

Stereotypy and Teat Selection in Pigs

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Introduction

"Suckling the hind teat", is a proverbial saying signifying deprivation due to continued lack of opportunity. Related to pigs it implies that each newly born pig sucks one and the same teat and that the hind teat gives the least nourishment. Farmers often report suckling stereotypy by describing the fight piglets engage in defending their teat. Such evidence, however, also indicates non-stereotypy of those piglets which tried to occupy the other ones' teats.

Scientific data are likewise conflicting. DONALD (1937) and HAFEX et al. (1962) suggest that much consistency in teat selection exists and that it develops first at front and rear teats. HARTMAN et al. (1962) observed suckling behavior on piglets but found no significant teat-preference in the development of the suckling stereotypy and no correlation between weight at six weeks and teat position. MCBRIDE (1963) reports teat orders established as early as one hour after birth, but lists also such factors as competition among piglets and the turning of the sow which act against stereotypy in teat selection.

The present study attempts to observe teat selection and suckling behavior in newly born pigs by establishing a stereotypy index which can be related to teat position, mortality and other variables.

Method

Records: Each pig was marked within approximately 30 minutes after birth with a black felt pencil receiving a block letter about 2 inches in size on each rear flank. Each litter was observed for two hours in the morning and for two hours in the late afternoon for ten consecutive days starting with birth. The two-hour observation periods followed the sows' morning and afternoon feedings. Observations were made from a distance of 5 to 10 feet. The record sheets for each litter contained a mimeo-

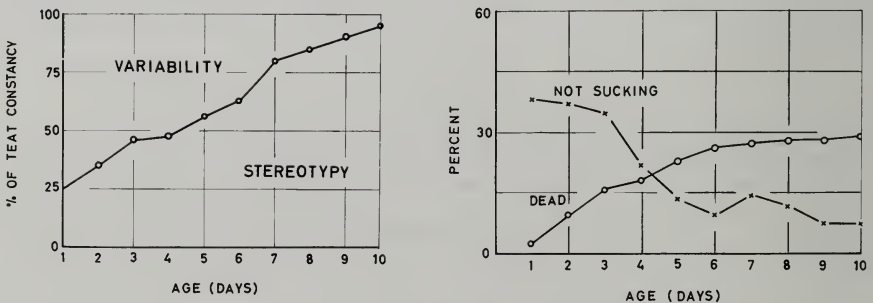


Fig. 1 (left). Teat constancy between a. m. and p. m. observations for the first ten days after birth — Fig. 2 (right). Percentage of pigs dying and percentage of pigs not suckling in one or both daily observation shown for the first 10 days after birth

graphed outline of the sow with the respective number of teats in each row. A reading was obtained by placing the letter of a suckling pig next to the teat and the record sheet. The side on which the sow lay during a suckling was also recorded. It was attempted to obtain a new reading each time the pigs in a litter started to suckle after having been away from the sow or each time one or more pigs changed teats during suckling.

Subjects: Eight sows and their litters maintained by the Swine Nutrition and Animal Husbandry departments of the Iowa State University served as subjects. Six sows (Yorkshire X Landrace) kept in farrowing pens and two sows (Yorkshire X Duroc) were observed in regular stalls. On the average the sows had their fourth litter, ranging from the third to the fifth. The average number of pigs born alive in a litter was 11, ranging from 6 to 15.

Results

The number of readings taken during a two-hour observation period varied with days and with litters. In some observation periods only one or two short sucklings could be observed not always involving all the pigs in one litter, while at other instances one or more teat changes occurred faster than the experimenter could record. At such instances of heightened activity the maximum frequency of readings taken was one per two minutes.

First day observations: Fluctuations between frequent and infrequent suckings and also between the number of pigs participating in one suckling were greatest during the first day after birth. Few pigs selected one teat and stayed with it. Newly born pigs were likely to show any of the following suckling behaviors: a. sampling from several teats, neighboring, distant, left or right ones, b. trying to suck on teat on which other pigs sucked, c. selecting one teat, d. nuzzling or nosing between front or hind legs where there were no teats, e. nuzzling toward teats on which sow was lying, and f. exhibiting no sucking activity while litter mates suckled. In some instances teats which yielded milk readily when touched by the experimenter were not selected on the first day though as many as four pigs crowded around one or two anterior teats.

Sucking stereotypy: To obtain a measure of stereotypy one forenoon reading was compared with one afternoon reading for each sow. The two readings were randomly selected from all those which showed the highest number of suckling piglets within each observation period. Fig. 1 shows the percentage of pigs which sucked on the same teat during the selected a.m. and p.m. readings. This percentage of stereotypy was computed from the total number of pigs which participated in both the a.m. and p.m. suckings. It did not include those pigs which participated only in one or in neither of the two sucking periods compared. Thus, the variability in Fig. 1 shows the percentage of pigs which were actually observed to suckle different teats at least once during one and the same day.

