! DISCLAIMER !

This is more of a method-sy talk and less a "this is how you solve a health issue" talk

(DIS)ENGAGEMENT

Chances and Challenges

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So what are we talking about here?!

Dis-

- What is engagement?
  - Motivation?
  - Willingness to do something?
  - Being involved in something?
  - Capability of doing something?

The opposite of this?

(PS: not talking about engagement as in marriage proposal or as military fighting)

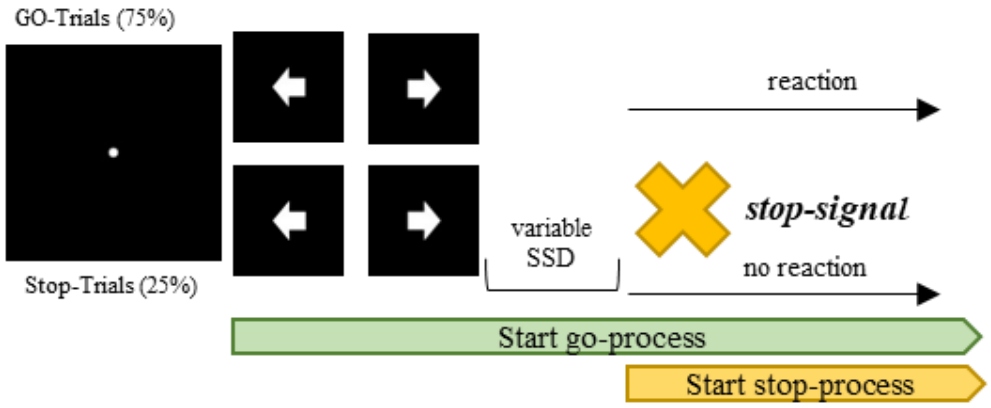
(PPS: also not talking about task-switching or (dis)engaging with a salient stimulus feature)

BORING TASKS DONE DIFFERENTLY

Adding game-like elements to cognitive tasks

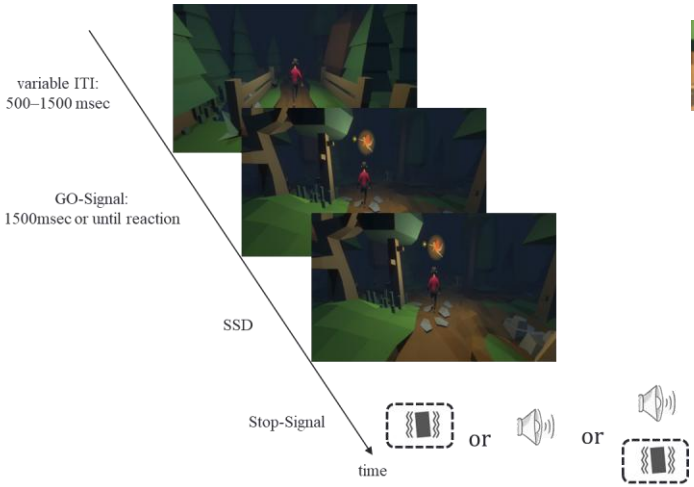
From basics to application *(here response inhibition)*

