Appendix S1

(a) Food treatment assignment and calculation of rations

The assignment of fish to food regimes was random but under the stipulation that the number of individuals, their body mass, and initial mass-independent SMR did not differ between the three regimes. Mass-independent (residual) SMR at the start of the experiment did not differ among individuals subsequently switched to the 3 food treatment groups ($F_{2,113}$ = 0.41, p = 0.67). Body mass ranged from 5.37 – 12.67 g (mean: 8.43 ± 0.13 g) across individuals at the start of the experiment but did not differ between fish subsequently switched to the 3 food treatment groups ($F_{2,113}$ = 0.002, p = 0.99). The three ration levels – low, intermediate, and ad libitum – were calculated from equations from Elliott (*Elliott, J. (1976) The energetics of feeding, metabolism and growth of brown trout (Salmo trutta L.) in relation to body weight, water temperature and ration size. Journal of Animal Ecology, 45, 923-948*) that model the growth of brown trout as a function of initial body size, caloric intake, and temperature. Published values of the energetic content of the trout pellets (Inicio Plus from BioMar Ltd, Grangemouth, UK) were used to convert Elliott's estimates of caloric intake into trout pellets (mg) and thereby obtain the daily ration (mg trout pellets) for each fish as a function of its body mass (W, g) and the water temperature (T, C) for the 3 food levels as follows: low food = $2.04W^{0.73}\, e^{(0.10T)}$, intermediate food = $2.91W^{0.737}\, e^{(0.154T)}$, and *ad libitum* food = $4.29W^{0.767}\, e^{(0.21T)}$.

(b) Derivation of mass-independent estimates of standard metabolic rate

Residual SMR (rSMR) for each individual was calculated from the regression line describing log-transformed SMR as a function of log-transformed body mass when including measurements from both the start and end of the experiment from 1) all fish from all food regimes, and 2) only those fish that remained on the constant intermediate food level, after accounting for random effects of batch and non-independence of repeated measures for each

individual. The equations describing SMR as a function of body mass were very similar between the two methods used to generate rSMR, so rSMR (r = 0.94, P < 0.001) and the change in rSMR (final rSMR – initial rSMR; r = 0.99, P < 0.001) were each highly correlated between the two methods. Results from analyses examining the change in rSMR and growth rates (see text) were therefore also similar. Thus, we report results using residuals from the first method since it allowed us to control for the random effects of batch among all fish in one single analysis and because it included all fish and therefore described the relationship between SMR and body mass for a larger size range (see figure 1 in text).

(c) Results from model using final rSMR as a predictor of growth

Final rSMR but not initial rSMR had consequences for growth during the 4 week interval following their switch to one of the three food regimes, but effects depended on food regime (food: $F_{2, 106}$ = 280.79, P < 0.001; initial rSMR: $F_{1, 106}$ = 0.07, P = 0.80; final rSMR: $F_{1, 106}$ = 3.29, P = 0.07; initial rSMR x food: $F_{2, 106}$ = 1.17, P = 0.31; final rSMR x food: $F_{2, 106}$ = 6.32, P < 0.01; initial fork length: $F_{1,106}$ = 10.78, P < 0.01; batch: Wald Z = 0.47, P = 0.31). Among individuals switched to the low food ration, those with a lower final rSMR grew at a faster rate than individuals with a higher final rSMR (t_{106} = -2.60, P = 0.01). In contrast, among individuals switched to *ad libitum* rations, those that had a higher final rSMR grew at a faster rate than individuals with a lower final rSMR (t_{106} = 2.49, P = 0.01). At the intermediate food level, there was no relationship between growth and final rSMR (t_{106} = 0.48, P = 0.63).

