Supplemental Digital Content 1

Questionnaire items vs $PRS_{measured}$ in explaining variation in objectively measured PA

Methods: In the MOBILETWIN study (1) comprehensive data from 640 individuals was available to analyze how much of the variation in objectively measured PA (MVPA and steps) could be accounted for by questionnaire items and by $PRS_{measured}$. The basic characteristics and questionnaire items used in this analysis were age, sex, body-mass index (BMI) calculated based on self-reported height and weight, self-reported distance walked or jogged outdoors, self-reported fitness, self-reported mobility restricting disease, and self-reported PA category. In more detail, we asked the participants to estimate with 0.5 km accuracy how many kilometers altogether they had walked or jogged outdoors during the past 7 days (2). Self-reported fitness was based on a question "Is your current physical fitness in your opinion?" 1) Very good, 2) Fairly good, 3) Satisfactory 4) Fairly poor, 5) Very poor. Due to low number of answers to categories four and five, these two were combined for the analyses and called poor (3). The response alternatives in the question 'Do you have any physician-diagnosed disease which restricts your mobility?' were 'no' and 'yes' (2). The overall PA category was based on the question: "How much do you move/exercise or participate in physical loading activities?" The response alternatives were: 1) I read, watch TV and do daily routines which do not load me physically (=Inactive), 2) I walk, bike or do light home or yard work many hours per week (=Moderately active), 3) I participate in conditioning exercises or sports such as running, skiing, skating or ball-games, several hours a week (=Highly active).

The proportion of total variation of outcomes explained by the model (R^2) was estimated by linear regression. Basic models were adjusted for 4 genetic principal components, sex and age. Multivariable models were constructed by entering potential predictors into the basic models one at a time. Finally, full models including all potential predictors were constructed and the change in R^2 (ΔR^2) was calculated. Square root-transformation of MVPA was used due to violation of the assumption of normal distribution. In all regression models within-pair dependency of twin individuals was taken into account in standard errors yielded by cluster variance estimator which were robust to non-independent observations within families (cluster option in Stata). The statistical analyses were executed using IBM SPSS Statistics for

Windows, Version 24 (IBM Corp. Armonk, NY, USA) and Stata version 15 (Stata Corp, College Station, TX, USA). The level of significance was set at $P < 0.05$.

Results: Self-reported weekly walking or running distance accounted for highest amount of variation in objectively measured MVPA (R^2= 44%) and daily steps (R^2= 36%, Supplemental Table 1). BMI, self-reported fitness level, mobility restricting disease, and PA category accounted for lower amounts of variation (R^2 from 11% to 23%). Multivariable model including age, sex, BMI, and the above physical fitness and activity related self-reports accounted for 57% variation in MVPA and 47% in daily steps. Adding $PRS_{measured}$ into these models increased the proportion of total variation explained only by 0.03% in MVPA and 0.31% in daily steps.

References

1. Waller K, Vähä-Ypyä H, Törmäkangas T, et al. Long-term leisure-time physical activity and other health habits as predictors of objectively monitored late-life physical activity – A 40-year twin study. *Sci Rep.* 2018;8(1):9400.
2. Kujala UM, Hautasaari P, Vähä-Ypyä H, et al. Chronic diseases and objectively measured physical activity among aged individuals - a cross-sectional twin cohort study. *Ann Med.* 2019;51(1):78-87.
3. Waller K, Vähä-Ypyä H, Lindgren N, et al. Self- reported fitness and objectively measured physical activity profile among older adults: a twin study. *J Gerontol A Biol Sci Med Sci.* 2019;74(12):1965-72.

Supplemental Table 1. Clinical questionnaire items and $PRS_{measured}$ as determinants of measured daily MVPA and steps in the MOBILETWIN study (N=640).

	Measured daily MVPA					**Measured daily steps**				
			Full model					Full model		
	β (SE)	*P*	R^2	*P*	ΔR^{2a}	β (SE)	*P*	R^2	*P*	ΔR^{2a}
Model 1										
Age	-0.39 (0.79)	0.634	0.0203	0.005		-109 (142)	0.442	0.0078	0.1278	
Sex	-4.96 (1.52)	0.001				-532 (275)	0.054			
Model 1 and BMI	-1.77 (0.18)	<0.001	0.1586	<0.001	0.1383	-283 (31)	<0.001	0.1158	<0.001	0.1080
Model 1 and self-reported distance walked or jogged	0.85 (0.06)	<0.001	0.4606	<0.001	0.4403	140 (11)	<0.001	0.3722	<0.001	0.3644
Model 1 and self-reported fitness										
Very good (ref.)	1		0.2483	<0.001	0.2280	1		0.2047	<0.001	0.1969
Good	-10.67 (1.70)	<0.001				-1902 (326)	<0.001			
Satisfactory	-21.00 (1.94)	<0.001				-3572 (348)	<0.001			
Poor	-34.85 (2.48)	<0.001				-5907 (443)	<0.001			
Model 1 and mobility restricting disease										
No (ref.)	1		0.1308	<0.001	0.1105	1		0.1162	<0.001	0.1084
Yes	-13.62 (1.61)	0.104				-2438 (289)	<0.001			
Model 1 and self-reported PA category										
Highly active (ref.)	1		0.1707	<0.001	0.1504	1		0.1292	<0.001	0.1214
Moderately active	-8.72 (2.05)	<0.001				-1325 (360)	<0.001			
Inactive	-25.75 (2.64)	<0.001				-4159 (425)	<0.001			
Model 1 and $PRS_{measured}$	1.70 (0.78)	0.030	0.0296	0.0038	0.0093	409 (140)	0.004	0.0244	0.0099	0.0166
Model 2			0.5697	<0.001				0.4695	<0.001	
Model 2 and $PRS_{measured}$	0.34 (0.50)	0.0497	0.5700	<0.001		178 (101)	0.078	0.4726	<0.001	

Model 1: Age (in years) and sex (men coded as 1 and women as 2) as independent variables in the regression model.

Model 2: Body-mass index (BMI, kg/m^2), self-reported distance walked or jogged, self-reported fitness, self-reported mobility restricting disease, and self-reported physical activity (PA) category as independent variables in the regression model.

$PRS_{measured}$ scaled to obtain standardized normal distribution with a mean of zero and standard deviation of 1.

[a]ΔR^2 shows the additional R^2 compared to Model 1.