Supporting material

Methods

To assess the magnitude of strategic body mass changes in passerines, I conducted two separate literature searches using the Web of Science database (apps.webofknowledge.com/) seeking to identify: (1) studies experimentally-manipulating perceived starvation risk proxies (predictability of food availability, variable amount of food, variable temperature or variable foraging success) involving adult passerines, reporting a measure of effect on mass (table S1); (2) studies experimentally-manipulating perceived predation risk proxies (model predator presentation, human capture/disturbance, presentation of predator calls/scent or conspecific mobbing calls, manipulation of protective cover, disablement of flight feathers) involving adult passerines, reporting a measure of effect on mass (table S2). The search terms used (for topic, across all years 1970-2020) are detailed in the legends of tables S1 and S2 respectively. Inclusion was limited to articles published in English. Studies reporting experimental manipulations of starvation/predation risk or their proxies were selected for inclusion; these proxies were described as such by the authors of the study in question with one exception (Ben-Hamo *et al* 2016) in which the manipulation was one considered to alter predation risk by other authors among the included studies. I excluded observational studies, those not concerning passerines and those not reporting an effect on body mass or fat reserves either statistically, numerically or graphically. The literature searches yielded 461 and 1,162 articles respectively. A review of titles and abstracts, followed by reading the remaining full manuscripts, reduced the field to the 22 and 21 papers in table S1 and S2. Where available, from these papers I extracted the percentage change in body mass between high and low starvation/predation risk treatments from the text or tables. In cases where relevant results were shown only in graphical form, I estimated mass change from the figure. If not reported directly, percentage mass changes were then calculated using (in order of preference): (a) the mean mass of subjects reported in the text; (b) the species' mass as reported in the text; or (c) the species' mass specified in the Royal Society for the Protection of Birds key information for that species (RSPB, www.rspb.org.uk/birds-and-wildlife/wildlife-guides/bird-a-z/).

Table S1. Summary of a systematic review of studies of the effect of altered starvation risk on body mass in passerines.

Species	Manipulation	Brief description of findings	Mass change (%)	Reference
Great tit, *Parus major*	Predictability of food supply	Birds gained more mass under unpredictable food.	↑ ~11%	Bednekoff & Krebs 1995
	Predictability of temperature	Evening body mass higher during periods of fluctuating temperature; weight gain greater on cold than warm days.	↑ NA	Bednekoff *et al* 1994
Coal tit, *Periparus ater*	Predictability of food supply	Mean body mass at dawn in the variable treatment was 0.17 g less than in the fixed treatment, but there was no difference in dusk mass.	↓ 1.8%/0	Polo & Bautista 2002
Willow tit, *Parus montanus*	Food supplementation	Supplemented birds heavier.	↓ ~2.5%	Koivula *et al* 2002
Marsh tit, *Parus palustris*	Variability in foraging success	Increased food hoarding but not body mass when foraging success more variable.	0	Hurly 1992
Tufted titmice, *Parus bicolor*	Predictability and amount of food supply	Increased evening mass but not morning or mean mass.	↑ 1.7%	Pravosudov & Grubb 1997
Black-capped chickadee, *Poecile atricapilus*	Predictability of food supply	Higher total body and fat mass in unpredictably-fed birds.	↑ 7.5%	Cornelius *et al* 2017
Mountain chickadee, *Poecile gambeli*	Predictability of food supply	Birds on unpredictable food treatment increased body mass over the course of the experiment while the increase in mass among birds fed *ad libitum* was not significant.	↑ NA	Pravosudov *et al* 2001
Carolina chickadee, *Poecile carolinensis*	Predictability of food supply	Dominants and subordinates had higher evening mass under unpredictable food availability than *ad libitum* food.	↑ 8-13%	Pravosudov & Lucas 2000
European starling, *Sturnus vulgaris*	Predictability of food supply	No significant effect on mass.	0	Witter *et al* 1995
	Intermittent (predictable) food removal	Increased fat reserves and mass, especially in those birds initially lightest.	↑ ~4%	Witter & Swaddle 1997
	Predictability of food supply	Increased daily mass gain and dusk mass when food unpredictable.	↑ ~1%	Cuthill *et al* 2000
	Predictability of food supply	Birds in the unpredictable food-removal treatment increased in mass during the beginning of the Food Restriction stage compared to predictable food-removal treatment; they then decreased in mass but did not return to pre-experimental baseline.	↑ ~3%[1]	Bauer *et al* 2011
Zebra finch,	Predictability of food supply	No significant effect on body mass.	0	Marasco *et al* 2015

