Anthropometric, physical fitness and psychological profile of adolescent rock climbers from the South of Spain: predictors of performance




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Introduction

Background

Sport climbing popularity has increased in the last years

Research on anthropometrical, psychological and physiological characteristics and adaptations

Mainly focused on **adults**

Watts et al. Eur J Appl Physiol 2004 Giles et al. Sports Med 2006 España-Romero. Int J Med & Sports Sci 2009

Introduction

Background

What about **children?**

- **Watts et al. 2003** → Anthropometry of 90 competitive climbers mean aged 13.5 y.
- **Morrison & Schoeffl, 2007** → Physiological responses and risks in youth
- **Balas et al. 2009** → Changes in strength and body composition in 50 climbers aged 10-17
- **Watts & Ostrowski, 2014** → Measure oxygen uptake and energy expenditure in children during rock climbing activities typical of school-based programs.

Introduction

Hypothesis

Physical fitness → Health related*

What about rock climbers?

- Upper limb strength
- Speed?
- Agility?
- Cardiorrespiratory fitness?

*Ortega et al., 2008, Int J Obes; Ruiz et al., BJSM, 2009

Introduction

Aims

(I) To **describe** the **physical fitness**, **anthropometric** and **psychological** characteristics of **young** Spanish climbers aged 12-18y, and to **compare** them with sex- and age-matched reference data from large national or European surveys.

(II) To **identify** which physical fitness, anthropometric and/or psychological **factors may** determine climbing **performance** in youth.

Methods

Design → Cross-sectional study

Participants → 19 (16 males) aged 12-18 years
Adolescent rock climbers from the South of Spain
Onsight rate V+ to 8a Training rate V+ to 8a+

Dependent variable → Climbing performance (onsight and trained rate)

Independent variable → Physical fitness levels, anthropometry, and psychological factors.

Independent variable → **Physical fitness levels, anthropometry,** d

Extended ALPHA Health-Related Fitness Test Battery for Children and Adolescents

Cardiorespiratory fitness	Musculoskeletal fitness	Body composition	Motor fitness
20m shuttle run test	Handgrip strength	Weight & Height (BMI)	
	Standing long jump	Waist circumference	
	Bent Arm Hang	Triceps & Subscapular skinfold thickness	4x10m shuttle run test

Humeral diameter
Femur diameter
Body surface

Somatotype

Independent variable → Physical fitness levels, anthropometry, and **psychological factors.**

Climbing motivation

- Basic motivation
- Daily motivation
- Extrinsic motivation
- Intrinsic motivation
- Ego oriented to
- Task oriented to

