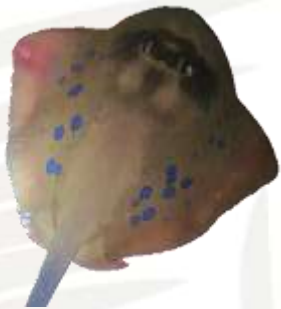


The responses of rays to temporally predictable events

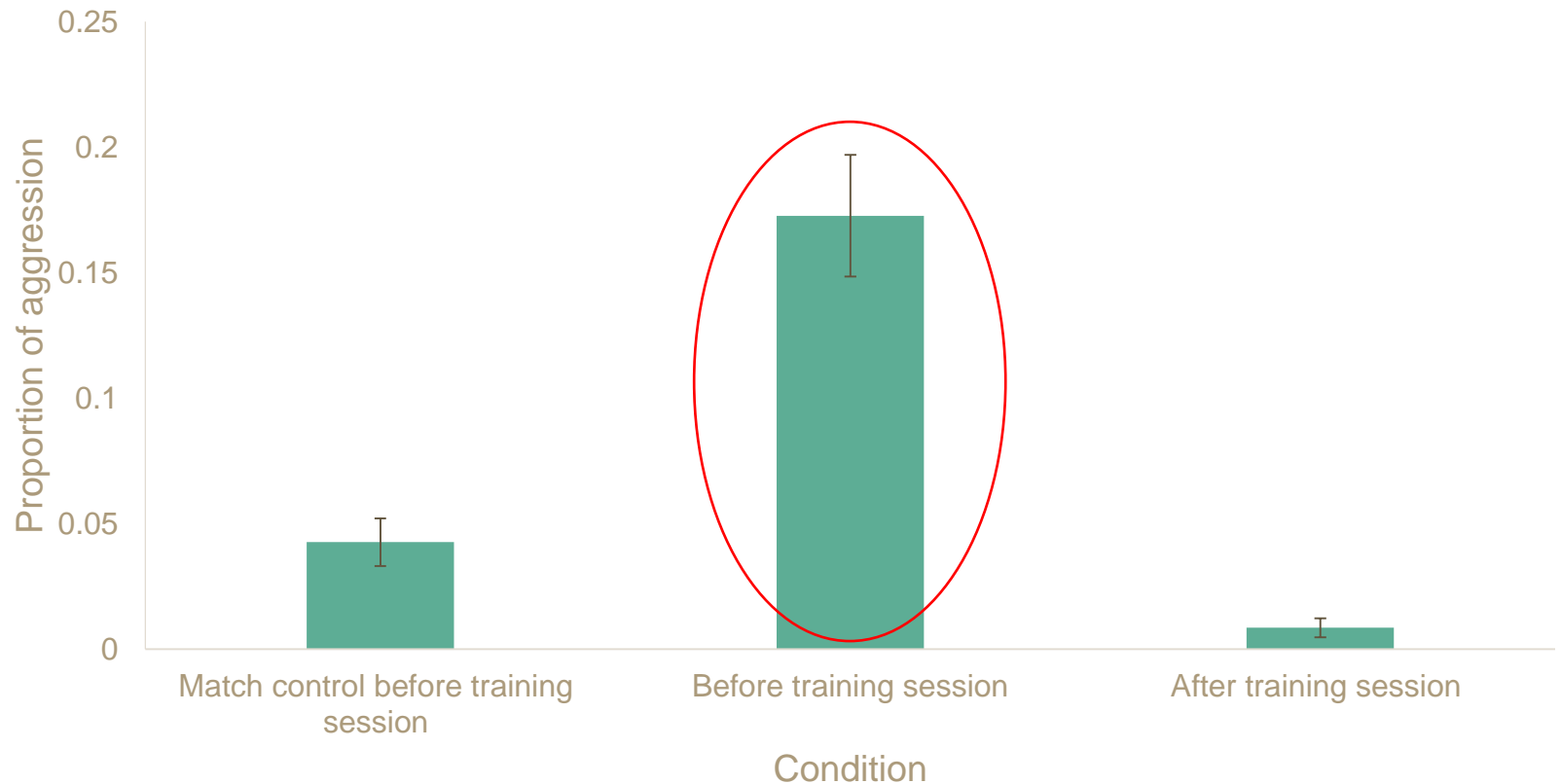
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2016/17 – Training and Aggression



