



**HARVARD
T.H. CHAN**
SCHOOL OF PUBLIC HEALTH



UCL

Life-course social participation and physical activity in midlife Longitudinal associations in the 1970 British Cohort Study (BCS70)

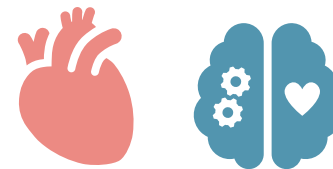
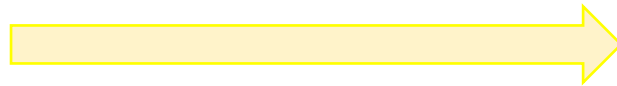
Stergiani (Stella) Tsoli

Centre for Longitudinal Studies (CLS), University College London

CLOSER Emerging Longitudinal Scholars webinar

Background

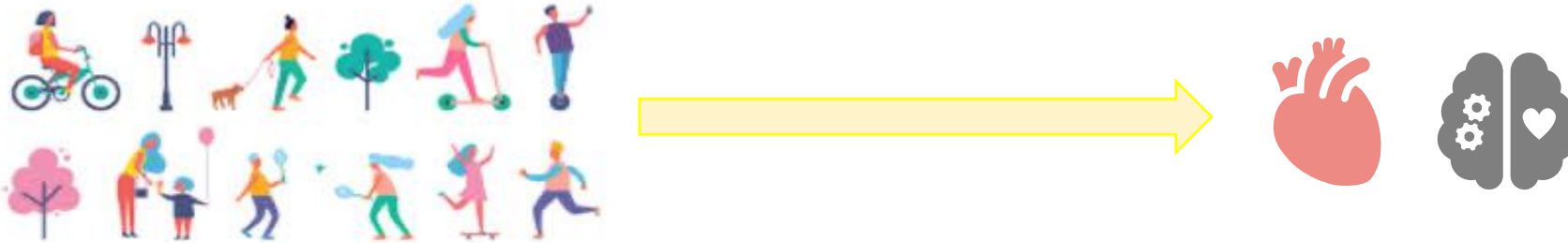
- Social participation is frequently described as “*a person’s involvement in activities that provide interaction with others in society or the community*”.
- An abundance of evidence **links active participation in social and leisure activities with physical and mental health outcomes in later life** including health and happiness, health functioning, age-related physical decline, malaise, anxiety and depression and others.



- Proposed **mechanisms of action** through which social participation promotes health and wellbeing include increased opportunities to **exchange social support** with others in a group, maintenance of cognitive skills (“**use it or lose it**”) through social interactions, and **peer influence** (e.g., encouragement and support to give up smoking from one’s social group).

Background

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- An abundance of evidence **links active participation in social and leisure activities with physical and mental health outcomes in later life** including health and happiness, health functioning, age-related physical decline, malaise, anxiety and depression and others.



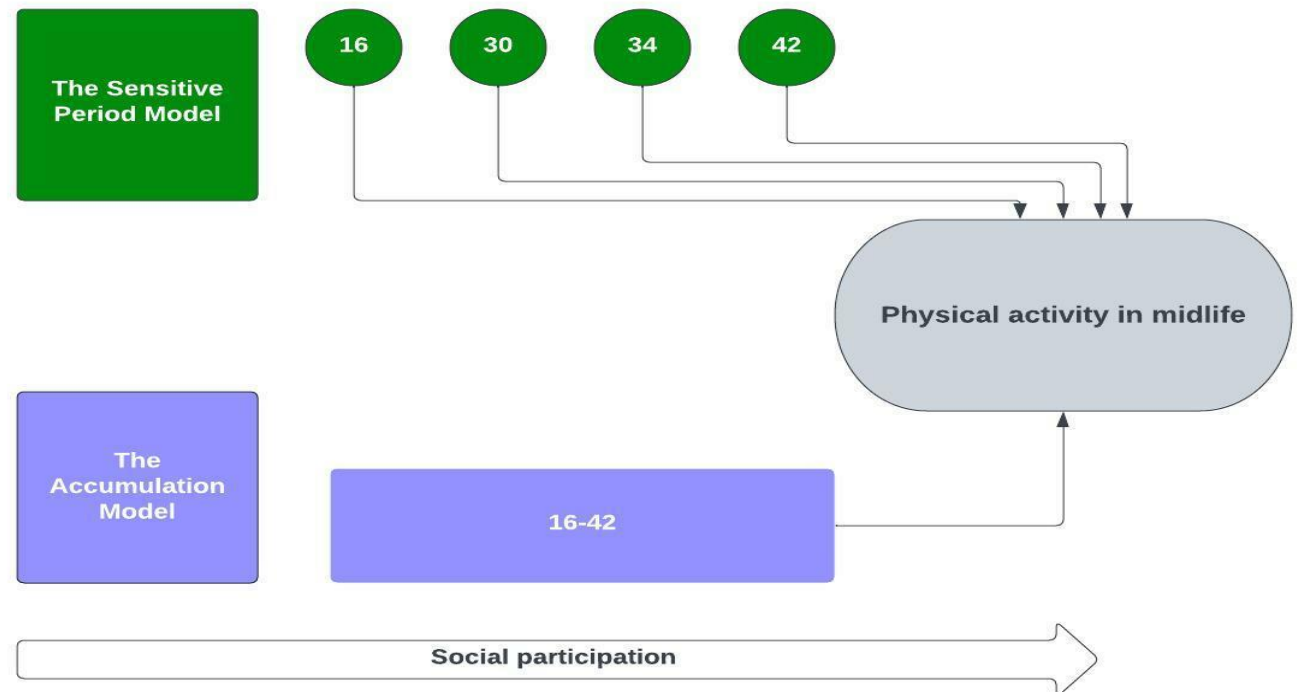
Limited research on the engagement in social activities through life-course and improvements in physical activity with a focus in later life (*most cross-sectional and with self-reported physical activity*)

Aims

To identify the association of social participation and objectively measured physical activity in midlife, using a life-course framework.

We examined :

- (i) the independent association of social participation at **different periods** through the life-course on physical activity at age 46
- (ii) the life-course associations of **cumulative** social participation between the ages of 16-42 on physical activity at age 46 in BCS70



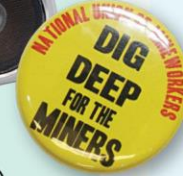
1946

1946 National Survey
of Health and
Development



1970

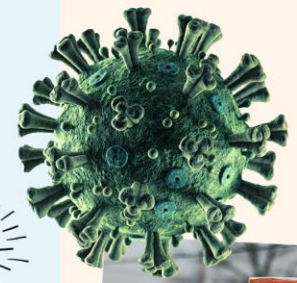
BCS70
1970 British
Cohort Study



2000

MILLENNIUM
COHORT STUDY

Photo: Miguelon756-5303



EARLY LIFE COHORT
FEASIBILITY STUDY

2022

NHS



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ncds
National Child
Development Study

1958



NEXT
STEPS
LEARNING FROM YOUR GENERATION

1989



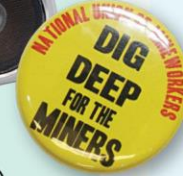
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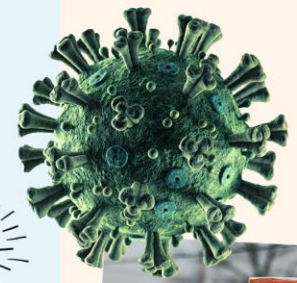
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1970 British Birth Cohort Study

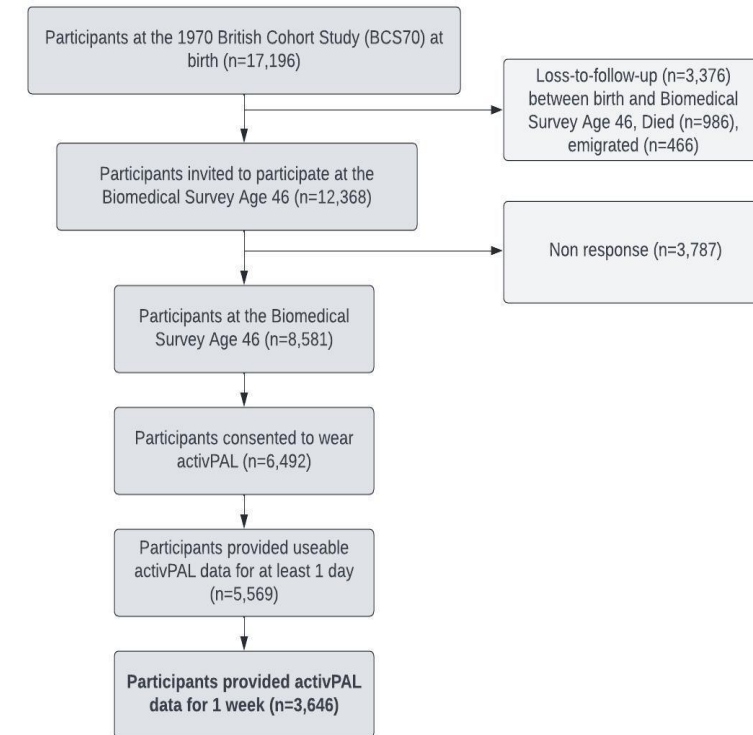
National birth cohort study that follows the lives of 17,196 individuals born in England, Scotland, and Wales in a **single week in 1970**.

Sample

- Participants at Wave 10 at age 46, with valid measurements of objectively measured physical activity for a week (n=3,646).

Activity monitoring

- Cohort members were asked to wear an **activity monitor** for **7 days** to collect detailed objective measures of physical activity.



