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*Understanding the effects of fatigue
on balance, gait and fall risk
in older people*

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Fatigue in older people

- 50% of people aged 70 report fatigue in their daily activities
 - increases to 80% of people 85 years.

Avlund et al. *Aging Clin Exp Res.* 2010;22:100-15.



RESEARCH ARTICLE

Open Access

Consequences of lower extremity and trunk muscle fatigue on balance and functional tasks in older people: A systematic literature review

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6/7 studies found a significant effect of fatigue on balance and function

- poorer standing, single-legged, reaching and reactive balance
- reduced speed and power of sit-to-stand repetitions
- less stable and more variable gait

Experimental study



The effect of lower limb muscle fatigue on obstacle negotiation during walking in older adults

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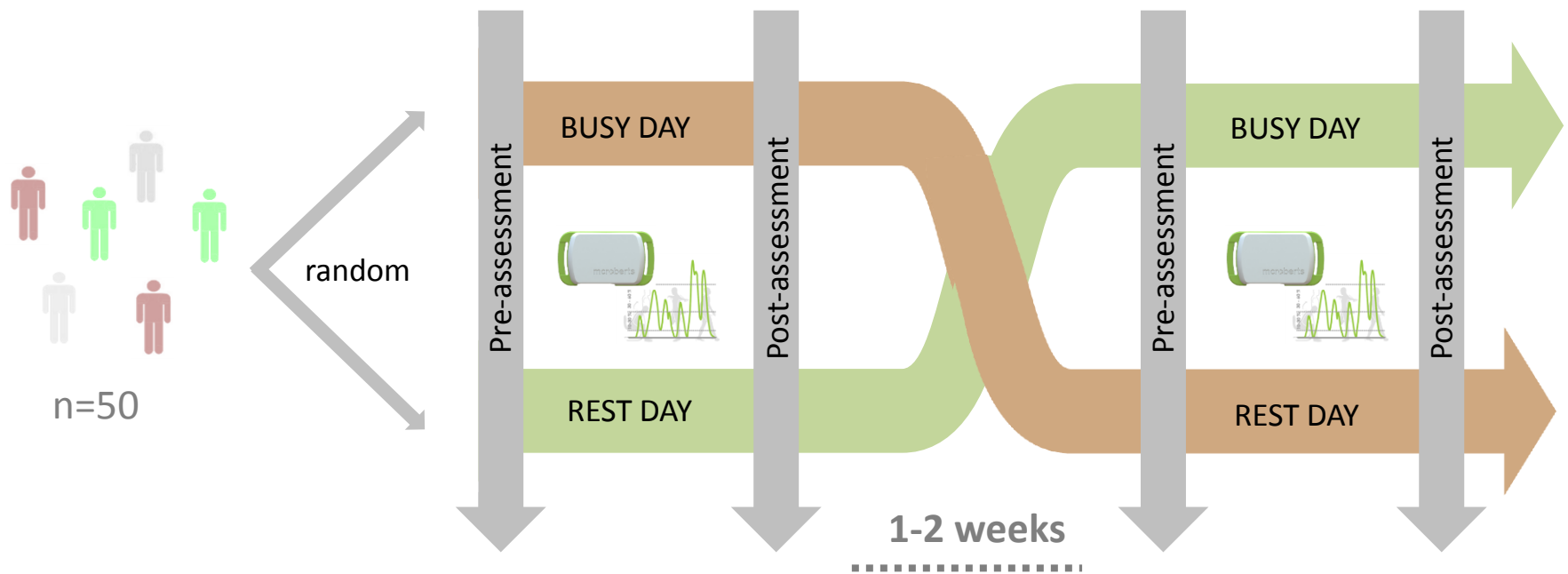
- **Method:** repeated sit-to-stand from 46cm hardback chair
“Stand up and sit down as quickly as you can and keep going for as long as you can.”
Averaged 63 repetitions (range 23–202) in 154 sec. Knee strength decreased by 9.5%.
- **Results:** with fatigue, participants:
 - cleared the obstacle with a shorter step
 - landed with poorer force absorption



