Workshop: What Does a Physical Activity Action Plan Look Like?

European Association for the Study of Obesity

Annecy; July 2022

David Thivel

Clermont Auvergne University

DAPHNE

Santé en Mouvement

Metabolic Adaptations to Exercise under Physiological and Pathological conditions Laboratory (AME2P, France)
International Research Chair Health in Motion (UCA foundation, France)
Appetite Control and Energy Balance Research Group, Faculty of Medicine and Health, University of Leeds, (ACBE, UK)
Research Center for Human Nutrition (CRNH Auvergne)
French National Observatory for Physical Activity & Sedentary Behavior (ONAPS)
European Childhood Obesity Group (ECOG)
Obesity Clinical and Research Group (CALORIS)

WORKSHOP: WHY DO WE NEED A PHYSICAL ACTIVITY ACTION PLAN? AND HOW?

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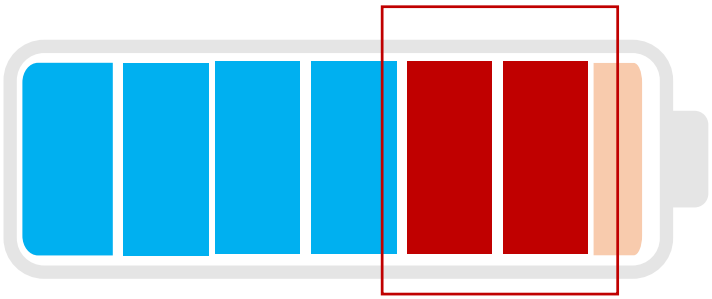
Physical activity
Physical inactivity
Sedentary behaviors
Physical fitness

Public Health & prevention

Obesity management

Physical Activity

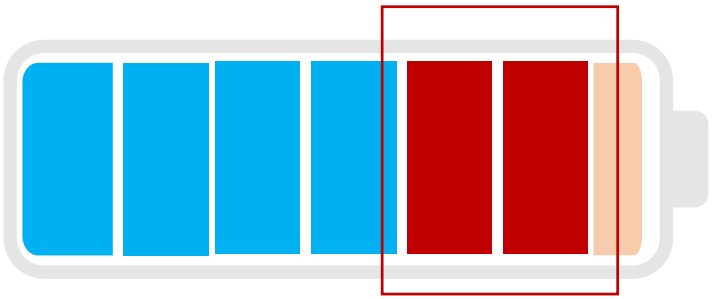
Body Movements generated by skeletal muscle contractions and favoring an increase of energy expenditure > to the Resting Metabolic Rate



20-25%	PA-related Energy Expenditure
70-75%	Resting Metabolic Rate
5-10%	Thermic effect of food
100%	Total Energy Expenditure

Physical Activity

Body Movements generated by skeletal muscle contractions and favoring an increase of energy expenditure > to the Resting Metabolic Rate



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Body Movements generated by skeletal muscle contractions and favoring an increase of energy expenditure > to the Resting Metabolic Rate

Physical Activity

Not reaching Physical activity recommendations

Physical Inactivity

Behaviors with EE <1.5 Mets (SBRN)

Sedentary Behaviors

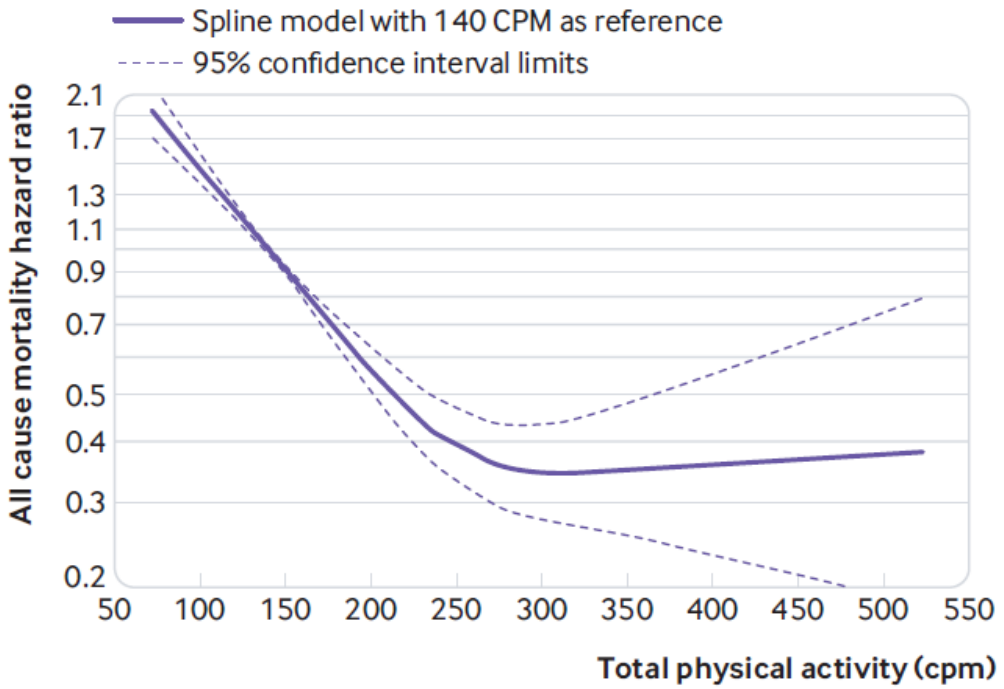
Physical Activity

RESEARCH

the bmj | *BMJ* 2019;366:l4570 | doi: 10.1136/bmj.l4570

Dose-response associations between accelerometry measured physical activity and sedentary time and all cause mortality: systematic review and harmonised meta-analysis

Ulf Ekelund,[1,2] Jakob Tarp,[1] Jostein Steene-Johannessen,[1] Bjørge H Hansen,[1] Barbara Jefferis,[3] Morten W Fagerland,[1,4] Peter Whincup,[5] Keith M Diaz,[6] Steven P Hooker,[7] Ariel Chernofsky,[8] Martin G Larson,[8] Nicole Spartano,[9] Ramachandran S Vasan,[10] Ing-Mari Dohrn,[11] Maria Hagströmer,[11,12] Charlotte Edwardson,[13,14] Thomas Yates,[13,14] Eric Shiroma,[15] Sigmund A Anderssen,[1] I-Min Lee[16,17]



Total volume of physical activity, irrespective of intensity, is associated with a substantially reduced risk of death

Physical Activity

RESEARCH

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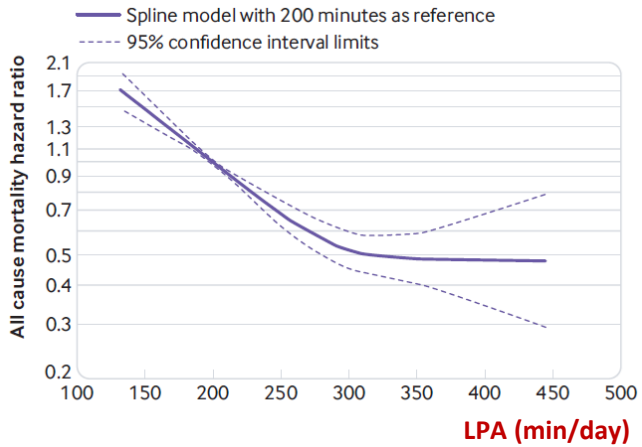

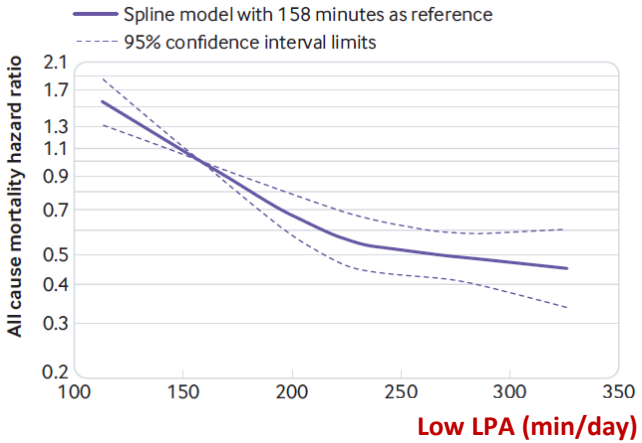

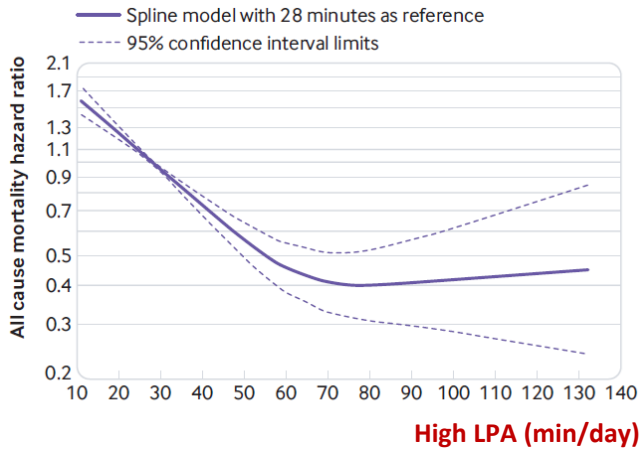

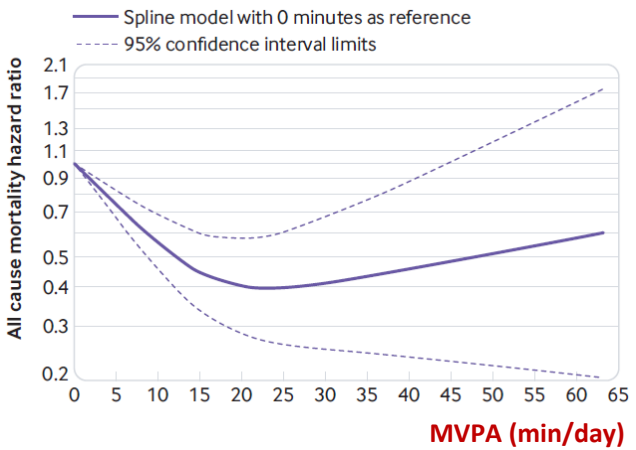

Physical Activity

RESEARCH

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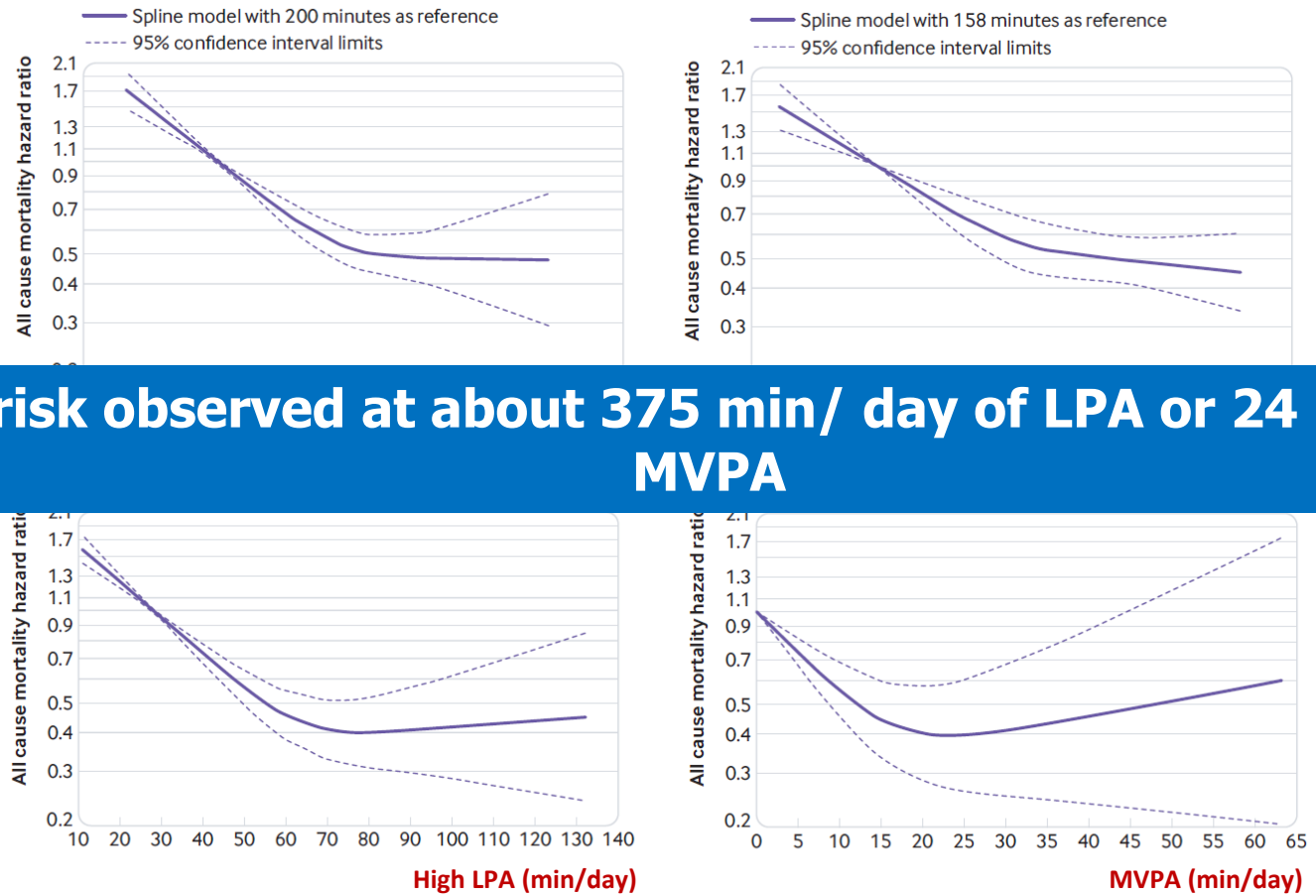


Lower risk observed at about 375 min/ day of LPA or 24 min/day of MVPA

Physical Inactivity

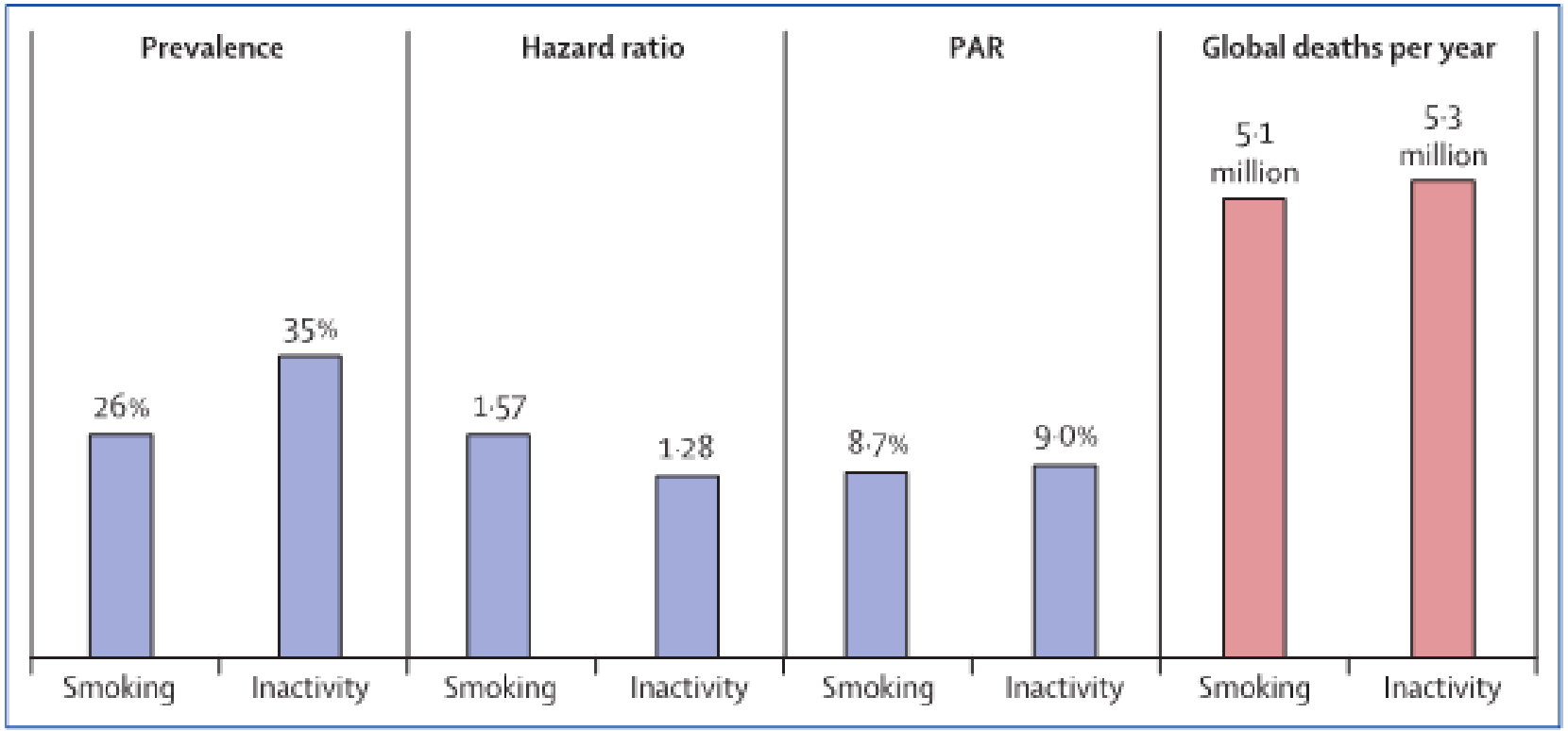
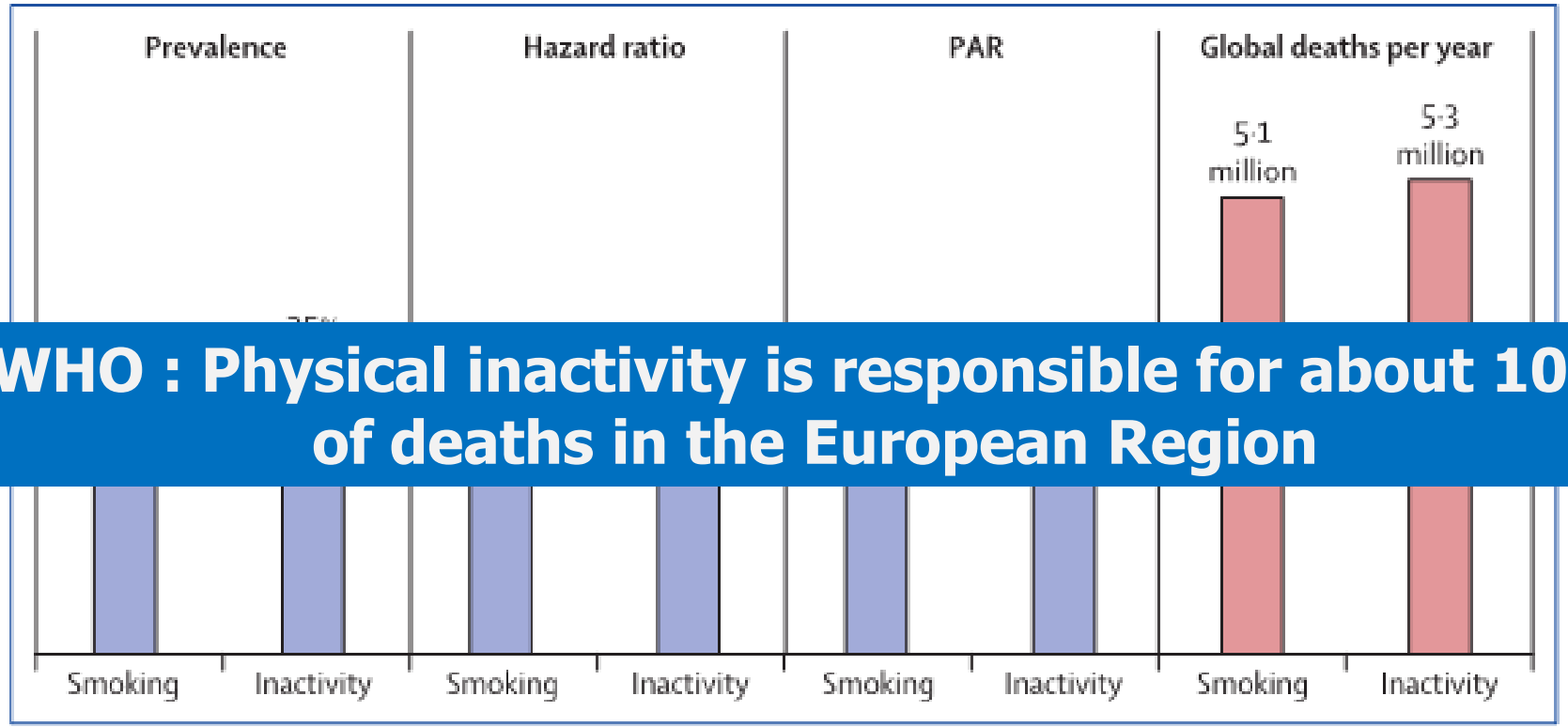


