%, *n =30*) and non-approach decisions (46.60%, *n =27*) was *"No preference"*, indicating that a large number of the sample claimed to disregard physical features when deciding to approach an unfamiliar dog (See Table 3/Figure 8).

Figure 8

Participant Responses to Approach and Non-approach Features
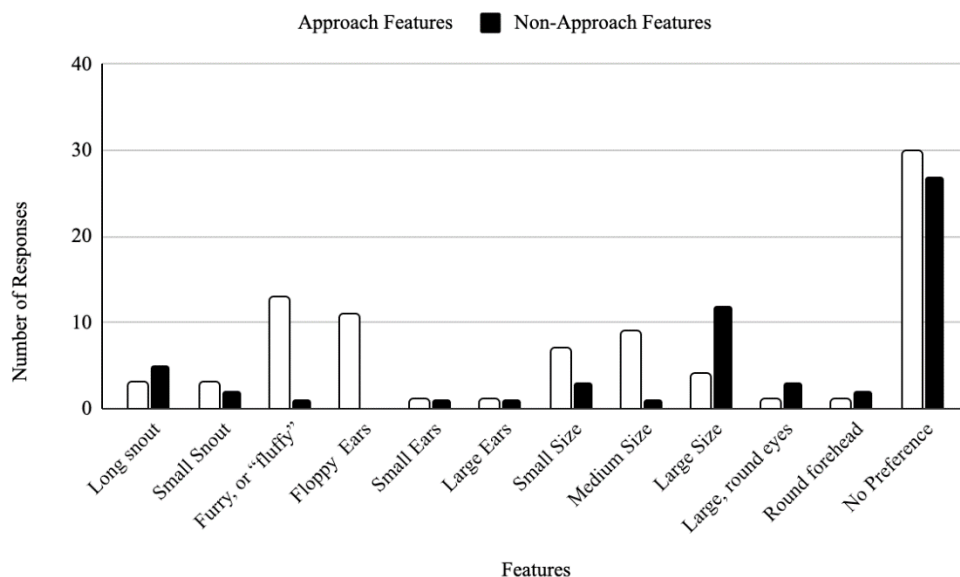
Note. Participant responses to *"What features do you look for when deciding to approach an unfamiliar dog? Please indicate all that apply"* in Black (Open) and responses to *"What features do you look for when deciding NOT to approach an unfamiliar dog? Please indicate all that apply."* in Black.

3.2 C-DAS Responses

The Coleman Dog Attitude Scale was utilized to measure participants' attitudes towards dogs. Overall, the majority of participants possessed positive attitudes towards dogs. All participants indicated that they either strongly agree or agree to the statement *"I love dogs"* (100.00%, *n = 46*), and the majority either agreed or strongly agreed to the statement *"I enjoy having a dog as a pet, or would if I had one"* (97.83%, *n = 45*). Most participants disagreed with the statement *"I avoid dogs"* (93.48%, *n = 43*) and participants disputed their hatred towards dogs, with all disagreeing with the statement *"I hate dogs"* (100.00%, *n = 46*). The C-DAS

results clearly indicate that the majority of participants possessed positive attitudes towards dogs (See Table 5).

3.3 Stimuli Pictures, Set 1

For the first set of stimuli pictures, participants were asked to use a seven-point Likert scale ranging from "Extremely Unlikely" to "Extremely Likely" to indicate how probable they were to approach an unfamiliar and unleashed dog. The Top 3 Dog Breeds that participants indicated they were likely to approach were: Cocker Spaniel (91.30%), Pug (89.10%) and Beagle (87.00%). The stimuli pictures that participants were least likely to approach were Doberman (with Pinned Ears) (43.48%), American Terrier (37.00%), and German Shepherd (30.43%). When examining within breed coloring, likelihood to approach remained similar with 77.20% of participants indicating they were likely to approach an unfamiliar Black Lab and 71.70% indicating they would approach an unfamiliar Yellow Lab. However, ear positioning may impact a person's perception of likeliness to approach with 43.48% of participants indicating they were unlikely to approach a Doberman with pinned ears, but when presented with one with unpinned ears, a mere 15.20% indicated they would be unlikely to approach (See Table 6).

3.4 Stimuli Pictures, Set 2

Chi-Square Tests of Independence were performed in order to explore participants' preference towards dog breeds, and expressions. When comparing the Friendly Golden Retriever to the Friendly German Shepherd, there was a significant difference, X^2 (1, n = 46) = 18.9, $p <$ .001, with participants showing a preference for the Friendly Golden Retriever (See Table 7). There was also a significant relationship between the Friendly Golden Retriever and Friendly Rottweiler, X^2 (1, n = 46), = 25.0, $p <$ .001, with the Golden Retriever given preference again.

When making comparisons between friendly and neutral expressions, the Friendly Golden Retriever was chosen over the Neutral German Shepherd X^2 (1, n = 46) = 48.4, $p <$ .001, and Neutral Rottweiler, X^2 (1, n = 46) = 45.4, $p <$ .001 (See Table 7). There was also a significant difference between Friendly German Shepherd and Neutral Rottweiler, with a preference for the Friendly German Shepherd, X^2 (1, n = 46) = 15.3, $p <$ .001 (See Table 8). Interestingly, when making comparison between the Friendly German Shepherd and Neutral Golden Retriever, there was no difference X^2 (1, n = 46) = 3.03, $p <$ 0.082 (See Table 8).

When comparing neutral expressions between breeds the only significant difference was between the Neutral German Shepherd and Neutral Rottweiler X^2 (1, n = 46) = 13.7, $p <$ .001, with preference given to the Neutral Rottweiler (See Table 11). Making within comparisons, there was a significant difference between the Friendly Golden Retriever compared to the Neutral Golden Retriever, X^2 (1, n = 46) = 3.19, $p <$ .001, Friendly German Shepherd and Neutral German Shepherd X^2 (1, n = 46)= 75.6, $p <$ .001 and Friendly Rottweiler and Neutral Rottweiler X^2 (1, n = 46) = 12.1, $p <$ .001 . Lastly, when comparing controls, there was a significant difference between the Friendly Golden Retriever compared to the Friendly Golden,

with a preference for the Golden Retriever on the right side of the screen, X^2 (1, n = 46) = 18.9, p < .001 (See Table 7-9).

4. Discussion

This study explored the effect of breed and facial expressions on a person's decision to approach an unfamiliar dog. Utilizing stimuli pictures, this project aimed to contribute to the limited research that examines how morphological differences, breeds, and facial expressions can impact a person's attitudes towards dogs (Bloom & Friedman, 2013; Clarke et al., 2016; Gunter et al., 2015; Kujala et al., 2017; Racca et al., 2012; Woodward et al., 2012). We hypothesized that participants would be more likely to approach stereotypically "family" dog breeds, such Golden Retrievers, Pugs and Beagles over "neutral" dog breeds, such as German Shepherds and Poodles, and "non-family" dog breeds such as American Terriers, Rottweilers, Dobermans and Boxers. Comparing breeds and facial expressions, we also predicted that Golden Retrievers (i.e. "family" dogs) would be chosen over German Shepherds (i.e. "neutral" dogs) and Rottweilers (i.e. "non-family" dogs), and relaxed expressions would be preferred over neutral expressions. Our results confirmed that participants were more likely to approach family dogs, such as Pugs and Beagles, and least likely to approach non-family dogs such as Rottweilers and American Terriers. As well, supporting our hypothesis, relaxed expressions were preferred over neutral expressions and Friendly Golden Retrievers were chosen over Friendly German Shepherds and Friendly Rottweilers.

In Part 1, the stimuli pictures contrasted different breeds, with all dogs' facial expressions remaining neutral. The results indicated the possibility of breed attitudes towards specific types of dogs. Since all facial expressions were neutral, if breed attitudes were not present, there should be no difference in participants' *"likeliness to approach"* each stimuli picture. However,

the Top 3 dog breeds participants indicated they were most likely to approach were: Pugs, Cocker Spaniels, and Beagles. One explanation for this could be that these breeds are well-known, possess distinguishing "family friendly" traits such as being small-medium in size, and are frequently portrayed positively in mainstream media. For example, a quick search of these breeds on the American Kennel Club website indicates that Beagles, Pugs and Cocker Spaniels possess many positive traits. Pugs score the highest rating for affection and are categorized as "*lovey-dovey*" and "*adorable*". Beagles are described as "*happy-go-lucky*" and "*funny,*" and Cocker Spaniels as "*sweet*" and "*merry*" (Clarke et al., 2016; Greenberg, 2017; Kriss, 2017). Based on these descriptions, it is evident that these breeds are often viewed positively and as non-threatening, offering a possible explanation for why they were the most likely to be approached.

Common media such as children's books and movies may also help popularize certain breeds and traits. For example, when examining the Top 100 Dog-Related Children's Books listed on https://bookroo.com/explore/books/topics/dogs, several dogs have similar characteristics. Most are small or medium in size (i.e *"Macduff Moves In"*), have floppy ears, (i.e *"Ribsy", "Hot Dog, Cold Dog"*) and often are illustrated throughout the book with relaxed and happy expressions on their faces. These depictions could possibly help drive the narrative surrounding specific traits and breeds being more *"family-friendly"* and *"positive"* than others. Also, when examining popular movies that have dogs as main characters, several of them have the same traits as the dogs portrayed in children's books. For example, in Disney's *Life of Pets* the two main dog characters Duke, a Newfoundland, is furry, fluffy and has floppy ears, and Louis, a Jack Terrier, is small, and also has floppy ears. Therefore, these popularizations may help drive our preferences for certain breeds and physical features.

In contrast, participants indicated they were least likely to approach Dobermans (with pinned ears), American Terriers, and German Shepherds. Examining the American Kennel Club, the descriptors used for these breeds are vastly different from those for Pugs, Beagles, and Cocker Spaniels. Dobermans are described as *"fearless"* and *"powerful"*, American Terriers as *"smart"* and *"loyal,"* and German Shepherd as possessing *"courage"* and *"confidence"* (Clarke et al., 2016; Kriss, 2017; Latimer, 2017). These descriptions may help perpetuate the narrative that Dobermans, American Terriers, and German Shepherds are *"tough"* and *"masculine"* compared to *"loveable"* and *"happy*." The negative perception of these breeds in popular media could explain why participants were less likely to approach them. As is highlighted by Clarke, Mills, and Cooper (2016) our perceptions and assumptions towards dogs can be influenced by organizations such as the American Kennel Club and are often an inaccurate representation of the breed in question.

The concept that people possess negative breed attitudes towards specific dogs is especially evident when examining American Terriers (i.e. Pitbulls). As highlighted by Gunter, Barber, and Wynne (2016) negative attitudes towards American Terriers and their subsets (i.e., Pitbulls) still exist and dominate the standard narrative within North American society. This study found that participants perceived American Terriers as the *"highest in aggressiveness,"* *"most difficult to train,"* and *"least attractive"* when compared to Labrador Retrievers and Border Collies. Interestingly, this aligns with our findings, as American Terriers were less likely to be approached when compared to the Golden Retriever and Border Collies.

The breed was not disclosed for the first set of stimuli pictures, allowing participants to make their own assumptions about what type of dog was being displayed on the screen. In order to examine differences in morphologies within breeds, two Doberman pictures were presented,

one with pinned ears (the popularized morphology for a Doberman) and the other with unpinned ears (more uncommon). If participants recognized them as the same breed, there should have been no difference in likeliness to approach (because their breed attitudes would have remained constant). Surprisingly, when presented with the same breed (i.e., the two Doberman pictures), participants were more likely to approach the Doberman with unpinned ears. Being classified as a non-family dog, Dobermans are often viewed negatively compared to breeds like Golden Retrievers. Given this, due to the ability to easily identify a Doberman with pinned ears, participants may have been linking their negative breed attitudes towards this stimuli picture, in turn decreasing their likeliness to approach. In contrast, a Doberman with unpinned ears is harder to identify, and this may have weakened the negative attitudes participants held, creating the opposite effect.

