

✖ **Digitize Your Exercise:**

How Digital Technologies Are Shaping

✖ How We Monitor, Prescribe and
Augment Our Physical Activities

A presentation by Dr. Yoah Sui





Hi!

My name is Dr. Yoah Sui.

I'm a postdoctoral fellow in the
Behavioural Medicine Lab at the
University of Victoria.

My area of research is digital health
behaviour change.



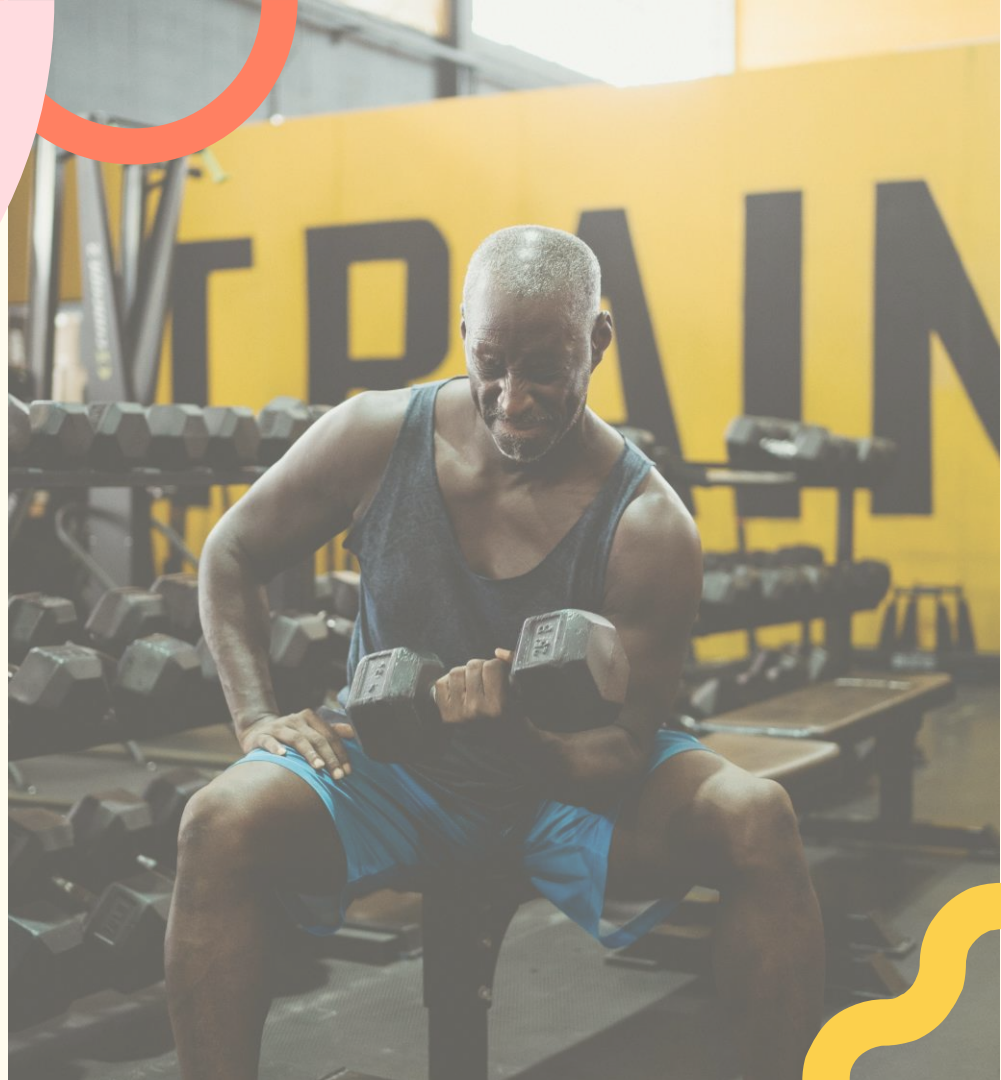
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✖ ✖

**What comes to mind
when you hear
Physical Activity?**

✖ ✖

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✖ ✖

What about physical activity in the last two years?



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What about physical activity in the last two years?





Digital technologies

have become an inseparable and ubiquitous part of our society.



