



Effects of human–dog familiarity on dogs' behavioural responses to petting

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ABSTRACT

The complex, subtle body postures and facial expressions used by dogs for communication is sometimes contrary to the human–dog communication mainly focused on verbal and tactile signals. Human–dog interactions might lead to misunderstandings because humans perform gestures that the pet interprets as social behaviours that are inappropriately performed by the human. Therefore, the behavioural responses of dogs to tactile human–dog interactions and slight forms of restraint are the focus of this study.

Privately owned dogs ($N = 24$) participated on this study. Each dog was exposed to nine different interactions either by a familiar or an unfamiliar person. The test sequences comprised various actions, e.g. holding the dog's paw, stroking the dog's head, each one being performed for 30 s. The inter-test interval was set at 60 s. The frequency and duration of the dogs' behavioural responses were evaluated. An ANOVA was conducted after the data of behavioural responses were log transformed.

A significant influence of human–dog familiarity on behavioural responses was found for initiating redirected behaviours ($F_{1,184} = 4.94$, $p = 0.027$). Likewise, there was a significant difference between the behavioural responses which were considered as appeasement gestures, both in frequency ($F_{1,193} = 10.67$; $p = 0.001$) and duration ($F_{1,184} = 21.85$; $p = 0.000$).

Findings suggest that the familiarity with the human handler has an effect on dogs' appeasement gestures and redirected behaviours to tactile human–dog interactions. Additional study is needed to assess the owners' awareness of these behaviour patterns and determine whether the dogs' responses detected in this study are potential indicators of the human–dog relationship.

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1. Introduction

Understanding the behavioural responses of individual dog in human–dog interaction is crucial for interpreting the risk evoked by a given dog. Dogs, like their ancestor the wolf, usually adjust their social communication familiarity to the counterpart (Mech, 1999; Feddersen-Petersen, 2008; Jensen, 2010). People, equal if familiar or unfamiliar to a pet, tend to show their affection towards

dogs by initiating physical contact. The physical parts of dogs' communication are used to maintain social affection or to impress, provoke or intimidate an opponent (e.g. social grooming, resting in close contact, putting paws over back or body of subordinate, grabbing the muzzle of the subordinate, and bowling over (Overall, 1997; Mech, 2001; Talacek, 2005; Feddersen-Petersen, 2008). Some human gestures might have a similar effect on dogs, resulting in positive or negative emotional states and corresponding behavioural responses of the dogs, even if they have been initiated with a different motivation (Miklosi, 2010). Therefore, an important question is whether dogs' responses in physical human–dog interactions depend on the human–dog familiarity and on the petted dog's body

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regions. Other possibilities of communication between humans and dogs, e.g. using visual (pointing, gazing) and acoustic (barking) signals, have been studied by many researchers in recent years (McKinley and Sambrook, 2000; Miklosi et al., 2003; Viranyi et al., 2004; Miklosi et al., 2005; Topál et al., 2006; Horn et al., 2009; Pongrácz et al., 2010). These studies have demonstrated that visual and acoustic human–dog communication is very effective so that such signals should be omitted studying physical human–dog interactions.

Many researchers have investigated the positive effect of tactile human–dog contact on the physiology, the mental states and the immune system of humans. Petting dogs decreases blood pressure and heart rate (Baun et al., 1984; Vormbrock and Grossberg, 1988) and increases the immune defence (Charnetski et al., 2004). Otherwise, being petted serves as positive reinforcement for dogs; accompanied by heart-rate deceleration (Kostarczyk and Fonberg, 1981). However, some dogs appear less relaxed even though they may tolerate physical contact and others even actively try to avoid it (Donaldson, 1996). Some dogs may be reactive only when their freedom of movement is temporarily constrained, or when intruded upon while resting or sleeping (Lindsay, 2001; Haug, 2008). Other dogs tend to show discomfort using ambivalent signals and conflict behaviours during all close interactions or when specific parts of their body are manipulated (Fatój et al., 2007; Luescher and Reisner, 2008). Problems may also occur, when the human handler performs special tactile gestures that – from a dog's point of view – are 'inappropriately' performed by the human due to the situation, the relationship or the familiarity of the human–dog dyad (Landsberg et al., 2003; Györi et al., 2010). Social signals of dogs, such as looking elsewhere, yawning, nose licking, and turning head which a dog will show in dog–dog conflict situations, might direct the dog to humans as well. Such conflict preventing or neutralizing behaviours have been described as appeasement gestures (Poggenberg, 2005; Meyer, 2006). Mariti et al. (2012) have found that only few owners correctly recognize and interpret such subtle behaviours and therefore are unable to intervene in early stages of stress in their dog.