Introduction

- Temporal predictability: how reliably an event occurs at the same time each day (Bassett and Buchanan-Smith, 2007)
- Social network analysis (SNA) of the intraspecific and interspecific aggressive interactions



Aims

- Continue to monitor the influence of positive reinforcement training (PRT) on aggression
- Determine if any behaviours are anticipatory and investigate the effects of predictability
- Determine the differences in the social network after a change in group structure

Methods - Target Training

- Training = predictable event
- Ribbontail rays trained to press their body against a target, rewarded with a favourable piece of food
- Signals kept the same throughout the study



Methods - Observations

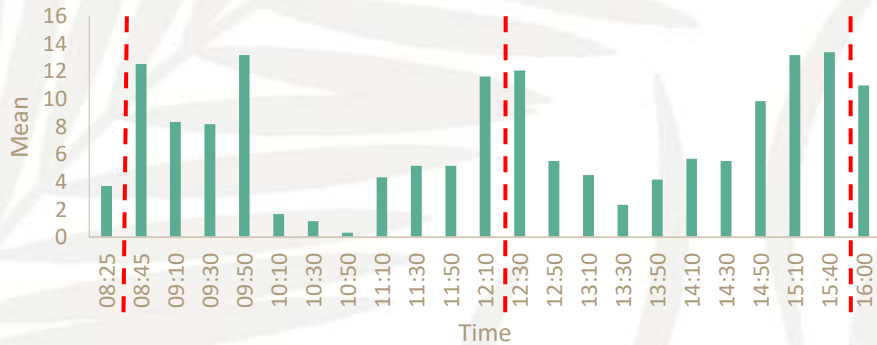
Condition	Duration (days)	Training time	Ray trained	Number of rays
No training	12	No training	N/A	6
Predictable 1	25	1530 hours	Sandy	6
Unpredictable	16	Random time (between 0845 and 1500 hours)	Alex	5
Predictable 2	16	1530 hours	Alex	5



Sandy died :(')