Also, there are clear morphological differences between a Doberman with unpinned ears and a Doberman with pinned ears. Another possible explanation for the differences in likeliness to approach could be due to different physical traits activating certain behavioral expectations (Gunter et al., 2016). Participants may have been less likely to approach a Doberman with pinned ears, as this physical trait could be activating negative behavioral assumptions (i.e. higher levels of aggression). On the other hand, a Doberman with unpinned ears (i.e. floppy), is not only harder to categorize as a Doberman, but also possess a physical trait that is commonly found in "family friendly" dog breeds (i.e., Golden Retrievers, Cocker Spaniels and Beagles). Therefore, this trait may activate more positive expectations about a dog's behavior (i.e. friendlier), leading to an increase in likeliness to approach.

One phenomenon that was not supported in our results was the theory of *"Big Black Dog Syndrome"*. This phenomenon occurs when dogs, primarily black and large, have more

challenging times finding long-term homes (Woodward et al., 2012). A possible explanation for this phenomenon is due to their lack of facial contrast, making black dogs' expressions harder to read, perhaps leading to more negative perceptions of them (Woodward et al., 2012). Our results do not support this hypothesis as participants were equally as likely to approach Yellow and Black Labs and Black and Multi-Colored German Shepherds. A possible explanation for these contradictory results could be our small sample size, as well as an extremely knowledgeable sample, with 100% of participants having lived with a dog once in their life. This could potentially impact their attitudes towards dogs, as they may have heightened knowledge and experience with dogs, perhaps relieving some biases (such as a preference for lighter colored dogs).

Examining the second set of stimuli pictures, breeds and neutral and relaxed facial expressions were contrasted. Golden Retrievers were given preference in almost all circumstances when compared to Rottweilers and German Shepherds. When examining relaxed expressions, the "Friendly Golden Retriever" was given preference over the "Friendly Rottweiler" and "Friendly German Shepherd". As well, the "Friendly Golden Retriever"' was chosen over the "Neutral German Shepherd" and "Neutral Rottweiler". When comparing within breeds, the dogs with relaxed expressions were chosen over neutral expressions (i.e. the Friendly Rottweiler was chosen over the Neutral Rottweiler, etc.)

There are parallels between our results and previous research that has explored humans' ability to classify dogs' facial expressions. When contrasting between neutral and relaxed stimuli pictures, the primary difference was the expression of the mouth. In neutral photos the mouth was closed, and in the relaxed photos the mouth was open. As highlighted previously, humans may place the most emphasis on a dogs' mouth relevant to the rest of the face when examining

their expressions (Correia-Caeiro, 2021). With humans focusing largely on the mouth, this may explain the initial differences in the results between relaxed and neutral stimuli pictures. Building on this, an open mouth is often a component of positive emotional expression in both dogs and humans (Bremhorst et al., 2021; Kujala et al., 2017; Matsumoto et al., 2008; Racca et al., 2012). Therefore, participants may have been viewing the relaxed expressions as positive or "happy", increasing their likeness to choose/approach these stimuli pictures. Contrasting this, it may have been harder for participants to associate a relevant or positive emotional expression when viewing neutral expressions, making them less likely choose dogs with these expressions.

As well, research has indicated that humans are inflexible with their facial viewing strategies and may process and categorize human and dog faces similarly (Bloom, & Friedman 2013; Correia-Caeiro et al. 2021; 2021, Kujala et al. 2012; Desmet et al. 2017 as cited in Correia-Caeiro et al., 2021). The relaxed stimuli pictures utilized in this study possessed traits comparable to those of a "happy" human face such as an open mouth and happy eyes (Frank, Ekman, & Friesen, 1993 as cited in Calvo et., 2016). Therefore, it is possible that participants perceived these dogs more positively, due to examining them within the context of a "happy" human face (Correia-Caeiro et al.,2021; Konok et al., 2015; Kujala et al., 2017).

It is also clear that breed attitudes are still a factor when comparing relaxed expressions, with Friendly Golden Retrievers given preference over Friendly Rottweilers and Friendly German Shepherds. Combined with the neutral expressions utilized in Part 1, these results help support the idea that when all dogs possess the same facial expressions (e.g. neutral or relaxed), breed still plays a role in someone's likeness to approach. In this situation, the preference for Golden Retrievers may relate back to breed attitudes, with this breed often portrayed and viewed positively in the media and within the general public.

The overall preference for Golden Retrievers, Beagles, Cocker Spaniels and Pugs is especially interesting as these dogs all possess similar traits such as being small/medium in size, having floppy ears, and being furry or fluffy. However, the preference for specific traits demonstrated in our results directly contradicts our participants' demographic responses. The majority of respondents indicated *"No Preference"* for any physical characteristics when deciding to approach an unfamiliar dog (See Table 3). This may be an indication that participants were unaware of their own biases and stereotypes when examining dogs' facial expressions, believing they were showing no preference for physical traits. Adding to this, despite the sample being relatively experienced with dogs (i.e. all participants living with a dog at some point in their life), these preferences still permeate throughout the results.

The use of stimuli pictures as a method of exploring breed attitudes and facial expressions has some implications in respect to animal welfare and treatment. Frequently, adoption shelters use pictures to promotion adoption. Based on our results, the type of facial expression a dog possesses may impact how they are perceived. Therefore, it may be crucial for shelters to utilize positive expressions (such as an open mouth and relaxed eyes), especially for dogs with more negative *"breed attitudes"*. Dogs are often viewed as our closest companion animals, and the human-animal bond we create with them is largely influenced by humans' categorizations and perceptions (Hosey & Melfi, 2014; Clarke et al., 2016; Gunter et al., 2016). Often, negative perceptions such as inaccurately perceiving certain breeds as aggressive can be harmful to this relationship (Gunter et al, 2016). Also, when the general public has negative biases towards specific breeds it can lead to severe implications for their welfare such as "breed bans", unnecessary euthanasian, and rehoming (Clarke et at., 2016 ; Lockwood & Rindy, 1997).

Therefore, it is important to investigate the categorizations and attributions we make towards dogs, as these can directly impact how we treat them.

Our results demonstrate a clear preference for specific breeds, physical traits and relaxed expressions. However, due to the homogeneity of the sample, with the majority being young females (ranging from 18-34) who have had prior experience with dogs, we were unable to examine the effect of gender, age and prior experience with dogs on our results. Therefore, a possible avenue for further exploration would be within the context of a more diverse sample, exploring differences between gender, age, as well as prior experience with dogs.

There is also the possibility to expand on the methodology used in this study, offering an avenue for further research. For example, participants were given the following written prompt: *"You are alone, walking on the Confederation Trail, when you see a dog starting to approach you. It is alone, unleashed and unfamiliar to you."* The "Confederation Trail" may be a subjective descriptor, with participants conceptualizing different trails when given this location. Therefore, it may be beneficial to provide all participants with a "trail stimuli" (i.e. a photo or video of a trail), so they all have the same environmental context. Building on this, it would be interesting to use different environmental cues (i.e. daytime or nighttime, wooded or clear trail etc.) and investigate how these factors may also impact someone's likeness to approach an unfamiliar dog.

As well, relevant breed information was not disclosed in our study, allowing participants to make their own assumptions about what type of breed was presented. For future research, it may be advantageous to contrast between stimuli pictures that have a "breed label" (i.e. a stimuli picture of a Pug, with the word "Pug" written underneath) and those that do not, as preliminary research suggests that these types of labels can activate certain breed attitudes (Clarke et al.,

2016; Gunter et al., 2015). This thesis project has room for expansion, and it would be beneficial to continue exploring the factors that impact humans' categorizations of dogs.

Table 1

Participant Demographic Statistics

Participant Demographics	Gender		Ethnicity		Age		Participants	
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Female	35	76.09%						
Male	10	21.24%						
Other	1	2.17%						
White European Descent	38	82.60%						
Black			2	4.35%				
East/Southeast Asian			1	2.17%				
Middle Eastern			2	4.35%				
South Asian			3	6.52%				
18-24					23	50.00%		
25-34					10	21.74%		
35-44					4	8.70%		
45-60					8	17.39%		
60+					1	2.17%		
Students							29	63.00%
Staff							3	6.52%
Other							14	30.40%

Note. Percentages are reflective of the number of participants responses to each question. Total number of participants (n=46).

Table 2

Participant Dog Ownership Questions.

Question	Do you currently live with a dog?		If yes, how many?		If no, why not?		Have you ever lived with a dog?	
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Yes	36	78.26%						
No	10	21.74%						
1			24	52.17%				
2			11	23.91%				
3			1	2.17%				
4			-	-				
5			-	-				
Current Accommodation Does not permit pets					3	30.00%		
Financial Reasons					3	30.00%		
Other					4	40.00%		
Yes							46	100.00%
No								

Note. Percentages are reflective of the number of participants responses to each question. Total number of participants (n=46).

Table 3

Dog Descriptives

Question	Please list your top three favorite dog breeds.		What features do you look for when deciding to approach an unfamiliar dog? Please indicate all that apply.		What features do you look for when deciding <u>NOT </u>to approach an unfamiliar dog? Please indicate all that apply.	
	n	*%*	*n*	*%*	*n*	*%*
German Shephard	9	6.52%				
Border Collie	4	2.90%				
Boxer	2	1.45%				
Chihuahua	1	0.72%				
Cocker Spaniel	1	0.72%				
Dachshund	3	2.17%				
Golden Retriever	13	9.42%				
Husky	4	2.90%				
Labrador	7	5.07%				
Poodle	4	2.90%				
Pug	3	2.17%				
Rottweiler	4	2.90%				
Mixed	11	7.97%				
Other	72	52.20%				
Long snout,			3	3.57%	5	8.62%
Small Snout			3	3.57%	2	3.45%
Furry, or "fluffy",			13	15.50%	1	1.72%
Floppy Ears			11	13.10%	-	-
Small Ears			1	1.19%	1	1.72%
Large Ears			1	1.19%	1	1.72%
Small Size			7	8.33%	3	5.17%
Medium Size			9	10.70%	1	1.72%
Large Size			4	4.76%	12	20.70%
Large, round eyes,			1	1.19%	3	5.17%
Round forehead			1	1.19%	2	3.45%
No Preference			30	35.70%	27	46.60%

Note. Percentages are reflective of the number of responses to each question. Total number of responses Top 3 Dog Breeds (n=138), approach features (n=84), unapproach features (n=58).

Table 4

Participants Top 3 Dog Breeds Compared to the Top 10 most Popular Dog Breeds of 2021 by the American Kennel Club

	n	%	Ranking by the American Kennel Club
Golden Retriever	13	9.42%	#2
German Shephard	9	6.52%	#4
Labrador	7	5.07%	#1
Border Collie	4	2.90%	-
Husky	4	2.90%	-
Poodle	4	2.90%	#5
Rottweiler	4	2.90%	-
Dachshund	3	2.17%	-
Pug	3	2.17%	-
Boxer	2	1.45%	-
Chihuahua	1	0.72%	-
Cocker Spaniel	1	0.72%	-
Mixed	11	7.97%	-
Other	72	52.20%	#3 (French Bulldog)

Note. Participants Top 3 Dog Breeds Compared to the Top 10 most Popular Dog Breeds of 2021 by the American Kennel Club. List take from *https://www.akc.org/most-popular-breeds/*.

