

Experimental investigation of decision-making processes in daily physically active behaviors using a virtual reality set-up

Alexis Ruffault^{1,2}, Marc Cloes³, Michael Schyns⁴, Stéphane Bouchard⁵, Jean Fournier⁶, Cyril Bossard⁷, Quentin Valembois⁴, Sébastien Czernichow^{8,9}, & Anne-Marie Etienne¹

¹ Health Psychology Department, Université de Liège, Liège, Belgium / ² Laboratoire de Psychopathologie et Processus de Santé (EA 4057), Université Paris Descartes, Sorbonne Paris Cité, Boulogne-Billancourt, France / ³ Movement Sciences Department, Université de Liège, Liège, Belgium / ⁴ Business School, Université de Liège, Liège, Belgium / ⁵ Laboratory of Cyberpsychology, Université du Québec en Outaouais, Gatineau (QC), Canada / ⁶ UFR STAPS, Université Paris Nanterre, Nanterre, France / ⁷ UFR STAPS, Université de Bretagne Occidentale, Brest, France / ⁸ Nutrition pole, Hôpital Européen Georges-Pompidou, AP-HP, Paris, France / ⁹ Faculté de Médecine, Université Paris Descartes, Sorbonne Paris Cité, Paris, France

Introduction

- Energy expenditure provided by physical activity (PA) can be significantly increased by daily behaviors (stair use, walking) [1,2].
- Factors from the environment, and motivational and volitional processes, tend to impact the decisions when an active solution (stairs) is available at the same time as an inactive solution (elevator) [3].

The aim of this study was to identify the decision-making processes implicated in daily PA when time and effort to reach an objective (e.g., a meeting) vary.



Methods

Participants

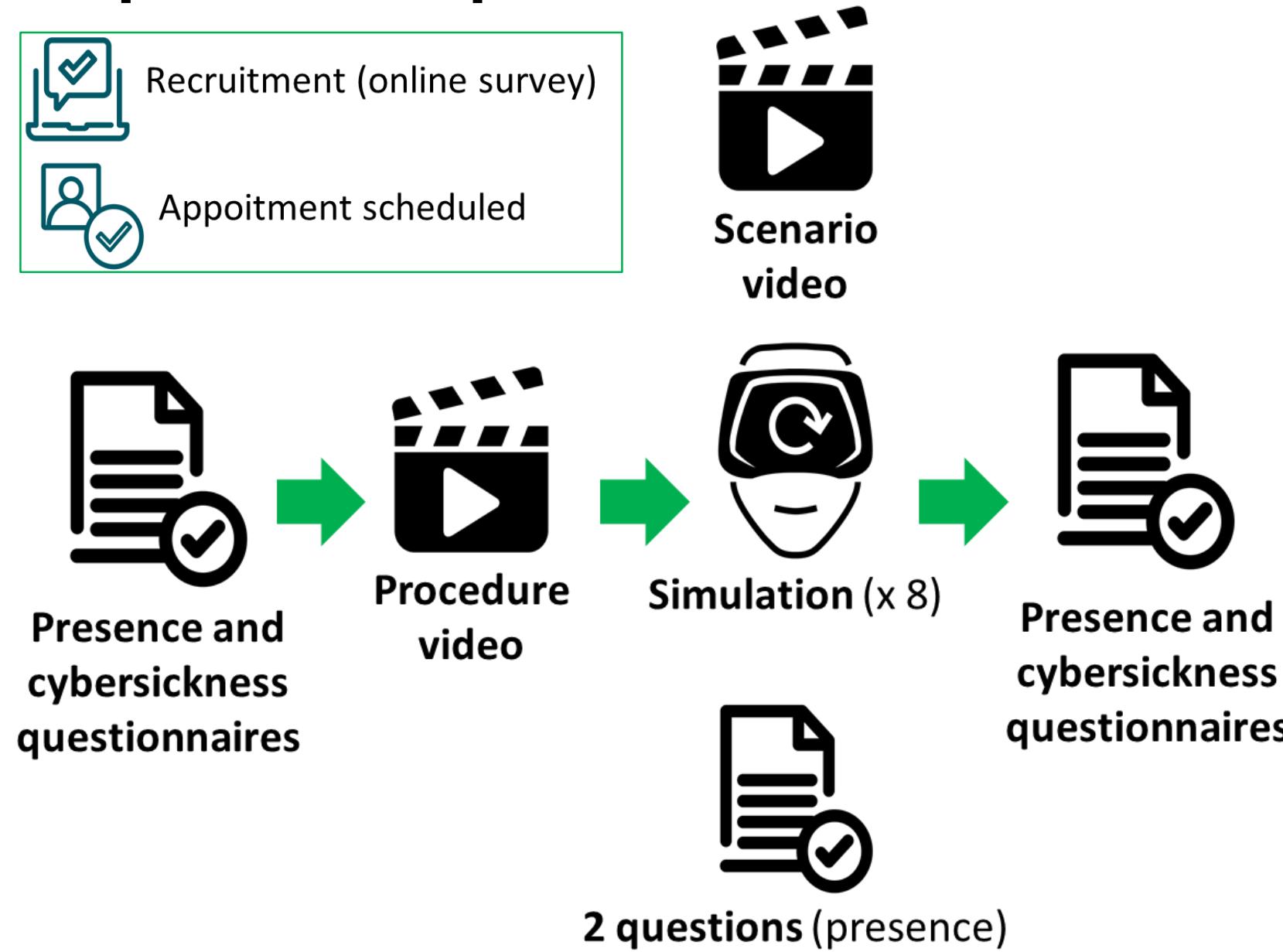
Recruitment through an online survey
✓ 23 healthy adults

