A Study in Behaviour Conservation: Applying Ecological Learning Theory to the Maintenance of Species-Typical Behaviour in Small Carnivores in a Zoo Environment.

Monique Kardos, B. Sc. Hons (Adelaide)

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Department of Psychology
The University of Adelaide

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Abstract

The behaviour of captive animals has – over the last few decades – increasingly become an issue of concern for researchers. Behaviour in zoo-housed animals can be problematic as a result of the lack of naturalistic stimuli or opportunities to perform species-typical behaviour under captive conditions. The research reported in this thesis concerned the conservation of species-typical behaviour via the application of a variety of methods from both the laboratory and more applied settings. The dual aims of the thesis were (1) to contribute to the understanding of behaviour conservation models and their application to captive species, and (2) to explore the combinations of methods which produced the most naturalistic levels and topographies of behaviour in the three subject species.

The experimental component sought to utilise Ecological Learning Theory and the *behaviour systems* approach as a framework for stimulating species-typical foraging and defense behaviour. The subject species were Fennec foxes (*Fennecus zerda*), Meerkats (*Suricata suricatta*), and Dwarf mongoose (*Helogale parvula*). The four studies employed a modified repeated measures design and involved the following conditions: (1) macro and micro reinforcement schedules, (2) non-response-contingent feeding, (3) response-contingent [operant] feeding, and (4) simulated predation. These conditions were applied individually and in various combinations.

Results indicated that, as expected, micro reinforcement schedule manipulations produced more substantial changes to behaviour than macro schedule manipulations in all species. In addition, non-response-contingent feeding resulted in the activation of modules within the foraging behaviour system previously unused in the captive environment. Levels of foraging behaviour were concomitantly modified. By contrast, response contingent [operant] feeding resulted in more stereotyped responding in the three subject species, as well as a tendency to decrease the overall level of foraging behaviour. Additionally, the operant feeding method led to decreased foraging effort on the part of the subjects when the inter-reinforcer interval was increased. Simulated predation resulted in increased group cohesion (indicated by decreased food-related and general aggression), as predicted. The combination of simulated predation with non-response-contingent feeding produced the greatest behaviour benefit for both the Meerkat and Dwarf mongoose groups in terms of increasing the level of foraging and decreasing overall aggression between group members. Overall, the data indicate that (1) species-typical behaviour can effectively be elicited in the captive environment using non-response-contingent methods, and (2) these methods are most effective when implemented within a *behaviour systems* framework.

The discussion explored the implications of the results for the management of behaviour in captive species. It is concluded that the behaviour of captive foraging species can be effectively managed when the *behaviour systems* approach is applied. In addition, making species-typical behaviour functional in the captive environment resulted in substantial benefits in terms of both the level and topography of behaviour displayed by the subjects. Directions for future research – in terms of both a broader range of species and techniques – were also considered.