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# RELATIONSHIP BETWEEN PHYSICAL LITERACY (PL), FAT MASS AND PHYSICAL ACTIVITY (PA) LEVEL IN MIDDLE SCHOOL STUDENTS



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## INTRODUCTION

In 2021 the health report of adolescents is worrying

- 15% of boys and 18% of girls are overweight and obese (Verdot et al., 2017)
- A decrease in the number of 11-14 year olds reaching PA recommendations (-8% for girls and -2% for boys in 4 years) (Verdot et al., 2020) and a decrease in their physical fitness (Vanhelst et al., 2020)



It is therefore important to find strategies to increase active behaviours among school children (Simon et al., 2014)

### Physical literacy :

"The motivation, confidence, physical competence, knowledge and understanding that an individual possesses that **enables them to value and take ownership of their commitment to lifelong physical activity**" (International Physical Literacy Association., 2014)

- LP level is a positive determinant of health among adolescents (Caldwell et al., 2020)
- LP level is positively associated with PA participation (Brown et al., 2020)
- In adolescents, the higher the LP level, the better the physical condition (Lang et al., 2018)
- There is a negative association between health literacy and obesity in adolescent aged 10-12 years (Kanellopoulou et al., 2020)

A good LP level means having good motor and psycho-motivational skills to adhere to PA throughout one's life (Sum et al., 2018)

However, none of these relationships have been shown in French schoolchildren

The hypothesis is that LP levels are positively associated with physical fitness and PA levels and negatively associated with fat mass in French adolescents.

## METHOD

- Cross-sectional study as part of a 3-year project to manage overweight and obese adolescents through adapted physical activity: CAPACITES 64

- The measurements were carried out on pupils in the 6th grade (10-13 years old) at the Marracq school in Bayonne (64). These pupils had no severe disabilities or neurological problems. The evaluations took place between February and June 2021

### Anthropometric data :

Height, weight  
(Cole et al., 2000)

### Impedance measurement:

The medical impedance meter " Biody XpertZMII ", AMINOGRAM. The data retained: **fat mass (%)**, **lean mass (%)** and **skeletal muscle mass (%)** (Talma et al., 2013)

### Perceived Physical Literacy Instrument (PPLI) (Sum et al., 2016) :

The level of physical literacy was assessed through a self-administered questionnaire. (Gandrieau et al., in submission). **The total literacy score, between 0 and 45.**

**Shuttle walk/run test over 20m (Quinart., 2015):** Assessment of **cardiorespiratory fitness**, adapted shuttle test (Leger et al., 1988). Two indicators: **maximum aerobic speed (km/h)** and **estimated VO2 (ml/kg/min-1)**

### Youth Risk Behaviour Surveillance System (YRBSS) (Guedes et al., 2010) :

**The PA levels of the schoolchildren were assessed using a self-administered questionnaire.** Crude and intensity-adjusted physical activity levels (min/week)

