

Play behaviour and its role to enhance pig welfare and production



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Play behaviour in non-human animals has been associated with feelings of pleasure as playing animals seem to be excited and “having fun” (Špinka et al. 2001). Play usually occurs in a stress-free environment when no threats are present, and all animal needs are satisfied (Burghardt 2005). This suggests the welfare status of the playing animals is likely to be high. But can promotion of play be used to enhance the welfare of the animals and support beneficial production characteristics?

Traditionally, approaches to improve animal welfare have focused on the elimination of negative experiences, such as pain. However, there has been a shift towards the promotion of positive experiences, with a focus on consideration and improvement of the quality of life for animals. Concepts that also resonate with consumer expectations for animals farmed for food.

Joyful activities such as play might have positive mental state-inducing effects on pigs. This could be beneficial for pigs in many aspects. For instance, a positive mindset could have immune-boosting properties which are confirmed in humans (Pressman et al. 2019). Pigs housed in alternative systems (e.g., an environment enriched with substrates, extra space, social enrichment, or cognitive enrichment) are able to recover faster or more efficiently from various challenges such as disease (van Dixhoorn et al. 2016), injuries (Ernst et al. 2006), transport, or temperature changes (Parois et al. 2022) compared to pigs from a barren environment. These pigs are also less excitable and less fearful in novel situations (Puppe et al. 2007, Zebunke et al. 2013). Research furthermore has identified that pigs from an enriched environment are in a more positive mental state and show more optimism when faced with an ambiguous situation (Douglas et al. 2012). Although no clear link has been made between the mental state and performance in pigs, the

evidence suggests that pigs with an enhanced welfare status maintain a positive mental state which could have beneficial effects on the performance and resilience. This is intriguing for the fact that intensively farmed pigs are challenged with various environmental and social challenges throughout their life and the promotion of positive welfare could be a means by which to support a greater resilience in pigs against challenges. Promoting positive experience through play behaviour may be one approach and could also have a stress-reducing effect which could further facilitate husbandry practices with less excitable animals and easier handling. Additionally, the performance of play at key time points early in the life of the pig is integral to the development of species specific behaviour, emotional regulation, and social skills. Therefore, providing outlets for expression of play may also support the conferring of beneficial traits to pigs. Lastly, the practical side of the strategy must not be neglected because only realistic options will be seriously considered by pig producers. The enrichment used in alternative systems is not viable in commercial conditions. However, play behaviour is naturally occurring in juvenile pigs even in intensive production units which makes it a good candidate to fulfil the role of promoting positive experience and beneficial traits in existing systems.

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This project is funded by the NSERC Industrial Research Chair program, a five-year research program focusing on emerging questions in swine welfare, led by Dr. Yolande Seddon and developed in collaboration with 14 industry partners representing Canadian producers, processors and swine genetics company. There are four overarching Goals of the program. Goal 2 will investigate whether play can be used as a tool to support positive welfare and beneficial production characteristics in pigs reared in the existing systems. Data collection is divided into a series of experiments that started in late 2020 and will continue until late 2023. The experiments are conducted at the Prairie Swine Centre, the University of Saskatchewan with final concepts to be tested at commercial facilities.



An upcoming experiment will address how the promotion of a positive mental state through play behaviour affects immunocompetency. Play could be stress-reducing but could also beneficially influence the immune response as a result of the relationship between a positive mental state and the benefits for the immune system (Ernst et al. 2006, van Dixhoorn et al. 2016). Lastly, assuming beneficial findings result, the promotion of play behaviour will be taken to a commercial barn. There, practicability, viability as well as the effect on the alleviation of common welfare challenges will be tested in real conditions.

Picture 1. Researcher with pigs that have experienced a play session in a play pen.

Because play is usually observed only in piglets between 2-6 weeks of age (Newberry et al. 1988), the first trial is exploring the promotion of play during its natural period of expression (pre-weaning), and testing pigs to establish whether the performance of different types of play, such as object play, social play and locomotor play, influences the response of piglets to weaning and the development of social skills when meeting with unfamiliar pigs. Data collection for this study is complete, and data analysis is underway.

A second trial explores whether play can be repeatedly promoted and sustained in older pigs, beyond the age at which play is naturally expressed, and aims to determine if promotion of play confers stress-relieving properties and results in a pleasurable/positive mental state. Play was promoted in finishing pigs by regular play opportunities either stimulated through enrichment items accompanied with scents in their home pen or, alternatively when given access to a larger, specific play pen area. Behaviour of animals exposed to play sessions was recorded throughout the trial to identify the response and will be compared to control pigs who receive no play opportunities. Weights were taken at the start and end of the trial from which to evaluate growth rate, and saliva samples were collected at specific time points for the assessment of levels of cortisol and alpha-amylase which are emerging markers of positive emotions and arousal. The effect of play on the mental state was researched in pigs that received play opportunities through heart rate variability and a behavioural test. Heart rate variability is a proxy measure of the autonomic nervous system and can indicate a psychological state by the interplay between the sympathetic ("fight or flight") and parasympathetic ("rest and digest") branches. The behavioural test (cognitive bias) assesses pigs' optimism and pessimism while being faced with a neutral situation. The results of this trial will identify if it is viable to promote play, and whether it confers positive mental states for pigs, which is a tool for enhancing quality of life in production systems.



Picture 2. Measuring heart rate variability during a play session in a play pen.

Implications

This project opens up a new approach by which the quality of life and performance of intensively farmed pigs could be enhanced by a means that will also resonate with consumers. By exploring the relationship between play behaviour, the pigs' emotions and productivity, the project aims to deliver a powerful tool with beneficial outcomes for production characteristics such as improved immune response and more effective responses to stress. Importantly, the tool will be designed and evaluated for application in the existing commercial systems. Therefore, the findings of this project will support the sustainability of the Canadian swine industry and benefit consumers of Canadian pork products. Finally – we are sure producers and barn staff will enjoy seeing pigs play!

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(Play behaviour and its role ... cont'd on page 11)

(Play behaviour and its role ... cont'd from page 9)

Biography

Karolína Steinerová is a PhD student in pig welfare at the University of Saskatchewan, Western College of Veterinary Medicine working under the supervision of Dr. Yolande Seddon. She obtained an MSc in Animal Science from the Swedish University of Agricultural Sciences, SE, and a BSc in Animal Welfare and Protection from the University of Veterinary and Pharmaceutical Sciences, CZ. Karolína incorporates her experience from animal husbandry from different parts of the world to improve the quality of life of farmed animals in Canada.

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