



The placebo effect on dual task in gait performance

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Introduction

The ability to perform two tasks simultaneously is an essential feature of daily life. In the elderly, this ability becomes more difficult when two tasks (e.g., walking and talking) share common attentional resources. In this case, the increased attentional load for a specific task reduces the available resources for completing a second task (Li et al., 2018).

Studies on the placebo effect, defined as a physical or psychological benefit following the administration of an inert treatment together with a positive context about its effect (Benedetti et al., 2011), have shown that positive expectations induce better motor performance (Fiorio et al., 2018)

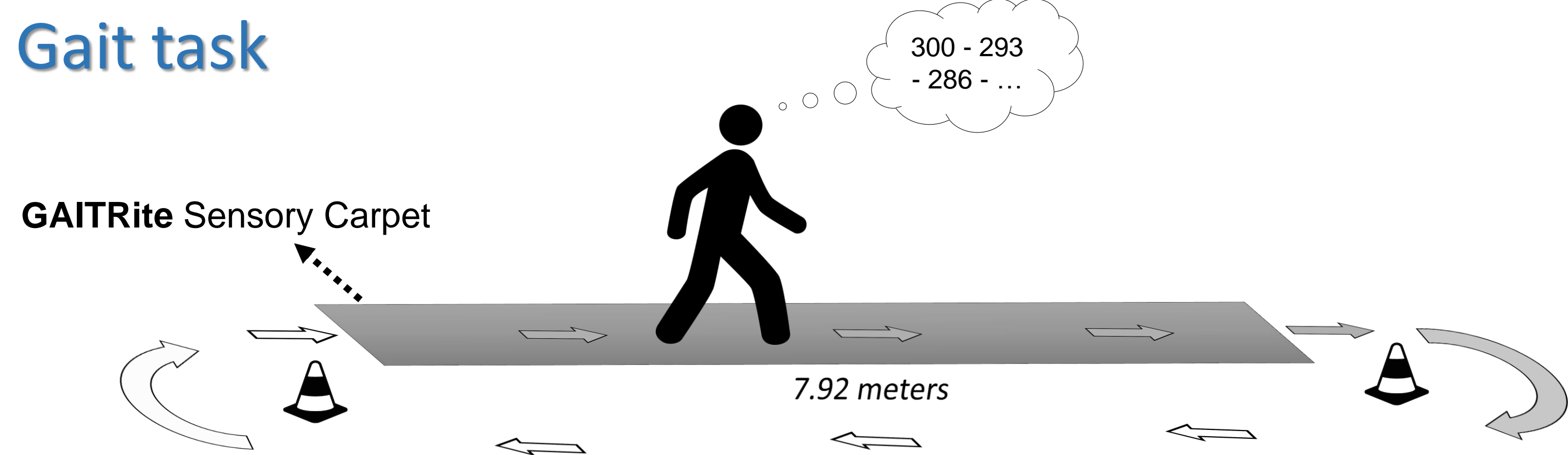
We aim at investigating whether a placebo effect, consisting of a verbal suggestion can improve the performance of cognitive-motor dual-task in the elderly population.

Material & Methods

Participants

Groups	N	Age	BMI (Kg/m ²)	Leg's length (cm)	School years
Placebo	N = 18 (9 females)	67,89 ± 6,56	24,55 ± 2,19	Right: 78,97 ± 4,82 Left: 78,83 ± 4,65	10,88 ± 3,47
Control	N = 17 (10 females)	65,18 ± 4,28 y.o.	25,30 ± 2,16	Right: 77,58 ± 4,56 Left: 77,61 ± 4,48	12,00 ± 4,04

