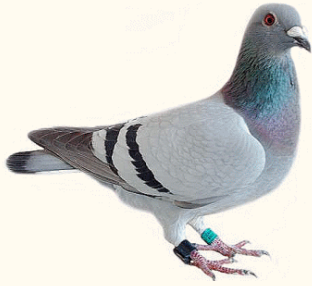


Using Applied Behaviour Analysis to decrease sedentary behaviour

Dawn Jun, MA; Philippa Mandeno, MA
University of Auckland

What is Applied Behaviour Analysis (ABA)?

A field of psychology that studies the behaviour of all organisms (humans included!)



A → B → C

Antecedent → Behaviour → Consequence

What is Applied Behaviour Analysis (ABA)?

“Applied behaviour analysis is the science in which the principles of behaviour are applied systematically to improve socially significant behaviour and experimentation is used to identify the variables responsible for behaviour change.”

- Learning History
- “Reinforcement” and “Punishment”
- Our behaviour depends on our environment
- Prompts/Reminders
- Setting Goals
- “Shaping” behaviour
- Reinforcement/Rewards
- Environment changes

ABA can help people overcome problems, reduce stress, achieve personal goals and improve their quality of life

How ABA can help our elderly communities

- Behavioural issues:
 - Abusiveness
 - Decreasing personal hygiene
 - Confusion and apathy
 - Hoarding
 - Paranoia and obsessive/compulsive behaviours due to anxiety
- Health outcomes
- Dementia
- Caregiver/staff training

Sedentary Behaviour

- What is it?
- Sedentary behaviour vs physical inactivity
- Health risks
 - Type 2 diabetes
 - Cardiovascular diseases
 - Metabolic syndrome
 - Depression
- Prevalence
- So what can we do to reduce the risks?

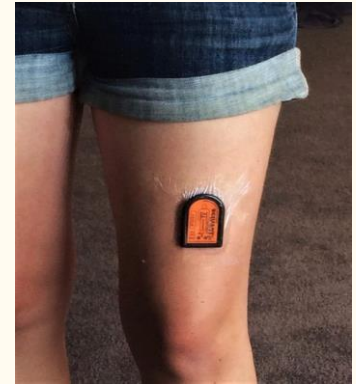


Rationale for our study

- Add to existing literature on interventions to reduce sedentary behaviour for older adults in residential care
- Investigate the feasibility of using prompt, social praise, and goal setting interventions
- Investigate simplest component or combination of components necessary for effective behaviour change
- Assess the maintenance effect and its persistence over time with two maintenance phases
- Include physiological and psychological measures to assess health outcomes

Our study

- 5 participants; 4 participants completed all the phases
- Concurrent multiple baseline design
- Attempted to decrease sedentary behaviour using vibrotactile prompt, staff training & social praise, and goal setting phases.
- Measured sedentary behaviour using ActivPal device
- Two maintenance phases after 4 weeks and 8 weeks since the last week of intervention phase
- Social validity questionnaire



Beginning stages...

- Information, consent and interviews
- Standardised tests: Timed Up & Go, Mini-Mental State Exam.
- Mental Health and Emotional Assessments
- “Baseline” Condition
- Preference Assessment






Methods: Prompting

- Tool used to increase likelihood of correct response
- Vibrotactile prompts provided by Garmin Vivosmart HR fitbit watches when participants were inactive for 1 hour
- Each participant given 1:1 explanation on purpose of prompt, when it'll go off, how it feels, what they could do in response to the prompt
- Participants asked to wear the device at all times



Methods: Staff Training and Praise

- We organised a meetup with the primary staff and caregivers, and any staff who wanted to be involved.
- During this meeting, we asked staff to provide social praise when they saw one of the participants standing.
- Praise: Intermittent & Effective  Social reinforcement
- “Participant sheet” - a table where each of the participating residents were listed and the days of the week.