88% of Canadians

own a smartphone¹



94% of Canadians

have access to the internet²



83% of adults over 65

have access to the internet, up from
79% in 2018²

How do our technologies intersect with our physical activity?



Monitor



Prescribe



Augment

01

Monitor

The ways in which we use digital technologies to track, regulate, and inform us of our biometrics and behaviour.



What do we monitor?



Steps



Heart Rate



**Intensity of
Activity**



**Sedentary
Behaviour**

What do we self-monitor?



Steps



Heart Rate



**Intensity of
Activity**



**Sedentary
Behaviour**

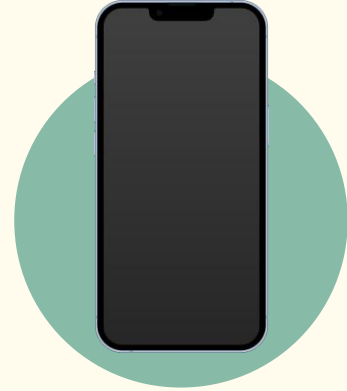
What do we self-monitor with?



Pedometers



**Fitness
Trackers**

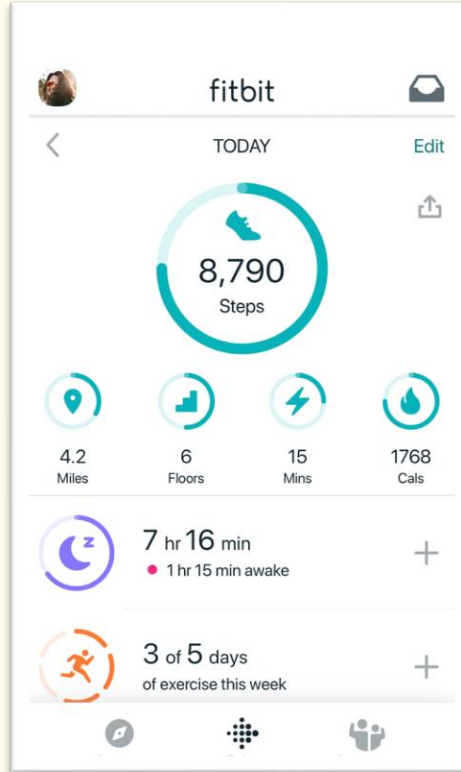


Smartphone

What do we self-monitor with?





Pedometers



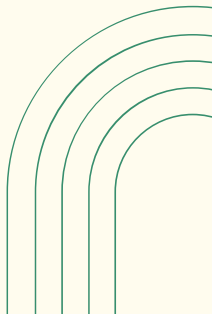



Is self-monitoring with technology effective?

A recent systematic review³ found interventions that used pedometers, Fitbit, or Nike SportsBand had high estimates for success.



Limited evidence for how physical activity behaviour was maintained long-term.






Is self-monitoring with technology effective?

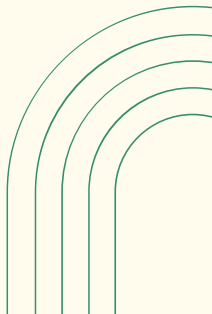
“Novelty” effect

Adherence to use

Inaccuracies in how technologies measure activity



Limited evidence for how physical activity
behaviour was maintained long-term.





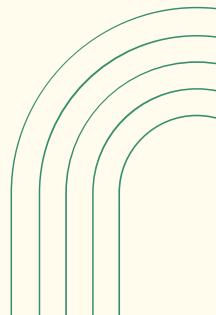
Participants



Researcher



**Traditional/Simple
Wearables**





Participants



Researcher

Traditional/Simple
Wearables



Participants



Third-Party
Developer

Consumer Wearables



Participants



Researcher

Traditional/Simple
Wearables



Participants



Researcher



Consumer Wearables

02

× Prescribe

× The ways in which we use digital technologies to design, tailor, and maintain our physical activity.



Who prescribes physical activity?

**Personal
Trainers**



**Physicians/
HCPs**

Companies



Who prescribes physical activity?

Personal
Trainers



Physicians/
HCPs

Companies



Who prescribes physical activity?

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Who prescribes physical activity?