***Figure:* Comparison of global burden between smoking and physical inactivity**

Prevalence of smoking, population attributable risk (PAR), and global deaths for smoking were obtained from WHO.[7] Hazard ratio for all-cause mortality of smoking was obtained from meta-analysis studies.[8,9] All inactivity data were obtained from Lee and colleagues.[5]

Pang Wen, Lancet 2012

Physical Inactivity



WHO : Physical inactivity is responsible for about 10% of deaths in the European Region

Figure: **Comparison of global burden between smoking and physical inactivity**
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Sedentary Behaviors

RESEARCH

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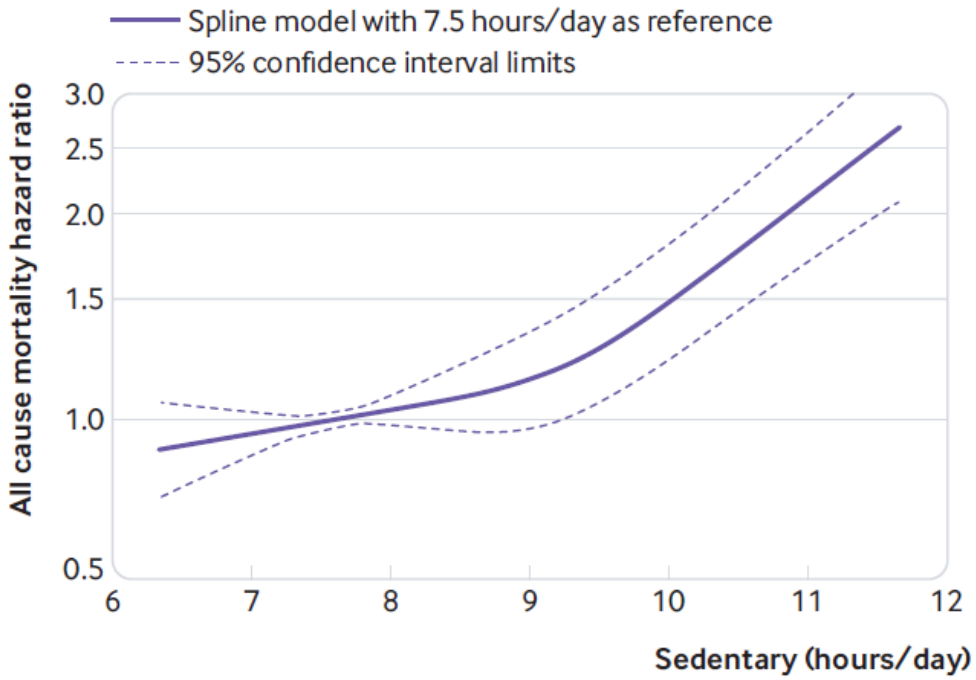


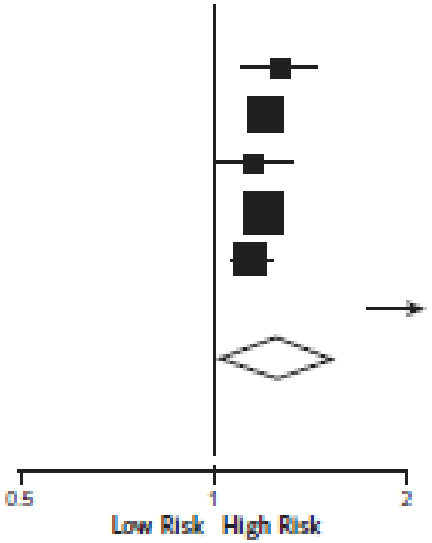
Significantly higher risk of death was observed from 9.5 or more hours per day for time spent sedentary

Sedentary Behaviors

Every ↑1h/day = ↑ T2D risk by 22% and MS by 39%

(Van der Berg 2016; Wijndaele 2017)

Effects	HR (95% CI)	Z Score	*P* Value
Pooled effects			
Outcome			
All-cause mortality (13 studies)	1.240 (1.090–1.410)	3.276	0.001
CVD mortality (6 studies)	1.179 (1.106–1.257)	5.049	0.000
CVD incidence (3 studies)	1.143 (1.002–1.729)	0.633	0.53
Cancer mortality (7 studies)	1.173 (1.108–1.242)	5.469	0.000
Cancer incidence (7 studies)	1.130 (1.053–1.213)	3.378	0.001
Diabetes incidence (5 studies)	1.910 (1.642–2.222)	8.377	0.000
Knapp–Hartung estimator	1.26 (1.03–1.55)		
Heterogeneity (I^2 = 92.62; P < 0.001; Q = 40.234)			



An HR >1 suggests that high sedentary time is harmful. Diamonds indicate overall HRs with associated 95% CIs. CVD = cardiovascular disease; HR = hazard ratio.

41 studies (29 000 to 800 000 participants/item)

Biswas et al. Annals of Internal Medicine 2015

The weight of words

JOURNAL OF SPORTS SCIENCES, 2017
https://doi.org/10.1080/02640414.2017.1420452

Routledge
Taylor & Francis Group

Are habitual runners physically inactive?

Timo Rantalainen [a], Arto J. Pesola [b], Matthew Quittner[a], Nicola D. Ridgers[a] and Daniel L. Belavy [a]

[a]School of Exercise and Nutrition Sciences, Institute for Physical Activity and Nutrition (IPAN), Deakin University, Geelong, Victoria, Australia;
[b]Active Life Lab, South-Eastern Finland University of Applied Sciences, Mikkeli, Finland

- Runners +40 km/week
- Runners 20 km/week
- Sedentary individuals

The weight of words

JOURNAL OF SPORTS SCIENCES
https://doi.org/10.1080/02640414.2018.1477420

Routledge
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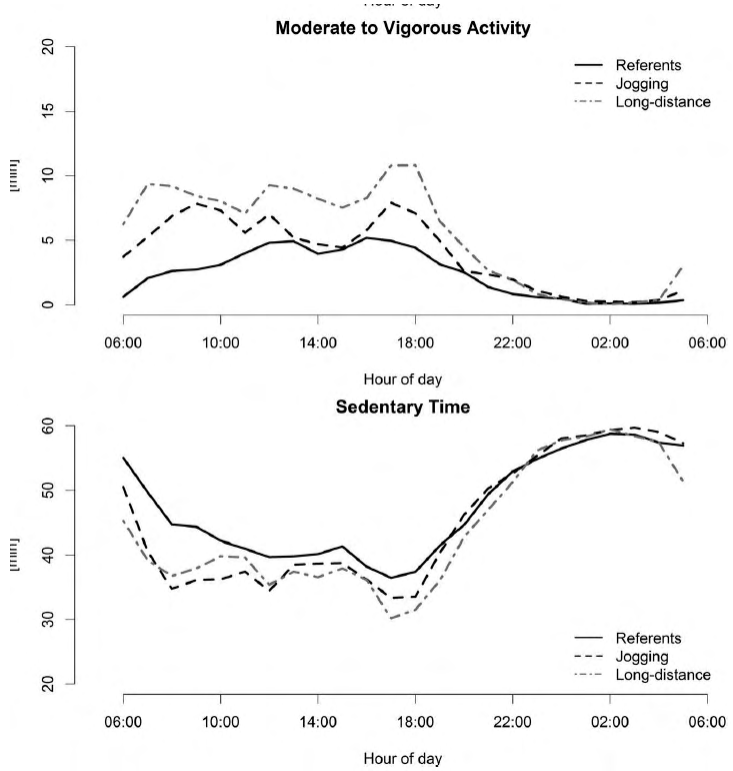
LETTER TO THE EDITOR

Inactive runners or sedentary active individuals?



Runners 20 km/week = **INACTIVES**

Similar levels of Sedentary time

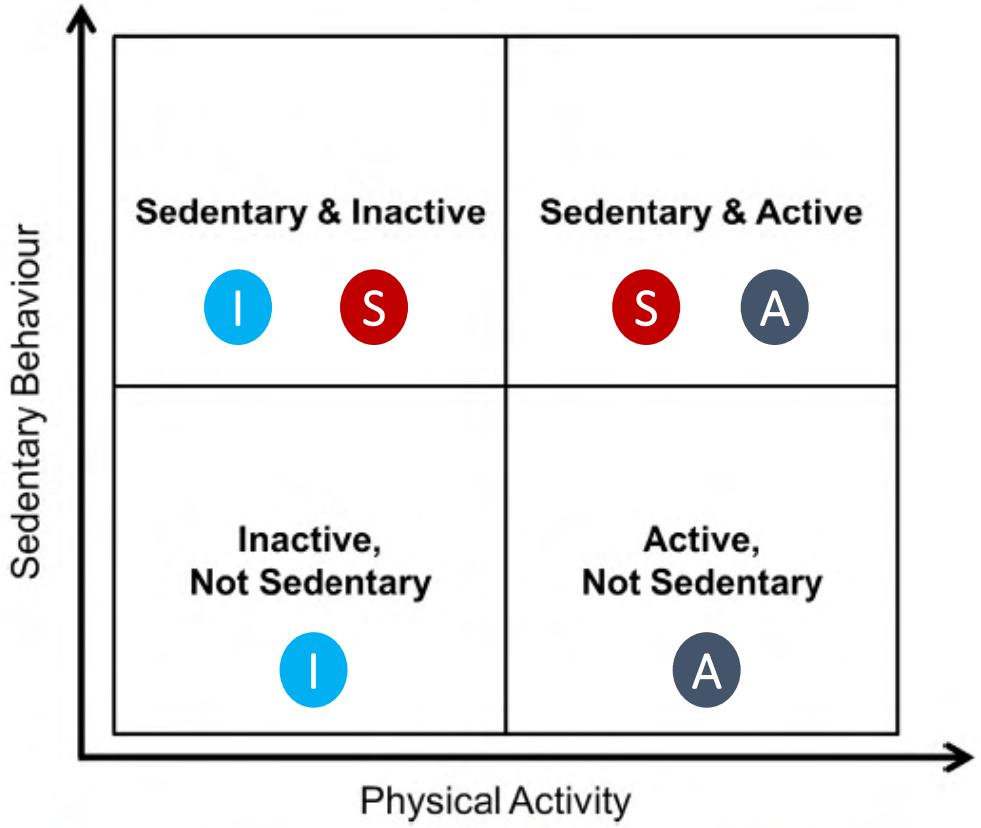
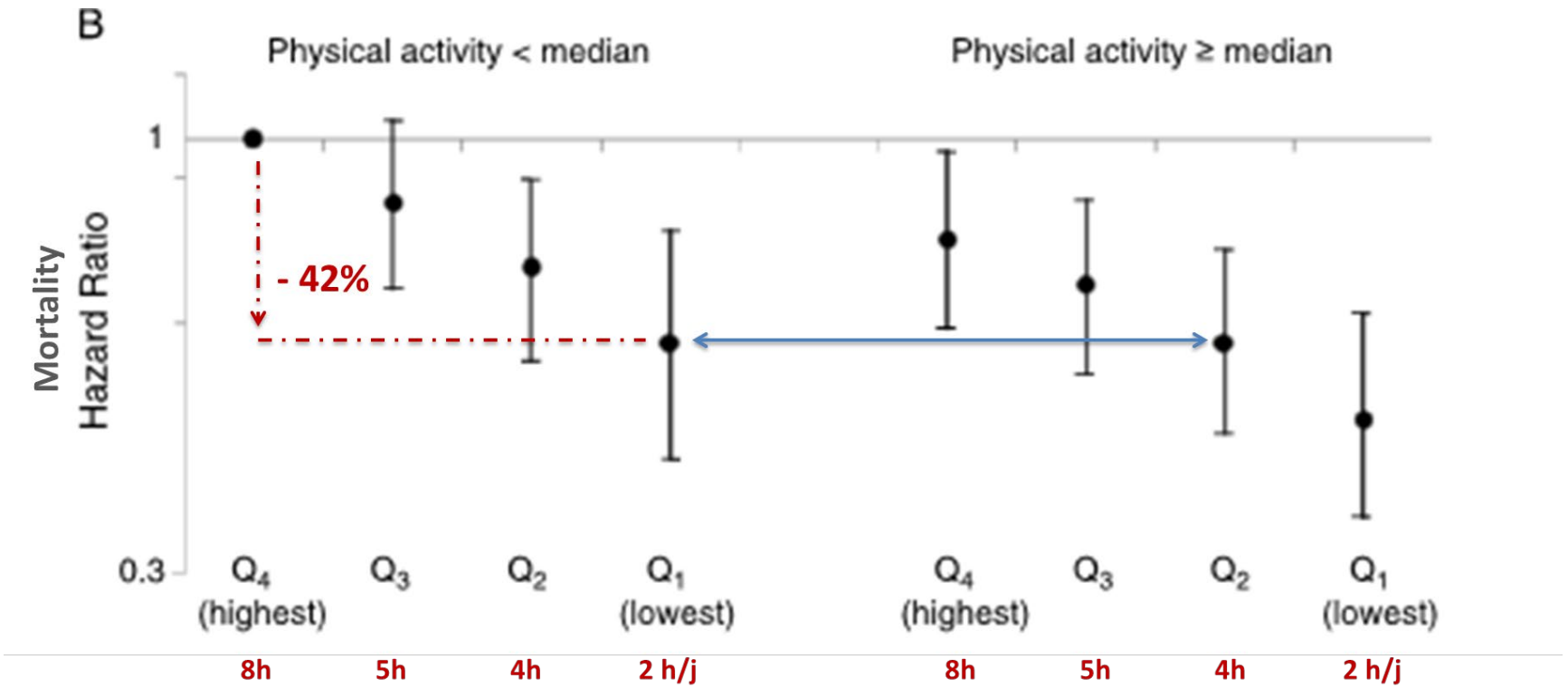


Figure 1. Sedentary behaviour and physical activity as distinct constructs.

Saunders et al., 2014



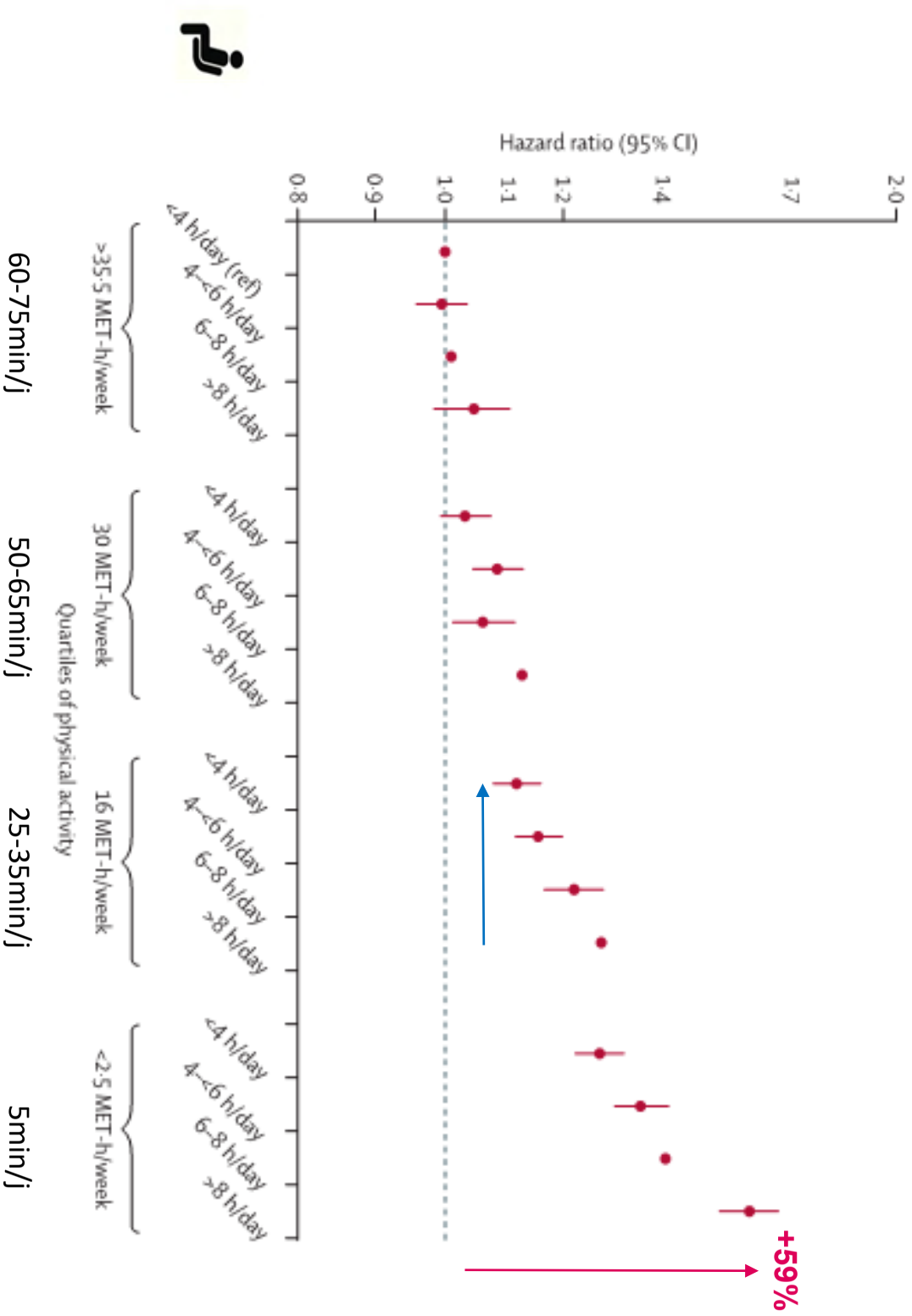
*Après ajustements multiples

Leon-Munoz et al., Med Sci Sports Exerc 45 (8) 1501-1507, 2013

Does physical activity attenuate, or even eliminate, the detrimental association of sitting time with mortality? A harmonised meta-analysis of data from more than 1 million men and women

