# Promoting play behaviour in grow-finish pigs

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## APPLICATION FOR PRODUCERS

Consider providing a variety of novel enrichments intermittently to growing pigs to provide opportunities for pigs to play. This play behaviour is a rewarding experience for pigs that can enhance their quality of life through improved welfare.


## SUMMARY

Play behaviour has been associated with excitement and fun, suggesting that playing animals experience pleasurable states. To determine if the provision of play opportunities could enhance the quality of life of pigs, this study investigated if play can be promoted and sustained in pigs beyond the natural period of expression (2-6 weeks of age) in a commercial setting. Growing pigs (n = 288, 10 weeks of age), housed in standard partly slatted pens, were assigned to either a Control treatment with no play interventions (CON, 1 $m^2$/pig); or to a Novelty (NOV) or Play pen (PLP) treatments, with play promotion between 10 and 21 weeks delivered through play sessions 3x/week. Play treatments received the intermittent provision of destructible novel objects provided either in the home pen (NOV, 1 $m^2$/pig), or in an enclosed 'play pen' area providing extra space (PLP, 2.9 $m^2$/pig).

The results showed that play was successfully promoted and sustained until the finishing period and equally expressed regardless of extra space. Pigs with play opportunities expressed indicators that play is a rewarding and motivating behaviour and could enhance the quality of life of farmed pigs when supported.


## INTRODUCTION

To improve the quality of life of farmed pigs, negative welfare states should be replaced or balanced with joyful activity, for example opportunities for play, which may provide positive affective engagement for animals and support positive welfare states. In pigs, play is naturally expressed between 2 and 6 weeks of age and declines with age.

The main objective was to investigate whether play can be promoted and sustained beyond the natural window of expression, in grow-finish pigs (10–21 weeks of age) in a commercial setting. The secondary aim was to determine whether play was positive which was explored through linking play opportunities with behavioural indicators. The effect of play on physiological and production (growth) measures was also explored.

## EXPERIMENTAL PROCEDURES

A total of 288 growing pigs (~35 kg) were housed in standard partly slatted pens (8 pigs/pen, 1 m2/pig) with point-source enrichment consisting of an untreated spruce lumber piece with a rope attached to a single chain. Pigs were assigned to one of three treatments from 10 to 21 weeks of age: i) Control (CON), ii) Novelty (NOV), and iii) Play pen (PLP). The Control treatment did not receive play interventions. Play was promoted in NOV and PLP treatments, collectively called play treatments, during intermittent play sessions that consisted of novel objects given in the home pen (NOV) or within a specific play pen (PLP, 2.9 m2/pig, solid concrete floor). Treatment pens (NOV and PLP) received a total of six, 30-minute play sessions, provided three days/week (Monday, Wednesday, Friday), two times/day (10 am/1 pm). Novel objects were rotated on a weekly schedule to reduce habituation and consisted of six items (cardboard, straw, plain popcorn, cotton rope, lumber, burlap) provided in different combinations. For each play session, the experimenter first distributed novel objects in the play pen, then entered the room and gave the novel objects to NOV treatment pens and then released PLP treatment pigs into the play pens, one group at a time. PLP pigs could not re-enter the room and their home pen during the play session. After 30 min, PLP treatment pigs were returned to their home pen, one group at a time, and the remains of the novel objects were cleared from the home pens of NOV treatment. The play pens were only cleaned after the PM play session of the day.

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Two gilts and two barrows were randomly selected from each pen (144 pigs) for behavioural observations at 4 phases: 1) a pre-play phase (PRE) recorded on a day without play sessions; 2) an anticipatory phase (ANT) of two minutes recorded before an AM play session, where anticipatory behaviour was stimulated with an experimenter walking back and forth in the room (conditioned stimulus) before the play session (unconditioned stimulus) commenced; 3) an active phase (ACT) capturing the AM play session; 4) a post-play phase (POST) starting one hour after completion of the PM play session lasting for 30 min. Saliva was sampled from the same pigs to determine the physiological response to play, with cortisol and alpha-amylase. The body weight of all pigs was measured at the start and end of the trial to calculate average daily gain (ADG).

