

Using technology to reduce sedentary behaviour in the workplace

Dr Jacqueline Mair





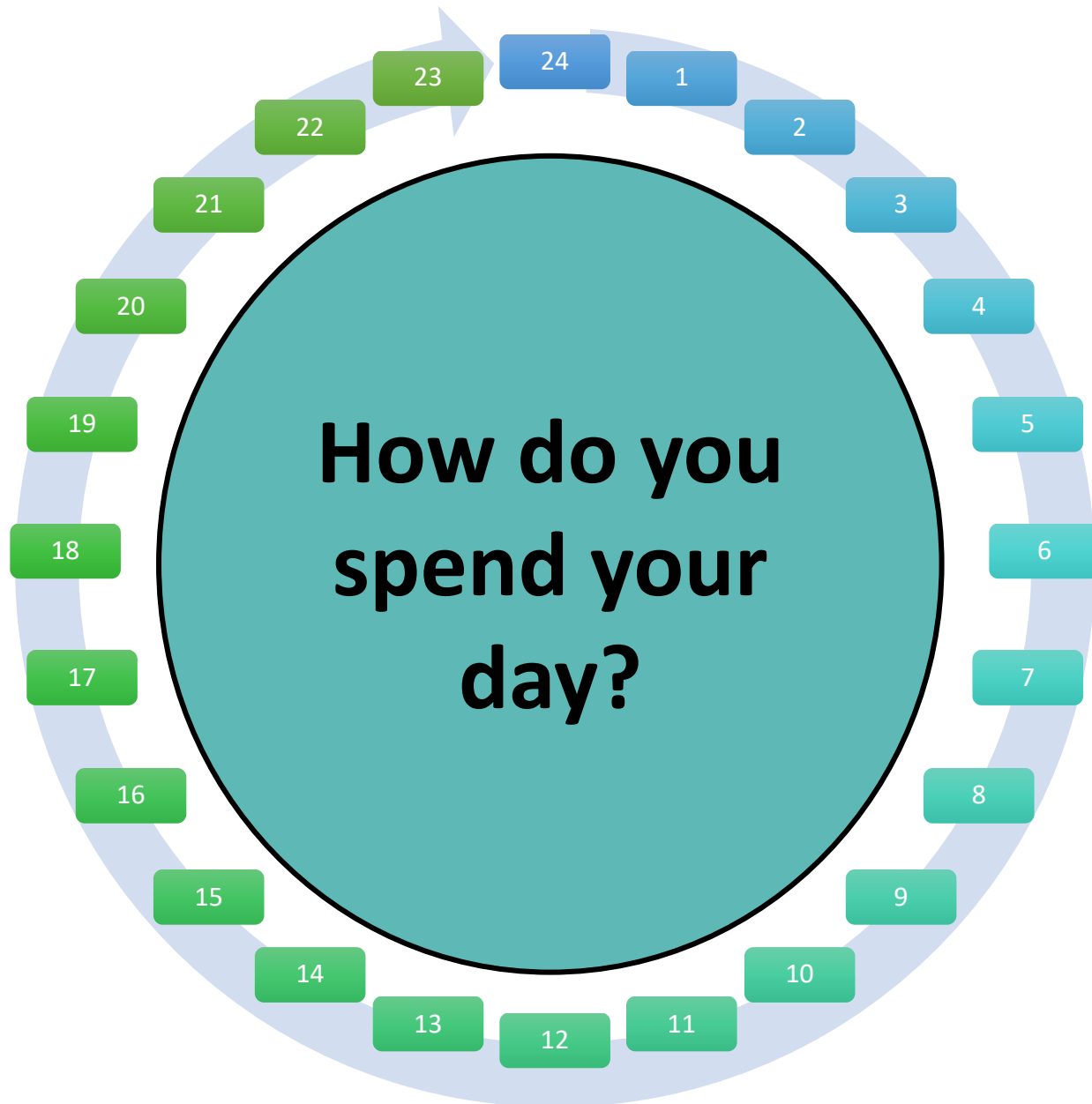
Overview

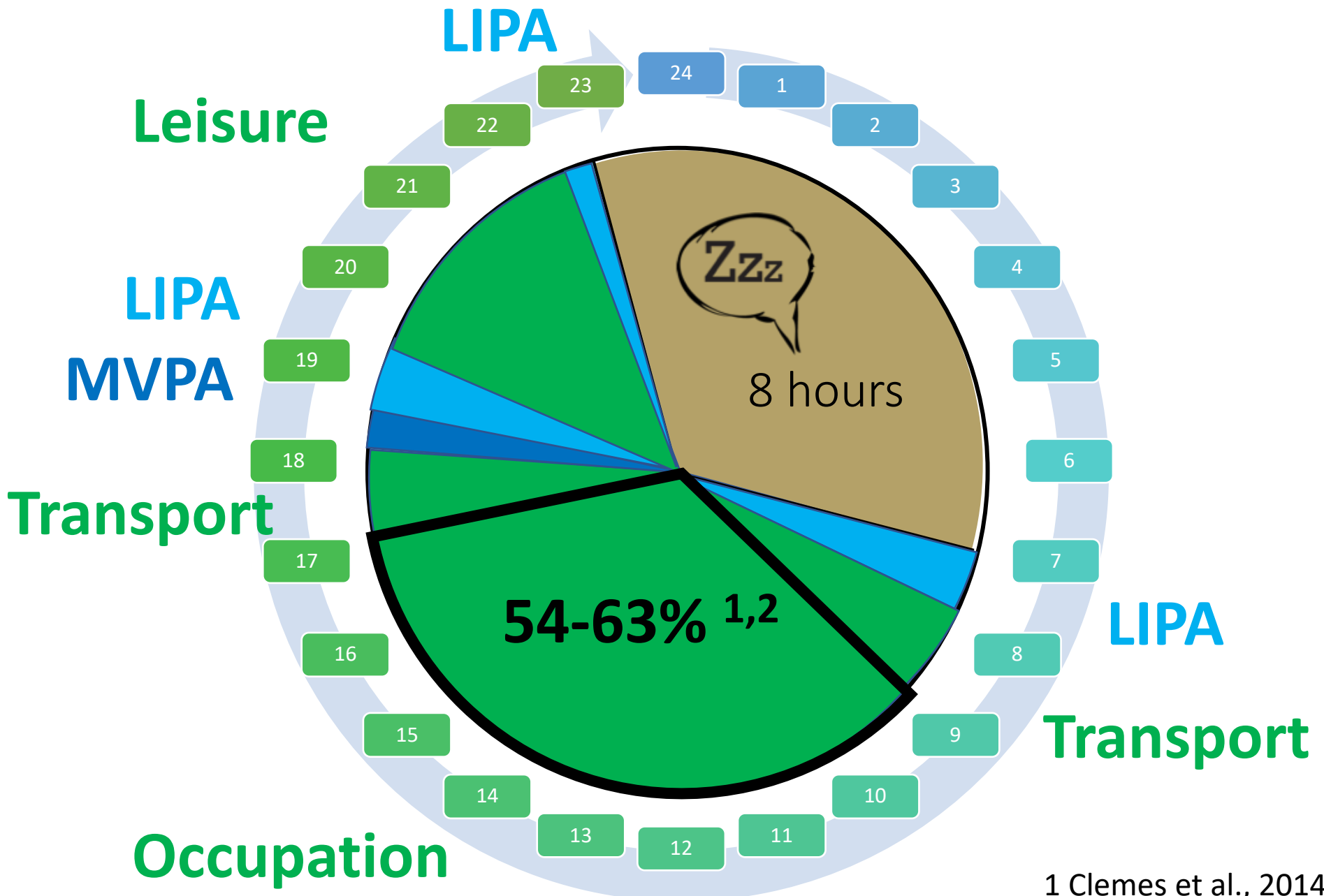
Current evidence on sedentary behaviour at work

Can technology help to positively change sedentary behaviour?

My research journey

What does the future hold?





Is sedentary behaviour a problem?



Sedentary Behaviour (SB)

Prolonged sitting is a risk factor for all-cause and CVD mortality,³⁻⁵ obesity,⁶ type II diabetes,⁶ certain cancers,^{7,8} metabolic syndrome,⁹... independent of physical activity.

Limited evidence for link with obesity in adulthood?

Changes in SB impact on cardiometabolic risk factors.^{10,11}

High dose of PA (60-75 min per day) eliminates risk of death associated with high levels of SB.¹²



Occupational SB

Office workers can spend 81% of the working day sedentary.¹³

Occupational sitting has been linked with increased mortality,¹⁴ diabetes mellitus,¹⁴ and obesity.¹⁵

Reducing SB alleviates musculoskeletal discomfort, increases worker productivity¹⁶, improves fatigue¹⁷ and may be beneficial for mental health.¹⁸

Technology

Wearable technology = ACSM's number 1 fitness trend in 2017

76% of UK adults own a smartphone.