Lancet 2016; 388: 1302–10

Ulf Ekelund, Jostein Steene-Johannessen, Wendy J Brown, Morten Wang Fagerland, Neville Owen, Kenneth E Powell, Adrian Bauman, I-Min Lee, for the Lancet Physical Activity Series 2 Executive Committe and the Lancet Sedentary Behaviour Working Group**



60-75min/j

50-65min/j

25-35min/j

5min/j

Moderate Intensity PA

Does physical activity attenuate, or even eliminate, the detrimental association of sitting time with mortality? A harmonised meta-analysis of data from more than 1 million men and women

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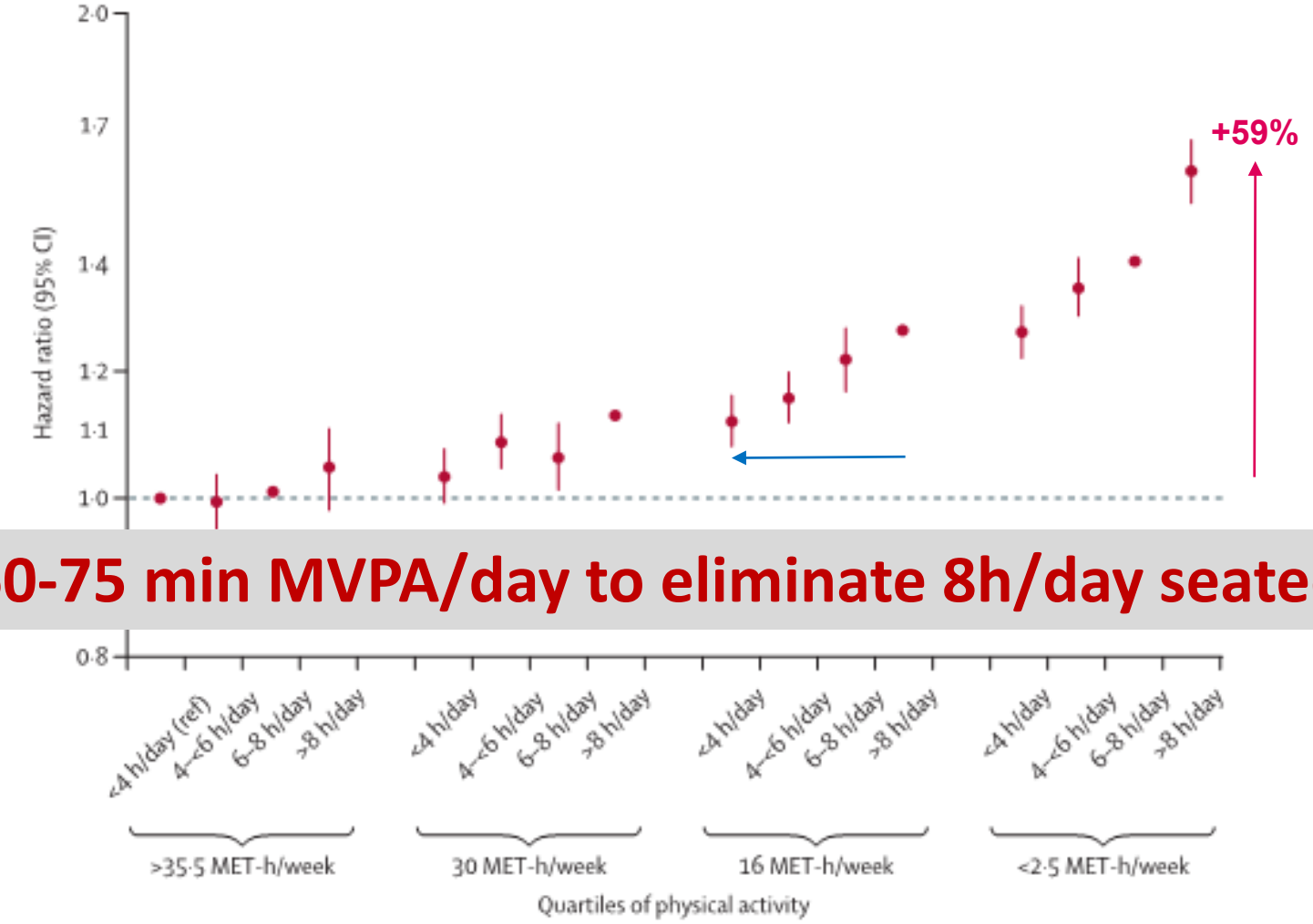

60-75 min MVPA/day to eliminate 8h/day seated

60-75min/j | 50-65min/j | 25-35min/j | 5min/j

Moderate Intensity PA

Does physical activity attenuate, or even eliminate, the detrimental association of sitting time with mortality? A harmonised meta-analysis of data from more than 1 million men and women

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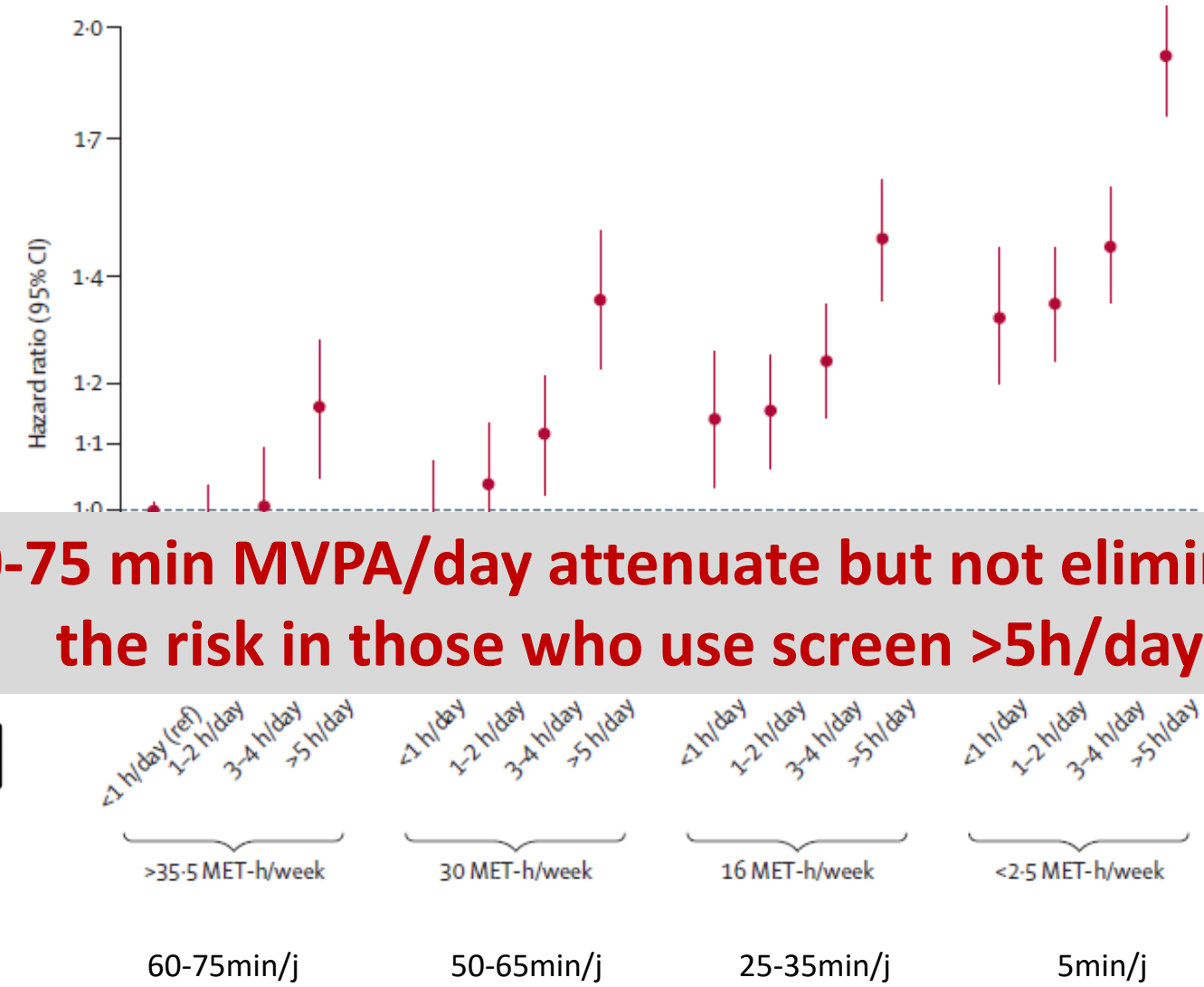


60-75 min MVPA/day attenuate but not eliminate the risk in those who use screen >5h/day

60-75min/j | 50-65min/j | 25-35min/j | 5min/j

AP intensité modérée

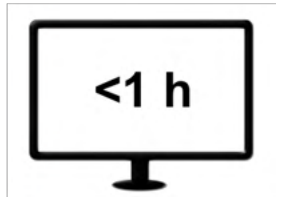
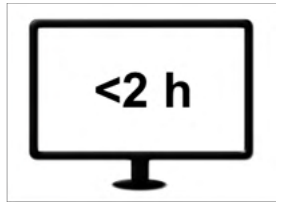
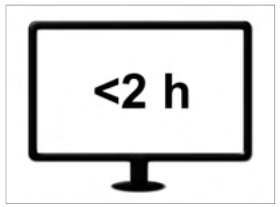
Physical activity
Physical inactivity
Sedentary behaviors
Physical fitness

Public Health & prevention

Recommendations

Obesity management

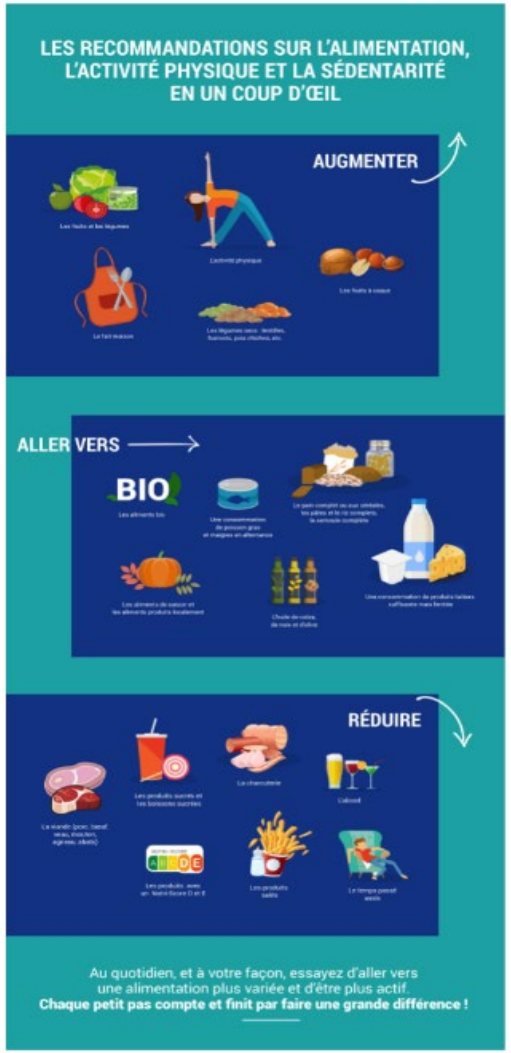
Recommendations

< 6 ans			
5-18 ans			
>18 ans			

Recommendations

< 6 ans	3 h		<1 h
5-18 ans	60min	>60%	<2 h
>18 ans	150min	>60%	<2 h

Santé publique France



Age	Type	Frequency	Benefit
< 12 months 	Supervised play Safe environments (e.g. tummy time, games with siblings to encourage reaching, grasping, pulling and pushing.)	**Daily** for 5-15 min sessions.	Supports brain development. Builds strong bones and muscles. Improves movement and co-ordination skills. Promotes social skills.
1-5 years 	Supervised games promoting reaching, stretching, crawling, running, kicking, throwing and catching	**At least** 3hr/day (short bouts of 10-20 minutes)	Builds strong hearts, bones and muscles. Improves balance and co-ordination skills. Helps achieve and maintain a healthy weight. Encourage self-confidence and independence.

Age	Type	Frequency	Benefit
5-12 years 	MVPA With impacts to promote bone health (e.g. skipping, jumping, running & dancing).	**At least 60 min/day** **At least 3 days/week high impact**	Supports concentration and learning Builds strong bones and muscles. Improves movement and co-ordination skills Improves balance and co-ordination skills. Helps achieve and maintain a healthy weight. Encourage self-confidence and independence. Helps the child to make new friends and to Develop social skills.
13-17 years 	MVPA With impacts to promote bone health Active transportation Organised and non-organised sports games PE and other activities at home, school, work and in the community.	**At least 60 min/day** **At least 3 days/week high impact**	Supports concentration and learning Builds strong bones and muscles. Improves balance and co-ordination skills. Helps achieve and maintain a healthy weight. Encourage self-confidence and independence. Helps the child to make new friends and to develop social skills. Improve cardiometabolic health, Enhances mental health and wellbeing, Supports cardiorespiratory fitness

ECOG European Childhood Obesity Group

International Journal of EXERCISE SCIENCE

Invited Editorial

Physical Activity and Physical Fitness in Pediatric Obesity: What are the First Steps for Clinicians? Expert Conclusion from the 2016 ECOG Workshop

GRACE O'MALLEY[1,2], SUSANNE RING-DIMITRIOU[2,3], PAULINA NOWICKA[2,11,12], ANDREA VANIA[2,13], MARIE-LAURE FRELUT[2,4], NATHALIE FARPOUR-LAMBERT[2,5], DANIEL WEGHUBER[2,6,7], and DAVID THIVEL[2,8,9,10]

First recommended clinical steps:

1. Estimate PA level
2. Identify barriers to PA and potential fitness impairments
3. Encourage the family to meet age-appropriate PA guidelines
4. Refer the child for exercise-testing and physiotherapy as appropriate

O'Malley G & Thivel D, 2016; ECOG EBook http://ebook.ecog-obesity.eu/

thebmj

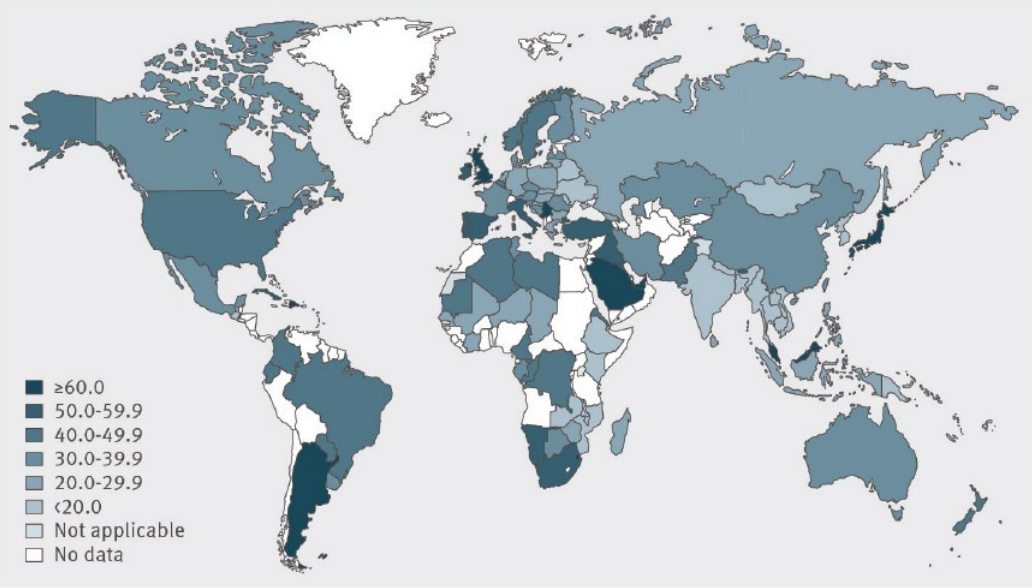
BMJ 2015;350:h23 doi: 10.1136/bmj.h23 (Published 21 January 2015)

ANALYSIS

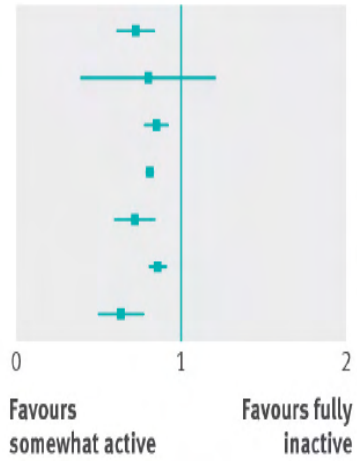
Global health agenda on non-communicable diseases: has WHO set a smart goal for physical activity?