From the lab

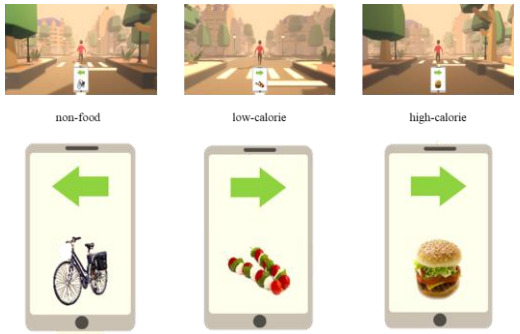


To more complex scenarios

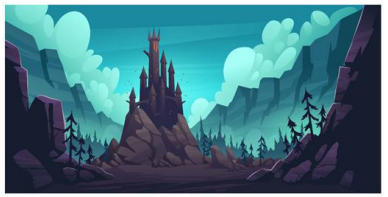
Games-based inhibiton



Food-based inhibition

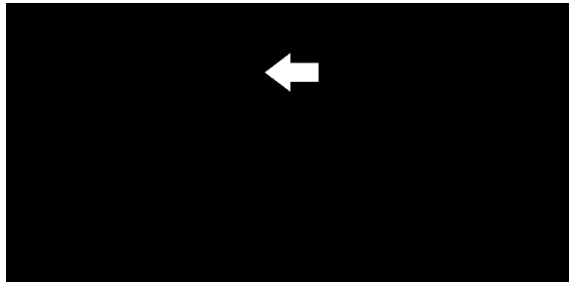


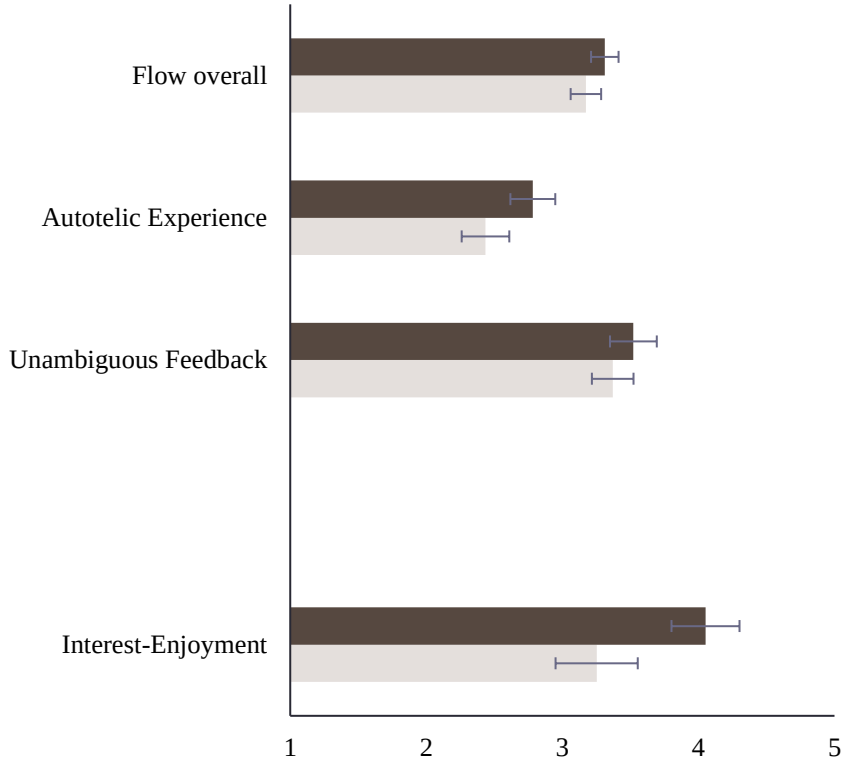
Motivational influences



see Friehs et al., 2020, 2021, 2022; Held et al., 2025; Kirsten et al., 2023

Improved experience *(only the statistically significant bits)*





Autotelic Experience
- Doing something for its own sake
- e.g. "The experience was extremely rewarding"
- $BF_{10} = 7.61$
- $F(1, 21) = 6.79, p < .05, \eta^2 = .24$

Interest-Enjoyment
- Enjoyment during and interest in the activity
- e.g. "I enjoyed doing this activity"
- $BF_{10} = 168.11$
- $F(1, 21) = 16.35, p < .01, \eta^2 = .44$

Flow overall (scale mean)
- high concentration and loss of self-consciousness, etc.
- $BF_{10} = 4.92$
- $F(1, 21) = 5.92, p < .05, \eta^2 = .22$

Unambiguous Feedback
- Immediate and clear feedback
- e.g. "I knew how well I was doing when I was performing the task."
- $BF_{10} = 1.96$
- $F(1, 21) = 5.76, p < .05, \eta^2 = .22$

Friehs et al., 2020

Games are versatile ! *Investigating food-based inhibition*

non-food

low-calorie

high-calorie

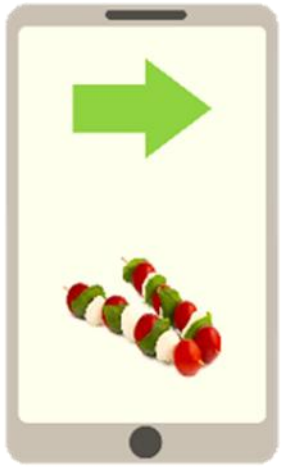


Table 3. Correlations of SSRTs (depending on the task condition) and questionnaire scores.

		Overall ($N = 83$)	No-Food ($n = 27$)	Low-Calorie ($n = 29$)	High-Calorie ($n = 27$)
BIS	Non-planning	.07	-.26	.25	.07
	Motor	.10	-.20	.44*	.07
	Attentional	.20	.28	.25	.14
	Total	.14	-.11	.37*	.11
FEV	Restrained	.08	.23	-.03	-.11
	External	.04	.14	-.12	.24
	Emotional	.10	.17	.05	.22
FCQTr		.22*	.25	.03	.34*
Hunger		.16	-.13	-.03	.56*

* $p < .05$ (two-sided).

In the high-calorie condition, the task performance was correlated with hunger and food craving

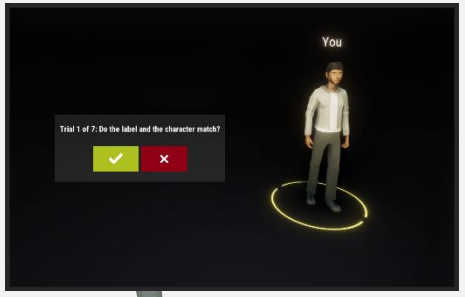
But performance not different per condition
➔ Different in people with an eating disorder?

Kisten et al., *2024*

Improved performance *(through self-relevance)*

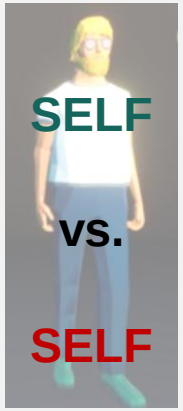
How to increase self-relevance?

Matching Task



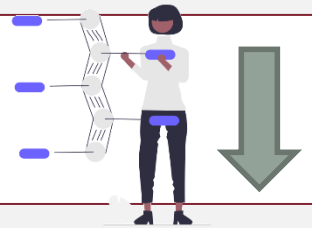
Avatar Customizer

Stimulus-Distance Manipulation



3 key results

- Self > Other
- Identification → Motivation
- Self-Relevance → Performance



Potential application

- Design of user interfaces in performance critical tasks
- Self-relevance and identification to improve outcomes in therapeutic as well as training settings

Friehs et al., 2022a, 2022b

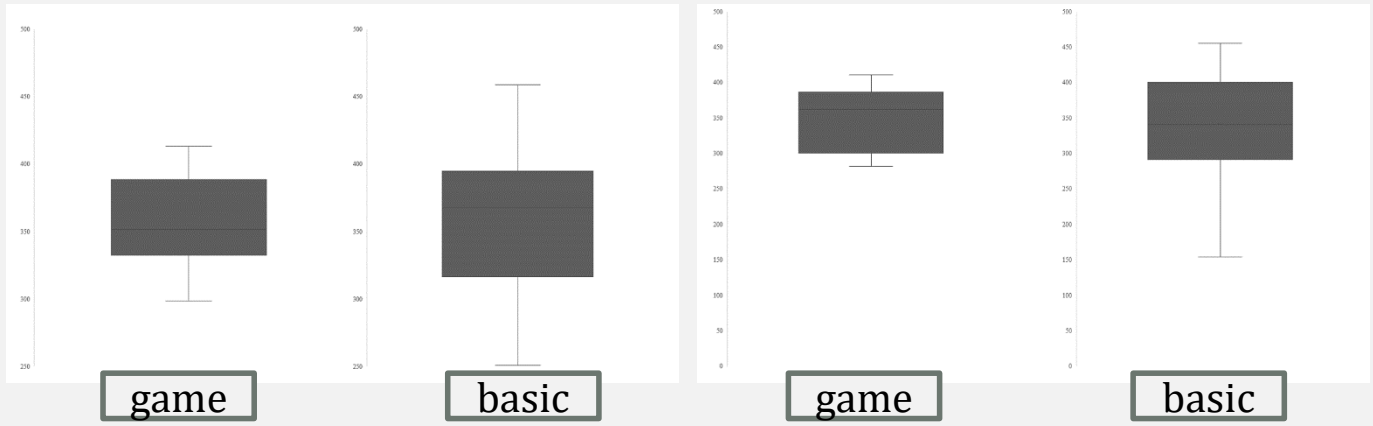
Improved data quality – example: Stroop game

