

The articles have been ordered in chronological order. This has been performed in order to provide the reader with information that is more up to date than the previous as each bibliography is read.

**Miklósi, A', Polgárdi, R., Topál, J., Csányi, V. (2000). Intentional behaviour in dog-human communication: An experimental analysis of “showing” behaviour in the dog. *Animal Cognition*, 3(3). 159-166. <https://doi.org/10.1007/s100710000072>**

**Summary:**

It is known that numerous species are able to communicate external events to conspecifics, these events are representative of showing behaviour. However, limited knowledge is known of this behaviour in dogs. Miklósi et al. (2000) aims to determine whether dogs participate in functionally referential behaviour in the form of showing to gain the attention and direct the owners to an object of interest. 10 subjects (4 male, 6 female) ranging in age from 2-7 years old participated in the study. The study involved three identical feeding bowls which the dogs were familiarized with. There were three conditions: Petting, Dog-alone, and Hiding, each condition consisted of three sessions. The session started with owner in the room for 1 minute and then leaves, the second session involves the hider entering and petting or introducing the food or toy and hiding it in a bowl before leaving, the third session involved the owner entering and reading for a minute (ignoring), both the hider and owner entering and giving the contents, or the owner providing the contents after a minute if the contents were found. As the petting condition was a control, no significant differences in behaviour were observed. The dog-alone condition had the dog increase vocalisations towards the door and frequency of gaze towards the bowl with the hidden contents. In the hiding condition, there was an increase in gaze frequency towards the owner and hidden content. These results indicated that dogs were able to communicate the hidden location of contents to their owner where the subjects started to perform behaviours, such as gaze alteration and vocalisation, which would gain the attention and direct the owners towards the hidden contents. This behaviour is indicative of showing behaviours within dogs and has been used in the communication between dogs and humans.

**Contribution:**

This article was selected for the literature review as it provides further support of previous studies in the field and supports other articles in the literature review. The article provides a new analysis of dog behaviour in dog-human communication. The significance of the article is that it provides evidence of showing behaviour in dogs which is used in dog-human communication for the dog to gain the attention and subsequently direct the attention of the owner in a specific manner. Future research must occur using the same methodology with the effects of unfamiliar individuals on showing behaviours in dogs.

**Call, J., Bräuer, J., Kaminski, J., Tomasello, M. (2003). Domestic dogs (*Canis familiaris*) are sensitive to the attentional state of humans. *Journal of Comparative Psychology*, 117(3), 257-263. <https://doi.org/10.1037/0735-7036.117.3.257>**

**Summary:**

It is known that dogs have extensive social-cognitive abilities in the interactions with humans. These skills may have developed predispositions for dog-human communication, facilitated through domestication. Call et al. (2003) performs this study to determine the effects of the attentional states of humans on the behaviour and actions of dogs. The subjects consisted of 12 dogs (8 males, 4 females) ranging from the age of 1-9 years old. The study was performed in one of three quiet rooms where three subjects received experiment 1 first, three received experiment 2 first and the others only received experiment 2. Experiment 1 focused on behaviour if owner stayed or left room and experiment 2 focused on attention states of owner. Each experiment had 4 conditions with 8 trials each; experiment 1 had in-forbid (control), out-forbid, in-take, and out-take. Experiment 2 had conditions eye open (control), distracted, eyes closed, and back turned. The results indicated that the dogs took significantly less food in the control of experiment 1 to the experimental conditions, with more indirect approaches. In experiment 2, significantly less food was taken in the control as compared to the experimental conditions with significant difference in indirect approaches between control and back-turned and eyes closed. Dogs had the greatest latency in taking the food in the eyes open condition. The significance of these results is that the study shows dogs are sensitive to the attentional states of humans as less food was taken by the dogs when humans had visual access to the food in both experiments. This indicates that attentional states provide a reference to dogs for when it is safe to perform certain behaviours and actions which can be a factor that influences dog-human communication in conjunction with other forms of communication including verbal and gestural signaling.

**Contribution:**

This article was selected for the literature review as the study performs an in-depth analysis of a different aspect of dog-human communication as attentional states can influence behaviour. This article further develops previous studies while opening new methodologies to understand dog behaviour in dog-human interactions. The significance of the article is that it provides us insight into how the attentional states of humans can influence the interactions between dogs and humans and the subsequent dog-human communication. Further research can be performed on the role social experiences in dogs play of the sensitivity to the attentional states of others.