## RESULTS

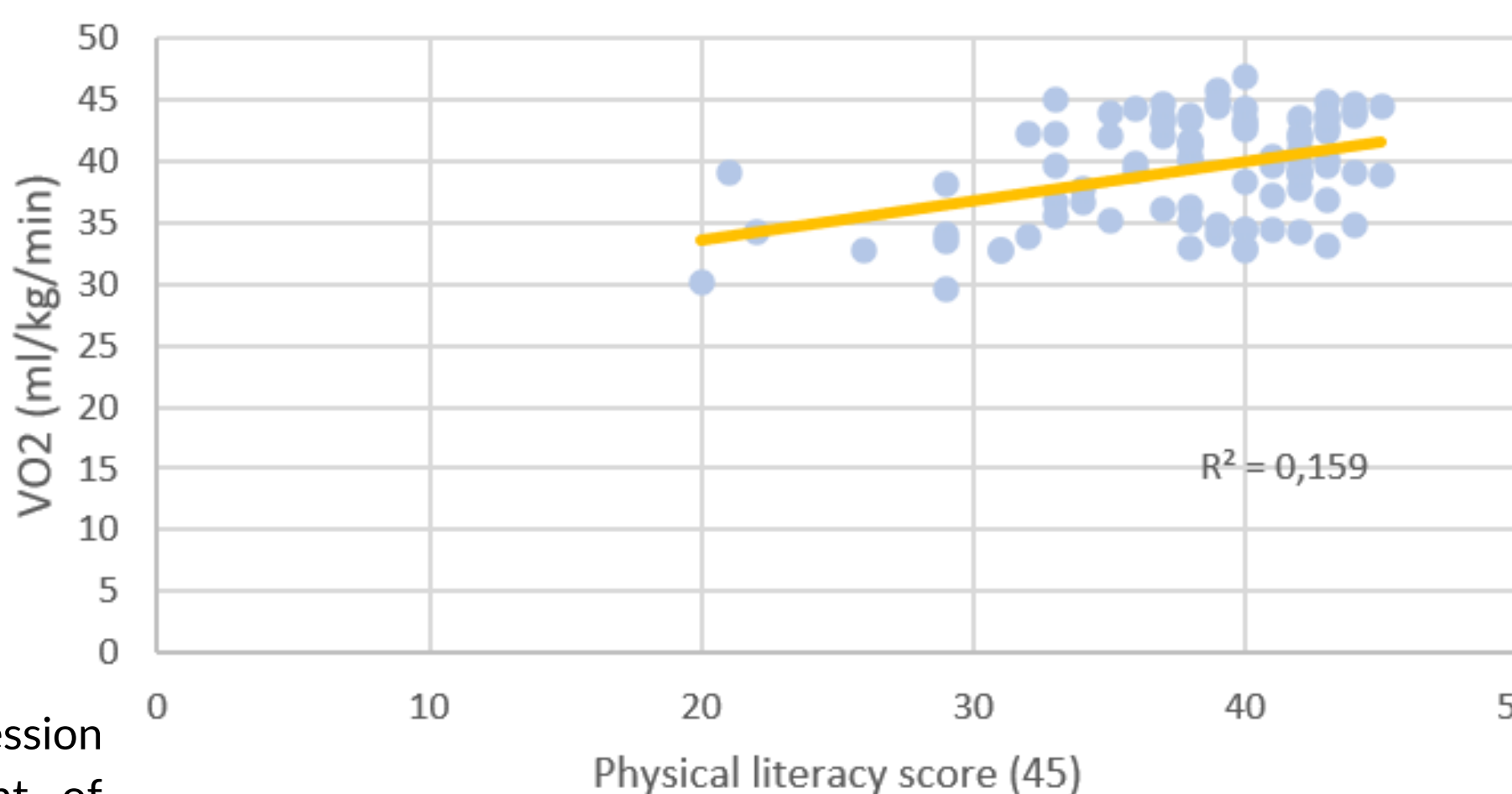
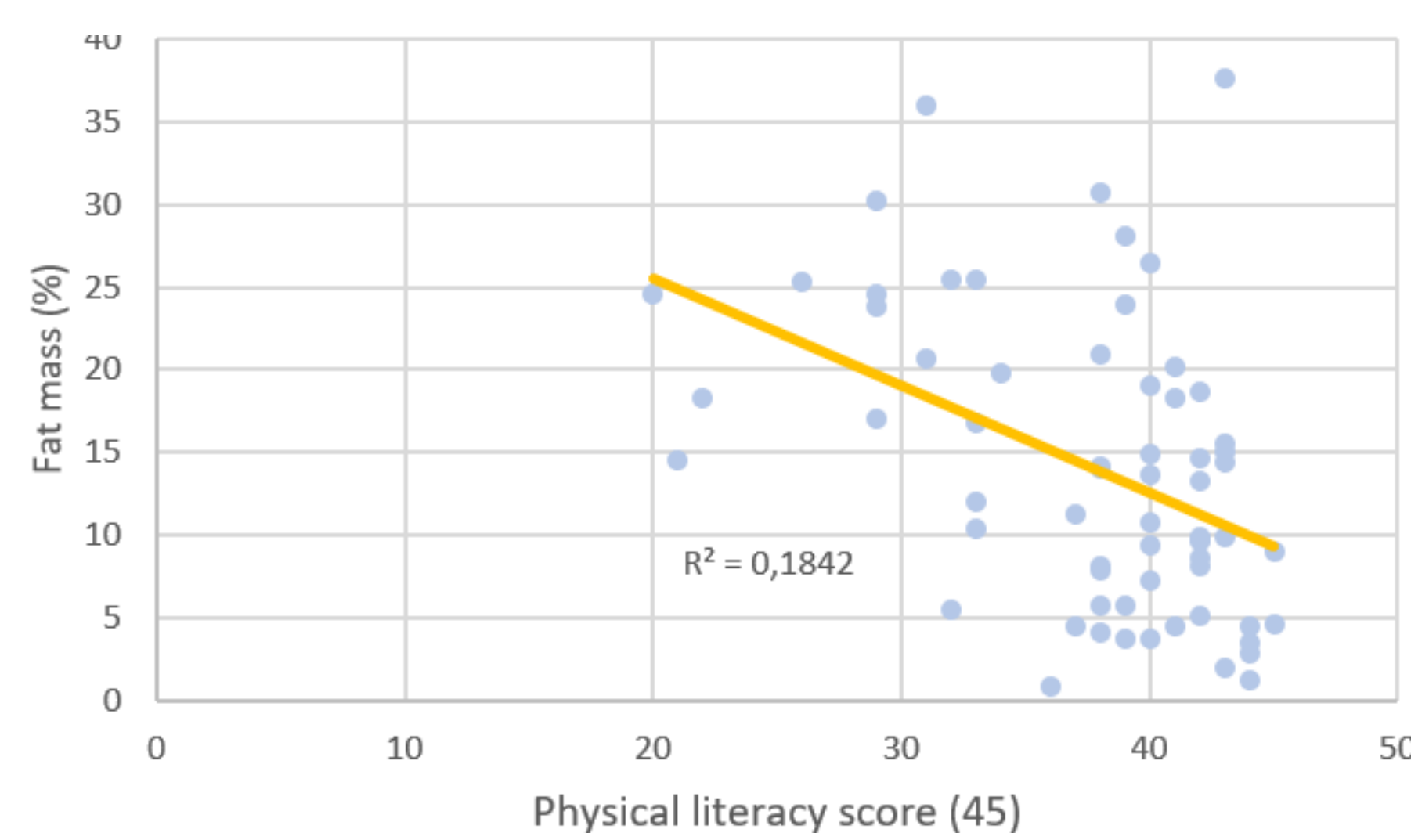
85 schoolchildren  
12.12 (±0.4) years old  
38% girls / 62% boys

