

1 **Supplemental Table S1:** Test statistic and p-value for statistical model of log-transformed focal  
 2 female standard length, mean social partner female standard length, and mean naïve-group  
 3 partner standard length as dependent variables.

<b>Model</b>	<b>Effect</b>	<b>Statistic</b>	<b>P-value</b>
<b><i>A. Focal female standard length</i></b>			
	Social environment	$F_{2,33} = 0.230$	0.7986
<b><i>B. Mean social partner female standard length</i></b>			
	Social environment	$F_{2,33} = 2.56$	0.0927
<b><i>C. Mean naïve-group partner standard length</i></b>			
	Social environment	$F_{2,33} = 1.86$	0.1709

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5 **Supplemental Table S2:** Least-squares mean  $\pm$  SE for focal female standard length, mean  
6 social partner female standard length, and mean naïve-group partner standard length across  
7 each treatment.

Measurement	Treatment	Average SL (mm)	LS mean $\pm$ SE	Test effect
<b>A. Focal female standard length</b>				$F_{2,33} = 0.23, p = 0.7986$
	Monoclonal	$30.83 \pm 2.92$	$1.5094 \pm 0.0379$	
	Clone 1	$32.94 \pm 1.85$	$1.5438 \pm 0.0379$	
	Clone 2	$32.39 \pm 2.06$	$1.5169 \pm 0.0379$	
<b>B. Mean social partner female standard length</b>				$F_{2,33} = 2.56, p = 0.0927$
	Monoclonal	$32.17 \pm 2.15$	$1.5226 \pm 0.0076$	
	Clone 1	$33.96 \pm 1.71$	$1.5065 \pm 0.0076$	
	Clone 2	$33.38 \pm 2.08$	$1.5304 \pm 0.0076$	
<b>C. Mean naïve-group partner standard length</b>				$F_{2,33} = 1.86, p = 0.1709$
	Monoclonal	$31.32 \pm 3.02$	$1.5118 \pm 0.0086$	
	Clone 1	$32.90 \pm 2.43$	$1.4938 \pm 0.0086$	
	Clone 2	$32.61 \pm 2.72$	$1.5160 \pm 0.0086$	

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9 **Supplemental Table S3:** Test statistic and p-value for full statistical model of aggression PC1,  
 10 exploratory/stress behaviors, and shoaling behaviors as dependent variables.

Model	Effect	Statistic	P-value
<b>A. Aggressive behavior in long-term social treatments (PC1)</b>			
	Baseline aggression	$F_{1,197.4} = 0.05$	0.824
	<b>Focal female standard length</b>	<b><math>F_{1,194.1} = 4.33</math></b>	<b>0.039</b>
	Mean social partner standard length	$F_{1,182.6} = 0.09$	0.345
	<b>Social environment</b>	<b><math>F_{2,156.9} = 6.30</math></b>	<b>0.002</b>
	Exposure time	$F_{7,218.5} = 1.29$	0.258
	Social environment*Time	$F_{14,189.6} = 0.69$	0.786
<b>B. Exploratory behavior in naïve-group trials (PC1)</b>			
	Baseline exploration	$F_{1,18.38} = 0.00$	0.952
	Focal female standard length	$F_{1,18.89} = 2.98$	0.101
	Mean naïve-group partner standard length	$F_{1,33.75} = 3.37$	0.075
	Mean social partner standard length	$F_{1,23.65} = 1.59$	0.219
	PC1 aggression experienced	$F_{1,13.11} = 0.34$	0.572
	<b>Social environment</b>	<b><math>F_{2,17.97} = 3.94</math></b>	<b>0.038</b>
	Exposure time	$F_{1,22.65} = 1.03$	0.320
	Social environment*Time	$F_{2,17.89} = 0.64$	0.539
<b>C. Shoaling distance in naïve-group trials</b>			
	Baseline aggression	$F_{1,23.11} = 0.91$	0.349
	Focal female standard length	$F_{1,33.18} = 0.19$	0.666
	Mean naïve-group partner standard length	$F_{1,42.59} = 0.23$	0.633
	Mean social partner standard length	$F_{1,19.16} = 1.10$	0.308
	PC1 aggression experienced	$F_{1,32.49} = 0.26$	0.617
	Social environment	$F_{2,20.46} = 0.99$	0.390
	Exposure time	$F_{1,42.1} = 0.00$	0.978
	Social environment*Time	$F_{2,20.75} = 2.89$	0.078

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12 **Supplemental Table S4:** Fixed effect estimates from final GLMM on aggression PC1.

