

Supplementary material

Appendix 1

We examined whether elevating perceived adult-directed predation risk modifies the relationship between male song complexity, as measured by song repertoire size and residual syllable number (relative number of syllables at a given song repertoire size), and parental effort in the song sparrow (*Melospiza melodia*). This online supplement contains a single appendix in which we report statistics regarding the difference between parental behavior recorded under the hawk (predator), negative control (finch), and baseline (no stimuli) treatments. This analysis justifies recoding the negative control treatment as baseline for final analyses. In addition, we report statistics from initial full statistical models relating parental behavior to song traits. These models contain non-significant results referenced in the text.

APPENDIX 1.

Table A1. Linear mixed effects models predicting paternal and maternal provisioning rates and latency to return to the nest from treatment (baseline, negative control (finch), predator (hawk))

	Estimate ($\beta \pm$ SE)	t	Denom (df)	P ($> t $)
Paternal nestling provisioning				
Intercept	4.03 \pm 0.04	10.20	93	<0.001
Finch v. baseline	0.04 \pm 0.57	0.07	93	0.94
Hawk v. baseline	-0.88 \pm 0.35	-2.50	93	0.01
Maternal nestling provisioning				
Intercept	2.09 \pm 0.11	18.44	93	<0.001
Finch v. baseline	-0.08 \pm 0.17	-0.47	93	0.64
Hawk v. baseline	-0.25 \pm 0.10	-2.37	93	0.02
Paternal latency to return				
Intercept	2.38 \pm 0.16	14.92	95	<0.001
Finch v. baseline	0.19 \pm 0.26	0.72	95	0.47
Hawk v. baseline	0.63 \pm 0.16	3.86	95	<0.001
Maternal latency to return				
Intercept	2.24 \pm 0.22	10.00	108	<0.001
Finch v. baseline	0.13 \pm 0.41	0.32	108	0.75
Hawk v. baseline	1.23 \pm 0.27	4.58	108	<0.001

N = 136 observations, 49 nests, 38 females, 34 males

Table A2. Initial linear mixed effects model predicting paternal provisioning rates from song traits and predator presence (treatment)

	Estimate ($\beta \pm$ SE)	F	Denom (df)	P (> F)
Intercept	-4.92 \pm 2.63			
Treatment	-0.74 \pm 0.19 ^a	8.59	25.65	<0.001
Repertoire size	0.39 \pm 0.39	0.06	17.34	0.34
Residual syllable number	-0.11 \pm 0.11	0.22	18.37	0.33
Brood size	1.22 \pm 0.27	15.86	17.57	<0.001
Nestling age	0.60 \pm 0.36	1.64	21.52	0.11
Time	-0.008 \pm 0.11	0.03	35.47	0.95
Date	0.01 \pm 0.02	0.68	19.63	0.48
Presentation order	1.14 \pm 0.67	2.31	42.99	0.10
Duration	0.72 \pm 0.76	2.51	23.66	0.35
Treatment \times repertoire	0.24 \pm 0.19	2.17	25.20	0.22
Treatment \times residual syllable	0.02 \pm 0.05	0.15	26.15	0.65

^aPredator (hawk) treatment relative to baseline

N = 74 observations, 35 nests, 28 females, 25 males

Table A3. Initial linear mixed effects model predicting paternal latency to return to the nest from male song traits and predator presence (treatment)

	Estimate ($\beta \pm$ SE)	F	Denom (df)	P (> F)
Intercept	2.93 \pm 1.43			
Treatment	0.35 \pm 0.12 ^a	8.85	36.14	0.005
Repertoire size	-0.27 \pm 0.18	2.25	24.91	0.15
Residual syllable number	-0.01 \pm 0.05	0.08	18.48	0.78
Brood size	-0.30 \pm 0.12	6.17	16.31	0.02
Nestling age	0.22 \pm 0.17	1.61	24.23	0.22
Time	0.03 \pm 0.06	0.16	53.16	0.69
Date	-0.02 \pm 0.01	1.81	9.13	0.21
Presentation order	0.46 \pm 0.32	2.08	24.79	0.16
Duration	-0.11 \pm 0.40	0.08	37.25	0.79
Treatment \times repertoire	-0.08 \pm 0.11	0.58	36.19	0.45
Treatment \times residual syllable	-0.003 \pm 0.03	0.01	38.94	0.92