Allocated to either:
• Study 1 (« Knowledge and access »)
• Study 2 (« Prompts »)

Measures (online survey)

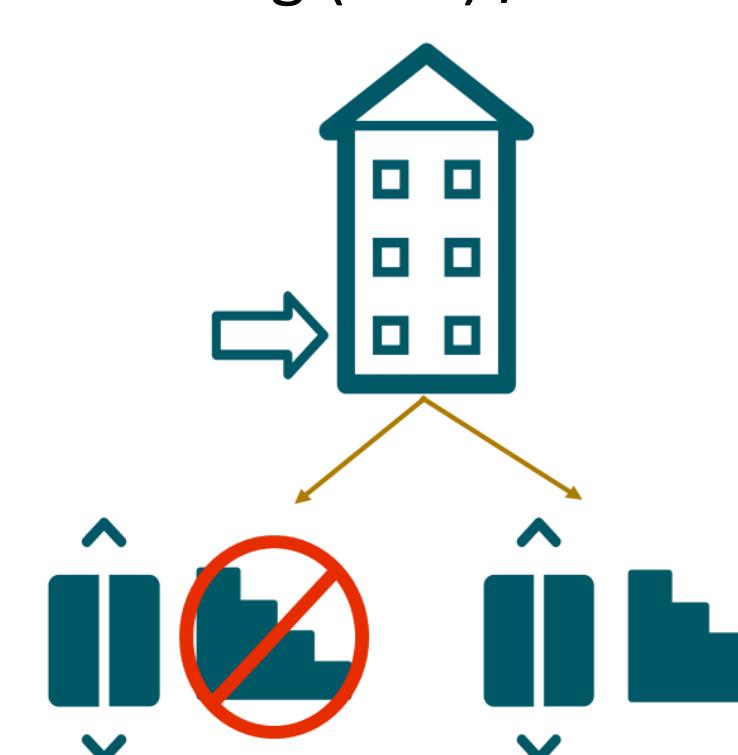
- Motivational regulation (Deci & Ryan)
- Beliefs and intentions (Ajzen)
- PA level (IPAQ)