In general, any dog–dog and human–dog situation in which a dog is highly motivated to behave in some particular way but is then prevented from doing so by some kind of restraint may lead to redirected behaviour (Falk, 1971). Frustration or conflicts often lead to specific, stress-related behaviours such as redirected behaviours and displacement activities, especially if the motivation of the animal to perform a behaviour is high, so that these stress-related behaviours can be considerably intensified (Yoburn et al., 1981; Kupfer et al., 2008; Kuhne et al., 2012). Redirected behaviours and displacement activities occur when an animal is temporarily and/or spatially unable to perform an elementary behavioural need due to environmental or individual restrictions (Rodenburg et al., 2005; Newberry et al., 2007; Dixon et al., 2008). Redirected behaviours and displacement activities will be performed by an animal until it is able to resolve the situation using other behavioural strategies.

Therefore, we tested the impact of tactile stimulations on several body parts of dogs and mild forms of restraint by an unfamiliar and a familiar human on dogs' behavioural responses. We examined if the human–dog familiarity has far-reaching influences on dog's behavioural responses to particular tactile human–dog interactions. It was hypothesized that petting special parts of the dog's body would have an effect on conflict indicating behavioural responses such as redirected behaviours and displacement activities as well as appeasement gestures. We predicted that familiarity with the human handler, petting the dog around his chest and less forms of restraint are preconditions of pleasant human–dog interactions. The frequency and duration of dogs' behavioural responses served as indicators of the dogs' emotional state.

2. Materials, animals and methods

2.1. Animals

The participating dogs ($N=24$) were privately owned pets. The dogs were aged 1–11 years and either gender. The dogs were of varying breed, life history and obedience training state. Their participation depended on the willingness of the dog's owner. The dog owners were recruited through contacts to dog schools and advertisements in newspapers. The life history of the dogs was previously revealed by a questionnaire to gain study dependent information about each dog (e.g. age obtained, previous owner, dermatological problems and current behavioural problem). The dog owners were asked to give written consent for the participation of their pet on the study that they were fully aware of all procedures their dog will be undergoing and that the whole test was videotaped.

The animals were handled in line with requirements to avoid any unnecessary discomfort based on the German Guidelines for the Care and Use of Animals in Research and Teaching, and our protocol was approved by the Institutional Animal Welfare Officer.

2.2. Testing procedure

The dogs were tested separately. A test session consisted of nine different human–dog interactions and was performed in a normal office setting. Each test sequence was performed for a period of 30 s and the inter-trial interval was set at 60 s. The nine test sequences were:

- 1) petting the dog on its shoulder ('Shoulder'),
- 2) petting the dog on the lateral side of the chest ('Chest'),
- 3) petting the dog on the ventral part of the neck ('Neck'),
- 4) petting and holding the laying dog on the ground ('Ground'),
- 5) holding a forepaw of the dog ('Paw'),
- 6) petting the dog on the top of the head ('Head'),
- 7) scratching the dog at the base of the tail ('Tail'),
- 8) holding the dog on its collar ('Collar'),
- 9) covering the dog's muzzle with one hand ('Muzzle').

Each dog was exposed once to these nine different interactions either with a familiar or an unfamiliar person, so

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