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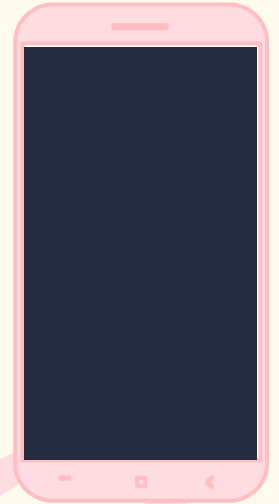





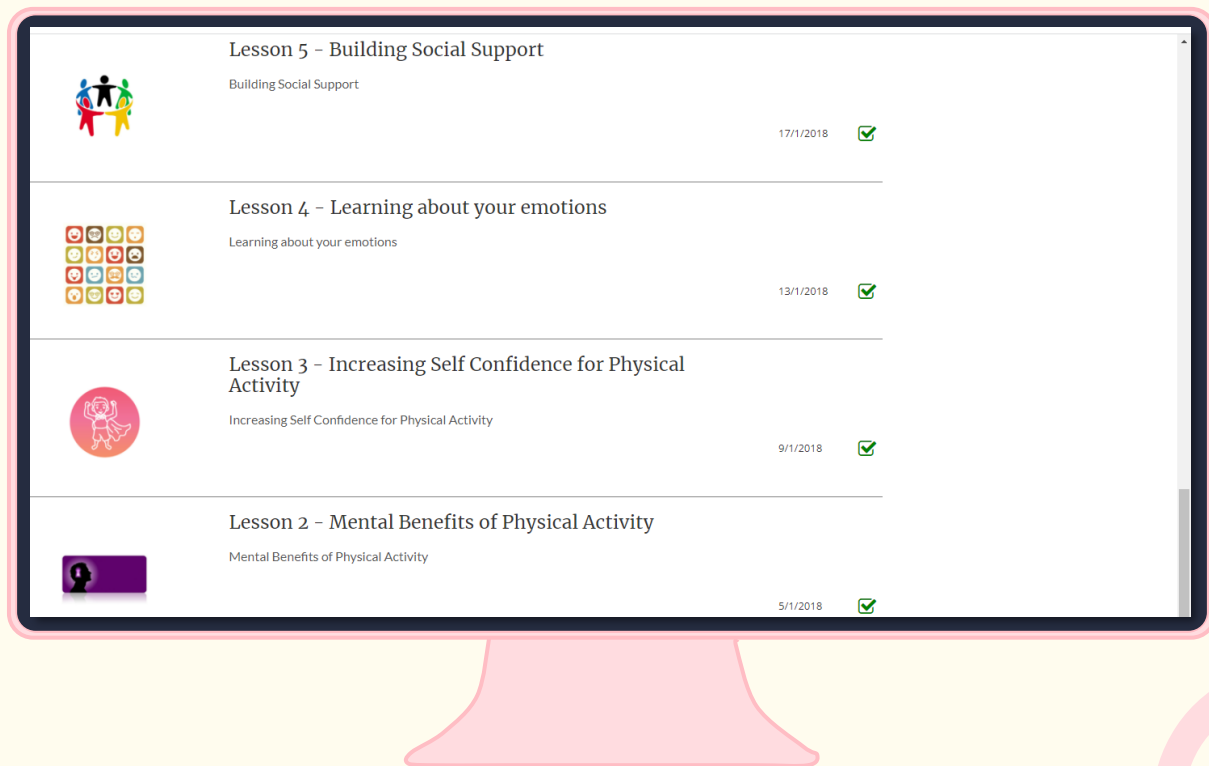
eHealth + mHealth

Health services and information delivered or enhanced through the Internet and related technologies.⁴