84,7% normal weighted  
9,4% overweight  
3,5% obesity  
2,4% underweight

Relationship between LP, fitness and PA levels and weight status

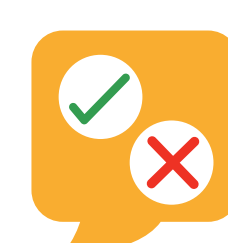
Variable	B (95% IC)	r <sup>2</sup>	p-value
<b>PL score</b>			
FM	-0,64 (-0,99 ; -0,30)	0,18	<0,001
SMM	0,34 (0,11 ; 0,57)	0,13	<0,001
Physical fitness (VO2)	0,31 (0,16 ; 0,47)	0,16	<0,05
Ajust PA time (min/sem)	12,50 (6,52 ; 18,48)	0,19	<0,001

FM: fat mass; SMM: skeletal muscle mass; B: regression coefficient; CI: confidence interval; r<sup>2</sup>: coefficient of determination; p-value: probability of rejecting the null hypothesis (p=0.05)



## DISCUSSION

- A **negative and significant** association between LP and body fat ( $\beta = -0,61$ )
- **No association** between LP and BMI ( $\beta = 0,05$ )
- A **positive and significant** association between LP and physical fitness ( $\beta = 0,31$ ) as well as between LP and PA time ( $\beta = 12,50$ )



Adolescents with the **lowest levels of LP** are those with the **highest levels of body fat**

Caldwell et al., 2020

Adolescents with the **lowest fitness level had the lowest LP scores**. Furthermore, this result is found between **skeletal muscle mass and LP**

Lang et al., 2018

Adolescents with the **least amount of PA time per week** had the **lowest LP scores**.

Brown et al., 2020

### Limits

- Modest sample size
- Only a perceived evaluation of the LP
- A subjective assessment of PA levels
- Work still in progress on the reliability of anthropometric data

## CONCLUSION / PERSPECTIVES

LP is negatively associated with body fat and positively associated with physical fitness and PA level. **Based on these results, the CAPACITES 64 management programme and its longitudinal follow-up can be started. It will aim to develop physical literacy in adolescents with a risk profile to increase their physical activity levels and improve their long-term health.** This project will be built around evaluations, physical activity sessions and education sessions on key health behaviours.

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