

1 Fluffy feathers: how neoptile feathers contribute to
2 camouflage in precocial chicks - Supplementary material

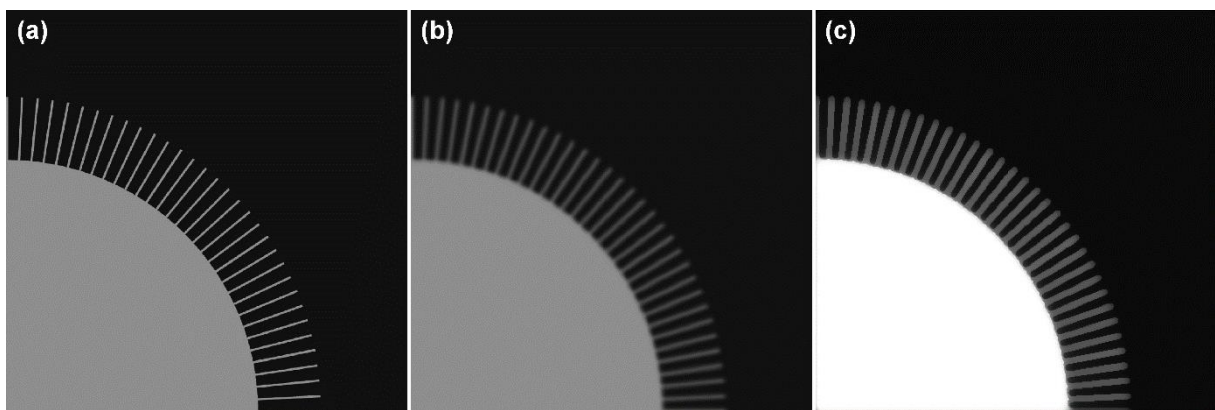
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11 **Figure S1:** Modelling human vision with an acuity of 72 cpd. (a) Cone catch image (b) Gaussian Acuity Control (c) Edge
12 reconstruction with Receptor Noise Limited (RNL) filter. All images exist as a stack of 4 channels (long, medium and short
13 wave, and luminance).

14 **Table S1:** Parameter combinations used in Experiment 1. Differences to Basic Scenario indicated in shaded cells

