Increasing physical activity amongst residents in Cambridgeshire

A proof-of-concept evaluation of a brief intervention

December 2025

Authors: Thorneloe, R.J[1]., Garstang, K[2]., Lamb, M[3,4]., Hope, D[1]., Humphreys, H[1].
[1]Centre for Behavioural Science and Applied Psychology, Sheffield Hallam University
[2]School of Sport, Exercise and Rehabilitation Sciences, University of Birmingham
[3]Advanced Wellbeing Research Centre, Sheffield Hallam University, UK
[4]School of Sport and Physical Activity, Sheffield Hallam University, UK

Contact: Rachael.Thorneloe@shu.ac.uk

Contents

Recommended citation:
Thorneloe, R.J., Garstang, K., Lamb, M., Hope, D., Humphreys, H. (2025). *Increasing physical activity amongst residents in Cambridgeshire: a proof-of-concept evaluation of a brief intervention.* A report commissioned by Cambridgeshire County Council.

Contact: Rachael.Thorneloe@shu.ac.uk

Executive Summary

Sheffield Hallam University were commissioned by Cambridgeshire County Council and Peterborough City Council to conduct research into the barriers and facilitators for seven health behaviours. These reports are available here (under 'healthy behaviours'). Following consultation with Cambridgeshire County Council, intervention recommendations for physical activity, alcohol consumption, and smoking in adults were taken forward for proof-of-concept testing. This report presents the findings for the **physical activity** proof-of-concept intervention evaluation. The findings for the smoking intervention and the alcohol intervention are presented in separate reports.

Aim: The aim of the randomised controlled trial (RCT) was to test whether a brief intervention that incorporated motivational, goal setting, and planning components could increase physical activity amongst residents living in Cambridgeshire.

Methods: Cambridgeshire residents were recruited via Prolific (an online panel of people who are willing to participate in online research) and invited to participate in an online study. Participants were randomised to one of three interventions:

(1) a motivation intervention which aimed to educate and persuade people about the benefits of physical activity.

(2) a motivation and goal setting/ planning intervention which aimed to increase motivation and support residents to make a commitment to increase their physical activity and plan how they will overcome any barriers.

(3) a control intervention.

The primary outcome was physical activity, two weeks after taking part in the intervention. The secondary outcomes were intentions, planning, and determination to be physically active.

Findings: We found that a motivation and goal setting/ planning intervention increased determination to be physically active, compared with a control condition. The brief intervention did not impact on intentions to be physically active, planning to be physically active, or level of physical activity.

Recommendations:

We recommend that:

Tools and techniques to educate and persuade residents about the benefits of physical activity should be targeted at those who are less motivated to be physically active in the first place.

Tools and techniques to support goal setting and planning should be targeted at those who are motivated and willing to increase their physical activity.

Tools and techniques should be used as part of supportive conversations with trained professionals, who should work with the resident to elicit their barriers and facilitators for being physically active, and to work with them to identify and set goals and plans that are suitable for the residents needs.

Main report

Background

We conducted a survey and interviews with residents in Cambridgeshire to identify key barriers and facilitators for being physically active [1]. We then used the Behaviour Change Wheel [2] to make theory-informed intervention recommendations for supporting physical activity.

We found that some residents report weak intentions to be physically active. Some residents would benefit from a motivational intervention that provides education and persuasion about the benefits of physical activity.

Others report a willingness to be physically active but had not yet translated these good intentions into action. These residents would benefit from support to translate those good intentions into physical activity behaviour. Research supports techniques such as Coping Planning or 'What-If' strategies to help a person turn their intentions to be active into behaviour [3].

Sheffield Hallam University were commissioned by Cambridgeshire County Council to undertake a proof-of-concept evaluation of this intervention. The Theory of Change for this intervention is presented on the following slide.

Theory of Change

Some residents in Cambridgeshire are **physically inactive**. We found that 61.6% of residents do not meet physical activity guidelines (they report doing physical activity on < 4 days in the past week).

Some residents report **weak intentions** to be physically active. Others report a willingness to be physically active but had not yet translated these **good intentions into action**.

Residents would benefit from a **motivational intervention** that provides education and persuasion about the benefits of physical activity.

Residents would also benefit from a **motivational intervention that also includes goal setting and planning components**, that support residents to set a physical activity goal and plan how they will overcome any barriers.

Residents that receive a motivational intervention will have **stronger intentions and determination** to be physically active.

Residents that receive a motivational intervention in combination with goal setting and planning components will have **stronger intentions and determination** to be physically active, and **stronger plans** to be physically active.

Residents that receive a **motivational intervention in combination with goal setting and planning components** will have increased physical activity.

Increases in physical activity will lead to improved **physical and mental health outcomes** amongst residents in Cambridgeshire.

Why is the intervention needed?

What is the intervention? What does it do?

Why is the intervention important and what will it achieve?

The outcomes to be examined in this proof-of-concept evaluation are those in the orange boxes.

Aims

The aim of the randomised controlled trial (RCT) was to test whether a brief intervention that incorporated motivational, goal setting, and planning components could increase physical activity amongst residents living in Cambridgeshire.

We tested three interventions:

1. An intervention to increase motivation for physical activity.

2. An intervention to increase motivation for physical activity, combined with setting a goal to be more physically active and planning to overcome any barriers that might get in the way of achieving that goal.

3. A control intervention to increase motivation to have a healthy diet.

The primary outcome was physical activity behaviour. The secondary outcomes were intentions, planning, and determination to be physically active.