## RESULTS AND DISCUSSION

Promotion and sustainability of play behaviour (Figure 1): Pigs in PLP and NOV played more frequently ($p = 0.002$) and for a longer duration of time ($p < 0.001$) across weeks compared to CON. NOV and PLP did not differ in play frequency and duration, except for week 21 when PLP played more frequently. In all treatments, the greatest frequency of total play occurred at 11 weeks, decreasing in weeks 16 and 21 in CON, while NOV and PLP sustained the level of play between weeks 16 and 21. Object play was more frequent in pigs with play opportunities than CON pigs across all weeks. Compared to CON, NOV played for a greater duration of time in all weeks while PLP played longer in weeks 11 and 21, but not 16.

A student interacting with PLP pigs after a play session

*"Pigs in play pen treatment and novelty treatment played more frequently and for a longer duration of time across weeks compared to control."*

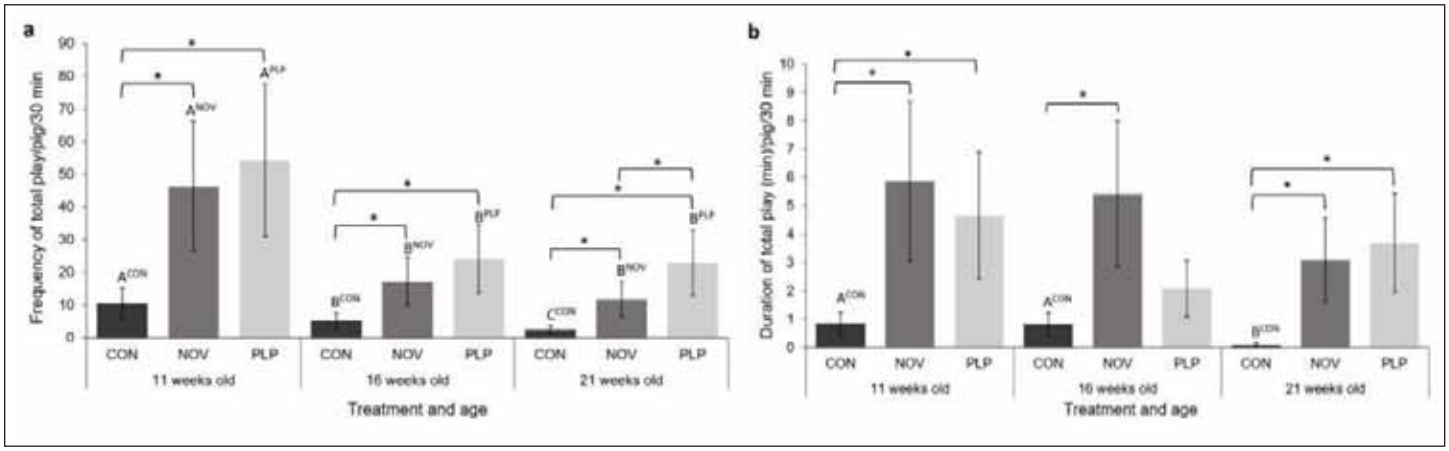


**Figure 1.** Frequency (a) and duration (min, b) of total play behaviour (locomotor, social, and object play) per pig (n = 159) in Control (CON), Novelty (NOV), and Play pen (PLP) treatments (12 pens/treatment) in the active phase (30-min play session) at the age of 11, 16 and 21 weeks. Predicted means and lower and upper 95% confidence intervals (CIs) are presented. * The asterisks (*) above the bars denote significant differences between treatments within week and the letters above the bars (A, B, C) denote significant differences within treatment across weeks. For clarity, where group letter above the bar was omitted, there was no significant difference. The threshold of significance for multiple comparisons (Bonferroni correction) for differences between treatments within week and within treatment across weeks (18 comparisons) was $p \leq 0.003$.

