

**Supplementary material**

## Appendix 1

We investigated differences in adrenocortical stress physiology, body mass, hematocrit, feather quality (representative of condition at molt) and total antioxidant capacity between song sparrows (*Melospiza melodia*) breeding within a heterogeneous urban environment characterized by activity centers (high disturbance levels) and refuges (buffered from disturbance). This online supplement contains a single appendix, which provides statistical details regarding original full models and non-significant results referenced in the manuscript.

**Table A1.** Linear models predicting plasma CORT levels from habitat type and covariates

	N	Estimate ( $\beta \pm SE$ )	F	P
Acute CORT (ng/ml)	67			
Intercept		4.85 $\pm$ 0.45		
Habitat type		-0.35 $\pm$ 0.12 <sup>a</sup>	4.49	0.03
Time of capture		0.04 $\pm$ 0.04	0.01	0.91
Date of capture		-0.007 $\pm$ 0.005	1.42	0.24
Year of capture		-0.28 $\pm$ 0.14	4.23	0.04 <sup>b</sup>
Baseline CORT (ng/ml)	71			
Intercept		4.45 $\pm$ 0.53		
Habitat type		-0.23 $\pm$ 0.15	0.25	0.63
Time of capture		-0.06 $\pm$ 0.05	6.51	0.02
Date of capture		-0.005 $\pm$ 0.005	0.26	0.617
Year of capture		-0.36 $\pm$ 0.17	4.55	0.04 <sup>b</sup>

<sup>a</sup>Activity center contrasted to activity refuge habitat.

<sup>b</sup>Non-significant in reduced models ( $P > 0.10$ ).

**Table A2.** Linear models predicting plasma CORT levels from urbanization scores and covariates

	N	Estimate ( $\beta \pm SE$ )	F	P
Acute CORT (ng/ml)	67			
Intercept		4.71 $\pm$ 0.45		
Urbanization score		-0.08 $\pm$ 0.03	3.71	0.06
Time of capture		0.03 $\pm$ 0.04	0.0002	0.99
Date of capture		-0.006 $\pm$ 0.005	1.39	0.24
Year of capture		-0.22 $\pm$ 0.14	2.52	0.12
Baseline CORT (ng/ml)	71			
Intercept		4.36 $\pm$ 0.52		
Urbanization score		-0.06 $\pm$ 0.04	0.15	0.69
Time of capture		-0.07 $\pm$ 0.05	6.78	0.01
Date of capture		-0.005 $\pm$ 0.005	0.32	0.58
Year of capture		-0.32 $\pm$ 0.17	3.77	0.06

**Table A3.** Linear models predicting physiological condition metrics from habitat type and plasma CORT variables

	N	Estimate ( $\beta \pm SE$ )	F	P
Body mass (g)	65			
Intercept		6.51 $\pm$ 4.76		
Habitat type		0.47 $\pm$ 0.26 <sup>a</sup>	1.83	0.18
Acute CORT		-0.04 $\pm$ 0.16	0.33	0.57
Baseline CORT		-0.09 $\pm$ 0.16	0.06	0.78
Time of capture		0.11 $\pm$ 0.08	3.88	0.05
Date of capture		0.007 $\pm$ 0.009	0.01	0.91
Year of capture		0.72 $\pm$ 0.30	7.45	0.01
Wingchord		0.18 $\pm$ 0.06	10.53	0.002
Tarsus length		-0.002 $\pm$ 0.18	0.01	0.91
Habitat $\times$ acute CORT		-0.06 $\pm$ 0.23	0.0002	0.99
Habitat $\times$ baseline CORT		0.32 $\pm$ 0.23	1.98	0.17
Hematocrit (%)	67			
Intercept		51.56 $\pm$ 4.03		
Habitat type		0.26 $\pm$ 1.13	0.35	0.56
Acute CORT		0.90 $\pm$ 0.73	0.004	0.95
Baseline CORT		0.23 $\pm$ 0.73	0.31	0.58
Time of capture		-0.17 $\pm$ 0.36	0.31	0.58
Date of capture		-0.02 $\pm$ 0.04	0.001	0.97
Year of capture		-0.91 $\pm$ 1.30	0.16	0.69
Habitat $\times$ acute CORT		-1.49 $\pm$ 1.03	2.08	0.15
Habitat $\times$ baseline CORT		-0.97 $\pm$ 1.02	1.55	0.22
Feather PC1	67			
Intercept		0.15 $\pm$ 0.40		
Habitat type		0.44 $\pm$ 0.32	4.48	0.04
Acute CORT		0.001 $\pm$ 0.21	0.001	0.97
Baseline CORT		0.14 $\pm$ 0.22	2.84	0.10
Year of capture		-0.59 $\pm$ 0.35	3.02	0.09
Habitat $\times$ acute CORT		-0.02 $\pm$ 0.29	0.004	0.94
Habitat $\times$ baseline CORT		0.02 $\pm$ 0.29	0.005	0.94
Total antioxidant capacity (mM HOCl)	43			
Intercept		5.47 $\pm$ 0.25		
Habitat type		-0.05 $\pm$ 0.06	1.17	0.29
Acute CORT		-0.02 $\pm$ 0.03	0.50	0.49
Baseline CORT		0.03 $\pm$ 0.04	1.03	0.32
Time of capture		0.02 $\pm$ 0.02	0.99	0.33
Date of capture		0.001 $\pm$ 0.002	0.25	0.62
Habitat $\times$ acute CORT		-0.01 $\pm$ 0.05	0.04	0.84
Habitat $\times$ baseline CORT		0.03 $\pm$ 0.06	0.19	0.67

<sup>a</sup>Activity center contrasted to activity refuge habitat.