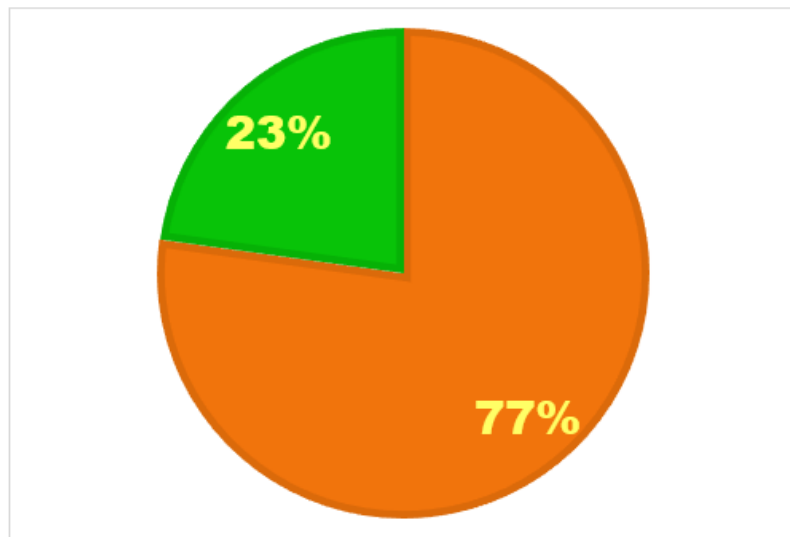
- When you have a moment, have a look at the participant sheet and see if there's a resident on there who **hasn't** been praised by a staff member that day.
- If not, then have a look at what they are doing. **Are they sitting down or standing up?**
- If they are standing up, give them some **behaviour-specific praise, while they are still standing!**
Example: "I like that you're making the effort to stand while you read, great work!"
- If they are sitting or lying down, **do not do anything**.
- Remember to **put a tick** on the participant sheet if you did praise them, in the resident's row and the day's column.
- If you see one of the residents being active, feel free to praise them (provided you **know** they're doing this phase of the study). Please remember to put a tick on the participant sheet afterwards.

*Any questions/concerns/suggestions? Feel free to email
Dawn & Philippa on pman620@aucklanduni.ac.nz
Thank you!!*

Methods: Goal Setting meetings

- Weekly meetings to discuss participants' goals for standing each day, as well as their current performance.
- They were given a poster showing all this information, and the participant decided their goal for the upcoming week in minutes of daily standing time
- With their permission, we called participants every day at a convenient time for them, reminding them of their goals
- In the second meeting, updating goals.
- Change in intervention: adding a specific activity

In the last week, I spent...



328 minutes standing up each day.

NEW GOAL:

Over the next week I will spend

_____ minutes standing up each day.

I will do this by _____

Results?

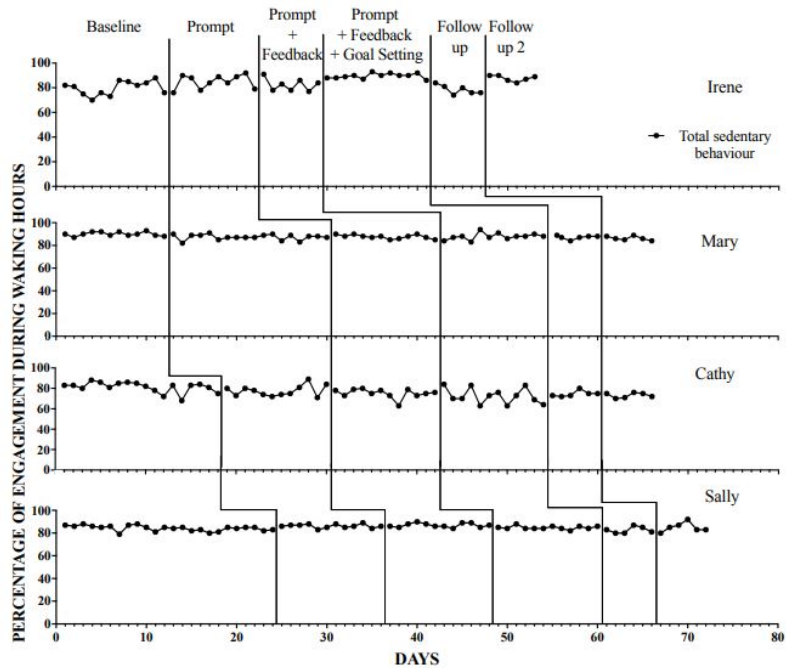


Figure 1. The daily percentage of engagement in total sedentary behaviour during waking hours across phases for each participant.