**Riedel, J., Schumann, K., Kaminski, J., Call, J., Tomasello, M. (2008). The early ontogeny of human-dog communication. *Animal Behaviour*, 75(3). 1003-1014. <https://doi.org/10.1016/j.anbehav.2007.08.010>**

**Summary:**

It is known dogs can follow a variety of social cues and are skillful at responding to these cues. Riedel et al. (2007) investigates the influences ontogeny of a dog has in dog-human communication. Three experiments were conducted with eight trials per condition, experiment 1 had cups placed near the experimenter, experiment 2 and 3 had cups near the subject. The subjects received the food if they followed the signal to the hidden food. Experiment 1 had 64 dogs (30 females, 34 males) in four age groups: 6-, 8-, 16-, and 24-weeks-old. 16- and 24-week-old puppies were tested in a quiet 20m<sup>2</sup> room, while the other groups were tested in a controlled room in their breeding home. One experimenter held the puppy while another gained the attention of the puppy while hiding the food. Four conditions were used for social cues: dynamic cross point, dynamic cross point move, marker, and control. Experiment 2 had the same procedure as experiment 1 with 48 dogs (29 females, 19 males) in three groups: 6-week-old puppies, naïve adult dogs, and experienced dogs. Two conditions were present, distal point middle and control. If after one minute the dog hasn't selected, trial was discarded. Experiment 3 used the same procedure as experiment 2, using 32 dogs (18 female, 14 male). Two groups, 6-week-old and adult naïve dogs, and had two conditions: distal point side and control. Experiment 1 indicated that all age groups made the correct selection above chance except in control. In experiment 2, only 6-week-old were able to perform above chance, and experiment 3 indicated both age groups performed above chance in correct selection. The significance of the results indicates the dog's ability to follow human social cues is present even before exposure to humans, providing evidence these skills are a result of selection through domestication and not ontogeny.

**Contribution:**

This article was selected for the literature review as it provides an analysis of the possible developmental effects have on dog-human communication. This significance of the article is that the authors provide an analysis of development in dog-human communication, this investigates how and if proximate causes influence the understanding of human social cues in the interactions between dogs and humans. The article does not indicate whether previous studies support or contradict the results. Future research should focus on whether dogs understand the pointing gestures in this study as referential, which would display dog's understanding of communicative intent.

**Miklósi, Á. (2009). Evolutionary approach to communication between humans and dogs. *Veterinary Research Communications*, 33. 53-59. <https://doi-org.ezproxy.lib.ucalgary.ca/10.1007/s11259-009-9248-x>**

**Summary:** Miklósi (2009) reviews research involved in understanding interspecies communication and the complex interactions of dog-human communication caused by domestication, an evolutionary perspective. These interactions have been understood on the individual level through the influence of the environment surrounding dogs. Communication is described as the change in behaviour and inner state of the receiver where the signal represents

an inner state of the sender. For communication to be studied, the sender must gain the attention of the receiver and cause a change in the behaviour of the receiver. This involves a learning component; however, the complex interactions indicate development of behavioural cues through evolution. The communication between two species can occur through three possibilities; (a) closely related species can rely on similar signaling processes, (b) distantly related species can develop similar communicative signals due to a similar environment, resulting in convergent behaviours, (c) common environment between two species allows for learning of other species' behaviours. Through domestication, the shared environment between dogs and humans allowed for convergent evolution of behaviours. This has been observed using gestural signals, pointing and body language, as a form of communication. Convergent evolution is also seen in dog-human communication through gaze and using unfamiliar gestures (leg pointing). These findings suggest evolutionary development of cognitive abilities within dogs have allowed for complex dog-human communication. The research in this article provides significance as it suggests ultimate causes of the complex behaviours observed in dog-human communication. Though further research must be performed on the method of how domestication affected cognitive abilities allowing for the responsiveness and facilitating human communication, there are three possibilities; (a) domestication could have acted directly on dogs during communication with humans, (b) domestication modified various mechanisms to facilitate communicative abilities, these mechanisms would have modified temperament (c) dog-human communication is solely based in terms of learning.

**Contribution:** This review article was chosen as it provides an in-depth analysis of ultimate causes on dog-human communication. It investigates and combines previous research performed on the effects of domestication in dog-human communication, advancing how interspecies communication occur and developed. It provides significance as the article indicates proximate causes, important on the individual level, have been influenced by the mechanisms developed through domestication, an ultimate cause. The article acts as a resource for more articles to further study. It supports future research on a widely accessible animal and suggests research on how domestication influenced the behavioural mechanism of dog-human communication.