**Table A4.** Linear models predicting physiological condition metrics from urbanization score and plasma CORT variables

	N	Estimate ( $\beta \pm SE$ )	F	P
Body mass (g)	65			
Intercept		7.37 $\pm$ 4.71		
Urbanization score		0.16 $\pm$ 0.07	3.65	0.06 <sup>a</sup>
Acute CORT		-0.07 $\pm$ 0.12	0.20	0.65
Baseline CORT		0.13 $\pm$ 0.12	0.08	0.78
Time of capture		0.13 $\pm$ 0.08	5.27	0.03
Date of capture		0.009 $\pm$ 0.009	0.02	0.89
Year of capture		0.67 $\pm$ 0.28	7.09	0.01
Wingchord		0.18 $\pm$ 0.06	10.09	0.002
Tarsus length		-0.04 $\pm$ 0.17	0.002	0.97
Urbanization $\times$ acute CORT		0.004 $\pm$ 0.06	0.04	0.85
Urbanization $\times$ baseline CORT		0.11 $\pm$ 0.06	3.04	0.09 <sup>a</sup>
Hematocrit (%)	67			
Intercept		51.43 $\pm$ 3.95		
Urbanization score		-0.09 $\pm$ 0.30	0.01	0.91
Acute CORT		-0.17 $\pm$ 0.57	0.04	0.84
Baseline CORT		-0.50 $\pm$ 0.55	0.30	0.59
Time of capture		-0.13 $\pm$ 0.37	0.40	0.53
Date of capture		-0.02 $\pm$ 0.04	0.03	0.86
Year of capture		-0.94 $\pm$ 1.24	0.33	0.57
Urbanization $\times$ acute CORT		-0.31 $\pm$ 0.29	1.29	0.26
Urbanization $\times$ baseline CORT		-0.30 $\pm$ 0.28	1.18	0.28
Feather PC1	67			
Intercept		0.48 $\pm$ 0.27		
Urbanization score		0.14 $\pm$ 0.08	5.19	0.03
Acute CORT		0.05 $\pm$ 0.16	0.22	0.64
Baseline CORT		0.12 $\pm$ 0.16	2.75	0.10
Year of capture		-0.59 $\pm$ 0.33	3.56	0.06
Urbanization $\times$ acute CORT		0.05 $\pm$ 0.08	0.35	0.56
Urbanization $\times$ baseline CORT		-0.01 $\pm$ 0.08	0.03	0.87
Total antioxidant capacity (mM HOCl)	43			
Intercept		5.49 $\pm$ 0.25		
Urbanization score		-0.007 $\pm$ 0.02	0.47	0.50
Acute CORT		-0.03 $\pm$ 0.03	0.34	0.56
Baseline CORT		0.04 $\pm$ 0.03	1.25	0.27
Time of capture		0.01 $\pm$ 0.02	0.80	0.38
Date of capture		0.001 $\pm$ 0.002	0.37	0.55
Urbanization $\times$ acute CORT		-0.01 $\pm$ 0.01	0.53	0.47
Urbanization $\times$ baseline CORT		-0.003 $\pm$ 0.02	0.07	0.79

<sup>a</sup> $P > 0.10$  in reduced model.

**Table A5.** Linear models predicting acute and baseline CORT concentrations from noise PC1 and noise PC2 in the entire dataset and within activity center males alone

	N	Estimate ( $\beta \pm SE$ )	F	P
<b>Acute CORT</b>				
Entire dataset	67			
Intercept		4.77 $\pm$ 0.46		
Noise PC1		-0.08 $\pm$ 0.04	3.01	0.09
Noise PC2		-0.05 $\pm$ 0.05	0.66	0.42
Time of capture		0.02 $\pm$ 0.04	0.005	0.95
Date of capture		-0.01 $\pm$ 0.005	1.82	0.18
Year of capture		-0.19 $\pm$ 0.14	1.92	0.17
Activity center only	43			
Intercept		4.84 $\pm$ 0.64		
Noise PC1		0.004 $\pm$ 0.08	0.19	0.66
Noise PC2		-0.05 $\pm$ 0.06	0.30	0.59
Time of capture		0.01 $\pm$ 0.06	1.15	0.29
Date of capture		-0.007 $\pm$ 0.005	1.48	0.23
Year of capture		-0.33 $\pm$ 0.17	3.62	0.07
<b>Baseline CORT</b>				
Entire dataset	71			
Intercept		4.45 $\pm$ 0.54		
Noise PC1		-0.08 $\pm$ 0.04	1.05	0.31
Noise PC2		-0.0004 $\pm$ 0.06	0.69	0.41
Time of capture		-0.08 $\pm$ 0.006	6.78	0.01
Date of capture		-0.006 $\pm$ 0.006	0.75	0.39
Year of capture		-0.29 $\pm$ 0.16	3.23	0.08
Activity center only	46			
Intercept		4.77 $\pm$ 0.77		
Noise PC1		-0.09 $\pm$ 0.10	0.87	0.36
Noise PC2		-0.07 $\pm$ 0.07	0.16	0.69
Time of capture		-0.11 $\pm$ 0.07	0.52	0.01
Date of capture		-0.006 $\pm$ 0.006	0.93	0.34
Year of capture		-0.21 $\pm$ 0.21	1.04	0.31