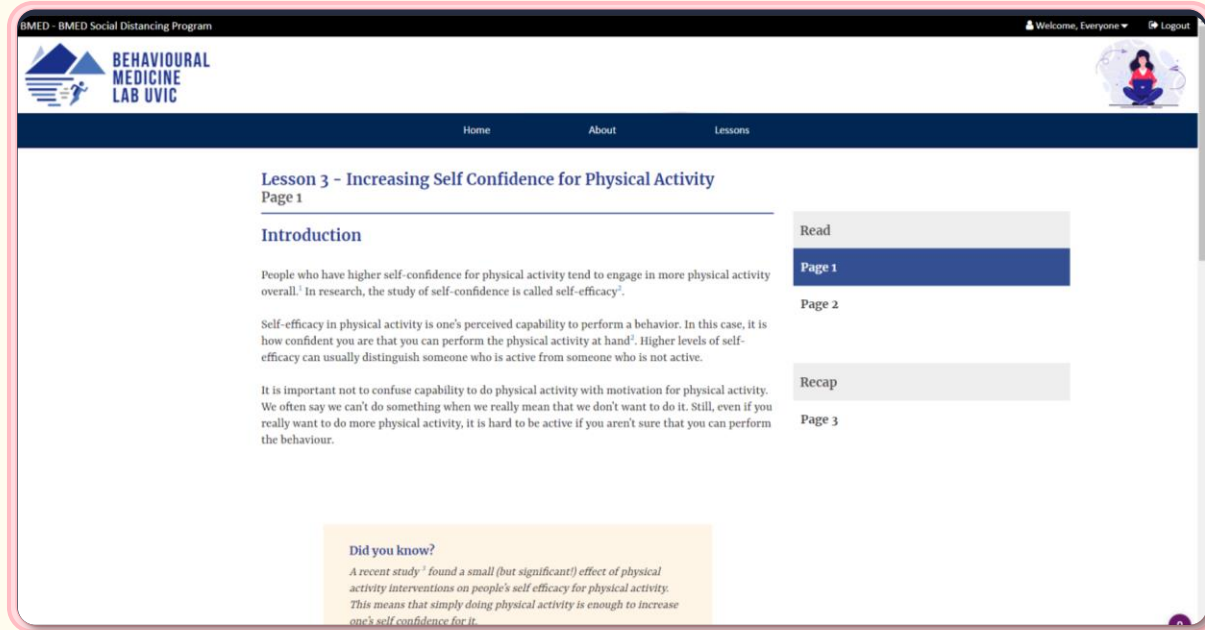
The use of mobile and wireless devices to improve health and deliver care.⁵



Web Platform for Increasing Physical Activity



Web Platform for Increasing Physical Activity



Who benefits from an eHealth Physical Activity Intervention?



New Moms

Who benefits from an eHealth Physical Activity Intervention?



New Moms



**Individuals
Practising Social
Distancing**

Who benefits from an eHealth Physical Activity Intervention?