Table 5

Coleman Dog Attitude Scale

Question	SD	D	C	N	C	A	SA
When I see a dog I want to play with it	-	-	-	*n* = 7, 15.22%	*n* = 39, 84.78%	*n* = 18, 39.13%	*n* = 21, 45.65%
I love dogs	-	-	-	-	*n* = 46, 100%	*n* = 14, 30.43%	*n* = 32, 69.57%
I like to walk dogs	-	*n* = 1, 2.17%	*n* = 1, 2.17%	*n* = 8, 17.39%	*n* = 37, 80.43%	*n* = 21, 45.65%	*n* = 16, 34.78%
I enjoy having a dog as a pet, or would if I had one	-	-	-	*n* = 1, 2.17%	*n* = 45, 97.83%	*n* = 7, 15.22%	*n* = 38, 82.60%
When I see a dog I smile	-	-	-	*n* = 1, 2.17%	*n* = 45, 97.83%	*n* = 14, 30.43%	*n* = 31, 67.39%
Dogs comfort me	-	-	-	*n* = 3, 6.52%	*n* = 43, 93.48%	*n* = 14, 30.4%	*n* = 29, 63.04%
I like to pet dogs	-	-	-	*n* = 2, 4.35%	*n* = 44, 95.65%	*n* = 14, 30.43%	*n* = 30, 65.22%
Dogs make me feel loved	-	-	-	n = 2 4.35%	*n* = 44, 95.65%	*n* = 19, 41.3%	*n* = 25, 54.35%
I like to play with dogs	-	-	-	*n* = 3, 6.52%	*n* = 43, 93.48%	*n* = 17, 36.96%	*n* = 26, 56.52%
I wanted a dog when I was a child	*n* = 1, 2.17%	*n* = 6, 13.04%	*n* = 7, 15.22%	*n* = 11, 23.91%	*n* = 28, 60.87%	*n* = 3, 6.52%	*n* = 25, 54.35%
I think dogs are cute	-	-	-	-	*n* = 46, 100%	*n* = 9, 19.57%	*n* = 37, 80.43%
Dogs make me happy	-	-	-	*n* = 3, 6.52%	*n* = 43, 93.48%	*n* = 12, 26.09%	*n* = 31, 67.39%
I avoid dogs	*n* = 25, 54.35%	*n* = 18, 39.13%	*n* = 43, 93.48%	*n* = 3, 6.52%	*n* = 1, 2.17%	*n* = 1, 2.17%	-
I think dogs are fun	-	-	*n* = 1, 2.17%	n = 1 2.17%	*n* = 45, 97.83%	*n* = 20, 43.48%	*n* = 25, 54.35%
Dogs calm me down	-	-	-	*n* = 9, 19.57%	*n* = 37, 80.43%	*n* = 22, 47.83%	*n* = 15, 32.61%
I would like to live with a dog	-	-	-	*n* = 1, 2.17%	*n* = 45, 97.83%	*n* = 20, 43.48%	*n* = 25, 54.35%
Dogs reduce my stress	-	*n* = 1, 2.17%	*n* = 1, 2.17%	*n* = 10, 21.71%	*n* = 35, 76.09%	*n* = 21, 45.65%	*n* = 14, 30.43%
Interacting with dogs makes me feel excited	-	-	-	*n* = 4, 8.70%	*n* = 42, 91.30%	*n* = 24, 52.17%	*n* = 18, 39.13%
I talk to dogs	-	*n* = 1, 2.17%	*n* = 1, 2.17%	-	*n* = 45, 97.83%	*n* = 18, 39.13%	*n* = 27, 58.70%

Table 5 Continued

Question	SD	D	C	N	C	A	SA
I like being around dogs	-	*n* = 1, 2.17%	*n* = 1, 2.17%	*n* = 1, 2.17%	*n* = 44, 95.65%	*n* = 19, 41.3%	*n* = 25, 54.35%
I would share my bed with my dog, or would if I had one	*n* = 1, 2.17%	*n* = 5, 10.87%	*n* = 6, 13.04%	*n* = 4, 8.70%	*n* = 36, 78.26%	*n* = 11, 23.91%	*n* = 25, 54.35%
I think dogs are adorable	-	-	-	*n* = 2, 4.35%	*n* = 44, 95.65%	*n* = 16, 34.78%	*n* = 28, 60.87%
I like to cuddle with dogs	-	-	-	*n* = 3, 6.52%	*n* = 43, 93.48%	*n* = 17, 36.96%	*n* = 25, 56.52%
I hate dogs	*n* = 42, 91.30%	*n* = 4, 8.70%	*n* = 46, 100%	-	-	-	-

Note. Responses to the Coleman Dog Attitude Scale, used to measure someone's attitudes towards dogs. Abbreviations as follows: Strongly Disagree (SD), Disagree (D), Neither Agree Nor Disagree (N), Agree (A), Strongly Agree (SA). Combined (C) columns represent the negative ("Strongly Disagree" and "Disagree") and positive ("Strongly Agree" and "Agree") totals.

Table 6

Stimuli Pictures Set 1, Likeliness to Approach

Stimuli Picture	EU	VU	U	C	N	C	L	VL	EL
German Shephard	4.35%	9.78%	16.30%	30.43%	14.10%	55.43%	23.90%	20.70%	10.90%
Golden Lab	2.17%	4.35%	8.70%	15.20%	13.04%	71.70%	19.57%	29.30%	22.80%
Rottweiler	4.35%	10.87%	8.69%	23.91%	10.87%	65.22%	29.35%	25.00%	10.87%
Golden Retriever	3.26%	3.26%	2.17%	8.70%	9.78%	81.50%	27.20%	29.30 %	25.00%
Cocker Spaniel	2.17%	-	-	2.17%	6.52%	91.30%	26.09%	38.00%	27.20%
Border Collie	4.35%	-	1.09%	5.43%	16.30%	78.30%	31.50%	26.10%	20.70%
Dobermann Pinned	14.13%	7.61%	21.74%	43.48%	13.04%	43.48%	20.70%	20.70%	2.17%
Pug	2.17%	2.17%	4.35%	8.70%	2.17%	89.10%	25.00%	31.50%	32.61%
Black Lab	3.26%	4.35%	5.43%	13.00%	9.78%	77.20%	23.90%	30.40%	22.80%
Beagle	2.17%	2.17%	1.09%	5.43%	7.61%	87.00%	29.30%	35.90%	21.70%
American Terrier	12.00%	9.78%	15.20%	37.00%	9.78%	53.30%	25.00%	16.30%	12.00%
Dachshund	2.17%	1.09%	4.35%	7.61%	9.78%	82.60%	20.70%	37.00%	25.00%
Husky	6.52%	6.52%	16.30%	29.30%	22.80%	47.80%	15.20%	19.57%	13.04%
Black German Shephard	5.43%	5.43%	14.10%	25.00%	18.50%	56.50%	19.60%	19.57%	17.39%

Table 6 Continued

Stimuli Picture	E U	VU	U	C	N	C	L	VL	EL
Boxer	2.17%	1.09%	6.52%	9.78%	13.04%	77.17%	27.20%	33.70%	16.30%
Poodle	2.17%	1.09%	9.78%	13.04%	19.57%	67.39%	22.80%	26.09%	18.50%
Chihuahua	2.17%	1.09%	6.52%	9.78%	15.20%	75.00%	32.60%	19.60%	22.80%
Doberman Unpinned	2.17%	4.35%	8.69%	15.20%	14.10%	70.70%	25.00%	26.10%	19.60%

Note. Percentages are reflective of participants' likeliness to approach an unfamiliar dog. Abbreviations as followed: Extremely Unlikely (EU), Very Unlikely (VU), Unlikely (U), Neutral (N), Likely (L), Very Likely (VL), Extremely Likely (EL).Combined (C) columns represent the totals for unlikely responses ("Extremely Unlikely", "Very Unlikely", "Unlikely") and likely responses ("Likely", "Very Likely", "Extremely Likely"). Total number of participants (n=46).

Table 7

Friendly Golden Retriever (FGR) Comparisons

Friendly Golden Retriever	71.74%	71.74%	75.00%	78.26%	84.78%	84.70%
	28.26%	28.26%	25.00%	21.74%	15.22%	16.30%
	FGR	FGS	FRT	NGR	NGS	NRT

Note. Percentages are reflective of participants choosing between a Friendly Golden Retriever and Friendly German Shepherd (FGS), Friendly Rottweiler (FRT), Neutral Golden Retriever (NGR), Neutral German Shepherd (NGS), and Neutral Rottweiler (NRT).

Table 8

Friendly German Shephard (FGS) Comparisons

	FGR	FGS	FRT	NGR	NGS	NRT
	28.26%	41.30%	51.09%	58.70%	93.5%	69.57%
Friendly German Shephard						
	71.74%	58.70%	48.91%	41.30%	6.52%	30.43%

Note. Percentages are reflective of participants choosing between a Friendly German Shephard (FGS) and Friendly Golden Retriever (FGR) Friendly German Shepherd (FGS), Friendly Rottweiler (FRT), Neutral Golden Retriever (NGR), Neutral German Shepherd (NGS), and Neutral Rottweiler (NRT).

Table 9

Friendly Rottweiler (FRT) Comparisons

	FGR	FGS	FRT	NGR	NGS	NRT
	25.00%	48.91%	45.65%	56.52%	75.00%	67.39%
Friendly Rottweiler	75.00%	51.09%	54.35%	43.48%	25.00%	32.61%

Note. Percentages are reflective of participants choosing between a Friendly Rottweiler (FRT) and Friendly Golden Retriever (FGR) Friendly German Shepherd (FGS), Friendly Rottweiler (FRT), Neutral Golden Retriever (NGR), Neutral German Shepherd (NGS), and Neutral Rottweiler (NRT).

Table 10

Neutral Golden Retriever(NGR) Comparisons

	21.74%	41.30%	43.48%	63.04%	59.78%	51.09%
Neutral Golden Retriever	78.26%	58.70%	56.52%	36.96%	40.22%	48.91%
	FGR	FGS	FRT	NGR	NGS	NRT

Note. Percentages are reflective of participants choosing between a Neutral Golden Retriever (NGR) and Friendly Golden Retriever (FGR) Friendly German Shepherd (FGS), Friendly Rottweiler (FRT), Neutral Golden Retriever (NGR), Neutral German Shepherd (NGS), and Neutral Rottweiler (NRT).

Table 11

Neutral German Shephard (NGS) Comparisons

	FGR	FGS	FRT	NGR	NGS	NRT
	15.22%	6.52%	25.00%	40.22%	34.78%	31.52%
Neutral German Shephard	84.78%	93.5%	75.00%	59.78%	65.22%	68.48%

Note. Percentages are reflective of participants choosing between a Neutral German Shepherd (NGS) and a Friendly Golden Retriever (FGR), Friendly German Shepherd (FGS), Friendly Rottweiler (FRT), Neutral Golden Retriever (NGR), Neutral German Shepherd (NGS), and Neutral Rottweiler (NRT).

Table 12

Neutral Rottweiler (NRT) Comparisons

	16.30%	30.43%	32.61%	48.91%	68.48%	43.48%
Neutral						
Rottweiler	84.70%	69.57%	67.39%	51.09%	31.52%	56.52%
	FGR	FGS	FRT	NGR	NGS	NRT

Note Percentages are reflective of participants choosing between a Neutral Rottweiler (NRT) and a Friendly Golden Retriever (FGR), Friendly German Shepherd (FGS), Friendly Rottweiler (FRT), Neutral Golden Retriever (NGR), Neutral German Shepherd (NGS), and Neutral Rottweiler (NRT).