Internal-consistency within a session higher in the game version

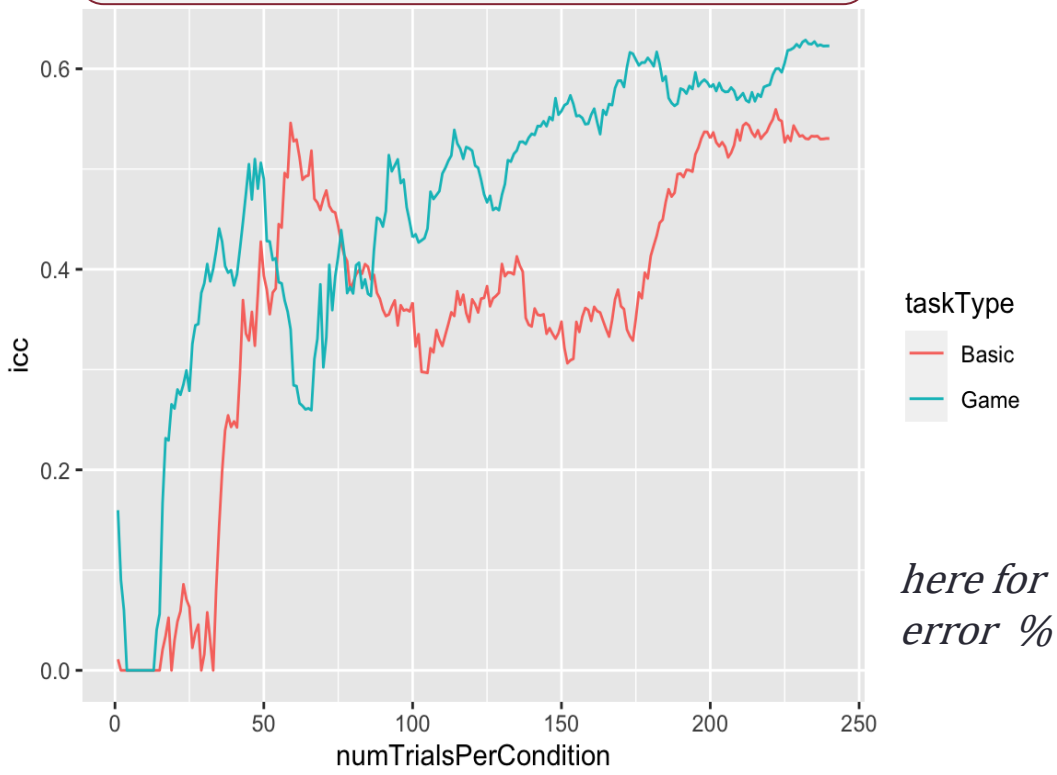
- Basic: RT $r_{SB} = 0.78$ and 0.64 // error: $r_{SB} = 0.79$ and 0.60
- Game: RT $r_{SB} = 0.83$ and 0.76 // error: $r_{SB} = 0.74$ and 0.74

Also evident in some of my other research:

- variance (game) < variance (basic)