Research questions

The primary research questions were:

1. Can a brief motivational intervention increase physical activity?

2. Can a brief motivational intervention in combination with goal setting and planning components increase physical activity, compared with a brief motivational intervention only?

The secondary research questions were:

1. Can a brief motivational intervention increase intentions, planning, and determination to be physically active?

2. Can a brief motivational intervention in combination with goal setting and planning components increase intentions, planning, and determination to be physically active compared with a brief motivational intervention only?

Interventions

Intervention 1: Motivation

To increase residents' motivation to be physically active by educating and persuading residents about the benefits of physical activity.

Activity: Residents are asked to select their personal reasons for being physically active from a list:

- My physical and mental health
- Doing something that I find enjoyable
- I want to look and feel good

Based on their chosen reason to be physically active, residents are then asked to rank the importance of three related statements.

For example, if people chose 'my physical and mental health', the statements were:

- I want to have good health later in life
- I want to be physically active to help manage a health concern I have
- Being active helps my mental health and makes me feel good

Intervention 2: Motivation and goal setting/ planning

To increase motivation and support residents to make a commitment to increase their physical activity and plan how they will overcome any barriers.

Activity: All residents completed the motivation components of intervention 1.

Goal setting: Residents were then asked whether they would be willing to commit to increase the amount of physical activity they do over the next two weeks. If yes, residents were asked to specify how they would become more active and to write their goal. Their goal was then presented back to them. E.g.

- On Mondays, I will walk home from work

Planning: Residents then identified barriers that could get in the way of them keeping that commitment, either from a list of barriers or their own free-text barriers. Residents were asked to identify potential solutions to overcome that barrier, either from a list of solutions or their own free-text solutions. Their plan was then presented back to them in an 'if-then' format. E.g.

- If I am feeling tired, then I will remember that it will be good for my physical and mental health

Intervention 3: Control

This intervention was the control condition. It replicated the structure of intervention 1 but was related to diet.

Activity: Residents are asked to select their personal reasons for having a healthy diet from a list:

- Implications for your health
- Enjoyment of food

Based on their chosen reason for having a healthy diet, residents are then asked to rank the importance of three related statements. E.g.

- Healthy foods taste nicer
- Healthy foods are fun to prepare and eat as a family
- Healthy foods give me more energy

Methods

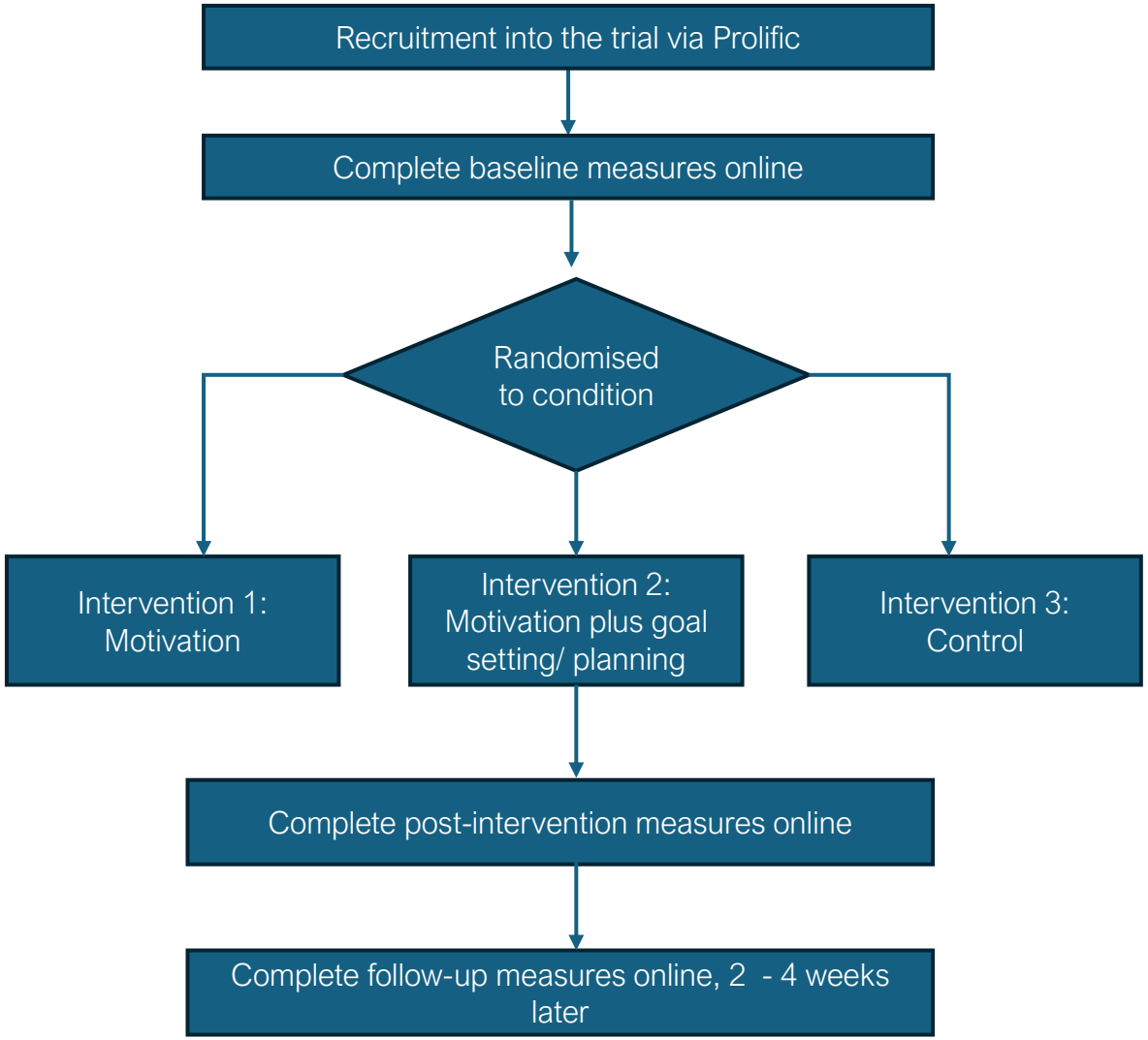
Individuals were recruited via Prolific, an online panel of people who are willing to participate in online research. Participants who were aged 18 – 64 years and living in Cambridgeshire were asked if they would be willing to participate in the study.

