



Social sham chewing in sows?

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ABSTRACT

In this short communication, we describe chewing behaviour in sows with no apparent edible substrate in their mouth as a potential social behaviour. Chewing in sows during interaction with unfamiliar sows was unexpectedly observed in a study assessing social abilities and damaging behaviours in group-housed dry sows. Such chewing was observed frequently and performed by almost all sows. To our knowledge, this behaviour has not been described previously in a social context in pigs, but rather as an oral stereotypic behaviour related to chronic hunger. We describe the behaviour in its social context and speculate on reasons for its occurrence in that context.

1. Context

This short communication describes a behaviour identified in a larger research project that aimed at developing sustainable and commercially relevant rearing and breeding strategies for sows under group-housing production systems. The experiment and all procedures involved were approved by the National Ethics Committee for Animal Experiments in Uppsala (Registration number: 5.8.18-16279/2017). Within the larger project, we followed 81 sows from birth to second farrowing and investigated effects of additional social mixing. Half of these sows at age 2–5 weeks had access to the neighbouring sows and their litter through a pop hole while the other half did not. From ten weeks of age, half of them were mixed in groups with unfamiliar female pigs, while the other half were kept in intact birth litter groups in a 2 × 2 factorial design. The 81 sows underwent a social interaction test during their second parity [mean age 409.2 days (range 343–470 days)]. The social interaction test consisted in placing a young sow (≤ 2 parities; $n = 81$) and an unfamiliar old sow (> 2 parities, $n = 48$) in a test arena (7.0 m × 5.3 m pen with deep straw bedding) for one hour. Old sows were selected randomly from the sow group that the young sows were about to be merged with. The sows were video-recorded and the frequency and duration of different behaviours were scored using continuous sampling throughout the whole duration of the social interaction test.

2. Sham chewing in a social context

During pilot observations in the one-hour interaction tests, we

observed sham chewing occurring during the interaction between young and old sows. To our knowledge this has not been reported previously in the literature in such a social context. The behaviour was analysed in video recordings and if it ceased for at least three seconds and was then initiated again, it was recorded as a new occurrence of the behaviour. Due to its relatively high frequency of occurrence, this response was added to the ethogram as *Sham chewing*. This was defined as chewing, with no apparent substrate in its mouth, often resulting in froth on the sides of the lips of the pig.

We observed both young and older sows regularly performing such sham chewing during social interactions when they had no food or substrate in the mouth. On several occasions, this behaviour was accompanied by, or resulted in, froth on the sides of the sow's lips. As evidence of the behaviour, we attach a video clip as Supplementary material (see link).

From the total 1 h/sow of video-recording only the first 20 min were analysed in detail. This because most of the social interactions occurred at the beginning of the social interaction test. Young and older sows chewed in 587 and 813 occasions, respectively. All older sows (48/48 old sows) and 95 % of young sows (77/81 young sows) showed this behaviour. Young sham-chewers performed this behaviour significantly less often than older sham-chewers [0.4 ± 0.36 vs 0.6 ± 0.40 counts/min (mean \pm SD), T-test: $t = 2.82$, $p = 0.006$]. Time from test start to first sham chewing event was 89.9 ± 169.46 s (range 0.5–1187.9 s) for young sows and 68.1 ± 99.27 s (range 1.9–773.4 s) for older sows (T-test: n.s.). During the test, frequency of sham chewing and social interaction per minutes correlated positively in both young ($r_s = 0.940$, $p < 0.001$) and old sows ($r_s = 0.900$, $p < 0.001$).

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Video 1. A video clip is available online. Supplementary material related to this article can be found online at [doi:10.1016/j.beproc.2024.105042](https://doi.org/10.1016/j.beproc.2024.105042).

