

# Analysis of socioeconomic inequalities in sedentary behaviours

*A case for Spanish children*

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- Background
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- Results
- Conclusions

# Sedentary behaviour... what is? does it matter?



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  - Substantial explanatory factor for the prevalence of different types of conditions such as diabetes type 2, heart diseases, asthma or arthritis (Humphreys et al, 2014; Katmarzyk and Jansen, 2004)
  - Direct link to all-cause deaths (Ekeleund et al, 2015)
  - Reasonable economic burden associated with sedentary behaviours (Sari, 2009)

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  - Reasonable economic burden associated with sedentary behaviours (Sari, 2009)
- Sedentary behaviours may be associated with **low levels of physical activity**...although conceptual caveats (Pearson et. al 2014)

## ... should we care about children?



- Practising physical activity during **childhood**:
  - Good predictor of physical activity during adulthood (Telama et al. 2005)
  - Contributes to develop a healthy and sustainable lifestyle (Telama et al, 2014)
- Policies aimed at promoting **physical activity** have shown to be more effective if they are focused on particular target groups (Booth et al. 1997)
- **Socioeconomic factors** may affect the level of physical activity (Farrell et al, 2014; Humphreys and Ruseski, 2010)

# Purposes of this research



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- 1 Explore the socioeconomic inequalities associated with the probability of experiencing a sedentary behaviour for the case of Spanish children.
- 2 Investigate the main underlying determinants that generate this inequality.



# Spanish National Health Survey (2011/2012)



- Cross sectional dataset that contains information about kids, adults and households.
- Information is divided in 3 core modules: health, health care utilization and determinants of health.
- The dataset for the analysis aggregates information referred to the kids and households datasets.
- 5419 observations referred to children after removing missing values and observations of no-response corresponding to the physical activity (1.5% of the sample)

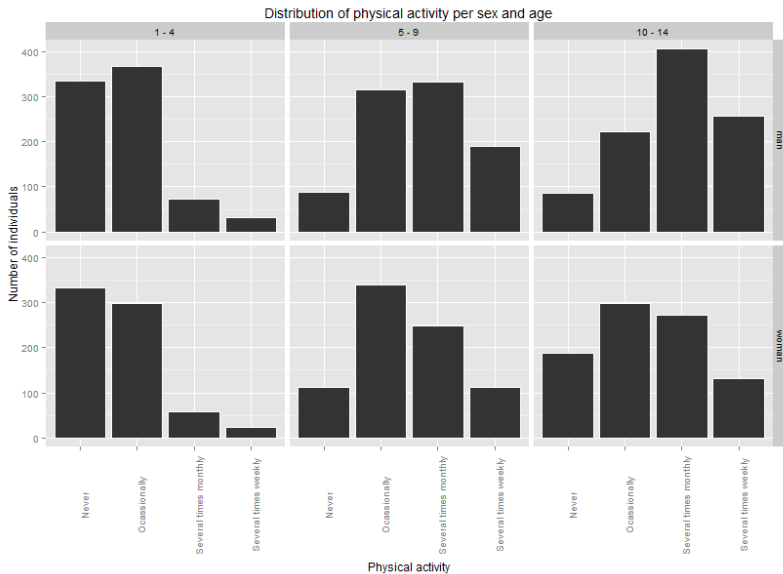
## Health variable: *sedentary behaviour*

- Latent variable.
- Information is retrieved by means of the following:
  - "How often does the child practice physical activities"?
- 4 possible categories associated with intensity: *Never*, *Occasionally*, *Several times monthly* and *Several times weekly*.
- *Sedentary behaviour* is estimated through an underlying **latent variable model**

$$y^* = x\beta + e, \quad e|x \sim N(0, 1)$$

$$Y_i = \begin{cases} 1 & \text{if } y^* > 0 \text{ never practices physical activity} \\ 0 & \text{if } y^* = 0 \text{ practices some physical activity} \end{cases}$$

$$P(y = 1 | x_i) = P(y^* > 0|x) = P(x'\beta + e > 0|x) = F(x'\beta)$$



# Explanatory variables

- *Characteristics of the children*: age, gender, mental health and physical limitations.
- *Environment*: Nationality, region, urban area (measured by population).
- *Socioeconomic status*<sup>1</sup>: high education and [income](#).