Buceta et al., 1999

Sport commitment

- Current level
- Future level

Orlick et al., 2004

Methods

Statistical analyses

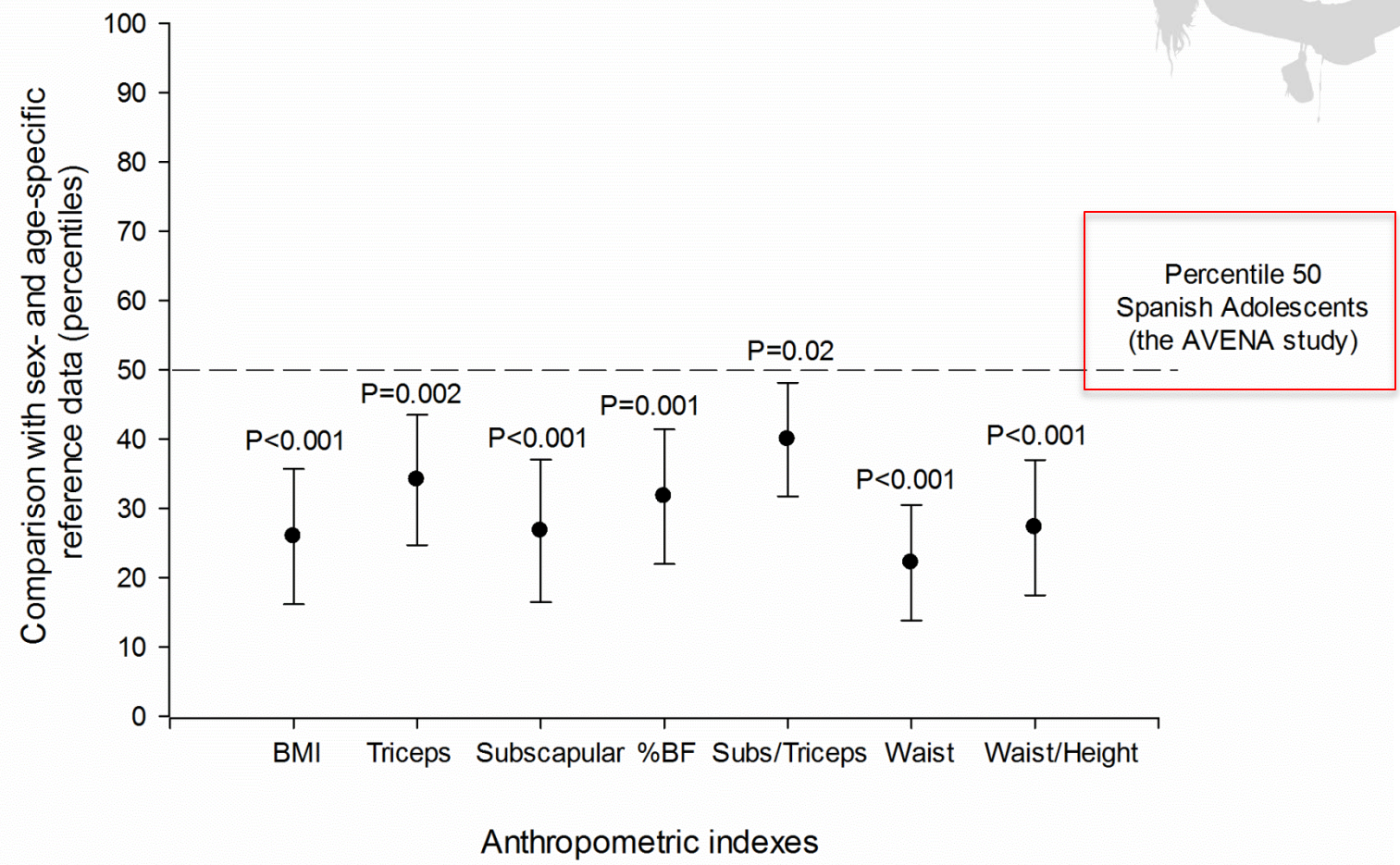
Relation of our sample with AVENA and HELENA percentiles (Aim 1)
ONE SAMPLE T-TEST

Relationship between potential predictors and performance (Aim 2)
PARTIAL CORRELATION MODELS
STEP REGRESSION MODELS