Busy day fatigue

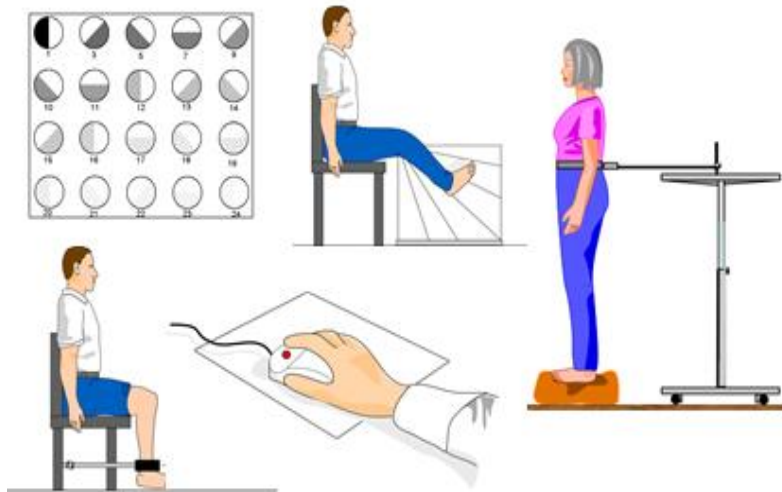
Aims: to compare the effects of a busy and restful day on self-reported fatigue, muscle strength, balance, mobility, and neuropsychological functioning in older people.

ACTRN12615000916549

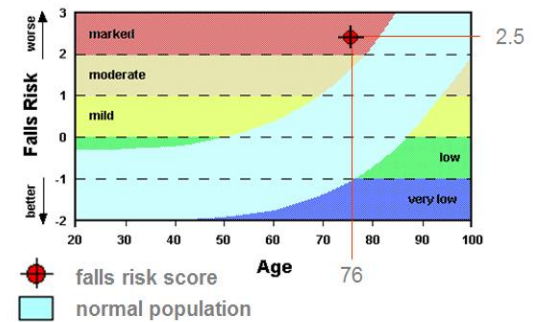


Outcome measures

Fall Risk Score: Composite assessment of sensorimotor function



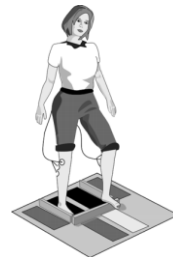
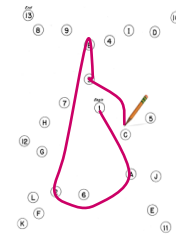
Falls risk



Outcome measures

Fall Risk Score: Composite assessment of sensorimotor function

Cognitive: Trail Making and Digit Symbol Modalities Tests



Physical: hand grip strength, coordinated stability, choice stepping reaction time

