

Application of behavioural change theory to the design, development, and implementation of camera-based systems to support home-based active and assisted living

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- Doctoral programme in Health Psychology
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Visual AAL technologies (VAALTs) are hardly accepted by older adults, which jeopardises their interventionist potentials¹⁻⁴

Project Background

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Behavioural change theory

Behaviour change

- Changing human behaviour from one state to another⁵

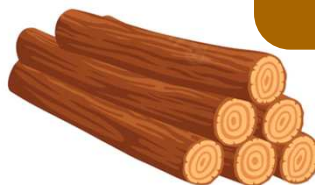
Theory

- Knowledge and/or assumptions about **what behaviour is**, what the **influences on it** are, and its underlying **mechanisms of action**⁶
- Explains and predicts when, why, and how behaviour (change) occurs or does not occur⁶

Why theory?

1. Helps to identify observable, replicable **behaviour change techniques** (“**active ingredients**”) for use in interventions⁵
2. Ensures/improves **effectiveness** of behaviour change interventions⁵
 - By avoiding implicit assumptions about behaviour and behaviour change

Your heritage is being vandalized every day by theft losses of petrified wood of 14 tons a year, mostly a small piece at a time



Project Background

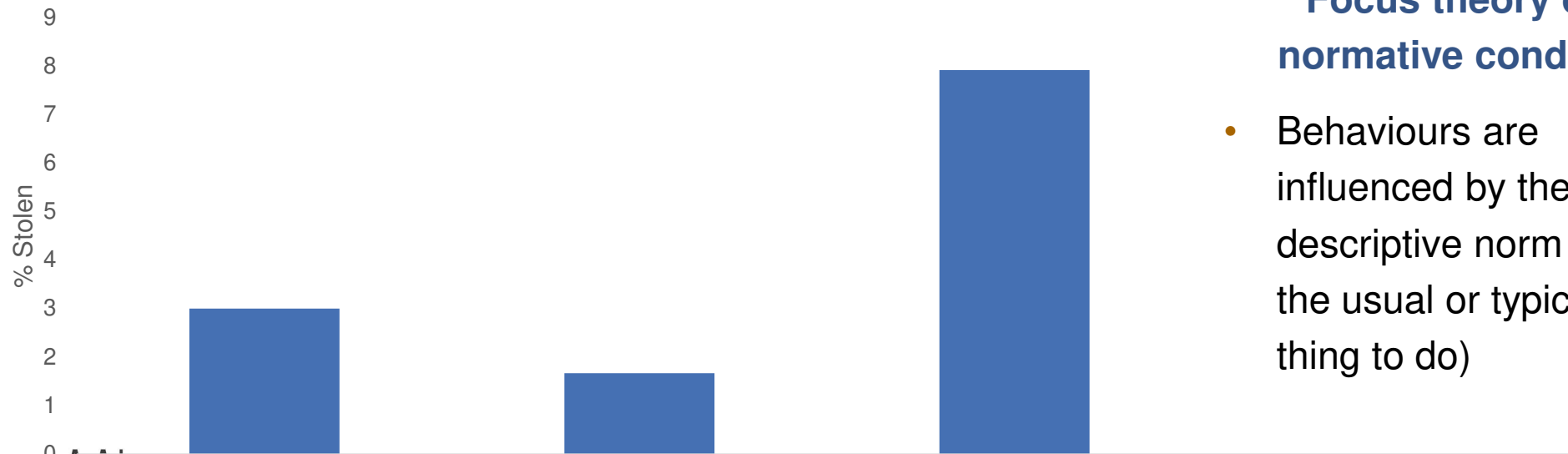
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Control (no sign)