Data consistency change over time: game > standard

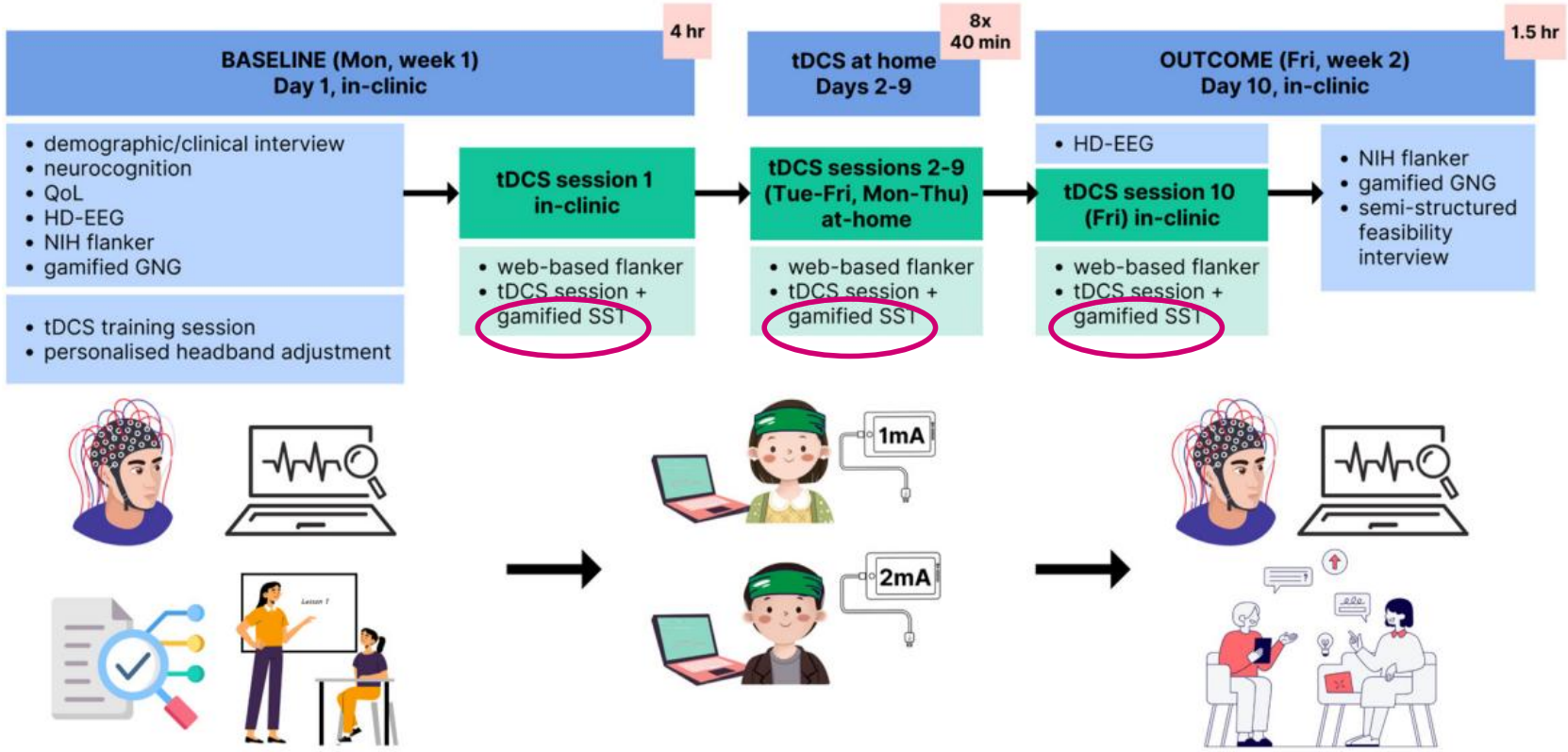


here for error %

Wiley et al, 2024

Make it useful outside cognitive psychology !

Studying children with traumatic brain injury



Stein et al 2025a, b

The fairy task is not the only task there is: we used 2!

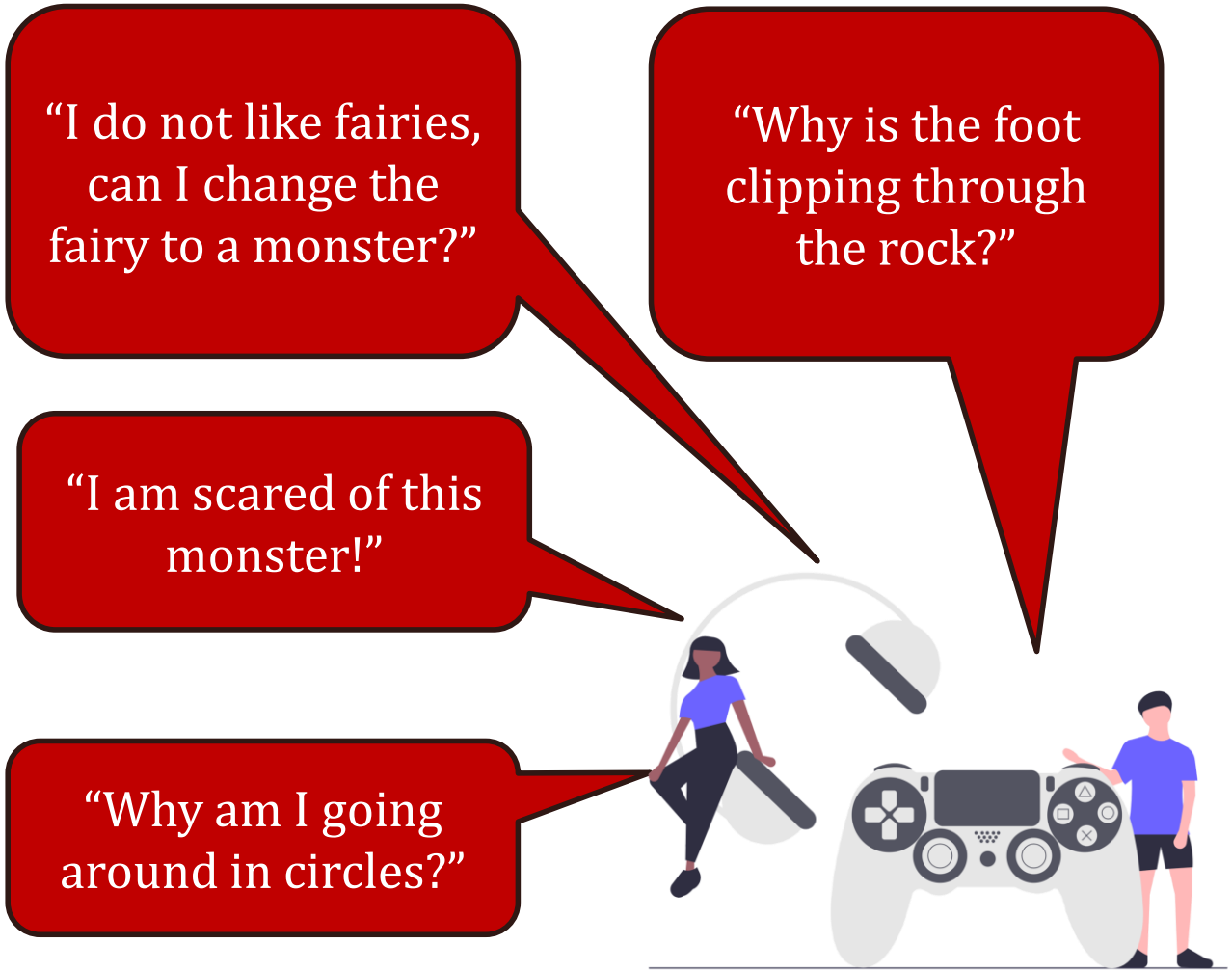
Games

Study Design

tDCS session 1 (Mon) in-clinic	→	tDCS session 2-9 (Tue-Fri wk 1, Mon-Thu wk 2) at-home	→	tDCS session 10 (Fri) in-clinic
A		BABABABA		B
B		ABABABAB		A

Stein et al 2025a, b: Friehs et al., under revision

But… children are children…and games are hard



Alright kiddos….
Why do you ask so many questions?!