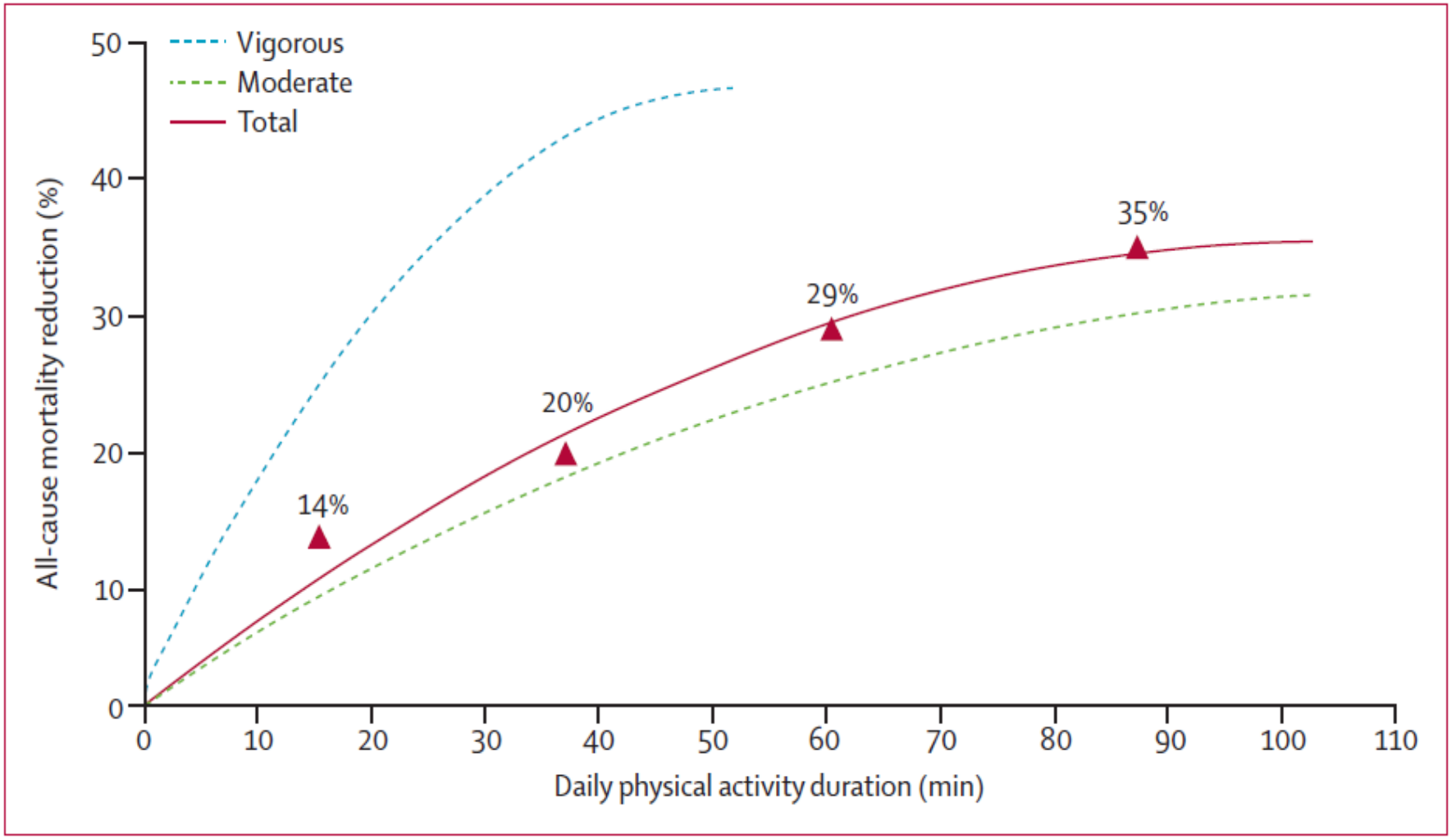
Philipe de Souto Barreto argues that, to reduce premature mortality, policies should focus on getting fully inactive people to do a little physical activity rather than strive for the entire population to meet current physical activity recommendations

Philipe de Souto Barreto *researcher*



Study	Physical activity	Effect size (95% CI)
Brown 2012	300–499 MET–min/week	0.73 (0.61 to 0.84)
Lan 2006	<500 kcal/week	0.80 (0.40 to 1.20)
Leitzmann 2007	<1h/week, moderate intensity	0.85 (0.78 to 0.92)
Moore 2012	0.1–3.74 MET–h/week	0.81 (0.79 to 0.83)
Sundquist 2004	<once/week	0.72 (0.60 to 0.84)
Wen 2011	92 min/week, moderate intensity	0.86 (0.81 to 0.91)
Wisloff 2006	once/week, >30min, light intensity	0.63 (0.50 to 0.77)





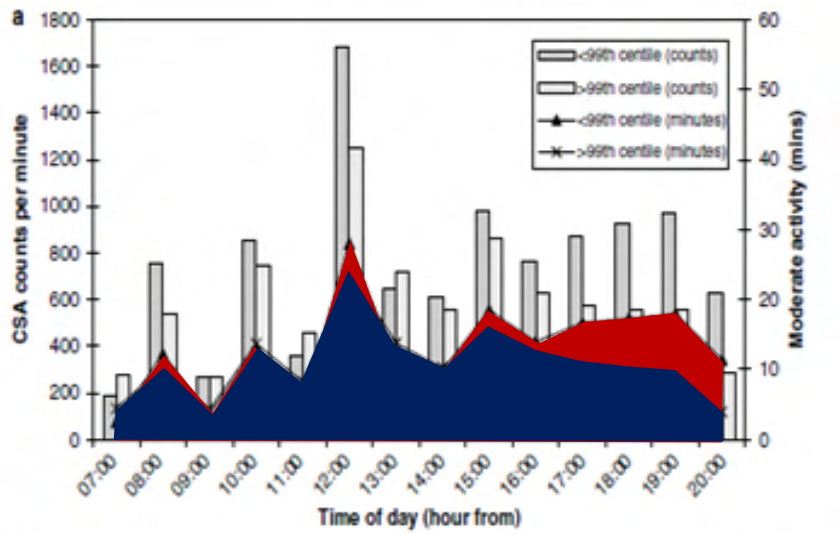
Pang wen et al. Lancet 378:1244-53, 2011

Physical activity
Physical inactivity
Sedentary behaviors
Physical fitness

Public Health

Recommendations

Obesity management



Lower PA level

Sedentariness
Physical Inactivity

Lower Physical Fitness

↑ Perceived Exertion / ↓ engagement
/ ↑ drop out

Page et al., 2005, IJO

ORIGINAL INVESTIGATION

Effect of Exercise on 24-Month Weight Loss Maintenance in Overweight Women

John M. Jakicic, PhD; Bess H. Marcus, PhD; Wei Lang, PhD; Carol Janney, MS

201 women with overweight and obesity

Interventions: ↘ intake to 1,200 to 1,500 kcal/d and ↗ PA based on dose (1,000 or 2,000 kcal/wk) and intensity (moderate or vigorous).

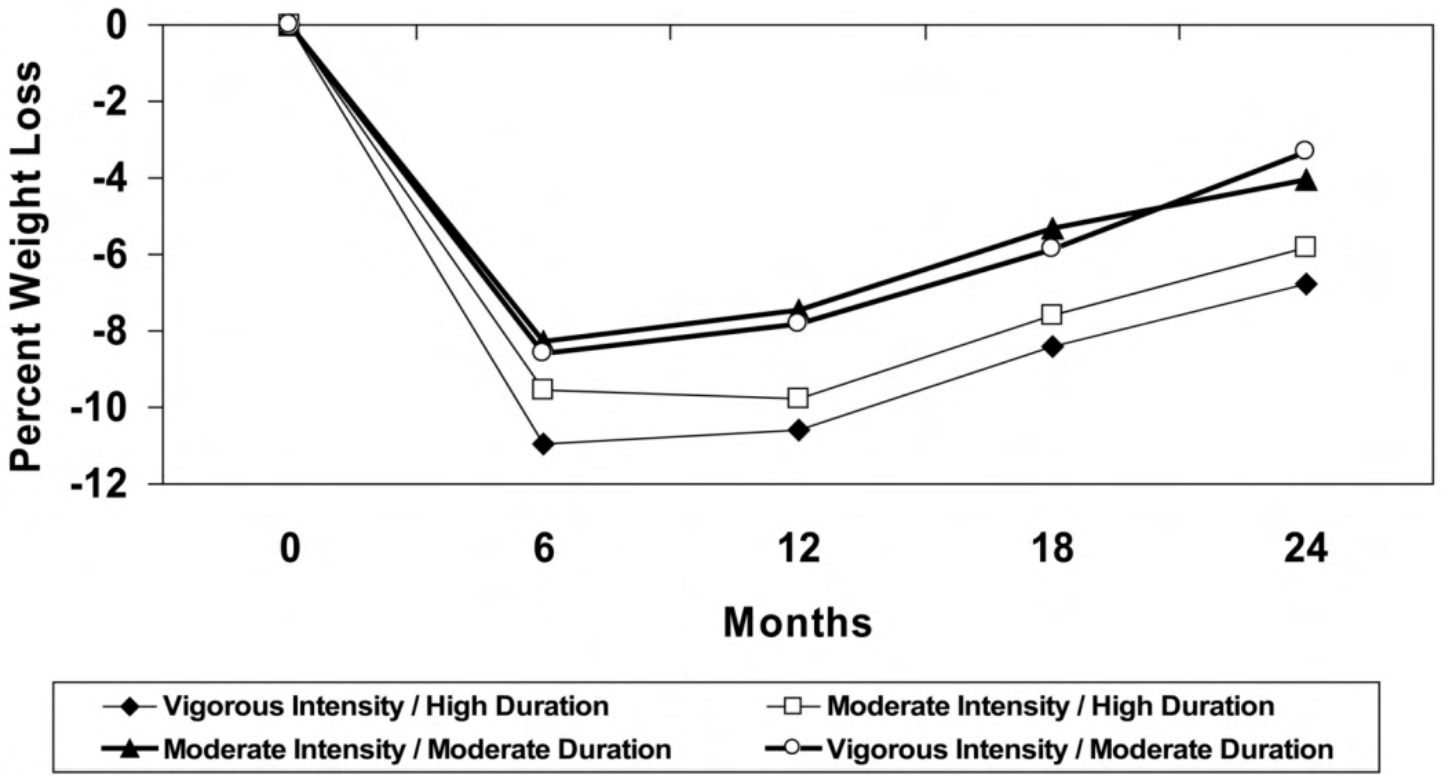


Figure 2.
Percent weight loss based on randomized group assignment (N = 191).

Jakicic et al. Arch int Med. 2008.

Original Article
EPIDEMIOLOGY/GENETICS

Obesity

Physical Activity Energy Expenditure and Total Daily Energy Expenditure in Successful Weight Loss Maintainers

Danielle M. Ostendorf[1,2], Ann E. Caldwell[1], Seth A. Creasy[2], Zhaoxing Pan[3], Kate Lyden[4], Audrey Bergouignan[1,2,5,6], Paul S. MacLean[2], Holly R. Wyatt[1], James O. Hill[1], Edward L. Melanson[2,7,8], and Victoria A. Catenacci[1,2]

Objective: The objective of this study was to compare physical activity energy expenditure (PAEE) and total daily energy expenditure (TDEE) in successful weight loss maintainers (WLM) with normal weight controls (NC) and controls with overweight/obesity (OC).
Methods: Participants were recruited in three groups: WLM ($n=25$, BMI 24.1 ± 2.3 kg/m^2; maintaining ≥ 13.6-kg weight loss for ≥ 1 year), NC ($n=27$, BMI 23.0 ± 2.0 kg/m^2; similar to current BMI of WLM), and OC ($n=28$, BMI 34.3 ± 4.8 kg/m^2; similar to pre–weight loss BMI of WLM). TDEE was measured using the doubly labeled water method. Resting energy expenditure (REE) was measured using indirect calorimetry. PAEE was calculated as (TDEE – [0.1 × TDEE] – REE).
Results: PAEE in WLM (812 ± 268 kcal/d, mean ± SD) was significantly higher compared with that in both NC (621 ± 285 kcal/d, $P<0.01$) and OC (637 ± 271 kcal/d, $P=0.02$). As a result, TDEE in WLM (2,495 ± 366 kcal/d) was higher compared with that in NC (2,195 ± 521 kcal/d, $P=0.01$) but was not significantly different from that in OC (2,573 ± 391 kcal/d).
Conclusions: The high levels of PAEE and TDEE observed in individuals maintaining a substantial weight loss (–26.2 ± 9.8 kg maintained for 9.0 ± 10.2 years) suggest that this group relies on high levels of energy expended in physical activity to remain in energy balance (and avoid weight regain) at a reduced body weight.

Obesity (2019) **27**, 496-504. doi:10.1002/oby.22373

Introduction

Changes in energy expenditure that occur with weight loss have been suggested to contribute to the propensity for weight regain after weight loss. Total daily energy expenditure (TDEE) declines with weight loss because of decreases in both resting energy expenditure (REE) and physical activity (PA) energy expenditure (PAEE) that result primarily from the reduction in body mass (1). Some evidence suggests that substantial weight loss may also generate additional decreases in REE and TDEE beyond that expected based on changes in body weight and/

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See Commentary, pg. 361.

Funding agencies: This work was supported by grants from the National Institutes of Health (NIH K23 DK078913, P30 DK048520, NIH UL1 TR002535, NIH T32 HL116276, NIH K99 DK100465, and NIH R00 DK100465) as well as from the American Heart Association (AHA 16PRE29660012). The contents do not represent the views of the US Department of Veterans Affairs or the US Government.

Disclosure: JOH and HRW are partners in Shakabuku LLC, a company that provides weight management services, outside the submitted work; JOH and HRW have been issued a patent on the "Energy Gap" (US Patent #7,949,508). JOH and HRW received clinical trial grant funding from Novo Nordisk and Gelesis. JOH and HRW received clinical trial grant funding and received payment for speaking for the Cattleman's Beef Association. JOH and HRW report stock options from Retrofit, a company that provides weight management services. JOH serves as a consultant for Zaluvida, Gelesis, and Livongo. HRW accepted personal fees as an advisory board member for Atkins, a low-carbohydrate weight loss program, during the time frame of the study presented. KL is a paid consultant for PAL Technologies, the company that manufactures the device used to measure physical activity in this study. The other authors declared no conflict of interest.

Author contributions: VAC, HRW, and JOH conceived of and designed the study and obtained funding. VAC wrote the protocol and acquired the data. ZP and DMO performed the statistical analysis. DMO, AEC, SAC, ZP, KL, PSM, AB, HRW, JOH, ELM, and VAC interpreted the data. DMO, AEC, SAC, and VAC drafted the manuscript. DMO generated tables and figures. All authors were involved in writing and revising the manuscript and approved the final version of the manuscript.

Clinical trial registration: ClinicalTrials.gov Identifier NCT03422380.

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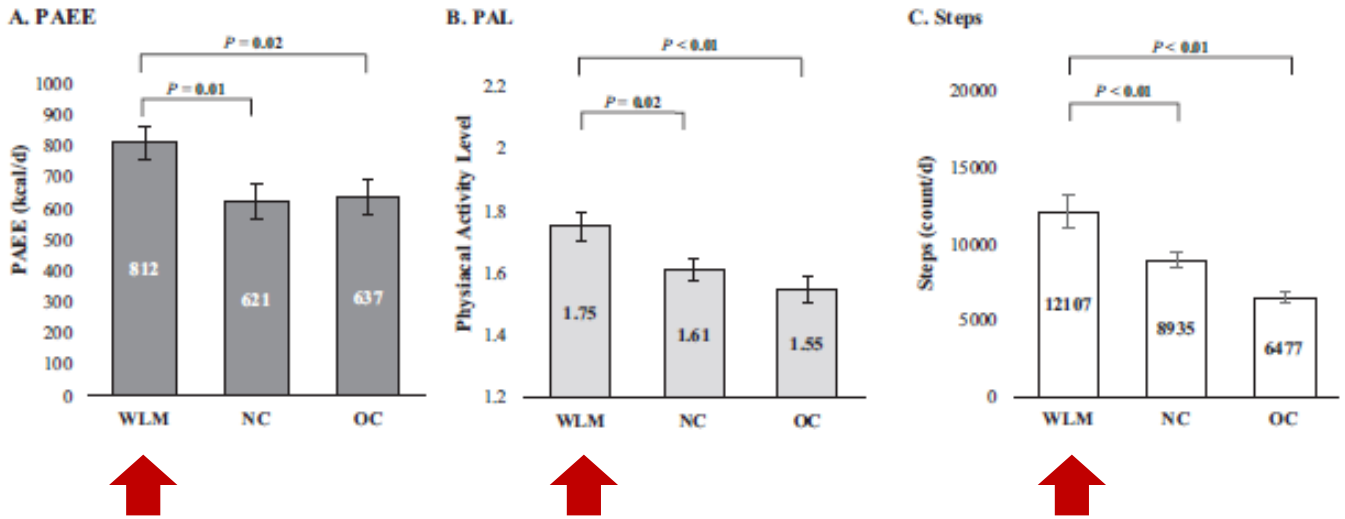


Received: 29 January 2021 | Revised: 13 May 2021 | Accepted: 15 May 2021
DOI: 10.1111/obr.13296

SUPPLEMENT ARTICLE

OBESITY Reviews WILEY

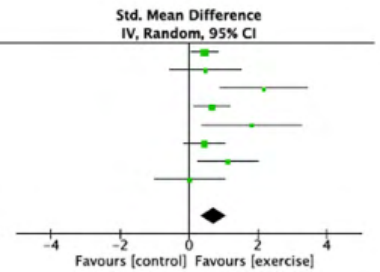
Effect of exercise training before and after bariatric surgery: A systematic review and meta-analysis

Alice Bellicha[1,2] | Marleen A. van Baak[3] | Francesca Battista[4] | Kristine Beaulieu[5] | John E. Blundell[5] | Luca Busetto[6,7] | Eliana V. Carraça[8] | Dror Dicker[6,9] | Jorge Encantado[10] | Andrea Ermolao[4] | Nathalie Farpour-Lambert[6,11] | Adriyan Pramono[3] | Euan Woodward[6] | Jean-Michel Oppert[12]

(A) Change in VO_2max

Study or Subgroup	Weight	Std. Mean Difference IV, Random, 95% CI
Coen (b)	23.5%	0.44 [0.05, 0.84]
Huck	8.7%	0.47 [−0.56, 1.50]
Marchesi	6.3%	2.16 [0.89, 3.43]
Mundbjerg (b)	19.3%	0.66 [0.14, 1.18]
Onofre	5.1%	1.82 [0.38, 3.26]
Oppert	17.2%	0.45 [−0.14, 1.04]
Shah	10.9%	1.13 [0.25, 2.01]
Stegen	8.9%	0.02 [−0.99, 1.04]
Total (95% CI)	**100.0%**	**0.70 [0.35, 1.06]**

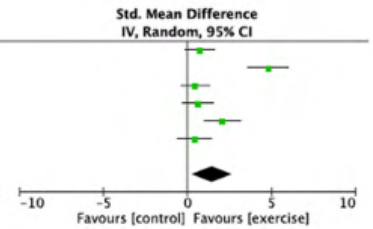
Heterogeneity: $Tau^2 = 0.10$; $Chi^2 = 12.09$, df = 7 (P = 0.10); $I^2 = 42\%$
Test for overall effect: Z = 3.89 (P < 0.0001)



(B) Change in walking test distance

Study or Subgroup	Weight	Std. Mean Difference IV, Random, 95% CI
Castello	17.1%	0.72 [−0.17, 1.62]
Coleman	15.8%	4.79 [3.58, 5.99]
Hassannejad (a)	17.2%	0.44 [−0.41, 1.28]
Hassannejad (b)	17.0%	0.61 [−0.30, 1.51]
Herring	16.3%	2.07 [0.96, 3.17]
Stegen	16.6%	0.40 [−0.62, 1.43]
Total (95% CI)	**100.0%**	**1.46 [0.27, 2.66]**

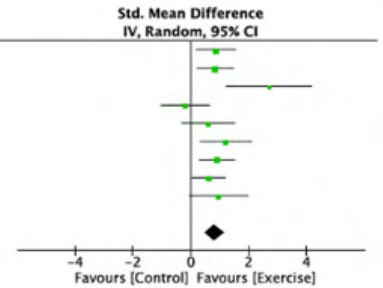
Heterogeneity: $Tau^2 = 1.98$; $Chi^2 = 44.67$, df = 5 (P < 0.00001); $I^2 = 89\%$
Test for overall effect: Z = 2.40 (P = 0.02)