All trial data were collected online (using Qualtrics) via two surveys: a baseline survey and a follow-up survey 2 – 4 weeks later.

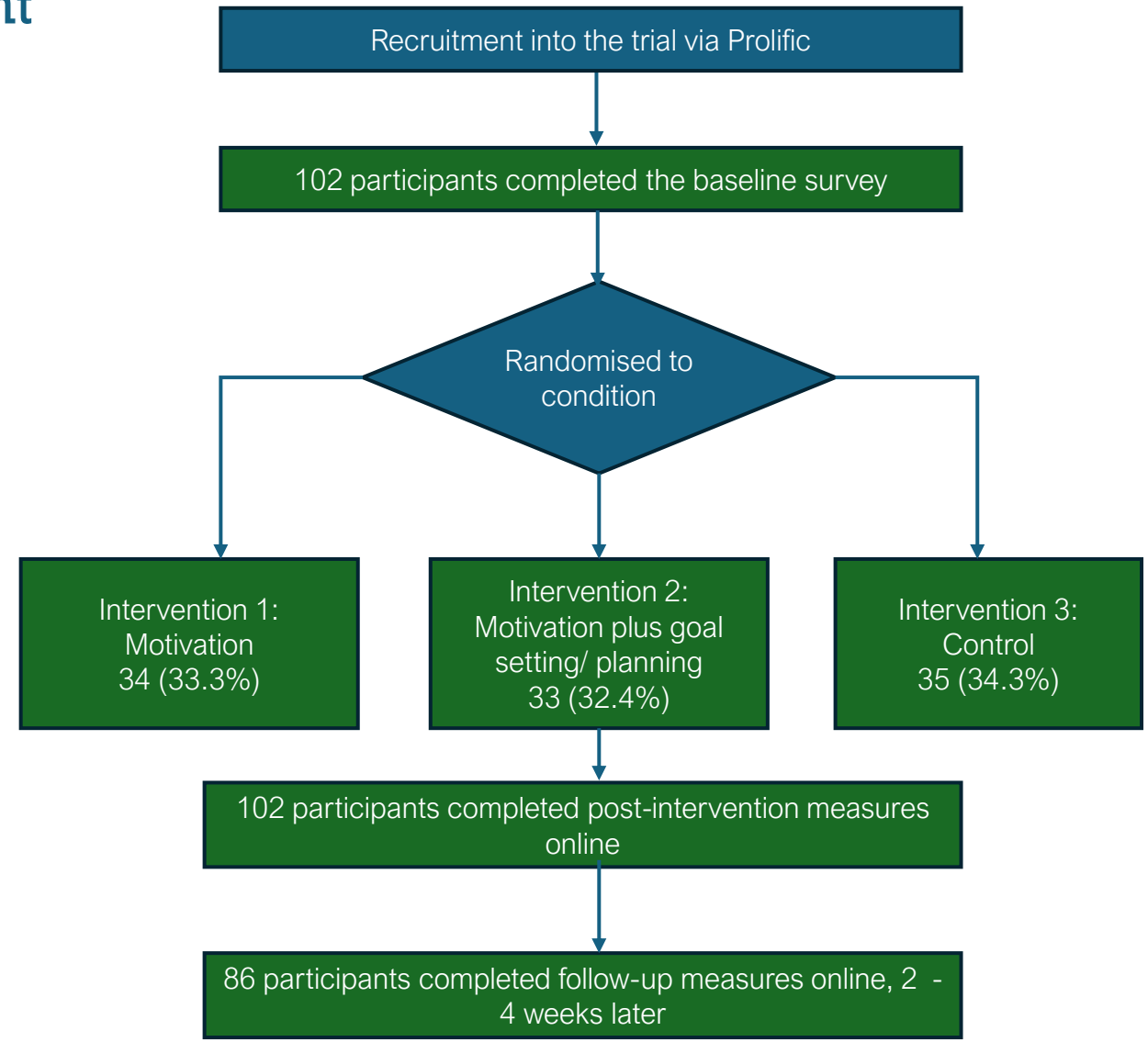
- In the baseline survey, we measured sample characteristics (demographics), intentions, plans, and determination to be physically active, and physical activity behaviour (IPAQ short-form [4]).
- Immediately after completing the baseline survey, participants were randomised to one of the three intervention arms. After completing the intervention, we measured post-intervention intentions, plans, and determination [5 - 7] to be physically active.
- In the follow-up survey, we repeated the measure of physical activity behaviour [4].