SPSS software (version 20.0.0) α =5%

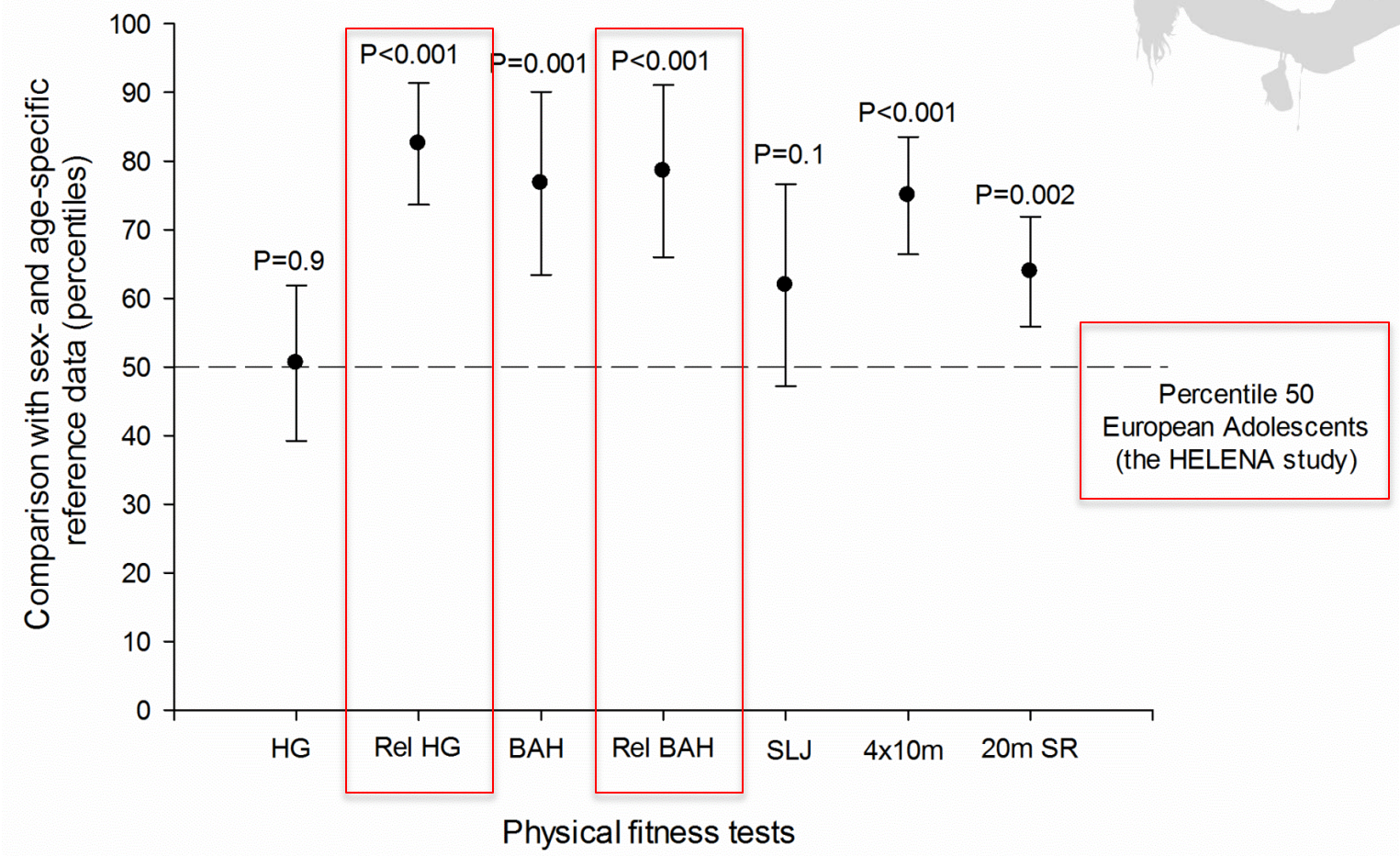
Results & Discussion

Anthropometry



Results & Discussion

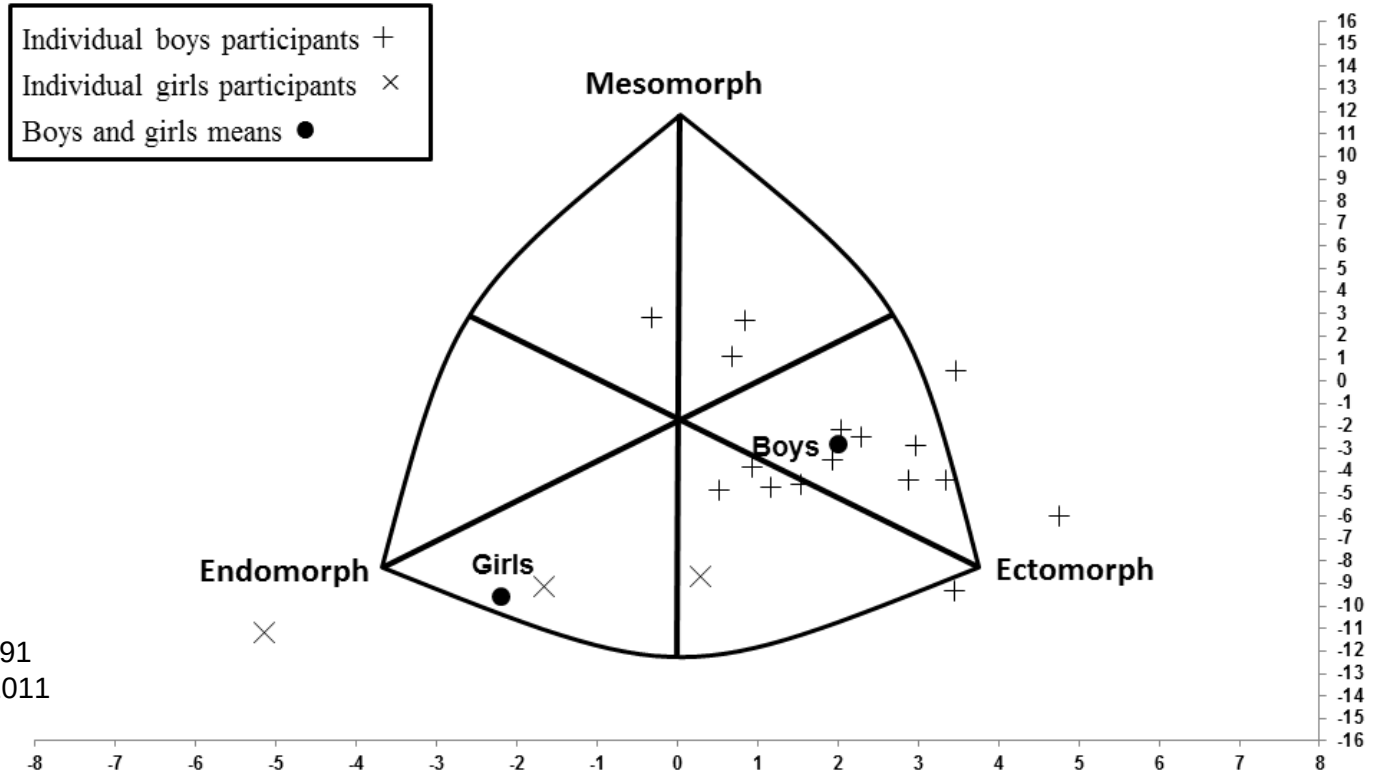
Physical fitness



Results & Discussion

Somatotype

Somatotype indicated values of 2.5±1.1, 1.2±1.6 and 3.9±1.2 for Endomorphy, Mesomorphy and Ectomorphy respectively



Viviani et al., JSMPF, 1991
Alvero-Cruz et al., IJM, 2011

Results & Discussion

Partial correlation of anthropometric and psychological with climbing performance

Variables	Onsight Grade		Trained Grade	
	r	P	r	P
Climbing experience	0.730	**0.001**	0.686	**0.003**
Training days per week	0.628	**0.009**	0.648	**0.007**
Anthropometric/Body composition				
Height	-0.538	**0.031**	-0.570	**0.021**
Body surface	-0.524	**0.037**	-0.487	**0.056***
Somatotype				
Mesomorphy	0.597	**0.015**	0.514	**0.042**
Psychology				
Daily motivation	0.710	**0.002**	0.750	**0.001**

**Borderline significant*

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Results & Discussion

Partial correlation of fitness with climbing performance

