

Supplemental Information

Energy compensation and adiposity in humans

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Source	TEE as response variable				AEE as response variable			
	Estimate	± se	<i>t</i>	<i>p</i>	Estimate	± se	<i>t</i>	<i>p</i>
(A) Overall compensation model								
Intercept	10.65	± 0.036			3.43	± 0.033		
Sex	-0.021	± 0.058	-0.36	0.716	-0.019	± 0.052	-0.36	0.716
Age	-0.018	± 0.002	-9.18	<0.001	-0.016	± 0.002	-9.18	<0.001
FFM	1.852	± 0.093	19.87	<0.001	1.666	± 0.084	19.87	<0.001
FM	-0.154	± 0.036	-4.23	<0.001	-0.138	± 0.033	-4.23	<0.001
BEE	0.723	± 0.049	14.64	<0.001	-0.349	± 0.044	-7.86	<0.001
(B) Compensation by sex, age, and body composition								
Intercept	10.669	± 0.072			3.450	± 0.065		
Sex	0.053	± 0.062	0.86	0.389	0.048	± 0.056	0.86	0.389
Age	-0.024	± 0.002	-10.99	<0.001	-0.022	± 0.002	-10.99	<0.001
FFM	1.883	± 0.094	19.95	<0.001	1.695	± 0.085	19.95	<0.001
FM	-0.068	± 0.041	-1.66	0.097	-0.061	± 0.037	-1.66	0.097
BEE	0.639	± 0.052	12.25	<0.001	-0.425	± 0.047	-9.05	<0.001
BEE × Sex	-0.045	± 0.063	-0.72	0.472	-0.041	± 0.057	-0.72	0.472
BEE × Age	0.001	± 0.002	0.60	0.551	0.001	± 0.002	0.60	0.551
BEE × FFM	0.090	± 0.063	1.44	0.150	0.081	± 0.056	1.44	0.150
BEE × FM	-0.069	± 0.029	-2.34	0.019	-0.062	± 0.026	-2.34	0.019
Sex × Age	-0.002	± 0.003	-0.78	0.435	-0.002	± 0.003	-0.78	0.435
Sex × FFM	0.026	± 0.102	0.25	0.801	0.023	± 0.092	0.25	0.801
Sex × FM	0.109	± 0.046	2.36	0.019	0.098	± 0.042	2.36	0.019
Age × FFM	-0.015	± 0.004	-3.46	0.001	-0.014	± 0.004	-3.46	0.001
Age × FM	-0.001	± 0.002	-0.73	0.466	-0.001	± 0.002	-0.73	0.466

Table S1. Sources of variation in total energy expenditure in adult humans. Related to Figures 2 and 3. (A) Estimates, standard errors (se), *t*-values and *P*-values from multiple linear regression models of total energy expenditure (TEE; MJ·d⁻¹) and activity energy expenditure (AEE; MJ·d⁻¹) as a function of age (*y*), fat free mass (FFM, in kg, square-root transformed), fat mass (FM, in kg, square-root transformed) and basal energy expenditure (BEE; MJ·d⁻¹). (B) Same model as A but with the inclusion of interactions to test if compensation varies according to sex, age, FFM, and FM, while controlling for age- and sex-related differences in body composition (FFM and FM). All variables have been centered, such that main effects are estimated at the mean values for each variable.

Component-trait	Estimate	±	se	χ^2_1	<i>P</i>
(A) Bivariate mixed model of TEE and BEE					
$V_{\text{between}} - \text{TEE}$	0.653	±	0.186		
$V_{\text{between}} - \text{BEE}$	0.101	±	0.062		
$\text{COV}_{\text{between}}$	0.188	±	0.079	6.76	0.0093
$V_{\text{within}} - \text{TEE}$	0.658	±	0.116		
$V_{\text{within}} - \text{BEE}$	0.365	±	0.065		
$\text{COV}_{\text{within}}$	0.055	±	0.062	0.80	0.3710
(B) Bivariate mixed model of AEE and BEE					
$V_{\text{between}} - \text{AEE}$	0.291	±	0.143		
$V_{\text{between}} - \text{BEE}$	0.101	±	0.062		
$\text{COV}_{\text{between}}$	0.068	±	0.070	0.90	0.3426
$V_{\text{within}} - \text{AEE}$	0.799	±	0.141		
$V_{\text{within}} - \text{BEE}$	0.365	±	0.065		
$\text{COV}_{\text{within}}$	-0.315	±	0.078	26.71	<0.0001

Table S2. Energy trade-offs between vs. within individuals. Related to Figure 4. Between- and within-individual variance in (V_{between} and V_{within}) and covariance between ($\text{COV}_{\text{between}}$ and $\text{COV}_{\text{within}}$) (A) total energy expenditure (TEE; MJ·d⁻¹) and basal energy expenditure (BEE; MJ·d⁻¹) and (B) activity energy expenditure (AEE; MJ·d⁻¹) and basal energy expenditure (BEE; MJ·d⁻¹) in 68 elderly men and women measured twice, 7 years apart. The significance of $\text{COV}_{\text{between}}$ and $\text{COV}_{\text{within}}$ was estimated using likelihood ratio tests.

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This group authorship contains the names of people whose data were contributed into the database by the analysis laboratory but they later could not be traced, or they did not respond to emails to assent inclusion among the authorship. The list also includes some researchers who did not assent inclusion because they felt their contribution was not sufficient to merit authorship, or their data were not used, e.g. studies of children.

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