Participants received payment for completing surveys. Ethical approval was obtained from Sheffield Hallam University (ER81533436) and local approval was obtained from Cambridgeshire County Council (200825RT).

Trial design

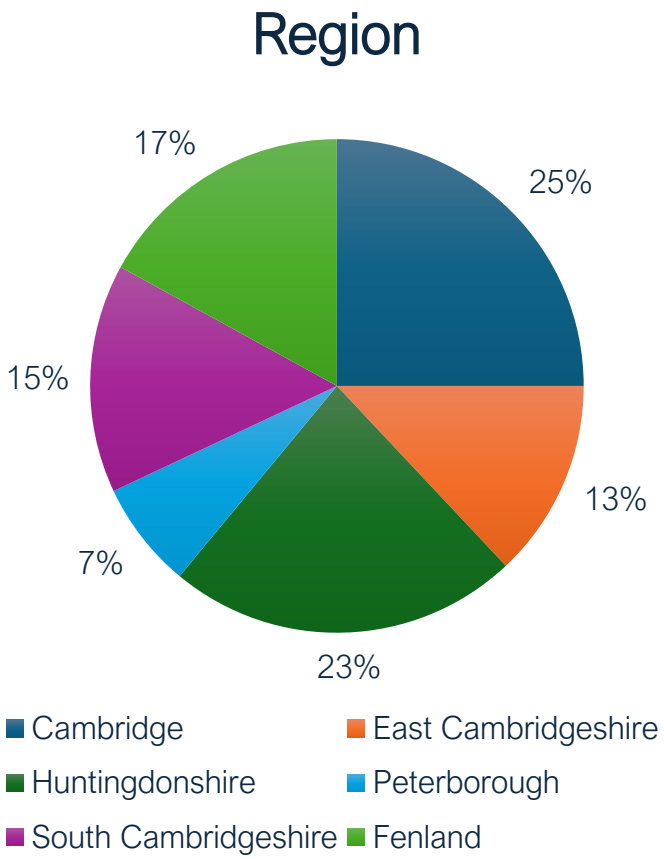


Findings – Recruitment



Findings – Participants

This slide presents the demographic characteristics of the 102 participants who completed the baseline survey.