Effect	Treatment	Week	Estimate	Error	DF	t-value	P-value
Intercept			-6.248	3.730	209.6	-1.67	0.095
Focal female SL			1.931	1.069	208.1	1.81	0.072
Social environment	Monoclonal		-0.461	0.566	246.7	-0.81	0.416
	Clone 1		-0.970	0.565	246.5	-1.72	0.088
	Clone 2		0	-	-	-	-
Week		1	-0.157	0.564	246.1	-0.28	0.781
		2	-0.236	0.564	246.1	-0.42	0.676
		3	-0.314	0.564	246.1	-0.56	0.578
		4	-0.949	0.564	246.2	-1.68	0.094
		6	0.299	0.564	247.1	-0.53	0.597
		8	0.721	0.564	254.2	-1.28	0.202
		10	-0.944	0.545	236.1	-1.73	0.085
		12	0	-	-	-	-
Social environment*Week	Monoclonal	1	0.685	0.798	246.1	0.86	0.392
	Monoclonal	2	0.889	0.798	246.1	1.11	0.266
	Monoclonal	3	1.026	0.798	246.1	1.29	0.200
	Monoclonal	4	1.141	0.798	246.2	1.43	0.154
	Monoclonal	6	0.921	0.798	247.1	1.15	0.249
	Monoclonal	8	1.013	0.797	254.2	1.27	0.205
	Monoclonal	10	1.354	0.771	236.1	1.76	0.080
	Monoclonal	12	0	-	-	-	-
	Clone 1	1	0.998	0.798	246.1	1.25	0.212
	Clone 1	2	0.196	0.798	246.1	0.25	0.806
	Clone 1	3	1.110	0.806	248.5	1.38	0.170
	Clone 1	4	0.916	0.798	246.2	1.15	0.252
	Clone 1	6	-0.143	0.798	247.1	-0.18	0.858
	Clone 1	8	0.981	0.797	254.2	1.23	0.219
	Clone 1	10	0.566	0.771	236.1	0.73	0.463
	Clone 1	12	0	-	-	-	-
	Clone 2	1	0	-	-	-	-
	Clone 2	2	0	-	-	-	-
	Clone 2	3	0	-	-	-	-
	Clone 2	4	0	-	-	-	-
	Clone 2	6	0	-	-	-	-
	Clone 2	8	0	-	-	-	-
	Clone 2	10	0	-	-	-	-
	Clone 2	12	0	-	-	-	-

- 14 **Supplemental Table S5:** Fixed effect estimates from GLMM on exploratory/stress behaviors
- 15 PC1 in the naïve-group trials.

Effect	Treatment	Week	Estimate	Error	DF	t-value	P-value
Intercept			0.241	0.242	20.63	1.00	0.330
Social environment	Monoclonal		-0.978	0.312	36.01	-3.13	0.003
	Clone 1		-0.248	0.377	30.55	-0.66	0.516
	Clone 2		0	-	-	-	-
Week	4		0.143	0.295	11.00	0.48	0.638
	12		0	-	-	-	-
Social environment*Week	Monoclonal	4	0.319	0.338	17.31	0.94	0.359
	Monoclonal	12	0	-	-	-	-
	Clone 1	4	-0.076	0.616	17.01	-0.12	0.903
	Clone 1	12	0	-	-	-	-
	Clone 2	4	0	-	-	-	-
	Clone 2	12	0	-	-	-	-

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17 **Supplemental Table S6:** Tests of covariance parameters based on the restricted likelihood  
 18 ratio for exploratory behavior but not for shoaling behavior.

Model		-2 Res Log Like	X <sup>2</sup> value	DF	Significance
<i>Exploratory/stress behavior in naïve-group trials (PC1)</i>	Variance differs by group?	180.04	26.00	6	p = 0.0002
	Repeatability significant?	172.79	18.76	3	p = 0.0003
	Complete lack of variance structure?	172.79	18.76	3	p = 0.0003
<i>Shoaling distance in naïve-group trials</i>	Variance differs by group?	-46.30	6.28	4	p = 0.179
	Repeatability significant?	-51.88	0.69	3	p = 0.875
	Complete lack of variance structure?	-51.88	0.69	3	p = 0.875

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20 **Supplemental Table S7:** Consistency of behavior for naïve groups across 4 and 12 weeks  
 21 measured using Pearson's r and 95% confidence limits. Variance differed by treatment for  
 22 exploratory behavior but not for shoaling behavior.