Gallagher et al., 2023; Friehs et al., under revision

SO HOW TO DEVELOP SUCH A GAME?

Academic game development is not easy

Unintended consequences and outcomes

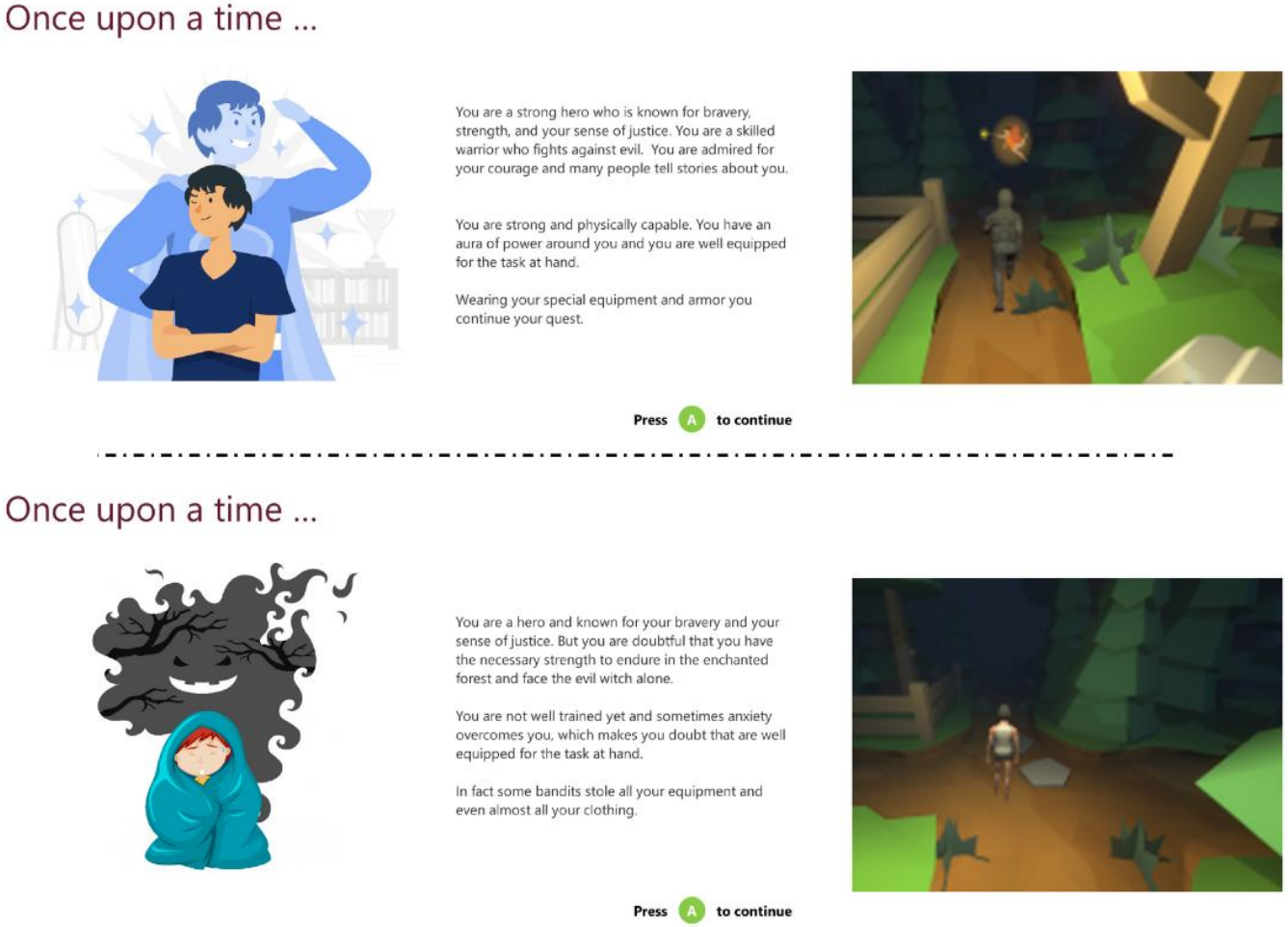


Fig. 2. Top: Strong avatar backstory and representation in game. Bottom: Weak avatar and its depiction in the game.

1. **Story and avatar strength didn't impact performance**

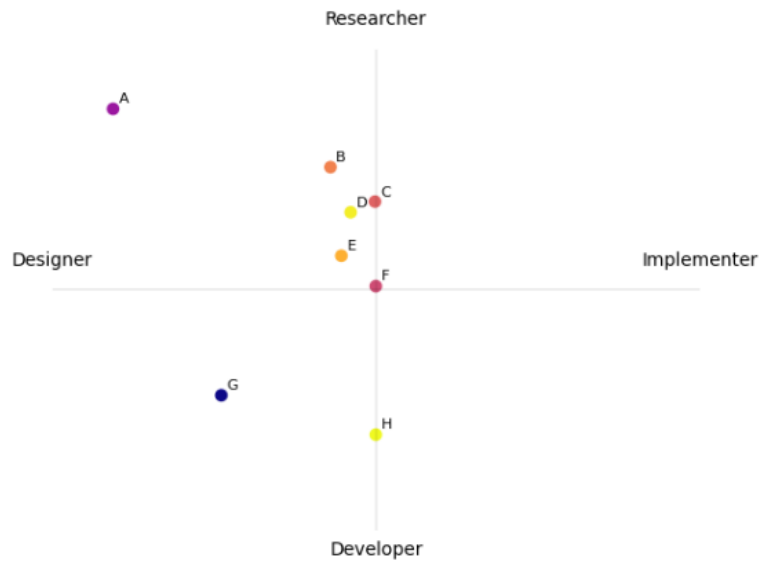
2. **More immersion = worse performance**:
   - Participants who felt more immersed in the game actually performed worse at stopping their responses.
   - It seems the game elements drew attention *away* from the core task.