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Appendix A

PARTICIPANT CONSENT FORM
"Factors that Impact the Categorization of Dogs' Facial Expressions "

I consent to participating in research that is investigating human-canine interactions.

I understand that my participation in this study involves responding to a few demographic questions, completing a standard questionnaire measuring human-canine interactions and responding to a set of stimuli pictures.

I have read and understood the material about this study in the Information Letter, and understand that:

1.   My participation in the research project will not involve any activity with risks
2.   My participation in the study is entirely voluntary;
3.   I may discontinue my participation at any time during the ZOOM meeting without any adverse consequence;
4.   My responses will be kept confidential, except where the researcher is required by law to report them;

5. I understand that all participants have the option to be entered into a draw for the chance to win a $50 gift card to the UPEI Bookstore or Canadian equivalent Amazon gift card . Participants wishing to be entered into the draw will provide their email addresses and accompanying names will be kept separate from the data. Students enrolled in Psychology 1020 or 1010 with Dr. Phillip Smith will be offered the choice between the 1% bonus point or entry to the draw for the gift card. Should participants wish to receive a 1% bonus point they must inform the honours student Katelyn Ford, who will then inform the course instructor.

6. Upon completion of the study, I am no longer able to withdraw them from the study
7.6. All data resulting from this research project will be stored on a computer in a locked   room in Memorial building and retained for a period of five years after the completion of the project, after which time it will be erased or destroyed;
87. I have the freedom to not answer any question included in the research;
98. I may have a PDF copy of the consent form to keep.

This research is being conducted by UPEI honours student Katelyn Ford for academic credit in Psychology 4900 under the supervision of Dr. Catherine Ryan and Dr. Tracy A. Doucette. Any questions or concerns about this study can be directed to Katelyn Ford at kford2@upei.ca, Dr. Ryan at ryan@upei.ca or Dr. Doucette at tdoucette@upei.ca

This project has been reviewed by the UPEI Research Ethics Board and it complies with Tri-Council guidelines for research involving human participants. I understand that I can contact the UPEI Research Ethics Board at (902) 620-5104 or by email if I have any concerns about the ethical conduct of this study at researchcompliance@upei.ca , File #6010451

Appendix B

PARTICIPANT INFORMATION LETTER
"Factors that Impact the Categorization of Dogs' Facial Expressions "

You have been invited to participate in a research project examining human-canine interactions. This project is being conducted by honours student Katelyn Ford under the supervision of Dr. Catherine Ryan and Dr. Tracy Doucette of the Department of Psychology at the University of Prince Edward Island.

Purpose of Study:
Previous research has examined human-canine interactions. This study hopes to build on this research using questionnaires and the presentation of stimuli via slideshow and explore what factors impact these interactions.

Participation requirements:
Participation in this project will take between 50-60 minutes of your time. You will meet with Honours research student, Katelyn Ford, via the online platform Zoom. A short questionnaire with basic demographic questions will be presented first. You will then be asked to complete the Coleman Dog Attitude Scale used to measure your level of interaction with dogs. Next, you will be given a situational prompt and then presented with a series of pictures. Participants must be over the age of 18 to participate in this study and have access to a computer, internet, and ZOOM. This study is aiming to recruit over forty participants.

Collection and Security of Identifying Information:
All information collected during this study will remain confidential (except where the researcher is required by law to report them). Personal identifiers will not be collected as part of the study, meaning that test results and questionnaire responses can not be linked back to any specific individual.
All data and forms will be stored on a password protected computer in a locked laboratory inside Memorial Building at UPEI. All data will only be accessed by project personnel. You will have until the end of the zoom meeting to choose to withdraw your data from the study after which time it will be included in the data pool. All data resulting from the research project will be retained for a period of five years after the completion of the project, after which time it will be erased or destroyed.

Compensation:
All participants will have the option to be entered into a draw for the chance to win a $50 gift card to the UPEI Bookstore or Canadian equivalent Amazon gift card . Participants wishing to be entered into the draw will provide their email addresses and accompanying names will be kept separate from the data. The estimated odds of the lottery draw are 1:50 or better. Students enrolled in Psychology 1020 or 1010 with Dr. Phillip Smith will be offered the choice between

the 1% bonus point or entry to the draw for the gift card. Should participants wish to receive a 1% bonus point they must inform the honours student Katelyn Ford, who will then inform the course instructor.

Any Risks or Benefits:

Your participation in the research project will not involve any activity involving more than minimal risk. Your participation in this research project is entirely voluntary. You have the freedom to not answer any questions included in the research, and you may stop your participation in the research project at any time during the experiment, without penalty or prejudice. Upon completion of the experiment you may no longer withdraw from this study.

Consent:

Your participation in this study is entirely volunteer and you may stop your participation at any point throughout the study. You will be given a final opportunity to withdraw your data from the study prior to termination of this study.

Questions/ Concerns:

As a participant, you have the opportunity to receive a summary of the results and can do so by contacting Katelyn Ford following the completion of the study.

If you have any questions or concerns about this research project, you may consult Katelyn Ford, Honours student, kford2@upei.ca, Dr. Catherine Ryan, (Supervisor), ryan@upei.ca, or Dr. Tracy Doucette, (Supervisor), tdoucette@upei.ca

This project has been reviewed by the UPEI Research Ethics Board and it complies with Tri Council guidelines for research involving human participants. I understand that I can contact the UPEI Research Ethics Board at (902) 620-5104 or by email if I have any concerns about the ethical conduct of this study at researchcompliance@upei.ca , File #6010451

Appendix C

Demographic Questionnaire and The Coleman Dog Attitude Scale (C-DAS)

Demographic Questions. Please tick the box that best applies to you.
1. What is your age?
- ☐ Under 18
- ☐ 18-24
- ☐ 25-34
- ☐ 35-44
- ☐ 45-60
- ☐ 60+

2. What is your gender?
- ☐ Female
- ☐ Male
- ☐ Non-binary
- ☐ Other, please specify _____
- ☐ Prefer not to answer

3. a) We know that people of different races do not have significantly different genetics. But our race still has important consequences, including how we are treated by different individuals and institutions. Which race category best describes you? Check all that apply:

- ❑ Black (African, Afro-Caribbean, African Canadian descent)
- ❑ East/Southeast Asian (Chinese, Korean, Japanese, Taiwanese descent or Filipino, Vietnamese, Cambodian, Thai, Indonesian, other Southeast Asian descent)
- ❑ Indigenous (First Nations, Métis, Inuk/Inuit)
- ❑ Latino (Latin American, Hispanic descent)
- ❑ Middle Eastern (Arab, Persian, West Asian descent (e.g., Afghan, Egyptian, Iranian, Lebanese, Turkish, Kurdish)
- ❑ South Asian (South Asian descent (e.g., East Indian, Pakistani, Bangladeshi, Sri Lankan, Indo-Caribbean)
- ❑ White European descent
- ❑ Another race category
- ❑ Do not know
- ❑ Not applicable
- ❑ Prefer not to answer

What is your ethnicity?

- ☐ European or Caucasian
- ☐ Asian
- ☐ East Indian
- ☐ Latin or Hispanic
- ☐ First Nations
- ☐ African or Black
- ☐ Middle Eastern
- ☐ Other, please specify _____

4. What is your primary role on the UPEI campus?

- ☐ Student, Major in _____
- ☐ Faculty
- ☐ Staff

5. Do you currently have/live with a dog?

- ☐ Yes
- ☐ No

6. If yes, how many dogs do you have/live with?

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5 or more

7. Have you ever had/lived with a dog?

- ☐ Yes
- ☐ No

8. If you do not currently have/live with a dog why not?

- ☐ I do not like dogs
- ☐ Financial reasons
- ☐ Too busy
- ☐ Current accommodation does not permit pets
- ☐ Current accommodation does not have the space
- ☐ Allergies
- ☐ Other, please specify_____

9. Please list your top three favorite dog breeds.

    1) _____

    2) _____

    3) _____

10. What features do you look for when deciding to approach an unfamiliar dog? Please tick all that apply:

    ☐ Long snout,
    ☐ Small snout,
    ☐ Furry, or "fluffy",
    ☐ Floppy ears,
    ☐ Small ears,
    ☐ Large ears,
    ☐ Small size,
    ☐ Medium size,
    ☐ Large size,
    ☐ Large, round eyes,
    ☐ Round forehead,
    ☐ No preference,

11. What features do you look for when deciding <u>NOT</u> to approach an unfamiliar dog? Please tick all that apply:

    ☐ Long snout,
    ☐ Small snout,
    ☐ Furry, or "fluffy",
    ☐ Floppy ears,
    ☐ Small ears,
    ☐ Large ears,
    ☐ Small size,
    ☐ Medium size,
    ☐ Large size,
    ☐ Large, round eyes,
    ☐ Round forehead,
    ☐ No preference,

The Coleman Dog Attitude Scale (C-DAS)
Instructions: answer the following questions based on your attitudes toward dogs by ticking the box that best applies to you.

1. When I see a dog I want to play with it

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

2. I love dogs

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

3. I like to walk dogs

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

4. I enjoy having a dog as a pet, or would if I had one

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

5. When I see a dog I smile

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

6. Dogs comfort me

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

7. I like to pet dogs

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

8. Dogs make me feel loved

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

9. I like to play with dogs

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

10. I wanted a dog when I was a child

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

11. I think dogs are cute

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

12. Dogs make me happy

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

13. I avoid dogs

☐Strongly Disagree ☐Disagree ☐Neither agree nor disagree ☐Agree ☐Strongly agree

14. I think dogs are fun

☐Strongly Disagree ☐Disagree ☐Neither agree nor disagree ☐Agree ☐Strongly agree

15. Dogs calm me down

☐Strongly Disagree ☐Disagree ☐Neither agree nor disagree ☐Agree ☐Strongly agree

16. I would like to live with a dog

☐Strongly Disagree ☐Disagree ☐Neither agree nor disagree ☐Agree ☐Strongly agree

17. Dogs reduce my stress

☐Strongly Disagree ☐Disagree ☐Neither agree nor disagree ☐Agree ☐Strongly agree

18. Interacting with dogs makes me feel excited

☐Strongly Disagree ☐Disagree ☐Neither agree nor disagree ☐Agree ☐Strongly agree

19. I talk to dogs

☐Strongly Disagree ☐Disagree ☐Neither agree nor disagree ☐Agree ☐Strongly agree

20. I like being around dogs

☐Strongly Disagree ☐Disagree ☐Neither agree nor disagree ☐Agree ☐Strongly agree

21. I would share my bed with my dog, or would if I had one

☐Strongly Disagree ☐Disagree ☐Neither agree nor disagree ☐Agree ☐Strongly agree

22. I think dogs are adorable

☐Strongly Disagree ☐Disagree ☐Neither agree nor disagree ☐Agree ☐Strongly agree

23. I like to cuddle with dogs

☐Strongly Disagree ☐Disagree ☐Neither agree nor disagree ☐Agree ☐Strongly agree

24. I hate dogs

☐Strongly Disagree ☐Disagree ☐Neither agree nor disagree ☐Agree ☐Strongly agree

Appendix D
Debriefing Script

Upon completion I will now disclose the true purpose of this study. I am investigating what factors impact humans' likeliness to approach dogs' and what role a dog's facial feature and breed play in this decision. By conducting this study I am hoping to further the research regarding factors that impact the attributions we make towards dogs'. Previous research indicates that many factors impact our attributions such as eyebrow prominence, fur color and breed attitude (Clarke et al., 2016; Mota-Rojas et al., 2022; Woodward et al., 2012). By exploring what factors impact the likelihood to approach an unknown dog, we hope to learn more about what role breed and facial expressions play in the attributes we make towards dogs.