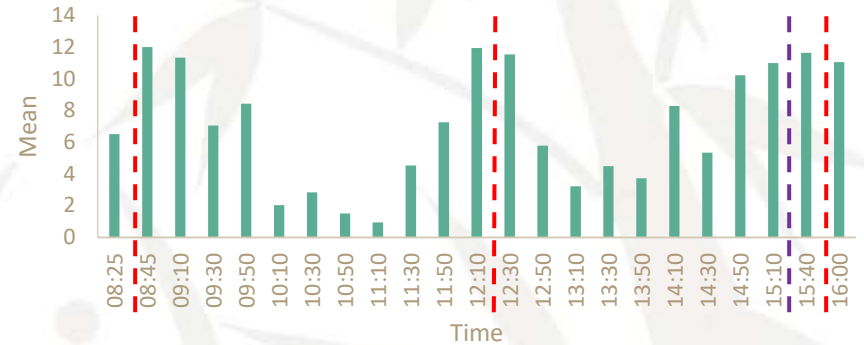
Daily Patterns in Active Behaviours

No training

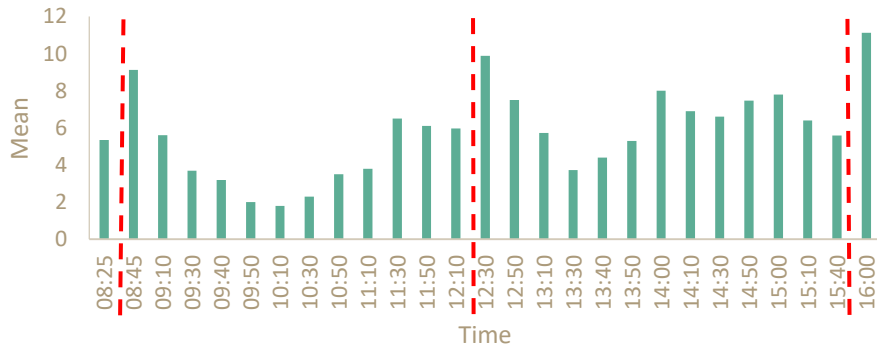


Feed - - -

Predictable 1