Smartphone apps are being used to help change health behaviours.

Smartphone apps¹⁹ and wearable devices^{20,21} have been shown to positively change SB in the general population.





My research
journey so far...



Using technology to deliver and monitor exercise interventions



²² Mair JL et al (2014) Benefits of a worksite or home-based bench stepping intervention for sedentary middle-aged adults – a pilot study. *Clin Physiol Funct Imaging*, 34: 10-17 ¹⁰

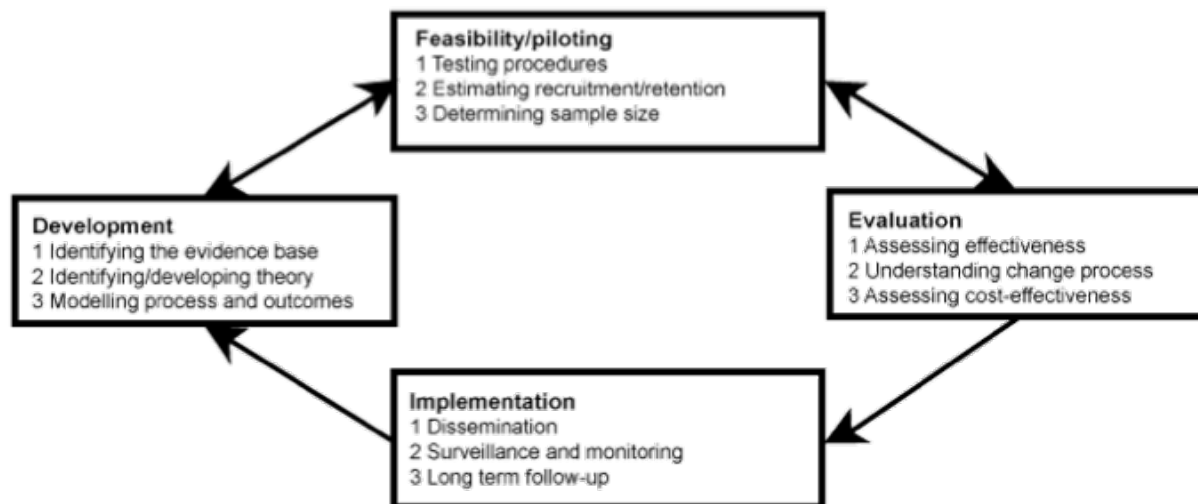
Reducing sedentary behaviour using digital health technology

What's the evidence for technology to help reduce SB?

What will work in a workplace setting?

How do we develop the right intervention?

What is the feasibility of the intervention?





Using computer, mobile and wearable technology enhanced interventions to reduce sedentary behaviour: a systematic review and meta-analysis

Aoife Stephenson^{1*}, Suzanne M. McDonough^{2,3,4}, Marie H. Murphy¹, Chris D. Nugent⁵ and Jacqueline L. Mair¹

Interventions using computer, mobile and wearable technologies can be effective in reducing SB by approximately **41 min/day**.

Effectiveness appeared most prominent in the **short-term** and lessened over time.

Need to improve **reporting of BCTs** within interventions and address the methodological flaws identified within the review through the use of more rigorously controlled **study designs** with longer-term **follow-ups**, objective **measures** of SB and the incorporation of strategies to reduce **attrition**



*warning!

Barriers, facilitators and strategies to reduce occupational sedentary behaviour



Knowledge
Productivity
The Organisation
Health
Culture
The Environment
Motivation

...there is actually some desire to address the problem and improve it but we don't quite know how or how much, but nor do we really have a clear idea how we can achieve that without causing extreme disruption to productivity and to the environment

[Technology] makes you more aware of time because certainly when I am sitting and looking at something time just flies by...

knowledge

Well the desks we have are all standard desks, so sit down desks, so there is no option to have a standing desk if you want one.

environment

It's just this career that you have chosen - you have to sit

I feel if you were at a meeting you would need to sit down.

