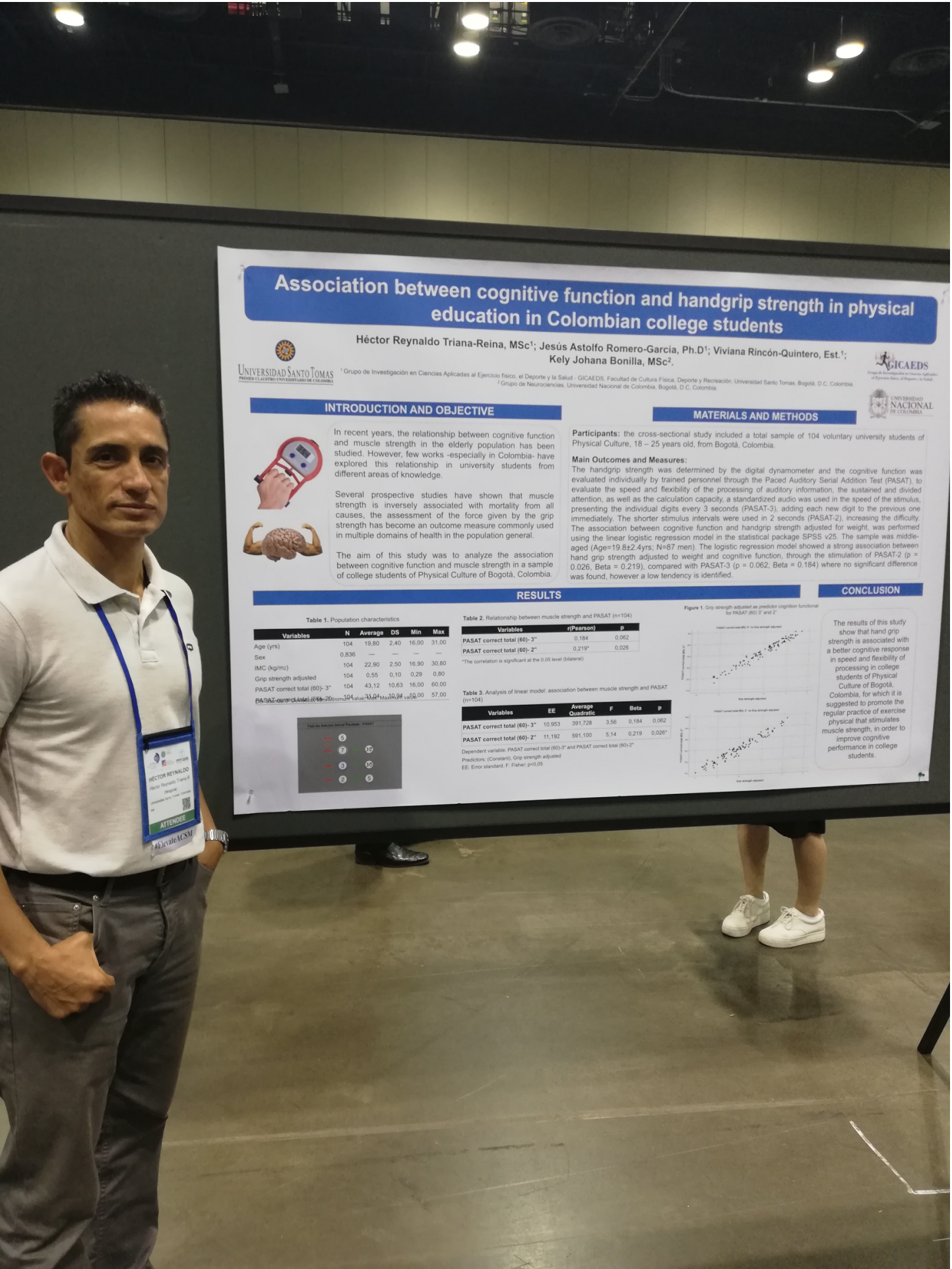




Association between cognitive function and handgrip strength in physical education in Colombian college students

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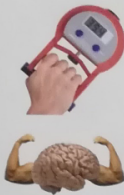
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INTRODUCTION AND OBJECTIVE



In recent years, the relationship between cognitive function and muscle strength in the elderly population has been studied. However, few works -especially in Colombia- have explored this relationship in university students from different areas of knowledge.