**Table A6.** Linear models predicting body mass (g), hematocrit (%), feather PC1 (feather quality), and total antioxidant capacity (mM HOCl) from noise PC1 and noise PC2

	N	Estimate ( $\beta \pm SE$ )	F	P
Body mass (g)	68			
Intercept		4.61 $\pm$ 4.68		
Noise PC1		-0.05 $\pm$ 0.07	1.20	0.28
Noise PC2		-0.06 $\pm$ 0.09	0.43	0.51
Time of capture		0.13 $\pm$ 0.08	5.21	0.03
Date of capture		0.004 $\pm$ 0.009	0.007	0.93
Year of capture		0.47 $\pm$ 0.26	4.43	0.04
Wingchord		0.21 $\pm$ 0.06	12.09	<0.001
Tarsus length		0.03 $\pm$ 0.17	0.03	0.86
Hematocrit (%)	71			
Intercept		48.30 $\pm$ 3.84		
Noise PC1		0.05 $\pm$ 0.31	0.04	0.84
Noise PC2		-0.15 $\pm$ 0.40	0.16	0.69
Time of capture		0.06 $\pm$ 0.36	0.03	0.87
Date of capture		-0.005 $\pm$ 0.04	0.01	0.91
Year of capture		-0.04 $\pm$ 1.17	0.001	0.97
Feather PC1	71			
Intercept		0.46 $\pm$ 0.23		
Noise PC1		0.16 $\pm$ 0.07	4.72	0.03
Noise PC2		0.17 $\pm$ 0.11	3.82	0.055
Year of capture		-0.60 $\pm$ 0.28	4.53	0.04
Total antioxidant capacity	45			
Intercept		5.54 $\pm$ 0.24		
Noise PC1		-0.02 $\pm$ 0.02	2.49	0.12
Noise PC2		-0.007 $\pm$ 0.02	0.34	0.57
Time of capture		0.01 $\pm$ 0.02	0.33	0.57
Date of capture		0.0004 $\pm$ 0.002	0.04	0.84

**Table A7.** Linear models predicting body mass (g), hematocrit (%), feather PC1 (feather quality), and total antioxidant capacity (mM HOCl) from noise PC1 and noise PC2 within activity centers

	N	Estimate ( $\beta \pm SE$ )	F	P
Body mass (g)	43			
Intercept		8.06 $\pm$ 5.85		
Noise PC1		0.12 $\pm$ 0.16	0.14	0.71
Noise PC2		0.003 $\pm$ 0.11	<0.001	0.98
Time of capture		0.21 $\pm$ 0.12	11.64	0.002
Date of capture		0.005 $\pm$ 0.01	0.003	0.96
Year of capture		0.64 $\pm$ 0.36	5.15	0.03
Wingchord		0.21 $\pm$ 0.08	5.53	0.02
Tarsus length		-0.17 $\pm$ 0.22	0.65	0.43
Hematocrit (%)	46			
Intercept		45.64 $\pm$ 5.02		
Noise PC1		0.87 $\pm$ 0.65	1.70	0.20
Noise PC2		-0.24 $\pm$ 0.44	0.56	0.46
Time of capture		0.52 $\pm$ 0.47	1.01	0.32
Date of capture		-0.05 $\pm$ 0.04	1.70	0.20
Year of capture		-0.10 $\pm$ 1.38	0.005	0.94
Feather PC1	46			
Intercept		0.50 $\pm$ 0.27		
Noise PC1		0.04 $\pm$ 0.17	0.19	0.65
Noise PC2		0.21 $\pm$ 0.13	3.34	0.07
Year of capture		-0.45 $\pm$ 0.36	1.55	0.22
Total antioxidant capacity	27			
Intercept		5.03 $\pm$ 0.36		
Noise PC1		0.002 $\pm$ 0.03	0.51	0.48
Noise PC2		-0.02 $\pm$ 0.03	2.43	0.13
Time of capture		0.06 $\pm$ 0.03	2.88	0.10
Date of capture		-0.001 $\pm$ 0.002	0.10	0.75