New Moms

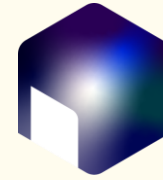


**Individuals
Practising Social
Distancing**

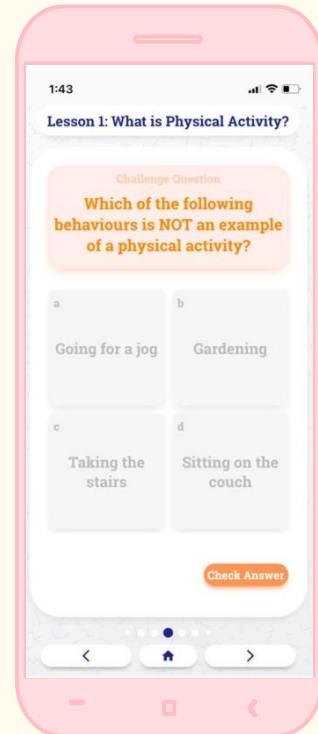
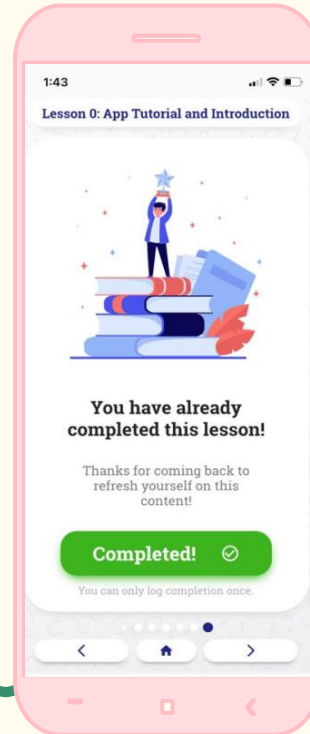
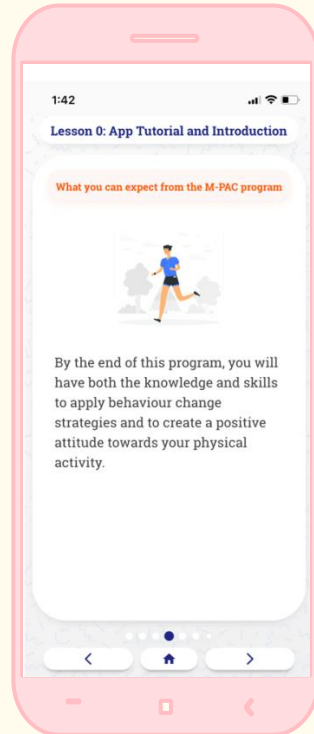
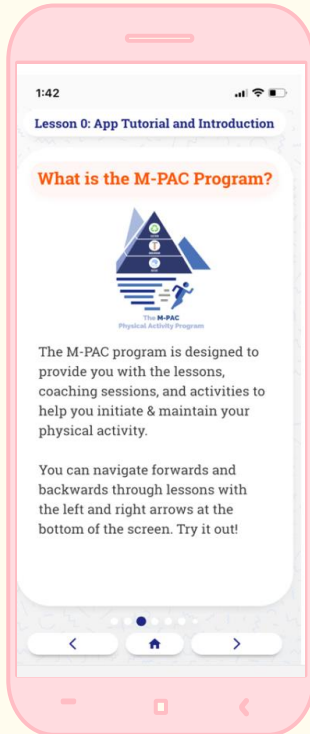


New Retirees

Mobile App for Increasing Physical Activity



PATHVERSE



Just-In-Time Adaptive Intervention (JITAI)



User sets an activity goal and due date



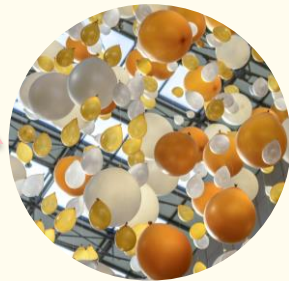
Trigger: Due date



If: Goal not met



Show: Relevant lesson



Else: Show congratulations



User sets new goal

03

✕ Augment

✕ The ways in which we use digital technologies to enhance, alter, and supplement how we perform our physical activities.





What did Physical Activity look like during COVID-19?

What did Physical Activity look like during COVID-19?

COVID-19 policies and restrictions transformed the physical activity landscape:

- Closure of gyms and rec centres
- Cancellation of sports and groups
- Practicing social distancing

So how did people stay active?



What did Physical Activity look like during COVID-19?

At-Home Fitness Videos

- YouTube is the 2nd most visited website in the world⁶
- Online fitness videos offer an accessible, free, and COVID-safe means of engaging in physical activity