Variables	Onsight Grade		Trained Grade	
	r	P	r	P
Physical fitness				
Handgrip strength	0.219	0.415	0.163	0.546
Relative handgrip strength	0.412	0.113	0.384	0.142
Bent arm hang	0.207	0.441	0.020	0.942
Bent arm hang/weight ratio	0.223	0.406	0.034	0.901
Standing long jump	0.308	0.247	0.169	0.532
One leg stand	-0.059	0.830	-0.178	0.511
4x10 meter shuttle run	-0.245	0.378	-0.112	0.691
20 meter shuttle run	0.172	0.540	0.091	0.748

Results & Discussion

Stepwise lineal regression

		Standardized B coefficient	Sig	R Square	R Square Change
Step 1	Age	0.231	0.334	0.200	0.200
	Sex	0.093	0.714		
	City	0.321	0.217		
Step 2	Age	0.205	0.231	0.626	0.426
	Sex	-0.053	0.774		
	City	0.379	0.050		
	Climbing Experience	0.668	0.001		
Step 3	Age	0.046	0.770	0.746	0.120
	Sex	-0.012	0.941		
	City	0.414	0.017		
	Climbing Experience	0.528	0.004		
	Training days per week	0.409	0.027		
Step 4	Age	-0.121	0.387	0.853	0.106
	Sex	-0.402	0.046		
	City	0.425	0.004		
	Climbing Time	0.523	0.001		
	Training days per week	0.249	0.104		
	Mesomorphy	0.579	0.012		