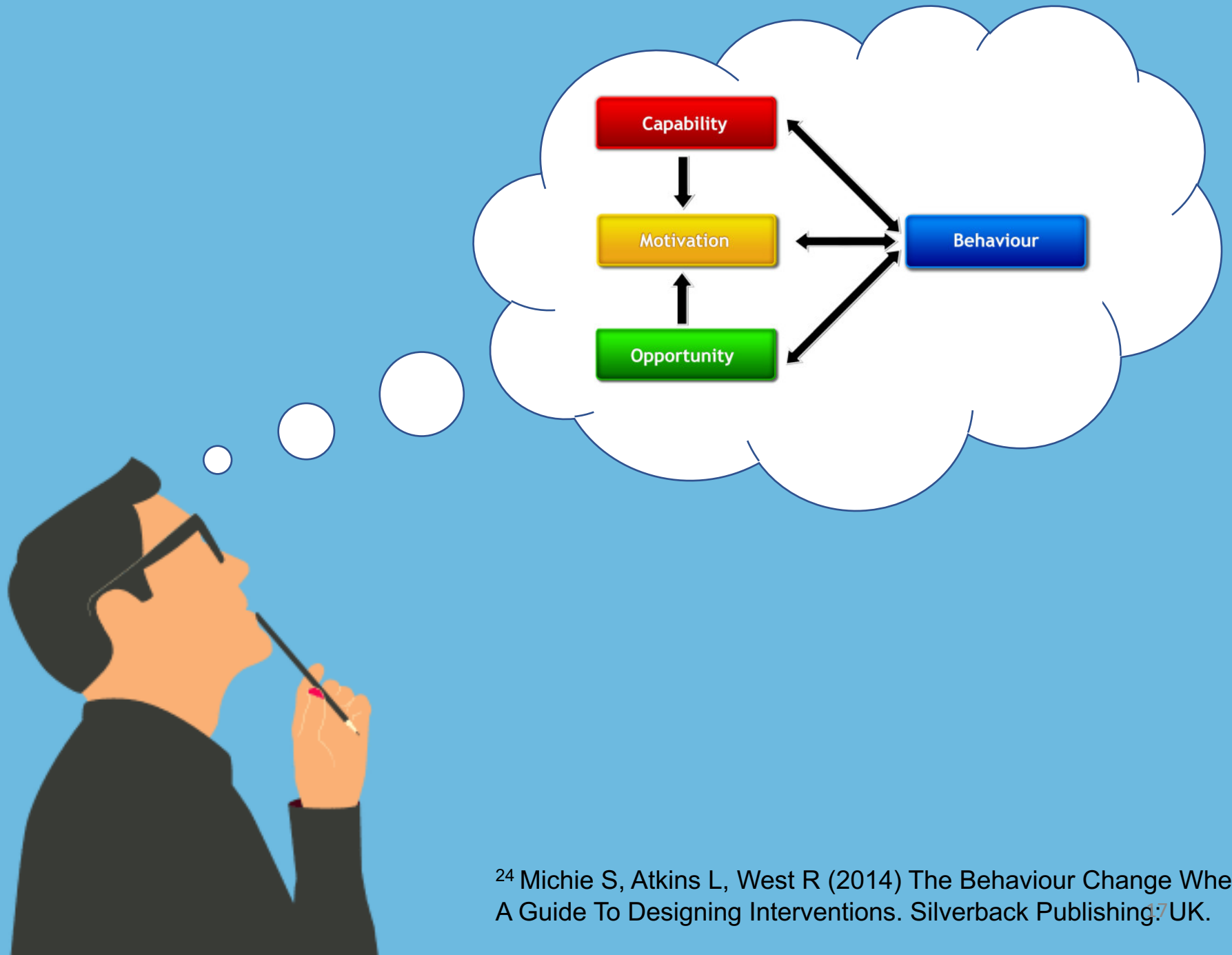
culture

A lot of time at desks and if you're not at your desk your sitting eating your lunch, you know, it's a lot of sitting.

you won't get much work done if you're up and down all day as well

productivity





²⁴ Michie S, Atkins L, West R (2014) The Behaviour Change Wheel: A Guide To Designing Interventions. Silverback Publishing UK.