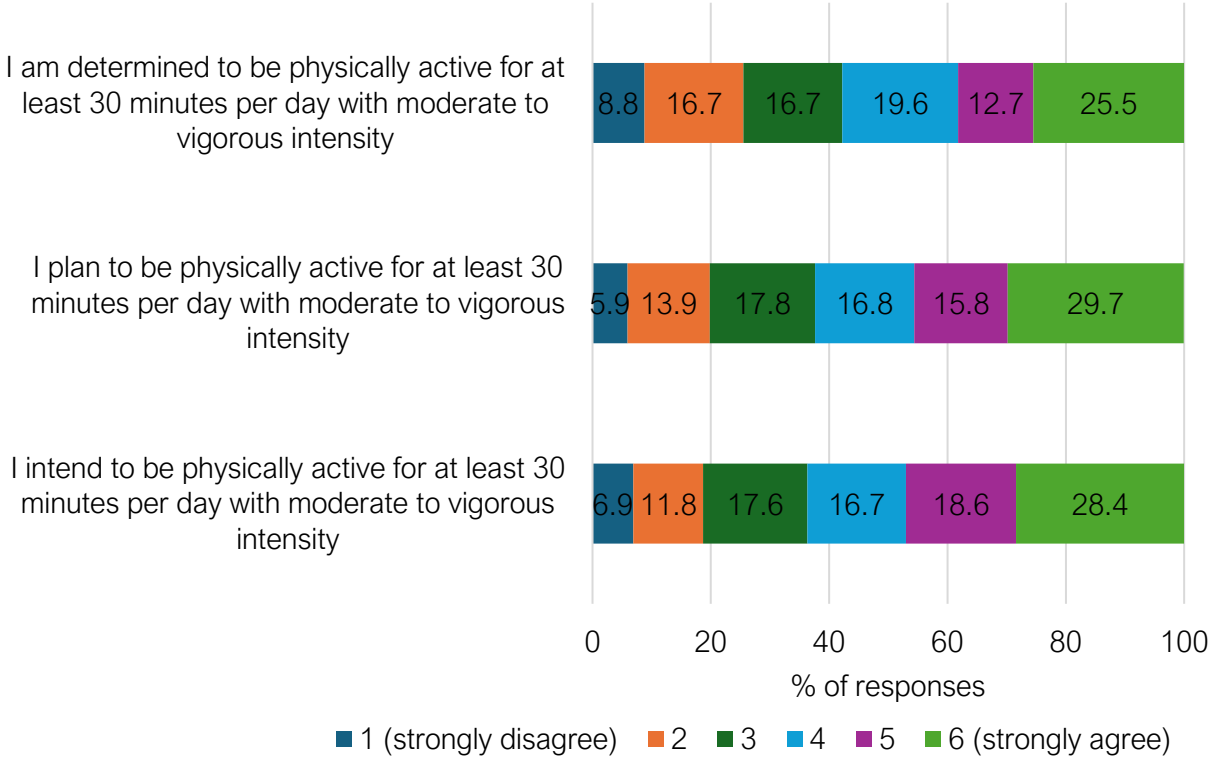


Variable		Value
Age		40.38 ± 11.68, range = 19 – 62 years
Gender	Male	42 (41.2%)
	Female	60 (58.8%)
Education	No formal educational qualifications	0 (0%)
	Educated to below degree level	34 (33.3%)
	Educated to degree level or above	64 (62.7%)
	Other	4 (3.9%)
Ethnicity	White British	69 (67.6%)
	White other	13 (12.7%)
	Mixed/multiple or other ethnic groups	8 (7.8%)
	Asian or Asian British	5 (4.9%)
	Black/ African/ Caribbean/ or Black British	7 (6.9%)
Living with a health condition or disability	Yes – living with a health condition or disability	42 (41.6%)
	A long-term physical condition or disability	18 / 42 (42.9%)
	A medically diagnosed mental health condition	24 /42 (57.1%)
	A physical disability	2 / 42 (4.8%)
	A learning difficulty	5 / 42 (11.9%)
	No – not living with a health condition or disability	59 (58.4%)
Employment[a]	Employed	77 (75.5%)
	Unemployed	9 (8.8%)
	Other	16 (15.7%)

a = employed categories are = Full-time, part-time, self-employed/ freelance, on maternity/ paternity, signed off sick short-term/ temporary; Not employed categories are = Unemployed and looking for work, Unemployed and not looking for work; Other employment categories are = retired, in full time education or training, looking after home or family, Unpaid carer, long-term sick or disabled, other.

Findings – Determination, plans, and intentions to be physically active

Before the intervention, residents were asked whether they were determined, had plans, and intend to be physically active [7]. All items were scored on a scale of 1 (strongly disagree) to 6 (strongly agree), with higher scores indicating stronger intentions, plans, or determination to be physically active.



Determination median (IQR) score was 4.0 (4). A considerable proportion of the sample strongly agreed (25.5%) or agreed (12.7%) that they are determined to be physically active.

Planning median (IQR) score was 4.0 (3). A considerable proportion of the sample strongly agreed (29.7%) or agreed (15.8%) that they plan to be physically active.

Intentions median (IQR) score was 4.00 (3). A considerable proportion of the sample strongly agreed (28.4%) or agreed (18.6%) that they intend to be physically active.

Findings – Self-determination to be physically active

Before the intervention, we measured different types of motivation people have for physical activity using the Behavioural Regulation In Exercise Questionnaire (BREQ-3) [5, 6]. It measures different types of motivation people have for physical activity, from external (doing it for others or to avoid feeling guilty) to very internal (doing it because it feels good).

The BREQ-3 is useful for understanding how self-determined someone's motivation for being physically active is. The more internal (self-determined) the motivation is, the more likely someone will be physically active long-term.

Amotivation	External regulation	Introjected regulation	Identified regulation	Integrated regulation	Intrinsic regulation
"I don't really see the point"	"I do it because others say I have to"	"I would feel bad if I didn't"	"It is important for me"	"It is part of who I am"	"It is fun, and I enjoy it"

Non-self determined → Increasing self-determination

Image adapted from http://exercise-motivation.bangor.ac.uk/breq/theory.php

Findings – Self-determination to be physically active

This slide shows the mean (SD) scores for different types of motivation to be physically active.

- The highest score was for 'identified regulation' – people believed that exercising regularly was important for them.
- The lowest scores were for non-self determined types of motivation – amotivation (not being motivated to exercise at all) and external regulation (only exercising because others tell them to).