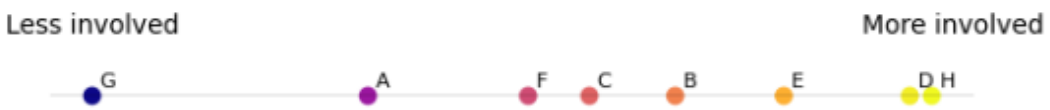
3. **Motivation faded quickly across sessions**

The promise and premise of a game counteracted our intended effects

Held et al., 2025

Mapping Practices of Academic Game Development





❑Key Themes:

1. Challenging Collaboration
2. Motivating and Engaging Experimental Participants
3. Using Conventional Games as Tasks
4. VR: Practical but Not a Game
5. Differences Between Tasks and Game Design
6. Differing Levels of Experience With Games
7. Lack of Understanding of Design Decisions
8. Lack of Time and Work Power
9. Bad and Buggy Games

Yeung et al., 2025; Yeung et al., in preparation

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Co-development is hard & be aware of hidden choices

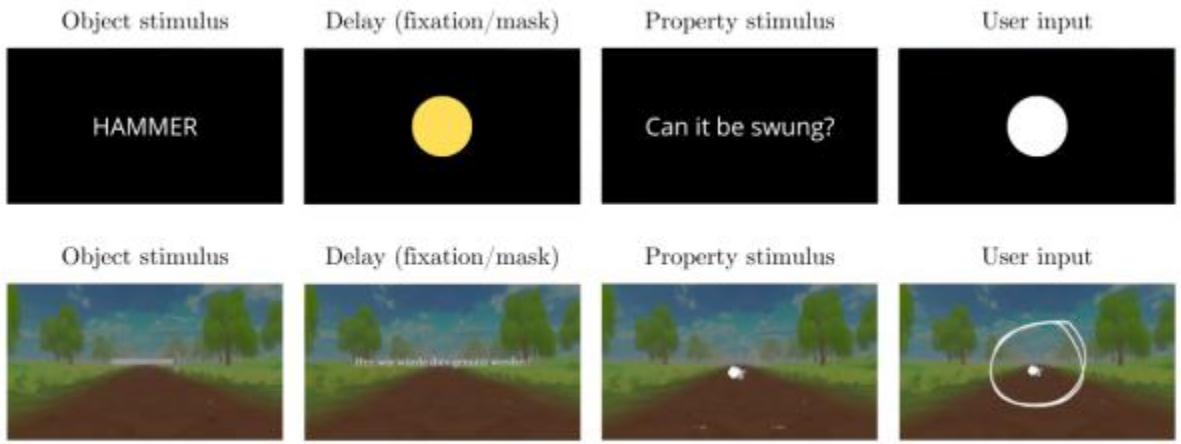


Figure 4.10: The base property verification task compared to the *Legend of the Lunchbox* property verification task.

- Co-development together with my former colleagues at the MPI and documentation of the full process

Lessons learned for translations of cognitive research tasks to “games”

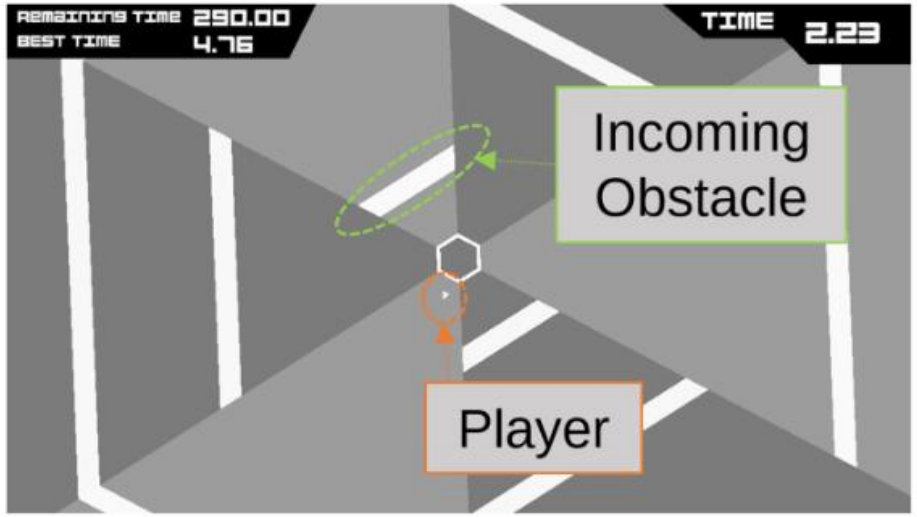
1. Stick to the research goal!
2. Consider how classical game mechanics or design choices may introduce bias
3. Be aware of distractions from the core task of the people
4. Reduce unwanted variability in task conditions