Please do not
remove the
petrified wood

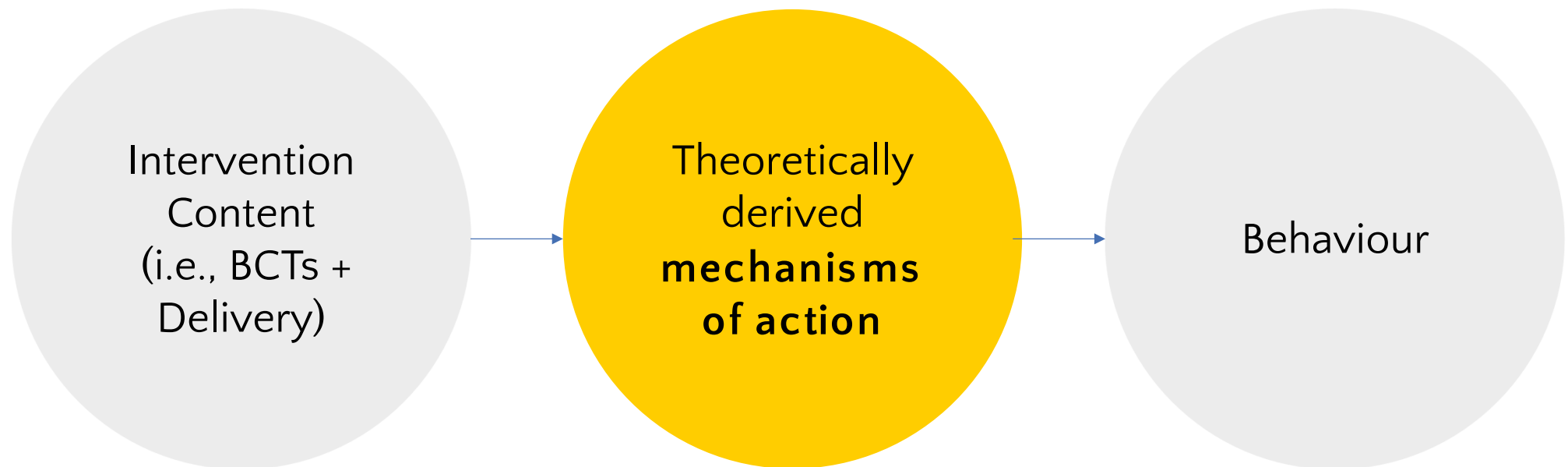
Many past visitors have
removed petrified wood
from the Park,
changing the state of
the Petrified Forest



Focus theory of normative conduct

- Behaviours are influenced by the descriptive norm (i.e., the usual or typical thing to do)

Conceptual framework: Ontology of behaviour change



What works to change what behaviours, for whom, in what situations, how, and why?

Research project 1: Scoping review

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Scoping review of the barriers and facilitators to older adults' acceptance of VAALTs

Behavioural problem

- Non-acceptance of home-based VAALTs by older adults

Gap in literature

Dearth of literature on theoretical determinants of VAALT (non-)acceptance⁸⁻¹¹

Research question

What are the barriers to and facilitators of older adults' acceptance of in-home VAALTs?