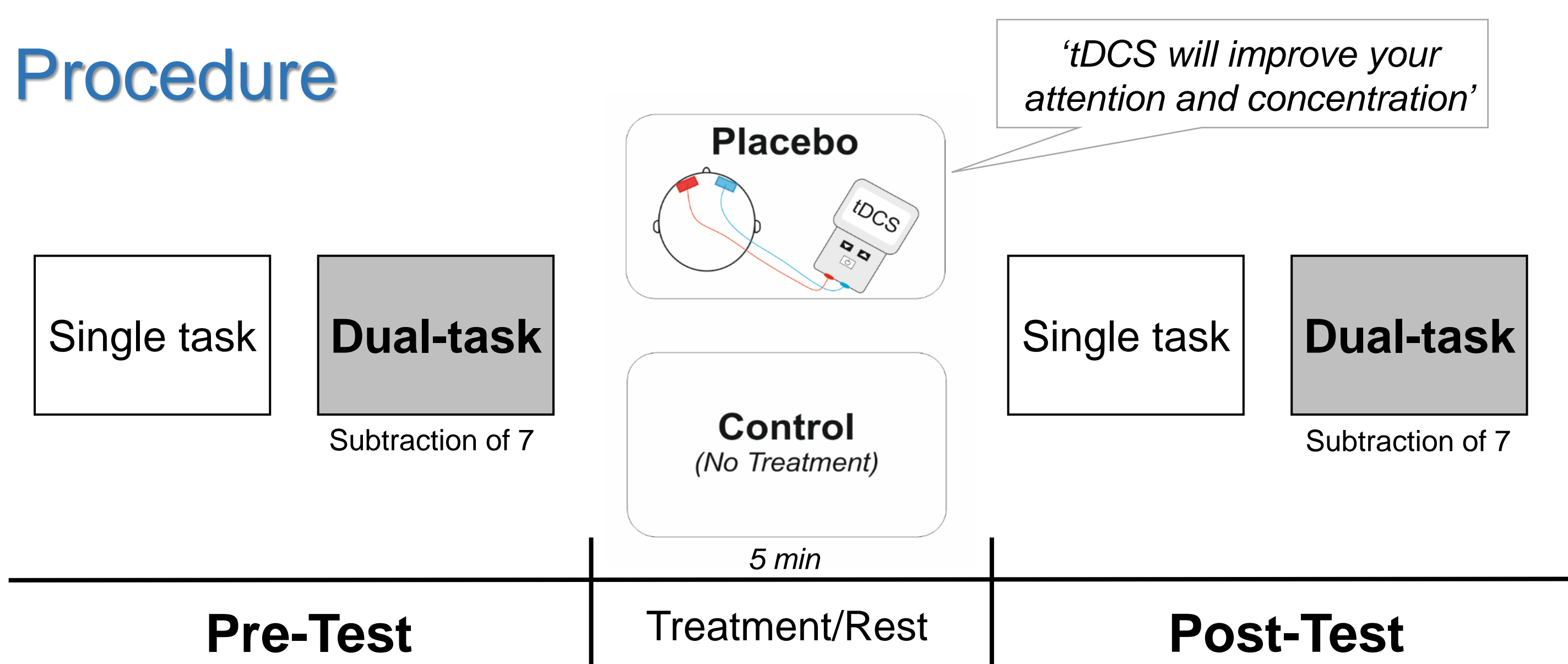
Gait task



Single task (ST): walking at their self-selected and usual pace continuously for a total of 6 rounds without stopping.

Dual-task (DT): ST while performing a count down with a serial subtraction of 7 by a starting number (300/500)

Procedure



Measurements

Gait Parameters

- **Speed:** distance travelled divided by the duration.
- **Stride length total:** distance between successive points of initial contact of the same foot
- **Step length total:** distance between the initial contact of one foot and the initial contact of the opposite foot
- **Stride speed:** stride length divided by step time

Dual-task Cost

$$C = \frac{-(DT-ST)}{ST} \times 100$$

C= cost; DT= dual-task; ST= single task

Cognitive and subjective parameters:

- Number of subtractions and number of errors.
- Perception of mental fatigue (VAS) ranging from 0 (not fatigued) to 10 (extremely fatigued)