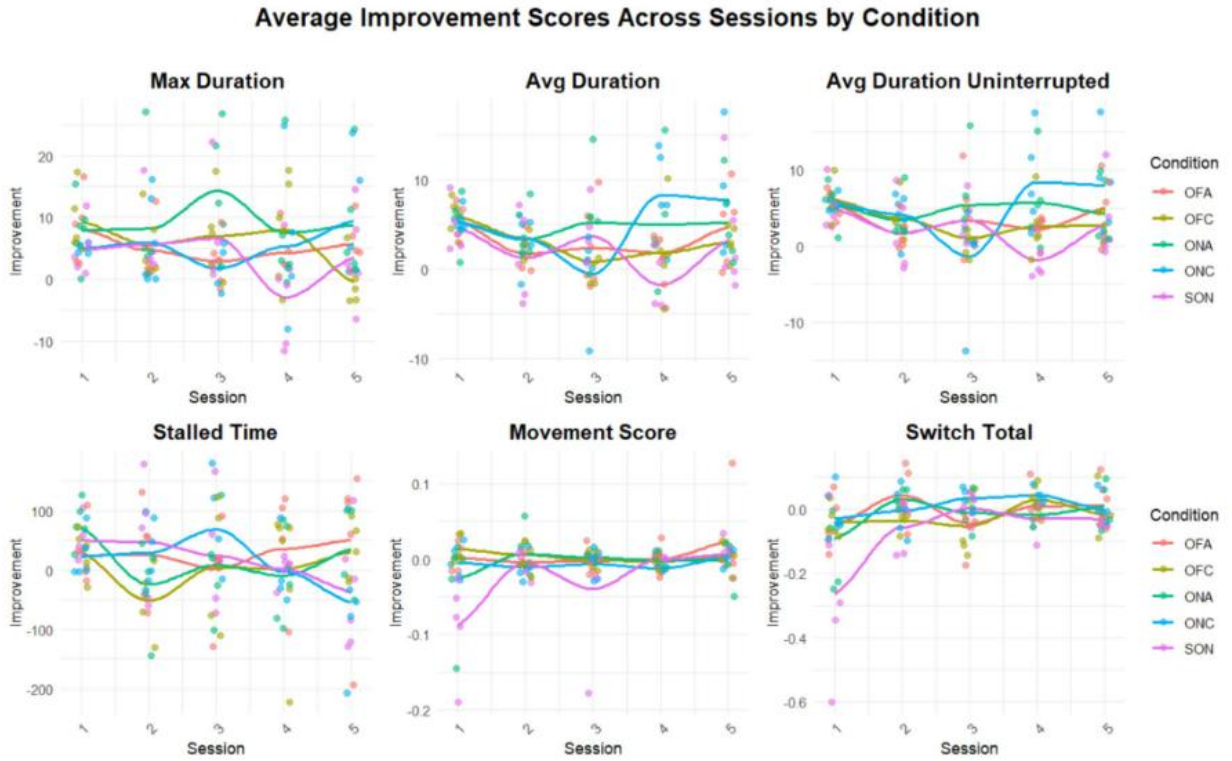
Yeung et al., 2025; Yeung et al., in preperation

ENGAGEMENT

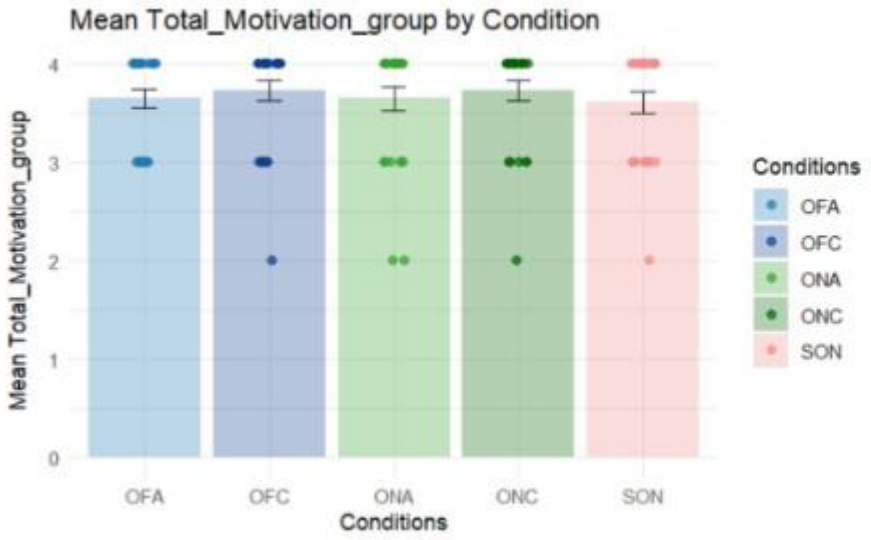
Too much of a good thing possible?

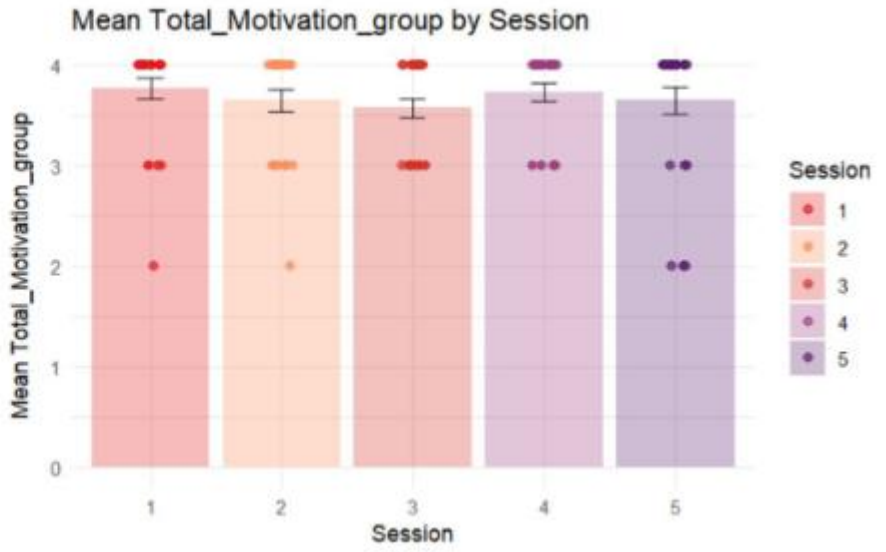
Too much of a good thing ?





This was a tDCS study and part of it is probably also the non-effect of tDCS but the motivation issue did not help





Haccou et al., 2025

Designing for behavior change – A few examples

Game Mechanics

Waiting: mechanics or resources on a cooldown timer

Rewards: immediate gratification for the player's actions

Completion: explicitly assigned tasks or goals

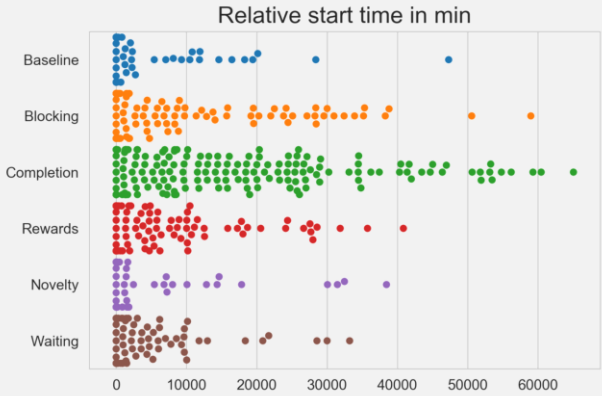
Novelty: providing players with new game elements

Blocking: temporarily prohibiting play

Casual Game

- *Novelty* and *Waiting* most effectively initially promote snacking patterns

Serious Game



- *Completion* and *Blocking* mechanics facilitated the strongest sustained engagement

See Alexandrovsky et al 2019, 2021

But don't change it too far: Problematic Gaming* – ICD 11

Problematic Gaming on par with other addictions and gambling !