Knowledge

Skills

Beliefs about capabilities

Social/Professional role and identity

Beliefs about consequences

Memory, attention, and decision processes

Environmental context and resources

Theoretical domains framework¹²

Social Influences

Optimism

Emotions

Goals

Intentions

Reinforcement

Behavioural regulation

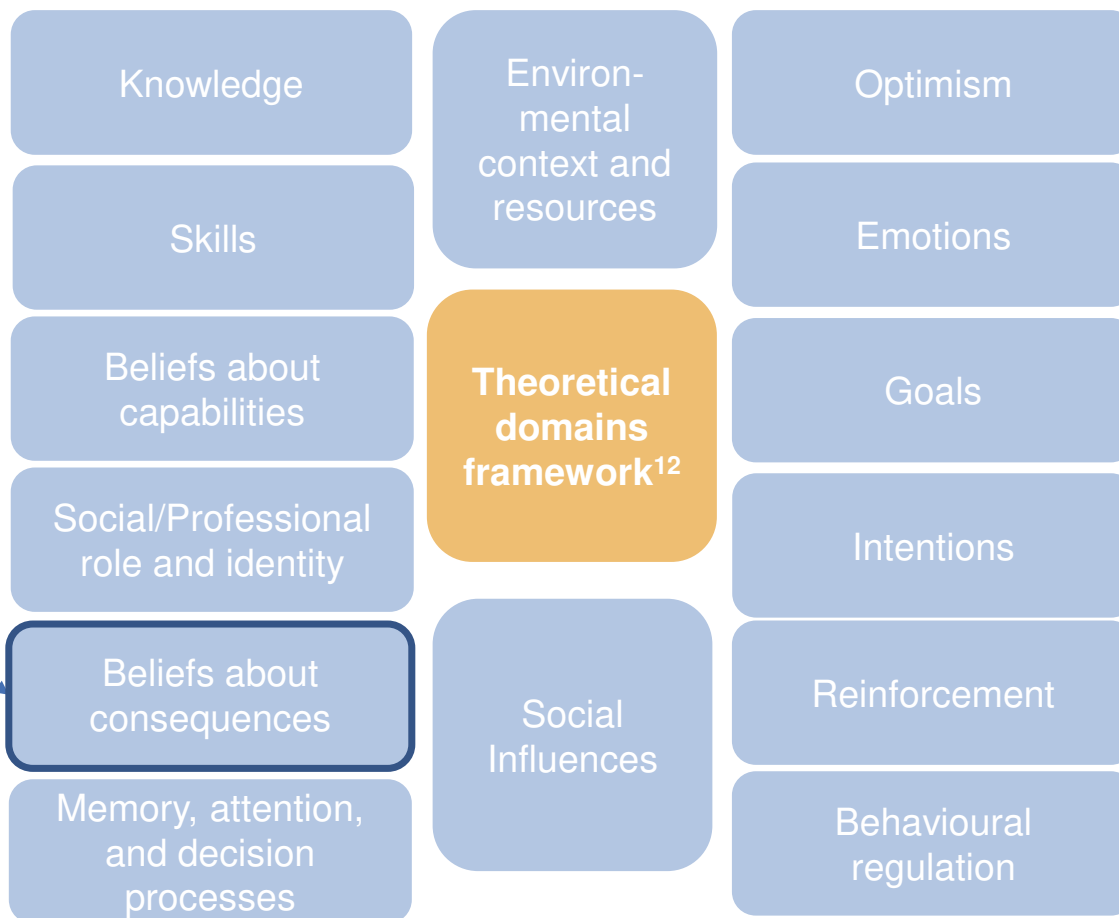
Research project 1: Scoping review

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Why the TDF?

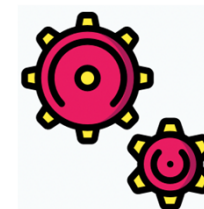
Technology acceptance model

- Perceived ease-of-use
- Perceived usefulness¹³



N behavioural influences (barriers, facilitators)

N levers for behaviour change (BCTs)



More extensive use of theory

Greater intervention effect size⁵

Research project 1: Scoping review

Results

- 37 articles identified across MEDLINE, CINAHL, Embase, Web of Science, ACM, IEEE Xplore, Google Scholar
- 38 B&Fs mapped to 12 domains

TDF domain	Barrier	Facilitator
Social/Professional Role and Identity	Stigma	Perceived need for care
Social Influences	Preference for human-provided care	Belief that VAALTs are used elsewhere
Memory, attention, and decision processes	Perceived lack of current need for VAALTs	Willingness to trade-off privacy for health

Contribution and Implications

- Determinants of VAALT acceptance span huge theoretical remit
- Informs **design and dissemination** of more acceptable VAALTs
 - E.g., unobtrusive (concealed) cameras & norm messaging to circumvent stigma

Dissemination plan

- ✓ Scoping review protocol (JBI-ES)
- ✓ Scoping review manuscript (JMIR)



Research project 2: Exploratory questionnaire study

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2 acceptance-related barriers of interest

Perceived
lack of
current need
for VAALTs

*"I don't need this now, but
perhaps at a later point"*

*"We're not in a position at the
moment to need any of those
things"*

Self-other
distinction in
perceived
need for
VAALTs

*"I have **friends** who'd benefit from
this a great deal – I'm not there
yet"*

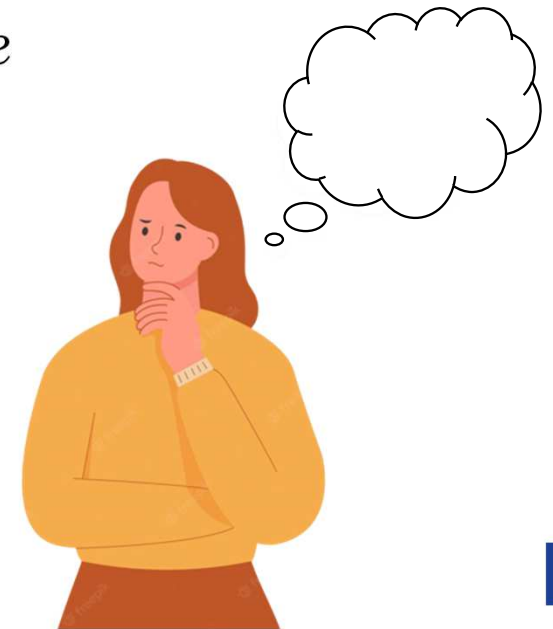
*"Thinking of **other people**, I think
it is marvellous"*

Research project 2: Exploratory questionnaire study

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The self in space and time

Think about yourself at this exact moment in time. Think about your thoughts, experiences, how you feel in this exact moment, the person you are and who you believe yourself to be. Please spend a few seconds really contemplating...



