

Liss, K. C. M., Lopez, L. K., Donelson, J. M. and Wong, Y. L. 2020.  
Predator–prey interactions and metabolic rates are altered in stable  
and unstable groups in a social fish. – Oikos doi: 10.1111/oik.06690

## Appendix 1

Table A1. *Gambusia holbrooki* size range, mean size ( $\pm$  SEM), mean biomass ( $\pm$ SEM) and mean size differences between adjacently ranked individuals ( $\pm$  SEM) in groups of stable (n = 20) and unstable (n = 20) dominance hierarchies.

Group member characteristics	Stable	Unstable
Size range (length in mm)	13-40	22-31
Mean size (length in mm)	26.54 $\pm$ 0.705	26.95 $\pm$ 0.224
Mean biomass (g)	0.315 $\pm$ 0.216	0.257 $\pm$ 0.074
Mean size differences to adjacently ranked individuals (length in mm)	4.838 $\pm$ 0.202	0.950 $\pm$ 0.079

Table A2. Experimental design in chronological order, highlighting the relative days on which procedures were carried out, n = 20 per stability treatment level.

Day number	Procedures
<b>Day 0</b>	Starve fish
<b>Day 1</b> (Time 1)	<ul style="list-style-type: none"> <li>• Group formation</li> <li>• Acclimation to observer (5 min)</li> <li>• Intraspecific observation</li> <li>• Addition of shrimp in acclimation cage (5 min)</li> <li>• Removal of acclimation cage</li> <li>• Interspecific observation</li> </ul>
<b>Day 2</b> (Time 1)	<ul style="list-style-type: none"> <li>• Shrimp survival</li> <li>• Removal of shrimp</li> <li>• Water change</li> </ul>
<b>Day 3</b>	
<b>Day 4</b>	Water change
<b>Day 5</b>	
<b>Day 6</b>	
<b>Day 7</b>	Starve fish
<b>Day 8</b> (Time 2)	<ul style="list-style-type: none"> <li>• Acclimation to observer (5 min)</li> <li>• Intraspecific observation</li> <li>• Addition of shrimp in acclimation cage (5 min)</li> <li>• Removal of acclimation cage</li> <li>• Interspecific observation</li> </ul>
<b>Day 9</b> (Time 2)	<ul style="list-style-type: none"> <li>• Shrimp survival</li> <li>• Removal of shrimp</li> <li>• End of trial</li> </ul>

Table A3. Behavioural ethogram for *Gambusia holbrooki* (predator) and *Paratya australiensis* (prey) used to score behaviours in experiment 1 of this study.

Observation	Behavioural Category	Behaviour	Behaviour Description
<b>Intraspecific</b>	Aggressive	Chase	Fish rapidly follows another fleeing conspecific
		Bite	Fish bites part of another conspecific, usually before or after a chase
		Jolt	Fish rapidly swims toward another conspecific but does not engage in a chase
		Aggressive posture 1	Fish forms an S-bend posture and thrashes toward another conspecific
		Aggressive Posture 2	Two fish curl caudal fin, stiffen their bodies and circle one another
	Submissive	Submissive posture	Slowly moves away OR from side to side when jolted toward OR in confrontation with aggressive posture 1
		Flee	Fish rapidly swims away from a conspecific it is being chased by
		<b>Interspecific</b>	Predator
Bite	Fish bites part of a shrimp		
Swallow	Fish engulfs entire body of shrimp over a period of approximately 5 – 20 minutes		
Prey	Shelter occupancy		Shrimp hides behind filter OR in black plastic pipe OR under white PVC pipe
	Swimming		Shrimp is suspended and moving through water
	Sedentary		Shrimp is sitting on substrate OR glass wall OR on top of white PVC pipe