Disorders due to addictive behaviours

Parent

Disorders due to substance use or addictive behaviours

Disorders Due to Addictive Behaviours include the following:

- 6C50 Gambling Disorder
  - 6C50.1 Gambling Disorder, predominantly online
  - 6C50.0 Gambling Disorder, predominantly offline
- 6C51 Gaming Disorder
  - 6C51.0 Gaming Disorder, predominantly online
  - 6C51.1 Gaming Disorder, predominantly offline
- 6C7Y Other Specified Disorders Due to Addictive Behaviours

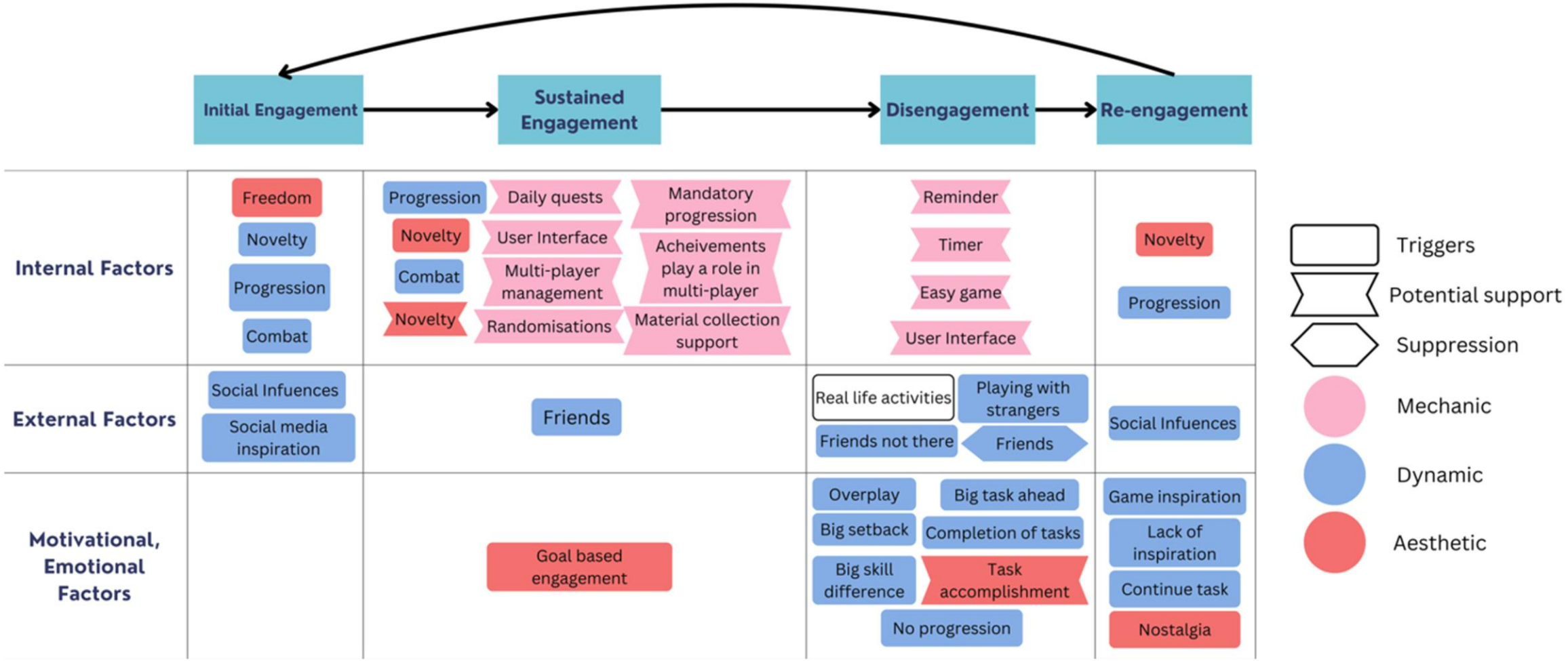
Essential (Required) Features:

- A persistent pattern of gaming behaviour manifested by all of the following:
  - **Impaired control** over gaming behaviour (e.g., onset, frequency, intensity, duration, termination, context);
  - **Increasing priority** given to gaming behaviour to the extent that gaming takes precedence over other life interests and daily activities; and
  - **Continuation or escalation** of gaming behaviour despite negative consequences (e.g., family conflict due to gaming behaviour, poor scholastic performance, negative impact on health).
- The pattern of gaming behaviour may be continuous or episodic and recurrent but is **manifested over an extended period** of time (e.g., 12 months).
- The gaming behaviour is **not better accounted for by another mental disorder** (e.g., Manic Episode) and is not due to the effects of a substance or medication.
- The pattern of **gaming behaviour results in significant distress** or impairment in personal, family, social, educational, occupational, or other important areas of functioning.

* Similar criteria apply to any other addition or social media addiction

https://icd.who.int/browse11/l-m/en; Griffiths, et al 2014, *Behavioral addictions;* Dieris-Hirche et al., 2020, Computers in Human Behaviour

An example about quitting multiplayer games



Doan et al., 2025, IJHCS

Thanks for your attention!

Questions?

Remarks?

Requests?

Illustrations provided by
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- https://www.flaticon.com/
- https://thenounproject.com/
- https://www.cira.ca/en/stock-gallery/

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All papers referenced (apart from the ICD 11) on the slides can also be found via my publications or I'll give you a preprint on request