Limitations & Strengths

LIMITATIONS

- Low number of participants (N=19) → Only 3 female
- Fitness test are not specifically designed for climbers
- Indirect measurements → Kinanthropometry

STRENGTHS

- Significant number for adolescent rock climbers
- Reliabilty and validity of the tests

Conclusion

Adolescent rock climbers from the South of Spain have

Lower levels of total and central **adiposity** than the reference values and **better fitness** than the average European reference values

Variables that may contribute to climbing performance are

A **mesomorphic** somatotype, **low height, body surface** and high levels of **daily motivation**

Acknowledgements

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Collabor

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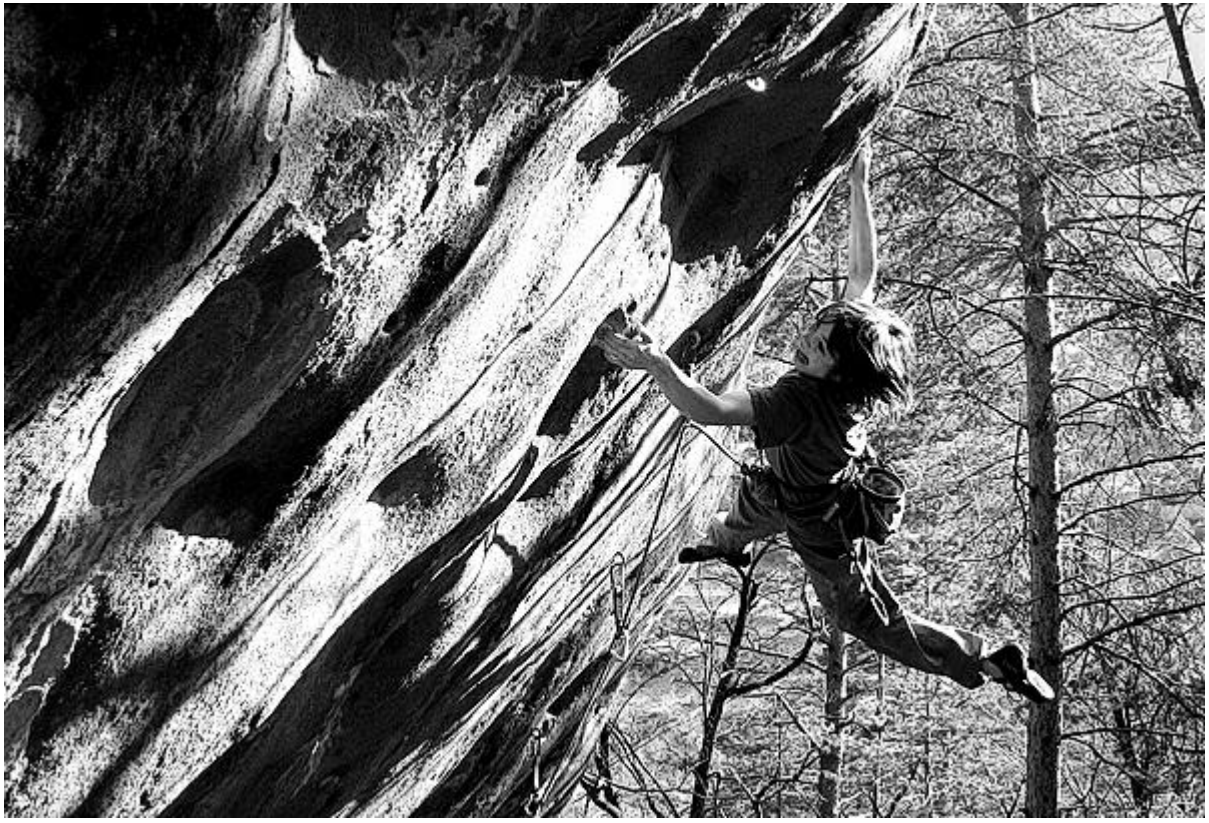
Acknowledgements

Inma Garrido

Carlos Corpas



Thank you for your attention!

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