Non-self determined

Increasing self-determination

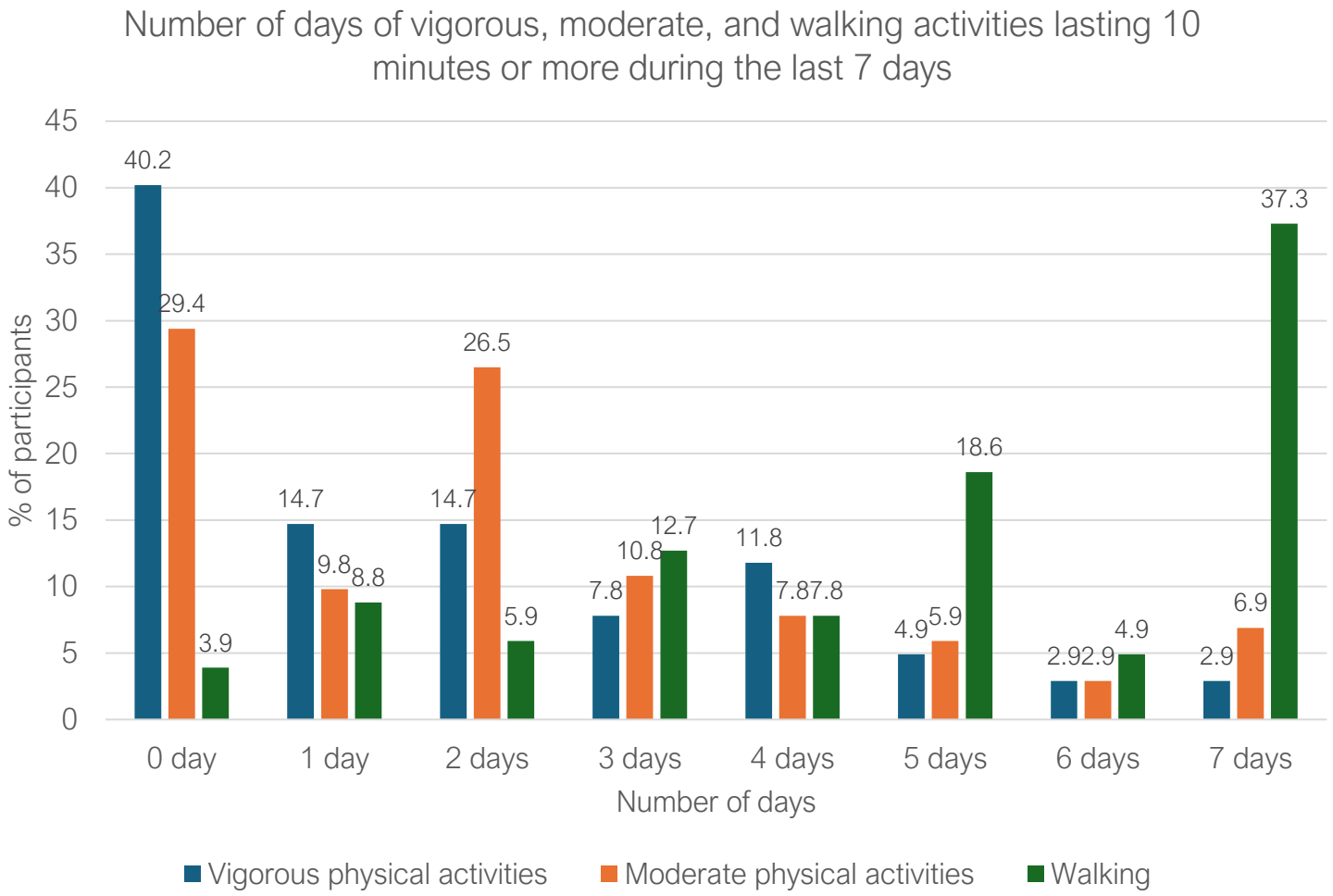
Subscale	Example item	Mean (SD)
Amotivation	"I can't see why I should bother exercising"	0.54 (0.80)
External regulation	"I exercise because other people say I should"	0.60 (0.79)
Introjected regulation	"I feel guilty when I don't exercise"	1.96 (1.09)
Identified regulation	"It's important to me to exercise regularly"	2.49 (0.91)
Integrated regulation	"I consider exercise part of my identity"	1.61 (1.15)
Intrinsic regulation"	"I exercise because it's fun"	1.95 (1.07)

Each subscale in the BREQ-3 [5, 6] has 4 items, scored on a 5-point scale ranging from 0 (not true for me) to 1 (very true for me). The items in each subscale are summed, and mean scores are computed ranging from 0 – 4, with higher scores indicating stronger types of motivation to be physically active.

Findings – Physical activity (days)

Before the intervention, participants were asked to report the number of days they had engaged in vigorous, moderate, and walking activities lasting 10 minutes or more during the last 7 days.

- The mean (SD) number of days of **vigorous physical activities** during the last 7 days was 1.77 days (SD 1.98), with participants spending on average 48.0 minutes (SD 58.51) on those activities, ranging from 0 – 240 minutes.
- The mean (SD) number of days of **moderate physical activities** during the last 7 days was 2.22 days (SD 2.1), with participants spending on average 53.31 minutes (SD 61.86) on those activities, ranging 0 – 240 minutes.
- The mean (SD) number of days spent **walking** during the last 7 days was 4.74 days (SD 2.24), with participants spending on average 63.78 minutes (SD 59.52) on those activities, ranging from 0 – 240 minutes.

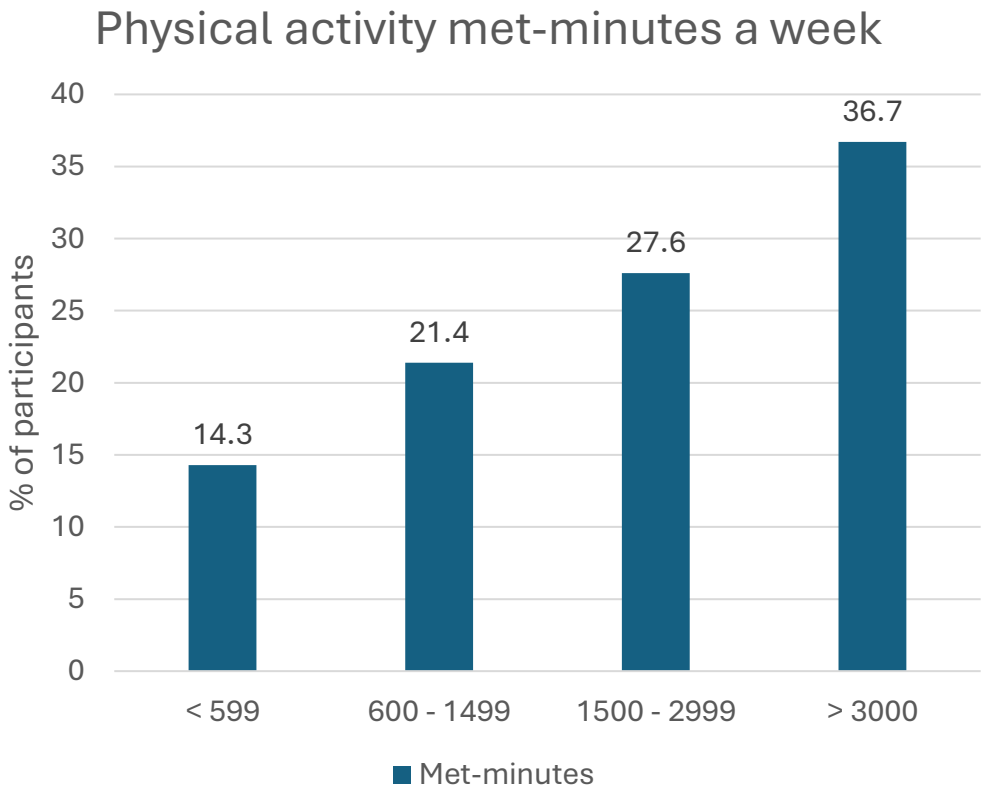


Physical activity was measured using the International Physical Activity Questionnaire short-form [4].