d) Data used in analyses of growth and metabolism

Batch	Fish ID	Food level*	Fork length day0 (mm)	fork length day28 (mm)	mass day0 (g)	mass day28 (g)	Measure 1: Standard metabolic rate (mg O_2 h^{-1})	Measure 2: Standard metabolic rate (mg O_2 h^{-1})
1	1	3	94.40	112.86	9.60	16.36	0.91	1.67
1	2	2	94.78	104.43	9.34	13.01	0.90	1.10
1	3	1	97.22	102.79	9.84	10.80	1.04	0.98
1	4	3	86.70	97.85	7.21	10.96	0.77	0.92
1	5	2	93.51	106.32	8.76	12.85	0.78	1.30
1	6	1	83.82	88.40	6.74	7.54	0.76	0.95
1	7	1	85.76	91.05	6.69	7.91	0.96	1.09
1	8	3	86.83	99.72	6.42	10.50	0.66	1.42
1	9	1	93.40	98.86	9.42	10.56	0.90	0.60
1	10	3	82.94	96.55	6.65	9.78	0.83	1.01
1	11	3	96.21	114.49	9.86	17.27	0.92	2.12
1	12	2	85.11	94.74	6.73	9.85	0.52	1.04
1	13	1	88.20	94.35	7.75	9.06	0.87	0.52
1	14	2	87.65	99.41	8.06	11.47	0.48	0.90
1	15	1	103.18	109.35	12.67	13.99	1.12	1.25
2	16	3	87.28	103.60	7.24	12.66	0.74	1.66
2	17	2	96.68	106.62	10.16	14.00	0.80	1.32
2	18	2	91.09	103.55	8.47	12.19	0.90	1.42
2	19	2	90.04	100.19	7.85	11.48	0.73	1.22
2	20	3	97.33	111.22	10.44	16.10	0.81	1.60
2	21	1	90.48	95.73	8.09	9.36	0.77	0.93
2	22	1	92.15	97.52	8.36	9.73	0.70	1.22
2	23	1	80.72	81.76	5.80	5.37	0.53	0.54
2	24	3	102.71	121.61	11.25	19.70	0.95	2.24
2	25	3	96.71	116.69	9.67	17.94	0.79	2.20
2	26	1	87.82	93.14	7.38	8.68	0.79	0.92
2	27	2	84.44	93.61	6.81	10.05	0.72	1.28
2	29	3	82.88	94.74	6.72	9.97	0.68	1.38
2	30	1	86.44	92.13	7.81	9.12	0.95	0.82
3	31	2	90.39	104.43	8.42	12.55	0.83	1.30
3	32	3	96.86	116.59	9.99	18.26	1.12	1.95
3	33	1	91.54	97.22	9.38	10.79	0.94	0.82
3	34	1	88.34	94.40	7.72	9.04	0.78	1.25
3	36	1	92.58	97.21	9.47	10.48	0.85	1.14
3	37	3	82.89	91.25	6.90	8.79	0.66	0.64
3	38	2	94.45	106.79	9.17	13.37	0.83	1.24
3	39	3	94.83	108.69	9.09	14.13	0.90	1.58
3	40	1	86.59	92.20	6.87	8.24	0.67	0.71
3	41	2	84.81	95.92	6.59	9.71	0.80	1.75
3	42	3	92.59	107.98	8.56	13.91	0.93	1.02