(C) Change in muscle strength

Study or Subgroup	Weight	Std. Mean Difference IV, Random, 95% CI
Campanha-Versiani	13.3%	0.88 [0.20, 1.55]
Coleman	14.6%	0.84 [0.22, 1.46]
Daniels	4.6%	2.71 [1.25, 4.17]
Hassannejad (a)	10.5%	−0.20 [−1.04, 0.63]
Hassannejad (b)	9.4%	0.62 [−0.29, 1.53]
Herring	9.8%	1.21 [0.33, 2.09]
Mundbjerg (b)	14.9%	0.90 [0.30, 1.51]
Oppert	15.0%	0.61 [0.01, 1.21]
Stegen	8.0%	0.96 [−0.06, 1.98]
Total (95% CI)	**100.0%**	**0.82 [0.48, 1.16]**

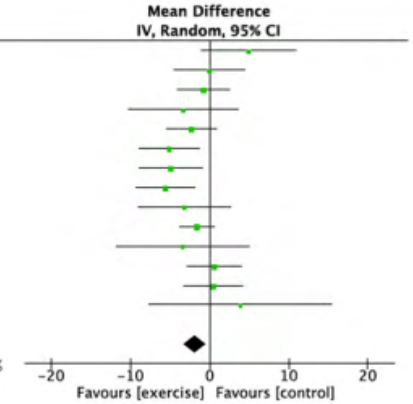
Heterogeneity: $Tau^2 = 0.11$; $Chi^2 = 13.75$, df = 8 (P = 0.09); $I^2 = 42\%$
Test for overall effect: Z = 4.69 (P < 0.00001)



(A) Change in body weight (in kg)

Study or Subgroup	Weight	Mean Difference IV, Random, 95% CI
Campanha-Versiani	4.3%	4.90 [−1.10, 10.90]
Castello	6.7%	0.00 [−4.49, 4.49]
Coen (a)	9.9%	−0.80 [−4.06, 2.46]
Coleman	3.4%	−3.28 [−10.21, 3.65]
Daniels	10.3%	−2.30 [−5.45, 0.85]
Hassannejad (a)	8.3%	−5.10 [−8.89, −1.31]
Hassannejad (b)	7.8%	−4.90 [−8.87, −0.93]
Herring	8.7%	−5.60 [−9.26, −1.94]
Huck	4.4%	−3.20 [−9.08, 2.68]
Mundbjerg (a)	14.2%	−1.60 [−3.79, 0.59]
Onofre	2.5%	−3.40 [−11.72, 4.92]
Oppert	9.4%	0.60 [−2.83, 4.03]
Shah	8.6%	0.50 [−3.20, 4.20]
Stegen	1.4%	3.90 [−7.61, 15.41]
Total (95% CI)	**100.0%**	**−1.81 [−3.20, −0.43]**

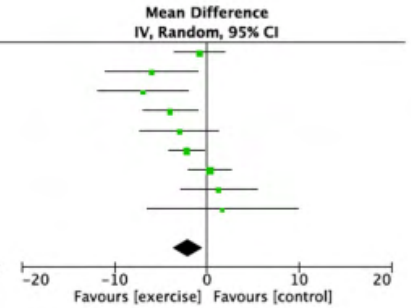
Heterogeneity: $Tau^2 = 2.28$; $Chi^2 = 20.14$, df = 13 (P = 0.09); $I^2 = 35\%$
Test for overall effect: Z = 2.56 (P = 0.01)
95% Prediction Intervals: (-5.4, 1.8)



(B) Change in fat mass (in kg)

Study or Subgroup	Weight	Mean Difference IV, Random, 95% CI
Coen (a)	14.6%	−0.80 [−3.54, 1.94]
Hassannejad (a)	7.3%	−6.00 [−11.04, −0.96]
Hassannejad (b)	7.6%	−6.90 [−11.80, −2.00]
Herring	13.6%	−4.00 [−6.98, −1.02]
Huck	9.1%	−3.00 [−7.29, 1.29]
Marchesi	18.3%	−2.22 [−4.18, −0.26]
Oppert	16.5%	0.30 [−2.04, 2.64]
Shah	9.6%	1.29 [−2.84, 5.42]
Stegen	3.4%	1.70 [−6.50, 9.90]
Total (95% CI)	**100.0%**	**−2.08 [−3.70, −0.45]**

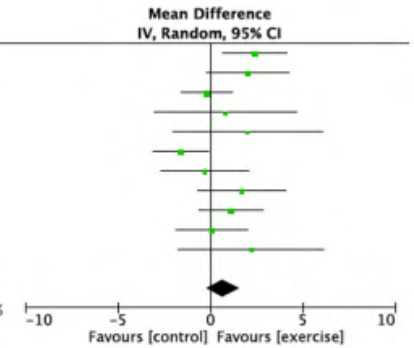
Heterogeneity: $Tau^2 = 2.76$; $Chi^2 = 15.86$, df = 8 (P = 0.04); $I^2 = 50\%$
Test for overall effect: Z = 2.50 (P = 0.01)



(C) Change in lean body mass (in kg)

Study or Subgroup	Weight	Mean Difference IV, Random, 95% CI
Campanha-Versiani	11.8%	2.40 [0.66, 4.14]
Castello	9.1%	2.00 [−0.23, 4.23]
Coen (a)	14.2%	−0.20 [−1.59, 1.19]
Hassannejad (a)	4.2%	0.80 [−3.07, 4.67]
Hassannejad (b)	3.9%	2.00 [−2.05, 6.05]
Herring	13.4%	−1.60 [−3.10, −0.10]
Huck	8.4%	−0.30 [−2.68, 2.08]
Marchesi	8.4%	1.70 [−0.68, 4.08]
Oppert	11.8%	1.10 [−0.64, 2.84]
Shah	10.6%	0.10 [−1.84, 2.04]
Stegen	4.1%	2.20 [−1.72, 6.12]
Total (95% CI)	**100.0%**	**0.68 [−0.20, 1.56]**

Heterogeneity: $Tau^2 = 0.92$; $Chi^2 = 18.12$, df = 10 (P = 0.05); $I^2 = 45\%$
Test for overall effect: Z = 1.52 (P = 0.13)
95% Prediction Intervals: (-1.7, 3.1)

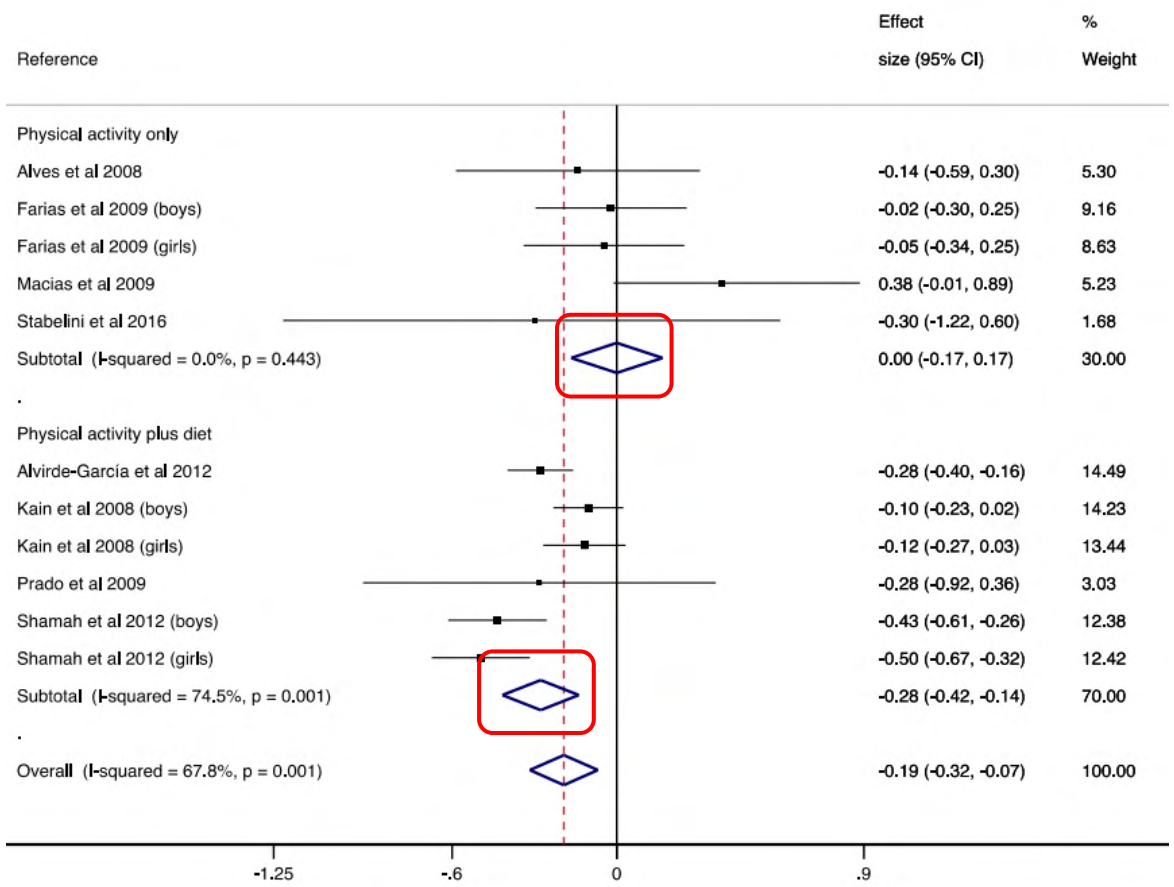


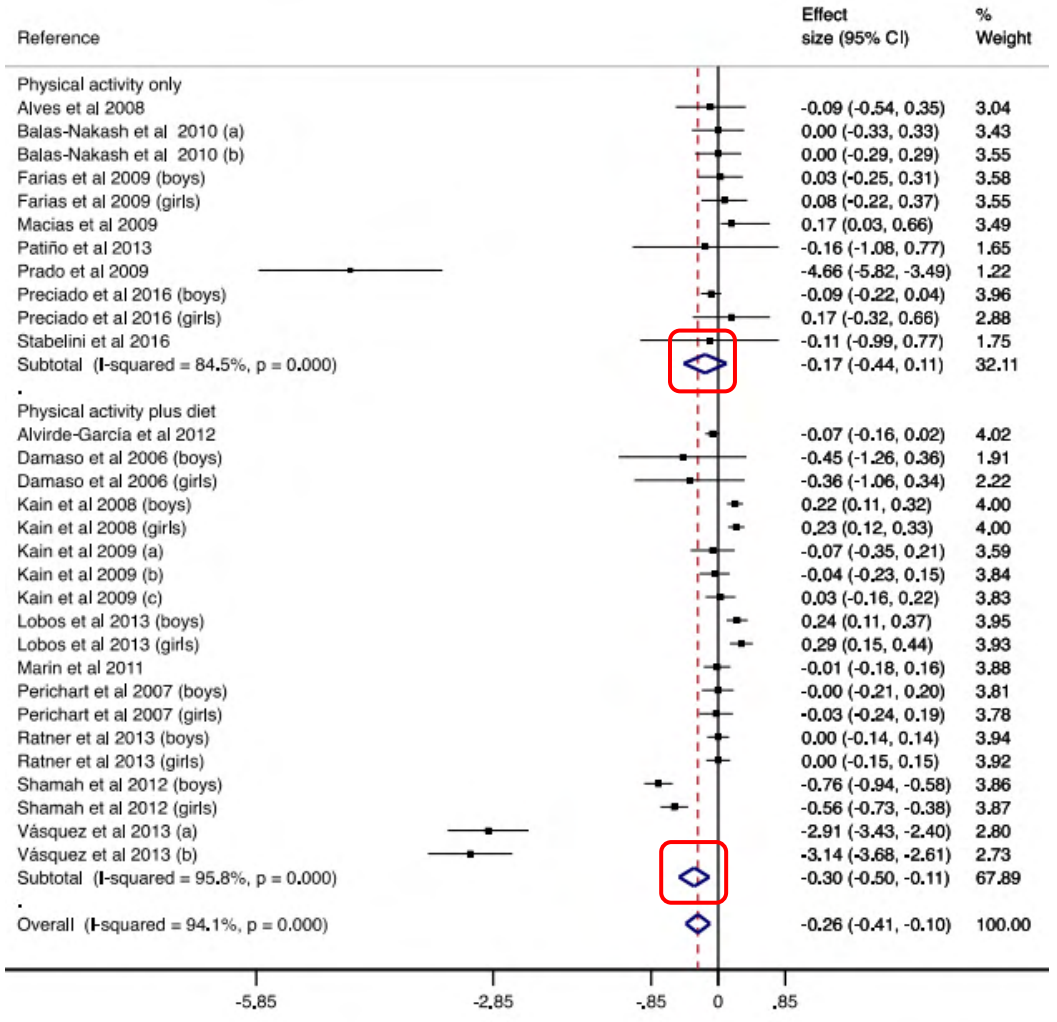
Review

The Effects of Physical Activity and Diet Interventions on Body Mass Index in Latin American Children and Adolescents: A Systematic Review and Meta-Analysis

Andrés Godoy-Cumillaf [1], Paola Fuentes-Merino [1], Armando Díaz-González [2], Judith Jiménez-Díaz [3], Vicente Martínez-Vizcaíno [4], Celia Álvarez-Bueno [4,5,*] and Iván Cavero-Redondo [4,5]

2020;12(5):1378.



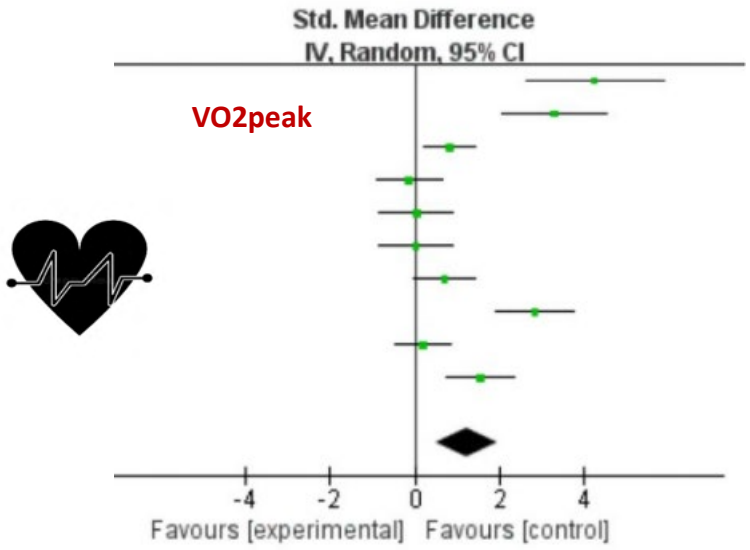


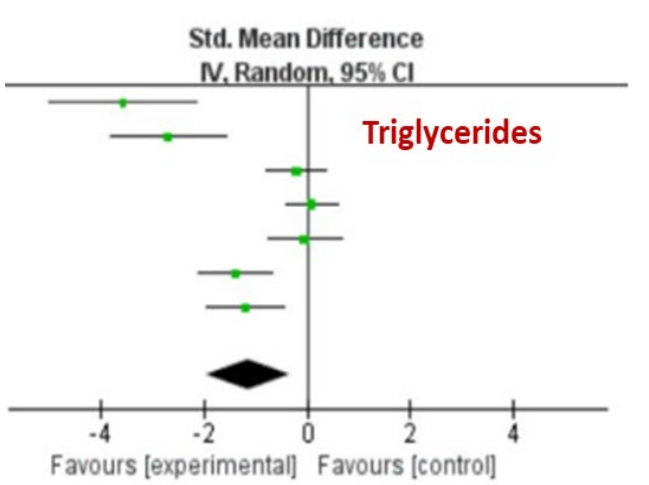
PLOS ONE | https://doi.org/10.1371/journal.pone.0257150 September 20, 2021

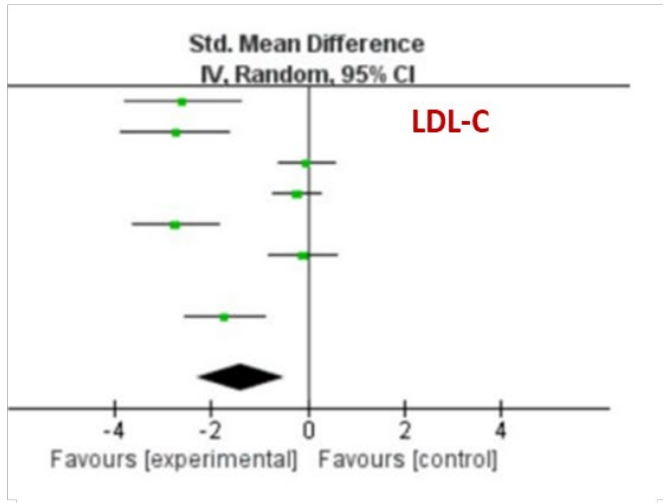
RESEARCH ARTICLE

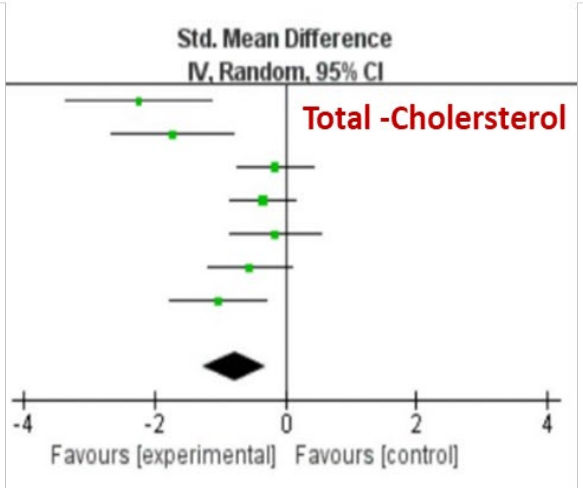
Effects of aerobic exercise and resistance exercise on physical indexes and cardiovascular risk factors in obese and overweight school-age children: A systematic review and meta-analysis

Tianhao Chen[1☯], Jingxia Lin[1☯], Yuzhe Lin[1‡], Lin Xu[1‡], Dian Lu[1‡], Fangping Li[2‡], Lihao Hou[3‡], Clare Chung Wah Yu[1*]