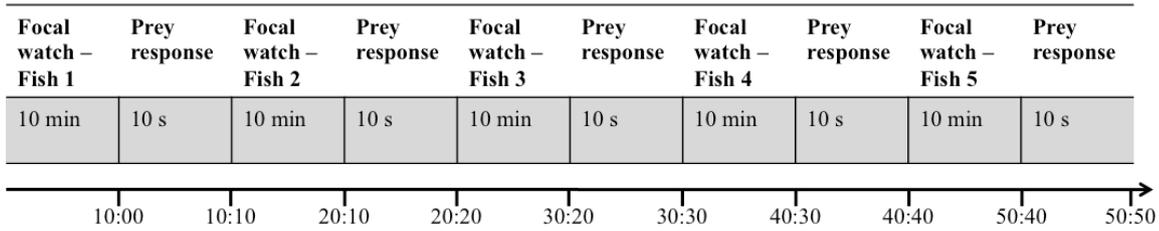


Figure A1. Representation of procedures of interspecific observations in the predator-prey experiment, in chronological order, where grey boxes indicate duration of the event and arrow represents time scale (min) throughout the observation.

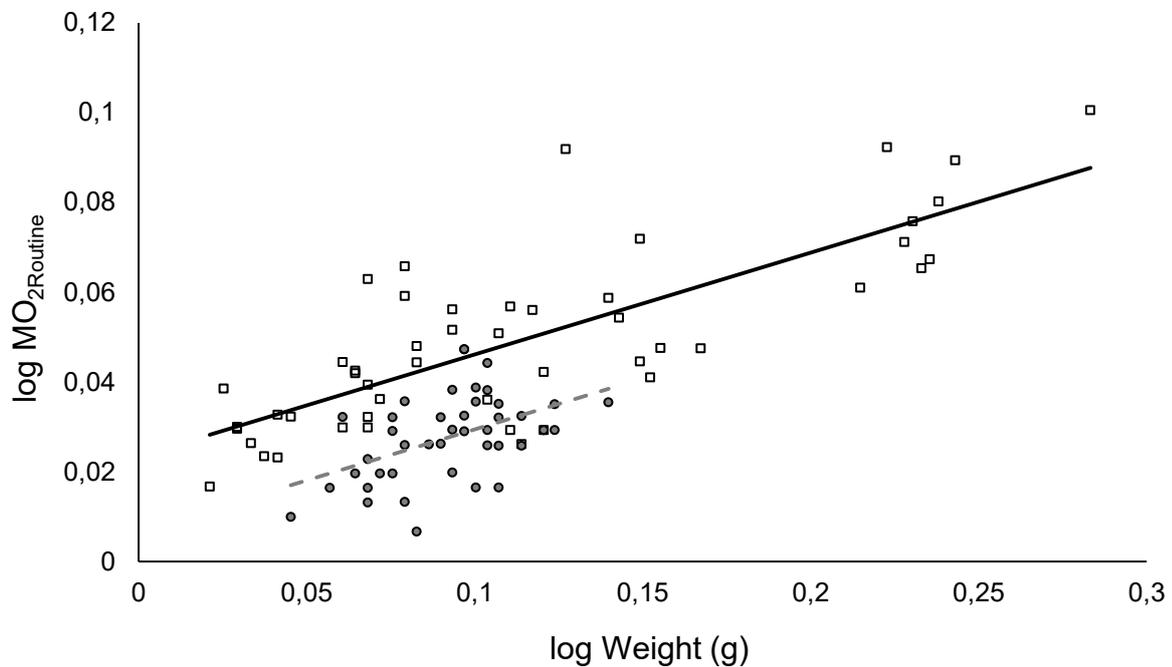


Figure A2. Relationship between  $\log MO_{2\text{Routine}}$  ( $\text{mg O}_2 \text{ h}^{-1}$ ) and  $\log$  weight (g), of *Gambusia holbrooki* from stable (square black) or unstable (circle grey) groups.