Analysis of data

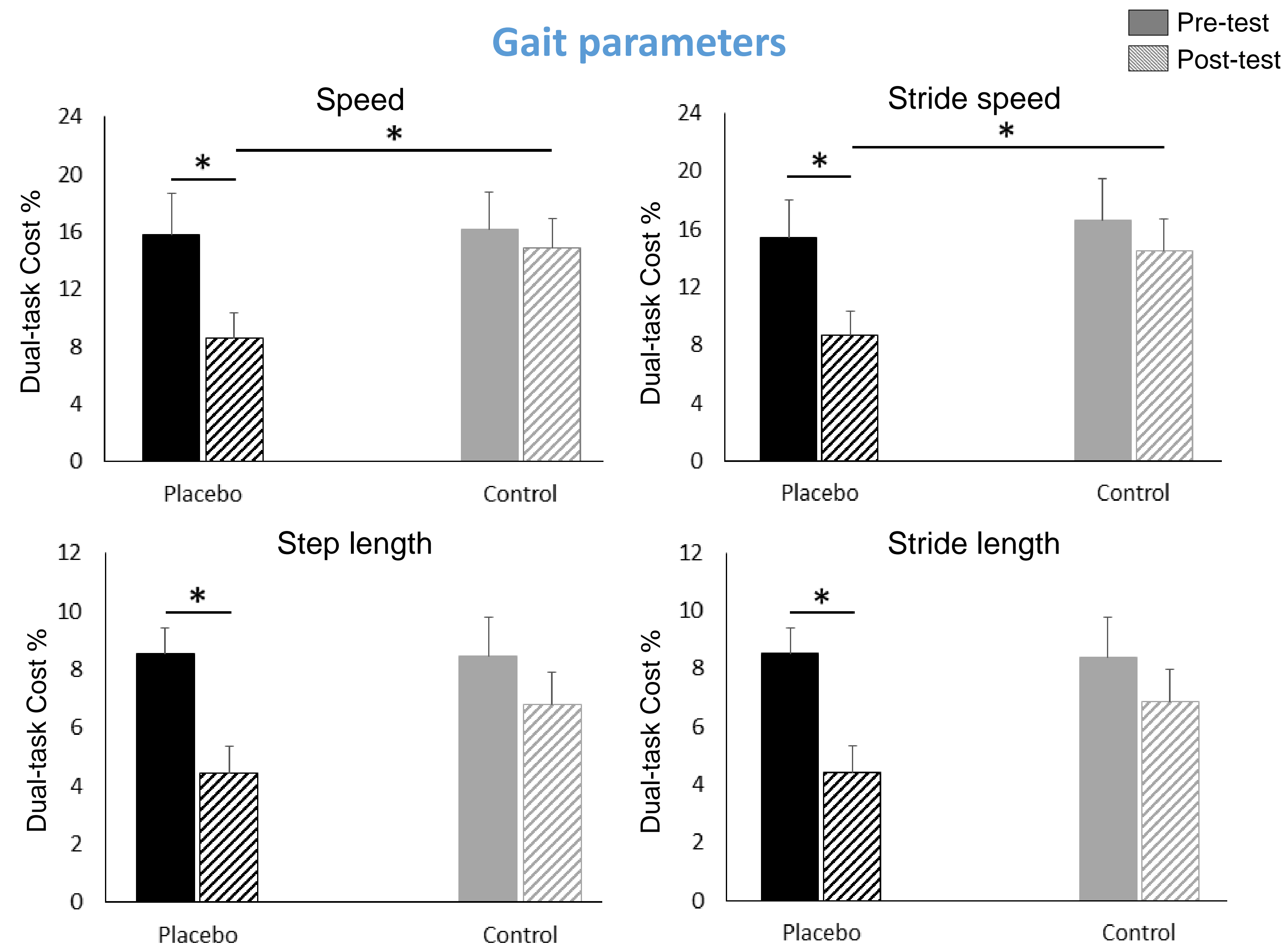
Repeated measure ANOVA for Dual-task Cost of gait and Cognitive parameters with Session (Pre-test, Post-test) as within-subjects and Group (Placebo, Control) as between-subjects factors.

Perception of mental fatigue was analysed by means of **Mann-Whitney U test** and **Wilcoxon signed-rank**.