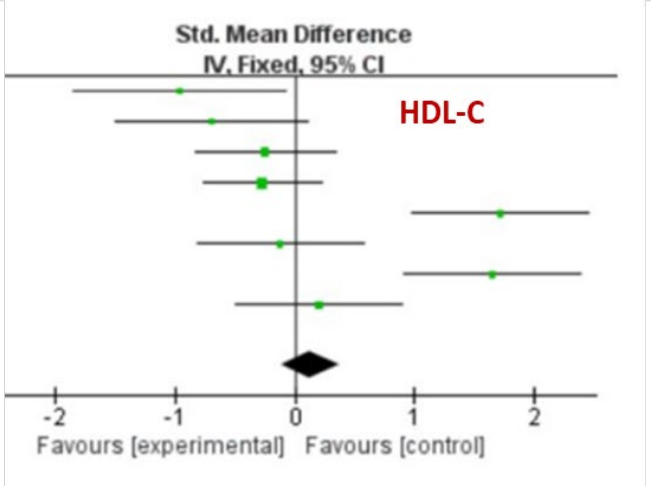
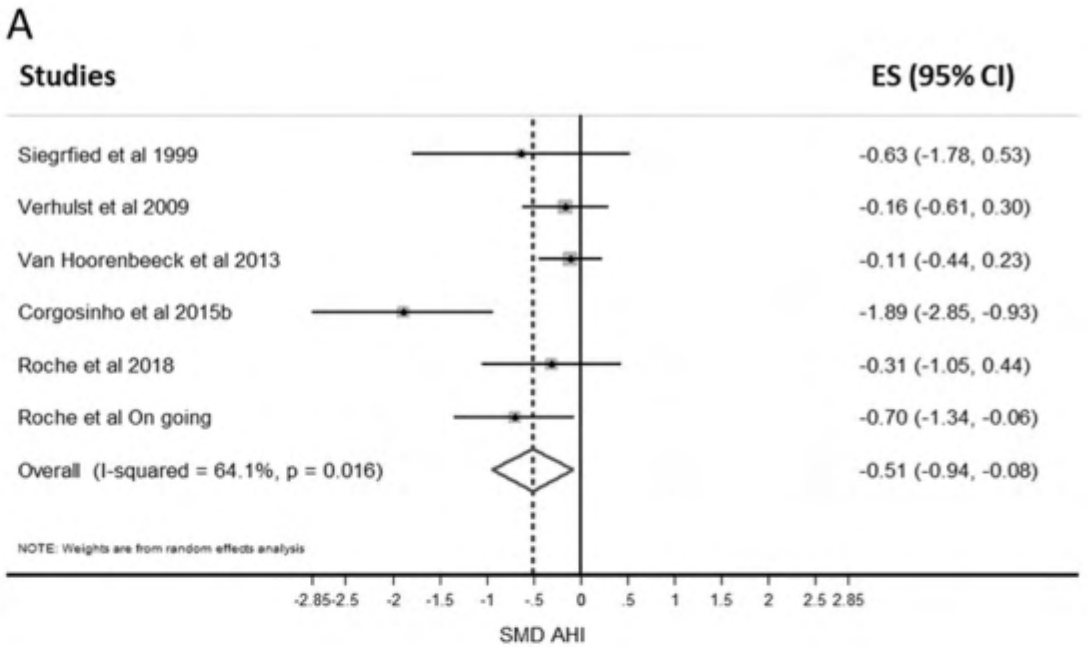
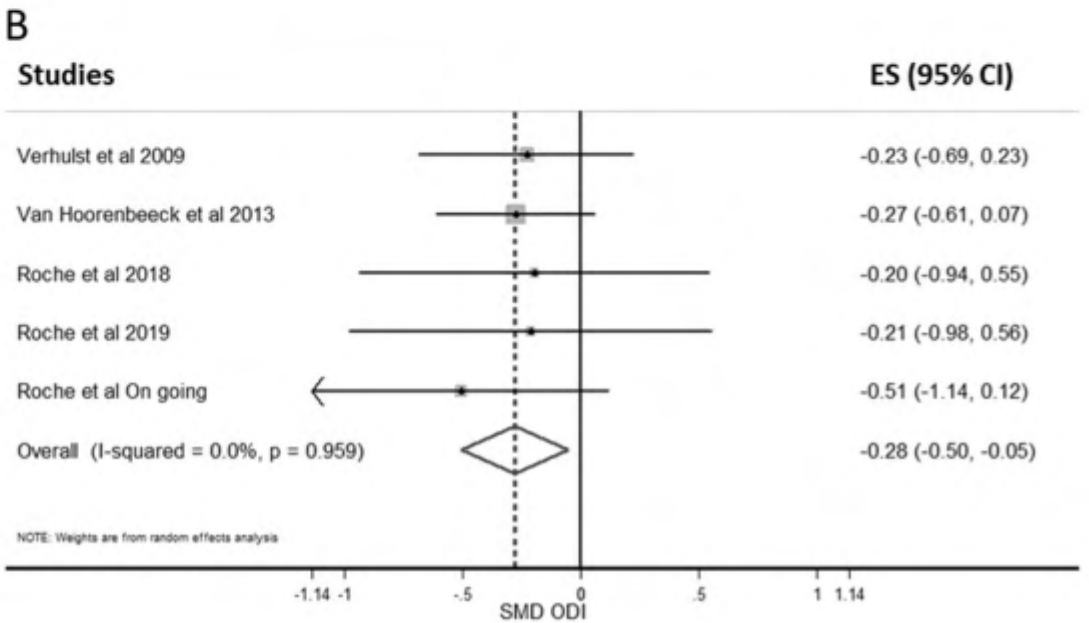


Fig. 2 Effect size forest plot for the **a** apnea–hypopnea index (AHI) and **b** oxygen desaturation index (ODI) changes in response to the multidisciplinary weight loss intervention (mean ± 95% confidence intervals)





International Journal of Obesity (2020) 44:753–770
https://doi.org/10.1038/s41366-019-0497-7

REVIEW ARTICLE

Pediatrics

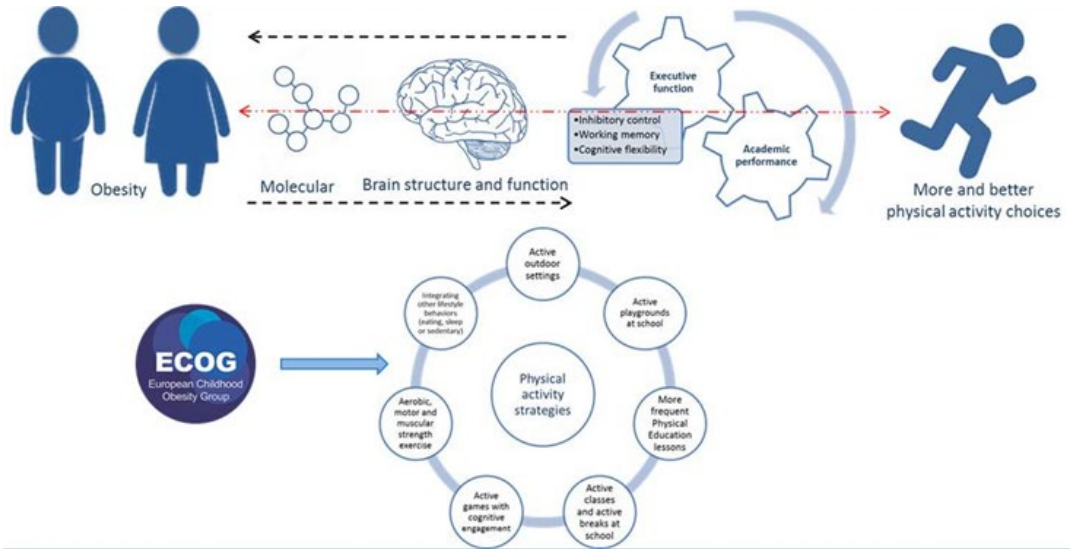
Are obstructive sleep apnea and sleep improved in response to multidisciplinary weight loss interventions in youth with obesity? A systematic review and meta-analysis

Johanna Roche[1,2,3] · Laurie Isacco[2] · Julie Masurier[4] · Bruno Pereira[5] · Fabienne Mougin[2] · Jean-Philippe Chaput[6,7] · David Thivel[1,8]

Pediatric Obesity, 2019

Pediatric obesity and brain functioning: the role of physical activity – A novel and important expert opinion of the European Childhood Obesity Group.

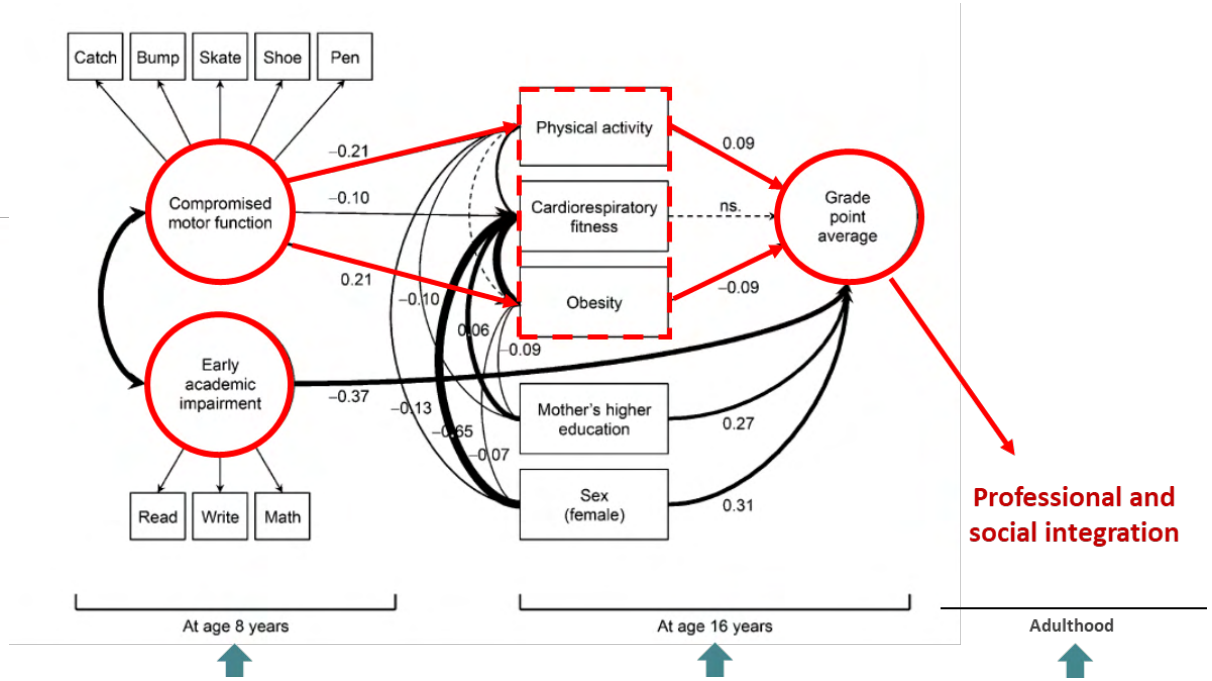
Esteban-Cornejo I, Reilly JJ, Ortega FB, Matusik P, Mazur A, Erhardt E, Forslund A, Vlachopapadopoulou E, Caroli M, Boyland E, Weghuber D, Thivel D.



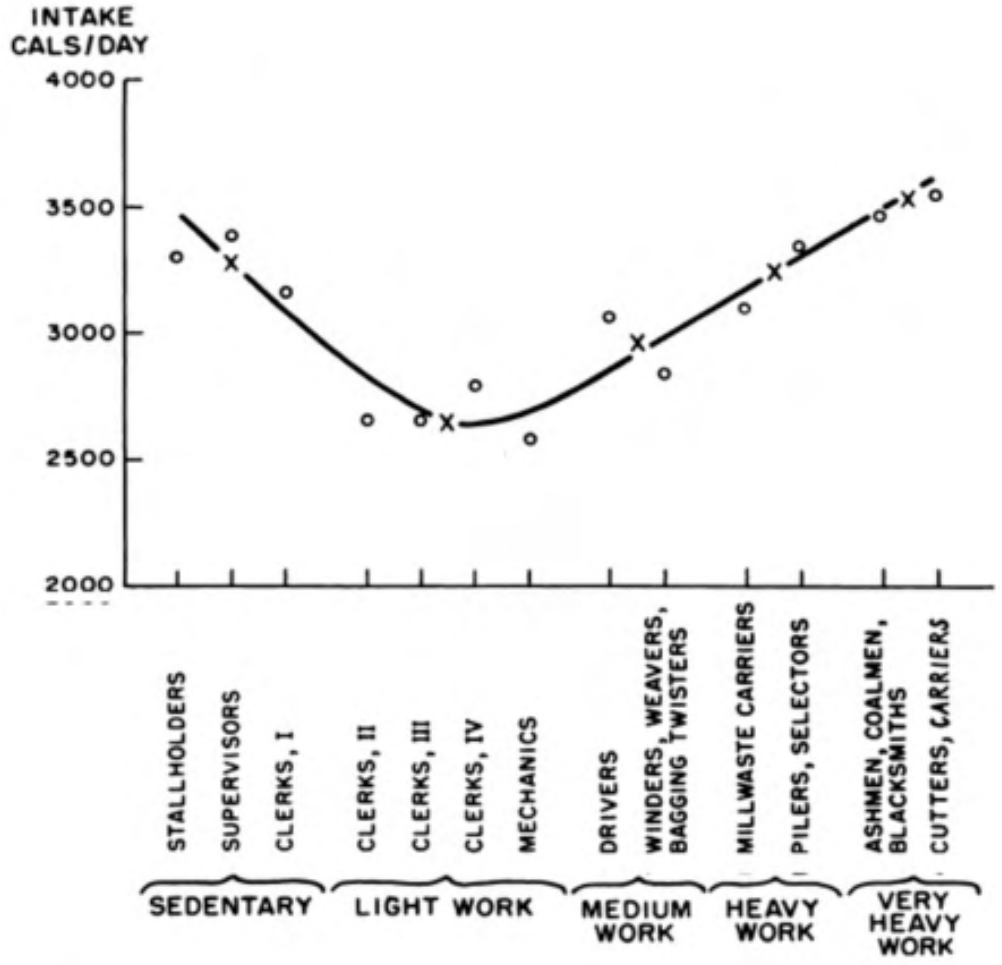
PNAS | January 29, 2013 | vol. 110 | no. 5 | 1917–1922

Physical activity and obesity mediate the association between childhood motor function and adolescents' academic achievement

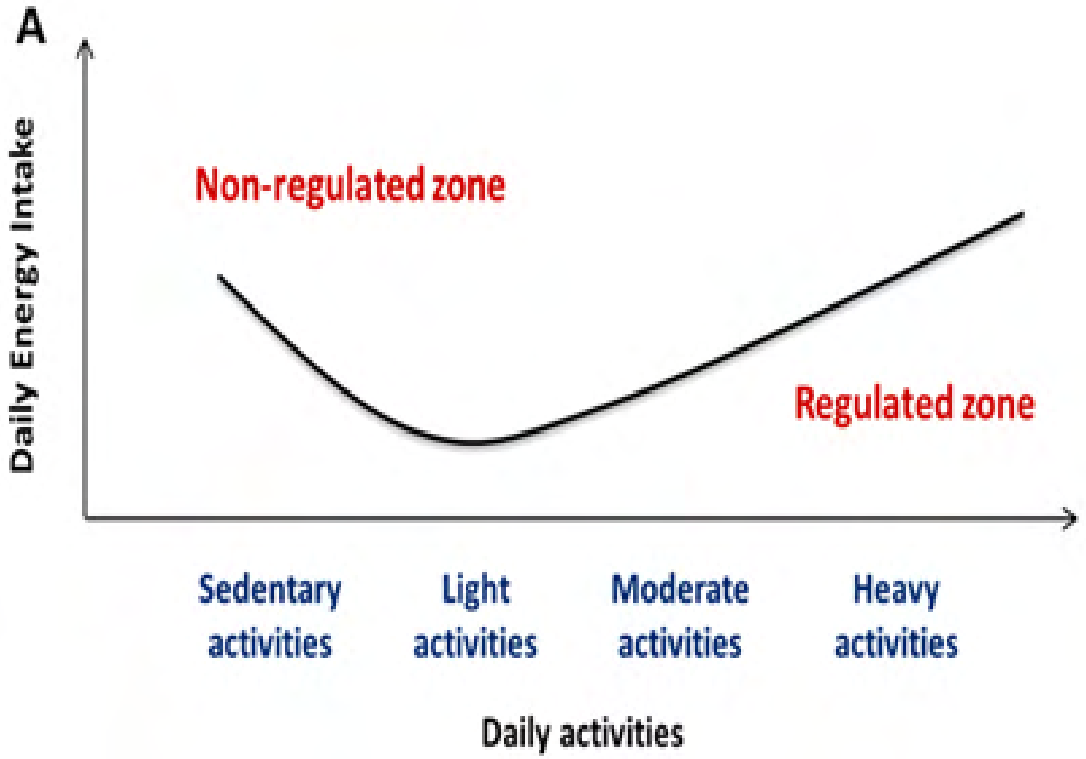
Marko T. Kantomaa[a,b,1], Emmanuel Stamatakis[c,d], Anna Kankaanpää[a], Marika Kaakinen[e,f], Alina Rodriguez[b,g,h], Anja Taanila[e,i], Timo Ahonen[j], Marjo-Riitta Järvelin[b,e,f], and Tuija Tammelin[a]