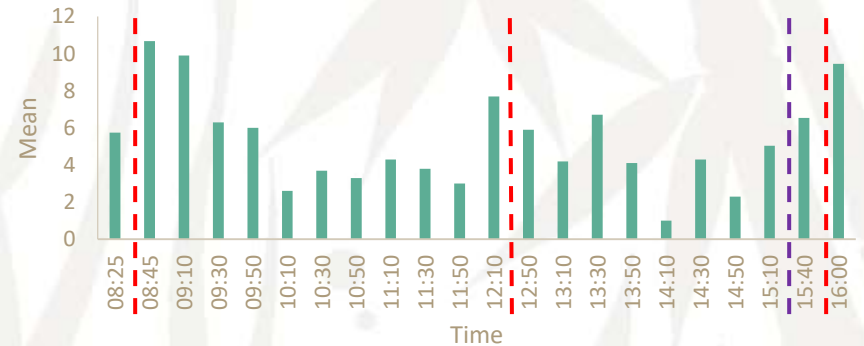


Unpredictable

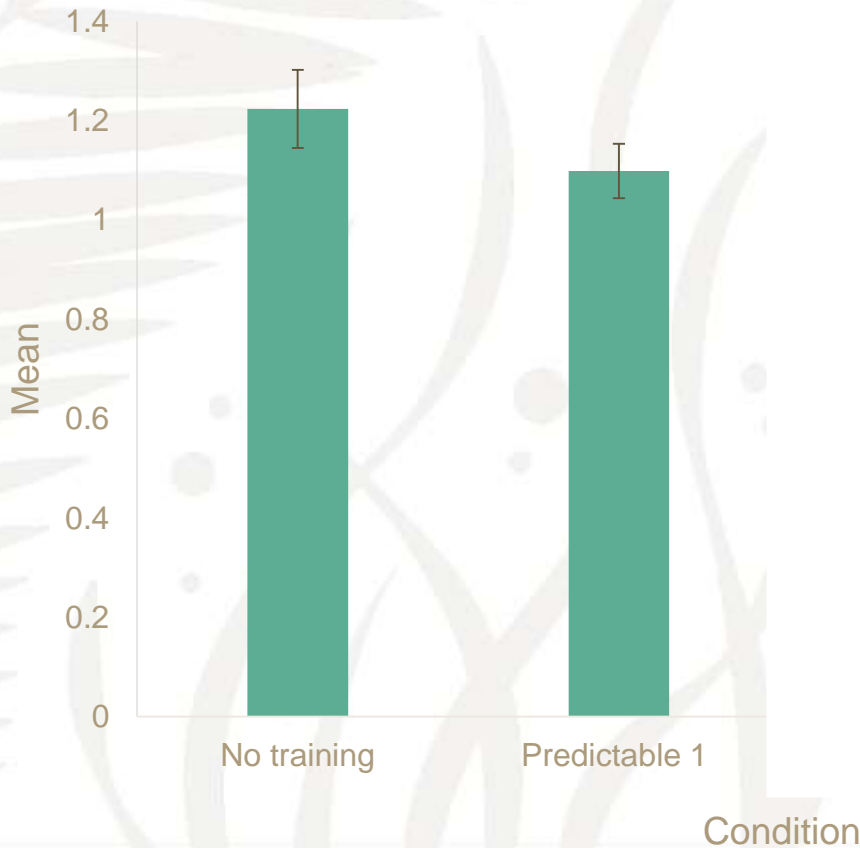


Training - - -

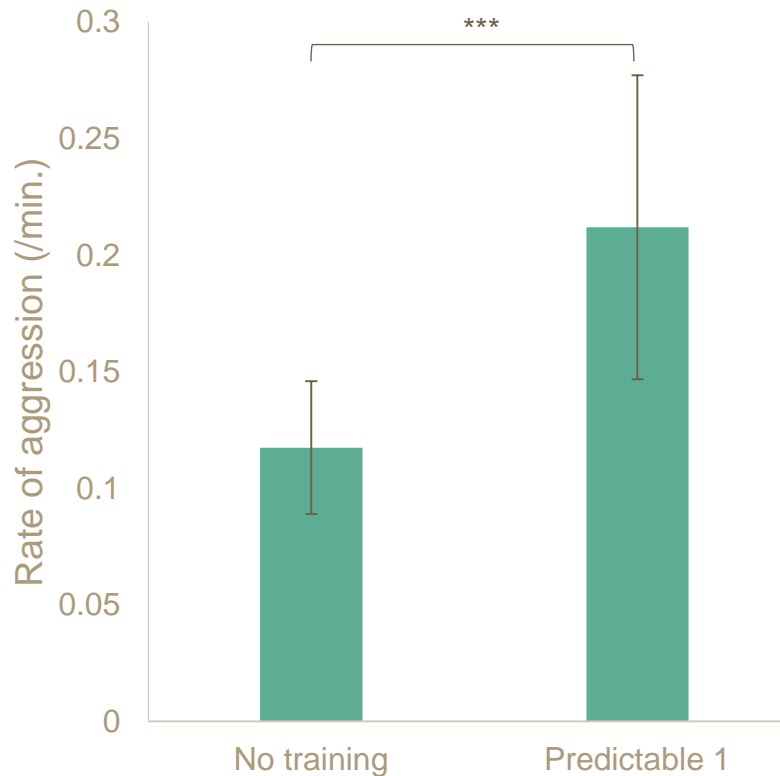
Predictable 2



Overall Daily Levels of Aggression