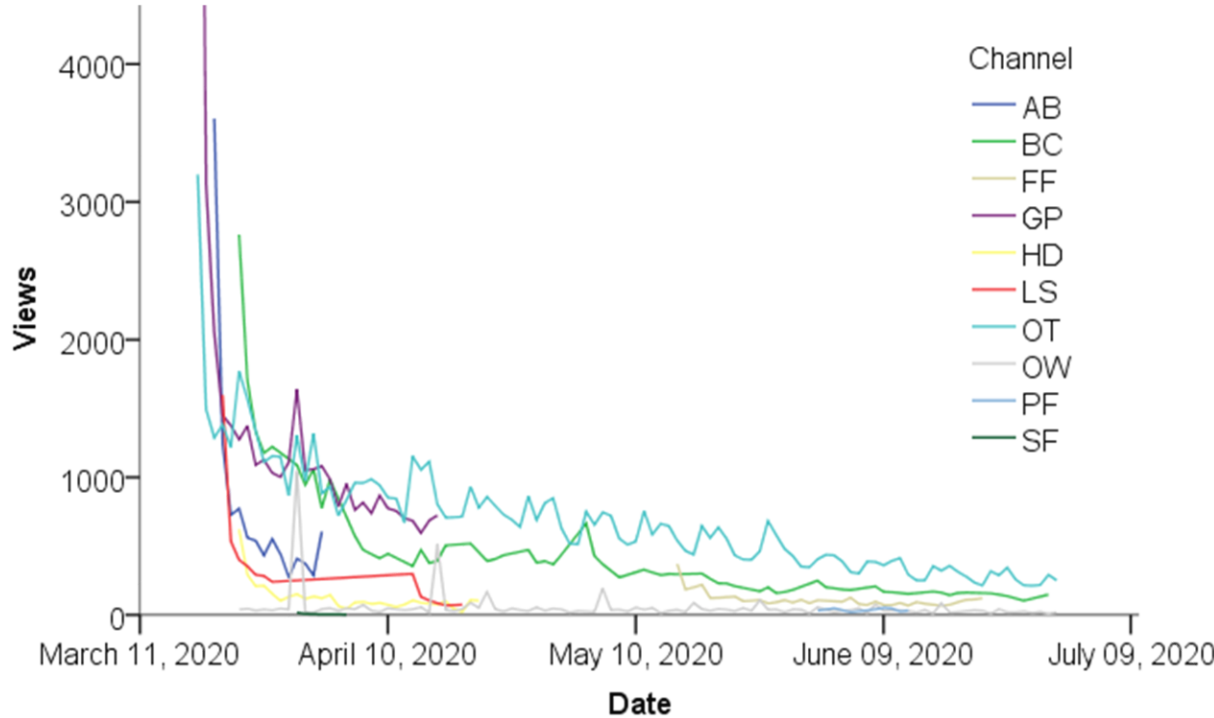
What did Physical Activity look like during COVID-19?

Interest over time ?



Search term: at home workout

Physical Activity look like during COVID-19?



During March and April 2020, The Body Coach TV, a British-based fitness channel regularly saw millions of views for its daily “P.E. with Joe” home workout videos.⁷