Experimental procedure

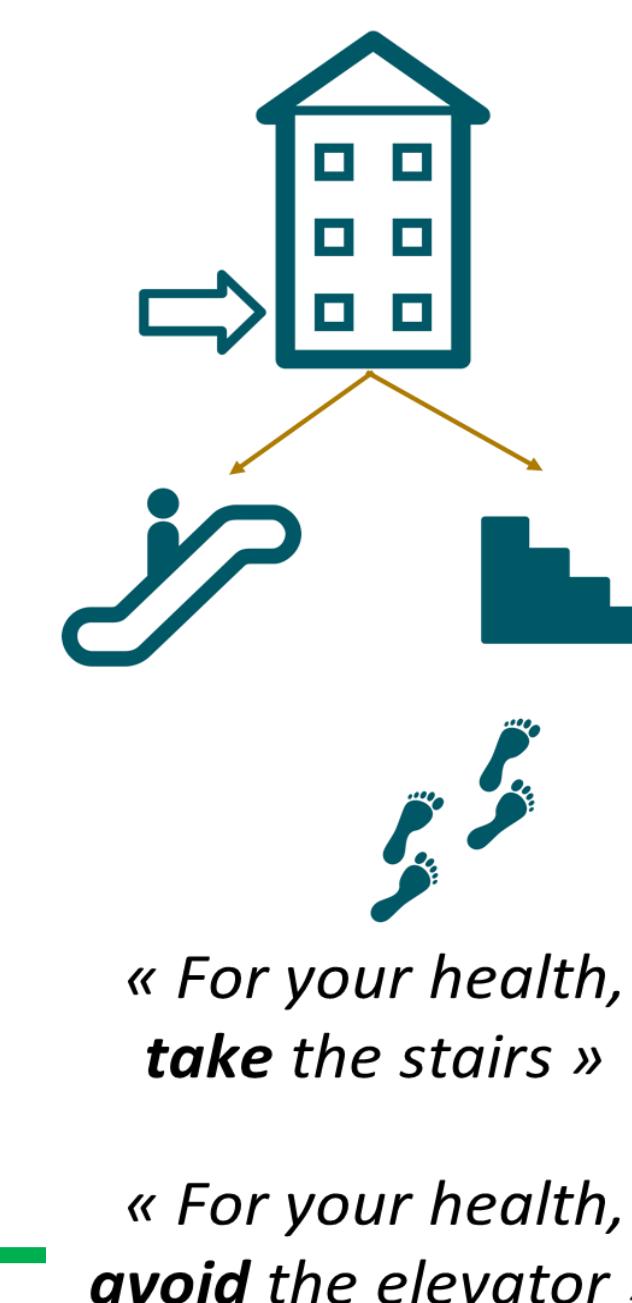


Knowledge and access (n=16)

Urgency / No urgency
1st floor / 3rd floor
Free access / No access
Know the building (n=8) / Never been (n=8)



Prompts (n=7)
Urgency / No urgency
Prompts (4 conditions)



