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The influence of body region, handler familiarity and order of region handled on the domestic cat's response to being stroked

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ABSTRACT

The domestic cat is now one of the most common pet species in the Western world. As part of its role as a pet, cats are expected to not only tolerate but enjoy being touched. This study consisted of two experiments, with the first investigating the influence of body region touched and handler familiarity on the domestic cat's behavioural response to being stroked. The second experiment extended this work by investigating the influence of order of body region touched on behavioural responses. Both handler familiarity and body region stroked significantly influenced negative behavioural responses. Familiar handling, in comparison to unfamiliar handling, led to significantly higher negative behavioural scores displayed by the cats ($Z = -3.235$, $N = 34$, $p = 0.001$). When considering the different body regions investigated, the caudal region produced the highest negative scores both when handled by the unfamiliar person (Experiment 1: $\chi^2 = 14.330$, $N = 34$, $p = 0.046$) and by the familiar person (Experiment 2: $\chi^2 = 18.387$, $N = 20$, $p = 0.002$). Order of body region touched had no significant bearing on behavioural responses exhibited. Results suggest that handling of cats should avoid the caudal region and highlight the need for further investigation into the owner–cat relationship.

1. Introduction

The domestic cat's (*Felis silvestris catus*) role in western society has changed over time from that of rodent catcher to predominantly one of social companion (Bradshaw et al., 2012), thus causing greater human desire for feline physical interaction (Bernstein, 2007). Such interaction has been reported to have several human-related health, psychological and social benefits, including reduced minor health problems such as headaches, colds and flu (Serpell, 1991), improved mood (Turner and Riger, 2001; Turner et al., 2003) and increased facilitation of social interactions (Bernstein et al., 2000). While we have come to expect cats to not only tolerate, but also enjoy being touched (Bernstein, 2007), there is little empirical research investigating whether this is actually the case. Stroking, a common form of human–animal interaction, has been shown to have stress-reducing effects for a range of social species, including farm animals (e.g. cows, Waiblinger et al., 2004), companion animals (e.g. shelter dogs, Hennessy et al., 1998) and laboratory animals (e.g. rats, Maruyama et al., 2012). Such results are consistent with reported benefits associated with intra-specific physical interactions, such as allo-grooming in highly social animals (e.g. ring-tailed

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macaques, Boccia et al., 1989; meerkats, Kutsukake and Clutton-Brock, 2006; horses, VanDirendonck and Spruijt, 2012; cattle, Sato and Tarumizu, 1993).

The domestic cat has only relatively recently in evolutionary terms been considered to have the ability to demonstrate social behaviour, with social grouping in free-ranging individuals generally depending on food distribution and relatedness (Crowell-Davis et al., 2004; Crowell-Davies, 2003). Within such groups positive, physical interactions generally only occur between close affiliates and take two predominant forms: allo-grooming, where one cat licks another; and allo-rubbing, where two cats rub parts of their body against one another (Bradshaw & Cameron-Beaumont, 2000; Crowell-Davis et al., 2004). Both physical interactions commonly take place at body areas rich in scent glands, primarily the peri-oral and temporal areas, although allo-rubbing is also sometimes witnessed in the form of tail wrapping, involving the caudal (base of tail) area (Crowell-Davies, 2003; Verberne and de Boer, 1976).

Results from studies in other species indicate that human instigated tactile interactions are most positive when they occur at regions normally involved in positive intra-specific contact (e.g. horses, Feh and de Mazieres, 1993; McBride et al., 2004; and dairy cattle, Schemied et al., 2008). Initial work by Soennichsen and Chamove (2002) has investigated whether this is the case for the domestic cat. They examined the behavioural response of cats to human stroking in four different body areas, three of which were gland sites (peri-oral, temporal and caudal), concluding that cats showed a clear preference for stroking in the temporal region, with the caudal region being rated as the most negative, although the latter was a non-significant tendency. However, there were a number of methodological limitations in their study, including a very small sample size ($n = 9$), pseudo-replication and several variables inadequately controlled, for example, a lack of consistency of familiarity of handler, handling of different non-gland areas for different cats and recording of data for some cats by untrained individuals. This may have confounded the results.

The aim of this study was therefore to address the methodological issues of Soennichsen and Chamove (2002) by re-investigating whether the body area of the cat handled has an influence on the behavioural responses it exhibits, extending the previous work to eight body regions (identified as commonly handled by owners in pilot data). In addition, this study also aimed to examine the influence of handler familiarity on behavioural responses, since studies on other species have demonstrated that animals are more likely to find handling by a familiar handler positive when compared with handling by someone unfamiliar (e.g. cattle, Boivin et al., 1998; rats, Davis et al., 1997). Furthermore, while Soennichsen and Chamove (2002) randomised the order of body areas touched, examination of feline rubbing has revealed that cats rub against objects and other individuals in a set order starting at the head and facial region and, in the case of allo-rubbing, often finishing at the tail (Feldman, 1994; Crowell-Davies, 2003). It is unknown whether such an order is important in human–cat interactions. Thus, a second experiment was carried out which examined the influence of sequence of body areas handled, by a familiar individual (their owner) on the behavioural responses exhibited by the cats.

2. Method

The School of Life Sciences Ethics Committee at the University of Lincoln approved all experimental procedures used in Experiments 1 and 2 of this study.

2.1. Experiment 1

2.1.1. Subjects

Thirty four healthy cats (22 females, 12 males) aged between 6 months and 12 years who had been in their current home for a minimum of 2 months were studied. Exclusion criteria comprised feral cats and those living exclusively outdoors. Owners were made aware that pet cats of any temperament living within the home could take part in the study. Cats were recruited from a database of cat owners held by the School of Life Sciences, University of Lincoln, UK, and via the social networking site Facebook ®.

2.1.2. Procedure

All handling took place within a room in the cats' homes that was familiar to them and each cat was given 15 min to habituate to the experimental set-up (video camera to record behavioural response and presence of experimenter) before data collection began. Handling consisted of stroking by the fingers, eight discrete areas on the cat's body, where three were considered gland sites: 1. the peri-oral gland site (area around the lips, chin and cheeks), 2. the caudal gland site (area around the base of the tail); and 3. the temporal gland site (area between the eyes and ears); and five; were considered non-gland areas: 1. the area on top of the head (but not between the temporal glands), 2. the middle of the back, 3. the area at the top of the back, 4. the back of the neck, and 5. the chest and the throat. These eight regions were selected on the basis of the results of a previous online questionnaire (unpublished data) which asked owners where they commonly stroked their cats. All of the eight selected areas in this study were frequently cited in the questionnaire and thus were considered of interest. The order in which these body areas were handled was randomized between cats. Stroking occurred in the direction of the hair for 15 s at 1 s intervals for each body area, using the middle and index fingers. Each cat received two handling sessions; one carried out by a familiar handler (owner) and one by an unfamiliar handler (experimenter, CG). Handling sessions for each cat by each handler took place on different days to one another, but at similar times of day, and the order in which handling occurred (familiar vs. unfamiliar handler) was randomized between cats. Handlers washed their hands before and after handling sessions to remove any scent from previous handling of the subject cat or other cats potentially influencing the subject cats' responses to the experimental handling. All handling sessions were recorded using a SONY® Digital Camera DSC-HX10V. The frequency of expression of specific affiliative, avoidant and agonistic body postures and behaviours exhibited by the cats were

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