Data and Methods

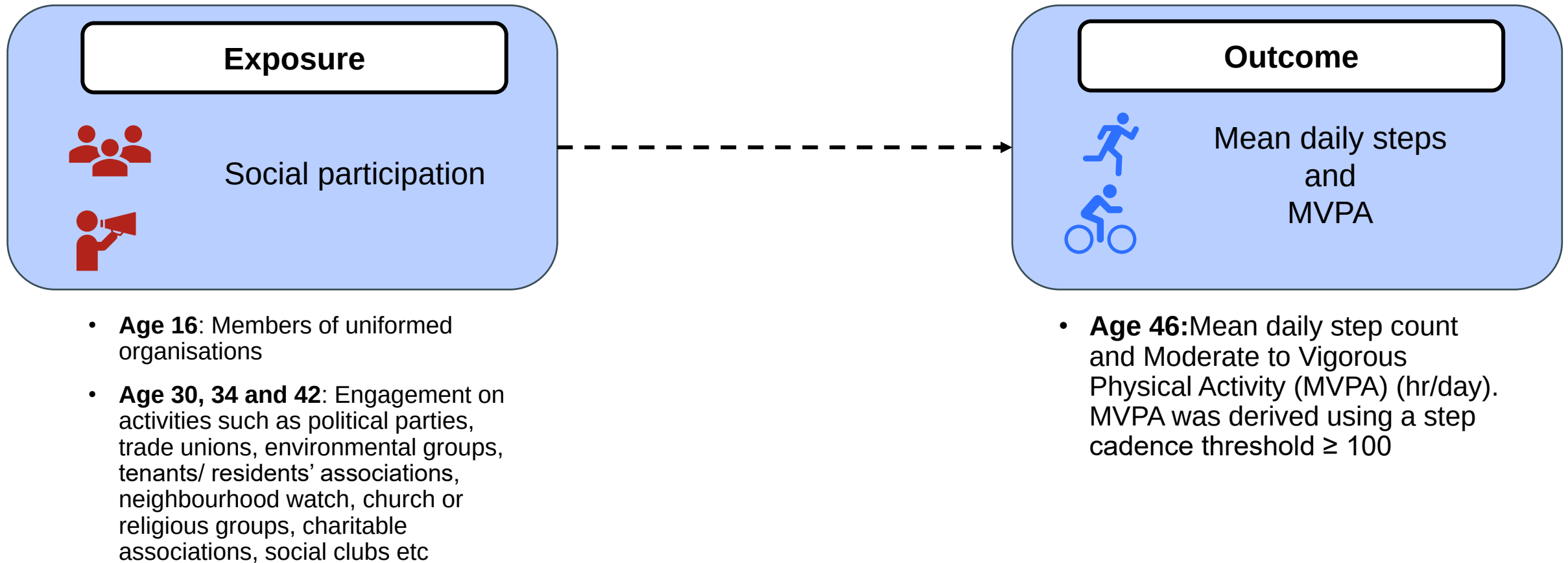
Exposure



Social participation

- **Age 16:** Members of uniformed organisations
- **Age 30, 34 and 42:** Engagement on activities such as political parties, trade unions, environmental groups, tenants/ residents' associations, neighbourhood watch, church or religious groups, charitable associations, social clubs etc

Data and Methods

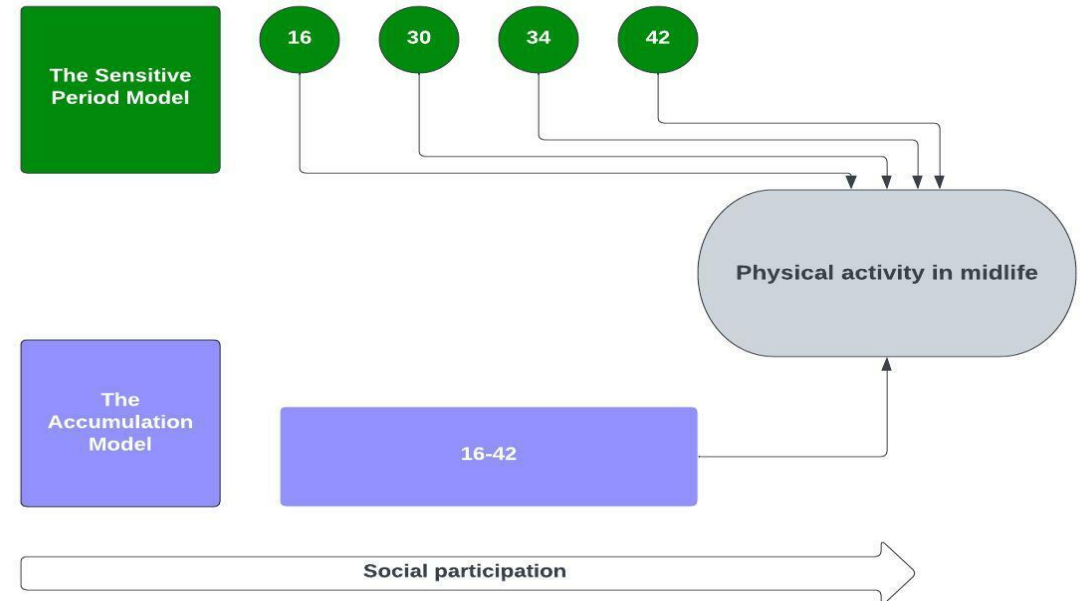


Statistical analysis-the idea

Model 1 - Accumulation model

- Cumulative Index of Social Participation (*Low, Medium and High*) was derived using responses at age 16, 30, 34 and 42.
- “**Low**” if they engaged with activities only at one sweep
- “**Medium**” if they engaged 2 times
- “**High**” if engaged at least three times (≥ 3), respectively.
- **None** (*ref*)

Model 2 - Sensitive period model



Statistical analysis



(OLS) regressions models

- **Multivariable linear** (*continuous outcome*) to estimate the association between social participation and physical activity

Missing Data Analysis

- Multiple Imputation with Chained Equations (MICE) adding to the model auxiliary variables;
50 imputed datasets

Software: STATA 17.0

Sensitivity analyses



Sensitivity Analysis 1

Restricted responders to different scenarios:

- a. those with one day of valid accelerometer readings
- b. those that participated at the Biomedical survey and the whole
- c. sample removing only those that migrated and are dead at age 46

Sensitivity Analysis 2

- At age 42, we omitted a specific type of (sports clubs) social participation indicator

Sensitivity Analysis 3

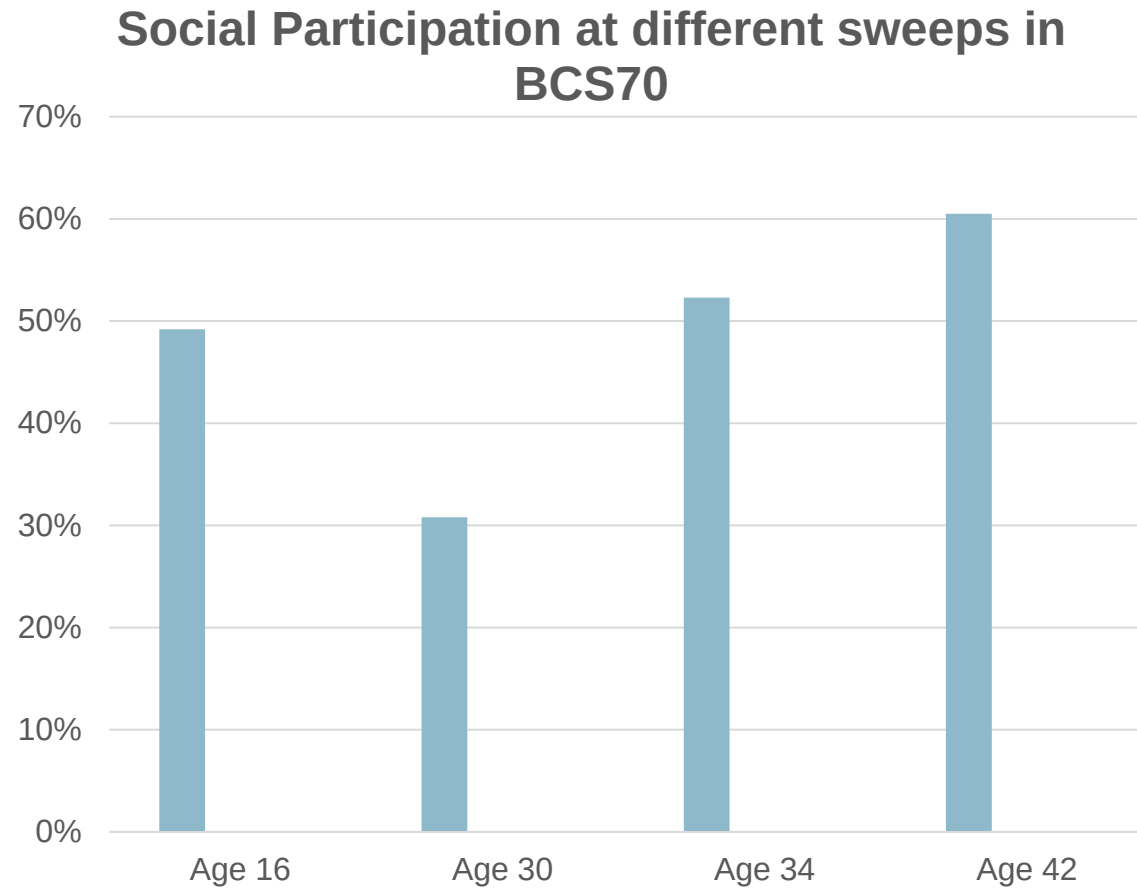
- Omitted age 30 social participation from the models