Results

* p < 0.05 ; ** p < 0.01

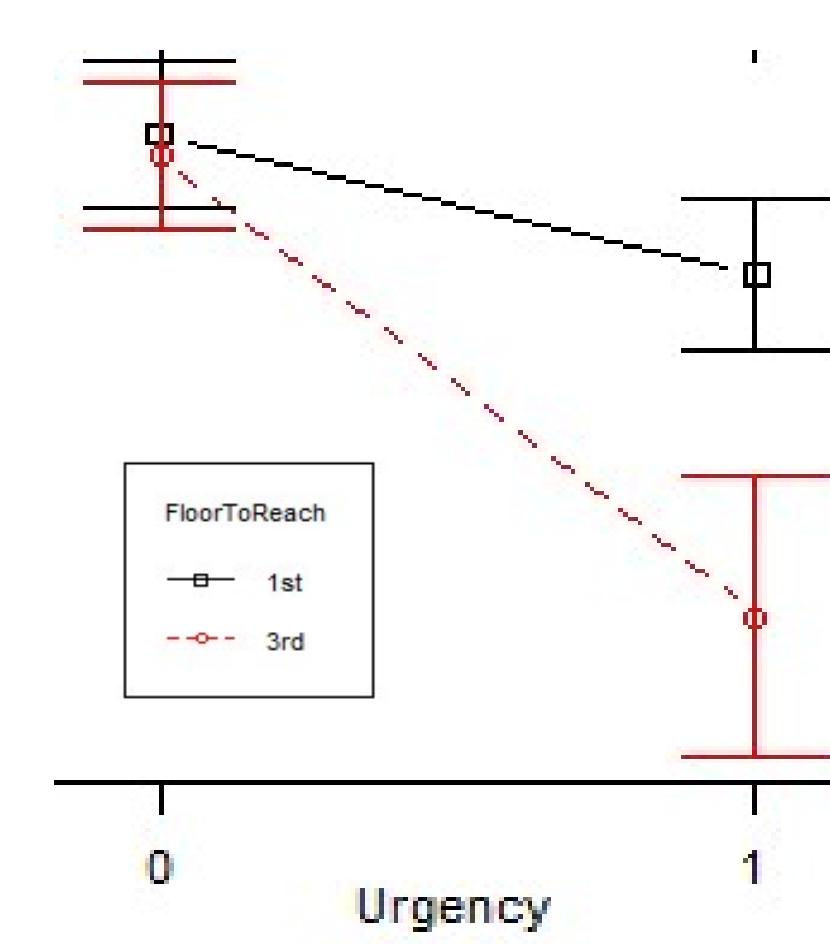
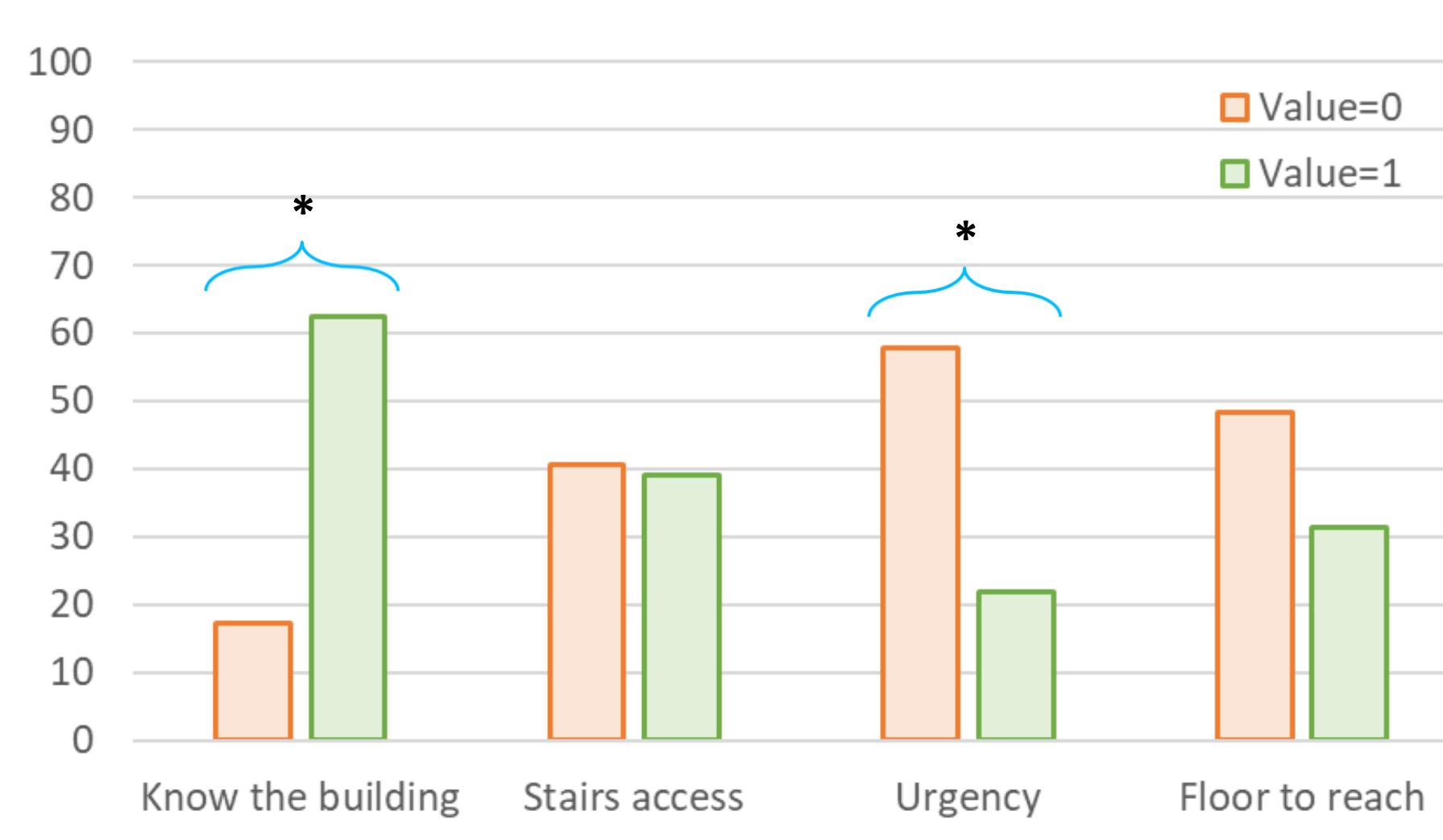
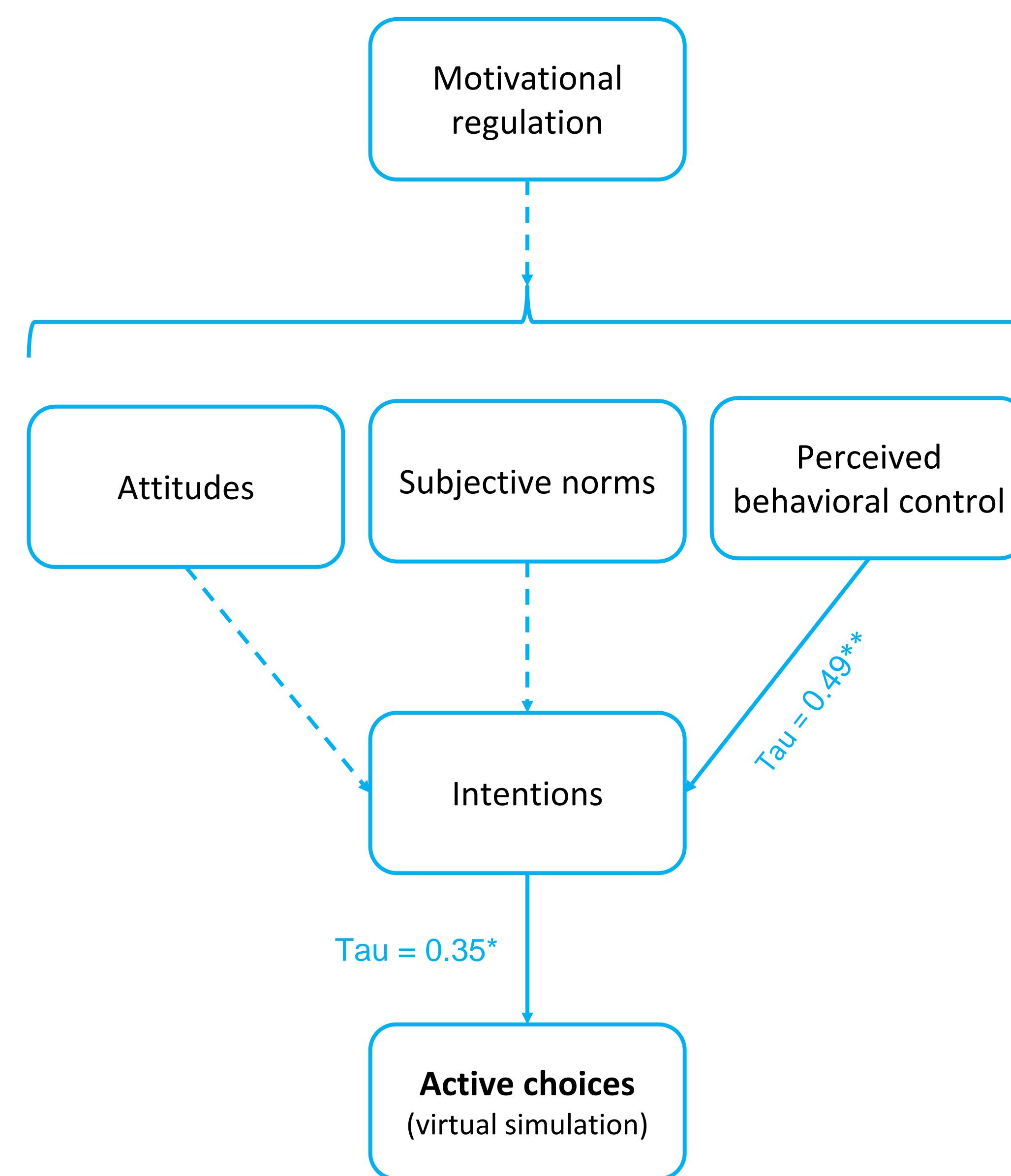