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- *Characteristics of the children*: age, gender, mental health and physical limitations.
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- *Socioeconomic status*<sup>1</sup>: high education and **income**.
  - The decomposition method requires ranking individuals according to socioeconomic status.
  - Information expressed in terms of intervals.
  - Left and right censored (e.g. *less than* and *more than...*)
  - Income is obtained through interval regression based on information of the head of the family (education attainment, social class, labour status, gender, age and region)

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# Decomposition analysis

- Health concentration indices (Kakwani, 1980; Wagstaff, 1991) measure inequalities comparing every individual's **level of health** and every individual's **rank** in the socioeconomic domain (Erreygers & Van Ourti, 2011)

$$C = \frac{2}{\mu} \text{cov}(h_i, R_i)$$

- The inequality may be decomposed in terms of the determinants of health condition Wagstaff et al. (2003):

$$C = \sum_{k=1}^k \left( \frac{\beta_k^m \bar{x}_k}{\mu} \right) C_k + \frac{GC_\epsilon}{\mu}$$

## Effects on the probability of sedentary behaviour

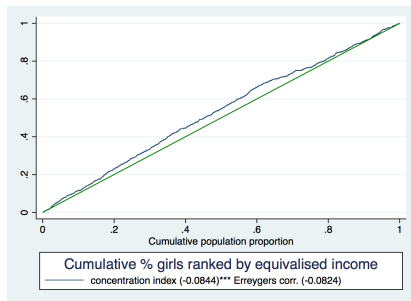
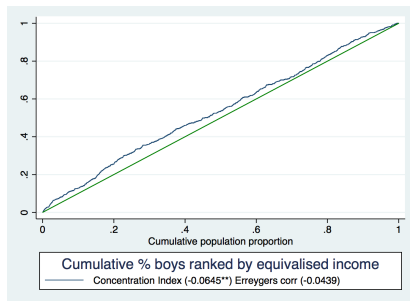


	Boys		Girls	
	Marginal effect	Standard error	Marginal effect	Standard error
Age 5-9	-0.100***	0.025	-0.141***	0.035
Age 10-14	-0.121***	0.024	-0.063	0.038
Foreign	0.035	0.032	0.109**	0.048
Limitation	0.090**	0.043	0.144***	0.051
Mental health 1	0.007	0.006	0.020***	0.007
Mental health 2	-0.009	0.007	-0.011	0.010
Mental health 3	-0.004	0.004	0.003	0.006
Mental health 4	0.021***	0.006	0.020***	0.009
Mental health 5	-0.018***	0.003	-0.028***	0.005
Rural	-0.010	0.019	-0.035	0.026
Aragón	0.069	0.054	-0.050	0.045
Asturias	0.187***	0.067	0.006	0.055
Illes Balears	0.159	0.074	0.040	0.057
Canarias	0.039	0.045	-0.160***	0.024
Cantabria	0.397	0.073	0.285***	0.078
Castilla y León	-0.016	0.034	-0.117***	0.032
Castilla la Mancha	-0.003	0.041	-0.050	0.043
Cataluña	0.080**	0.037	-0.081**	0.031
Comunitat Valenciana	0.007	0.034	-0.047	0.037
Extremadura	-0.003	0.038	-0.098**	0.036
Galicia	0.002	0.037	-0.037	0.041
Madrid	-0.016	0.030	-0.064*	0.035
Murcia	0.081	0.049	0.094*	0.060
Navarra	0.103**	0.060	0.085	0.071
País Vasco	-0.093***	0.020	-0.170***	0.023
Rioja	0.002	0.049	-0.119**	0.037
Ceuta y Melilla	0.132**	0.073	-0.001	0.059
Degres	-0.039*	0.019	-0.030	0.027
Logit(income)	-0.020	0.016	-0.051**	0.024
No. of obs.	2443		2219	
Wald test	355.31		283.48	
Pseudo R	0.22		0.17	

\*\*\*, \*\*, \* represent significant coefficients from zero (P<0.01), (P<0.05) and (P<0.1)

Omitted categories: Age 1-5 and Andalucía

# Concentration index and concentration curves





# Summary of decomposition results

	Boys		Girls	
	Partial concentration index	% Contribution	Partial concentration index	% Contribution
Age	-0.028	-11.14%	0.002	3.65%
Foreign	-0.219	6.07%	-0.220	10.97%
Limitation	-0.045	2.36%	-0.001	0.03%
Mental health	-0.229	-7.34%	-0.262	2.01%
Rural	-0.046	-0.87%	-0.037	-1.16%
Region	0.241	-10.71%	0.275	10.82%
Education	0.522	40.15%	0.544	19.13%
Income	0.039	46.33%	0.041	67.93%
Residual	0.352		-0.134	

# Main insights

- Evidence of **social gradient** associated with the probability of experience sedentary behaviours.
  - **Girls** present a higher level of inequality than boys.
  - **Income** of the head of the family seems to be contribute to total inequality in more extent than the level of education.
  - The contribution of **education** referred to the head of the family is more remarkable for the case of boys.
- The **nationality** and the **mental health** referred to the children contribute differently to inequality depending on the gender.
  - Also the region of residence but more challenging interpretation.

# Limitations



Some issues need to be addressed in the future...

- The definition of sedentary behaviour and the consideration of further explanatory variables that may affect (e.g. family composition, education attainment of other members within the household...)
- Specification issues of the model
  - Income estimation
  - Missing data
  - Other?

Thank you for listening!

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