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"Irrelevant" ground pecking in agonistic situations in burmese red junglefowl (*Gallus gallus spadiceus*)

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Document Version

Publisher's PDF, also known as Version of record

Publication date:
1971

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Feekes, F. (1971). *"Irrelevant" ground pecking in agonistic situations in burmese red junglefowl (*Gallus gallus spadiceus*)*. [Thesis fully internal (DIV), University of Groningen]. s.n.

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SUMMARY

Threatening cocks may suddenly peck at the ground, pick up a food grain and swallow it. The occurrence of a feeding pattern during threat appears to be out of context and seems functionally irrelevant. Kruijt (1964), concluded from his data that ground pecking in threatening cocks is caused by disinhibition of feeding, in addition to which redirection of aggression plays a role. He further suggested that the occurrence of ground pecking depends on the ratio of the tendencies to attack and to escape.

As this interpretation appears to be unsatisfactory in some respects, a further analysis of ground pecking in agonistic situations in junglefowl cocks was undertaken.

In a controlled experimental environment the birds were tested singly or with an opponent. The agonistic situation was varied: either two strange adult cocks were separated by a wire partition, so that they showed mainly side display, or a number of cockerels developing a rank order and showing predominantly frontal display were allowed to move freely in the test cage. Food deprivation conditions and eliciting stimuli for ground pecking were manipulated.

The frequency of ground pecking varied from one situation to another, independently of the hunger-state, when this was kept constant and low. Attempts to find - by studying correlations between ground pecking and other behaviour patterns in the performer - one or a restricted number of factors responsible for these variations were unsuccessful. Though ground pecking was negatively correlated with alarm behaviour and positively correlated with aggressive responses (e.g. kicking/jumping and raising of the feathers) its occurrence was not sufficiently defined by these correlations. Attempts to find correlations with behaviour of the opponent only revealed distance as a variable affecting the peck frequency, but this variable proved to be only sufficient to explain a small part of the variation. It was finally concluded that within certain limits ground pecking occurs under a rather wide variety of conditions, with respect to the behavioural context, both of the pecking bird itself and of the opponent. (Chapter III).

Experiments on the influence of food deprivation show that factors controlling feeding behaviour affect ground pecking in agonistic situations, e.g. during frontal display and during side display. (Chapter II). However, these factors only express their influence when particles associated with food intake are present. These may be food, sand (which becomes associated with food intake because chickens often find their food in sand), or small polythene particles, associated with food intake through an operant conditioning procedure, (experiment 14).

When the particles have not previously been associated with food intake ground pecks nevertheless occur, but these are hunger-independent. These hunger-independent pecks were observed in untrained birds pecking at the small polythene particles, when they were single as well as with an opponent, but more so during side display than in periods without threat or in isolation. Thus, factors associated with agonistic behaviour can cause ground pecks independently of factors controlling feeding. Some hunger-independent pecks can be considered as exploratory pecks, but in the presence of an opponent ground pecks occur, which are exclusively under the control of factors associated with agonistic behaviour. These results show that different motivational systems influence ground pecking either separately or together. (Chapter IV).

It has been attempted to explain the result that several different complexes of controlling factors lead to ground pecking by assuming that not the control by these factors, but the performance of ground pecking is primary and that the performer executes ground pecks as an operant to manipulate its motivational state.

Cocks were placed on a floor without sand or other particles. Ground pecks disappeared and - compared with cocks on a floor with sand - more alert looking around and less kicking/jumping and aggressive pecking during fights were shown. It is argued (e.g. on the basis of a control experiment with birds without an opponent) that the increase in alarm behaviour could not be attributed to a direct effect of the absence of sand in the environment, but to the impossibility to perform ground pecks, because of the absence of eliciting stimuli. It is concluded that the performance of ground pecks leads to a reduction in alarm and an increase in aggressive behaviour in agonistic situations. Ground pecks are thought to have a direct feedback effect on the pecking bird itself. By producing changes in the tendencies to show alarm and/or aggressive behaviour, ground pecking may help to maintain the motivational state, so that ongoing behaviour can continue. It will have evolved in agonistic situations, because here the continuation of displays has often survival value.

It is suggested that the birds learn to perform ground pecks, when this leads to favourable changes in motivation. As an operant response ground pecking can occur in different agonistic contexts, e.g. during frontal display and during side display (drive generalization). The occurrence of ground scratching closely linked with ground pecking can be considered as response generalization. The addition of vigorous bill beating to the normal pecking movements can be identified with the concept of induction in the literature on operant conditioning.

ACKNOWLEDGEMENTS

This study would never have been accomplished without the help of colleagues, technicians and friends. Unfortunately, it is not possible to mention everybody who helped me, but I wish to express my thanks to all. I am grateful to many, contributing to my scientific education. Particularly I thank Prof. Dr. N. Tinbergen, who introduced me to the study of animal behaviour, for his kindness and help.

I am indebted to Prof. Dr. G. P. Baerends allowing me full scope to complete this study and I wish to express my thanks for his stimulating suggestions during the work and his critical comments on the manuscript.

I thank Dr. J. P. Kruijt for his assistance throughout the study and his valuable criticism of the results. His critical discussion of the manuscript has contributed greatly to its improvement.

For many invaluable discussions I thank my colleagues of the Zoological Institute at Groningen. I am particularly grateful to Prof. Dr. L. de Ruiter, Dr. P. R. Wiepkema and the members of the research group on feeding behaviour at Groningen and to Prof. Dr. P. Sevenster at Leiden.

I thank Dr. J. Reddingius for his unremitting help with the statistical analysis. Mr. L. Hoekstra for preparing the figures and Mr. G. Thomas for correcting the English.

I am grateful to Mrs. H. Lochorn, who managed to decipher my writing and typed the successive versions of this paper.

However, I would not have been able to collect the data without the assistance of many technicians, particularly Mr. J. B. J. Veltman and his colleagues taking care of the animals.

I wish to thank my friends, who helped me in many ways.