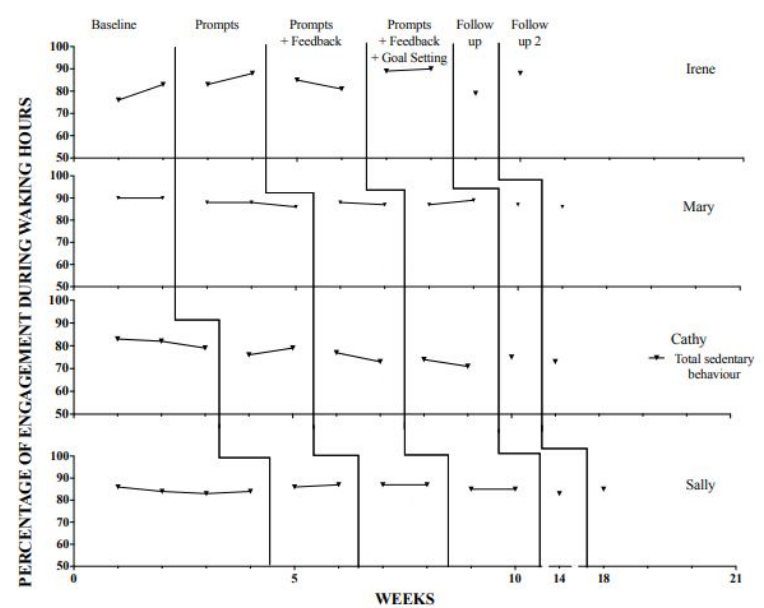


Figure 3. The weekly average percentage of engagement in total sedentary behaviour across phases for each participant

Results?

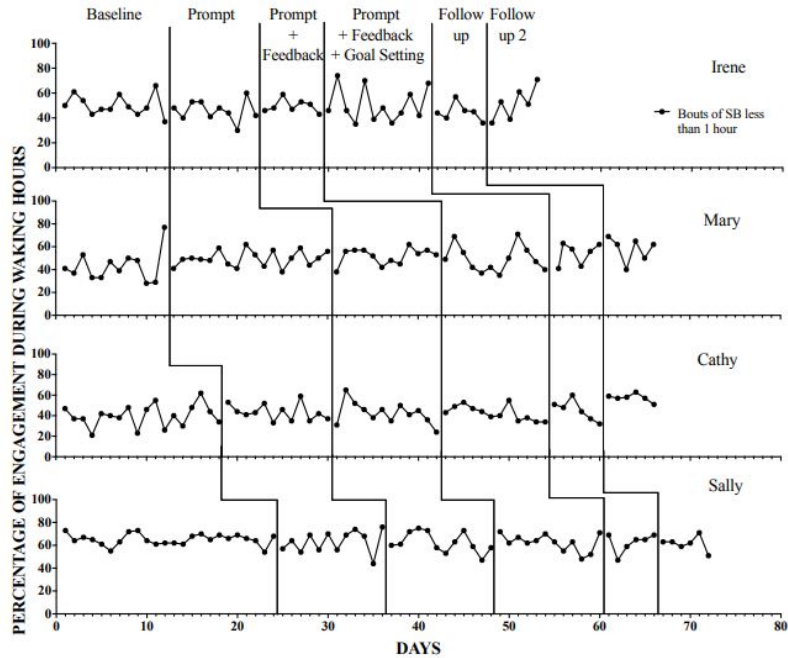


Figure 2. The daily percentage of engagement in sedentary behaviour (SB) in bouts of less than 1 hour across phases for each participant