Before Training Session Aggression

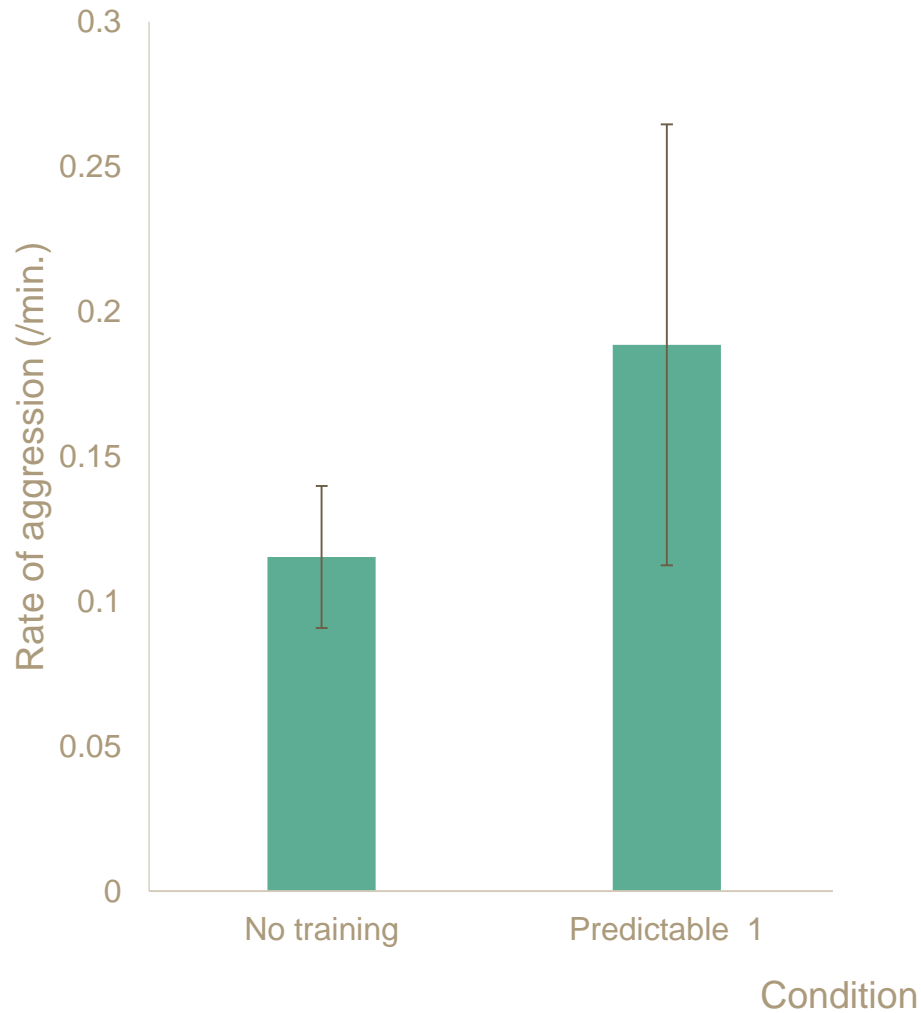


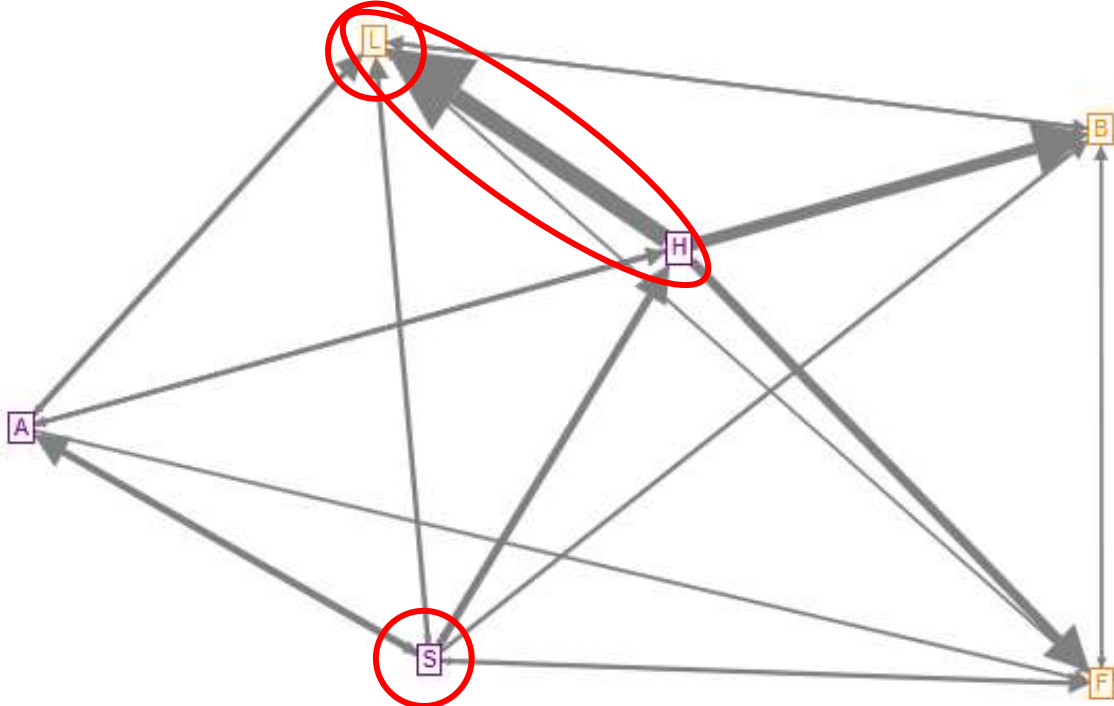
$\chi^2 = 0.94, df = 14$
*** $p < 0.001$

