

# AN ASSESSMENT OF ENCLOSURE SUITABILITY FOR CAPTIVE ORANG-UTANS AND THE INFLUENCES THAT DESIGN MAY HAVE ON BEHAVIOUR.

Gee, E., Howell, C. P.

Research Department, Blackpool  
Zoo, Blackpool, Lancashire, FY3 8PP

NOTTINGHAM  
TRENT UNIVERSITY



**Orangutan enclosure usage**

# AIMS

- Do our orang-utans show environmental preferences for particular features within their enclosure, indicating enclosure efficiency?
- Do the behaviours of the individual and the feature in use have an association?



## NULL HYPOTHESIS:

There are no environmental preferences for particular enclosure features.

There is no relationship between the feature in use and the behaviour displayed by the individual.

# METHODS

**Instantaneous group scan sampling** (Altmann, 1974)  
every **minute**

- Feature in use
- Behaviour
- Tier

Monday and Wednesday  
10:00-12:00 and 12.30-14:00

75 hours per individual  
375 hours in total

**Electivity Index and Mann Whitney Test**

$$E^* = \frac{W_i - \left(\frac{1}{n}\right)}{W_i + \left(\frac{1}{n}\right)} \quad W_i = \frac{\left(\frac{r_i}{p_i}\right)}{\sum r_i/p_i}$$

Ross *et al.*, 2009



**2 way Chi-Square Test**

- Feature Use
- Behaviour

# RESULTS

	Movable Objects	Vents	Training Ledge	Solid Structures	Ceiling Supports	Low Open	Net Ceiling
Ramon	-0.114	0.354	0.806	-0.186	-1.00	-0.880	-0.999
Vicky	-0.230	0.855	-1.00	-0.273	-1.00	-0.910	-0.998
Cherie	0.705	0.741	-1.00	-0.316	-1.00	-0.930	-0.961
Summer	0.0702	0.829	-0.832	-0.210	-1.00	-0.890	-0.969
Jingga	0.799	0.278	0.295	0.0203	-1.00	-0.980	-0.765

## Mann Whitney test:

There was not a significant difference in feature preference between individuals



Overuse



Close to expected use



Underuse



Orangutan enclosure usage

# RESULTS

## CHI-SQUARED

Feature in use ↔ Behaviour  
 $\chi^2 (165)=0.0, p=0.000.$

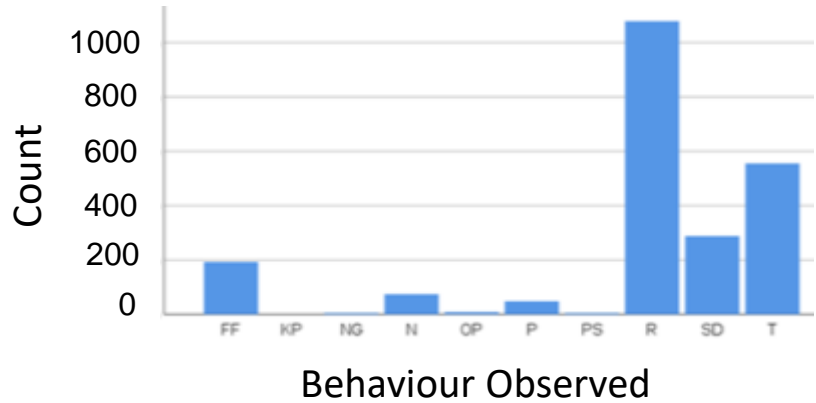
Null hypothesis was rejected ( $p < 0.05$ ).



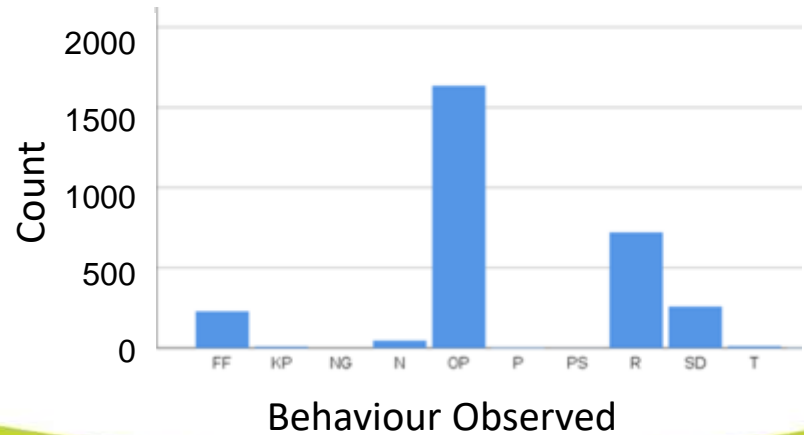
**Resting**  
 All features  
 All heights

**Locomotion**  
 Movable  
 Objects  
 Net ceiling

Behaviours Observed on Movable Objects



Behaviours Observed at Glass Partition



# CONCLUSIONS

- **Preference varied** but overall individuals used the enclosure in similar ways
- **Features in use/available** may influence **behaviour**
- **Movable objects** used in excess and encourage locomotion

## References

Altmann, J., 1974. Observational study of behavior: sampling methods. *Behaviour*, 49(3), pp.227-266.

Ross, S.R., Schapiro, S.J., Hau, J. and Lukas, K.E., 2009. Space use as an indicator of enclosure appropriateness: A novel measure of captive animal welfare. *Applied Animal Behaviour Science*, 121(1), pp.42-50.



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