Sensitivity Analysis 4

- Adjusted for physical activity(self-reported) in previous waves

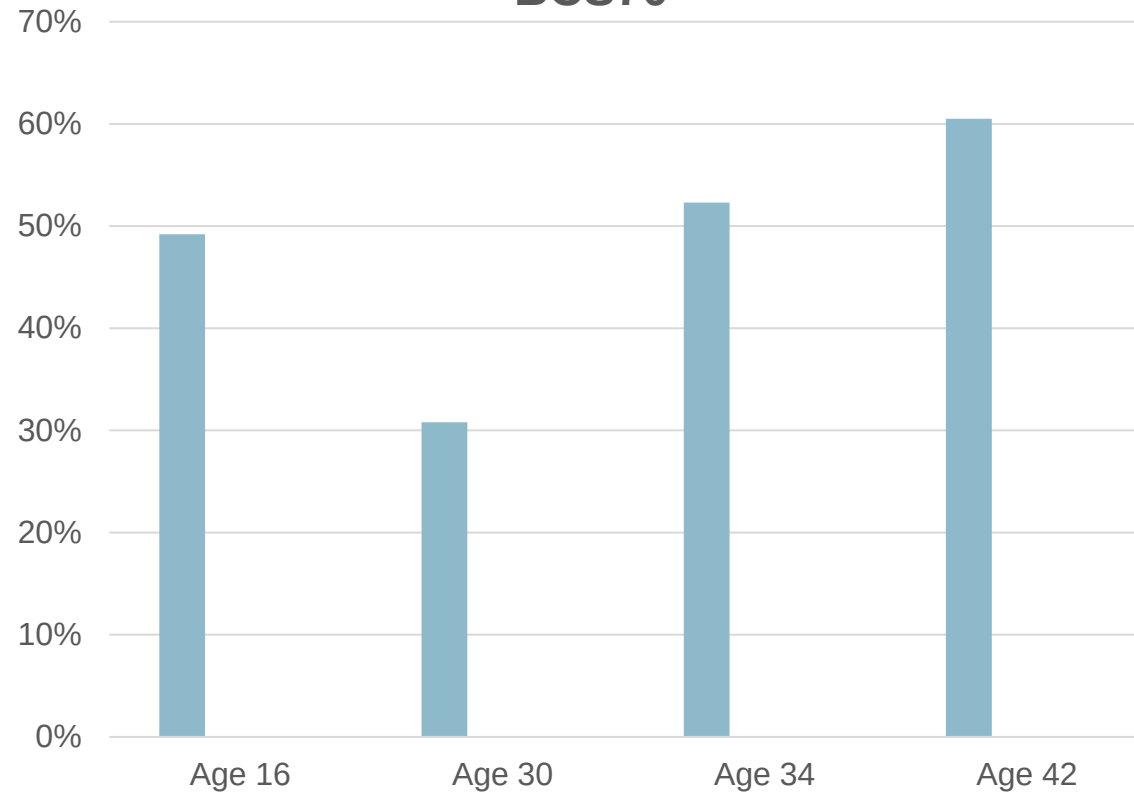
Results

Participant characteristics



Participant characteristics

Social Participation at different sweeps in BCS70

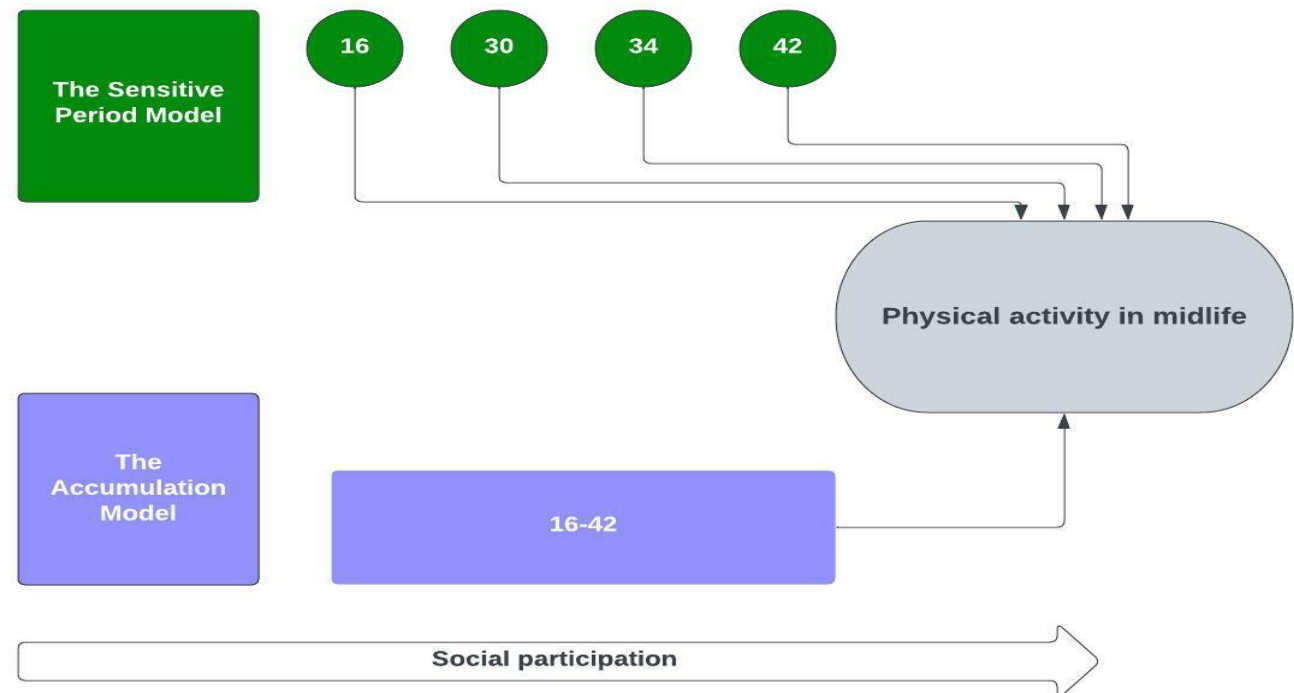


Participants reported a mean (SD) of 0.9 (0.4) hours of daily **MVPA** and 9570.2 (3,482) of **mean daily steps**.

Reminder

We examined :

- (i) the independent association of social participation at **different periods** through the life-course on physical activity at age 46
- (ii) the life-course associations of **cumulative** social participation between the ages of 16-42 on physical activity at age 46 in BCS70



a. Accumulation Model

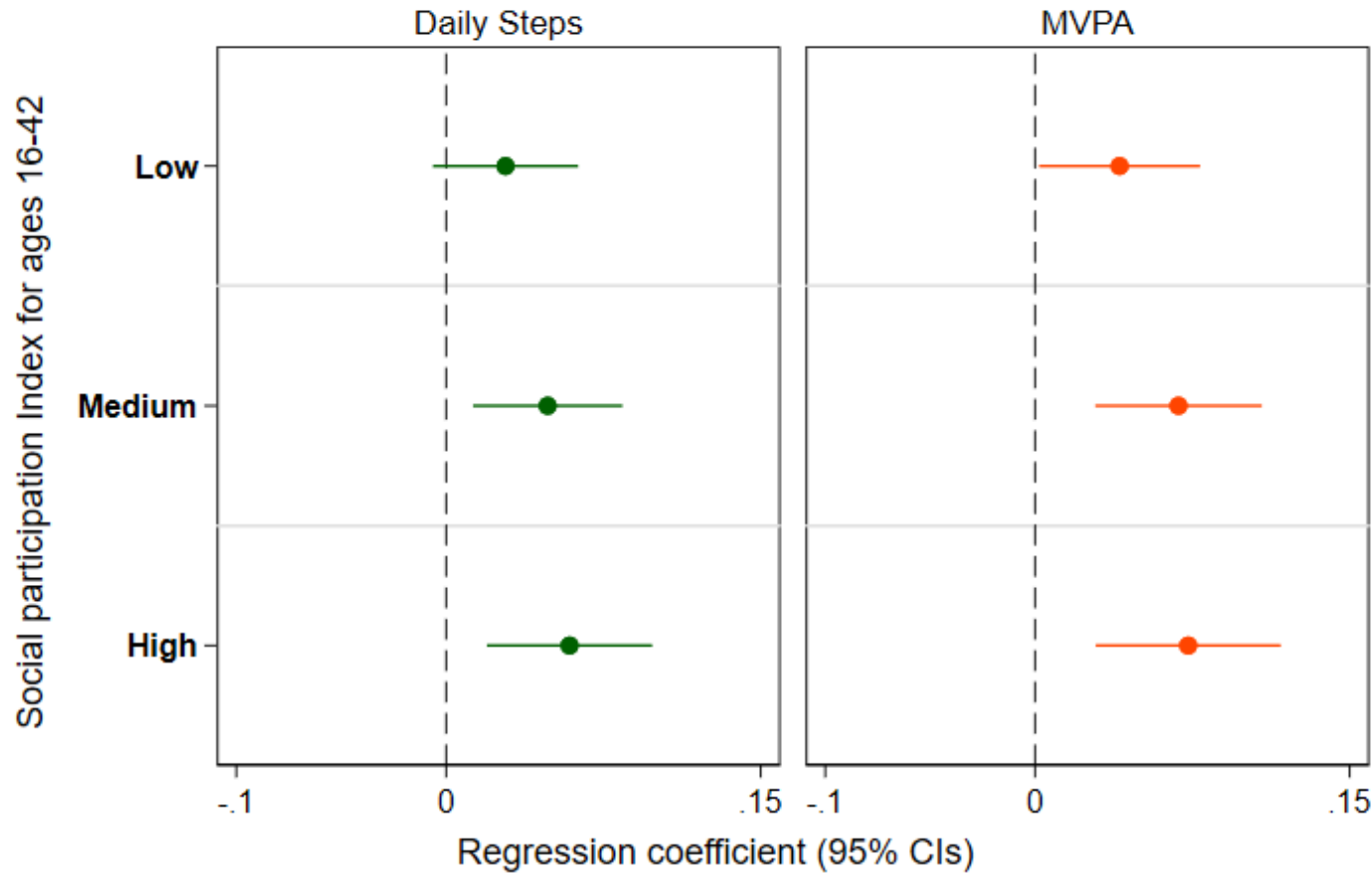


Figure 1: Adjusted regression coefficients (95% CI) for the a. Accumulation Model