Can At-Home Fitness Videos Change Behaviour?

Behaviour Change Technique (BCT)

- “A systematic procedure included as an active component of an intervention designed to change behaviour.⁸”
- Do the most popular YouTube at-home fitness creators use BCTs in their videos?



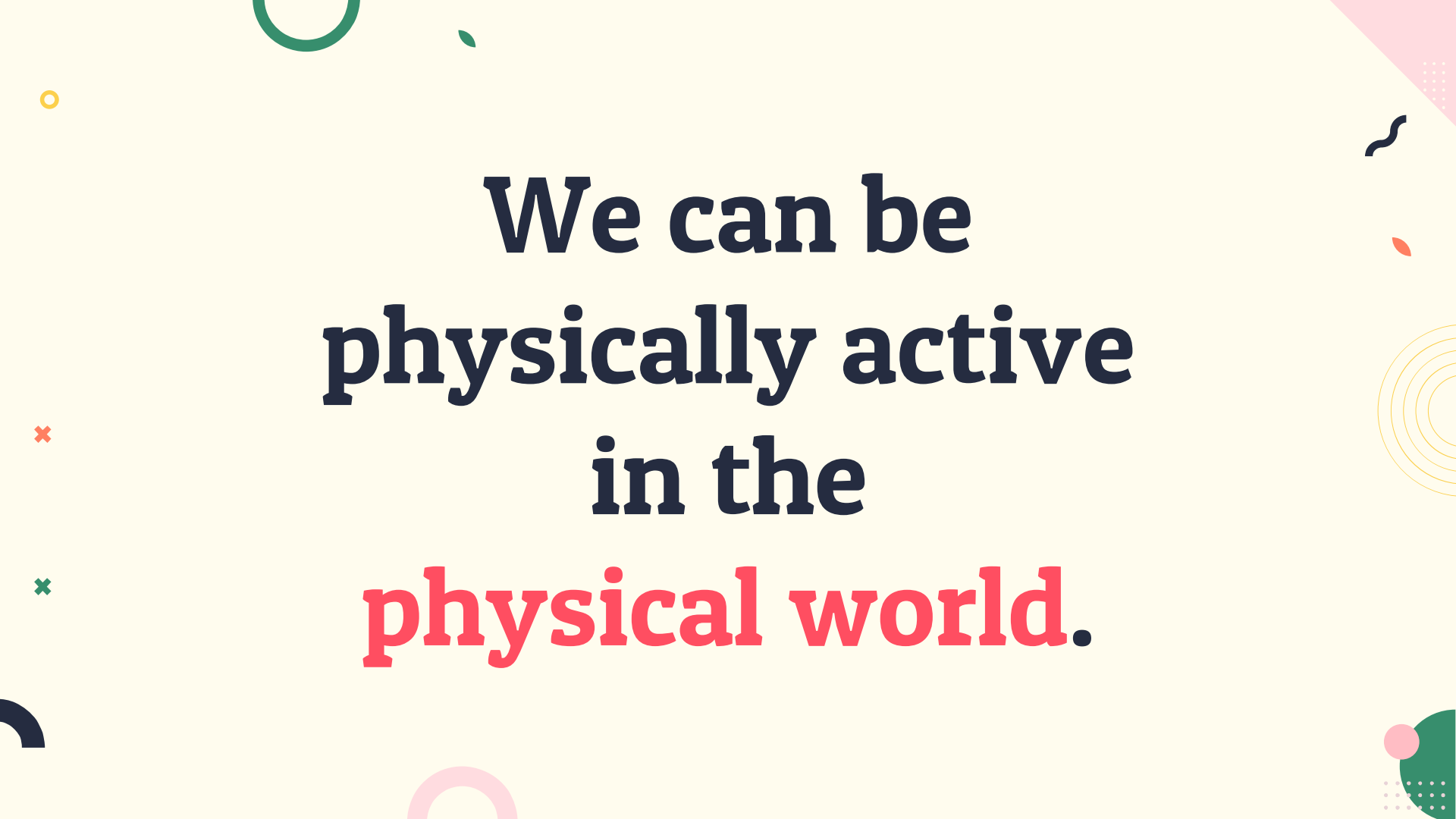
Can At-Home Fitness Videos Change Behaviour?