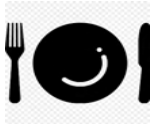


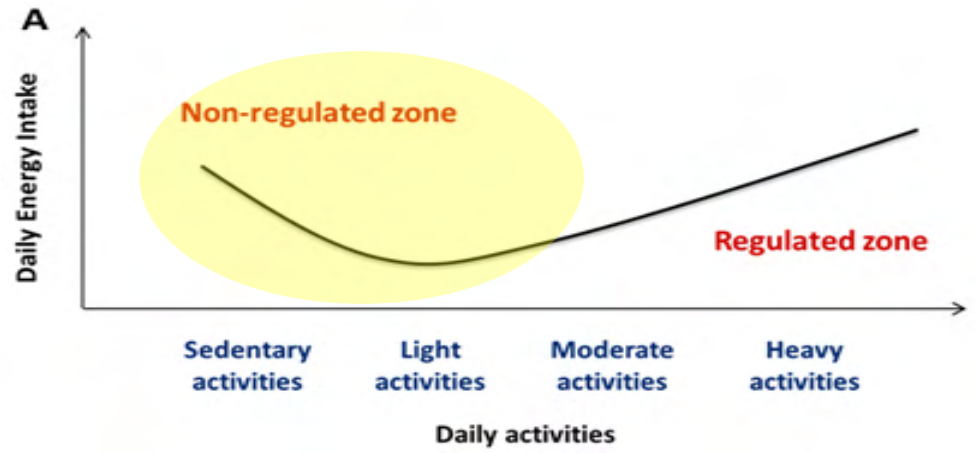
Mayer et al., 1956

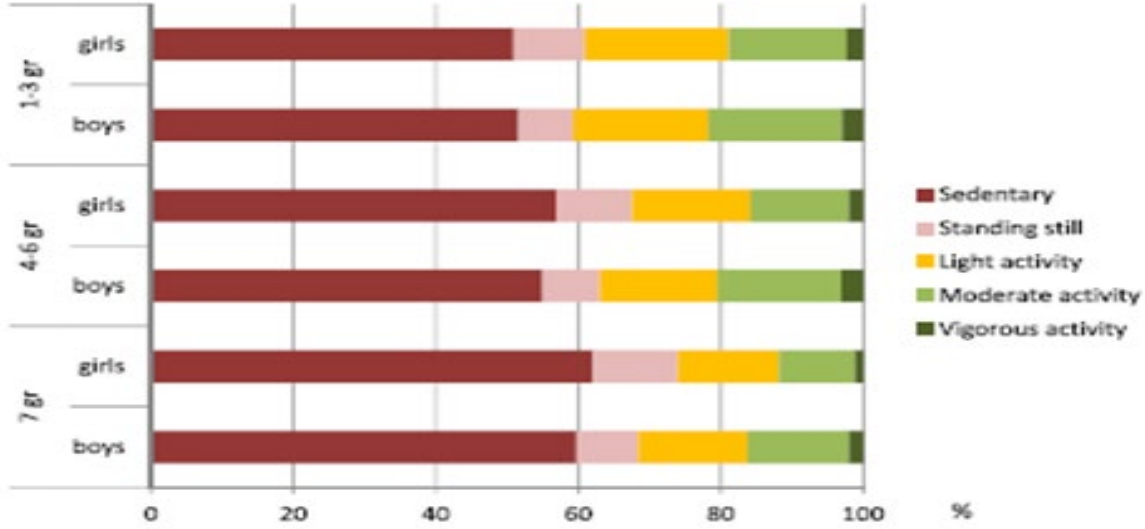


Taylor J, 1974

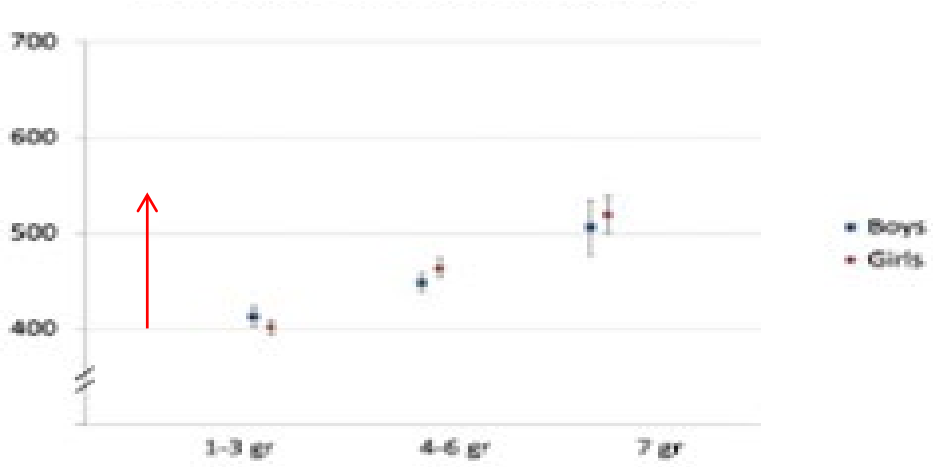




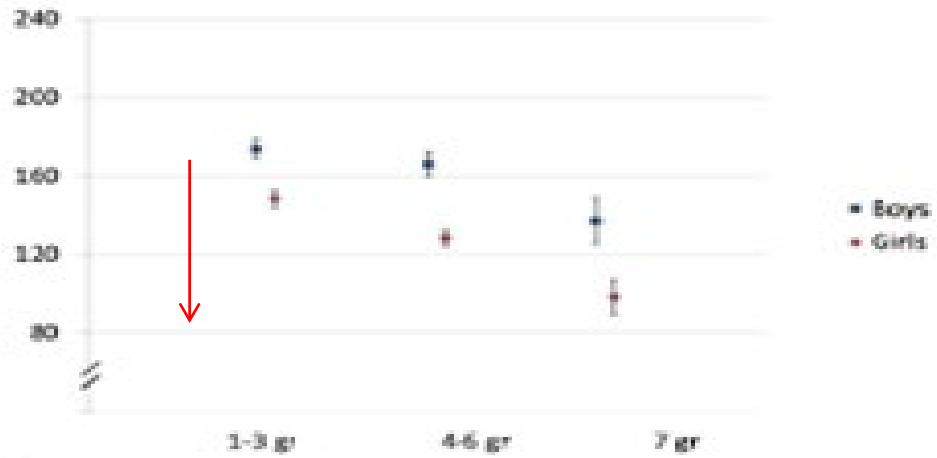


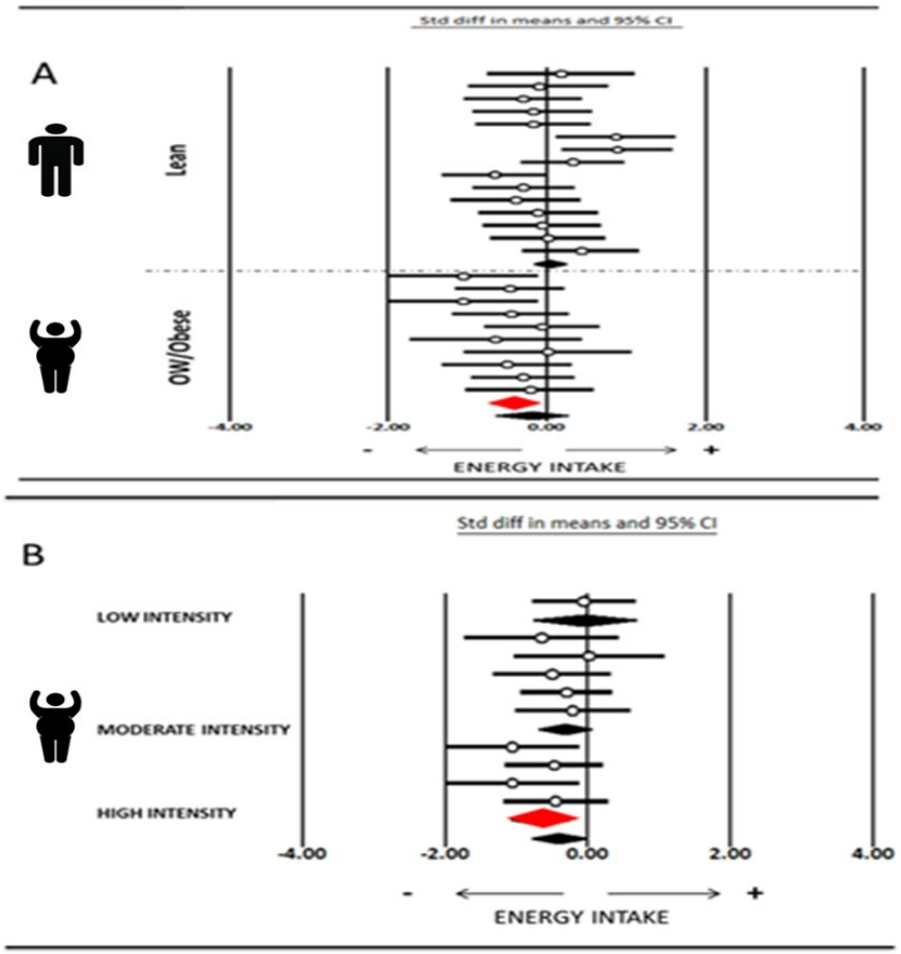


Sedentary Behaviors, min/day

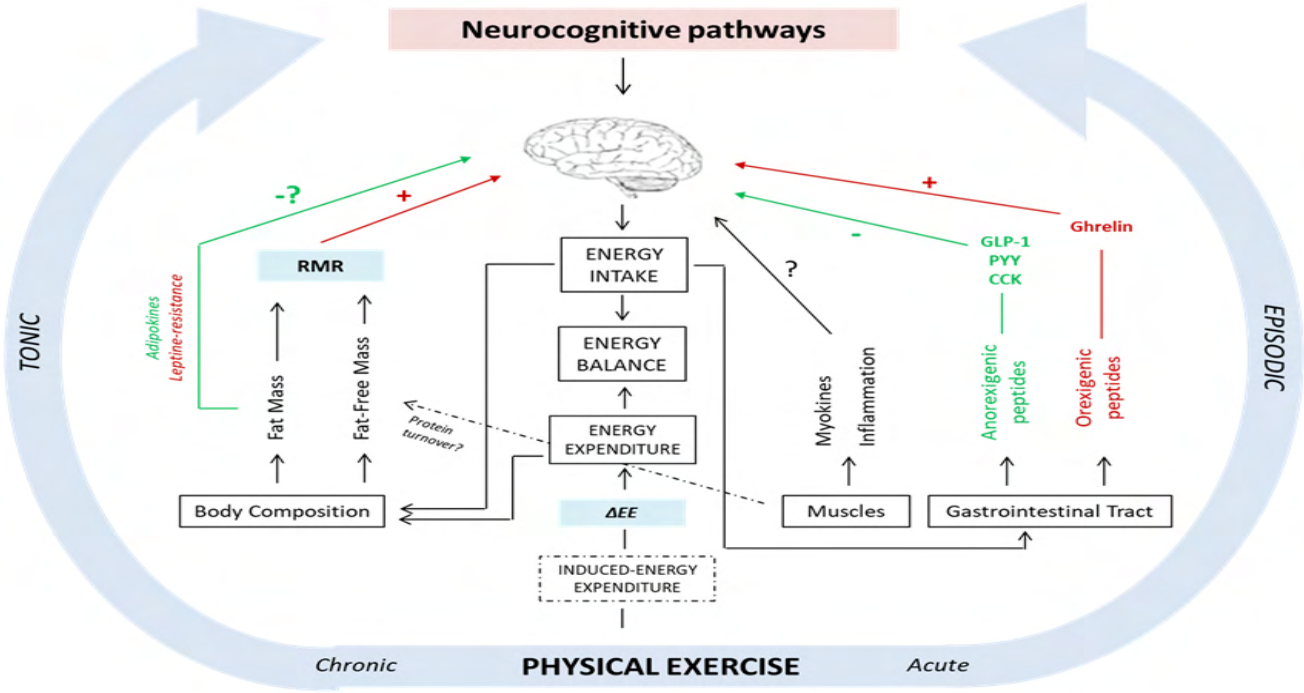


MVPA, min/day

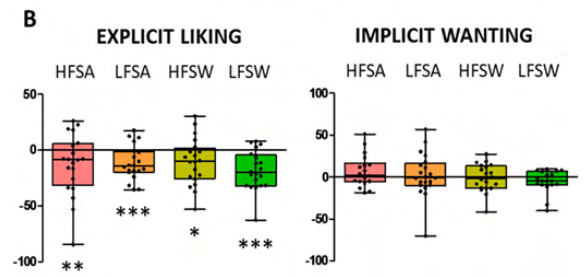




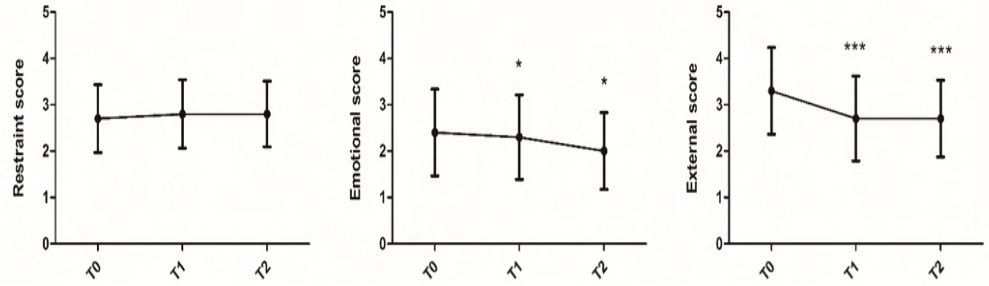
IJO; 2016



Obesity Reviews, 2019



Miguet et al., 2020



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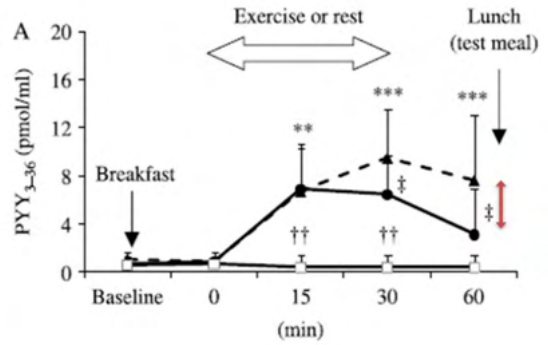
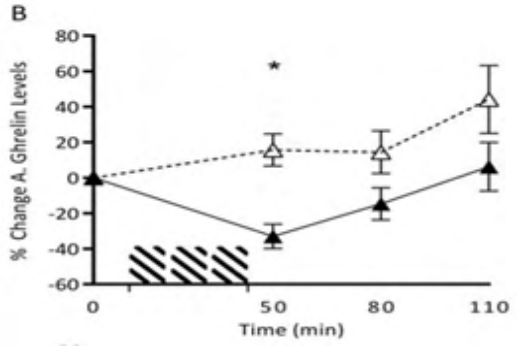
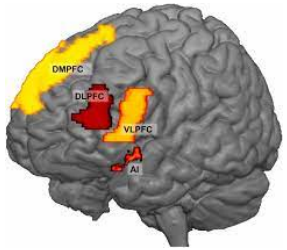
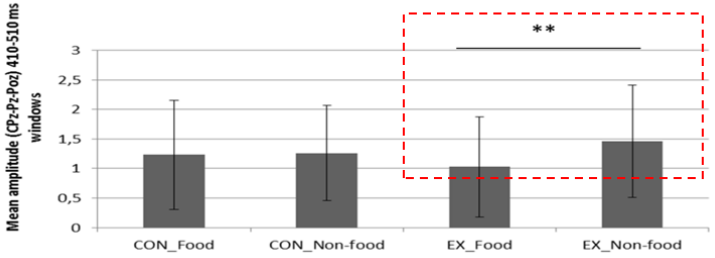


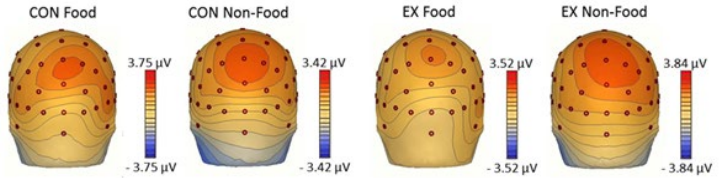
Ueda et al., 2009



Hunschede, et al., 2019







Fearnbach et al., 2016 & 2017

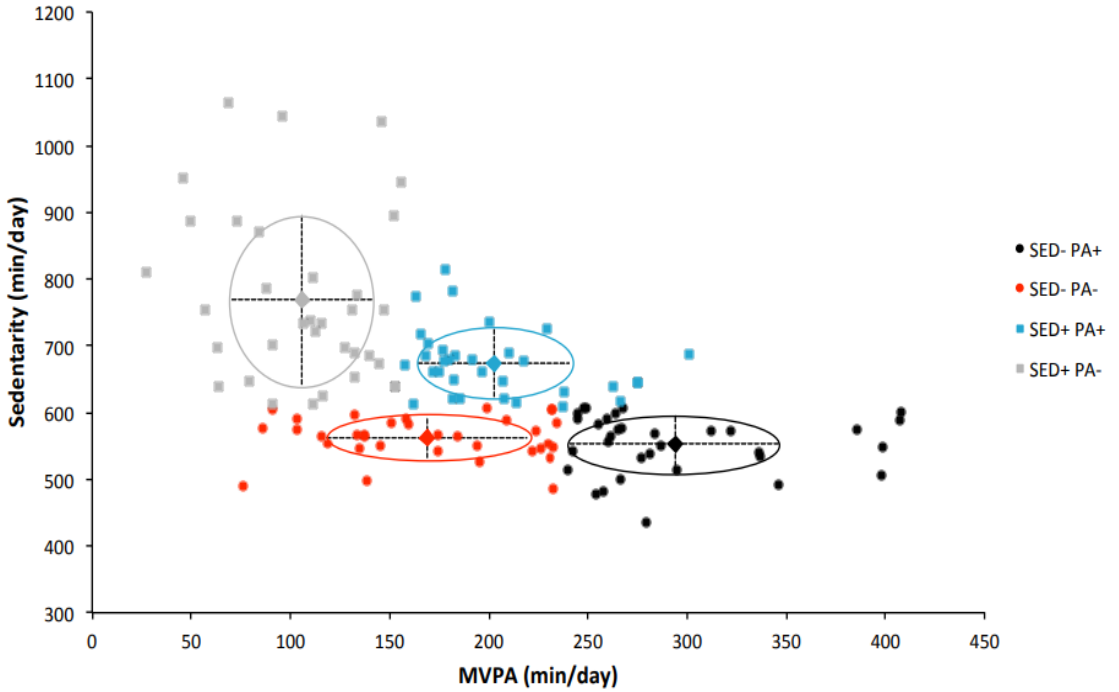
What about Sedentary behaviors?

ORIGINAL RESEARCH

Pediatric OBESITY WILEY

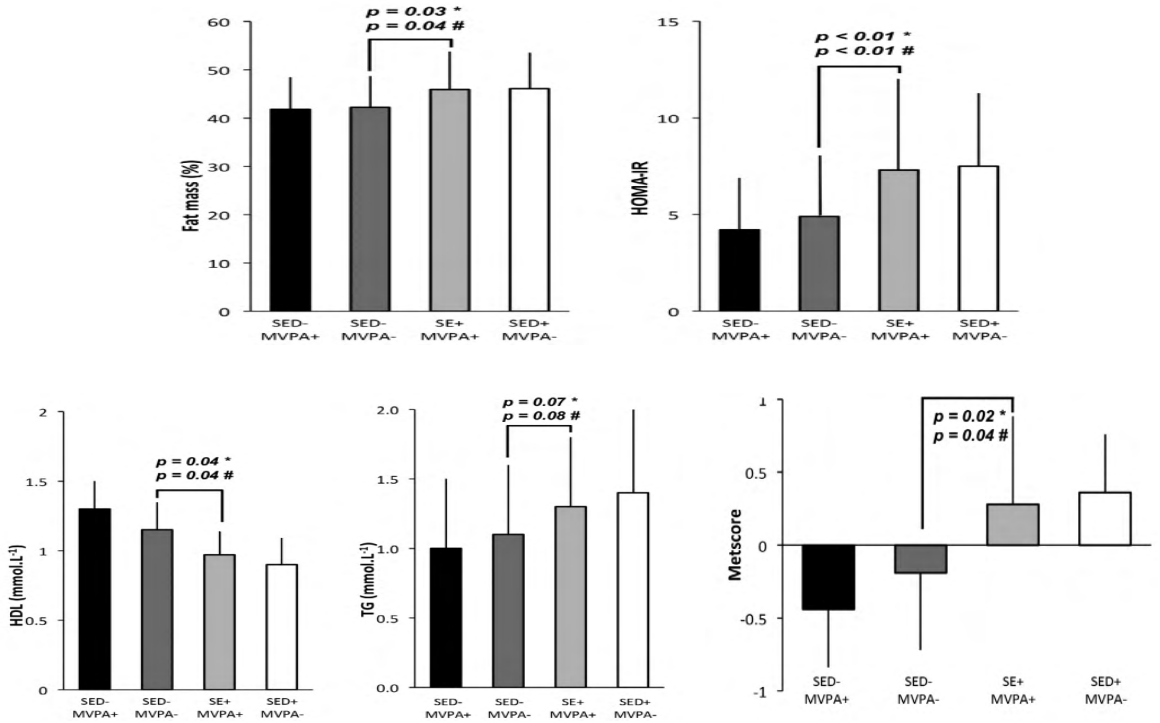
Sedentary time has a stronger impact on metabolic health than moderate to vigorous physical activity in adolescents with obesity: a cross-sectional analysis of the Beta-JUDO study

