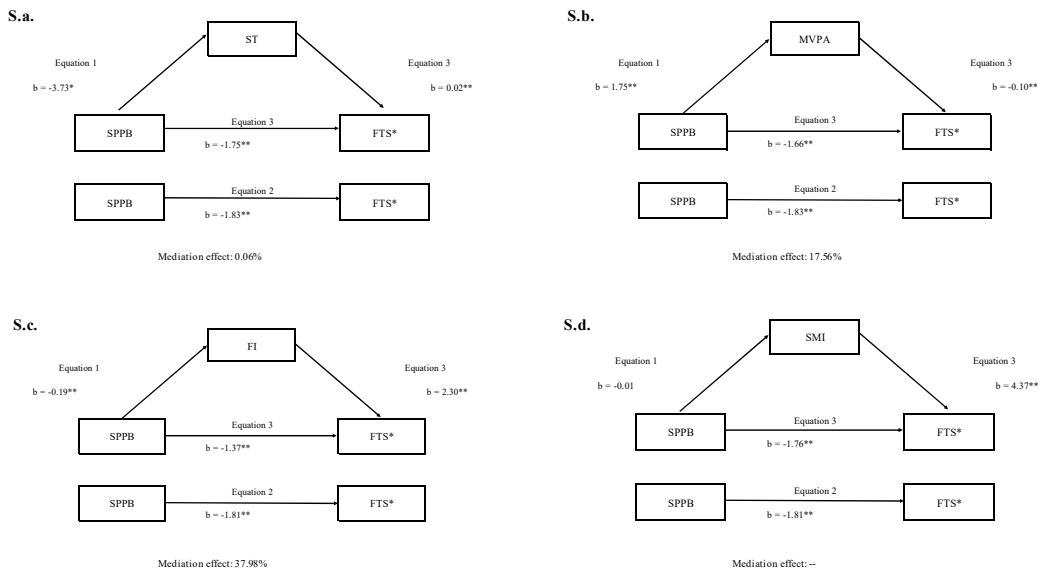**Supplementary File 1**. Simple mediation models of the associations between physical fitness (SPPB) and frailty (modified FTS), with movement behaviors and body composition as independent mediators in older adults.
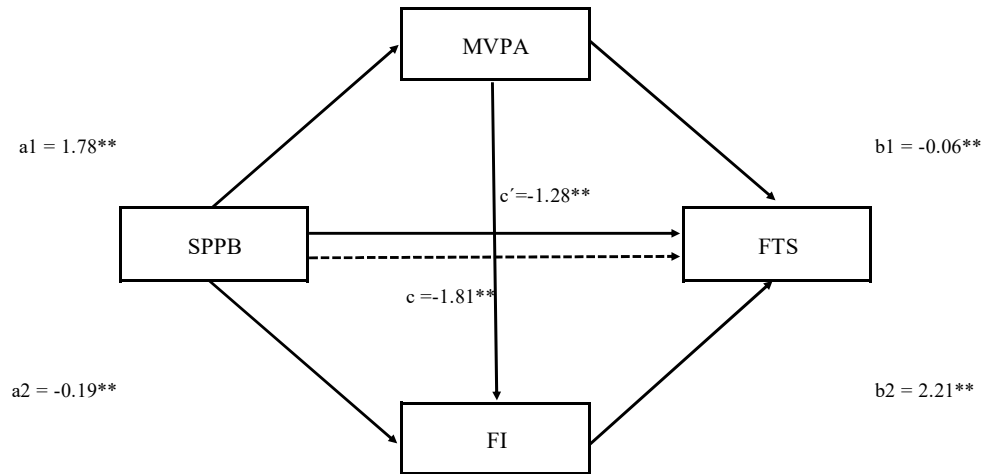
a. Association between SPPB and modified FTS mediated by sedentary time (ST);

b. Association between SPPB and modified FTS mediated by moderate-to-vigorous physical activity (MVPA);

c. Association between SPPB and modified FTS mediated by fat index (FI);

d. Association between SPPB and modified FTS mediated by skeletal muscle index (SMI). *p<0.05; **p<0.001. FTS*: modified FTS with variables included in the SPPB removed. All models were adjusted for age, sex and educational status.

S.a.

Equation 1
b = -3.73*

ST

Equation 3
b = 0.02**

SPPB — FTS*
Equation 3
b = -1.75**

SPPB — FTS*
Equation 2
b = -1.83**

Mediation effect: 0.06%

S.b.

Equation 1
b = 1.75**

MVPA

Equation 3
b = -0.10**

SPPB — FTS*
Equation 3
b = -1.66**

SPPB — FTS*
Equation 2
b = -1.83**

Mediation effect: 17.56%

S.c.

