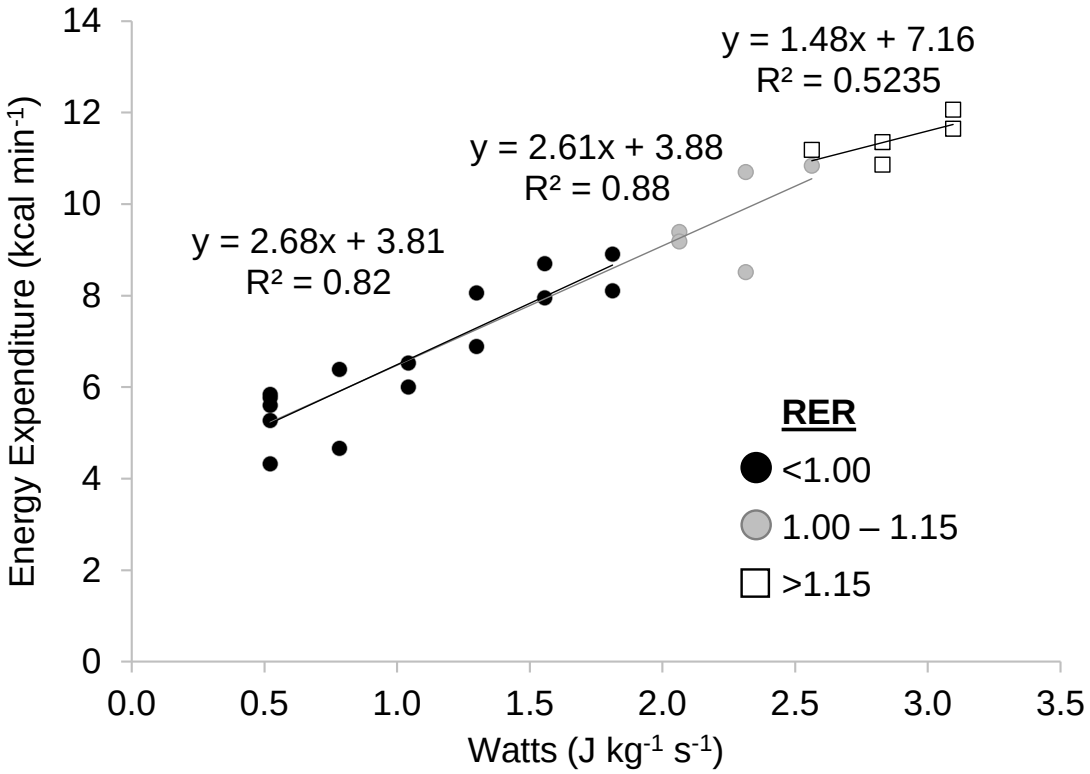

Fig. S1. Energy expenditure as a function of work. Energy expenditure, calculated from VO_2 and VCO_2 using the Weir equation, plotted against workload for a human subject in a graded exercise test reported in Table 3 of Evardsen et al. 2014. The subject maintained a constant running speed (4.8 kph) while the incline of the treadmill increased from 4% to 20%. Once the treadmill reached 20%, speed was further increased to 5.3 kph and then to 5.8 kph. Workload (Watts) reflects the rate of ascent, speed×sinθ, where θ is treadmill incline angle. The first minute of the test is excluded from this analysis. As can be seen from the plot, energy expenditure continues to track workload above RER=1.00, up to RER=1.15.

Table S1

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Table S2. Tested COL_{net} linear mixed effect models. Selected model is bolded.

Model	R^2m	R^2c	AIC
lmer (COL_{net} ~ velocity + (1 | subject))	**0.52**	**0.86**	**187**
lmer (COL_{net} ~ t_c^{-1} + (1 | subject))	0.29	0.59	232
lmer (COL_{net} ~ velocity + mass + (1 | subject))	0.53	0.86	192
lmer (COL_{net} ~ velocity + imi + (1 | subject))	0.52	0.86	180
lmer (COL_{net} ~ velocity + arm + (1 | subject))	0.54	0.86	189
lmer (COL_{net} ~ velocity + height + (1 | subject))	0.53	0.86	192
lmer (COL_{net} ~ velocity + difficulty + (1 | subject))	0.54	0.86	188
lmer (COL_{net} ~ velocity + experience + (1 | subject))	0.51	0.86	188

Table S3. Correlation tests between velocity and potential explanatory variables of COL_{net}.

Variable	Type of test	Correlation coefficient	Significance
Experience	Spearman's	$\rho = -0.08$	$p = 0.54$
Difficulty	Spearman's	$\rho = -0.51$	**$p < 0.01$**
Inverse contact time	Pearson's	$r = 0.73$	**$p < 0.01$**
Body mass	Spearman's	$\rho = 0.05$	$p = 0.70$
Arm length	Spearman's	$\rho = 0.02$	$p = 0.91$
Height	Spearman's	$\rho < 0.01$	$p = 0.95$
IMI	Spearman's	$\rho = 0.29$	$p = 0.08$