a. Accumulation Model

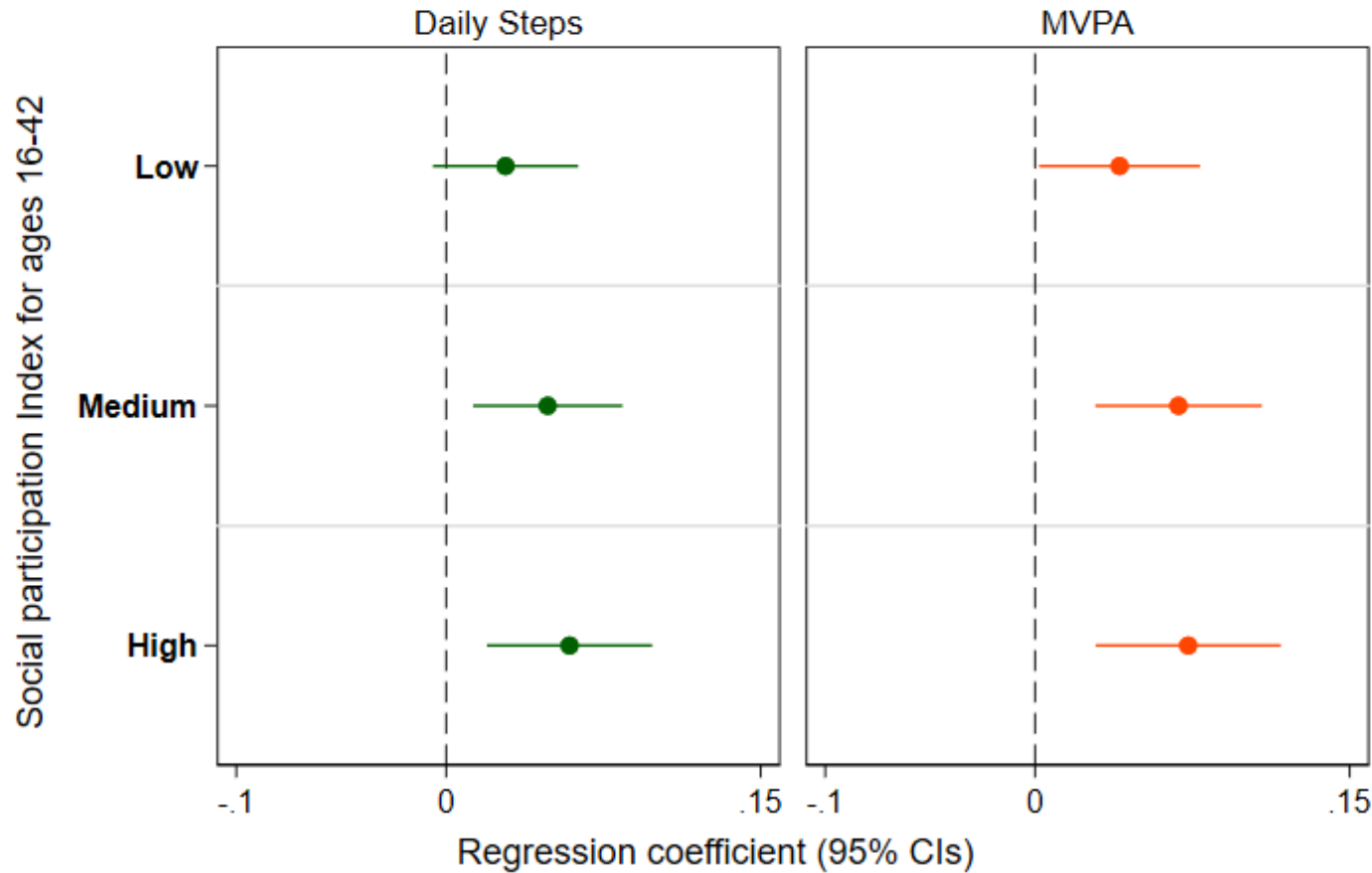


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a. Accumulation Model

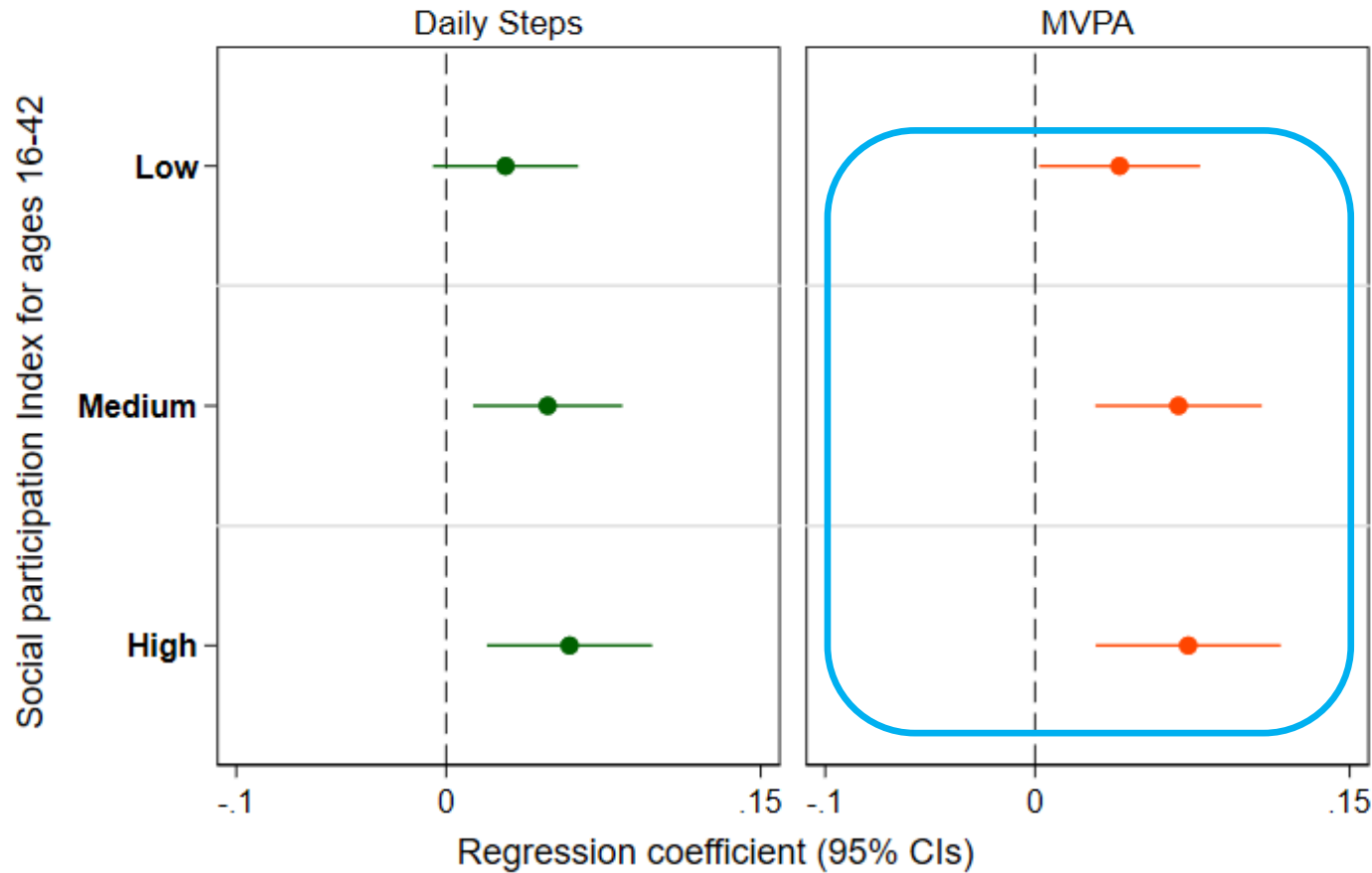


Figure 1: Adjusted regression coefficients (95% CI) for the a. Accumulation Model

b. Sensitive Period Model

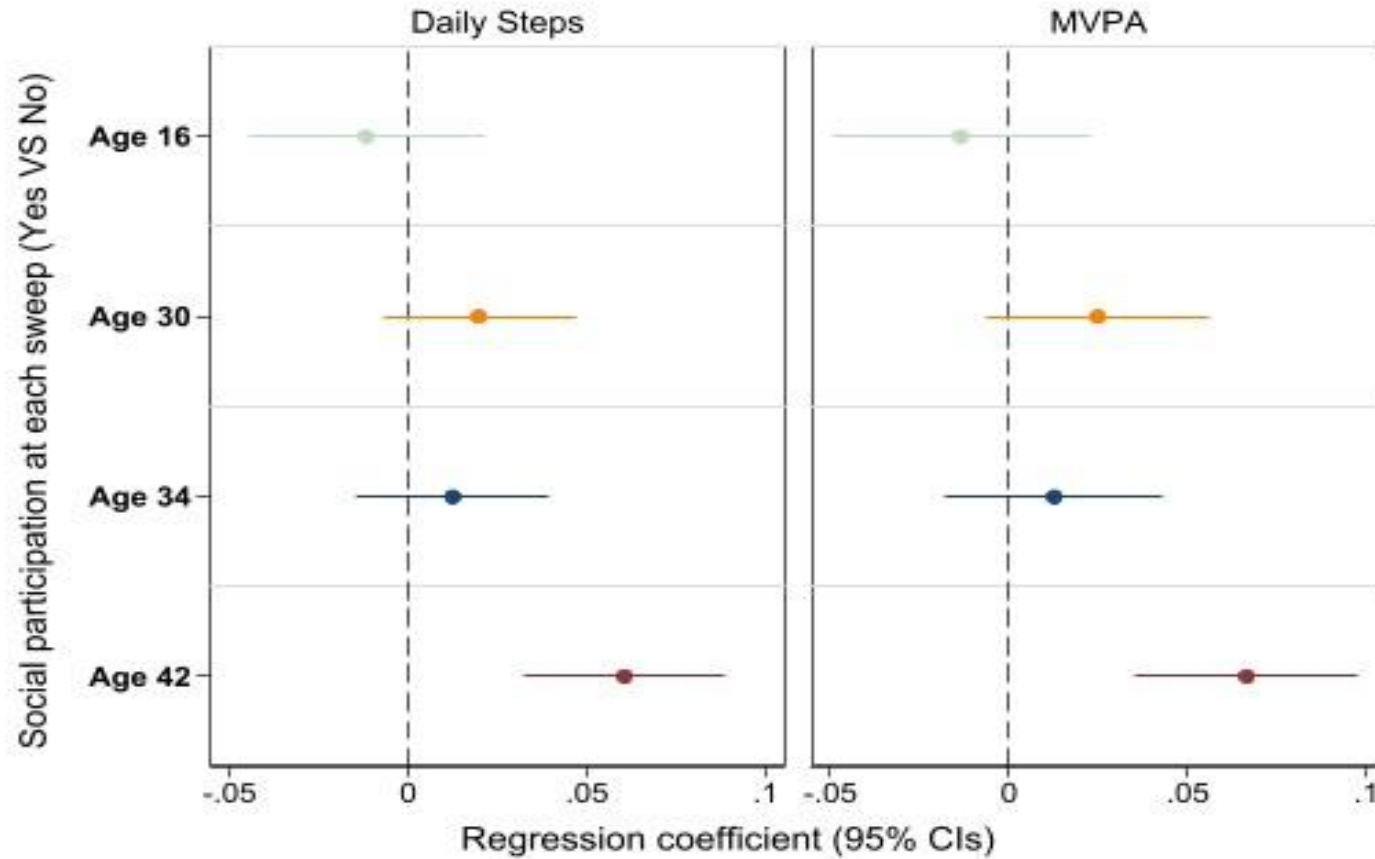


Figure 2: Adjusted regression coefficients (95% CI) for the b. Sensitive period Model

b. Sensitive Period Model

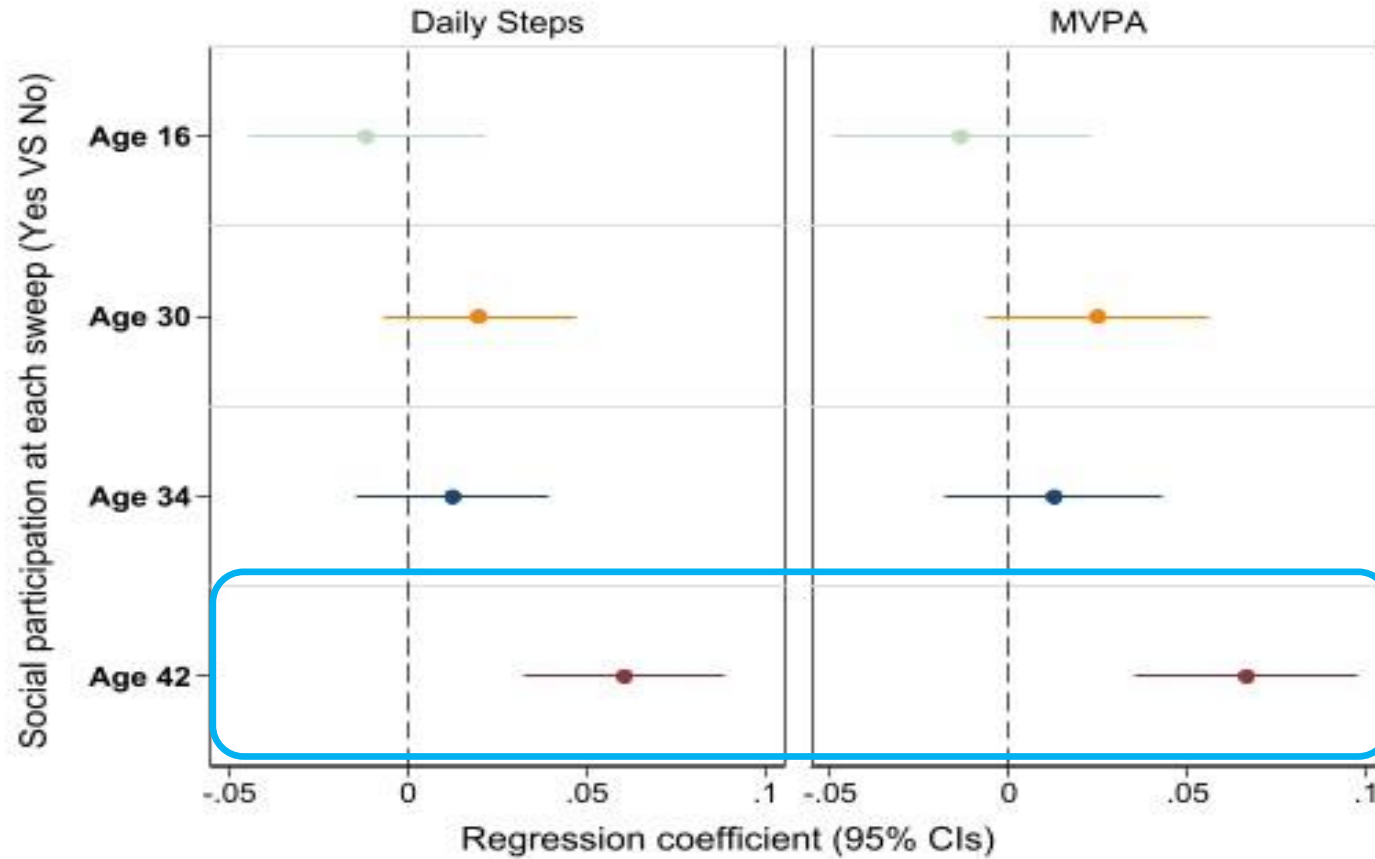


Figure 2: Adjusted regression coefficients (95% CI) for the b. Sensitive period Model

