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The pig's nose and its role in dominance relationships and harmful behaviour

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ABSTRACT

Affiliative behaviour may have an essential role in many behavioural processes. Gently nosing between group members occurs in almost all social behavioural processes of pigs (*Sus scrofa*), but the reasons for its performance are unclear. We examined whether nosing between pigs was related to dominance relationships or harmful behaviours such as manipulation of the tail using 80 crossbred pigs. Both males and females, housed in straw pens, were studied at 8 weeks of age (10 pigs/pen). Dominance ranks were determined by a feed competition test. The behaviour of 64 focal pigs was observed for 2 h per pig in total. Pigs nosed their pen mates on average 36 ± 3 times within 2 h, and nosing behaviour mainly consisted of nose-to-nose contact, nosing the head and nosing the body, rather than nosing the ear, groin, tail or ano-genital region. These gentle pig-directed nosing behaviours, i.e. gently touching another individual with the snout, was here defined as social nosing. Dominance relationships did not influence the amount of nosing given or received. Social nosing was largely unrelated to harmful behaviour. Nosing the tail correlated with tail biting ($r_s = 0.37$), but only 0.3 percent of social nosing was followed by this behaviour. Pigs which delivered much nosing did not receive less aggression, and nor did they receive a heightened amount of nosing in return. We suggest that pigs may nose each other for social recognition, as affiliative behaviour, to gain olfactory signals, or to satisfy an intrinsic need to nose. In conclusion, social nosing in pigs was largely unrelated to harmful behaviours, was not related to dominance relationships and should remain largely unaffected by efforts to minimise harmful behaviours in farming systems.

1. Introduction

It is often unclear why animals expend energy on performing certain social behaviours whose benefit to the performer is not obvious. Social behaviours without clear positive or negative effects on the individual or its conspecifics are much less studied and understood than behaviours that clearly affect animal fitness or welfare, which is especially the case in farm animals (Boissy et al., 2007; Yeates and Main, 2008).

Touch and nose contact have an essential role in communication, recognition, social grooming and the maintenance of dominance relationships (Newberry and Wood-Gush, 1986; Spruijt et al., 1992). Touch has been shown to be important for physical and mental health and development in humans and in other mammals (McDonald-Culp, 1997). Touch may stimulate the release of oxytocin in both the actor and the receiver, and may generate a positive affective state (Uvnäs-Moberg, 1998; Odendaal and Meintjes, 2003). Gentle touch between

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animals is most evident when engaged in social grooming, which has been well studied in primates, but to a lesser extent in other species (Spruijt et al., 1992). Social grooming may serve a number of functions associated with improving body hygiene, reducing tension and improving social bonding (Spruijt et al., 1992). Affiliative behaviours like touch and nose contact may contribute to group cohesion, which may minimise the occurrence of aggressive behaviour (Marler, 1976; Lehmann et al., 2007). Subtle touch or nose contact may therefore also have an essential role in other, more prominent, social behaviours.

In fundamental studies, affiliative behaviours and touch are generally considered to have a positive impact on the receiver (Feldman et al., 2003; Odendaal and Meintjes, 2003). In more applied studies related to farm animals, touch between animals is often viewed in the context of harmful behaviours, such as tail biting in pigs (Breuer et al., 2003; Van de Weerd et al., 2005). In pigs, the relationship between gentle pig-directed nosing and damaging forms of nosing and oral manipulation are not well understood, although a study on indoor commercially kept pigs showed that there is a positive correlation between social nosing and tail biting (Beattie et al., 2005). Efforts continue to minimise the expression of harmful oro-nasal behaviours in pigs, amongst others by extensive research on the causes and consequences of tail biting, and the development of strategies to reduce it (reviewed by Schrøder-Petersen and Simonsen, 2001). If minimising such behaviours also has correlated effects on the expression of nosing behaviour, this may have implications for the attainment of the benefits associated with non-damaging forms of pig-directed nosing which need to be understood.