Figure 2. Interaction model Urgency * FloorToReach in Study 1 (percentage of active choices, 128 observations)

- ✓ Significant interaction Urgency * FloorToReach
- ✓ Adding KnowledgeOfBuilding improved the fit
- X Access and feeling of presence do not improve the fit

Generalized mixed effects models with **experimental conditions** (urgency, floor to reach, access to the stairs, knowledge of the building) and **immersion variables** (presence and cybersickness) as **fixed factors**, and **participants** and **simulation** order as **random factors**.

Figure 1. Percentage of active choices / experimental conditions in Study 1 (above) and Study 2 (below)



Discussion

- ✓ Environmental factors such as accessibility of the stairs and prompts did not impact the percentage of active choices.
- ✓ Absence of urgency, lower effort to produce (i.e., floor to reach), and previous knowledge of the building predicted active choices.
➤ Asking people to arrive in advance to their meeting could lead them to more active choices (e.g., taking the stairs)
- ✓ Previous intention to take the stairs predicted later choice to take the stairs in a virtual reality simulation.
- ✓ Actual PA level and motivation to be more physically active did not predict active choices
➤ **Steps forward:**
 1. Continue inclusion and data collection to increase statistical power
 2. Verify ecological validity of such results with an after-simulation questionnaire

References

[1] Melanson. *Obes Rev*. 2017 // [2] Ekblom-Bak, Ekblom, Vikström, de Faire, Hellénius. *Br J Sports Med*. 2014 // [3] Brymer, Davids. *Sports Med*. 2016