Research project 2: Exploratory questionnaire study

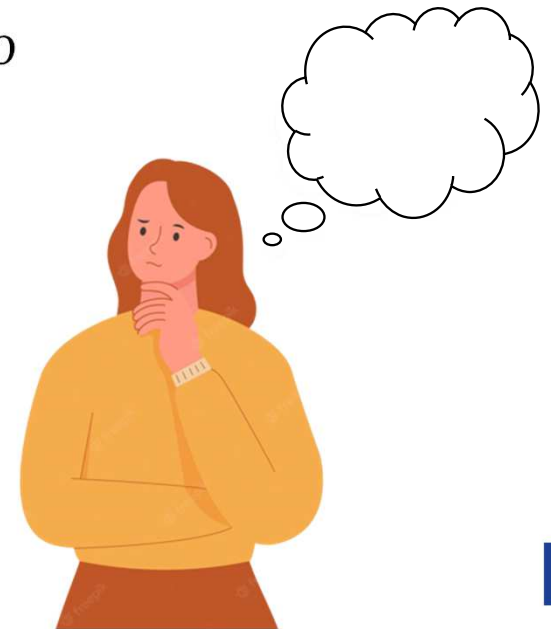
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The self in space and time

*Think about yourself **in 10 years' time**.*

Think about this person's thoughts, experiences, feelings, the person they are and who they believe themselves to be.

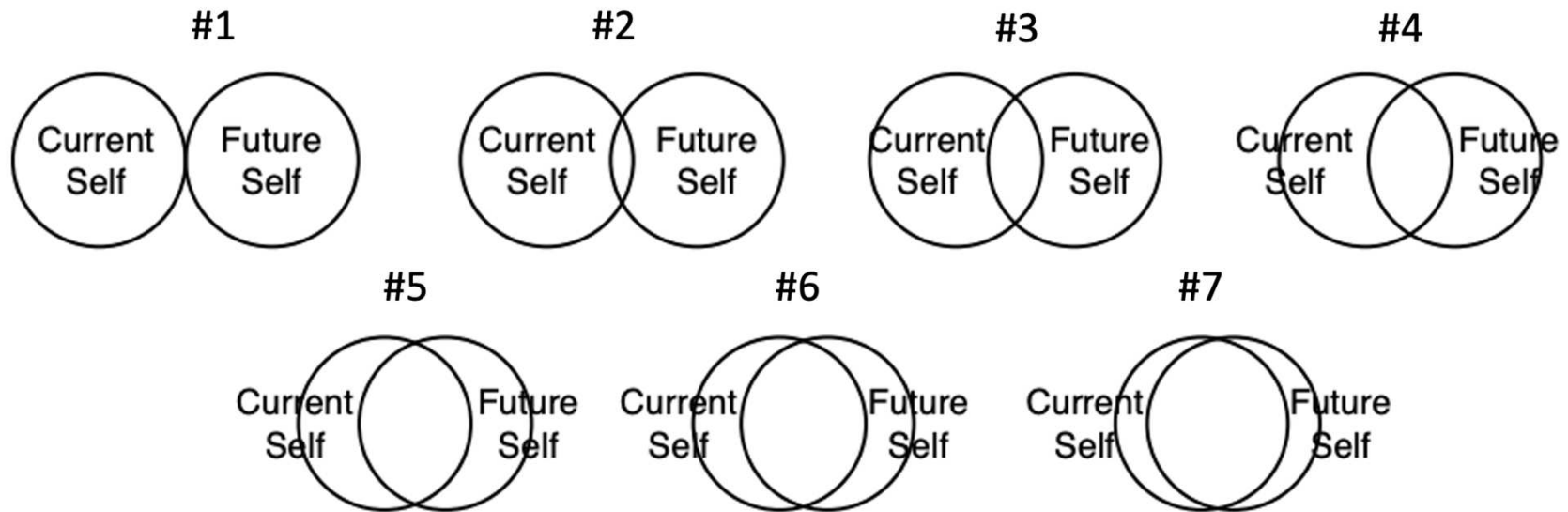
Please spend a few seconds really contemplating...