Condition

$\chi^2 = 13.65, df = 13$
*** $p < 0.001$

After Training Session Aggression



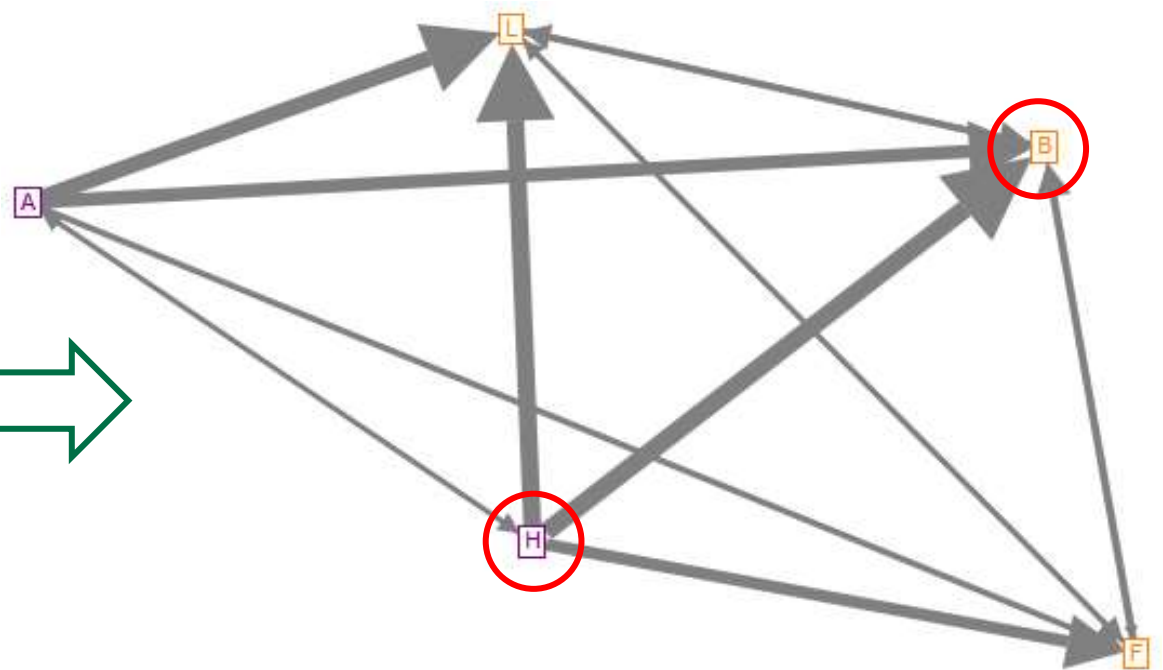


Predictable 1 rankings

- 1 - Sandy
- 2 - Holly
- 3 - Alex
- 4 - Freckles
- 5 - Barb
- 6 - Luna

Predictable 2 rankings

- 1 - Holly
- 2 - Alex
- 3 - Freckles
- 4 - Luna
- 5 - Barb



Conclusions

- PRT continued to help decrease aggression in the group, with lower overall daily levels of aggression when training was offered
- Individual differences in ability to predict or result of change in group structure
- Blue-spotted ribbontail rays were dominant over the blue-spotted maskrays throughout the study.
Death of Sandy – shift in roles

Acknowledgements

- Dr Holly Farmer
- Dr Jo Newbolt
- FCR department
- Living Coasts staff



Questions



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References

- Bassett, L. and Buchanan-Smith, H.M., 2007. Effects of predictability on the welfare of captive animals. *Applied Animal Behaviour Science*, 102(3-4), pp.223-245.
- Opsahl, T., Agneessens, F. and Skvoretz, J., 2010. Node centrality in weighted networks: Generalizing degree and shortest paths. *Social Networks*, 32(3), pp.245-251.