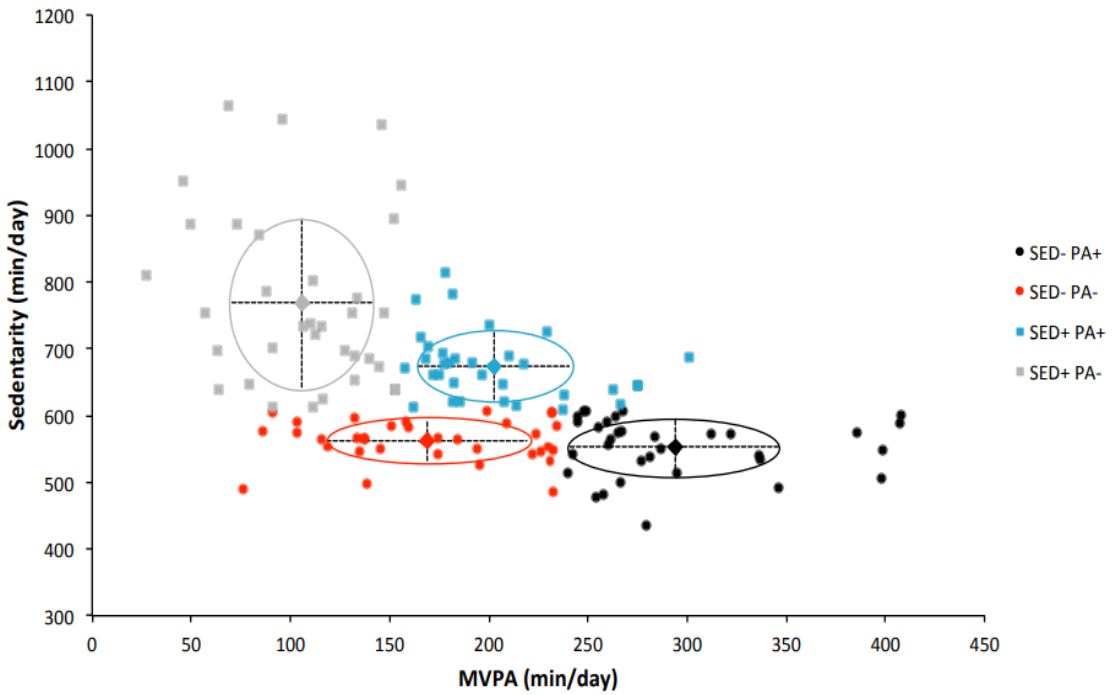
Valérie Julian[1,2] | Peter Bergsten[3] | Anders Forslund[4] | Hakan Ahlstrom[5,6] | Iris Ciba[4] | Marie Dahlbom[4] | Dieter Furthner[7,8] | Julian Gomahr[2,8] | Joel Kullberg[5,6] | Katharina Maruszczak[2,8] | Katharina Morwald[2,8] | Roger Olsson[4] | Thomas Pixner[7,8] | Anna Schneider[2,8] | Bruno Pereira[9] | David Thivel[10] | Daniel Weghuber[2,8]



Julian et al., 2021

What about Sedentary behaviors?





Julian et al., 2021; 2022; 2022

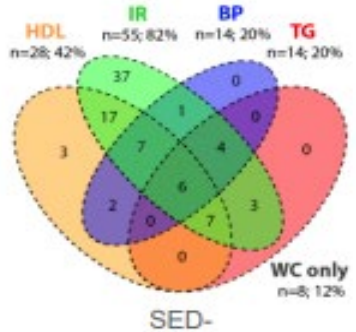
nutrients

MDPI

Article

Association between Metabolic Syndrome Diagnosis and the Physical Activity—Sedentary Profile of Adolescents with Obesity: A Complementary Analysis of the Beta-JUDO Study

Valérie Julian [1,2,*], Iris Ciba [3,4], Roger Olsson [4], Marie Dahlbom [3,4], Dieter Furthner [5,6], Julian Gomahr [2,6], Katharina Maruszczak [2,6], Katharina Morwald [2,6], Thomas Pixner [5,6], Anna Schneider [2,6], Bruno Pereira [7], Martine Duclos [1], Daniel Weghuber [2,6], David Thivel [8], Peter Bergsten [3,4,9] and Anders Forslund [4,5]



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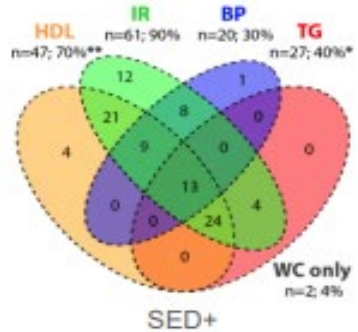

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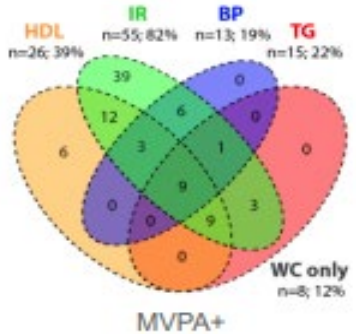

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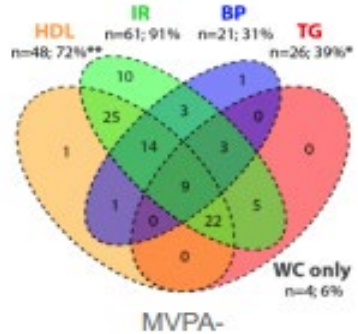

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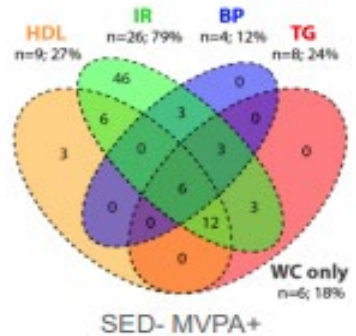

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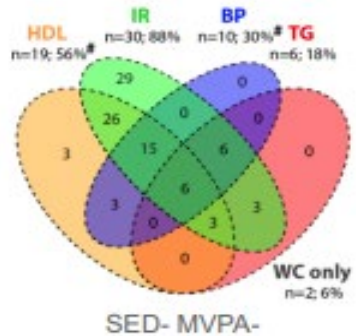

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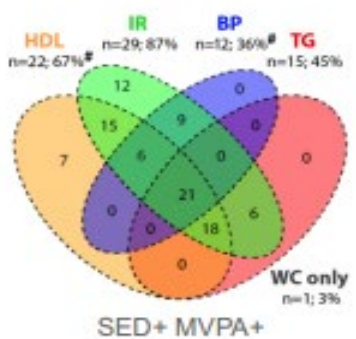
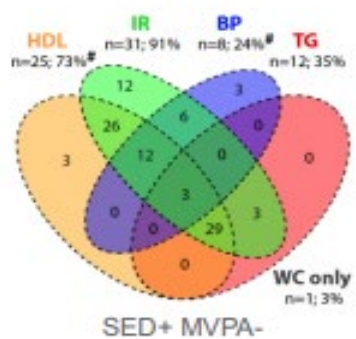


SED+ MVPA+



SED+ MVPA-

Annals of Nutrition and Metabolism

Human Nutrition: Editorial

Ann Nutr Metab
DOI: 10.1159/000507840

There is a clinical need to consider the physical activity – sedentary pattern in children with obesity. Position paper of the European Childhood Obesity Group

Julian V, Ring-Dimitriou S, Wyszyńska J, Mazur A, Matłosz P, Frelut ML, Erhardt E, Vlachopapadopoulou E, Forslund A, Boyland E, Weghuber D, Thivel D.

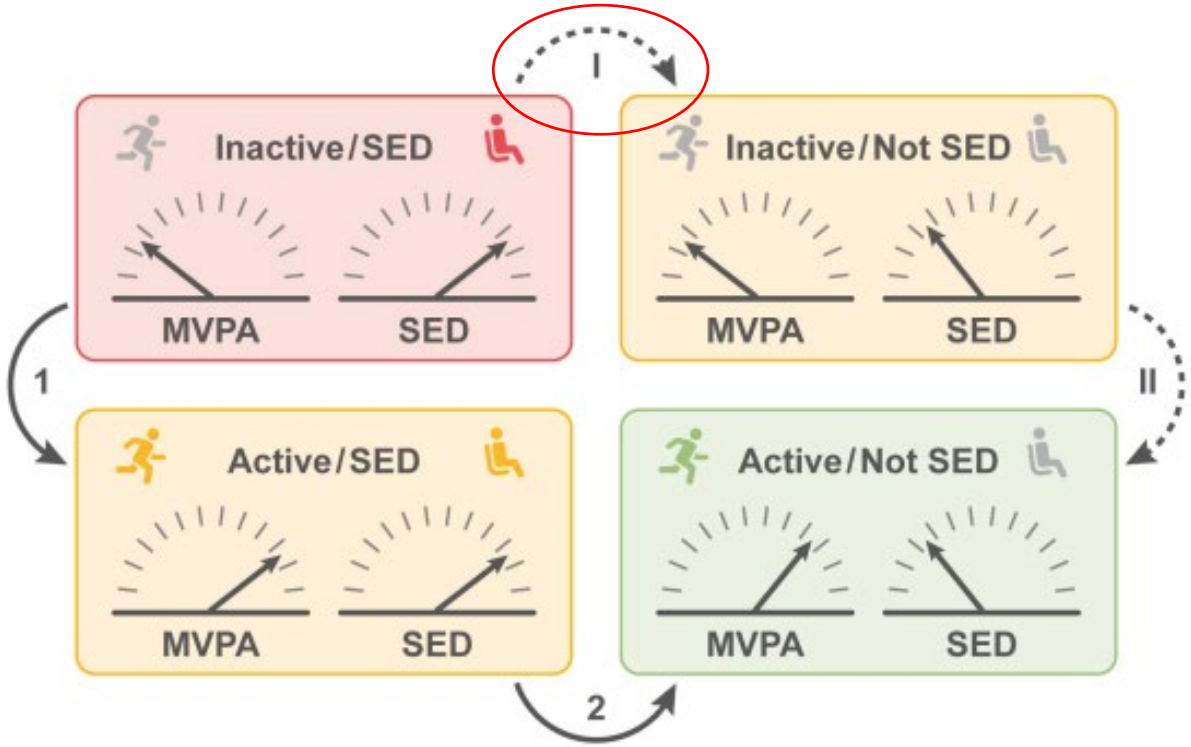
van der Ploeg and Hillsdon *International Journal of Behavioral Nutrition and Physical Activity* (2017) 14:142
DOI 10.1186/s12966-017-0601-0

International Journal of Behavioral Nutrition and Physical Activity

DEBATE Open Access

Is sedentary behaviour just physical inactivity by another name?

Hidde P. van der Ploeg[1,2*] and Melvyn Hillsdon[3]



ECOG European Childhood Obesity Group

obesity reviews doi: 10.1111/obr.12680

Pediatric Obesity/Treatment

Effects of multidisciplinary interventions on weight loss and health outcomes in children and adolescents with morbid obesity

J. Zolotarjova[1], G. ten Velde[1] and A. C. E. Vreugdenhil[1,2]

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Summary

Objective: Morbid obesity is the fastest growing subcategory of childhood obesity, associated with an increased health risk that persists into adulthood. There is an urgent need to develop multifaceted interventions that target initial and long-term lifestyle changes. This review investigates the effects of multidisciplinary interventions on weight loss and health outcomes in children and adolescents with morbid obesity. The influence of age, gender and family participation on health outcomes and intensive treatment alternatives are explored.

Methods: The review includes 16 studies conducted between 1995 and 2017. Studies examined youth with morbid obesity, 4–18 years old, undergoing multidisciplinary treatment.

Results: All studies found a reduction in body mass index (BMI or z-score) and if measured, cardiovascular risk factors. Physical activity, nutrition education, behavioural modification and family involvement are commonly included treatment components and have improved weight loss and health-related outcomes. However, initial weight loss was often not sustainable, despite the favourable interventional effect on cardiometabolic risk markers. Weight loss was prolonged in younger children and among the male sex.

Conclusions: There is not a 'one-size-fits-all' treatment approach, and matched care to personal needs is preferable. The integration of a chronic care approach is critical for the successful adaption of sustainable health behaviours.

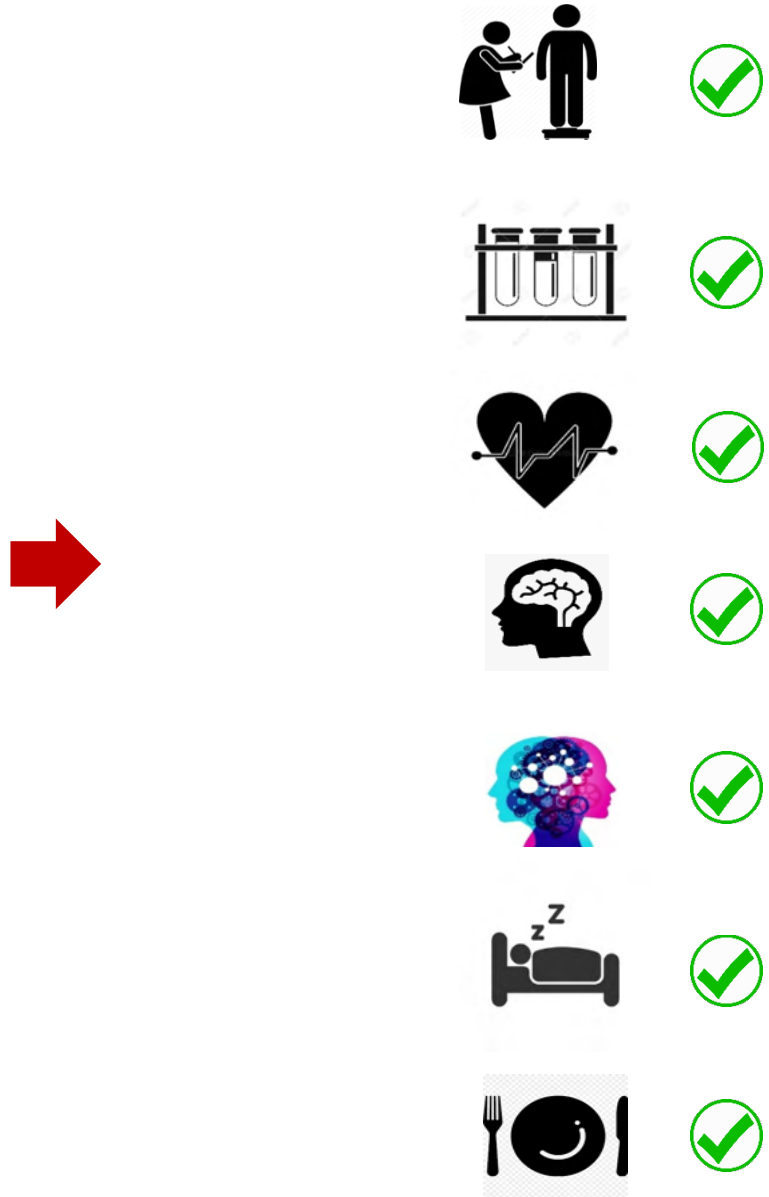
Keywords: Cardiovascular diseases, childhood obesity, morbid obesity, obesity treatment.

Abbreviations: BMI, Body mass index; CVD, Cardiovascular disease; mHealth, Mobile health; RYGB, Roux-en-Y gastric bypass; SG, Sleeve gastrectomy.

Introduction

The childhood obesity epidemic is a critical public health challenge facing the 21st century, incurring a significant loss of quality of life and increased costs to society and healthcare systems worldwide (1). Despite the stabilization trend of childhood obesity prevalence in the United States, a greater shift toward severe or morbid obesity has emerged (1,2). Alarmingly, morbid obesity is the fastest growing subcategory of childhood obesity, affecting 4%–6% of youth in the United States (1,3). In European countries such as the Netherlands, the prevalence of morbid obesity among children has also been steadily increasing (4).

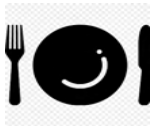
When compared to children with overweight or obesity, individuals with morbid obesity possess a significant health risk that is likely to project into adulthood, including the potential for developing life-threatening chronic diseases,



obesity reviews doi: 10.1111/obr.12680

What Does a Physical Activity Action Plan Look Like?

- Focused on encouragements and progression
- Clearly explained to patients
- Daily overall movements
- Sedentary Behaviors
- At any point of the prevention and treatment interventions
- From Public Health Recommendations to Adapted Physical activity



Journal of Obesity & Metabolic Syndrome 2022;31:88-90
https://doi.org/10.7570/jomes22006

Response

jomes
pISSN 2508-6235
eISSN 2508-7576

Response: *In Situ* Mobilization of Patients with Obesity as a Key Determinant of Weight Loss Interventions (J Obes Metab Syndr 2020;29:292-302)

David Thivel[1,*], Géraldine Rix-Lièvre[2], Michel Recope[2]

[1]Clermont Auvergne University, EA 3533, Laboratory of the Metabolic Adaptations to Exercise under Physiological and Pathological Conditions (AME2P), Clermont-Ferrand; [2]Université Clermont Auvergne, EA 4281, Laboratoire Activité, Connaissance, Transmission, Éducation (ACTé), Clermont-Ferrand, France

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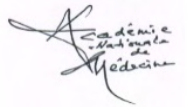
While there is a growing body of evidence regarding the metabolic, physiological, or functional benefits of multi-disciplinary weight loss interventions in adolescents who are overweight and obese, their effects on mental health, well-being, health-related quality of life (HRQOL), and perceived physical-fitness and health remain less explored. Our research group recently tried to better understand these potential psycho-physiological responses to multi-disciplinary weight loss programs by considering different modalities of exercise interventions in obese adolescents.[1] In particular, we recently reported in *Journal of Obesity & Metabolic Syndrome*, that a 4-month multi-disciplinary intervention incorporating high-intensity interval training improved HRQOL and perception of health and physical fitness in obese adolescents, and that most of these improvements were associated with degree of weight loss.[2]

In an Letter to the Editor, Choi[3], while pointing out the quality and relevance of our work and its results, also stressed the necessity to fully consider the nature of the psychological support received by the adolescents, as well as the potential implication of their initial motivation when engaging in such interventions. We would like to thank Choi[3] for raising these important points, giving us the opportunity to complete our initial publication, and to initiate what we believe are necessary discussions regarding the role and implications of adolescent (and overall patients) motivation and engagement in clinical interventions.

First, the psychological intervention the adolescents received a monthly 90-minute session of psychological support through individual consultations with a professional. Sessions focused on self-esteem and emotional, social, and familial relationships and issues. As suggested by Choi[3], psychological sessions can focus on motivation of patients to engage in the intervention efforts and to lose weight, which will impact their engagement with the program and affect the success of the intervention. However, our sessions mainly focused on coping with social and emotional difficulties that often accompany pediatric obesity.

In his paper, Choi[3] describes the importance of considering patient motivation, adherence, and engagement for intervention success. We agree and would like to take advantage of this opportunity to explore these concepts and clarify their potential implication for success of behavioral and clinical programs.

Second, it seems important to clarify that our initial published

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Thanks for your attention

"It looks as though man should be regarded now, if not in the past, as a predominantly sedentary rather than an upright animal"

Edholm, Fletcher, Widdowson & McCance, *BJN*, 1955

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