Sucking participation: The absolute figures from which the daily percentages of sucking consistency were computed were influenced by the death rate and by participation in sucking. As Fig. 2 indicated 27% of the 84 pigs alive on the first day were dead on the tenth day. However, the percentage of pigs not participating in the daily comparison decreased. On the first day after birth 38% of the 84 pigs observed did not participate in either a.m. or p.m. sucklings, while on the tenth day only 7% of the surviving 61 pigs abstained from it.

Teat Position: From a total of 526 suckings randomly selected from the observations of eight litters for the first five days 266 occurred on teats located on the left side and 260 on teats on the right side. When distributed over the individual teats the left-right symmetry was maintained. The initial, first day sucking positions of 84 pigs

were examined in relation to teat preference. Fig. 3 shows these frequencies of selections combined for right and left side and distributed over eight teats. Examining initial teat preferences by Chi-square the null-hypothesis for the first seven teats can be rejected with $P < .001$. Since only one sow had an eighth pair of teats, the data for the eighth teat were omitted in establishing the expected frequencies. Also shown in

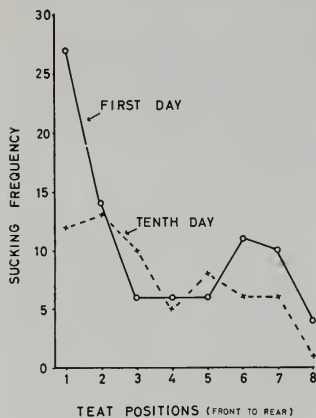


Fig. 3. Combined left and right teat positions and frequencies for the initial suckling of 84 piglets and for suckling after 10 days for the 61 surviving piglets

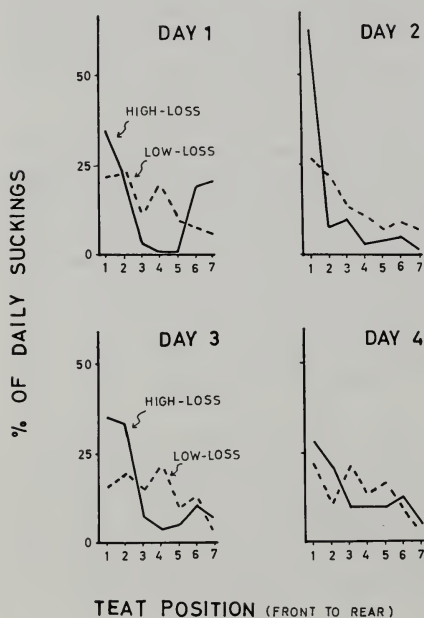


Fig. 4. Percentage of suckling frequencies and teat positions shown for a High-loss group and a Low-loss group for the first four days after birth

Fig. 3 are the selection frequencies made on the tenth day for the 61 surviving pigs. The null-hypothesis for these frequencies can not be rejected.

Teat position and mortality: To examine the relationship between teat position and mortality the subjects were divided into a high-loss group consisting of three litters with a loss 53% during the first ten days and into a low-loss consisting of four litters having lost only 14% during the same period. Fig. 4 shows the comparison for the first four days for both high- and low-loss groups, with the ordinate expressing the percent of total daily sucklings to examine the preference pattern independent of magnitudinal differences due to loss.

Fighting behavior: Fighting among piglets was observed in large as well as small litters. Aggression did not seem to correlate with weight. Pigs ranking fourth or fifth on a litter's weight scale were sometimes observed to initiate fights and to displace those ranking first or second in weight. In one litter of six pigs the first and fourth heaviest pig fought by displacing each other from their respective teats during each suckling observation for a period of eight days. On the eighth day the heavier one did not interfere with the lighter one but selected a third, vacant teat, whereupon the lighter one left his usual teat immediately trying to displace the heavier one on this third teat. It appeared that it was not a specific teat, but the partner's suckling behavior in general which stimulated the fighting among these two pigs.

While stronger pigs were often observed to fight and displace each other on one teat, smaller ones were frequently left alone, especially when suckling at a distal teat. Occasionally smaller pigs were crowded out clusters and suckled at less crowded regions perhaps to the advantage of their survival.

Nuzzling: Newly born pigs nuzzled areas in which teats were not located. The favorite nuzzling place was the cavity formed by the front legs. As stereotype in teat selection increased nuzzling occurred more and more around a respective teat in alternation with suckling. Observation made on motherless pigs raised by KAEERLE (1963)

at the Veterinary Hygiene department of Iowa State University, seem to indicate that nuzzling is a more innate activity than suckling. His subjects which were raised from birth on by drinking from bowls would not suck objects when given the opportunity. However, they did exhibit spontaneous nuzzling by pushing their snouts rhythmically against cardboard or plywood walls. This nuzzling behavior occurred also during drinking which was often interrupted for a few seconds so a nearby wall could be nuzzled to the point of vibration. Though never reinforced directly, this nuzzling behavior continued into the third week after birth.