<b>Behavior</b>	<b>Social environment</b>	<b>Pearson's r</b>	<b>Lower 95% CL</b>	<b>Upper 95% CL</b>	<b>Significance</b>
PC1 exploratory	Monoclonal	0.732	0.272	0.920	Z = 5.23, p < 0.0001
	Clone 1	-0.759	-0.887	-0.023	Z = -5.92, p < 0.0001
	Clone 2	0.280	-0.350	0.736	Z = 1.01, p = 0.314
Shoaling	Monoclonal	0.190	-0.427	0.691	Z = -0.02, p = 0.985
	Clone 1	0.176	-0.443	0.682	Z = 0.62, p = 0.533
	Clone 2	-0.006	-0.578	0.570	Z = 0.52, p = 0.604

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24 **Supplemental Table S8:** Fixed effect estimates from GLMM on shoaling behavior in the naïve-  
 25 group trials.

Effect	Treatment	Week	Estimate	Error	DF	t-value	P-value
Intercept			0.808	0.037	21.46	22.05	<0.0001
Social environment	Monoclonal		0.080	0.051	43.42	1.42	0.128
	Clone 1		-0.034	0.068	36.39	-0.51	0.613
	Clone 2		0	-	-	-	-
Week	4		0.063	0.048	11.00	1.33	0.212
	12		0	-	-	-	-
Social environment*Week	Monoclonal	4	-0.164	0.070	21.89	-2.35	0.028
	Monoclonal	12	0	-	-	-	-
	Clone 1	4	0.002	0.086	19.05	0.02	0.981
	Clone 1	12	0	-	-	-	-
	Clone 2	4	0	-	-	-	-
	Clone 2	12	0	-	-	-	-

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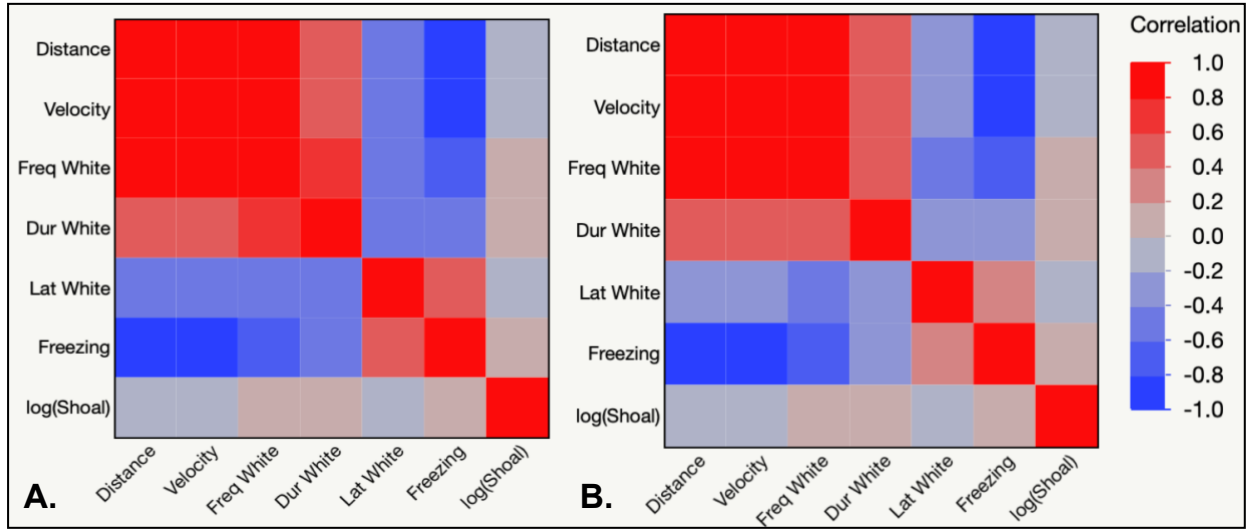


27 **Supplemental Table S9:** Intraclass correlation coefficient and variance components for PC1 for  
 28 exploratory behaviors, along with corresponding residuals and their tests statistics. There was  
 29 no significant difference among the three social environment treatments.