I could not inform you of the true nature of the study without the risk that the knowledge would affect your responses and impact your categorizations and attributions. Now that I have disclosed the true intent of the study, do you have any questions? You will now have one last opportunity to choose to withdraw your data from the study if you wish to do so.

Thank you so much for your time! Your participation in this study is now complete!

Appendix E

Recruitment Poster

Participants Needed!

Hello! My name is Katelyn Ford and I am a psychology student at the University of Prince Edward Island. As part of my Psychology Honours Thesis I am conducting a study on human-canine interactions.

- 🐶 This study will be conducted virtually via the online platform Zoom.
- 🐶 Participants will be required to answer a few brief questionnaires and then be presented with a situational prompt, and a range of photos. Participation in this study should take no longer than 50 minutes.
- 🐶 You must be over the age of 18, have the ability to speak English and have access to a computer, internet and ZOOM to participate in the study.

This research is supervised by Dr.Catherine Ryan and Dr.Tracy Doucette.

If you are interested in participating, or have ANY questions regarding this study, please do not hesitate to contact me, Katelyn, by **email kford2@upei.ca** or by **phone (902) 566-6055.**

By participating in this study, you will have the opportunity to be entered into a draw to win a 50$ Amazon Gift Card!

Appendix F

Google Slides Presented to Participants
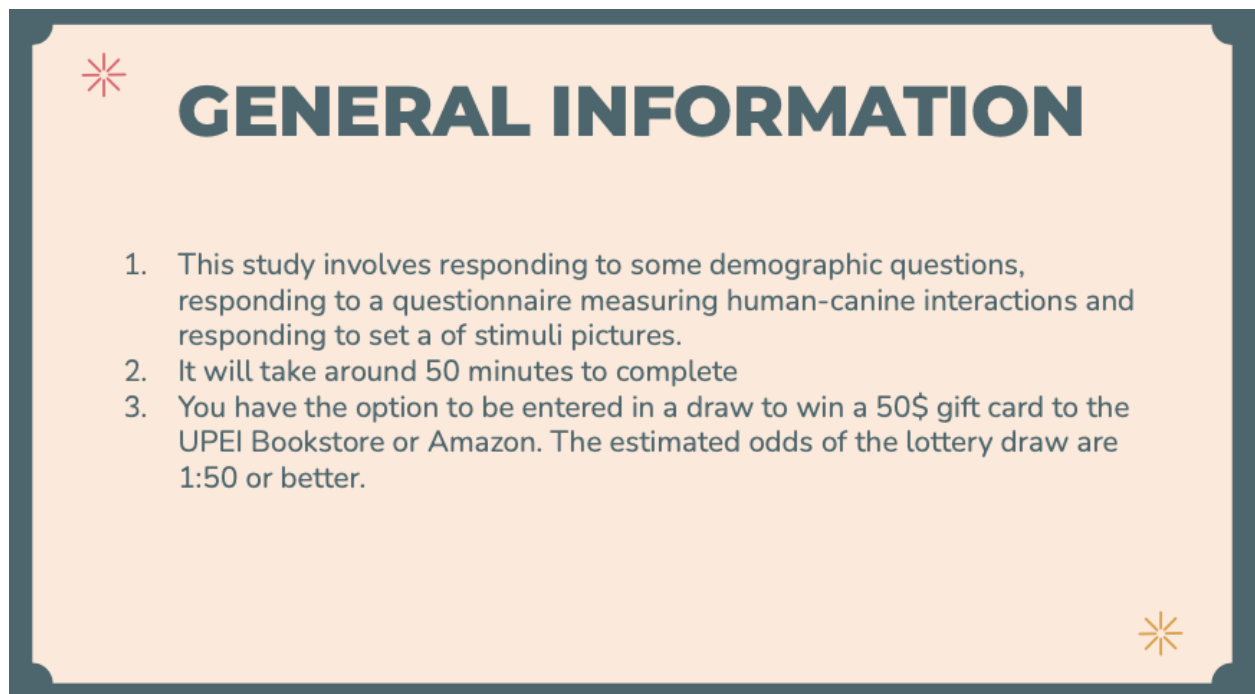
CONSENT FORM

- *I consent to participating in research that is investigating human-canine interactions.*
- *I understand that my participation in this study involves responding to a few demographic questions, completing a standard questionnaire measuring human-canine interactions and responding to a set of stimuli pictures.*
- *I have read and understood the material about this study in the Information Letter, and understand that:*

- My participation in the research project will not involve any activity with risks
- My participation in the study is entirely voluntary;
- I may discontinue my participation at any time during the ZOOM meeting without any adverse consequence;
- My responses will be kept confidential, except where the researcher is required by law to report them;
- I understand that all participants have the option to be entered into a draw for the chance to win a $50 gift card to the UPEI Bookstore or Canadian equivalent Amazon gift card. Participants wishing to be entered into the draw will provide their email addresses and accompanying names will be kept separate from the data. Students enrolled in Psychology 1020 or 1010 with Dr. Phillip Smith will be offered the choice between the 1% bonus point or entry to the draw for the gift card. Should participants wish to receive a 1% bonus point they must inform the honours student Katelyn Ford, who will then inform the course instructor.

CONSENT FORM

- Upon completion of the study, I am no longer able to withdraw from the study
- All data resulting from this research project will be stored on a computer in a locked room in Memorial building and retained for a period of five years after the completion of the project, after which time it will be erased or destroyed;
- I have the freedom to not answer any question included in the research;
- I may have a PDF copy of the consent form to keep.

This research is being conducted by UPEI honours student Katelyn Ford for academic credit in Psychology 4900 under the supervision of Dr. Catherine Ryan and Dr. Tracy A. Doucette.

Any questions or concerns about this study can be directed to Katelyn Ford at kford2@upei.ca, Dr.Ryan at ryan@upei.ca or Dr. Doucette at tdoucette@upei.ca This project has been reviewed by the UPEI Research Ethics Board and it complies with Tri-Council guidelines for research involving human participants. I understand that I can contact the UPEI Research Ethics Board at (902) 620-5104 or by email if I have any concerns about the ethical conduct of this study at researchcompliance@upei.ca.

Do you consent? Please verbally indicate Yes or No.

Next, you have the chance entered in a draw to win a 50$ gift card to the UPEI Bookstore or Amazon. Students enrolled in Psychology 1020 or 1010 with Dr. Phillip Smith will be offered the choice between the 1% bonus point or entry to the draw for the gift card.

Please verbally indicate if you want to be entered into the draw or receive a 1% bonus point.

Demographic Questions - Please Verbally Indicate Your Response

1. What is your age?
a) Under 18
b) 18-24
c) 25-34
d) 35-44
e) 45-60
f) 60+

2. What is your gender?
a) Female
b) Male
c) Non-binary
d) Other, please specify
e) Prefer not to answer

3. We know that people of different races do not have significantly different genetics. But our race still has important consequences, including how we are treated by different individuals and institutions. Which race category best describes you? Indicate all that apply:
a) Black (African, Afro-Caribbean, African Canadian descent)
b) East/Southeast Asian (Chinese, Korean, Japanese, Taiwanese descent or Filipino, Vietnamese, Cambodian, Thai, Indonesian, other Southeast Asian descent)
c) Indigenous (First Nations, Métis, Inuk/Inuit) Latino (Latin American, Hispanic descent)
d) Latino (Latin American, Hispanic descent)
e) Middle Eastern (Arab, Persian, West Asian descent (e.g., Afghan, Egyptian, Iranian, Lebanese, Turkish, Kurdish)
f) South Asian (South Asian descent (e.g., East Indian, Pakistani, Bangladeshi, Sri Lankan,Indo-Caribbean)
g) White European descent
h) Another race category
i) Do not know
j) Not applicable
k) Prefer not to answer

---

4. What is your primary role on the UPEI campus?
a) Student, Major in _____
b) Faculty
c) Staff

5. Do you currently have/live with a dog?
a) Yes
b) No

6. If yes, how many dogs do you have/live with?
a) 1
b) 2
c) 3
d) 4
e) 5 or more

7. Have you ever had/lived with a dog?
a) Yes
b) No

8. If you do not currently have/live with a dog why not?
a) I do not like dogs
b) Financial reasons
c) Too busy
d) Current accommodation does not permit pets
e) Current accommodation does not have the space
f) Allergies
g) Other, please specify_____

9. Please name your top three favorite dog breeds.

10. What features do you look for when deciding to approach an unfamiliar dog? Please list all that apply:
a) Long snout,
b) Small snout,
c) Furry, or "fluffy",
d) Floppy ears,
e) Small ears,
f) Large ears,
g) Small size,
h) Medium size,
i) Large size,
j) Large, round eyes,
k) Round forehead,
l) No preference,

11. What features do you look for when deciding **_NOT_** to approach an unfamiliar dog? Please list all that apply:
a) Long snout,
b) Small snout,
c) Furry, or "fluffy",
d) Floppy ears,
e) Small ears,
f) Large ears,
g) Small size,
h) Medium size,
i) Large size,
j) Large, round eyes,
k) Round forehead,
l) No preference,

The Coleman Dog Attitude Scale (C-DAS)
Instructions: answer the following questions based on your attitudes toward dogs by naming the box that best applies to you.

1. When I see a dog I want to play with it

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

2. I love dogs

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

3. I like to walk dogs

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

4. I enjoy having a dog as a pet, or would if I had one

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

5. When I see a dog I smile

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

6. Dogs comfort me

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

7. I like to pet dogs

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

8. Dogs make me feel loved

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

9. I like to play with dogs

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

10. I wanted a dog when I was a child

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

11. I think dogs are cute

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

12. Dogs make me happy

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

13. I avoid dogs

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

14. I think dogs are fun

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

15. Dogs calm me down

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

16. I would like to live with a dog

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

17. Dogs reduce my stress

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

18. Interacting with dogs makes me feel excited

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

19. I talk to dogs

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

20. I like being around dogs

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

21. I would share my bed with my dog, or would if I had one

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

22. I think dogs are adorable

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

23. I like to cuddle with dogs

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

24. I hate dogs

☐ Strongly Disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

Part One

You will be presented with a scenario. 18 dog breeds will then be presented via pictures of their faces. After each picture is presented, using the 7 point scale below, please indicate **_how likely_** you are to approach the dog.

☐ Extremely Unlikely
☐ Very Unlikely
☐ Unlikely
☐ Neutral
☐ Likely
☐ Very Likely
☐ Extremely Likely

SCENARIO ONE

"You are alone, walking on the Confederation Trail, when you see a dog starting to approach you. It is alone, unleashed and unfamiliar to you."