Channel/Creator name	Average unique BCTs per video (SD)	Mode of exercise
Chloe Ting	11.40 (4.93)	Bodyweight/HIIT
Pamela Reif	8.80 (2.39)	Bodyweight/HIIT
Yoga with Adriene	17.20 (2.17)	Yoga
Roberta's Gym	3.80 (1.30)	Bodyweight
Madfit	2.00 (1.00)	Bodyweight/HIIT
Emi Wong	14.60 (4.51)	Bodyweight/HIIT
Walk at Home by Leslie Sansone	24.60 (2.30)	Walking
Popsugar Fitness	21.40 (3.97)	Bodyweight/HIIT
Lilly Sabri	17.00 (1.87)	Bodyweight/HIIT
Fitness Blender	8.00 (1.41)	Bodyweight
Note. BCT = Behaviour Change Technique, SD = standard deviation.		

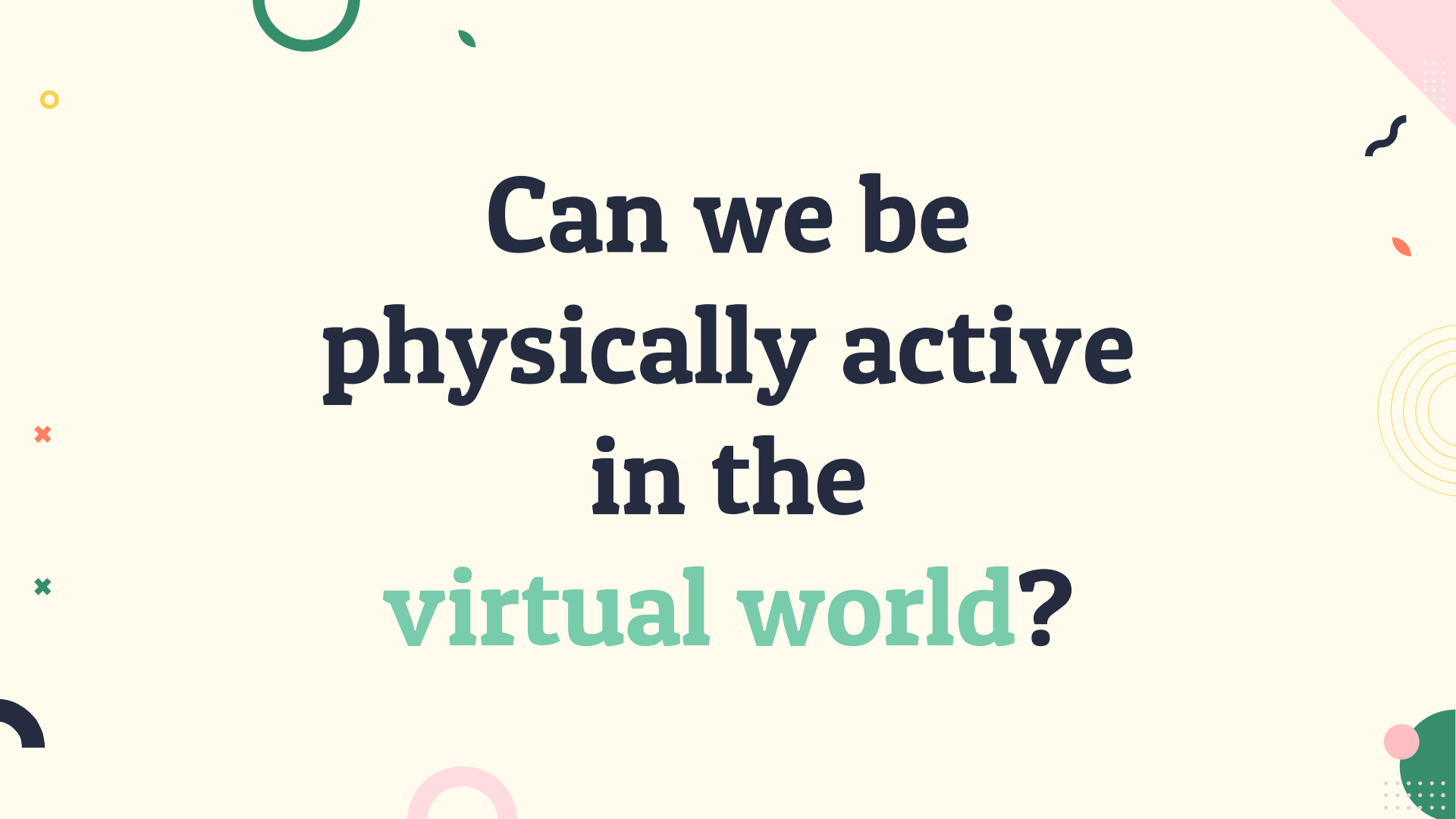


Use of BCTs varies.

BCT use doesn't appear to be related to engagement.⁸

The background is a light cream color with various decorative elements. In the top left, there's a green circle and a small yellow circle. On the left side, there are two small orange 'x' marks and one small green 'x' mark. In the top right, there's a pink triangle with a white dotted pattern and a small black squiggle. On the right side, there are concentric yellow circles and a small orange teardrop shape. In the bottom right, there's a green circle with a pink dot and a white dotted pattern. At the bottom center, there's a pink circle. At the bottom left, there's a dark blue curved shape.

**We can be
physically active
in the
physical world.**

The background is a light cream color with various decorative elements. In the top left, there's a green circle and a small yellow circle. On the left side, there are two small red 'x' marks and one small green 'x' mark. In the top right, there's a pink triangle with a white dotted pattern and a small black squiggle. On the right side, there are several concentric yellow circles. In the bottom right, there's a green circle with a pink dot and a white dotted pattern. At the bottom center, there's a pink circle. The text is centered and reads:

**Can we be
physically active
in the
virtual world?**

Virtual Reality (VR)

Allow for an immersive and unique physical activity experience.





https://www.youtube.com/watch?v=aggd3Qmt2So&ab_channel=RageofMars

Virtual Reality (VR)

- Improved frequency of physical activity⁹
- Improved strength of physical performance⁹
- Preliminary evidence for reduced anxiety and depression¹⁰
- For older adults, preliminary evidence for improvements to balance, walking speed, physical therapy¹¹



~

**Digital technologies
continue to shape how
we monitor, prescribe,
and augment our ✕
physical activities~**

✕



How will digital tech
influence your
physical activity? ✕





Thanks!

Do you have any
questions?

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