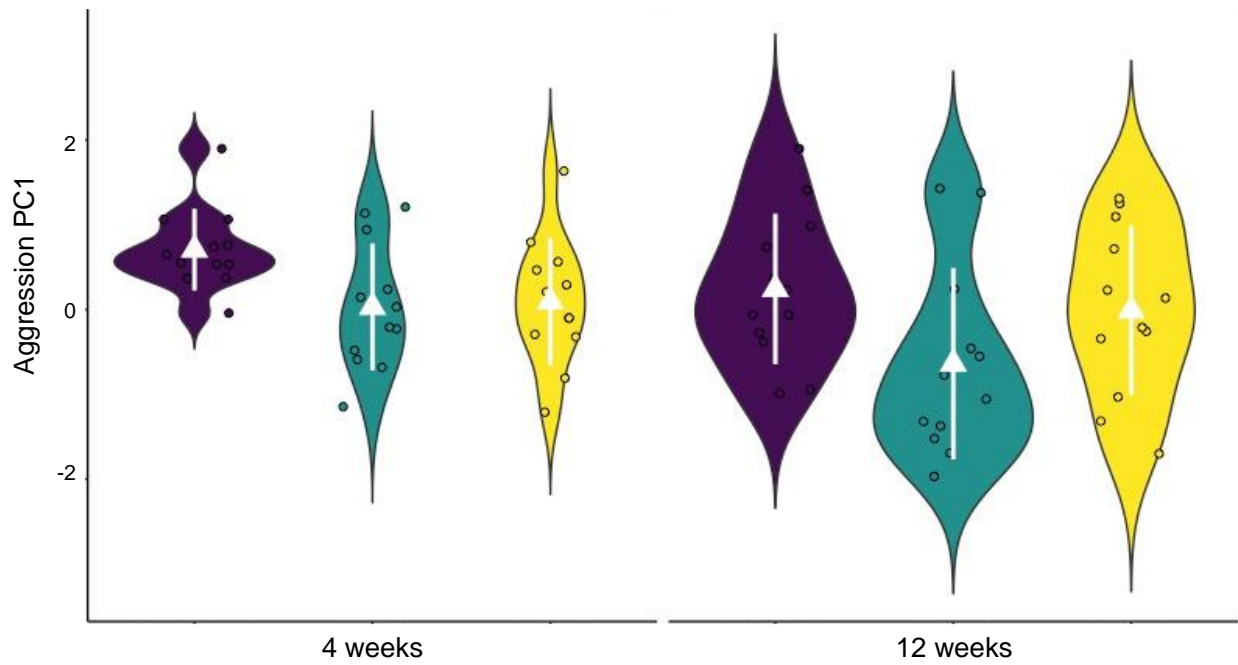
Model	Social environment	Parameter	Variance	Significance	ICC	Lower 95% CI	Upper 95% CI
PC1 for exploratory behavior	Overall	Group	0.836 ± 0.122	Z = 6.84, p < 0.0001	0.831	0.781	0.882
		Residual	0.170 ± 0.016	Z = 10.39, p < 0.0001			
	Monoclonal	Group	0.741 ± 0.186	Z = 3.99, p < 0.0001	0.829	0.738	0.920
		Residual	0.131 ± 0.022	Z = 6.00, p < 0.0001			
	Clone 1	Group	0.973 ± 0.246	Z = 3.95, p < 0.0001	0.825	0.730	0.919
		Residual	0.205 ± 0.034	Z = 6.00, p < 0.0001			
	Clone 2	Group	0.793 ± 0.201	Z = 3.95, p < 0.0001	0.852	0.767	0.936
		Residual	0.172 ± 0.029	Z = 6.00, p < 0.0001			

