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The effect of visitors on zoo animals

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Importance of understanding welfare

- ◆ Ethical obligation
- ◆ Practical implications for zoos
 - Influence on visitor support (Hosey 2005; Kreger and Mench 1995)
 - Health and reproduction consequences (Buchanan 2000 and Tarlow 2007)





Factors that can influence behaviour and welfare

- ◆ Immediate environment (enclosure structure, social housing, nutrition)
- ◆ External stimuli

Humans





The visitor effect

Visitor conditions

- ◆ Presence of unfamiliar humans, constantly changing
- ◆ Range of behaviours: passively observing animals → actively seeking interaction



How to assess effects on animals?

- ◆ Behaviour
- ◆ Physiology





Primate response to visitors...

Species	Finding	Reference
Cotton-top Tamarins	↓ Social behaviour and play	Glatson et al 1984
Gorillas	↑ intra-group aggression and stereotypes	Baker 2004
Spider monkeys	↑ Urinary cortisol	Davis 2005
Stumped-tailed Macaques	↑ aggression	Simpson 2004
White handed gibbons	↑ self-scratching, ↑ territorial behaviours	Cooke 2007
Siamangs	No changes	Nimon and Dalziel 1992



Non-primate response to visitors...

Species	Finding	Reference
Leopards	↓ activity ↑ pacing	Mallapur 2002
Black rhinos	↓ breeding success	Carlstead 2005
Mexican Wolf	↑ faecal cortisol	Pifarre 2011
Blackbuck	↑ aggression ↑ faecal cortisol	Rajagopal 2011
Jaguar	↑ time spent out of view ↑ pacing	Sellinger 2005



Meerkat study - Aim

To determine if meerkats adjust their behaviour in response to manipulated visitor behaviour





Methods

- ◆ 3 groups of meerkats, 3 sites (Melbourne Zoo and Werribee Zoo)
- ◆ Two treatments imposed over full day periods
 - 1) **Control**; visitor behaviour was unregulated
 - 2) **Modified visitor behaviour**; through the presence of uniformed officials and signs requesting:

“Research in progress. Please be as quiet as possible and do not attempt to interact with the animals”





Methods

- ◆ All meerkats were individually identifiable
- ◆ Observations from 10.30h – 15.00h, 8 days per site (4 per treatment)
- ◆ 2 observers (1 recording human data and 1 recording meerkat data)

Table 1. Measures for both visitors and meerkats at the exhibit recorded every 2 mins

Visitors	Meerkats
Number of children	Distance from viewing area
Number of adult males and females	Body posture
Noise level (Db Logger)	Behavioural state
Intensity of visitor behaviour	Orientation in relation to visitors



Results – visitor conditions

- Treatment successful at reducing visitor behaviour intensity to very low levels
- Associated with reduction in noise level of 4db

Table 2. Effect of treatment on visitor conditions at the exhibit.

	Control	Treatment	sed	P Value	
				Main effect of treatment	Interaction of exhibit with treatment
Behaviour intensity				0.000013	0.013
Melbourne A	0.69	0.12	0.079		
Melbourne B	0.20	0.05	0.079		
Werribee	0.48	0.04	0.079		
Crowd Noise (db)	55.3	51.4	0.60	0.00011	0.76
Number of visitors	5.9	5.3	0.83	0.25	0.56
Number of children	2.5	2.1	0.26	0.20	0.56
Number of adults	3.5	3.0	0.47	0.21	0.76



Results – meerkat behaviour

- No significant difference in meerkat behaviour between treatments

Table 3. Effect of treatment on meerkat behaviour, posture, orientation, proximity to visitor viewing area and time out of view.

	Variable	Back Transformed		P Value	
		Control	Treatment	Main effect of treatment	Interaction of exhibit with treatment
Location	Out of View	0.10	0.11	0.73	0.92
Postures	Alert	0.25	0.25	0.81	0.73
	Resting	0.19	0.15	0.50	0.97
	On all fours	0.48	0.54	0.21	0.74
Behaviours	Vigilance	0.32	0.34	0.56	0.70
	Resting	0.11	0.05	0.18	0.87
	Locomotion	0.11	0.15	0.064	0.22
Orientation	Towards Visitors	0.46	0.42	0.37	0.50
Separation	Proximity to viewing area (m)	3.1	2.9	0.22	0.45



Interpretation

- ◆ Visitor behaviour can be successfully modified
- ◆ No evidence that meerkats show avoidance of increased intensity of visitor behaviour
 - Habituated to constant visitor presence (visitors irrelevant part of environment?)
 - Species differences in response to visitors
 - More aware of aerial stimuli e.g. birds?
- ◆ Meerkats a good zoo species





Orang-utans – preference test

Aim: To study the motivation of orang-utans to seek or avoid visual interaction with visitors

Methods:

- ◆ Visitor viewing window altered:

1. window was uncovered,
2. left side covered, and
3. right side covered



- ◆ Record the position of orang-utans on the platform (left or right)
- ◆ Record the direction each individual was facing (towards or away from visitors)



Results

Effect of partial closing of viewing area on positioning of orang-utans

	Right & Left Open	Right Open, Left Closed	Right Closed, Left Open	sed	P value
Time on right side facing out (as a proportion of time facing out while on platform)	0.76	0.78	0.27	0.086	0.0066

Preference for right

But avoidance of the right if the animal cannot see forward



Other studies...

- ◆ Visitor effect in free range exhibits
- ◆ One way vision and primate aggression
- ◆ Visitor encounter effects on animal behaviour and welfare
- ◆ Development of non-invasive measures



The future...

- ◆ A need for these studies in a range of species
- ◆ Understanding the effect (+ or -) to highlight opportunities to enhance welfare using visitors
 - Positive: encourage interaction
 - Negative: slight management changes (e.g. visitor behaviour, vision?)
- ◆ Human-animal studies should be the focus of future welfare research in zoos





Thanks - any questions?



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