Gait and Mobility: gait velocity, Timed up and go test



Self-reported fatigue - Visual Analogue Scale for Fatigue

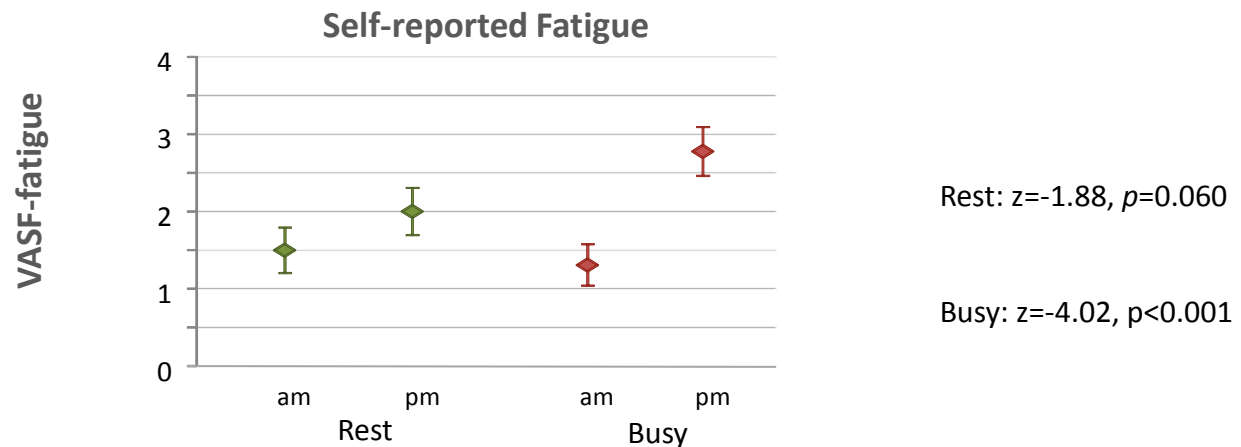


Results

Participants

- n=49 (1 dropout), aged 73.5 years (range 61-90), 70% female, 22% fallen previous year

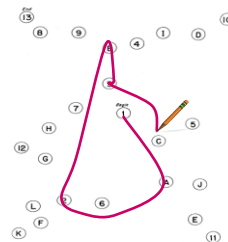
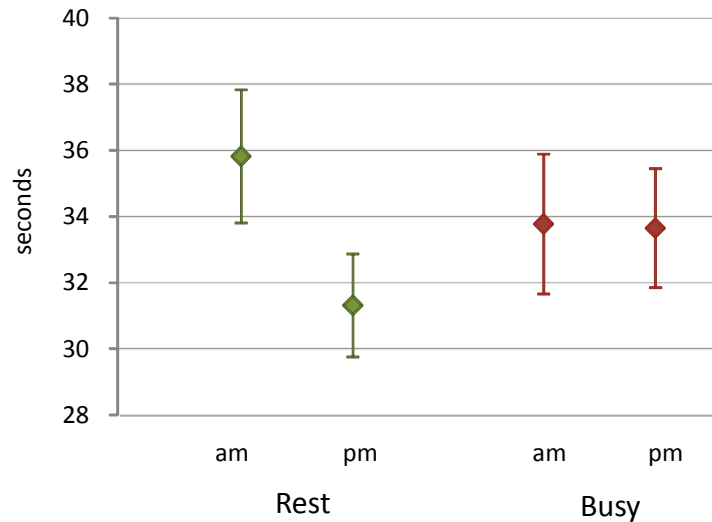
Activity monitoring	REST		BUSY	
	Mean (SD)	range	Mean (SD)	range
n=30				
Active (min)	93 (45)	4-211	152 (56)	23-262
Locomotion (min)	36 (20)	5-80	74 (46)	4-226
Steps	3226 (1766)	358-7596	7214 (5105)	3430-24940



Cognitive performance

Trail making test A

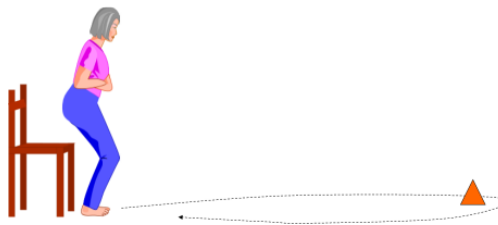
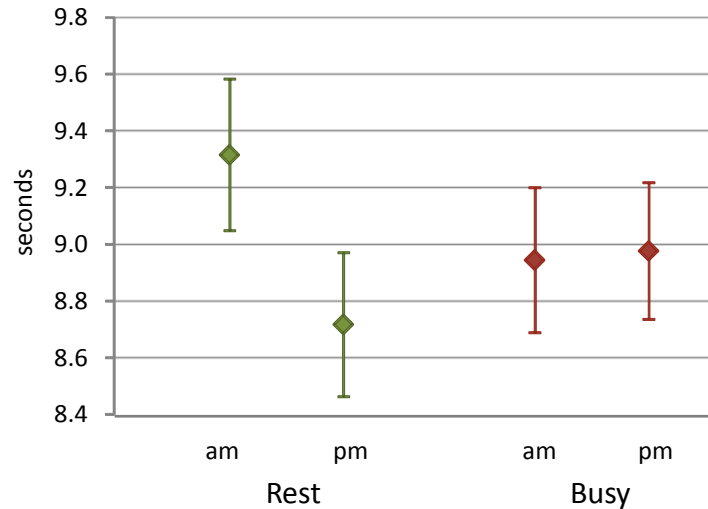
Group x Time: $p=0.064$