Research project 2: Exploratory questionnaire study

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The self in space and time



Which sets of circles do you think best represents how **connected** or **similar** you feel to your future self?

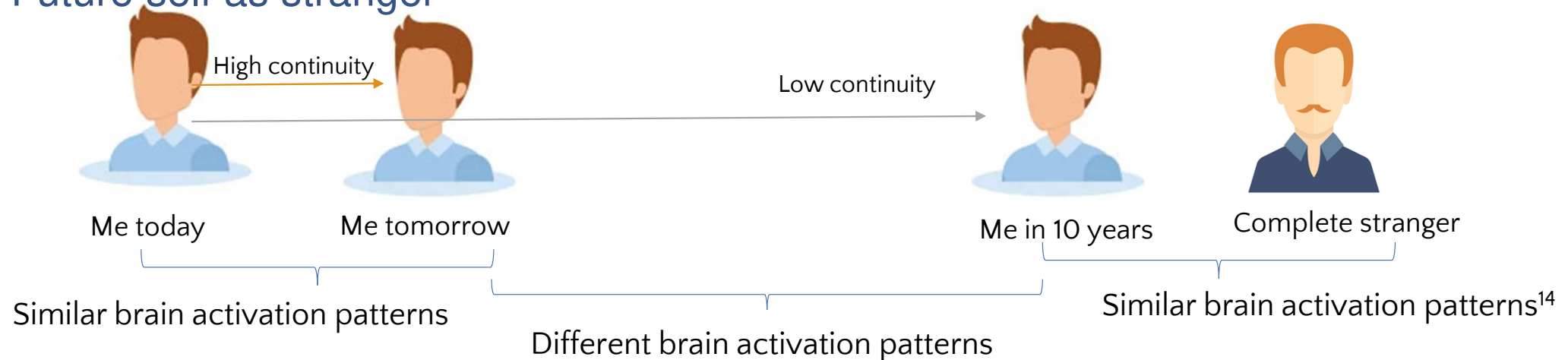
Research project 2: Exploratory questionnaire study

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Future self-continuity (FSC)

- Degree of felt **psychological connectedness** between the **present and future self**¹⁴
- Varies as a function of time¹⁴

Future self as stranger



FSC and intertemporal decision-making

- Low FSC -> preference for immediate gratification¹⁵



OR

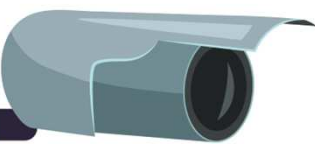


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Research project 2: Exploratory questionnaire study

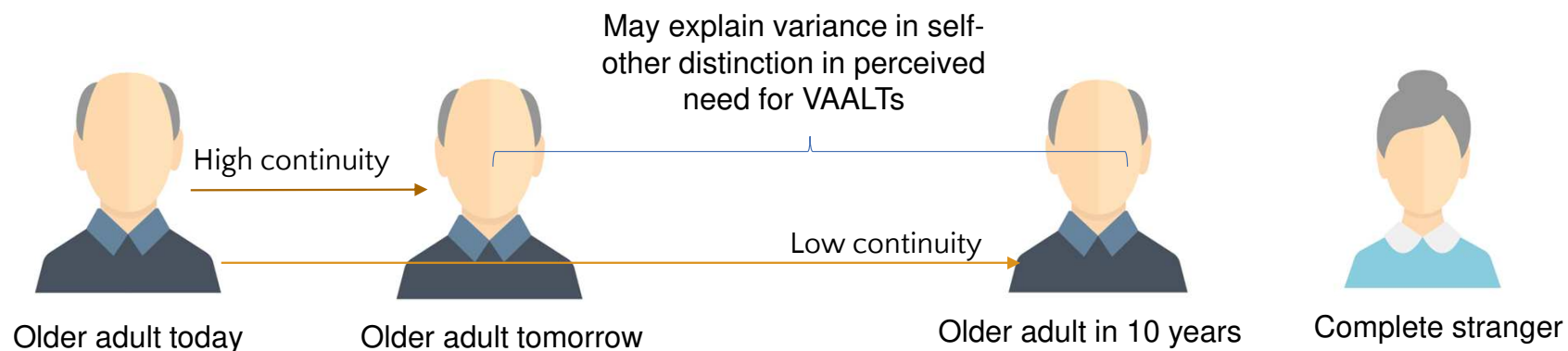
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VAALT use has temporally displaced costs and benefits