Taeniopygia guttata	Predictability of food supply	No significant effect on mean body mass or fat reserves.	0	Dall & Witter 1998
Greenfinch, *Carduelis chloris*	Predictability of food supply	Increased body mass when foraging success unpredictable.	↑ ~2%	Ekman & Hake 1990
	Predictability of food supply	When food predictability was decreased, subordinate birds increased fat reserves more than dominants.	↑ NA	Hake 1996
House sparrow, *Passer domesticus*	Predictability of food supply	Birds switched from wild rural to predictable simulated urban diet: reduced scaled mass index in rural birds when given predictable access to food.	↑ NA	Hudin *et al* 2016
Magpie, *Pica pica*	Predictability of food supply	Lower mass on unpredictable feeding schedule, especially under restricted food quantity.	↓ ~6-9%[2]	Cucco *et al*, 2002
Hooded crow, *Corvus corone*	Predictability of food supply	Birds fed with highest unpredictably lost mass.	↓ ~10%	Acquarone *et al* 2002
Florida Scrub-Jay, *Aphelocoma coerulescens*	Predictability of food supply	No significant effect on mass.	0	Bridge *et al* 2009
Curve-billed thrasher, *Toxostoma curvirostre*	Variable amount of food supply	Birds in the variable feeding treatment decreased their body mass relative to birds in the constant feeding group.	↓ ~14%	Fokidis *et al* 2012

[1]As compared to predictable food-removal; [2]Not statistically tested in paper.

Mass change '↑' denotes increased mass with increasing starvation risk or proxy; '↓' denotes decreased mass; '0' denotes no significant effect; 'NA' denotes single numerical percentage mass change not discernible from paper; '~' denotes percentage estimated from figures and/or mean mass of species. Search terms were: ("fat reserves" OR fat OR "fat storage" OR "body fat" OR mass OR "body mass" OR "body-mass" OR "weight" OR "body weight" OR "body-weight" OR "body reserves" OR "mass regulation") AND ("starvation risk" OR starvation OR unpredictable OR "food unpredictability" OR "food predictability" OR "predictable food" OR "unpredictable food" OR "variable food") AND (bird OR passerine).

Table S2. Summary of a systematic review of studies of the effect of altered predation risk on body mass in passerines.

Species	Manipulation	Brief description of findings	Mass change (%)	Reference
Great tit, *Parus major*	Model predator	Reduced fat reserves under higher predation risk (as much as one fat-score unit, equivalent to about 0.4 g of fat).	↓ ~2.5%	Gentle & Gosler 2001
	Model predator	Delayed mass gain diurnally under higher predation risk.	NA	Macleod *et al* 2005b
	Human capture & handling	Handled birds gained mass within a day of capture and maintained this increase for a week (0.7g increase in mass; represents a 64% increase in diurnal mass gain).	↑ ~4%	Macleod & Gosler 2006
	Predator call playback	Birds exposed to predator playback lost mass relative to controls, particularly fast explorative individuals.	↓ ~6%	Abbey-Lee *et al* 2016
	Predator & mobbing call playback	Body mass decreased in plots with predator playback compared to control plots.	↓ ~1%	Mathot *et al* 2016
	Reduced wing area by taping primary feathers	Individuals reduced body mass when their wing area was reduced.	↓ 3.3%	Senar 2002
Blue tit, *Parus caeruleus*	Human chasing	Birds (when on long days) lost mass soon after being chased, compared to controls.	↓ ~5%	Rands & Cuthill 2001
Coal tit, *Parus ater*	Human chasing	Morning body mass decreased on days when birds were chased compared to control days.	↓ 2.6%	Carrascal & Polo 1999
	Reduced wing area	Body mass decreased when wing area was reduced in the field, but not in captivity.	↓ ~1%	Carrascal & Polo 2006
Tufted titmice, *Baelophus bicolor*	Model predator	Increased body mass after exposure to model stationary hawk.	↑ NA	Pravosudov & Grubb 1998b
Pied flycatcher, *Ficedula hypoleuca*	Predator urine & faeces	Body mass unaffected by predation risk cues.	0	Ruuskanen *et al* 2017
Zebrafinch, *Taeniopygia guttata*	Distance from cover, model predator, predator call playback	Birds under greater predatory threat showed mass loss.	↓ 7.4%	Kobiela *et al* 2015
Greenfinch, *Carduelis chloris*	Model predator, human handling	Reduced body mass when exposed to model flying hawk or to handling.	↓ NA	Lilliendahl 1997
	Model predator	Diurnal accumulation of mass was lower on days with presentation of flying model hawk, which resulted in lower relative maximum and evening body mass in comparison with days both before and after the predator exposure.	↓ ~1.7%	Lilliendahl 2000