**Dorey, N. R., Udell, M. A., Wynne, C. D. (2010). When do domestic dogs, *Canis familiaris*, start to understand human pointing? The role of ontogeny in the development of interspecies communication. *Animal Behaviour*, 79(1), 37-41.**

<https://doi.org/10.1016/j.anbehav.2009.09.032>

**Summary:**

Domestication has been understood as the cause of the behaviours through evolution, however, it is unknown whether ontogeny has any impact on dog-human communication. This research article investigated whether understanding human pointing in dog-human communication was influenced by ontogeny. Dorey et al. (2010) explores this as it has been understood that dogs are

sensitive to numerous human social cues in communication and have used human pointing to understand human communication, however, is accounting for various experimental errors observed in previous studies. 33 puppies (16 male, 17 female) were involved in the study, which were volunteered by their owners to participate, aged between 9-24 weeks old. The puppies were separated into four age groups: 9-12 weeks old (10 individuals), 13-16 weeks old (6 individuals), 17-20 weeks old (8 individuals), 21-24 weeks old (9 individuals). Testing occurred in the morning or afternoon when puppies were the most active. The puppies were held 1.5 m away from the experimenter, who sat at the midpoint between two SOLO cups (0.5 m). Food was placed within the cups, a correct response to pointing resulted in the food reward. Incorrect response led to no reward. Four pretraining trials occurred before 10 experimental trials, with a control trail every two experimental trails. Experimenter gained attention of the puppy in trail, momentarily pointed to a cup before returning to a neutral position, then each puppy was released. The results indicated the number of subjects who had eight or more correct responses to human pointing to increase with age; zero for the first two groups, two individuals in 17-20 weeks old, and six individuals in 21-24 weeks old. Performance due to age was most significant between the 9-12 week and 21-24-week age groups. Though the puppies do not indicate learning over the trails, there is evidence of learning human pointing as puppies grow older, implying a role of ontogeny in dog-human communication.

**Contribution:**

This article was selected as it provides vital context to describe the proximate and ultimate effects on dog-human communication. The results from the study show the effects of both causes, learning and evolution, is involved in dog-human communication. This article advances the knowledge in the field as it provides a concrete answer on whether learning is involved in dog-human communication. Previous studies contradicted the article's results, stating that evolution is the sole contributor, however, it was stated experimental errors were evident in these studies. Further research should investigate how much and what type of social interactions allow for dog-human communication.

**Lakatos, G., Gácsi, M., Topál, J., Miklósi, Á. (2012). Comprehension and utilisation of pointing gestures and gazing in dog-human communication in relatively complex situations. *Animal Cognition*, 15(2). 201-213. <https://doi.org/10.1007/s10071-011-0446-x>**

**Summary:**

It is known that dogs are skillful at understanding a variety of gestural signaling in dog-human communication. However, there are a limited number of studies performed in which this signaling is used in more complex situations. Lakatos et al. (2012) performs this study to determine the effect gestural signaling is affected and influenced in complex situations. Three studies were performed. The first study had 16 dogs (11 males, 5 females) who performed two sessions, a participation criteria and test. In each session, with eight controls and testing trails,

four bowls were placed (two on each side of the experimenter) where food was placed in with (pretraining) and without (testing) observation by the subject. The experimenter gained the attention of subject and pointed to the baited bowl, only if correct selection occurred did the subject receive the food. In study 2, 23 subjects were used, with a similar methodology to the first study. However, there were two experimenters, one who pointed to the baited bowl and one who pointed to an incorrect bowl. The owner then pointed to the experimenter with the baited bowl. In the third study, 12 subjects (4 males, 8 females) were used, where food was placed in one of three butter pots. Control and experimental trials were performed with four test trials: pointing with owner returning, touching the correct pot, pointing with experimenter returning, pointing with marker. Results indicated significance at group level, however, at the individual level few individuals were more than chance. The significance of these studies indicated that dogs selected the correct side more often than chance, however, preferred bowls closer to the experimenter. The dogs utilized indirect pointing in the second study and were able to indicate location of an object without prior knowledge using a variety of behaviours based on the third study.

**Contribution:**

This article was selected to be a part of my literature review as the authors have an in-depth analysis of gestural signaling in dog-human communication in a variety of situations. The article provided significant insight into dog-human communication in more complex situations as most experimental studies only focused on generalizable and simple experimental methods, and thus, focuses on more life-like situations. The article remains in line with prior studies that focused on gestural signaling. However, future research should focus on studies in this article individually due to slight discrepancies to provide an in-depth analysis to ensure significance of data remains.