☐ Extremely Unlikely ☐ Very Unlikely ☐ Unlikely ☐ Neutral ☐ Likely ☐ Very Likely ☐ Extremely Likely

☐Extremely Unlikely ☐Very Unlikely ☐ Unlikely ☐Neutral ☐Likely ☐ Very Likely ☐ Extremely Likely

☐Extremely Unlikely ☐Very Unlikely ☐ Unlikely ☐Neutral ☐Likely ☐ Very Likely ☐ Extremely Likely

☐ Extremely Unlikely ☐ Very Unlikely ☐ Unlikely ☐ Neutral ☐ Likely ☐ Very Likely ☐ Extremely Likely

☐ Extremely Unlikely ☐ Very Unlikely ☐ Unlikely ☐ Neutral ☐ Likely ☐ Very Likely ☐ Extremely Likely

☐ Extremely Unlikely ☐ Very Unlikely ☐ Unlikely ☐ Neutral ☐ Likely ☐ Very Likely ☐ Extremely Likely

☐ Extremely Unlikely ☐ Very Unlikely ☐ Unlikely ☐ Neutral ☐ Likely ☐ Very Likely ☐ Extremely Likely

☐Extremely Unlikely ☐Very Unlikely ☐ Unlikely ☐Neutral ☐Likely ☐ Very Likely ☐ Extremely Likely

☐Extremely Unlikely ☐Very Unlikely ☐ Unlikely ☐Neutral ☐Likely ☐ Very Likely ☐ Extremely Likely

☐ Extremely Unlikely ☐ Very Unlikely ☐ Unlikely ☐ Neutral ☐ Likely ☐ Very Likely ☐ Extremely Likely

☐ Extremely Unlikely ☐ Very Unlikely ☐ Unlikely ☐ Neutral ☐ Likely ☐ Very Likely ☐ Extremely Likely

☐ Extremely Unlikely ☐ Very Unlikely ☐ Unlikely ☐ Neutral ☐ Likely ☐ Very Likely ☐ Extremely Likely

☐ Extremely Unlikely ☐ Very Unlikely ☐ Unlikely ☐ Neutral ☐ Likely ☐ Very Likely ☐ Extremely Likely

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Part Two

You will be presented with a second, scenario. Two pictures will be presented at a time. Please indicate which dog you would approach, the dog on the left, or the dog on the right.

☐ Left   ☐ Right

SCENARIO TWO

"You are alone, walking on the Confederation Trail, when you see two dogs starting to approach you. They are both unleashed and unfamiliar to you. As they come closer to you, you must choose to approach one of them."

☐Left

☐ Right

☐ Left   ☐ Right

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Summary

- The true purpose of this study was to investigate what factors impact humans' likeliness to approach dogs' and what role a dog's facial feature and breed play in this decision.
- Previous research indicates that many factors impact our attributions such as eyebrow prominence, fur color and breed attitude (Clarke et al., 2016; Mota-Rojas et al., 2022; Woodward et al., 2012).
- We hope to learn more about what role breed and facial expressions play in the attributes we make towards dogs.
- I could not inform you of the true nature of the study without the risk that the knowledge would affect your responses and impact your categorizations and attributions.

Do you have any questions?

- You will now have one last opportunity to choose to withdraw your data from the study if you wish to do so.

Thanks!

Your participation in this study is now complete!

Do you have any questions?

Feel free to reach out via email:
kford2@upei.ca
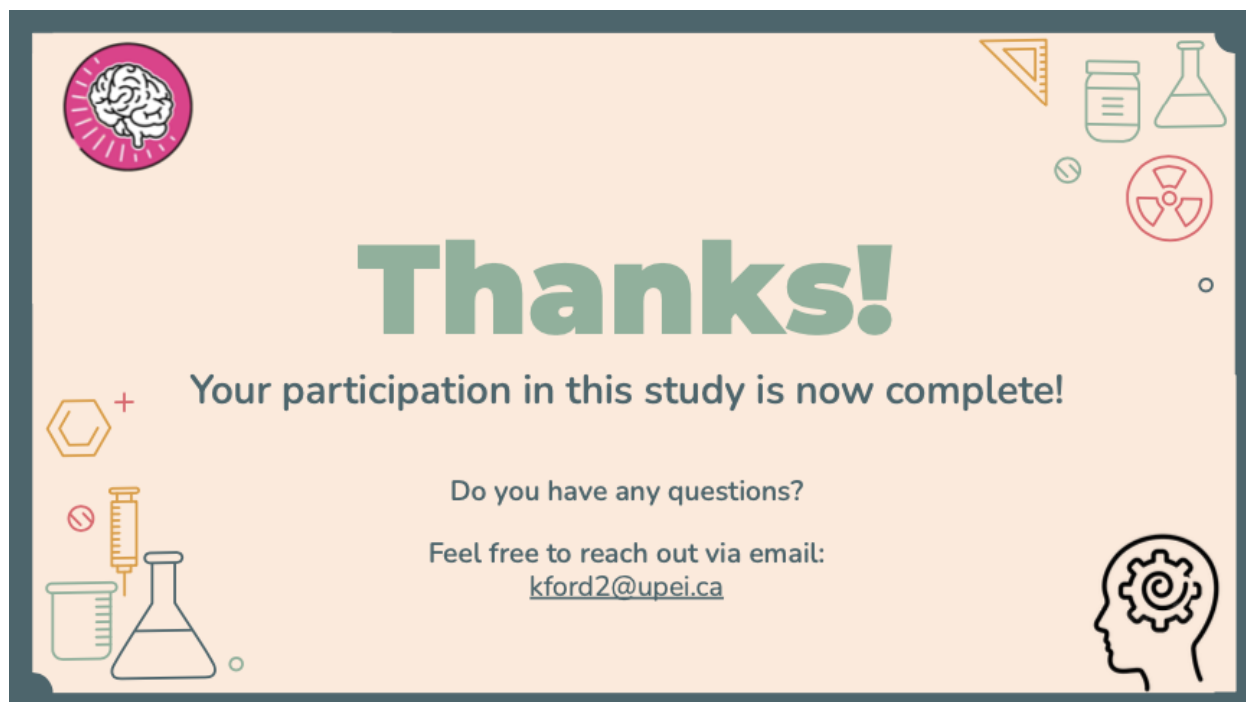
Appendix G
Ethics Review Protocol Submission Form with REB Edits

Project Info.

File No: 6010451
Project Title: Factors that Impact the Categorization of Dogs' Facial Expressions
Principal Investigator: Dr. Catherine Louise Ryan (Faculty of Arts\Psychology)
Start Date: 2022/01/01
End Date: 2022/11/30
Keywords: Dogs, Emotions, Attitudes, Facial Features

Project Team Info.

Principal Investigator

Prefix: Dr.
Last Name: Ryan
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Position: Professor
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Phone1: 566-0323
Phone2:
Fax:
Primary Address: Dept of Psychology, UPEI
Institution: University of Prince Edward Island
Country: Canada
Comments:

Other Project Team Members

Prefix	Last Name	First Name	Affiliation	Role In Project	Email

| Dr. | Doucette | Tracey | Faculty of Arts\Psychology | Co-Investigator | tdoucette@upei.ca |
| Ms. | Ford | Katelyn | Faculty of Arts\Psychology | Undergraduate student | kford2@upei.ca |

Common Questions

1. General information

#	Question	Answer
1.1	Is this research intended to fulfill part of the requirement for a student program?	yes
1.2	If yes, specify the program type below.	Undergraduate Honours program
1.3	If you selected 'other program' then please specify the program in the box below.	
1.4	If this research is related to a student program, then specify the relevant department below.	Psychology
1.5	Is this research funded?	no
1.6	Have you signed a Release of Funds Agreement?	no
1.7	Does your project involve the use of animals?	no
1.8	If yes, include the title of the Animal Use Protocol and the (Romeo) AUP file number in the box below.	
1.9	Does this research involve the use of biohazardous materials?	no
1.10	If yes, include the title of the Biosafety file and the (Romeo) Biosafety file number in the box below.	

1.11	Does this study involve more than minimal risk to the participants?	no
1.12	Has this study been submitted for review by any other Research Ethics Board?	no
1.13	If 'yes' then specify the name/s of the institutions or organizations to which the study protocol has been submitted, and include information about the current status of the application (pending review, conditional approval, full approval etc).	

2. Project personnel

3. Project summary

#	Question	Answer

3.1	Briefly describe the rationale and purpose of the study.	Recent evidence suggests that dogs are capable of reflecting states of emotions through their facial expressions. Facial expressions are considered a primary visual stimuli used to convert emotional information therefore being a key component of nonverbal communication, with this being extended to dogs (Correia-Caeiro et al., 2021; Kujala et al., 2017). Dogs' use their faces and bodies to visually express emotions (Bloom & Friedman, 2013; Kujala et al., 2017). In general, aggressive facial expressions in dogs present themselves as bared-teeth, a wrinkled muzzle, and erect/forward pointing ears. Positive expressions are viewed as a relaxed face, an open mouth, protruding tongue and erect ears. Lastly, neutral expressions are viewed as a relaxed face and having no apparent facial muscle tension (Racca et al., 2012). In order to discover how well participants can categorize a dog's emotions, photographs of a dog's face are used as stimuli. However, to date the majority of these studies have failed to use a wide range of different stimuli with contrasting morphologies and breeds. These factors may have an impact on how participants rate and categorize the facial expressions of dogs. This in turn could influence our perceptions of these animals, and reflect on their welfare and treatment. This honours project will examine how differences in facial features and breeds can impact our perceptions and categorization of dogs' facial expressions. With evidence suggesting color, facial structure and breed can have an impact on behavioral and perceptual categorizations,

		there may be an effect present while examining facial expressions. In order to investigate the attitudes towards differences in breeds and expressions, this study will take a situational approach, and investigate how likely participants are to approach a dog using pictures of their faces.
3.2	What new knowledge is anticipated as an outcome of the study?	This study hopes to produce new knowledge surrounding the factors that impact humans categorizations of dogs' facial expressions. More specifically, it will aim to generate new knowledge surrounding how differences facial expression and breed impacts participants likeness to approach an unfamiliar dog.

4. Study design

#	Question	Answer
4.1	State the hypothesis or aim of the study.	The aim of this study is to explore how a dogs' facial expressions and breed impacts someone's "likeness to approach" an unfamiliar dog. It also aims to explore the impact that participants' attitudes towards dogs, as well as their prior experience, comfort level and likeability towards dogs has on these categorizations.

4.2	Provide justification for the study. Address the scholarly/scientific validity of the study and the appropriateness of utilizing human participants.	Preliminary studies have demonstrated that breed and physical traits can play a role in what attributes humans assign to dogs. Recent research suggests that people perceive black dogs negatively due to the inability to discern facial expressions because of their dark faces (Woodward et al., 2012). As well, one study found that mesocephalic morphologies were perceived more positively than dogs with longer muzzles, perhaps explaining the increase in popularity in mesocephalic dogs (Brincat et al., 2022). Lastly, a study showed that breed perception can play a role in behavioral categorization. Clarke et al found that if a dog was classified as a terrier (regardless of the actual nature of the breed) this attracted high scores in aggressiveness, in contrast to being classified as a toy dog (Clarke et al., 2016). This indicates that the mere label a human places onto a dog can have a strong effect on people's perceptions surrounding behavioral traits. Therefore, this honours project will examine how differences in facial features and breeds can impact our perceptions and categorization of dogs' facial expressions. With evidence suggesting color, facial structure and breed can have an impact on behavioral and perceptual categorizations, there may be an effect present while examining facial expressions. In order to investigate the attitudes towards differences in breeds and expressions, this study will take a situational approach, and investigate how likely participants are to approach a dog using pictures of their faces. References: Brincat BL, McGreevy PD, Bowell VA, Packer RMA. Who's Getting a Head Start?