Worktivity



Self-monitoring

Goal setting

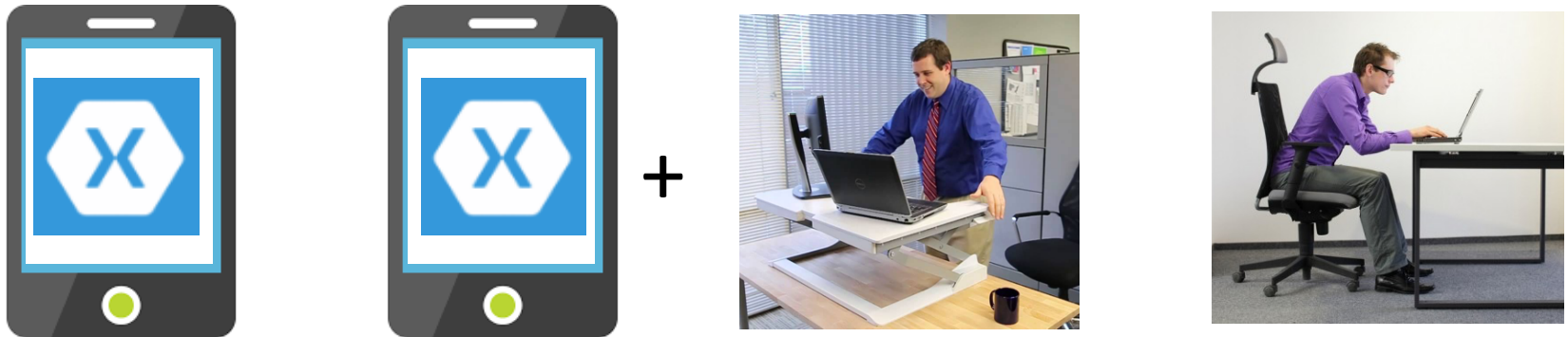
Feedback

Educational prompts

Reminders

Reducing sedentary behaviour using digital health technology

Feasibility cluster RCT



Outcomes of interest:

Time spent sitting, standing and stepping (activPAL device)

Productivity (Likert scale) and Mood (BRUMS)

Recruitment and reach

App engagement and intended use

End-user satisfaction

Reducing sedentary behaviour using digital health technology

the messages to say "move"
sometimes its not possible and you almost feel guilty

app only

too difficult to integrate phone app into routine

app + desk

unable to reduce my sitting by much as I have to stop working to do so

app only

I was very keen at the beginning and my sitting time reduced substantially...as time went on I used the standing desk less and less. Sometimes I was too busy, sometimes I forgot and sometimes I just wanted to sit

app + desk

although it made me more aware I cant spend 2 hours during work wandering around doing nothing

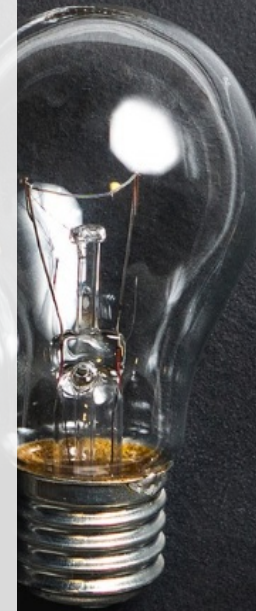
app only

*unpublished data

Summary

- Primacy of work
- Cultural changes are necessary
- Environmental facilitators seem to be most important
- Technology may work best alongside other facilitators

Keeping up with the rapidly evolving digital health technology market is a challenge !!



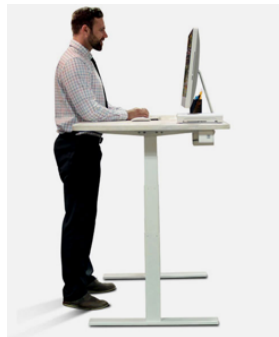
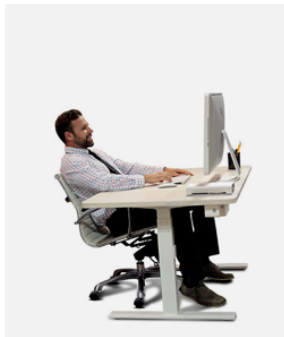
What next?

- Better understanding of the association between sedentary behaviour and health is needed.
- How can we best measure sedentary behaviour at work?
- What are the determinants and correlates of sedentary behaviour in different domains and in different populations?
- What are the best interventions to reduce sedentary behaviour in the workplace?
- How do we implement and up-scale these interventions for impact?



Acute responses to breaks in sedentary behaviour

- Physiological and psychological responses to breaking sitting with standing and walking
 - free-living glucose, ABP and PA
 - endothelial dysfunction, vascular function
 - Cognition – executive function



Thank you



Aoife Stephenson, Marie Murphy, Suzanne McDonough, Chris Nugent, Mathias Garcia-Constantino

Colin Boreham, Giuseppe De Vito, Massimiliano Ditroilo,
David McKeown, Madeleine Lowry, Brian Caulfield,
Amanda Pitkethly, Alison Kirk, Mark Ross



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