

Vieuille-Thomas, C., Le Pape, G. and Signoret, J.P. 'Stereotypies in pregnant sows: indications of influence of the housing system on the patterns expressed by the animals'. *Applied Animal Behaviour Science*, Volume 44, Issue 1 (1995).  
Extracts from pp. 19 & 20.



## Stereotypies in pregnant sows: indications of influence of the housing system on the patterns expressed by the animals

### Abstract

Patterns of stereotypy were observed in pregnant sows maintained in different housing systems in commercial farms. Comparisons were made among females of the same genotype: stalls vs. tethers for Large White (respectively 124 and 68 sows) and stalls vs. group-housed for Large White/Landrace crosses (respectively 81 and 71 sows) for two farms in each case. The patterns of stereotypy were observed for 1 h after food distribution.

The proportion of sows developing stereotypies did not differ between stall-housed and tethered females (89.5 vs. 94.1%), but was lower in group-housed compared with stall-housed sows (66.2 vs. 92.6%). The stereotypies presented by tethered sows were predominantly licking and rubbing, whereas in stalls or group-housed, they were most frequently biting and vacuum oral activities.

The function of stereotypies, the effect of the environment and the origin of the heterogeneity of the patterns displayed are discussed

### 1. Introduction

Stereotypies have been described as fixed and repetitive sequences of motor acts that have no apparent function (Wood-Gush et al., 1975; Kiley-Worthington, 1977; Dawkins, 1980). Sows housed indoors in modern intensive pig production systems exhibit a large range of such behavioural patterns (Stolba et al., 1983; Rushen, 1984; Appleby and Lawrence, 1987) that mainly occur just before and after feeding. Before food distribution, the most frequent stereotypies are rooting and licking (Staddon, 1977). During several hours following food distribution they take a variety of forms depending on the housing condition. Stereotypies have been especially studied in tethered sows, but they are not specific to this housing system and have been observed in stalled as well as in grouped sows (Vestergaard and Hansen, 1984; Barnett et al., 1984; Schouten and Rushen, 1992).

Stereotypies in sows are essentially oral activities that can be easily identified and described. They involve: vacuum chewing; head waving; chewing of bars; licking, chewing or nosing of various available objects (Fraser, 1975; Stolba et al., 1983; Terlouw et al., 1991a). They are less frequent in gilts and increase in frequency with parity (Cariolet and Dantzer, 1984; Rushen, 1985). When performed at high frequency, they are strongly resistant to environmental changes (Schouten and Rushen, 1992).

Stereotypies have been observed to develop in situations where some kind of frustration was present. For instance, hungry pigs could develop stereotypic pulling and chewing a chain placed in their stall (Dantzer and Mormède, 1981). Furthermore, this reaction has been used as an automatic measure of the frequency of stereotypies by Dantzer and Mormède (1983), Cronin and Wiepkema (1984), Rushen et al. (1990) and Terlouw et al. (1991b). The fact that they are more apparent in confinement has been used as an argument to suggest that such housing systems may be detrimental to the welfare of animals, with the hypothesis that welfare could be assessed by their presence and/or frequency (Ödberg, 1978; Dawkins, 1980; Duncan, 1980; Broom, 1983; Fraser and Broom, 1990; Wiepkema, 1993).

## SCIENCE TEXTS

### Short Written Texts (Journals)

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In the present study we have observed the different types of stereotypies displayed after feeding by sows kept in commercial farms, with the aim of comparing the expression of stereotypies, as a contribution to the evaluation of animal welfare and adaptation in different housing systems where the females were tethered, stalled or group-housed.

#### 2.1. Observations

Sows were continuously observed for 1 h starting from the beginning of morning food distribution (between 07:00 and 08:30 h), for the presence and the types of stereotypies.

Two observers entered the sow building when the stockman started to distribute the food. Each observer watched from 10 to 25 females, according to the size of the female herd. Behavioural observations started when the first sow from each observer's sample got food. Each observer walked quietly along the rows of sows or pens and noted at 2 min intervals the position of the female (standing, sitting or lying) and the occurrence of stereotypies. Stereotypies have been first described as repetitive motor acts, fixed in form and pattern. With the time sampling technique adapted to a large scale field investigation, we have not attempted to assess the repetitiveness of the pattern, but its presence on successive observations at 2 min intervals. We thus considered repeated movements, oral activities without obvious finality, rooting and nosing, as stereotypies (Rushen, 1984).

Motor activities were identified as stereotypies when done in a repetitive way at a constant speed (about one act  $s^{-1}$ ), the female's snout returning at the initial position at the end of each act or series of acts. The type of activity was recorded together with the substrate on which the activity was performed (bar, trough, floor, etc.), if any.