		Mesocephalic Dogs in Still Images Are Attributed More Positively Valenced Emotions Than Dogs of Other Cephalic Index Groups. Animals (Basel). 2021 Dec 27;12(1):49. doi: 10.3390/ani12010049. PMID: 35011155; PMCID: PMC8749540. Clarke, T., Mills, D., & Cooper, J. (2016). Type as Central to Perceptions of Breed Differences in Behavior of Domestic Dog. Society & Animals, 24(5), 467-485. 10.1163/15685306-12341422 Woodward, L., Milliken, J., & Humy, S. (2012b). Give a Dog a Bad Name and Hang Him: Evaluating Big, Black Dog Syndrome. Society & Animals, 20(3), 236-253. 10.1163/15685306-12341236

4.3	Describe the plan for data analysis in relation to the hypotheses/questions/objectives.	Analyses will explore whether dog attributes, dog facial features, breed and/or participants attitudes toward dogs will impact on the probability of approach using the appropriate descriptive, parametric and non-parametric test statistics.
4.4	Is this study intended to be a pilot study or a fully developed project?	fully developed project
4.5	Are you requesting a phased review of this protocol?	no
4.6	If a phased review is being requested, describe why it is needed and which phases are contained in this application.	

5. Detailed methodology

#	Question	Answer
5.1	Where will the research be conducted?	This study will be conducted virtually via the online platform zoom, using a Powerpoint presentation presented by the honors student. The honours student will conduct this study out of the Behavioral Neuroscience lab, Rm 113, in Memorial Hall on the UPEI Campus using the lab computer. The honours student will meet virtually via Zoom with participants.

| 5.2 | What will the participants be asked to do? How long will it take to complete each task? What is the total time required by each participant to complete all tasks? | For a more detailed explanation see Step-by-Step Methods in Appendix E. First participants will be presented with the information letter (See Appendix B) and consent form (See Appendix A) and have time to read it over.In order to consent the words "Participant Consent" with the question "Do you consent to participate in this study?" with "Yes/No" options will appear on the screen. Participants will be asked to verbally respond and then to provide a "tick mark" in the box using the stamp that reflects their oral response.Next they will indicate whether they would like to be entered into the draw for the gift card, or given a bonus point for Psychology 1010 or 1020(5 mins).The bonus point is contingent on the syllabus of the course instructor. If there is no space allotted in the syllabus for the 1% bonus and an alternative assignment participants will be entered into the draw instead. Participants who wish to receive a 1% bonus point must inform the honours student, who will then inform the course instructor. Next a short demographic questionnaire will be performed (See Appendix C) (5 mins). Participants will then be asked to fill out the Coleman Dog Attitude Scale (C-DAS) (See Appendix C) (5 mins.). Similar to giving consent, participants will record their responses using the stamp tool on Zoom to create an X to indicate their responses. For Part 1 Participants will be given a situational prompt. Next, the stimuli will be presented using Microsoft Slides (See attached slides). 18 breeds will be presented via individual pictures with each picture will be shown twice for a total of 36 photos. |

After each photo participants will be asked to answer on a 7 point scale how likely they would be to approach the dog. 0) Extremely unlikely 1) Very Unlikely 2) Unlikely 3) Neutral 4) Likely 5) Very Likely 6) Extremely Likely. This scale will be presented underneath the photo and participants will respond by ticking the corresponding response. Participants will have 30 seconds to respond to each picture, and at 15 seconds, they will be given a verbal prompt that they have 15 seconds left to respond (15-18 mins). In Part 2 participants are given a second situational prompt. Using the same Microsoft Slides, a total of 36 comparisons will be made. Participants will be asked which dog they would approach 1)the dog on left or 2) the dog on right. A box with the word "Left" will be placed underneath the photo on the left, and a box with the word "Right" will be placed underneath the photo on the right. Participants will respond by ticking either the left or right box. Identical to Part 1 participants will have 30 seconds to respond to each picture, and at 15 seconds, they will be given a verbal prompt that they have 15 seconds left to respond (15-18 mins).After participants will be briefed (5 mins)and a final opportunity to withdraw consent will be presented. In total, participation in the study will take no more than 50 minutes.

5.3	Describe what data will be recorded and what research instruments will be used.	Data to be Recorded: Demographic Questionnaire Responses,C-DAS scale responses, Part 1 Individual Rating of the single pictures (Using Likert Scale) and Part 2 Individual Responses of the comparisons pictures.Research instruments: Demographic questions, C-DAS Scale, Part 1 Individual Rating of the single pictures (Using Likert Scale) and Part 2 Individual Responses of the comparisons pictures. The zoom sessions will not be recorded. The student's personal account, kford2@upei.ca will be used for the purpose of this study.
5.4	Describe the role/s of each of the study investigators and project team members.	K.Ford; honours student/co-investigator; will be responsible for recruitment, leading participants through the study (data collection) and analyzing the data. The roles of Drs. Doucette and Ryan include project oversight and data management at all stages. As well, the study will take place in their joint laboratory facility and will be available at all times during data collection via phone.
5.5	For research involving sensitive issues (e.g. abuse) what ethical qualifications do the research team members have?	

6. Recruitment/Participants

#	Question	Answer
6.1	Total number of participants in this research is:	40+

6.2	Describe the source/s of the participants in the box below.	Recruitment for participants will begin on the UPEI campus through advertisement (See Recruitment Poster) in Psychology 1010 and 1020 courses, and various UPEI informational sources such as Campus News and PASS (Psychology student club) Facebook page. Participation will be open to any English-speaking individual 18 years of age or older with access to a computer, internet and ZOOM. Ms.Ford will be the primary recruiter, and will recruit from Introduction to Psychology 1010 & 1020. Students will not be participating in their instructor's research as the recruitment will primarily take place with the following instructors: Dr. Neil Soggie, Dr. Stacey Mackinnon and Dr. Phillip Smith.
6.3	List all participant inclusion and exclusion criteria.	Participation is restricted to English-speakers, those over the age of 18 with access to a computer, internet and Zoom.
6.4	Describe the method of recruiting participants, including who will contact them. Indicate when participants will be approached.	Recruiting will take place via an online advertising and on the UPEI Campus by the Honours student as well as promotion directly to the PSYCH 1010 and 1020 classes. Advertising will be posted on the UPEI Campus news, Psych dept students Group Facebook page (PASS) and relevant Facebook groups. Participants will be contacted only after they initiate contact via an email response to the recruitment poster.

6.5	Provide a copy of the recruitment script or notice to be used.	(Copy of Recruitment Poster Attached) Hello! My name is Katelyn Ford and I am a psychology student at the University of Prince Edward Island currently working on my honours research under the co-supervision of Dr. Catherine Ryan and Dr. Tracy Doucette. I am extremely interested in furthering the current research on human-canine interactions. I will be looking to meet with more than 40 participants for this research project. The study will be conducted via the online platform Zoom. Participants will be required to answer a few brief questionnaires and then be presented with a situational prompt, and a range of photos. Participation in this study should take no longer than 50 minutes. By participating in this study, you will have the opportunity to be entered into a draw to win a $50 Canadian Amazon gift card! If you are interested in participating, or have ANY question regarding this study, please do not hesitate to contact me, Katelyn, by email kford2@upei.ca or by phone (902) 213-1116.
6.6	Are vulnerable participants being recruited? (e.g. inmates, patients)	no
6.7	If vulnerable participants will be recruited, please describe the groups in the box below.	

7. Risks and Benefits

#	Question	Answer
7.1	If more than minimal risk is involved then discuss the risks of the proposed research to all parties, specifying the particular risks associated with each procedure, test, interview, or other aspect of the protocol.	

#	Question	Answer
7.2	Describe the estimated probability of these risks (e.g. low, medium, high, or more precisely, if possible)	
7.3	Describe what steps will be taken to mitigate the risks.	
7.4	Describe what risks might exist for communities that are involved in the study.	
7.5	Describe the direct benefits (if any) of participation to participants (not compensation).	

8. Informed Consent Process

#	Question	Answer
8.1	Provide a detailed description of the informed consent process in the box below.	A participant informed consent form will be presented to the participant prior to beginning the study (See Appendix A). Participants are informed that their participation is completely voluntary and that they are free to leave the study at any time throughout the duration of the session without the fear of any repercussions or consequences. First participants will be presented with the information letter (See Appendix B) and consent form (See Appendix A) and have time to read over it. After, using the stamp tool on Zoom to create an X they will indicate whether or not they consent to participation in the study. Participants will be given a final opportunity to choose to withdraw their data from the study following the debriefing at the end, after which time, if consent is maintained, the data will be added to the data pool.

8.2	If oral consent is desired, describe why it is necessary and how it will be done.	Due to this study being conducted virtually, both oral and physical consent confirmation is necessary. Since Zoom is the method of delivery, participants will begin with a shared screen and Powerpoint display. The initial display is the Participant Information letter (shared on the screen and read by the Experimenter). Following this, Participants will be asked to provide consent. The words "Participant Consent" with the question "Do you consent to participate in this study?" with "Yes/No" options will appear on the screen. Participants will be asked to verbally respond and then to provide a "tick mark" in the box using the stamp that reflects their oral response. After recording oral consent, the time of consent will be noted.
8.3	If a waiver of consent is sought, please justify.	
8.4	For third party consent (with or without assent), describe how this will be done.	
8.5	Describe the need for, and the plans (if any) for on-going consent.	Participants will be informed that they are free to withdraw from the study at any time during the duration of the data collection without fear of repercussion or consequences during the introduction to the study and reviewing of the informed consent form. Participants will be reminded of their right to forgo participation in the study before leaving the study.
8.6	If community consent is needed, describe how it will be obtained.	
8.7	What effort has been made to recruit an inclusive sample?	Any person over the age of 18 with access to a computer, internet and ZOOM is welcome to participate in the study.

8.8	Are the participants competent to consent?	yes
8.9	If 'no', then who will consent?	
8.10	Are children involved?	no
8.11	If 'yes', then what age groups? (select all that apply)	
8.12	How will the children be recruited? (select all that apply)	
8.13	If you selected 'other' or 'through another institution' then please specify how and where the children will be recruited.	
8.14	Will consent for the child to participate in this research be sought from the child's parent or guardian?	
8.15	If 'yes', will the child's assent to participate be obtained?	
8.16	If 'no', then please explain.	
8.17	If students are being recruited, are they the researcher's own students?	no

9. Deception/Incomplete Disclosure

#	Question	Answer
9.1	Describe what misdirection will be used (if any) and discuss its justification.	Participants will be told that the purpose of this study is to examine human-animal interactions. The true nature of this study is not revealed due to the risk that the knowledge would affect the responses, categorizations and attributions.
9.2	Describe what relevant information will not be disclosed to participants and discuss its justification.	It will not be disclosed that the true purpose of this study is to explore what factors impact someone's "likeness" to approach an unfamiliar dog. This is done to prevent the participant from being influenced by the knowledge that certain factors can impact our categorization of dogs' attributes. The true purpose of the study will be shared at the end of this

		study.
9.3	Describe how participants will be briefed and given the opportunity to withdraw their data.	Upon completion the true intent of the study will be disclosed (See Debriefing Script in Appendix D). Participants will be given one final opportunity to withdraw their data from the study and then the study will terminate.