Physical performance

Timed Up and Go

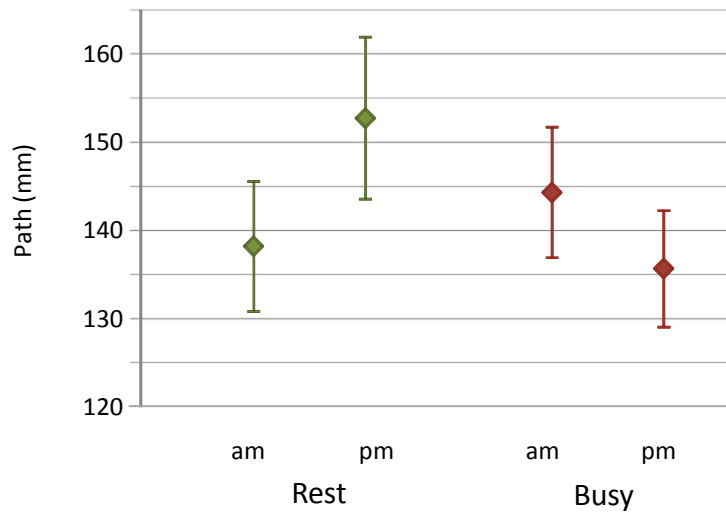
Group x Time: $p=0.031$



Fall risk

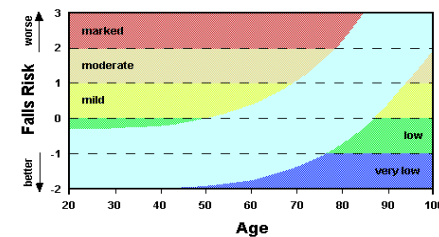
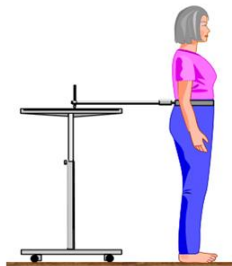
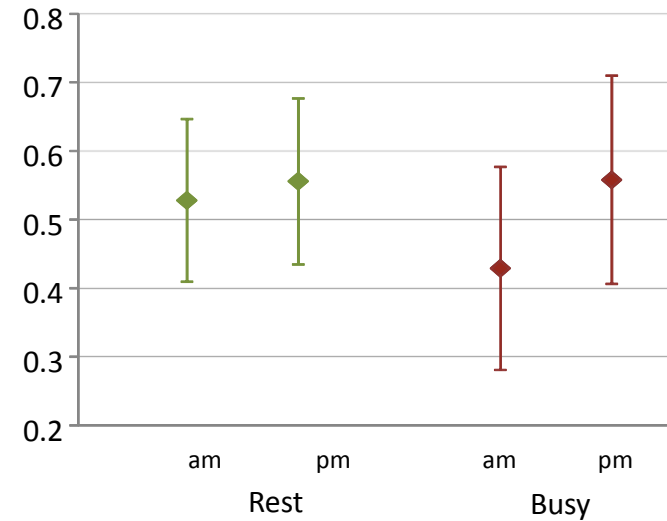
Sway Eyes Closed

Group x Time: $p=0.037$



PPA fall risk score

Group x Time: $p=0.518$

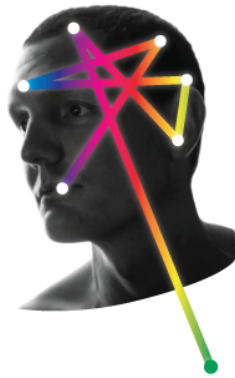


Summary

- Participants did not show great disparity in activity between busy and rest days.
 - regardless, increased reported fatigue on busy day
- No significant differences detected in measures of cognitive function
- Few differences detected in measures of physical function
 - Poorer mobility
 - No difference in fall risk score



Overall, the effects of a busy day (fatigue?) on cognitive and physical function in older people seem few and give us little reason to think it might pose a significant risk of falling.



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