Discussion

The stereotypy-variability continuum has long served as a convenient classifier in the phylogenetic assessment of learning abilities. Animals with more variable behaviors often linked to an increase in cortical surface, adapt easier and are considered innately more intelligent than those which are more rigid or stereotyped. Such criteria, however, should be used with caution, since the present data suggest that stereotypy itself may be learned. With respect to teat selection, for instance, the pig seems to be more variable right after birth than ten days thereafter.

It is difficult to specify the social, perceptual or the physiological factors such as the drying up of unused teats which condition the stereotypy in teat selection. Whatever the cause, it can be expected that this early conditioned stereotypy generalizes. This generalization may influence only certain aspects of behavior. It may account for some of the controversies found in the description of pig behavior. At times farmers describe as "most stubborn" that animal which DARWIN considered "most sagacious" (MELLEN, 1952). WESLEY and KLOPPER (1962) presented gilts with simple black and white, visual discrimination problems and found that the swine's horizontal position habits interfered in learning this task which is readily mastered by many animals far lower on the phylogenetic scale. BRELAND (1955), on the other hand, was successful to teach pigs to climb into a bathtub and turn on a shower by pulling a string. He considers the pig high on the intelligence scale. Not all positional behavior observed in this study and by MCBRIDE (1963) became stereotyped. Changes in up and down positions accounted for more of the variability than left-right variations. Such early differential conditioning may explain that an animal learns a certain task easily, but can not perform on another task which appears to be equally difficult.

The present results picture the onset of stereotypy in teat selection more gradual than observations reported by other investigators, notably MCBRIDE (1963). It is possible that the methodology of this study comparing one randomly selected forenoon reading with one late afternoon reading increased the variability. Comparisons made over a shorter time span may result in a more rapidly accelerated stereotypy curve.

Initial, first day sucklings did show a preference for anterior and posterior teats, while observations on the tenth day (Fig. 3) showed no such preferences. This time factor may explain the divergence between preferences reported by HAFEZ et al. (1962) and the non-preference observed by HARTMAN et al. (1962).

Similar differences are found when comparing teat preferences between high and low mortality sub-groups in the present experiment. The high-loss group on the first day (Fig. 4) shows an exaggerated pattern of the total group's initial sucking behavior (Fig. 3) with strong front and rear teat preferences. The low-loss group, on the other hand, shows a first-day pattern similar to that exhibited by the total group on the tenth day. Avoidance of the middle teats was also reported by MCBRIDE (1963) who pointed to the increased difficulty in the initial reaching of teats 3, 4, 5 and 6. HARLOW et al. (1962) have repeatedly shown that the desire for "contact love" is strong

and independent of the nourishing reward associated with it. Clustering between fore and hindlegs would be a condition favoring "contact" more than nourishment. MOUNT (1963) has shown that piglets prefer a higher temperature on the first day than on following ones. This may make clustering dependent on environmental temperature, and could cause physiologically less mature litters to cluster more strongly on fore and hind teats; a condition favoring contact more than nourishment. The inadequacy of sharing front teats will increase with growth. Those pigs which are crowded out or leave the cluster early will have a greater chance of stimulating an unused teat than those which disburse later when the unused teats have dried up. In general clustering on a front teat seems to be more detrimental than suckling on the hind teat.

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Summary

Sucking stereotypy in pigs was found to develop gradually within the first ten days after birth. Its formation seems to depend on the dynamic interaction between trial and error learning conditioned by social, perceptual and/or physiological variables. Early nonparticipation in sucking was found to establish limitations for the entire litter. The high-loss subgroup preferred front and rear teats initially, while the low-loss litters distributed themselves more evenly over all teats. Psychological and physiological variables were discussed which may bring about the observed clustering predominant around the front teats. The stereotypy-variability continuum and its influence on animal behavior in general and on swine learning in particular were also discussed.

Zusammenfassung

Die Stereotypie des Saugens entwickelte sich bei Ferkeln allmählich innerhalb der ersten 10 Tage nach der Geburt. Die Entwicklung dieser Stereotypie scheint auf der dynamischen Zusammenwirkung sozialer, visueller, und physiologischer Faktoren zu beruhen, die den Ausdruck eines „Versuch- und Irrtum“-Lernens geben. Seltenes Saugen einiger Ferkel in den ersten Tagen bedingte Begrenzungen für den ganzen Wurf. Wurfgruppen mit hohem Verlust drängten sich anfangs an die vorderen und hinteren Zitzen, während die Gruppen mit niedrigen Verlusten sich mehr einheitlich über alle Zitzen verteilten. Psychologische und physiologische Variationen wurden erörtert, die Hypothesen über den beobachteten Drang nach den vorderen Zitzen darbieten. Einige Fragen der Stereotypie-Plastizität und deren Einfluß auf das Verhalten und Lernen der Schweine und der Tiere im allgemeinen wurden diskutiert.

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