Findings – Physical activity (MET-minutes)

MET minutes represent the amount of energy expended carrying out vigorous, moderate, and walking physical activities. A high proportion of the sample (36.7%) had a high level of physical activity (achieving a minimum total physical activity of at least 3000 MET minutes a week).

Variable	Mean ± SD	Median (IQR)
Total vigorous physical activity MET-minutes per week	1086.26 ± 1607.30, range 0 – 8400.0	480.0 (1680.0)
Total moderate physical activity MET-minutes per week	723.6 ± 1078.89, range 0 – 4800.0	360.0 (960.0)
Total walking MET-minutes per week	1165.61 ± 1344.09, range 0 – 5544.0	660.0 (1138.50)
Total MET-min/week score	**3016.14 ± 2832.26, range 114.0 – 15144.0**	**2146.5 (2773.0)**



Physical activity was measured using the International Physical Activity Questionnaire short-form [4]. MET minutes a week are calculated by multiplying the MET value (walking = 3.3, moderate activity = 4, vigorous activity = 8) by the minutes the activity was carried out and by the number of days that that activity was undertaken.

Research Question 1: Can a brief intervention increase physical activity?

	Pre-intervention total MET-min/week score (n = 83)		Post-intervention total MET-min/week score (n = 81)	
	Median (IQR)	Mean rank	Median (IQR)	Mean rank
Intervention 1: Motivation	1866.0 (2029.5)	36.89	2034.0 (3228.0)	38.65
Intervention 2: Motivation and goal setting	2079.0 (4288.5)	43.55	2830.5 (2677.5)	46.05
Intervention 3: Control (diet)	2907.0 (3964.25)	45.77	2312.25 (2106.75)	38.00

At pre-intervention, there was no significant difference in physical activity (total met-minute/ week scores) between the intervention arms (p = .365). This is to be expected due to randomisation.

At post-intervention, there was no significant difference in physical activity at follow-up (total met-minute/ week scores) between the intervention arms (p = .371).

The results suggest that the motivation intervention, and the motivation plus goal setting/ planning intervention, did not increase physical activity, compared with the control condition.

Physical activity data were not normally distributed. Significant differences in the mean rank for each intervention group was examined using Kruskal-Wallis tests.

Research Question 2a: Can a brief intervention increase *intentions* to be physically active?

	Pre-intervention intentions (n = 102)		Post-intervention intentions (n = 102)	
	Median (IQR)	Mean rank	Median (IQR)	Mean rank
Intervention 1: Motivation	4.0 (2)	45.87	4.0 (2)	45.79
Intervention 2: Motivation and goal setting	5.0 (3)	60.85	5.0 (2)	61.59
Intervention 3: Control (diet)	4.0 (4)	48.16	4.0 (3)	47.53

At pre-intervention, there was no significant difference in **intentions** between the intervention arms (p = .075). This is to be expected due to randomisation.

At post-intervention, there was a significant difference in **intentions** to be physically active between the intervention arms (p =.049), but post hoc tests were not significant following adjustment by the Bonferroni correction for multiple tests.

The results suggest that the motivation intervention, and the motivation plus goal setting/ planning intervention, did not result in an immediate increase in intentions to be physically active, compared with the control condition.

Data on intentions was not normally distributed. Significant differences in the mean rank for each intervention group was examined using Kruskal-Wallis tests.

Research Question 2b: Can a brief intervention increase *planning* to be physically active?

	Pre-intervention planning (n = 101)		Post-intervention planning (n = 102)	
	Median (IQR)	Mean rank	Median (IQR)	Mean rank
Intervention 1: Motivation	4.0 (3)	50.10	4.0 (3)	46.69
Intervention 2: Motivation and goal setting	5.0 (3)	53.55	5.0 (2)	61.64
Intervention 3: Control (diet)	4.0 (4)	49.54	4.0 (3)	46.61

At pre-intervention, there was no significant difference in **planning** between the intervention arms (p = .828). This is to be expected due to randomisation.

At post-intervention, there was a significant difference between the intervention arms in **planning** (p =.049), but post hoc tests were not significant following adjustment by the Bonferroni correction for multiple tests.

The results suggest that the motivation intervention, and the motivation plus goal setting/ planning intervention, did not result in an immediate increase in planning to be more physically active, compared with the control condition.

Data on planning was not normally distributed. Significant differences in the mean rank for each intervention group was examined using Kruskal-Wallis tests.

Research Question 2c: Can a brief intervention increase *determination* to be physically active?

	Pre-intervention determination (n = 102)		Post-intervention determination (n = 101)	
	Median (IQR)	Mean rank	Median (IQR)	Mean rank
Intervention 1: Motivation	4.0 (3)	49.53	4.0 (2)	46.79
Intervention 2: Motivation and goal setting	4.0 (3)	57.21	5.0 (2)	62.38
Intervention 3: Control (diet)	4.0 (4)	48.03	4.0 (4)	44.24

At pre-intervention, there was no significant difference in determination between the intervention arms (p = .381). This is to be expected due to randomisation.