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Sensitivity analysis

Sensitivity analyses



Sensitivity Analysis 1

Restricted responders to different scenarios:

- a. those with one day of valid accelerometer readings
- b. those that participated at the Biomedical survey and the whole
- c. sample removing only those that migrated and are dead at age 46

Sensitivity Analysis 2

- At age 42, we omitted a specific type of (sports clubs) social participation indicator

Sensitivity Analysis 3

- Omitted age 30 social participation from the models

Sensitivity Analysis 4

- Adjusted for physical activity(self-reported) in previous waves

Sensitivity Analysis 1

Adjusted regression coefficients (95% CIs) estimating the association between social participation and physical activity at age 46 for the Accumulation model with different sample restrictions

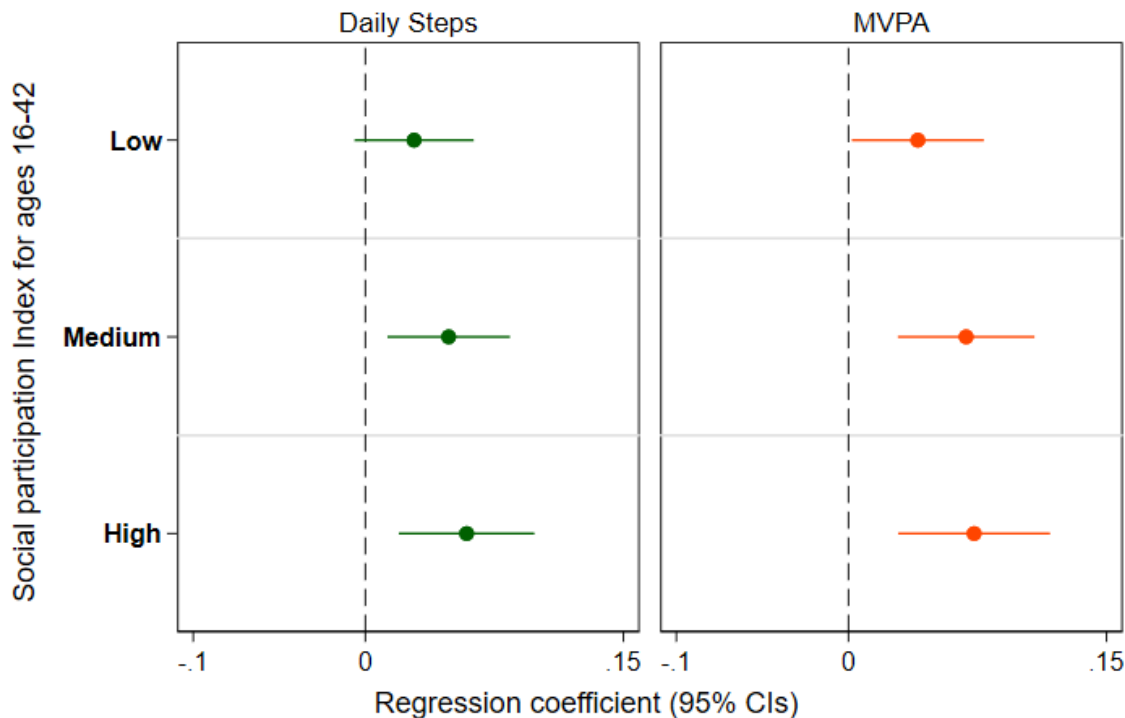
	Sample with participants with 7 days of accelerometer data (n=3,646)		a. Sample with participants with 1 day of accelerometer data (n=5,569)		b. Sample with participants at the Biomedical survey (n=8,581)		c. Sample with participants not migrated and dead (n=17,237)	
	Mean daily Steps	MVPA	Mean daily Steps	MVPA	Mean daily Steps	MVPA	Mean daily Steps	MVPA
Social Participation Index - Low	0.028	0.040**	0.031**	0.038**	0.043***	0.049***	0.047***	0.053***
	(-0.006 - 0.063)	(0.002 - 0.079)	(0.001 - 0.061)	(0.006 - 0.070)	(0.012 - 0.074)	(0.017 - 0.081)	(0.016 - 0.078)	(0.020 - 0.086)
	0.109	0.039	0.042	0.020	0.006	0.003	0.003	0.002
Social Participation Index - Medium	0.048***	0.068***	0.065***	0.075***	0.072***	0.082***	0.074***	0.085***
	(0.013 - 0.084)	(0.029 - 0.108)	(0.033 - 0.096)	(0.042 - 0.109)	(0.040 - 0.104)	(0.048 - 0.116)	(0.035 - 0.112)	(0.045 - 0.125)
	0.008	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Social Participation Index - High	0.059***	0.073***	0.075***	0.079***	0.081***	0.084***	0.083***	0.087***
	(0.019 - 0.098)	(0.029 - 0.117)	(0.040 - 0.110)	(0.041 - 0.117)	(0.044 - 0.118)	(0.045 - 0.123)	(0.038 - 0.129)	(0.042 - 0.132)

The reference group for all models is “Never participated”. *** p<0.001, ** p<0.01, * p<0.05.

Notes: Models adjusted for confounders until age 16.