Figure published in Steinerová, K., Parker, S. E., Brown, J. A., & Seddon, Y. M. (2024). The promotion of play behaviour in grow-finish pigs: The relationship between behaviours indicating positive experience and physiological measures. *Applied Animal Behaviour Science*, 275, 106263. https://doi.org/10.1016/j.applanim.2024.106263.

Behaviours indicating positive experience (Table 1): Play treatments expressed more anticipatory behaviour and behavioural indicators associated with a positive experience (ears relaxed and forward, tail wagging, barks) compared to CON.

Agonistic behaviours (Figure 2): In the ACT phase, PLP pigs performed the least agonistic behaviour, while NOV was intermediate, and CON had the highest frequency. In CON, agonistic behaviour increased in the ACT compared to the PRE phase, while in PLP aggression decreased in the ACT phase compared to the PRE and POST phases. Agonistic behaviour in NOV did not differ across phases (Figure 2a). Play treatments interacted with objects for a greater amount of time during the ACT phase compared to other phases, while CON did not differ across any phase (Figure 2b).

Physiological response to play – measures of cortisol, alpha-amylase, and ADG: Cortisol was elevated only in NOV compared to CON after the play session, but alpha-amylase and growth rate did not differ among treatments.

PLP pigs in a playpen: playing with cardboard during a play session

**Table 1.** Frequency of ear and tail postures per pig (n = 159) in Control (CON), Novelty (NOV) and Play pen (PLP) treatments (12 pens/treatment) in the active phase (30-min play session) across weeks. Predicted means and lower and upper 95% confidence intervals (CIs) are presented.

| Posture | CON | | NOV | | PLP | |
|---|---|---|---|---|---|---|
| | Mean | 95% CIs | Mean | 95% CIs | Mean | 95% CIs |
| Ears relaxed | | | | | | |
| Week 11 | 0.27a | 0.04–0.50 | 3.52b | 1.49–5.54 | 2.82b | 1.20–4.43 |
| Week 16 | 0.54 | 0.22–0.86 | 1.94 | 0.93–2.96 | 2.22 | 1.09–3.34 |
| Week 21 | 0.58a | 0.24–0.92 | 1.70ab | 0.80–2.60 | 2.96b | 1.48–4.44 |
| Ears forward | 2.43a | 2.07–2.80 | 3.01ab | 2.57–3.46 | 3.28b | 2.81–3.75 |
| Ears backward | | | | | | |
| Barrows | 2.33a | 1.66–2.99 | 1.29a | 0.86–1.72 | 0.29b | 0.14–0.45 |
| Gilts | 2.49a | 1.75–3.23 | 1.53ab | 1.02–2.04 | 0.74b | 0.44–1.03 |
| Ears mixed | 0.17 | 0.08–0.25 | 0.19 | 0.09–0.30 | 0.13 | 0.05–0.21 |
| Tail wagging | | | | | | |
| Week 11 | 0.44 | -0.09–0.99 | 1.33 | -0.15–2.82 | 0.87 | -0.08–1.81 |
| Week 16 | 0.07 | -0.02–0.16 | 0.56 | 0.13–0.99 | 1.22 | 0.34–2.10 |
| Week 21 | 0.09 | 0.02–0.20 | 0.35 | 0.05–0.65 | 0.67 | 0.16–1.17 |
| Tail motionless | 4.62a | 4.18–5.06 | 5.75b | 5.22–6.27 | 4.26ac | 2.83–4.68 |

*Different superscript letters denote significant differences between treatments within week or sex (a, b, c; bolded). No significant differences within treatment across weeks or sexes found. The threshold of significance for multiple comparisons (Bonferroni correction) for difference between treatments (ears forward/mixed, tail motionless; 3 comparisons) was $p \leq 0.02$, between treatments within week and within treatment across weeks (ears relaxed, tail wagging; 18 comparisons) was $p \leq 0.003$, between treatments within sex and within treatment across sexes (ears backward, 9 comparisons) was $p \leq 0.006$.