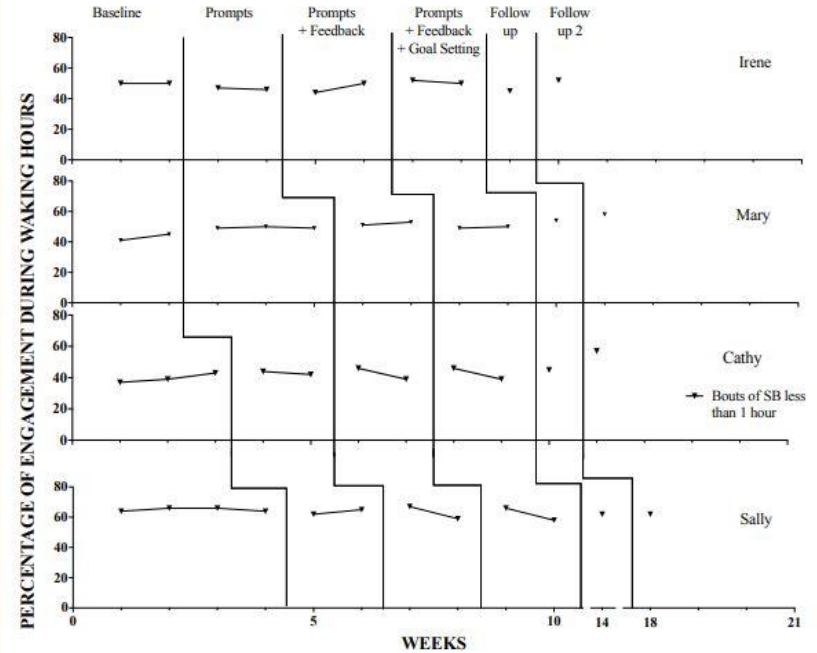


Figure 4. The weekly average percentage of engagement in sedentary behaviour (SB) less than 1 hour across phases for each participant

Results?

Effect Size Analysis of Sedentary Behaviour (Hedges G ± Variance).

	Prompt	Prompt + praise	Prompt + praise+ goal setting	Maintenance 1	Maintenance 2
Sedentary behaviour	0.00±0.01	-0.11±0.02	0.05±0.01	0.32±0.05	-0.11±0.03
Sedentary behaviour (bouts shorter than 1 h)	0.06±0.01	0.12±0.02	0.09±0.02	0.12±0.02	0.46±0.05

- Hedges' g
- Rule of thumb

Small effect = 0.2

Medium effect = 0.5

Large effect = 0.8

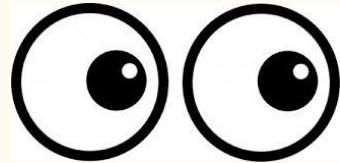
- Small effect for total sedentary behaviour in maintenance 1
- Medium effect in bouts of sedentary behaviour in maintenance 2

Interesting and unexpected outcomes...

- Higher emotional wellbeing, and lower perceived limitations and engagement in activities due to emotional problems. Why??
- Extra company from a younger person, regular visits and chats while the devices charged.
- Positive feedback from both participants and staff... despite no concrete results.
- Placebo effect??

Challenges and Solutions: The Garmin Watch

- Participants couldn't feel the prompt
- Limitations with the device:
 - Not able to detect postural change
 - Not able to record data on when the prompts were delivered
 - Sleeping time?
- Future research can explore a different type of cue?



Challenges and Solutions: Staff availability

- None of the participant sheets were filled out during the study
- We had no way of knowing for sure what was happening.
- Were our expectations too high?
 - Time-consuming?
 - Over-complicated?
 - Unclear?
 - Not many opportunities?
- Different suggestions after study completion

Challenges and Solutions: Better Reinforcement!

Ultimately our reinforcers (rewards) were not motivating enough.



Challenges and Solutions: Goal Setting

- Change of procedure
 - Less vague
 - Only 2 participants left, and only 1 weeks of data
 - *Seems* potentially successful...
 - BUT not enough to be conclusive.

More research needed!

Questions? Thoughts?