Sensitivity analysis 2: no sports clubs age 42

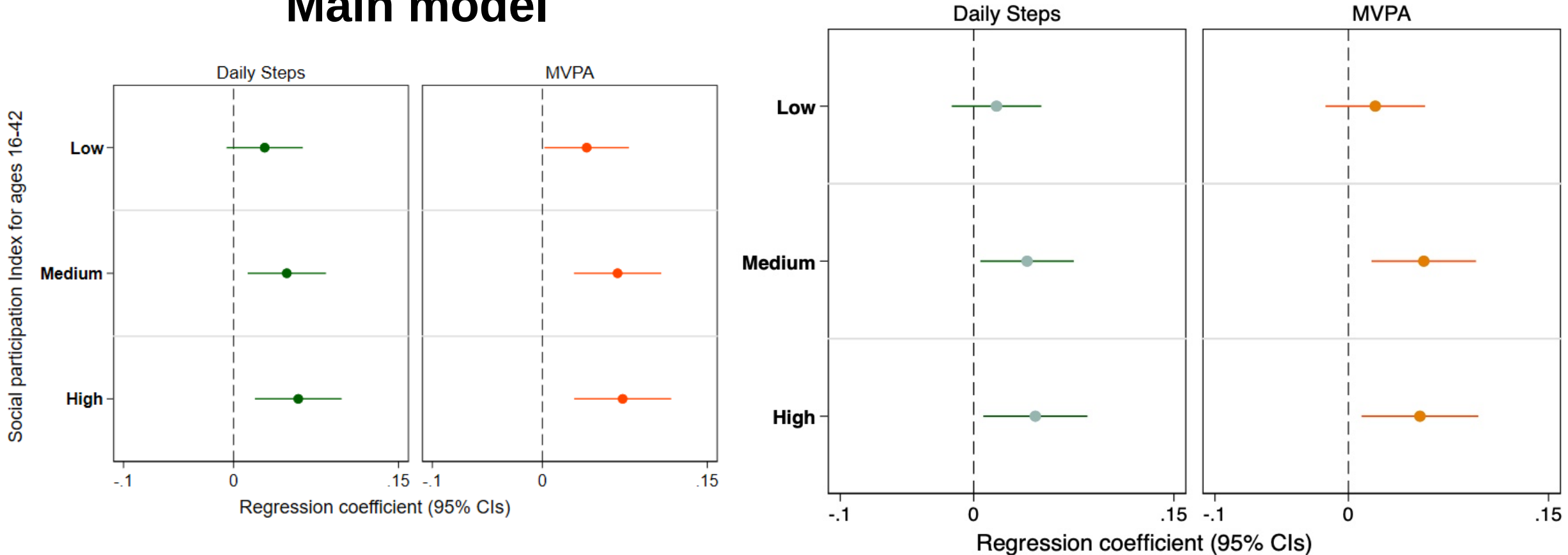
Main model



Sensitivity analysis 2: no sports clubs age 42

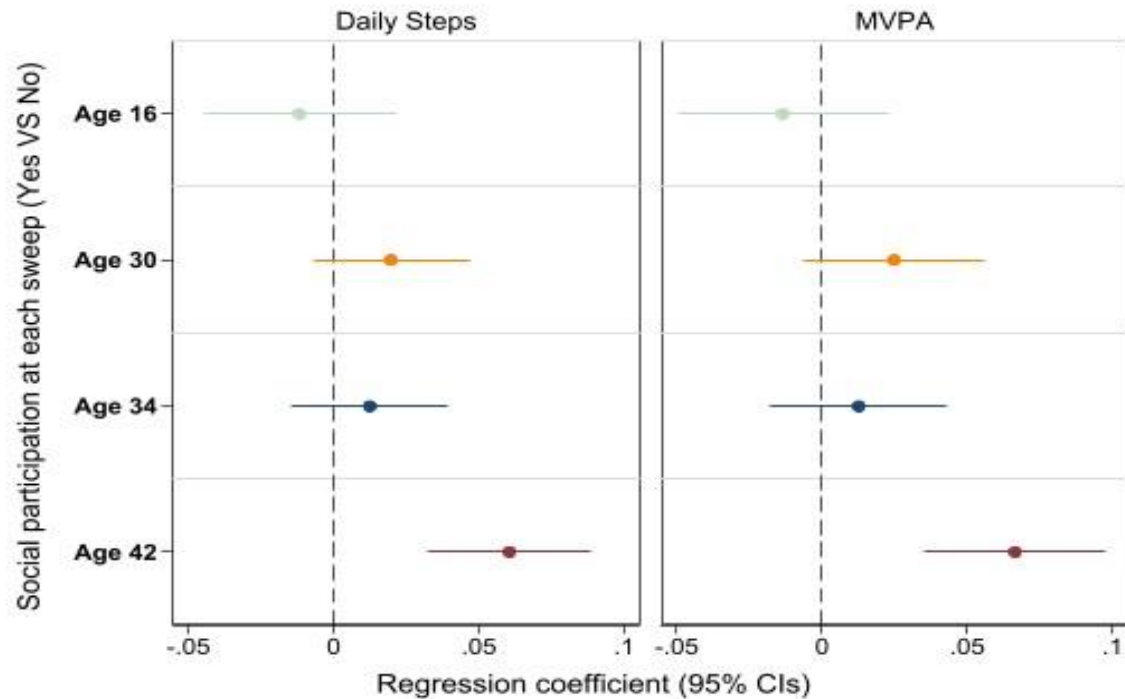
a. Accumulation model

Main model



Sensitivity analysis 2: no sports clubs age 42

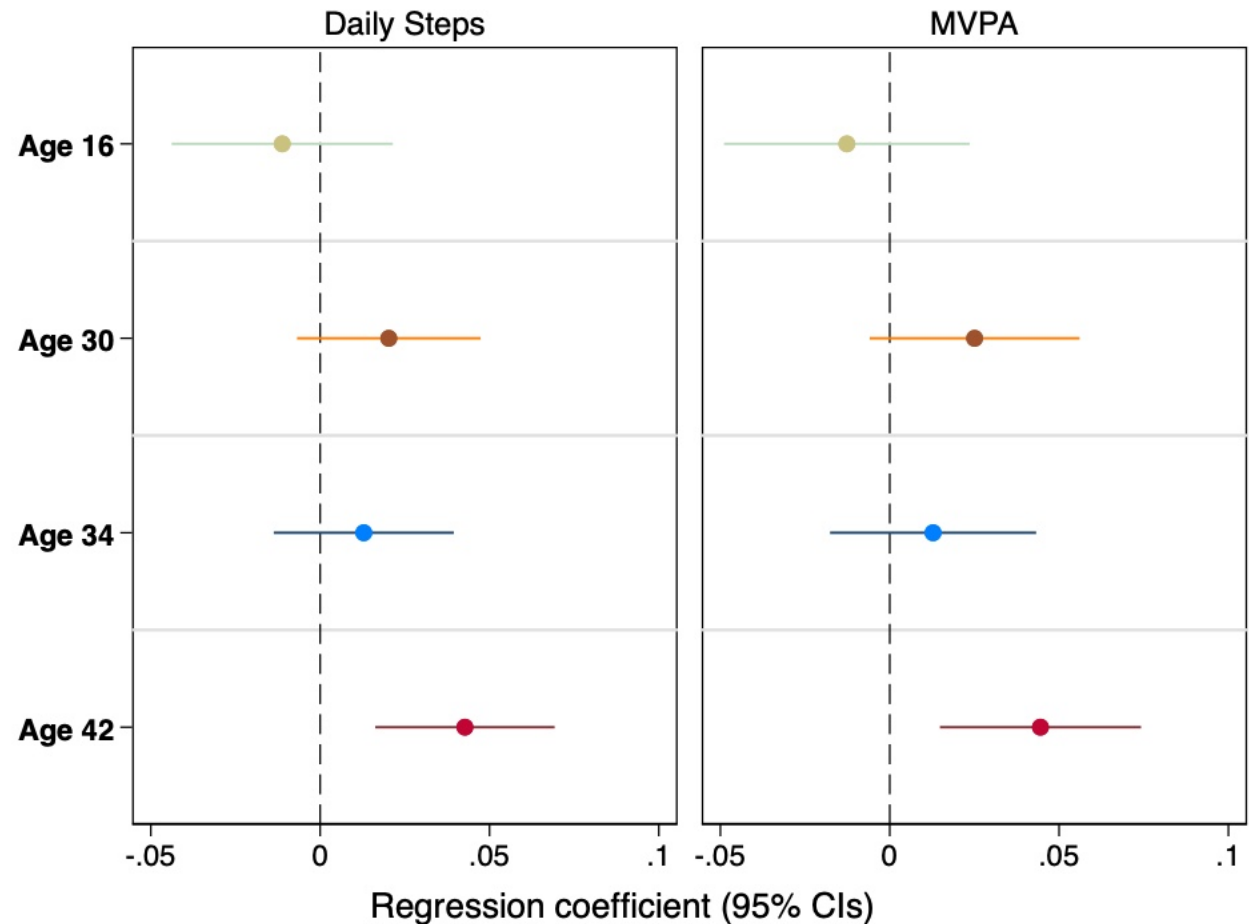
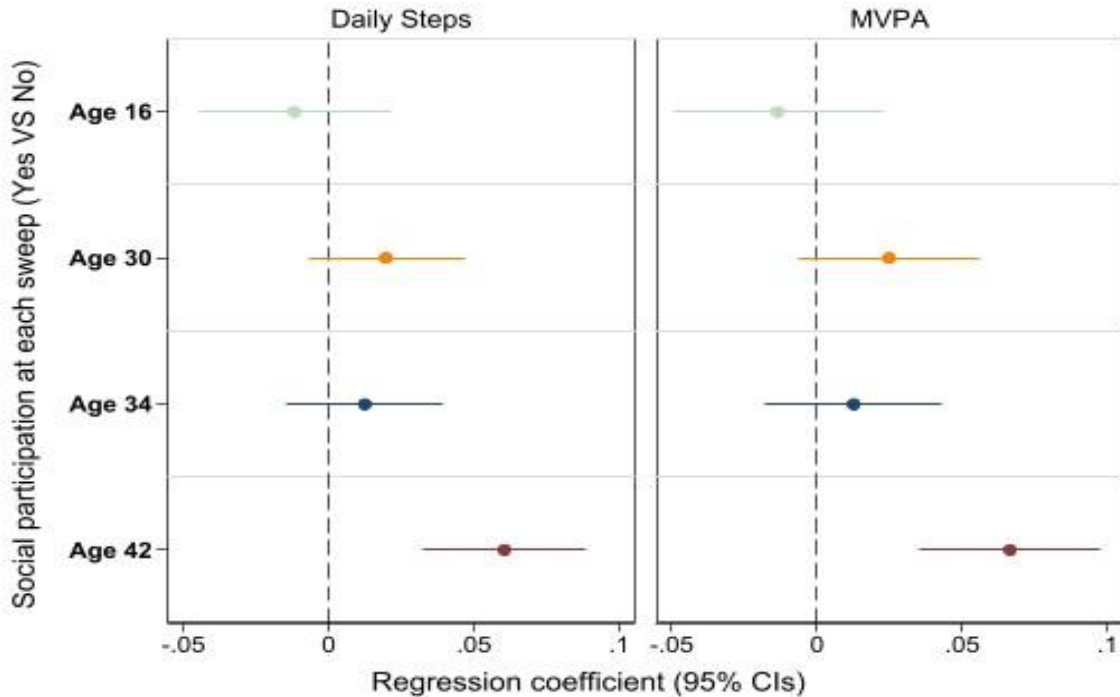
Main model



Sensitivity analysis 2: no sports clubs age 42

b. Sensitivity period model

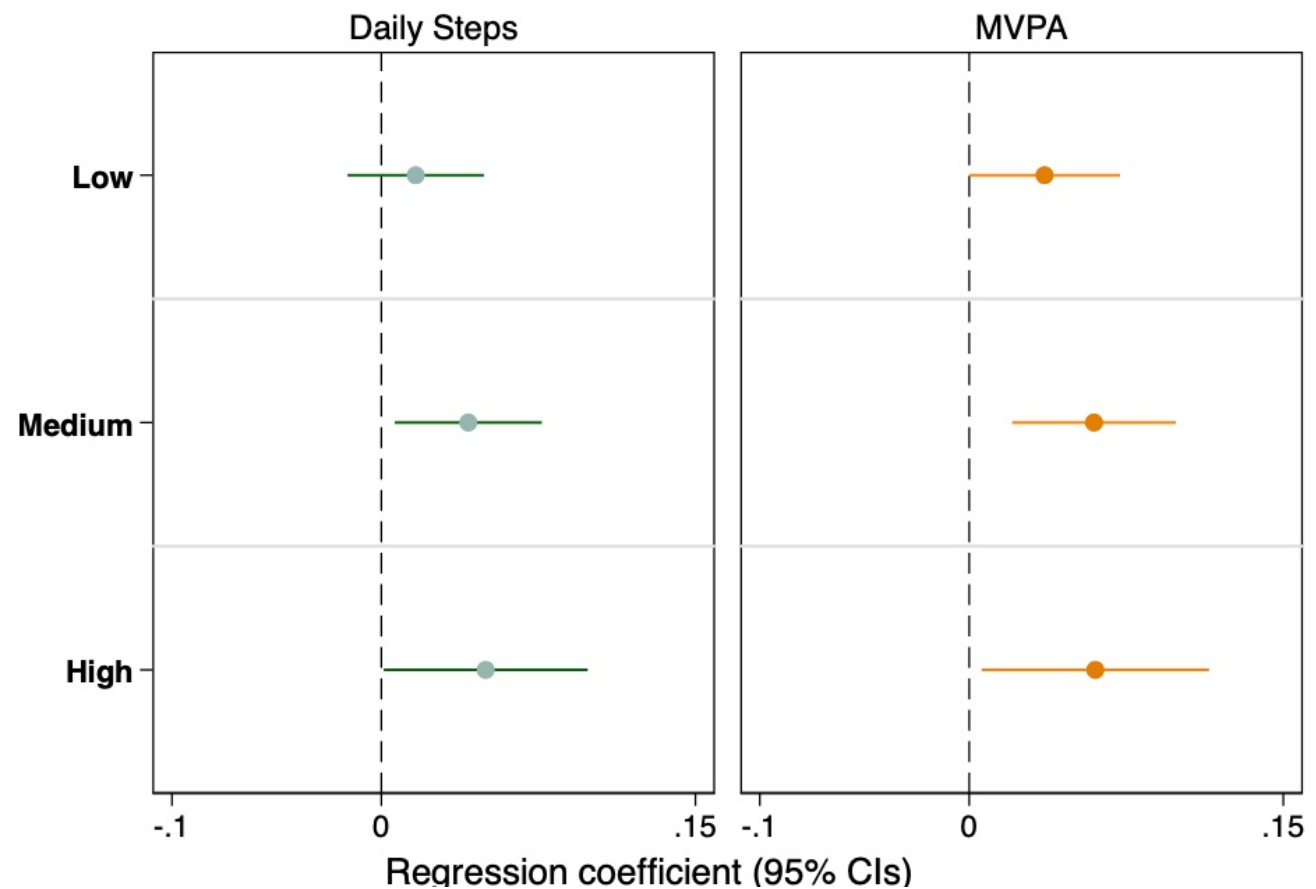
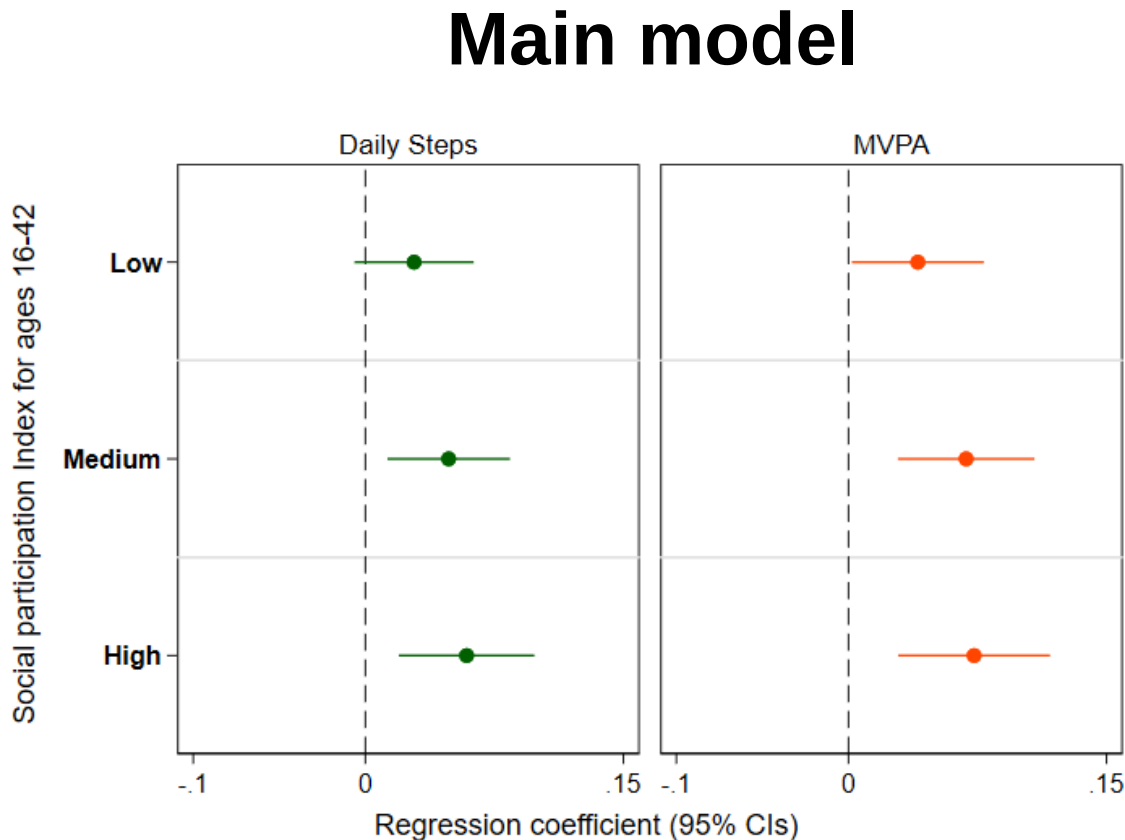
Main model