^aPredator treatment relative to baseline

N = 74 observations, 35 nests, 28 females, 25 males

Table A4. Initial linear mixed effects model predicting maternal provisioning rate from song traits and predator presence (treatment)

	Estimate ($\beta \pm$ SE)	F	Denom (df)	P (> F)
Intercept	-3.18 \pm 2.13			
Treatment	-0.69 \pm 0.16	18.21	33.79	< 0.001
Repertoire size	-0.17 \pm 0.41	0.16	24.1	0.68
Residual syllable number	0.08 \pm 0.10	0.58	26.14	0.45
Nestling age	1.06 \pm 0.38	7.62	29.39	0.009
Brood size	0.68 \pm 0.28	5.71	27.23	0.02
Time	0.10 \pm 0.09	1.12	43.83	0.29
Date	-0.02 \pm 0.02	1.43	27.06	0.24
Presentation order	1.73 \pm 0.67	6.59	48.74	0.01
Duration	-0.0008 \pm 0.01	0.002	47.64	0.95
Treatment \times repertoire	-0.13 \pm 0.17	0.59	35.20	0.44
Treatment \times residual syllable	0.09 \pm 0.04	5.14	33.64	0.02

^aPredator (hawk) treatment relative to baseline

N = 74 observations, 35 nests, 28 females, 25 males

Table A5. Initial linear mixed effects model predicting maternal latency to return to the nest from male song traits and predator presence (treatment)

	Estimate ($\beta \pm$ SE)	F	Denom (df)	P (> F)
Intercept	2.64 \pm 1.69			
Treatment	0.72 \pm 0.19	13.36	43.49	< 0.001
Repertoire size	0.32 \pm 0.27	1.35	25.67	0.25
Residual syllable number	-0.04 \pm 0.07	0.35	17.61	0.55
Nestling age	0.21 \pm 0.26	0.68	26.03	0.41
Brood size	-0.23 \pm 0.19	1.51	32.53	0.22
Time	0.12 \pm 0.10	1.36	55.81	0.24
Date	-0.01 \pm 0.01	0.77	37.97	0.38
Presentation order	-0.94 \pm 0.51	3.37	43.69	0.07
Duration	0.003 \pm 0.01	0.05	60.34	0.82
Treatment \times repertoire	0.27 \pm 0.20	1.81	46.31	0.18
Treatment \times residual syllable	-0.06 \pm 0.25	1.33	43.08	0.25

^aPredator treatment relative to baseline

N = 74 observations, 35 nests, 28 females, 25 males

Table A6. Initial linear mixed effects model predicting the proportion of provisioning trips performed by the female from male song traits and predator presence (treatment)

	Estimate ($\beta \pm$ SE)	F	Denom (df)	P (> F)
Intercept	0.92 \pm 0.19			
Treatment	0.009 \pm 0.01 ^a	0.40	26.97	0.53
Repertoire size	-0.06 \pm 0.02	6.65	23.31	0.02
Residual syllable number	0.02 \pm 0.007	6.34	20.65	0.02
Brood size	-0.03 \pm 0.02	3.05	14.30	0.10
Nestling age	0.02 \pm 0.02	1.20	20.15	0.29
Time	0.01 \pm 0.008	3.42	40.98	0.07
Date	-0.004 \pm 0.002	6.60	24.10	0.02 ^b
Presentation order	-0.005 \pm 0.04	0.02	23.14	0.89
Duration	-0.16 \pm 0.05	11.03	40.56	0.002
Treatment \times repertoire	-0.04 \pm 0.01	7.09	27.34	0.01
Treatment \times residual syllable	0.01 \pm 0.004	8.78	28.4	0.006

^aPredator treatment relative to baseline

^bBecomes non-significant upon model reduction ($P = 0.06$)

N = 70 observations, 35 nests, 28 females, 25 males