3. How can the occurrence of sham chewing be explained in this context?

To our knowledge, the chewing behaviour we observed in the interactions between a young and unfamiliar older sow, which we describe as *sham chewing*, has previously been described mainly as an oral stereotypic behaviour observed in feed-restricted gestating gilts and sows (e.g. Lawrence and Terlouw, 1993; Stewart et al., 2008; Tatemoto et al., 2019). This has been described as e.g. “*chewing with nothing apparently in mouth*” (Stewart et al., 2008), which is very similar to the behaviour we observed. Previous research describing this as an oral stereotypy attributed it to chronic hunger or inability to perform foraging behaviours (Stewart et al., 2008; D’Eath et al., 2018), to frustration about not being able to forage or as an appetite behaviour without a consummatory phase (Tatemoto et al., 2019). However, all sows in the present study were fed the normal feeding regimen for lactating sows. Additionally, during the social interaction test, sows were kept on deep straw bedding and had opportunities for rooting and foraging behaviours as regularly observed. Thus, the description of stereotypic sham chewing did not fit the context and situation in which our sows were observed. Moreover, sham chewing was only observed during encounters with unfamiliar sows and it is unlikely that an oral stereotypic behaviour, with an underlying cause of hunger or frustration to forage, would have been expressed in almost all sows in such encounters. Sham chewing behaviour may have been expressed in other phases of the larger study, but was only observed by researchers and animal technicians as part of social interactions. It is plausible to think that sham chewing here could be regarded as being related to social interactions between unfamiliar young and old sows.

It can be speculated that sham chewing is a behavioural response associated with some form of communication between sows, possibly a type of agonistic display associated with social hierarchy. Foaming from the mouth has been observed as part of ritualised agonistic behaviours in pigs prior to fights, suggested to be a strategy to avoid costs (Camerlink et al., 2022). In their study, however, foaming was common in the males but “nearly always absent in females”, and they suggest that such foaming was a result from repeated teeth grinding, which we did not see in this study. Peden et al. (2018) also suggest that sows use this behaviour to communicate their status in an attempt to avoid physical interaction, which may reduce the risk of injuries. However, a previous study in which sham chewing was considered a stereotypic behaviour found no relationship between social factors, such as aggression

(delivered or received) and sham chewing in group-housed nulliparous sows (Hemsworth et al., 2017).

It should be emphasised that social mixing of sows is a stressful event. The sham chewing seen in this study may act as a displacement behaviour in the conflicting situation of whether to attack or retreat. This would explain the high positive correlation between sham chewing and social interactions. Displacement behaviours are frequently associated with frustration, which may explain why sham chewing was performed in a potentially conflicting social situation. A previous study examining displacement behaviours in pigs observed displacement behaviours such as continuous licking of the wall, repeated mastication (i.e. chewing) and salivation (Marcet-Rius et al., 2019). However, the aim of that study was to investigate the effect of straw provision on the behaviour of mini-pigs and observations revealed fewer displacement behaviours (including chewing) in pigs with access to straw. This may indicate that the sham chewing we observed could be considered a displacement behaviour, although the underlying motivation may differ in different situations. If this suggestion is correct, sham chewing behaviour may have relevance for sow welfare, as displacement behaviours can be a result of frustration (e.g. Marcet-Rius et al., 2019).

In future studies on social mixing of pigs, in addition to e.g. counting lesions, we encourage researchers to include sham chewing into the ethogram when measuring social interactions between pigs. Future studies should also investigate the aetiology and underlying motivation for this oral behaviour in this context, to assess its potential usefulness as an animal welfare indicator.

4. In conclusion

In the present article, we describe sham-chewing behaviour in a social context of interaction between unfamiliar individuals. To our knowledge, this has not been reported in the literature before. We encourage researchers studying social interactions in pigs to include these behaviours as part of their ethogram. Future research opportunities could be the aetiology, underlying motivation, and its potential as an animal welfare indicator.

CRediT authorship contribution statement

Anna Wallenbeck: Writing – review & editing, Supervision, Funding acquisition, Formal analysis, Conceptualization. **Daiana De Oliveira:** Writing – review & editing, Supervision, Conceptualization. **Linda Marie Backeman Hannius:** Writing – review & editing, Methodology, Investigation, Data curation, Conceptualization. **Claes Anderson:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Investigation, Conceptualization.

Data availability

Data will be made available on request.

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