- 
- Costs**
- Material investment
 - Privacy violations
 - Stigma
 - **Borne by the present self**

- Benefits**
- Improved health and wellbeing
 - Improved independence, social inclusion
 - **Borne by the future self**

Time →



- For whom costs are avoided and benefits are prioritised

- To whom benefits are deferred; for whom costs are discounted

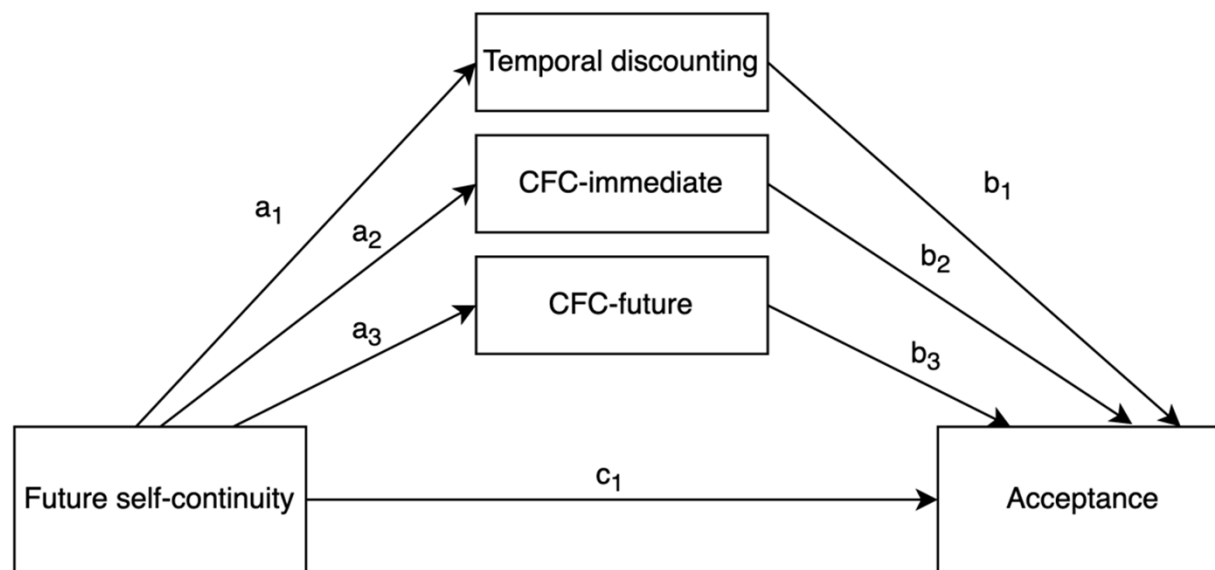
Research project 2: Exploratory questionnaire study

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Future self-continuity as a psychological driver for VAALT (non-)acceptance

H₁: Acceptance will be positively predicted by future self-continuity (FSC)

H₂: The FSC-acceptance relationship will be mediated by (a) temporal discounting and (b) consideration of future/immediate consequences



Progress to-date

- ✓ Study protocol
- ✓ Under review: Ethics application, data protection impact assessment
- ✓ Qualtrics questionnaire

Research project 2: Exploratory questionnaire study

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Future directions

- Investigating FSC as a **behavioural target** for promoting VAALT acceptance
- Techniques to promote FSC may causally increase VAALT acceptance (e.g., age-progressed selfies¹⁶)



@futuretester¹⁷

How FaceApp Made Me Plan For My Future

"But after seeing my aged self, and embraced who I will one day become, now I feel like I have someone I have to take care of—the future me can't be held off forever."

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Planned secondment



- Develop and evaluate behaviour change intervention aimed at increasing FSC, with a view to promote VAALT acceptance
- Intervention testing at Dundalk Institute of Technology



Planned future work

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Behavioural diagnosis

- Scoping review of barriers and facilitators to VAALT acceptance
- Exploratory study: Effects of FSC on VAALT acceptance

Intervention design and evaluation

- Interventional study: Effects of enhanced FSC on VAALT acceptance

RQ: What more can be done to prompt older adults to think about, care for, and empathize with who they will one day become?

Acceptance-
promoting
intervention
(BCTs + Delivery)

Mechanisms of
action
underpinning
(non)-
acceptance

Heightened
VAALT
acceptance

Thank you

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