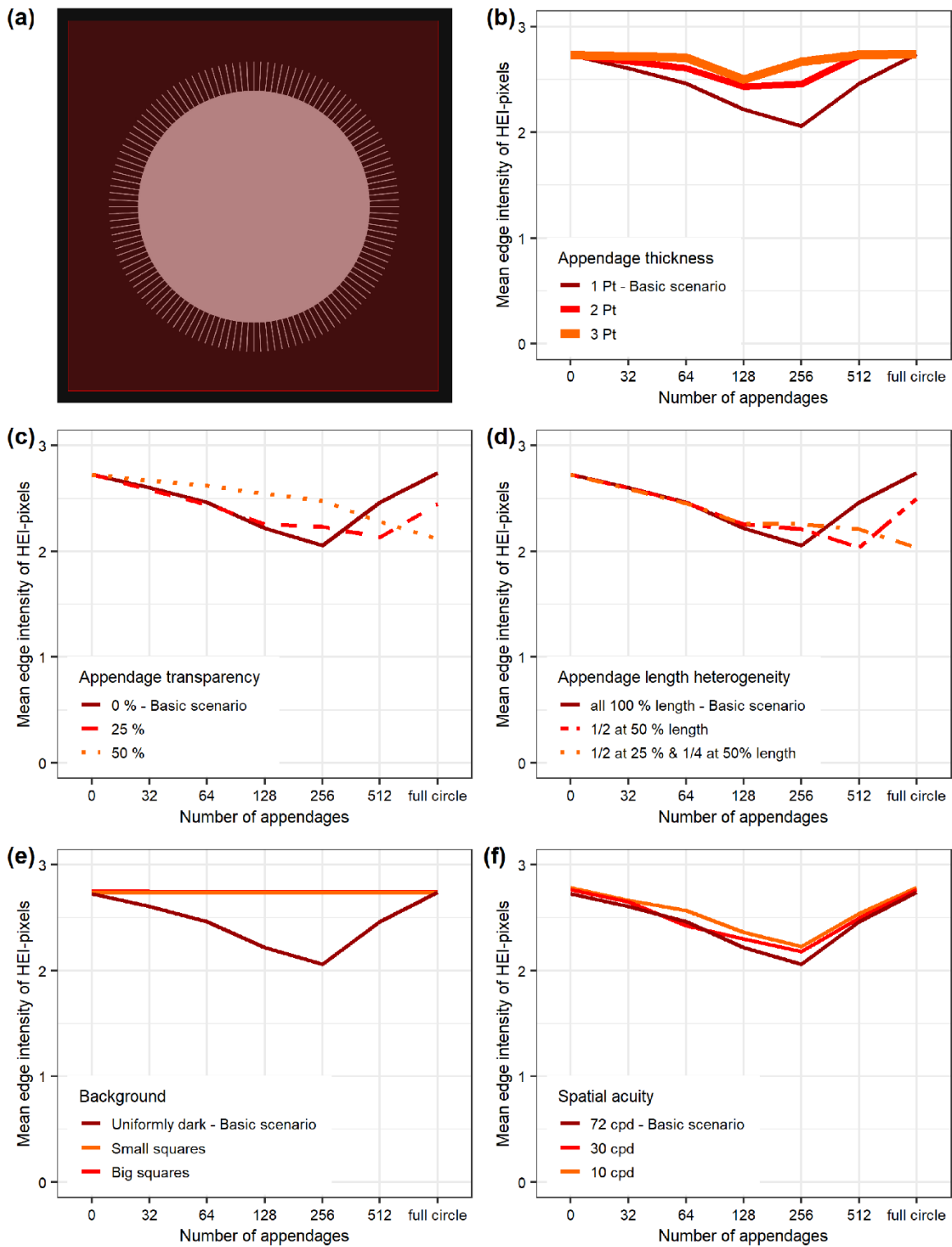
Parameter comb. index	Scenario	Number of appendages	Appendage thickness (Pt/px/mm)	Distance between appendages (px/mm)	Appendage transparency	Length heterogeneity	Background	Acuity (cpd)
a	Basic Scenario	0	1/4/0.4	-	0%	all 100% length	dark grey	72
b		32		88/7.5				
c		64		42/3.6				
d		128		19/1.6				
e		256		7/0.6				
f		512		2/0.1				
g		full circle		-				
h	Scenario 1a: 2 Pt Thickness	0	2/8/0.7	-	0%	all 100% length	dark grey	72
i		32		84/7.1				
j		64		38/3.2				
k		128		15/1.3				
l		256		3/0.3				
m		512		-2/-0.2				
n		full circle		-				
o	Scenario 1b: 3 Pt Thickness	0	3/12/1.1	-	0%	all 100% length	dark grey	72
p		32		80/6.8				
q		64		34/2.9				
r		128		11/0.9				
s		256		-1/-0.1				
t		512		-7/-0.6				
u		full circle		-				
v	Scenario 2a: 25% Transparency	0	1/4/0.4	-	25%	all 100% length	dark grey	72
w		32		88/7.5				
x		64		42/3.6				
y		128		19/1.6				
z		256		7/0.6				
aa		512		2/0.1				
ab		full circle		-				
ac	Scenario 2b: 50% Transparency	0	1/4/0.4	-	50%	all 100% length	dark grey	72
ad		32		88/7.5				
ae		64		42/3.6				
af		128		19/1.6				
ag		256		7/0.6				
ah		512		2/0.1				
ai		full circle		-				

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aj	Scenario 3a: 1/2 at 50% length	0	1/4/0.4	-	0%	1/2 at 50% length	dark grey	72
ak		32		88/7.5				
al		64		42/3.6				
am		128		19/1.6				
an		256		7/0.6				
ao		512		2/0.1				
ap		full circle		-				
aq	Scenario 3b: 1/2 at 25% & 1/4 at 50% length	0	1/4/0.4	-	0%	1/2 at 25% & 1/4 at 50% length	dark grey	72
ar		32		88/7.5				
as		64		42/3.6				
at		128		19/1.6				
au		256		7/0.6				
av		512		2/0.1				
aw		full circle		-				
ax	Scenario 4a: background - big tiles	0	1/4/0.4	-	0%	all 100% length	chessboard fields 346 px/29.3 mm	72
ay		32		88/7.5				
az		64		42/3.6				
ba		128		19/1.6				
bb		256		7/0.6				
bc		512		2/0.1				
bd		full circle		-				
be	Scenario 4b: background - small tiles	0	1/4/0.4	-	0%	all 100% length	chessboard fields 86 px/7.3 mm	72
bf		32		88/7.5				
bg		64		42/3.6				
bh		128		19/1.6				
bi		256		7/0.6				
bj		512		2/0.1				
bk		full circle		-				
bl	Scenario 5a: 30 cpd acuity	0	1/4/0.4	-	0%	all 100% length	dark grey	30
bm		32		88/7.5				
bn		64		42/3.6				
bo		128		19/1.6				
bp		256		7/0.6				
bq		512		2/0.1				
br		full circle		-				
bs	Scenario 5b: 10 cpd acuity	0	1/4/0.4	-	0%	all 100% length	dark grey	10
bt		32		88/7.5				
bu		64		42/3.6				
bv		128		19/1.6				
bw		256		7/0.6				
bx		512		2/0.1				
by		full circle		-				