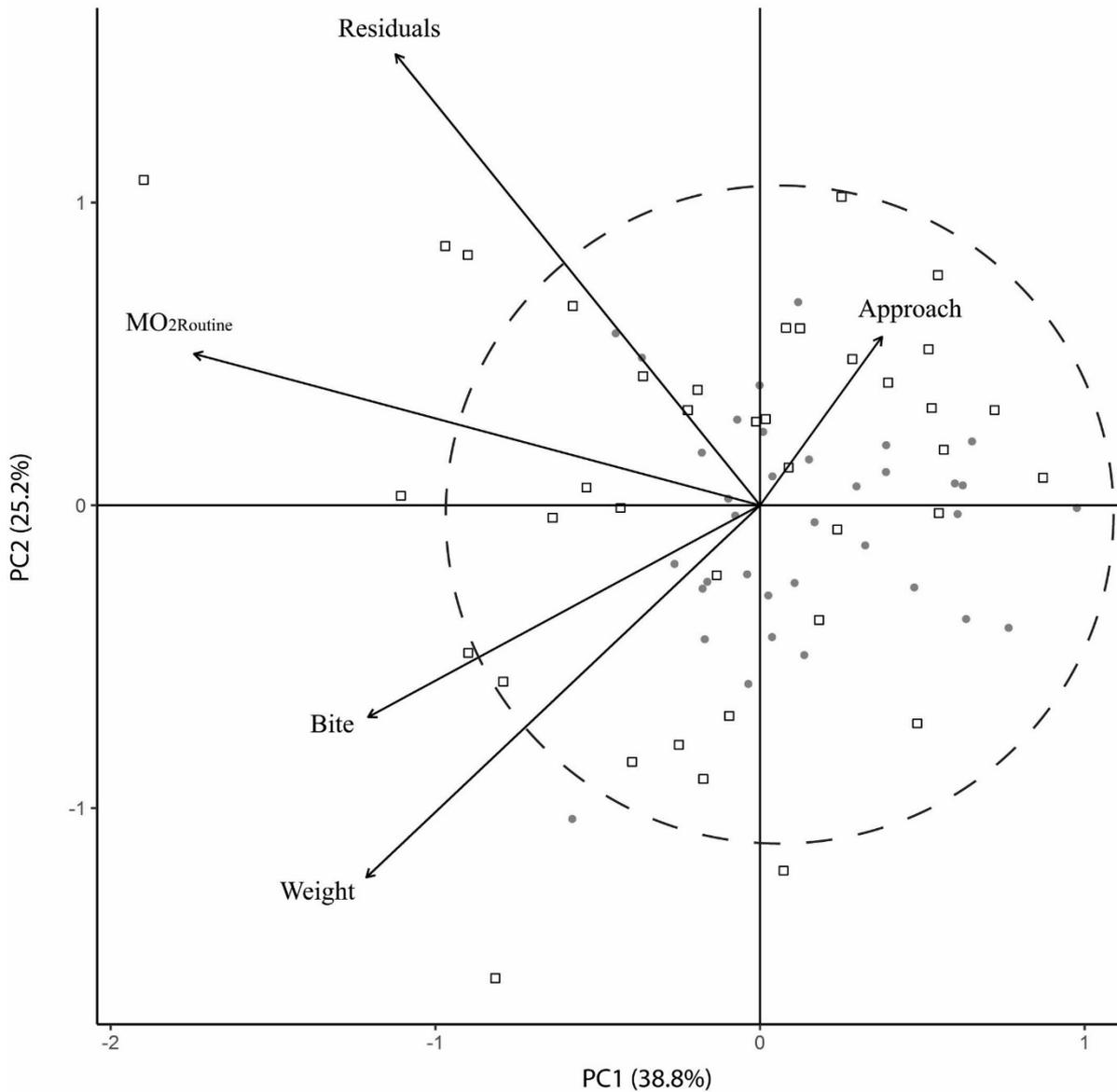


Figure A3. Principal component analysis biplot of *Gambusia holbrooki* individuals depending on the variables of predation effort (bites and approaches), weight and respiration rate ( $MO_{2\text{Routine}}$ :  $\text{mg O}_2 \text{ kg}^{-1} \text{ h}^{-1}$ ), from stable (black square;  $n = 48$ ) and unstable (grey circle;  $n = 44$ ) hierarchy groups. The dashed line represents a 95% confidence ellipse for all data.