10. Confidentiality and Anonymity

#	Question	Answer
10.1	Are the data being collected of a personal or sensitive nature?	no
10.2	Describe how the data will be collected, stored and handled in a confidential manner. Include information about who will have access to the data.	Data will be collected and stored on a password protected computer in a locked laboratory in Memorial Hall (Room 113). Any work being done with the data will take place on this password protected laboratory computer. Only the PI and project supervisors will have access to the data.
10.3	How long will the data be retained? What are the plans for their disposal?	All data will be securely retained for a period of 5 years after the completion of the study, after which time, they are destroyed.

| 10.4 | Is it possible for participants to remain anonymous? If yes, how will this be achieved? | No personal identifying factors will be recorded in this study except for those students wishing to receive the bonus mark in the PSY 1010 or 1020 course. These student ID numbers and emails will be kept separate from the study data and destroyed once the list of students who completed the survey is compiled for the PSY 1010 or 1020 professor. The identifying information will include the participants email and contact information (email). The information for participants receiving a bonus point will be supplied to the department tech. The information for the participants entered in the lottery will be supplied to the primary investigators (Dr.Ryan and Dr.Doucette). These student ID numbers and emails will be kept separate from the study data and destroyed once the list of students who completed the survey is compiled for the department tech and primary investigators. No personal identifying information will be collected or stored with the data and therefore will not be able to be linked to any individual participant. |
| 10.5 | Will a waiver of confidentiality be sought from participants? If so, why? | |

| 10.6 | How will de-identification be handled in publication of results to minimize the risk of a breech of anonymity? | No personal identifying information will be collected or stored with the data and therefore will not be able to be linked to any individual participant. The identifying information will include the participants email and contact information (email). The information for participants receiving a bonus point will be supplied to the department tech. The information for the participants entered in the lottery will be supplied to the primary investigators (Dr.Ryan and Dr.Doucette). These student ID numbers and emails will be kept separate from the study data and destroyed once the list of students who completed the survey is compiled for the department tech and primary investigators. No personal identifying information will be collected or stored with the data and therefore will not be able to be linked to any individual participant. |
| 10.7 | How will confidentiality be maintained in focus groups? (if applicable) | |

11. Compensation and Debriefing

#	Question	Answer
11.1	Will compensation be offered to the research participants?	yes

| 11.2 | If 'yes', describe how the compensation will be provided to the participants and how it will be handled for participants who do not complete the study. | Compensation options as outlined below will be offered to all Participants who consent to participate, regardless of completion of the study or not. Students who are enrolled in UPEI Psych 1010 or 1020, depending on the instructor, can be offered, as part of course options, a 1% bonus point for participation in specific Psychology Dept research studies. Students in this situation, will be offered the option of the 1% bonus point or to have their names entered into the draw as outlined below. Instructors must also have an alternative assignment for those who do not wish to participate in the project. If there is no space allotted in the syllabus, then students would be eligible for the draw-option only. Should participants wish to receive a 1% bonus point they must inform the honours student Katelyn Ford, who will then inform the course instructor. For all other Participants, the option of entering into a draw will be offered. The names of consenting Participants will be entered into a draw for a $50.00 Canadian equivalent giftcard to the UPEI Bookstore or Amazon.ca.Participants wishing to be entered in the draw will provide their email address which will be used to contact them should their name be drawn. A list of email addresses and accompanying names will be kept separate from the data. |
| 11.3 | Amount and form of compensation to be offered to the participants. | All Participants are offered the opportunity to enter into a draw for a $50.00 UPEI Bookstore gift card or a Canadian Amazon Gift card or (odds of winning 1:50). Psychology 1010 or 1020 students (if they have a 1% bonus option), |

		will be offered the choice between the 1% class bonus point or entry to the draw.
11.4	Are participants likely to incur any expenses as a result of taking part in this research? If so, please describe.	No
11.5	Describe your plans for adequate and timely debriefing. Include a script of the basic debriefing given to the participants at the completion of their participation.	Participants will be debriefed on the true purpose of the study after completing the Microsoft slideshow and will only take a few moments (See Debriefing Script in Appendix D)
11.6	Describe your plans for informing participants of the results of the study.	Participants wishing to be made aware of the results of the study can contact Katelyn (kford2@upei.ca) after the project has been completed.

12. Conflict of Interest

#	Question	Answer
12.1	What direct or indirect benefits (if any) are you, as PI, receiving as a result of this research?	As PI, benefits from this research include the fulfilling the requirements to complete the Psych 4900 honours thesis
12.2	Do you or your collaborators have any affiliation with, or financial involvement in, any organization or entity with a direct or indirect interest in the subject matter or materials of this research?	no
12.3	If 'yes' then provide details in the box below.	
12.4	Are there any agreements between the investigator/s and the sponsor/s of this research that restrict publication of results from this research?	no
12.5	If 'yes', provide details in the box below.	

13. Human Genetics Research

#	Question	Answer
13.1	Does your research involve human genetic material?	no
13.2	If 'yes', what are the ethical issues involved? (consult Chapter 13 in the TCPS 2 (2018)).	

14. UPEI Submission Checklist for Informed Consent

#	Question	Answer
14.1	Please select all items that you have included in your participant Consent Form/s and/or participant Letter/s of Information:	identification of document as Consent Form|title of study|identity and affiliation of researchers|contact information of individual conducting the study|invitation to participate in the research|assurance of voluntariness and right to withdraw without repercussions|short description of the purpose of the study|short description of the study design and how many participants are involved|description of participant inclusion and exclusion criteria|description of what the participant is being asked to do|estimate of the time commitment required of the participant|description of where the research will take place|description of how anonymity will be handled|description of how confidentiality of the data will be assured|description of the benefits and risks associated with participating in this research|description of compensation that will be provided to participants|description of how study results will be provided to participants

#	Question	Answer
14.2	The Consent Form should also include the following statements. Please select all statements that are included in the Consent Form.	I understand that I can contact the UPEI Research Ethics Board at (902)-620-5104, or by email at reb@upei.ca if I have any concerns about the ethical conduct of this study|I have the freedom to withdraw at any time|no waiver of rights is sought|I understand that I can keep a copy of the signed and dated consent form|I understand that the information will be kept confidential within the limits of the law|I have the freedom to withdraw at any time and/or not answer any question/s

15. Information and Submission Checklist for REB appli ...

#	Question	Answer
15.1	Applications that are submitted to UPEI REB and to Health PEI REB must include the following documents (where applicable). Select all that you have included with your application.	UPEI Research Ethics Board application form|participant Consent Form/s|participant Letter/s of Information|advertisements and/or other recruitment notices|telephone or other scripts used for participant recruitment|questionnaire/s, measurement instruments or other survey tools|CV of the primary investigator|TCPS 2 certificate/s

16. PI Declaration

#	Question	Answer
16.1	I agree to abide by the ethical guidelines and procedures of the University of Prince Edward Island Research Ethics Board (UPEI REB, current version) of the Tri-Council Policy Statement (current version), of my profession or discipline, as well as of the institution in which the research is undertaken. I am aware of my responsibility to be familiar with these standards.	I agree

16.2	I agree to notify the UPEI REB of any change in the methodology or status of the research project and to comply with requests made by the REB during the life of this research.	I agree
16.3	I understand that this REB protocol is VALID FOR 12 MONTHS from the date of commencement.	I agree
16.4	I understand that this REB protocol can be renewed annually for a maximum of 5 years in total.	I agree
16.5	I understand this REB protocol accurately describes the proposed inclusion of human participants. It will be kept current and will be modified only after obtaining the approval of the UPEI REB.	I agree
16.6	I understand that the research will be carried out by personnel listed in the 'Project Personnel' tab and that these individuals are trained and competent in using the approved approaches and/or techniques described in the protocol.	I agree
16.7	I understand that I must inform the UPEI REB within 24 hours about any adverse events that have occurred.	I agree
16.8	I certify that the information provided in this application is accurate and complete.	I agree

Attachments

Doc / Agreement	Version Date	File Name	Description

Appendices	2022/03/24	Appendices A-E - Revised (With Track Changes) (5) (1).docx	Revised Appendices with Track Changes
Appendices	2022/03/24	Revised_ Honours Proposal (with references) (1).pdf	Revised Honours Proposal
Appendices	2022/03/24	Revised - Recruitment Poster (2).pdf	Revised Recruitment Poster
Appendices	2022/02/10	CV 2021.docx	CV Principal Investigator Dr. Catherine Ryan
Appendices	2022/02/10	Appendices A-E.pdf	Appendices A-E Appendix A - PARTICIPANT CONSENT FORM Appendix B - PARTICIPANT INFORMATION LETTER Appendix C - Demographic Questionnaire and The Coleman Dog Attitude Scale (C-DAS) Appendix D - Debriefing Script Appendix E - Step-by-Step Methods
Appendices	2022/02/10	Recruitment Poster.pdf	Recruitment Poster

Appendices	2022/02/10	Honours Proposal (with references).pdf	Detailed Honours Proposal consisting of Introduction, Methods, Anticipated Results and References (references for stimuli pictures also included in this document).
Appendices	2022/02/10	Stimuli Pictures.pdf	Stimuli Pictures being used in the Microsoft Slides
Approval Certificate	2022/03/28	Ryan approval 6010451.pdf	N/A
Correspondence	2022/03/17	proposed-standard-for-race-based-data-en.pdf	CIHR standard for race and ethnicity in research; referred to in review comments.
TCPS2 Tutorial Certificate	2021/02/23	TCPS2 - Dr. Catherine Ryan.pdf	TCPS2 Tutorial CertificATE
TCPS2 Tutorial Certificate	2021/11/30	Katelyn Ford tcps2_core_certificate (1).pdf	TCPS 2: CORE Katelyn Ford
TCPS2 Tutorial Certificate	2019/10/21	T Doucette tcps2-eptc2-certificate.pdf	TCPS 2: CORE Dr. Tracy Doucette

Appendix H
Stimuli Picture Sources

Pictures retrieved via Google Image Search from the following sources:

Golden Retriever: https://www.pinterest.ca/pin/555068722829081529/
Beagle: https://dogpack.com/dog-breeds/beagle
Pug: Bahou, R. (2016). Animal Soul. Red Door Publishing
Border Collie: https://bordercolliehealth.com/white-border-collie/
Black Lab:
https://www.shutterstock.com/image-photo/black-labrador-portrait-image-taken-studio-1046021 908
Golden Lab:
https://healthtopics.vetmed.ucdavis.edu/health-topics/canine/inheritance-coat-color-labrador-retri ever
German Shepherd:
https://fineartamerica.com/featured/sable-german-shepherd-dog-sandy-keeton.html?product=gre eting-card
Black German Shepherd: https://www.pngarts.com/explore/155720
Husky: Bahou, R. (2016). Animal Soul. Red Door Publishing
Cocker Spaniel:
https://www.istockphoto.com/photo/english-cocker-spaniel-9-months-old-sitting-against-white-b ackground-gm150420987-21072317
Chihuahua:
https://fineartamerica.com/featured/chihuahua-dog-portrait-at-a-pink-background-elles-rijsdijk.ht ml
Doberman (Pinned):
https://www.gettyimages.ca/detail/photo/portrait-of-a-doberman-royalty-free-image/982678518 **Doberman (Unpinned):** http://vision.stanford.edu/aditya86/ImageNetDogs
American Terrier: https://www.ukpets.com/blog/is-an-american-bully-a-pitbull/
Rottweiler: https://www.pikist.com/free-photo-vkkuv
Boxer: https://fineartamerica.com/featured/11-portrait-of-a-boxer-dog-animal-images.html
Friendly Golden Retriever:
https://fineartamerica.com/featured/smiling-and-happy-golden-retriever-dog-portrait-mary-evans -picture-library.html
Friendly Rottweiler:
https://www.dreamstime.com/stock-photo-rottweiler-front-white-background-portrait-image5676 6850

Friendly German Shepherd:

https://pixers.ca/wall-murals/german-shepherd-dog-portrait-on-white-56922386

Background removed using:

https://www.remove.bg/.

Picture of dog on recruitment poster:

https://www.hiclipart.com/free-transparent-background-png-clipart-ipogx