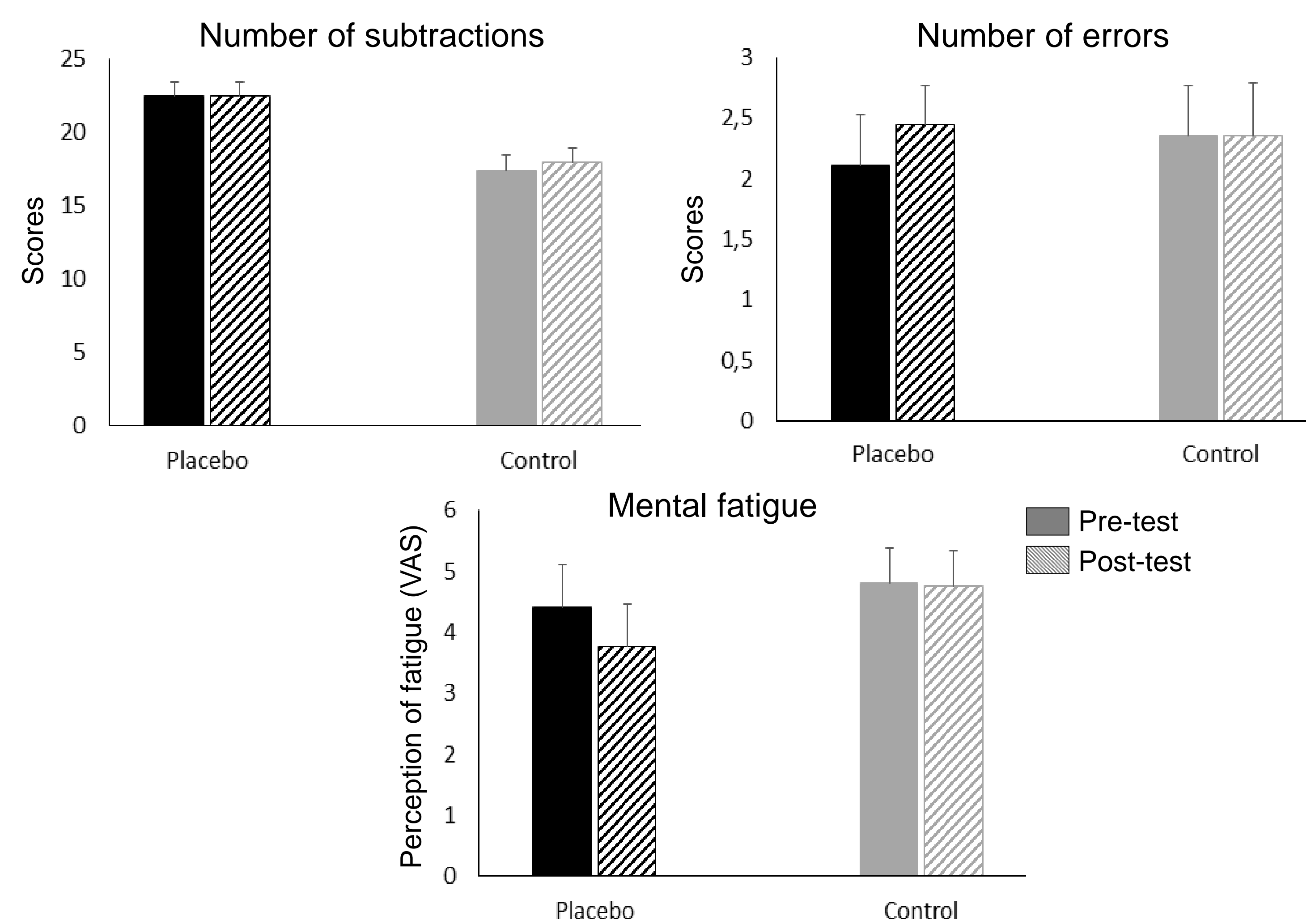
Post-hoc comparisons: independent and paired t-test. The significance was set at $p \leq 0,05$ and data are represented as mean ± SEM.

Results

Gait parameters



Cognitive and subjective parameters



Discussion

Speed and stride speed cost in the dual-task was lower in the placebo group than the control group at the post-test. Moreover, it decreased from pre-test to post-test only in those participants who received a placebo procedure of improvement of attention and concentration.

Step length and stride length cost showed a significant reduction at the post-test compared to the pre-test in Placebo group.

The total number of subtractions and the number of errors were stable across sessions in both groups. Finally, the perception of mental fatigue was not modulated by the placebo procedure.

Take-home message

The placebo procedure could be a potential method to reduce the attentional costs of a cognitive-motor dual-task and thus improving gait in the elderly population.

References

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