



# Effectiveness of verbal and gestural signals and familiarity with signal-senders on the performance of working dogs



Anna Scandurra<sup>a,b</sup>, Alessandra Alterisio<sup>a</sup>, Lieta Marinelli<sup>b</sup>, Paolo Mongillo<sup>b</sup>,  
Gün Refik Semin<sup>c</sup>, Biagio D'Aniello<sup>a,\*</sup>

<sup>a</sup> Department of Biology, University of Naples "Federico II", Naples, Italy

<sup>b</sup> Department of Comparative Biomedicine and Food Science, University of Padua, Legnaro, Padua, Italy

<sup>c</sup> William James Center for Research, ISPA-IU, Lisbon, Portugal

## ARTICLE INFO

### Article history:

Received 17 August 2016

Received in revised form 29 January 2017

Accepted 5 February 2017

Available online 9 February 2017

### Keywords:

Dog

Gestural cue

Human-dog communication

Contrasting paradigm

Familiarity

Vocal cue

## ABSTRACT

We assessed how highly trained dogs respond to gestural versus verbal signals when their handlers or an unfamiliar person asked them to perform an obedience task. Dogs were requested to perform four different actions ("Sit", "Down", "Stay" and "Come") upon receiving congruent (only gestural or only verbal) or incongruent signals (gestural and verbal signals contradict each other).

The dogs' performance measures were the frequency of correct responses and their response latency. Generalized Estimation Equation models were used to determine whether the type of signal, the coherence of the signals and familiarity with the signaler influenced dogs' responses.

Our results show that the probability of dogs expressing the requested behaviour was lower when the stranger gave verbal signals, than in any of the other conditions. In the incongruent condition, the probability that dogs expressed the behaviour indicated by the verbal signal was lower for signals provided by the stranger than for signals provided by the owner. The reverse was observed for gestural signals. In general, longer latencies to perform the "Come", "Down" and "Sit" behaviours were observed in response to the stranger's verbal signals than when the stranger gave gestural or incongruent signals. Additionally, the response latency to the stranger's verbal stimuli took longer than verbal stimuli were provided by the owner in the case of "Come" ( $P=0.002$ ) and "Sit" ( $P<0.001$ ) actions.

Our data support the argument that for highly trained dogs, gestural signals are less dependent upon signal-giver familiarity, whereas verbal signals are less effective when they are given by an unfamiliar person.

© 2017 Elsevier B.V. All rights reserved.

## 1. Introduction

Accurate and smooth information flow is an important part of successful and smooth communication. A possible source of communication failure is when a signal or message delivered in different modalities conflict. The focus of the current research is how the congruence and incongruence of a signal given in two modalities (verbal versus gestural) influences the responses of highly trained dogs when they are delivered by an unfamiliar person or their handlers.

A meta-analysis of human studies (Hostetter, 2011) comparing messages presented only verbally (speech) with messages that are

presented both verbally and with gestures, found that gestures have a significant effect and improved communication efficacy. Gestures accompanying speech also increase memory for verbal content, as demonstrated by Galati and Samuel (2011). Information from speech and gestures seem to be processed in parallel in the human brain (Özyürek et al., 2007; Willems et al., 2007). In the case of humans, action-related language activates the motor system and it has been shown that the neural processing of gestures is similar to neural processing in comprehending words (see Willems and Hagoort, 2007 for a review), revealing a strong interdependence between gestures and speech. There is evidence that young children (2 and 4 years old) tested in an object choice task rely most heavily on pointing gestures compared to words when these two sources of information conflict, indicating the importance of visual cues (Grassmann and Tomasello, 2010). Interspecies communication also often relies on bimodal signals. Indeed, humans combine

\* Corresponding author at: Department of Biology, University of Naples "Federico II" via Cinthia, 80126 Naples, Italy.

E-mail address: [biagio.daniello@unina.it](mailto:biagio.daniello@unina.it) (B. D'Aniello).

gestural and verbal cues simultaneously when they interact with dogs.

Human gestures are very important for dogs and many studies have underlined the significance of specific human visual signals in affecting their attention and behaviour. Gazing, head-nodding, head turning and glancing at a target (Agnetta et al., 2000; Hare and Tomasello, 2005; Hare et al., 2002, 1998; Soproni et al., 2001), as well as human pointing gestures (Hare and Tomasello, 1999; Lakatos et al., 2012, 2009; Miklósi and Soproni, 2006; Miklósi et al., 1998; Soproni et al., 2002, 2001; Udell et al., 2008a,b) have been shown to direct dogs' attention and behaviour.

Dogs also rely on human verbal communication, responding to both words and non-verbal vocal sounds (Mills, 2005 for a review) and are able to learn the meaning of several hundred words (Kaminski et al., 2004; Pilley and Reid, 2011). They are also able to discriminate between live-sounds and recorded sounds and moderate the responsiveness to the command (Fukuzawa et al., 2005) suggesting their sensitivity to the vocal qualities of human speech (Gibson et al., 2014). Furthermore, dogs can also use human voice referentially, being able to locate food following the direction of the voice of a hidden person (Rossano et al., 2014).