European starling, *Sturnus vulgaris*	Availability of protective cover	Fat reserves highest when most cover was available, but no effect on overall body mass.	0	Witter *et al* 1994
Yellowhammer, *Emberiza citrinella*	Model predator	Lost more body mass after exposure to predator, but no change in morning/evening body mass.	0	van der Veen 1999
	Model predator	Mass loss when exposed to predator was greater than when exposed to feeding interruption alone, but similar to that when exposed to dummy (plastic bottle). Lost 10% of normal daily mass increase upon each exposure to hawk model.	↓ ~8%	van der Veen & Sivars 2000
	Model predator	Gained mass following predator exposure.	↑ ~0.7-2%	Lilliendahl 1998
Blackcap, *Sylvia atricapilla*	Model predator	Higher pre-migratory body mass increase rate under predator exposure.	↑ NA	Fransson & Weber 1997
Brown-headed cowbird, *Malothrus mater*	Model predator & predator call playback	Increased mass in predator treatment compared to non-predator control, due to fat gain.	↑ 2%	Walters *et al* 2017
House sparrow, *Passer domesticus*	Flight feathers cut or plucked	Sparrows from control & cut groups increased in mass, while those with plucked feathers maintained steady mass.	NA[1]	Ben-Hamo *et al* 2016

[1]Results ambiguous concerning predation risk.

Percentage mass change '↑' denotes increased mass with increasing predation risk or proxy; '↓' denotes decreased mass; '0' denotes no significant effect; 'NA' denotes single numerical percentage mass change not discernible from paper; '~' denotes percentage estimated from figures and/or approximate mean mass of species. Search terms were: ("fat reserves" OR fat OR "fat storage" OR "body fat" OR mass OR "body mass" OR "body-mass" OR "weight" OR "body weight" OR "body-weight" OR "body reserves" OR "mass regulation") AND ("predation risk" OR predation) AND (bird OR passerine).

Table S3. Examples of diurnal variation in body mass among passerines.

Species	Diurnal variation in mass (%)	References
Finch species	6-18%	Lehikoinen 1987, Metcalfe & Ure 1995, Meijer *et al* 1996, Cuthilll *et al* 1997, Dall & Witter 1998, Carrascal & Polo 1999, Krams 2002, Rozman *et al* 2003, Brandt & Cresswell 2009
Tit species	4–12%	Lehikoinen 1987, Haftorn 1989, 1992, Hurly 1992, Koivula *et al* 1995a, 2002, Lilliendahl *et al* 1996, Pravosudov & Grubb 1997, Kullberg 1998, Kullberg *et al* 1998, Carrascal & Polo 1999, Barluenga *et al* 2001, Lilliendahl 2002, Polo & Bautista 2002, 2006b, Krams 2002, Broggi *et al* 2003, Lange & Leimar 2004, Macleod *et al* 2005b, Cooper 2007, Krams *et al* 2012, Moiron *et al* 2018
Chickadee species	7-9%	Cooper, 2007; Vladimir V. Pravosudov & Lucas, 2000
European Starling, *Sturnus vulgaris*	7-14%	Meijer *et al* 1994, Bautista *et al* 1998, Macleod *et al* 2008
Blackbird, *Turdus merula*	1-9%	Cresswell 1998, Macleod *et al* 2005a
European robin, *Erithacus rubecula*	4-8%	Thomas 2000
Dark-eyed Junco, *Junco hyemali*	10%	Vézina *et al* 2009
European nuthatch, *Sitta europaea*	5%	Lilliendahl 2002
Northern wheatear, *Oenanthe oenanthe*	5%	Delingat *et al* 2009
Swainson’s thrush, *Hylocichla ustulata*	3%	Mueller & Berger 1966
Greenish leaf warbler, *Phylloscopus trochiloides*	8%	Katti & Price 1999
Snow bunting, *Plectrophenax nivalis*	7-10%	Smith & Metcalfe 1997