16 **Table S2:** Spatial acuity of humans and potential chick predators.

Spatial acuity approximation	Potential predator of snowy plover chicks	Related species with known spatial acuity	Spatial acuity
High (72 cpd)	Human (<i>Homo sapiens</i>)	human (<i>Homo sapiens</i>) – (Land 1981, Hirsch and Curcio 1989, Land and Nilsson 2012, Caves and Johnsen 2018)	72 – 73 cpd
	Birds of prey (Page et al. 1985, Mabee and Estelle 2000)	Brown Falcon (<i>Falco berigora</i>) – (Reymond 1987)	73 cpd
Medium (30 cpd)	Crested caracaras (<i>Caracara cheriway</i>) – (C Küpper, personal observations)	Chimango caracara (<i>Phalcoboenus chimango</i>) – (Potier et al. 2016, Caves et al. 2018)	15 – 40 cpd
	Corvids – (Page et al. 1985, Mabee and Estelle 2000)	Several corvids – (Dabrowska 1975, Caves et al. 2018)	30 – 33 cpd
	Raccoon (<i>Procyon lotor</i>) – (Stoddard et al. 2016)	Raccoons (<i>Procyon lotor</i>) – (Johnson and Michels 1958)	25 – 30 cpd
Low (10 cpd)	Feral dog (<i>Canis familiaris</i>) – (Stoddard et al. 2016)	Dog (<i>Canis familiaris</i>) – (Bromberg and Dawson 1980, Odom et al. 1983, Pretterer et al. 2004)	4.62 – 12.59 cpd
	Coyote (<i>Canis latrans</i>) – (Stoddard et al. 2016)		
	Bobcat (<i>Lynx rufus</i>) – (Stoddard et al. 2016)	European lynx (<i>Lynx europaea</i>) – (Maffei et al. 1990)	7 – 8 cpd
		Cat (<i>Felis catus</i>) – (Wässle 1971, Caves and Johnsen 2018)	10 cpd



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18 **Figure S2:** Local edge intensity analysis in experiment 1 with an expanded region of interest (ROI). The highest 0.37 % of the
 19 pixels are classified as “High Edge Intensity-pixels” (HEI-pixels). (a) ROI is a 1500 x 1500 pixel-wide rectangle (red). (b) Scenario
 20 1: variation in appendage thickness. (c) Scenario 2: variation in appendage transparency. (d) Scenario 3: variation in
 21 appendage length. (e) Scenario 4: variation in background complexity. Note that the “Big squares” and “Small squares” curves
 22 overlap fully. (f) Scenario 5: variation in spatial acuity.

23 **Table S3:** General characterisation of the chick images. Percentage values of ROI available for analysis.

Chick ID	Feather region excl. shadow	Contour region excl. shadow	HEI-pixels threshold
CN0333	77%	75%	0.9859
CN0339	57%	58%	0.9827
CN0340	61%	62%	0.9789
CN0345	88%	82%	0.9815
CN0347	61%	59%	0.9839
CN0350	82%	82%	0.9829
CN0353	91%	89%	0.9789
CN0356	58%	58%	0.9830
CN0360	64%	64%	0.9854
CN0361	100%	100%	0.9840
CN0363	100%	100%	0.9789
CN0364	81%	78%	0.9846
CN0367	58%	56%	0.9858
CN0411	66%	56%	0.9821
CN0415	57%	55%	0.9800
Mean	73%	72%	0.9826

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