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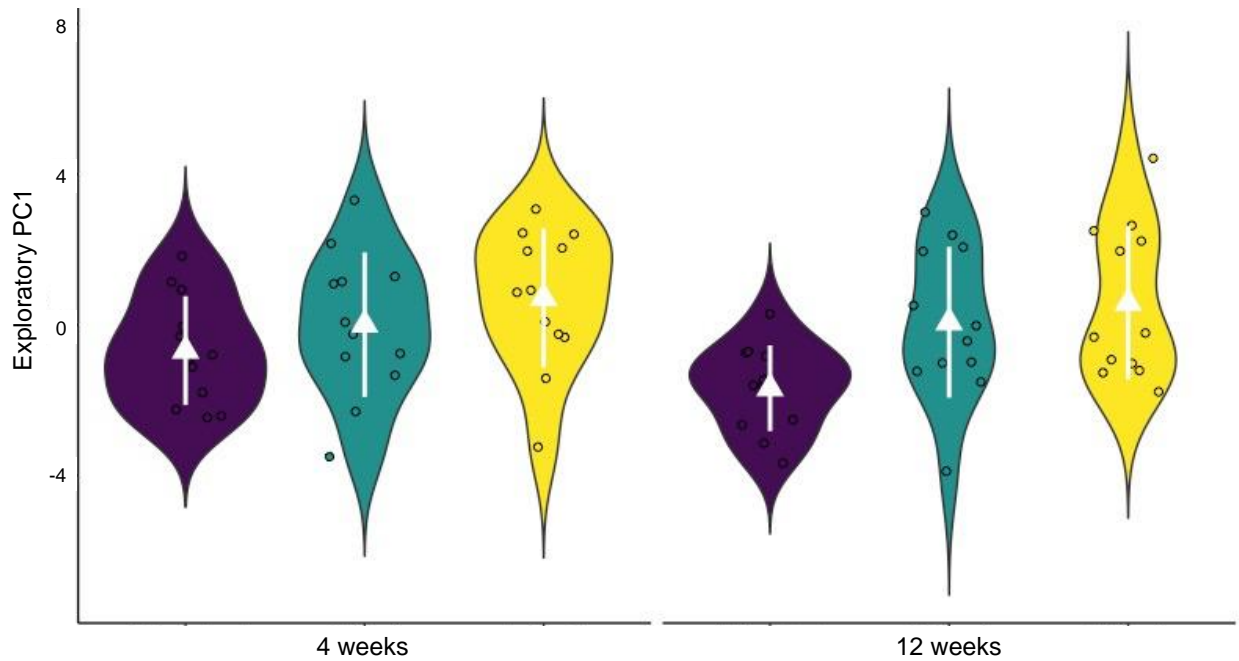
31 **Supplemental Figure S1:** Heatmap of Pearson's correlations among exploratory behavioral  
32 variables at the group level (**A.**) and at the individual level (**B.**).



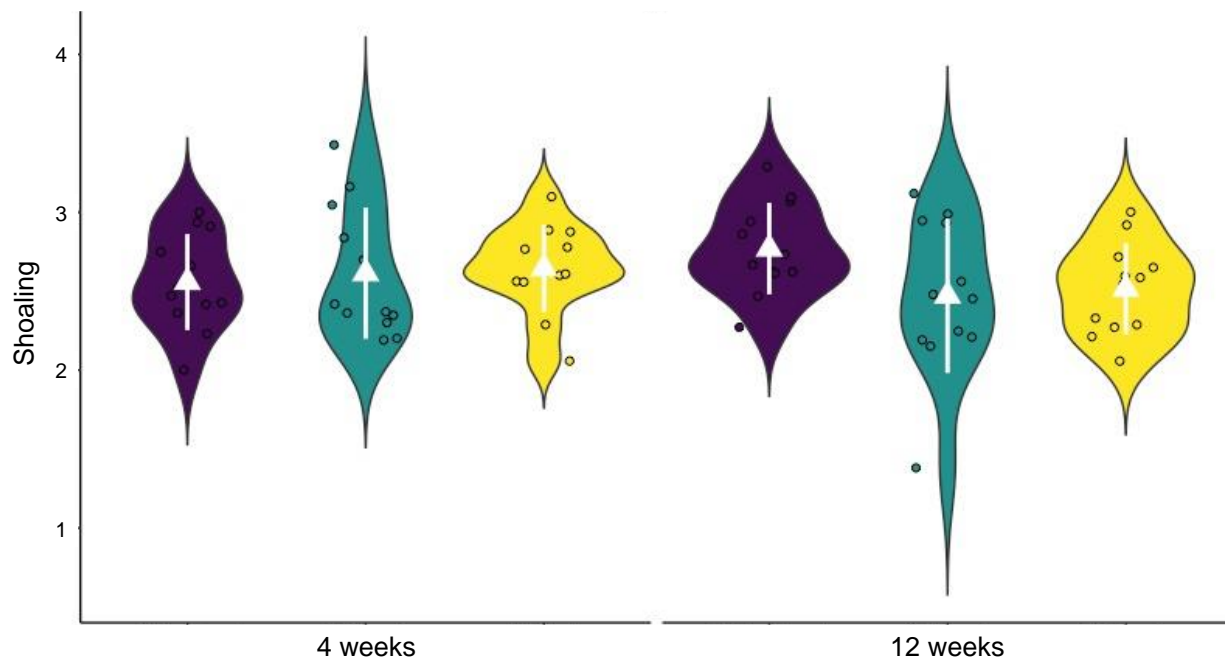
33 **Supplemental Figure S2:** Average (white triangles)  $\pm$  standard error for the PC1 score  
34 summarizing the amount of aggression experienced within each social environment.  
35 (Monoclonal – purple; Clone 1 – teal; Clone 2 – yellow). Violin plots depict the distribution of  
36 the PC1 scores for each treatment after the first four weeks and after 12 weeks of exposure,  
37 with raw scores represented by each open circle.