At post-intervention, there was a significant difference between the intervention arms (p =.019). Post hoc tests showed:

- A significant difference between the motivation and goal setting/ planning intervention and the control condition (p = .026).
- No significant difference between the control condition and the motivation intervention (p = 1.00)
- No significant difference between the motivation intervention and the motivation and goal setting/ planning intervention (p = .079).

The results suggest that the motivation plus goal setting/ planning intervention resulted in an **immediate increase in determination** to be physically active, compared with the control condition.

Data on determination was not normally distributed. Significant differences in the mean rank for each intervention group was examined using Kruskal-Wallis tests.

Reflections

Many of the participants were already motivated to be physically active (i.e., intended to be physically active). As the motivation intervention intended to educate and persuade people about the benefits of physical activity, this intervention may be more effective in those who are less motivated to be physically active.

Many of the participants were already physically active. As the motivation and goal setting/ planning intervention intended to support people to translate those good intentions into action, this intervention may be more effective in those who are less active.

The extent to which people follow (or adhere) to intervention instructions will likely influence the effectiveness of any intervention. Two residents in the motivation and goal setting/ planning intervention were unwilling to commit to increasing the amount of physical activity they do over the next two weeks. This means that these residents did not complete the goal setting/ planning component of the intervention, and this would have influenced its effectiveness.

In the motivation and goal setting/ planning intervention, participants were asked to specify how they would become more active, to identify barriers that could get in the way of them keeping that commitment, and to identify potential solutions to overcoming that barrier. The effectiveness of this approach depends partly on the *suitability* of the goal (i.e., whether it is something that is feasible for the participant to achieve), the *ability* to identify a barrier that would get in the way of them achieving that goal (i.e., they have a good understanding of what gets in the way of them being more physically active), and the *suitability* of their solution to overcome that barrier (i.e., whether it is something that is likely to address that barrier).

These tools may be more effective if they are used as part of a supportive conversation with a trained professional. This could help ensure that the commitment is suitable for the resident. A trained professional could help elicit the resident's barriers for being physically active and work with them to identify suitable solutions. This may increase the effectiveness of these tools and techniques.

Conclusions

We tested whether a low-cost and brief intervention could increase physical activity amongst residents living in Cambridgeshire.

We found that a brief intervention that educated and persuaded people about the benefits of physical activity, supported them to make a commitment to increase the amount of physical activity they do, and plan how to overcome any barriers increased **determination** to be physically active, compared with a control condition.

The brief intervention did not impact on intentions to be physically active, planning to be physically active, or level of physical activity.

Recommendations

Coping Planning or 'What-If' strategies to help a person turn their intentions to be active into behaviour have been shown to be useful tools for supporting physical activity [3]. We recommend that:

- Tools and techniques to educate and persuade residents about the benefits of physical activity should be targeted at those who are less motivated to be physically active.
- Tools and techniques to support goal setting and planning should be targeted at those who are motivated and willing to increase their physical activity.
- Tools and techniques are used as part of supportive conversations with trained professionals, who should work with the resident to elicit their barriers and facilitators for being physically active, and to work with them to identify and set goals and plans that are suitable for the residents needs.

References

1. Lamb, M., Garstang, K., Paddock, D., Clarke, E., Rutkauskas, L., Brown, C., Arden, M, Humphreys, H., Thorneloe, R. (2025). Supporting physical activity amongst residents in Cambridgeshire. A report commissioned by Cambridgeshire County Council. https://cambridgeshireinsight.org.uk/wp-content/uploads/2025/06/Behavioural-Insights-Research-Phase-1-report-PHYSICAL-ACTIVITY.pdf
2. Michie, S., Atkins, L., & West, R. (2014). The Behaviour Change Wheel: A Guide to Designing Interventions. Great Britain: Silverback Publishing.
3. Wee, Z. Q. C., & Dillon, D. (2022). Increasing physical exercise through action and coping planning. International journal of environmental research and public health, 19(7), 3883.
4. Craig, C. L., Marshall, A. L., Sjöström, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., ... & Oja, P. (2003). International physical activity questionnaire: 12-country reliability and validity. Medicine & science in sports & exercise, 35(8), 1381-1395.
5. Markland, D., & Tobin, V. (2004). A modification to the behavioural regulation in exercise questionnaire to include an assessment of amotivation. Journal of sport and exercise psychology, 26(2), 191-196.
6. Wilson, P. M., Rodgers, W. M., Loitz, C. C., & Scime, G. (2006). “It's Who I Am… Really!’The importance of integrated regulation in exercise contexts 1. Journal of Applied Biobehavioral Research, 11(2), 79-104.
7. Pfeffer, I., & Strobach, T. (2019). Effects of a planning intervention on physical activity behavior in an RCT: Intention strength as moderator and action planning, coping planning, and coping self-efficacy as mediators. Sport, Exercise, and Performance Psychology, 8(2), 192.

Recommended citation:

Thorneloe, R.J., Garstang, K., Lamb, M., Hope, D., Humphreys, H. (2025). *Increasing physical activity amongst residents in Cambridgeshire: a proof-of-concept evaluation of a brief intervention.* A report commissioned by Cambridgeshire County Council.

Contact: Rachael.Thorneloe@shu.ac.uk