**Kaminski, J., Nitzschner, M. (2013). Do dogs get the point? A review of dog-human communication ability. *Learning and Motivation*, 44. 294-302.**

<https://doi.org/10.1016/j.lmot.2013.05.001>

**Summary:**

Dogs have demonstrated skillful use of various human communicative cues in the communication between dogs and humans. Further, they have demonstrated that they are highly attentive to human attentional states during dog-human communication. Kaminski & Nitzschner (2013) investigates dog's communicative ability with humans and its development causes by domestication through the review of several articles. Studies were performed through object-choice paradigm which indicated dogs are skillful in the use of gestural signaling to find a reward. As these behaviours were not explained from local enhancement, various treatments where incongruent signaling led to dogs responding the gestural signal. Further, when no social cues were provided, the success rate was similar to chance. Indicating that gestural signaling



were interpreted by dogs. Domestication is a widely accepted theory of these traits as dogs outperform many other species in the use of gestural signaling in dog-human communication. Studies show dogs outperform wolves in the use of signaling when they are under the same conditions of how they were raised. For wolves to perform at the same level, they required significantly more social interactions as compared to dogs. More evidence which supports domestication causing selection of these skills is that dogs outperform species outside of their genus, outperforming man's closest relative, the chimpanzee. There are two prevailing hypotheses for the causes of domestication: by-product hypothesis and adaptation hypothesis. By-product hypothesis dictates that through selection against fear and aggression in dogs, it allowed for flexible social cognition as a by-product. The adaptation hypothesis dictates dogs were selected to perform certain tasks which used various forms of human communication. Through various studies, it was determined that the adaptation hypothesis supported the results of these studies. Thus, the significance of this indicates that dogs' abilities of using human gestural signals were used as specialized skills through directives rather than a general understanding of human communication.

**Contribution:**

This article was selected for the literature review as the article provides deep insight into dog-human communication through reviewing various articles. Another reason for selection is that this article has cited several articles used in the literature review. The significance of the article is that the authors compiled various studies in order to determine the communicative ability which allowed for the investigation of how domestication has influenced the high social cognition of dogs in dog-human communication. Further research can be performed on the restrictions of dog's social cognition and the mechanisms which underly their use of gestural signaling in dog-human communication.

**Meyer, I., Forkman, B. (2014). Nonverbal communication and human-dog interaction.**

*Anthrozoös*, 27(4), 553-568. <https://doi.org/10.2752/089279314X14072268687925>

**Summary:**

It is known that both dogs and humans rely on being able to interpret the other's body language in order to interact and communicate. Meyers et al. (2014) investigates the influences of human nonverbal sensitivity and experience with dogs on dog-human interactions and subsequent communication. Two studies were performed: study 1 investigated associations between experiences with dogs and human nonverbal sensitivity. Study 2 investigated how experience with dogs and nonverbal sensitivity affect dog-human interactions. Study 1 had 97 participants (90 females, 7 males) who performed a psychometric PONS test for nonverbal sensitivity and a questionnaire for experience (childhood, caretaking, other, present ownership). Dog skills were also evaluated. In study 2, 31 participants were selected, 16 with high nonverbal sensitivity and

15 with low nonverbal sensitivity. In groups of 3-5, students individually interacted with a 7-year-old, intact, Golden Retriever. The dog and owner stood in a 3m x 3m square with the students 3m from the edge of the square. Behaviours of the students and dogs measured using an ethogram. Results from the first study indicated 22 students had low nonverbal sensitivity, 54 had medium, and 21 had high sensitivity and having a dog in the household during childhood had no associations with levels of nonverbal sensitivity. The second study indicated more insecurity behaviours when greeting students with low nonverbal sensitivity and no dog experience with a significant positive correlation between insecurity behaviours and duration of student touching the head of the dog. However, the results also signify that caretaking experience reduces the negative effects of low nonverbal sensitivity in dog-human interactions. The significance of these results indicates that high levels of sensitivity to human nonverbal communication leads to positive interactions between dogs and humans, reducing insecurity behaviours in dogs. These positive interactions represent high nonverbal sensitivity to dogs during interactions and communication by humans.

**Contribution:**

The article was selected for literature review as it provides insight into how nonverbal communication between dogs and humans can influence and affect interactions and communication. The significance of the article is that it provides a unique perspective to dog-human communication in which the effects of human behaviour, nonverbal communication and experience impacts the interactions between them. Although the article provides deep insight into this field, the author does not develop whether their research supports or contradicts prior research. Future research should focus on the influence of nonverbal communication of non-dog people on dog-human interactions and communication.