Equation 1
b = -0.19**

FI

Equation 3
b = 2.30**

SPPB — FTS*
Equation 3
b = -1.37**

SPPB — FTS*
Equation 2
b = -1.81**

Mediation effect: 37.98%

S.d.

Equation 1
b = -0.01

SMI

Equation 3
b = 4.37**

SPPB — FTS*
Equation 3
b = -1.76**

SPPB — FTS*
Equation 2
b = -1.81**

Mediation effect: --

Supplementary File 2. Multiple mediation model of the association between physical fitness (SPPB) and frailty (modified FTS), with moderate-to-vigorous physical activity (MVPA) and fat index (FI) as mediators in older adults.

*p<0.05; **p<0.001. FTS*: modified FTS with variables included in the SPPB removed. Model was adjusted for age, sex and educational

Mediation effect: 40.41%

	Coefficient	s.e.	p	Bootstrap 95%CI
Total effect (c Path)	-1,81	0,18	0,00	(-2.17; -1.46)
Direct effect (c'Path)	-1,28	0,16	0,00	(-1.59; -0.97)
Indirect effect (via mediators)	-0,53	0,11		(-0.76; -0.33)
SPPB→MVPA→FTS	-0,11	0,04		(-0.20; -0.05)
SPPB→MVPA→FI→FTS	0,31	0,11		(0.10; 0.53)
SPPB→ FI→FTS	-0,42	0,1		(-0.63; -0.23)

. Frailty differences according to physical function (SPPB), sedentary time (ST), moderate-to-vigorous physical activity (MVPA), fat index (FI)

and skeletal muscle index (SMI) categories.

Model	SPPB Low (n=412)	High (n=332)	ST Low (n=194)	Medium (n=388)	High (n=194)	MVPA Low (n=194)	Medium (n=388)	High (n=194)
1	43.9 ± 0.6	30.4 ± 0.7*	35.1 ± 1.0	37.3 ± 0.7	42.2 ± 1.0*†	43.9 ± 1.0	37.9 ± 0.7	32.6 ± 1.0*†θ
2	43.7 ± 0.6	30.5 ± 0.7*	-	-	-	43.1 ± 1.0	38.0 ± 0.7	33.0 ± 1.0*†θ
3	43.2 ± 0.6	31.2 ± 0.7*	35.9 ± 1.0	37.4 ± 0.7	41.2 ± 1.0*†	-	-	-
4	42.8 ± 0.5	31.6 ± 0.6*	37.2 ± 0.9	37.0 ± 0.6	40.5 ± 0.9*†	42.2 ± 0.9	37.6 ± 0.6	34.0 ± 0.9*†θ
5	42.8 ± 0.5	31.6 ± 0.6*	37.2 ± 0.9	37.1 ± 0.6	40.5 ± 0.9*†	42.2 ± 0.9	37.6 ± 0.6	34.0 ± 0.9*†θ
6	-	-	37.0 ± 0.7	37.5 ± 0.5	39.3 ± 0.7	40.4 ± 0.8	37.4 ± 0.5	36.0 ± 0.7*θ

Model	FI Low (n=193)	Medium (n=388)	High (n=193)	SMI Low (n=193)	Medium (n=388)	High (n=193)
1	28.3 ± 1.0	37.5 ± 0.6	48.6 ± 1.0*†θ	32.3 ± 1.1	38.0 ± 0.7	43.1 ± 1.0*†θ
2	28.7 ± 1.0	37.5 ± 0.6	48.2 ± 1.0*†θ	32.5 ± 1.0	38.1 ± 0.7	42.8 ± 1.0*†θ
3	29.5 ± 1.0	37.3 ± 0.6	47.9 ± 1.0*†θ	32.7 ± 1.0	38.3 ± 0.6	42.3 ± 1.0*†θ
4	-	-	-	38.0 ± 1.0	37.8 ± 0.6	38.0 ± 1.0
5	29.7 ± 1.0	37.3 ± 0.6	47.5 ± 1.1*†θ	-	-	-
6	30.9 ± 0.8	37.6 ± 0.5	45.5 ± 0.9*†θ	37.5 ± 0.9	37.5 ± 0.5	38.7 ± 0.8

Data are ± SEM.

12   Covariates for each model: Model 1 (age, sex and educational status); Model 2 (Model 1+ ST); Model 3 (Model 2 + MVPA); Model 4 (Model 3 +
13   FI); Model 5 (Model 4 + SMI); Model 6 (Model 5 + SPPB).
14   * $p<0.05$ for High group vs. Low group. † $p<0.05$ for High group vs. Medium group. ɵ $p<0.05$ for Medium group vs. Low group.
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