Several prospective studies have shown that muscle strength is inversely associated with mortality from all causes, the assessment of the force given by the grip strength has become an outcome measure commonly used in multiple domains of health in the population general.

The aim of this study was to analyze the association between cognitive function and muscle strength in a sample of college students of Physical Culture of Bogotá, Colombia.

MATERIALS AND METHODS

Participants: the cross-sectional study included a total sample of 104 voluntary university students of Physical Culture, 18 – 25 years old, from Bogotá, Colombia.

Main Outcomes and Measures:

The handgrip strength was determined by the digital dynamometer and the cognitive function was evaluated individually by trained personnel through the Paced Auditory Serial Addition Test (PASAT), to evaluate the speed and flexibility of the processing of auditory information, the sustained and divided attention, as well as the calculation capacity, a standardized audio was used in the speed of the stimulus, presenting the individual digits every 3 seconds (PASAT-3), adding each new digit to the previous one immediately. The shorter stimulus intervals were used in 2 seconds (PASAT-2), increasing the difficulty. The association between cognitive function and handgrip strength adjusted for weight, was performed using the linear logistic regression model in the statistical package SPSS v25. The sample was middle-aged (Age=19.8±2.4yrs; N=87 men). The logistic regression model showed a strong association between hand grip strength adjusted to weight and cognitive function, through the stimulation of PASAT-2 ($p = 0.026$, Beta = 0.219), compared with PASAT-3 ($p = 0.062$, Beta = 0.184) where no significant difference was found, however a low tendency is identified.

RESULTS

Table 1. Population characteristics

Variables	N	Average	DS	Min	Max
Age (yrs)	104	19.80	2.40	16.00	31.00
Sex	0.836	—	—	—	—
IMC (kg/m ²)	104	22.90	2.50	16.90	30.80
Grip strength adjusted	104	0.55	0.10	0.29	0.80
PASAT correct total (60)-3"	104	43.12	10.63	16.00	60.00
PASAT correct total (60)-2"	104	33.04	10.94	16.00	57.00

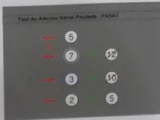


Table 2. Relationship between muscle strength and PASAT (n=104)

Variables	r(Pearson)	P
PASAT correct total (60)-3"	0.184	0.062
PASAT correct total (60)-2"	0.219*	0.026

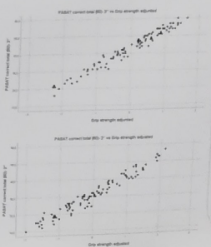
*The correlation is significant at the 0.05 level (bilateral)

Table 3. Analysis of linear model: association between muscle strength and PASAT (n=104)

Variables	EE	Average Quadratic	F	Beta	P
PASAT correct total (60)-3"	10.953	391.728	3.56	0.184	0.062
PASAT correct total (60)-2"	11.192	591.100	5.14	0.219	0.026*

Dependent variable: PASAT correct total (60)-3" and PASAT correct total (60)-2"
Predictors: (Constant), Grip strength adjusted
EE: Error standard, F: Fisher, p<0.05

Figure 1. Grip strength adjusted as predictor cognitive functional for PASAT (60)-3" and 2"



CONCLUSION

The results of this study show that hand grip strength is associated with a better cognitive response in speed and flexibility of processing in college students of Physical Culture of Bogotá, Colombia, for which it is suggested to promote the regular practice of exercise physical that stimulates muscle strength, in order to improve cognitive performance in college students.