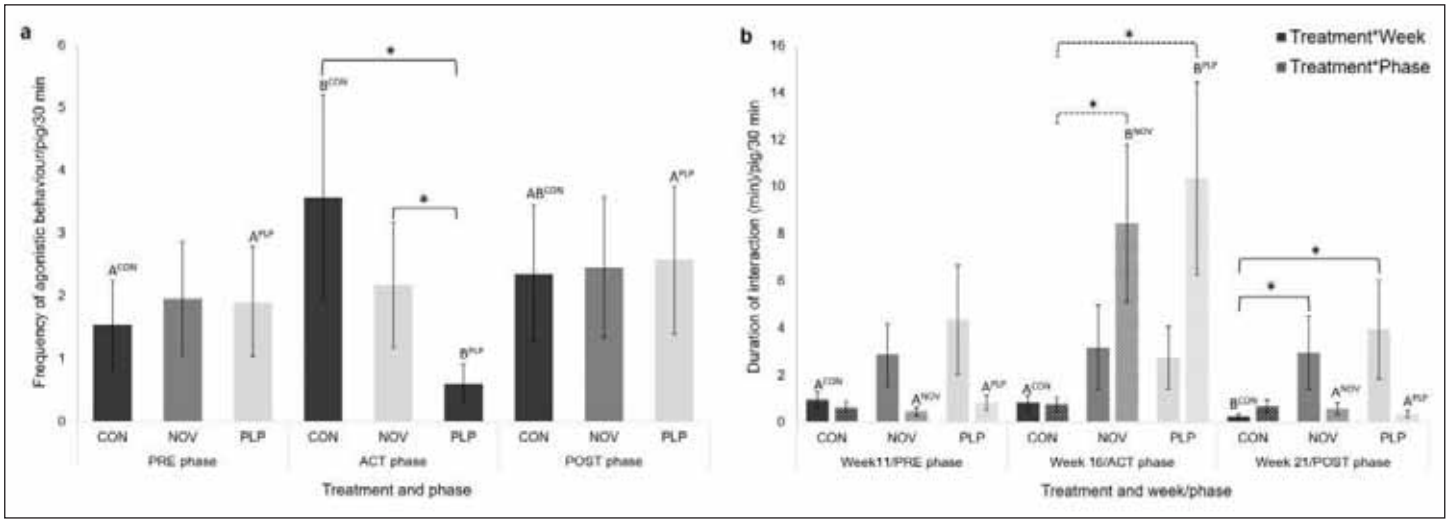


**Figure 2.** Frequency of agonistic behaviour across phases (PRE-play 30-min, ACT: active 30-min play session, POST-play 30-min, a), and duration (min) of interaction behaviour across phases and weeks 11, 16 and 21 (b) per pig (n = 159) in Control (CON), Novelty (NOV) and Play pen (PLP) treatments (12 pens/treatment). Predicted means and lower and upper 95% confidence intervals (CIs) are presented. * The asterisks (*) above the bars denote significant differences between treatments within phase or week and the letters above the bars (A, B, C) denote significant differences within treatment across phases or weeks. For clarity, where group letter above the bar was omitted, there was no significant difference. The threshold of significance for multiple comparisons (Bonferroni correction) for differences between treatments within phase or week and within treatment across phases or weeks (18 comparisons) was $p \leq 0.003$.

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## IMPLICATIONS

The present study demonstrated that play behaviour can be promoted and sustained in grow-finish pigs in a commercial setting, regardless of whether extra space is available, as long as pigs are intermittently provided with novel enrichment. The fact that play was increased in the standard production pen with 1 $m^2$/124 kg pig, similar space allowance to the minimal space allowance of 0.95 $m^2$/100 kg pig in the Pig Code of Practice, indicates that promotion of play is a promising proof of concept to improve welfare of farmed pigs. The findings indicate that play is a highly positive behaviour for pigs, fostering positive welfare states. Incorporating this concept into husbandry routines and utilizing lower cost materials for novel objects like cardboard can minimize extra labor and costs, as would automating the delivery of materials, supporting its application on commercial farms. These findings hold significant implications for supporting the development of animal-friendly husbandry systems and for improving the quality of life of intensively farmed pigs.

*"Promotion of play is a promising proof of concept to improve welfare of pigs."*

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