**D’Aniello, B., Scandurra, A., Alterisio, A., Valsecchi, P., Prato-Previde, E. (2016). The importance of gestural communication: A study of human-dog communication using incongruent information. *Animal Cognition*, 19. 1231-1235.**

<https://doi.org/10.1007/s10071-016-1010-5>

**Summary:** This research article investigated how dogs weighed gestural and verbal signals to perform a task through dog-human communication. This research was performed as there was limited amount of background knowledge on the preferences of gestural or verbal signals in dogs. D’Aniello et al. (2016) provided dogs with incongruent information to determine if verbal and gestural signals were discriminated and whether dogs preferred one type of signal in dog-human communication. To explore the objective, simple verbal signals and gestures of the same commands (Sit, Stay, Come, Lie Down) were used to test the dogs. Multiple traits were accounted for to limit the bias of the experiment and were then divided into three phases: gestural, verbal, and contrasting commands. The sample consisted of 25 trained dogs were used all from the same training institution, 10 Golden Retrievers (3 Males, 7 Females) and 15



Labrador Retrievers (9 Males, 6 Females). The sample was equally trained in verbal and gestural commands. Phase 1 consisted of only gestural commands in which the four commands were performed using only gestures. Phase 2 was verbal only, where the commands were performed using verbal signals. Phase 3 repeated the same commands using contradictory signals. Four treatments: 1) verbal command “lie down” with gesture “sit” 2) verbal “sit” with gesture “lie down” 3) verbal “come” with gesture “stay” 4) verbal “stay” with gesture “come”. The results of this study indicate that dogs prefer gestural signals more than verbal signals when asked to perform an action. Thus, this study supports previous ideas that dogs use human body language in dog-human communication. This study shows significance as it allows us to understand a deeper relationship on the dog-human communication. Further research is required in Phase 3, with more contrasting commands in order to determine whether the results will remain similar and significant.

**Contribution:** The article provides the latest insight into dog-human communication while also going in-depth through several experiments and treatments to understand how a dog weighs gestural and verbal commands. The research advances the knowledge in the field, providing a clearer image of how and through what process dogs understood humans. Previous studies performed contradicted these results as it had used a biased sample of verbally trained dogs. Further expansion of this research can be done by studying the mechanisms of the nervous and endocrine system when provided with incongruent information and the evolution of the use of gestural signals.

**Kaminski, J., Piotti, P. (2016). Current trends in dog-human communication: Do dogs inform? *Current Directions in Psychological Science*, 25(5). 322-326. <https://doi-org.ezproxy.lib.ucalgary.ca/10.1177/0963721416661318>**

### **Summary:**

Kaminski et al. (2016) review previous studies and research to understand whether dogs can inform humans in dog-human communication. It is understood that dogs are capable of being informed by humans as they are skillful at understanding various forms of human communication, gestural signals, and verbal signals. The evolution of the social skills of dogs in dog-human communication arose from domestication, where the evolutionary past dogs had with humans selected for traits that required following human cues. Informative communication, a communication with the intent of informing others about things rather than telling an individual what to do, is considered vital to understanding whether dogs inform. This relies on the mutual understanding of the signaler’s intention to communicate, referential intention, and motivation to be helpful to others. For dogs to inform, their communication in dog-human interactions must satisfy these factors. From previous studies it has been observed that dogs can differentiate communicative intent from random gestures as compared to other animals, however, an ostensive cue must precede the signal. Further studies indicated dogs were not any better than

other animals in noncommunicative social contexts, which means dogs are limited to cooperative communication between dogs and humans. Dogs were observed to only perform a task when directed to do so and was not performed spontaneously, indicating that dogs see human communication more as directives. The significance of this review indicates that it has been observed through previous studies that dogs can understand human communication as information, however, no evidence is provided for dogs being capable of acting with a helpful motif or understanding human mental state during communication – an important aspect of informative communication. However, a question posed in the review is that infants and dogs are skilled at following cues in similar ways, however, only infants are considered informative in communication.

**Contribution:**

This article was selected as it provides a study of dog-human communication, discussing whether dogs can inform humans. It investigates studies to provide a greater idea of the methodology of informative communication in dogs. This article remains in line with previous studies as they develop further the ultimate causes of dog's social skills in communication. Though further research needs to be done, the article provides significance as it explores informative communication and if dogs have this capability in communication. Future research questions include if helpful motives have an influence in dog-human communication as dogs have the building blocks for informative communication.