Sensitivity analysis 3: omitting Age 30

a. Accumulation model

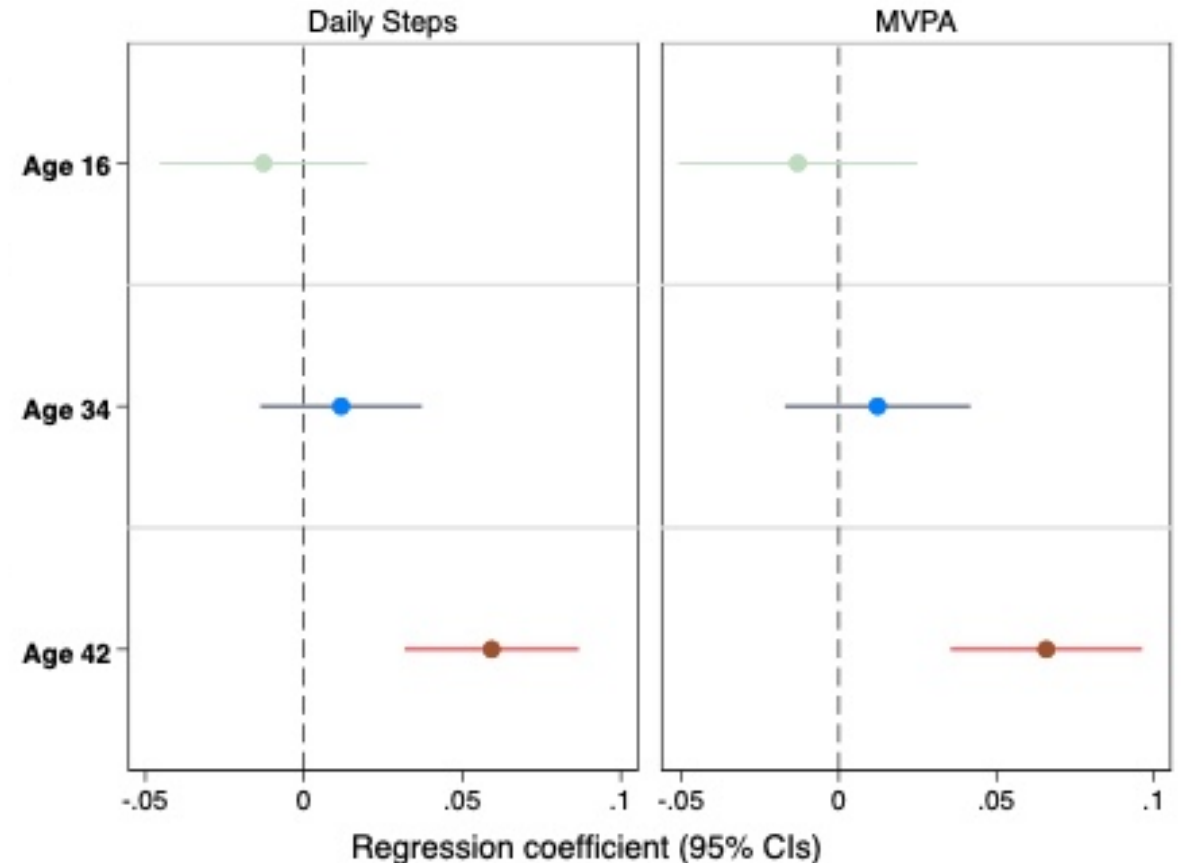
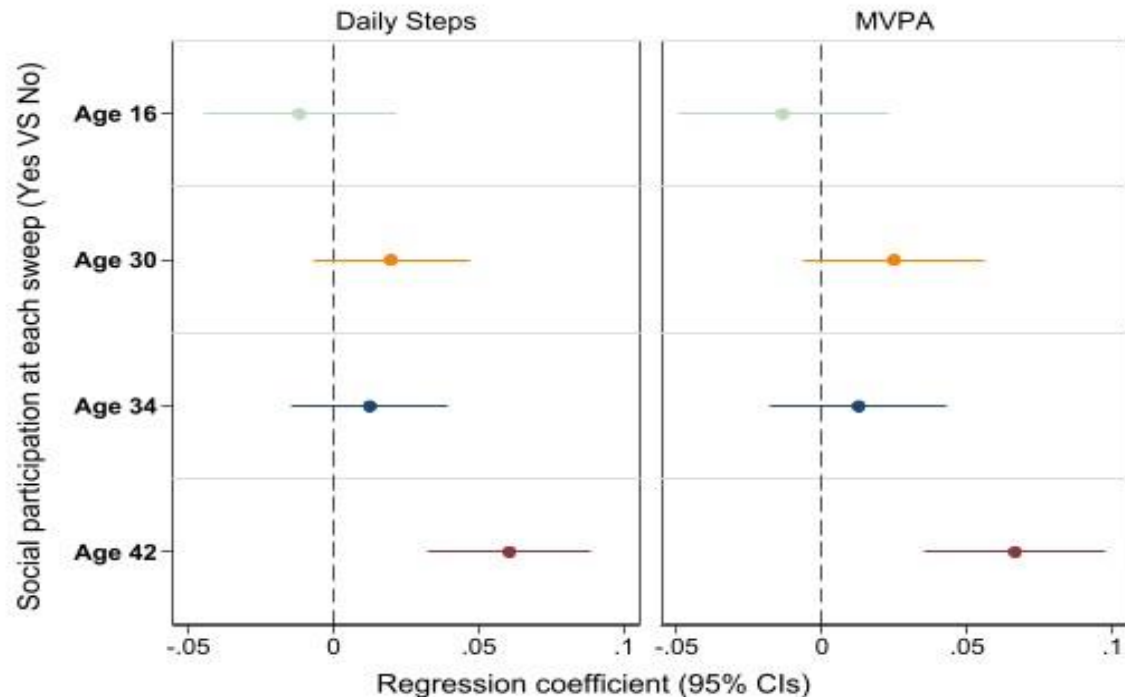
Main model



Sensitivity analysis 3: omitting Age 30

b. Sensitivity period model

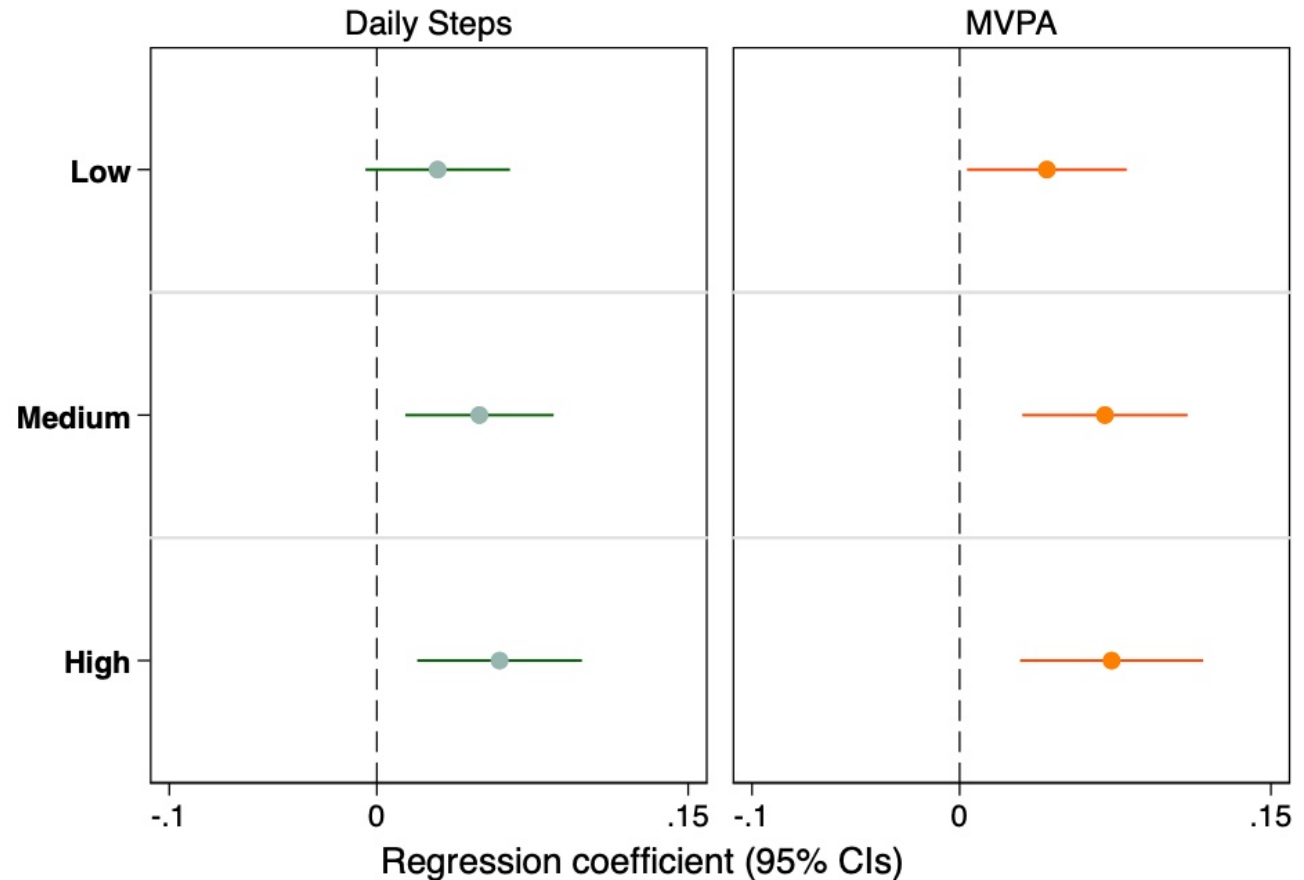
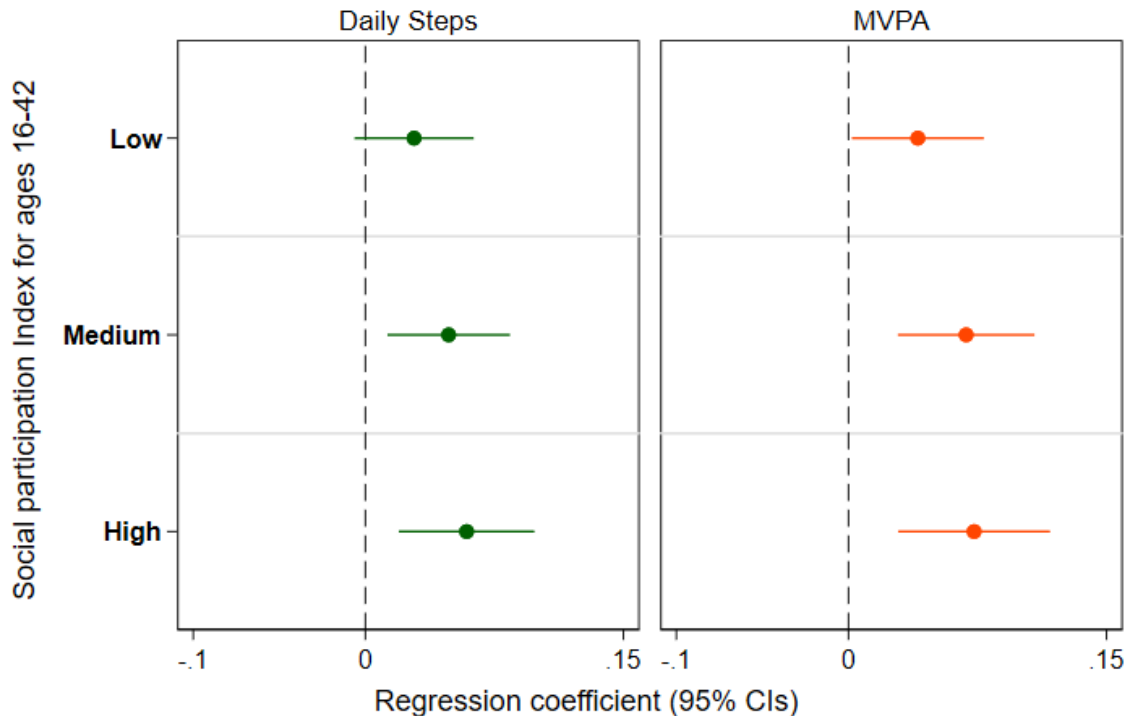
Main model