The relative relevance of human gestural and verbal signals for dogs has received little attention so far. One study (Pongrácz et al., 2003) reported that dogs tend to respond correctly to verbal-gestural commands given by their owner whose life-size image was projected on a screen. However, when the owner commanded the dog from an other room (via loudspeaker) but was not visible, then dogs barely responded. Another study (Virányi et al., 2004) revealed that well-trained dogs tended not to respond to the simple "lie down" command if their owner gave the command while facing another human person and not the dog. In comparison, dogs performed better when their owner was facing the wall, or he/she was hidden behind a screen while commanding. These results indicate that human visual attention for dogs, interpreted as a visual signal, constitutes a significant component of human-dog communication.

A study showed that there was no significant increase in error rates of dogs' obedience when human body movements were restricted and verbal signals were provided (Fukuzawa et al., 2005). Furthermore, in an object choice task in which dogs were asked to fetch an object by name while the researcher pointed and looked to another object, dogs preferentially chose the object mentioned by name rather than the object that was pointed to (Grassmann et al., 2012). These outcomes suggest that dogs rely more on verbal signals and less on gestural signals. However, the dogs tested by Grassmann et al. (2012) had received a word-based training and generally, their owners did not use gestures in training the fetching game. This could have been responsible for finding that their dogs relied mainly on verbal signals. Indeed, it has been shown that for dogs that are equally familiar to respond both to gestural and verbal signals during the training, gestures were preferred compared to verbal cues, indicating that the handler's gestural signals were more relevant than verbal ones (D'Aniello et al., 2016). An open question is how dogs would perform when the signaler is not their handler.

It is well known that dogs are able to discriminate between their owner and an unfamiliar person in a variety of situations. They show a clear preference for their caretakers given their attachment bond (see Prato-Previde and Valsecchi, 2014 for a review) and they pay more attention to their owners in different contexts (Miklósi et al., 2005; Mongillo et al., 2010). In the impossible task paradigm, water rescue dogs directed their first gaze significantly more often towards their owner (D'Aniello et al., 2015). Agility dogs, in similar experimental conditions, clearly preferred their owner, gazing at him/her for significantly longer periods (Marshall-Pescini et al., 2009). However, it seems that social familiarity alone cannot account for dogs' higher attention to their owners, since an

increase in attention levels requires a close relationship, rather than mere familiarity (Horn et al., 2013). Furthermore, discrimination of a familiar person seems to be context-specific, since dogs discriminate their owner from other familiar people less well in situations requiring obedience relative to playful or fearful emotional situations (Kerepesi et al., 2015). In training contexts, dogs obey the commands of their handlers significantly more often than those of a stranger (Coutellier, 2006; Kerepesi et al., 2015). More specifically, it was found that dogs obeyed their owners' recorded voices in the presence of their owners significantly more compared to a stranger's voice in the presence of the stranger when human body movements were constrained (Coutellier, 2006). When no verbal signals are given, dogs are more likely to attend to the gestural signals of familiar others than unfamiliar ones (Cook et al., 2014).

The novel contribution of the current study is not only the relative strength of gestural and verbal signals, but also the signal source, namely the owner and a stranger. The goal was to separate the relative contribution of these two factors to the effectiveness of obedience commands. To this end, highly trained dogs, able to respond to basic obedience commands, were selected and their obedience rates to verbal and gestural signals were examined (i.e. giving gestural signals without verbal support and vice versa). Moreover, the dogs were also tested in a condition where they received signals that were incongruent between the two modalities (i.e., voice and gesture). The simultaneously delivered bi-modal signals referred to opposite actions. We chose to test water rescue dogs, which are extremely well trained to respond to obedience signals. Since they have to work in crowded beaches, such dogs are also highly socialized, which should prevent them from annoying or fearful effects of an unfamiliar signal-giver during the test (for further details of water rescue dogs training and activities see Scandurra et al., 2016). Based on the results of previous studies (Cook et al., 2014; Coutellier, 2006), we expect that the dogs' performance would generally be better when the owner provides signals than when a stranger does, regardless of the modality in which signals are provided. Moreover, using a similar protocol, we (D'Aniello et al., 2016) demonstrated that dogs obey an owner's gestures significantly more compared to when the owner gives the same signal verbally. Also, they exhibit a clear preference for gestures when conflicting gestural and verbal commands are given simultaneously. We expected that dogs would show a similar gestural preference when conflicting gestural and verbal commands are given by a stranger.

## 2. Materials and methods

### 2.1. Participants

22 dog-owner dyads participated in the study: 6 Golden retrievers (four males and two females) and 16 Labrador retrievers (eight males and eight females), mean age  $\pm$  SD =  $5.2 \pm 1.8$  years; 10 male and 12 female owners. All dyads were recruited at the Italian School of Water Rescue Dogs (Scuola Italiana Cani Salvataggio – SICS) and were already qualified as water rescue teams (having obtained a SICS Water Rescue Certificate®). The training lasts at least two years during which the owners are expected to be very competent in dog training. Water rescue dogs live in families in which one member of the family is also the handler. Before being trained for their specific tasks in water, these dogs are educated for obedience on land. During the training, all owners learn to give the obedience commands to their dogs in the same way, using the specific gestural and verbal stimuli for each single command.

Download English Version:

<https://daneshyari.com/en/article/5763424>

Download Persian Version:

<https://daneshyari.com/article/5763424>

[Daneshyari.com](https://daneshyari.com)