The observations were done once in each group of females, as previous studies have shown a good repeatability within herd of such observations (Vieuille-Thomas et al., 1994).

Table 1  
Frequency of items produced by LW sows (items with a frequency of less than 7 have been omitted from the analysis)

Item	Frequency
Vacuum chewing	374
Floor licking	131
Trough licking	91
Bar-biting	87
Trough snout rubbing	57
Vacuum suckling	31
Floor snout rubbing	29
Bar snout rubbing	27
Head waving	26
Series of four vacuum chewing	24
No stereotypy observed	17
Bar licking	15
Series of five vacuum chewing	11
Yawning	10
Trough biting	9
Vacuum chewing and yawning	8
Edge biting	8
Series of eight vacuum chewing	7

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Table 2  
Frequency of items produced by LW × LD sows

Vacuum chewing	188
Floor licking	61
Trough licking	54
Vacuum chewing and slobbering	38
No stereotypy observed	30
Bar biting	28
Trough biting	28
Floor snout rubbing	25
Tongue movements	22
Vacuum chewing and yawning	21
Yawning	19
Vacuum suckling	15
Bar licking	14
Trough snout rubbing	13
Series of four vacuum chewing	10
Vacuum chewing and tongue rolling	9
Series of six vacuum chewing	7
Bar snout rubbing	7
Wall licking	7

### 3. Results

Large White and LW × LD sows displayed a similar number of different items during the first hour after morning food distribution (63 and 65), but many items were rare. Tables 1 and 2 give the list of the items whose frequencies were over 6 for the two breeds (19 for LW, 20 for LW × LD).

Tables 3 and 4 present the typical items for each modality of housing, their frequency per modality sample, their total frequency (two samples) and the significance of the associated probability.

The proportion of sows developing stereotypies did not differ between stall-housed and tethered females (LW sows; Table 5).

Tethered females mainly exhibited licking/rubbing activities on two types of substrate (bar and trough). Stall-housed sows also exhibited activities on the same substrates (bar and trough), but the motor form was biting instead of licking. Furthermore, they were characterised by 'vacuum' stereotyped movements such as head waving and jaw movements (sucking, chewing with stretching).

A smaller proportion of group-housed sows presented stereotypies ( $\chi^2 = 6.63$ ,  $P < 0.01$ ) compared with stall-housed females (LW × LD; Table 5).

For stall-housed sows, biting of bar and trough substrates, as well as vacuum activities (tongue movements and chewing) were characteristic, as for LW females.

The lower occurrence of stereotypies in group-housed sows resulted in the prevalence of the item 'no stereotypy observed'. However, stereotypies were observed in 66.2% of the sows. The most frequent forms of stereotypy observed were licking of concrete walls and repeated vacuum chewing.

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#### 4. Discussion

As described in the previous findings, most of the typical stereotypic activities were oral movements (Barnett et al., 1985), whether directed to a physical substrate or a vacuum activity.

Specific characteristics of the movements appeared to depend on the housing system. Bar-biting was a typical item of the stall-housing system, for the two genotypes. This activity holds a particular place in previous observations: Barnett et al. (1985) observed that it was the predominant stereotyped behaviour of stall-housed gilts, its frequency being higher than that of gilts housed in groups. In a previous comparison between other treatments (tether, pairs, group, yard, paddock), Barnett et al. (1984) found in a long-term study (12 months) that sows' oral behaviour and biting were expressed with similar frequencies.

However, bar-biting seemed to have specific determinants: its frequency was not influenced by providing straw, whereas other stereotypic activities could be reduced and replaced by chewing of straw in sows (Fraser, 1975). The expression of bar-biting seemed to be mainly related to the stall-housing system.

In tethered females, 'licking', the absence of 'biting' and the use of a substrate were characteristic. In a comparative approach of housing systems, tethering limits the movements of the sows to a similar range as in stall-housing, but this limitation generates different motor forms of repetitive activities.

Such a difference in the forms of stereotyped activity is surprising: the width of the stalls was identical to that of the tether, and the possibility for movement to and from the trough similar. This suggests that the animals' perception of space limitation might be changed by contact with the tether and when space is restricted by metal bars.

The proportion of group-housed sows presenting stereotypies was the lowest observed. However, it is far from a minor event in group-housed sows, since it was observed in 66% of them. In this situation, the physical environment of food distribution—trough and separating bars—is similar to the other housing systems. However, stereotypic movements are not oriented to such substrates. Although having the same function, trough and bars are available but no longer appear to be a centre of interest. If the origin of some stereotypies is hypothesised as a displacement activity in hunger frustrated animals, we would have expected a similar result in restrained and loose sows. In fact, the stereotypies observed are different. Such an unexpected result suggests that other factors could be involved in the development of stereotypies in group-housed sows, a situation where a variety of movements and social interactions are possible.