Sensitivity analysis 4: adjusting for previous PA

a. Accumulation model

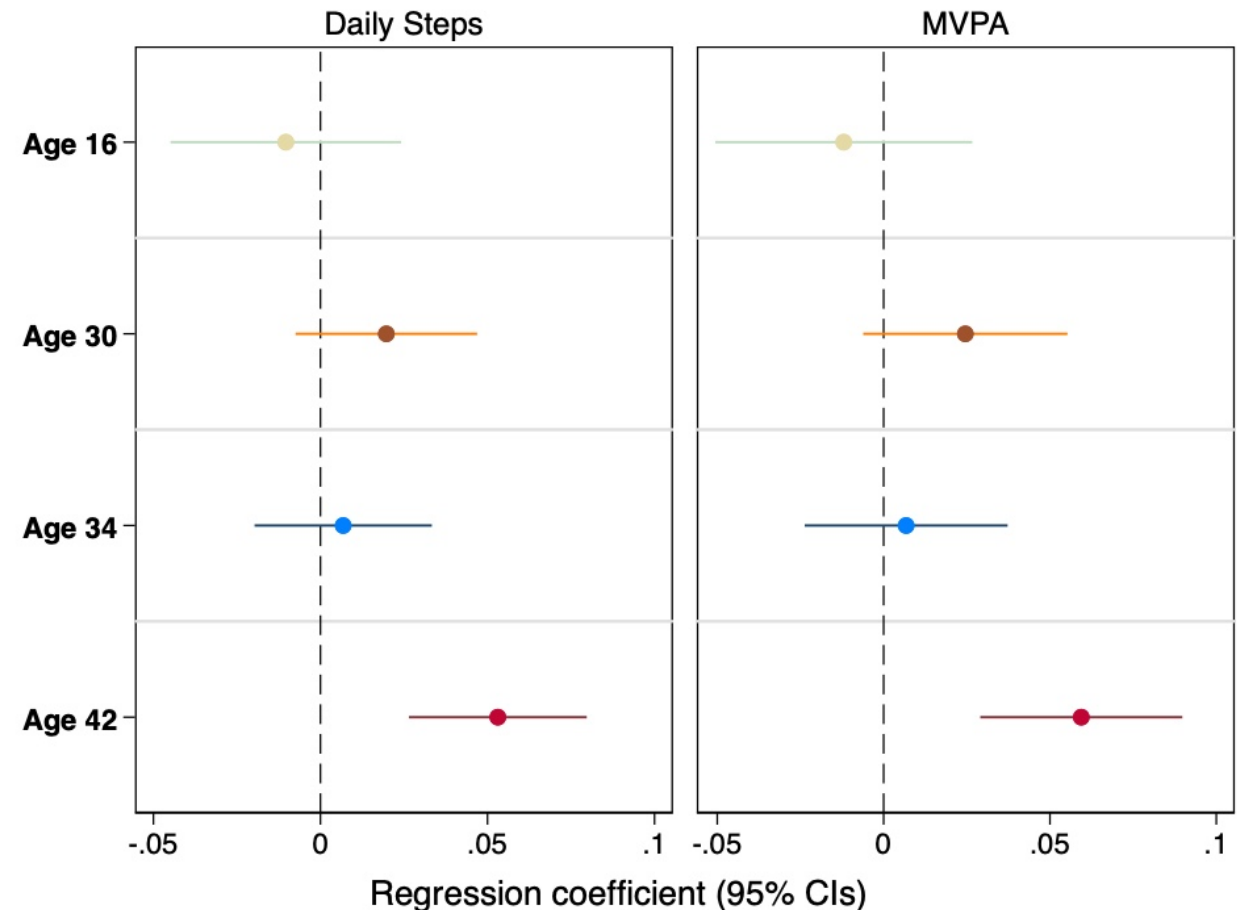
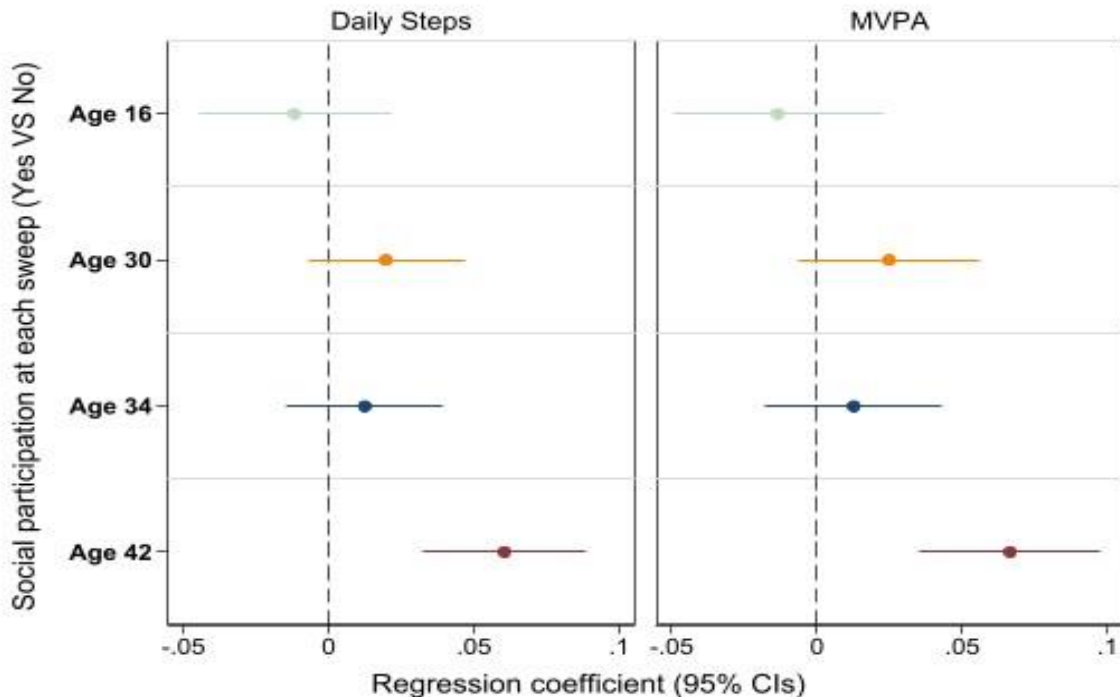
Main model



Sensitivity analysis 4: adjusting for previous PA

b. Sensitivity period model

Main model



Summary

This study adopted a life-course approach to study the association between social engagement and objectively measured physical activity in a prospective sample of middle-aged women and men.

- Overall, we found that **higher social engagement** throughout life was associated with **physical activity at middle age**.
- The association was **more pronounced for MVPA** and was maintained even after controlling for a wide range of potential confounders.
- Rather, the strongest association was found between **recent social participation (at age 42)** and physical activity in midlife (at age 46).

Strengths

- **First longitudinal examination** of the association of life-course social engagement and physical activity using one of the British birth cohorts
- **Rich information** on cohort member's socioeconomic and health **controls** over their life-course
- **Thigh-worn accelerometers** to measure Physical Activity

Limitations

- ❖ Selective attrition and the losses related with missing data
- ❖ Agnostic to the exact types of activities the cohort members engaged
- ❖ Agnostic to the frequency of engagement
- ❖ Measures of physical activity only at 1 time point

Take home message

- Our study **expands our understanding** and **provides new evidence** on the link between social participation and objective accelerometry-based measures of physical activity among middle-aged adults in the UK.
- Our study provides empirical evidence on the importance of **sustaining social participation at all ages over the life-course** rather than a particular timepoint of someone's life.
- Considering that physical inactivity is a leading risk factor linked to increased morbidity and mortality, **encouraging sustained social engagement at all ages** will be **key** to enhancing physical activity across the life-course.

Acknowledgements

Tsoli S^{a,d}, Fancourt D^b., Sullivan A^a., Hammer M. ^c, Ploubidis G.B^a, Kawachi I.^d , 2024, Life-course social participation and physical activity in midlife: Longitudinal associations in the 1970 British Cohort Study (BCS70), European Journal of Epidemiology, 2024 Mar 16. doi: 10.1007/s10654-024-01107-7

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Thank you for your attention



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Covariates