3	43	3	85.68	99.67	7.69	11.81	0.74	1.31
3	44	2	79.32	89.32	5.50	8.09	0.66	1.10
3	45	2	88.20	99.20	8.10	11.13	0.84	1.41
4	46	2	91.24	101.88	8.82	12.81	0.95	1.28
4	47	1	91.09	95.47	8.17	9.26	1.07	1.05
4	48	3	85.85	103.96	6.75	12.75	0.89	2.19
4	49	1	82.30	85.61	5.49	6.14	0.57	0.56
4	50	3	95.70	111.70	9.77	16.37	1.09	1.94
4	51	1	93.37	98.75	9.40	10.61	1.00	1.03
4	52	1	96.50	103.01	10.04	11.40	1.06	0.96
4	53	2	85.75	97.97	7.21	10.77	0.87	1.00
4	54	2	93.75	104.85	9.43	13.41	1.05	1.59
4	55	2	94.06	106.20	9.67	13.78	0.88	1.31
4	56	2	100.55	112.08	11.36	15.85	1.02	1.52
4	57	3	95.72	113.63	9.38	17.10	0.96	2.44
4	58	3	93.08	109.77	8.99	16.03	0.60	2.07
4	59	1	96.38	101.45	9.69	10.99	0.97	1.28
4	60	2	94.75	101.67	9.50	12.60	0.95	1.26
5	61	2	93.71	105.87	9.22	13.27	0.91	1.32
5	62	2	89.08	102.12	8.05	12.02	0.78	1.34
5	63	3	86.92	101.79	7.67	12.66	0.81	1.51
5	64	1	99.03	103.89	10.81	12.17	1.02	1.03
5	65	3	92.50	109.37	8.11	15.48	0.79	1.83
5	66	3	95.16	112.70	9.32	16.64	1.01	2.57
5	67	3	96.20	112.97	9.62	16.66	0.91	1.82
5	68	1	86.22	91.28	7.99	9.10	0.76	0.73
5	69	1	91.77	98.42	8.95	10.40	0.76	0.73
5	71	2	89.04	101.94	7.85	11.75	0.65	1.13
5	72	3	84.40	91.99	6.61	8.32	0.65	0.97
5	73	1	98.01	103.88	9.81	11.17	0.95	0.95
5	74	1	93.38	100.27	8.87	10.31	0.94	1.01
5	75	2	97.44	108.34	10.82	15.03	1.10	1.39
6	76	1	96.98	101.69	9.78	10.98	0.95	1.37
6	77	3	91.31	108.53	8.26	14.92	0.92	1.88
6	78	1	95.88	100.86	9.65	10.75	1.01	1.10
6	79	3	90.71	102.95	7.95	12.38	0.93	1.54
6	80	3	90.53	104.78	8.01	14.21	0.83	1.77
6	81	1	89.89	95.35	7.63	9.04	0.84	1.00
6	82	1	81.97	84.85	6.24	6.88	0.60	0.58
6	83	3	88.15	105.24	7.71	14.04	0.82	2.04
6	84	2	88.75	100.10	7.62	11.28	0.83	1.12
6	85	2	93.90	104.77	9.31	12.86	0.96	1.39
6	86	3	93.53	108.85	9.37	15.49	1.03	1.95
6	87	2	87.71	96.81	6.60	9.52	0.72	1.19
6	88	1	85.40	89.41	7.30	8.25	0.81	1.00
6	89	2	92.79	103.60	8.29	12.09	0.92	1.42

6	90	1	81.34	86.45	5.69	6.70	0.75	0.79
7	91	2	86.16	96.75	7.03	10.41	1.01	1.34
7	92	3	98.62	111.86	10.88	17.88	1.27	2.64
7	93	3	84.22	102.54	7.20	13.64	0.79	1.77
7	94	1	78.53	83.21	5.37	6.38	0.54	0.57
7	95	2	88.55	100.25	7.46	11.49	0.92	1.49
7	96	2	89.23	101.39	7.33	11.29	0.96	1.39
7	98	3	88.99	95.57	8.01	10.05	0.95	0.95
7	99	3	90.80	102.92	7.88	11.79	0.96	1.45
7	100	2	94.56	105.39	8.95	13.00	0.99	1.43
7	101	3	97.86	116.45	9.46	17.35	1.10	2.30
7	102	2	97.34	107.30	9.93	13.93	0.87	1.38
7	103	1	98.06	104.08	9.97	11.39	1.13	1.24
7	104	1	95.31	100.05	9.11	10.45	1.25	1.30
7	105	1	99.40	103.49	11.11	12.01	1.41	1.49
8	106	3	89.50	107.62	8.12	14.35	0.86	1.82
8	107	1	90.62	96.67	7.89	9.41	0.85	0.98
8	108	1	96.77	102.29	9.91	11.15	1.11	0.88
8	109	3	93.73	111.03	8.83	15.83	1.05	2.00
8	110	3	87.16	98.41	7.49	10.93	0.67	1.23
8	111	1	89.08	94.29	7.23	8.63	0.73	0.91
8	112	2	90.54	103.72	7.84	11.78	0.82	1.52
8	113	3	89.29	103.50	7.68	12.20	0.97	1.38
8	114	1	86.73	93.14	7.20	8.79	0.88	1.05
8	115	3	91.00	110.35	8.30	15.46	0.83	1.97
8	116	2	91.89	103.14	8.29	11.89	1.07	1.24
8	117	2	102.64	113.60	11.95	16.65	1.23	1.75
8	118	2	88.00	100.20	7.27	10.91	0.85	1.31
8	119	2	92.38	105.26	8.45	12.65	0.99	1.80
8	120	1	94.31	99.57	9.36	10.54	1.03	1.07

*1 = low, 2 = intermediate, 3 = ad libitum