ONE KINKAJOU AND 4 KEEPERS – PROBLEM IS SOLVED FROM OUTSIDE

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Zoo keepers are often faced with animals' behavioural problems even in species-specific enriched enclosures. In some cases keepers' attempts to change animals' behaviours are ineffective because a motives of undesirable behaviour are not noticeable. Such situation took place in Moscow Zoo "Night World" exhibit with male kinkajou (*Potus flavus*) which impeded to carry out daily husbandry procedure. Zoo researchers tried to solve this problem in cooperation with keepers.

The causes of undesirable kinkajou behavior were studied on the frame of the "environmental optimization hypothesis", which propose model of zoo animals welfare improvement through varying of predictability and improving of controllability of their environment (VIII ICEE, Popov, 2007).

METHODS

1. **Visual observations** of keeping procedure: "ad libitum" method (Altmann, 1974) to make qualitative estimation of behaviour.
2. **Interview**: each keeper described relationship with kinkajou taken as a whole, suppositions concerning its undesirable behaviours (preliminary) and his own activity and kinkajou behaviour (post observation).

MATERIALS

Registration	Duration (min)	Number (total)		Regime (time in the week)	
		1st set	2nd set	1st set	2nd set
Preliminary interview	10 - 15	4	-	once	-
Observations	45 - 90	12	12	2-3	weekly
Postobservation interview	15 - 20	12	12	2-3	weekly

1st set of observations and interview was followed by discussion of results with keepers and after one month's interval by the 2nd set

Housing conditions: ♂ kinkajou was housed in enclosure with ♂ agouti (Dasyprocta punctata) and ♂ opossum (Monodelphis domestica) under invertible light day and looked after by 4 keepers by turn.

Kinkajou exhibit enclosure (7x2x2 m).
Keeping procedure took place in enclosure with animals.

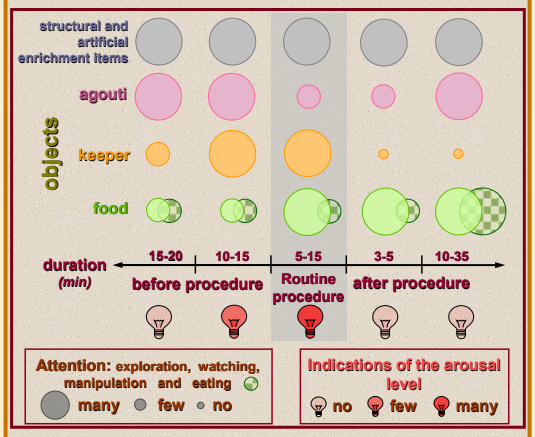
RESULTS

1. Description of behaviour

Kinkajou activity:
importunate attention and too close approaches to keeper (sometimes with aggression), immediate inspecting new objects, indications of the arousal (rapid breathing with opened jaw, stereotypy, strained gestures).

Keeper's activity:
feeding, carrying out enrichment (hang puzzle-feeder, olfactory items), behaviors, directed to the supporting safety distance to kinkajou, uncertainty patterns (strained gestures, pausing before entered into enclosure, anxious looking round).

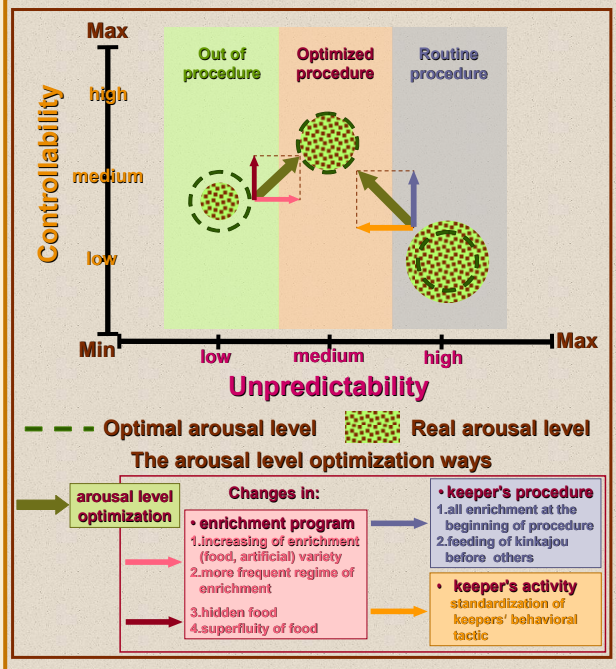
2. Attention distribution and arousal level changes of kinkajou during daily husbandry



High level of kinkajou exploratory activity and manipulation directed to the structural, artificial and food enrichment objects showed a distinct novelty needs.

Kinkajou arousal level and attention to keeper increased before and during routine procedure and decreased to zero soon after ending of procedure .

4. Scheme of kinkajou keeping procedure optimization and diagnosis



Kinkajou had a lack of stimulation out of routine procedure. Kinkajou had an extra-stimulation during procedure: increasing of unpredictability and decreasing of controllability that lead to arousal level increasing.

We regard such research as a methodical assistance to keepers in Moscow zoo.

3. Factors influenced on the kinkajou arousal level changes during routine procedure

Arousal changes vector	Keeping conditions		Changes of environmental parameters
↑	1.delay of routine procedure 2.keeper enters without food 3.feeding of agouti was followed by feeding of kinkajou 4.keeping kinkajou off the feeder	restricted access to food	controllability ↓ / unpredictability ↑
↓	1.presence of yesterday's food before procedure 2.placement of additional feeders	unrestricted access to food	controllability ↑ / unpredictability ↓
↓	3.some enrichment at the beginning of procedure 4. structural and artificial enrichment the day before	availability of new objects	controllability ↑ / unpredictability ↓

High arousal level of kinkajou during routine procedure could decrease if 1) the animal was able to control environment or/and 2) environmental novelty increased.

5. Changes of behaviours and emotional state of keeper and kinkajou as a result of optimization

Keeper's behavioral tactics for the supporting of safety distance	Number of the arousal indications		Number of kinkajou undesirable behaviours (max 6)	Observations
	Keeper (max 4)	Kinkajou (max 5)		
Preventing the kinkajou to reduce the distance	2	4	3	before optimization
Increasing of distance at the kinkajou approach	4	2	6	
Contradictory tactics (e.g. food reinforcement coupled with keeping off the kinkajou)	4	4	5	
Preventing the kinkajou to reduce the distance	0	1	2	post optimization

"Offensive" keeper's behavioral tactics decreased the number of kinkajou undesirable behaviours, but it restricted the animal's ability to control the situation and provoked arousal raising. Other tactics was ineffective and evoked the keeper's stress.

Negative consequences of uncontrolled impact to kinkajou were minimized by improvement of keeper behavior predictability (standardization) during routine procedure.