In a previous study we found that immature pigs, *Sus scrofa*, that received much nosing had a higher growth rate (Camerlink et al., 2012). In primates, dominant animals are the primary recipients of social grooming (Schino, 2001). It remained unclear from our earlier study whether the apparently beneficial effect of receiving nosing on growth was also due to dominance in which a dominant individual may be expected to receive a large amount of nosing and to obtain preferential access to feed and to grow most rapidly (Ewbank and Meese, 1971). The purpose of the current study was therefore to examine how nosing behaviour is embedded in the behavioural repertoire of pigs and specifically to examine whether the receipt of nosing is influenced by dominance relationships and whether this behaviour is correlated with harmful oro-nasal manipulation.

2. Materials and methods

2.1. Animals and housing

A total of 80 crossbred pigs ((Large White × Landrace) × Pietrain; 39 entire males and 41 females) of approximately 8 weeks of age (39.5 ± 6.4 kg) were studied at the SRUC pig unit (Roslin, UK). To facilitate behavioural observations, half of the pigs were studied for 5 days in the first week of the trial (batch 1) and the other half was studied directly thereafter in the second week of the trial (batch 2). Four pens of 20 pigs (formed 3 weeks earlier at the start of the finisher phase) were each split into two at the start of each batch, 2 days before the behavioural observations, to create a total of 8 mixed sex groups of 10 pigs. Pigs originated from 12 different litters, and final pens were composed of on average of 2 pigs from 5 different litters. One male was excluded due to poor health after the start of the trial, leading to $N = 79$. Pens measured 1.8×5.3 m (0.95 m^2/pig), had a solid floor with a light dusting of straw and were cleaned and provided with approximately 4.5 kg fresh straw daily between 8.30 and 10.00 am. Each pen contained a dry pellet feeder with space for two pigs, and a separate nipple drinker. Pigs received a spray marked number on their back for recognition which was refreshed before tests and observations. Pigs were individually weighed at 4 weeks (weaning), 8 weeks (start of trial) and 9 weeks of age (end of trial). The work was subjected to an ethical appraisal by the Animal Experiments Committee at SRUC.

2.2. Feed competition test

A feed competition test was performed to determine the dominance hierarchy and was modified from the description by Thodberg et al. (1999). Access to feed was denied from the afternoon of the day prior to the test and pens were then tested in random order on the test day itself from 12.00 to 14.00 h. To conduct the test, the observer entered the pen and ensured that all pigs were standing and were paying attention to the observer. One kilogram of dry pelleted feed was then placed in the middle of the pen after which the observer exited the pen and recorded each feed-related aggressive interaction and the identity of the initiator and receiver. When the feed had been consumed, the pig that had initiated the most attacks (but at least 3) was removed from the pen. A new sample of feed, 200 g less in weight than in the previous round, was placed in the middle of the pen and the process repeated. This procedure continued until the position of all pigs in the hierarchy had been determined. Where no pig initiated 3 or more attacks the procedure was repeated without removal of a pig. Repetition of the procedure without removal of a pig was allowed on a maximum of two consecutive occasions. The test was ended on the third occasion if no pig attacked at least 3 times, which usually occurred when there were ~3 pigs left in the pen. Pigs were ranked within their pen using first the order of removal, and thereafter the number of attacks delivered and then order of initiating an attack. Pigs with zero attacks shared the lowest rank. Animals with rank 1–5 were classified as relatively dominant pigs, and those with rank 6–10 were classified as relatively subordinate pigs for further analysis. This resulted in 39 dominant pigs (17 females and 22 males) and 40 subordinate pigs (24 females and 16 males).

2.3. Live behavioural observations

Continuous live observations were performed on 64 pigs to record the occurrence of different forms of nosing behaviour, together with aggression and potentially injurious oro-nasal manipulation (an ethogram is provided in Table 1). Focal pigs were selected based on the feed competition test, whereby the 2 most dominant and 2 most