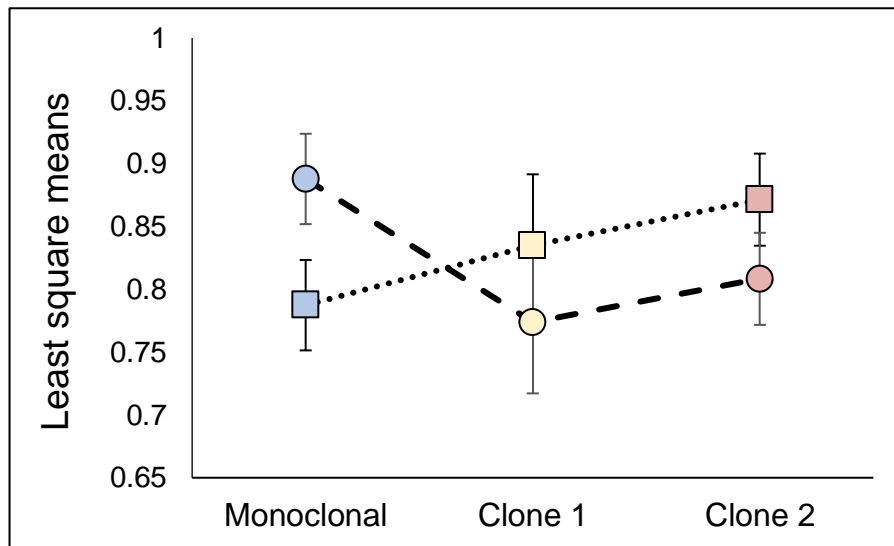
38 **Supplemental Figure S3:** Average (white triangles)  $\pm$  standard error for the PC1 score on the  
39 exploratory behaviors within each social environment. (Monoclonal – purple; Clone 1 – teal;  
40 Clone 2 – yellow). Violin plots depict the distribution of the PC1 scores for each treatment after  
41 the first four weeks and after 12 weeks of exposure, with raw scores represented by each open  
42 circle.



43 **Supplemental Figure S4:** Average (white triangles)  $\pm$  standard error for shoaling behavior  
44 within each social environment. (Monoclonal – purple; Clone 1 – teal; Clone 2 – yellow). Violin  
45 plots depict the distribution of shoaling for each treatment after the first four weeks and after 12  
46 weeks of exposure, with raw scores represented by each open circle.



47 **Supplemental Figure S5:** Least square means  $\pm$  standard error from ln(shoaling behavior) for  
48 the interaction between the long-term social environment a focal female experienced and the  
49 duration of exposure to that environment (squares and dotted line = 4 weeks; circles and  
50 dashed line = 12 weeks) (Monoclonal = blue; Clone 1 = yellow; Clone 2 = pink).



51 **Supplemental Figure S6:** Representative heatmaps of four focal females from each of the  
52 different social environments. Within each treatment are the heatmaps of the three individuals  
53 (i.e., the focal female + 2 naïve sister clones; S1-S36) within each naïve-group trial before  
54 exposure to the social environment (Pre), 4 weeks (4 wks), and 12 weeks (12 wks) after  
55 exposure to each social environment (monoclonal, clone 1, and clone 2).

