

# A Blueprint for Unraveling Therapeutic Video Game Design

Naïma Gradi<sup>1,2</sup>

Camille Carliez<sup>3,1</sup>

Shadee Thiam<sup>1,4</sup>

Swann Pichon<sup>4</sup>

Mathieu Scheltienne<sup>5,2</sup>

Chenyu Ye<sup>6</sup>

Jan L. Plass<sup>6,7</sup>

Daphne Bavelier<sup>1,2</sup>

naima.gradi@unige.ch

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<sup>1</sup> FPSE, University of Geneva, Switzerland

<sup>2</sup> Neuro @Campus Biotech, Geneva, Switzerland

<sup>3</sup> Université Lumière Lyon 2, France

<sup>4</sup> Geneva School of Health Sciences, Switzerland

<sup>5</sup> Dandelion-Science, Geneva, Switzerland

<sup>6</sup> Educational Communication and Technology, New York University, USA

<sup>7</sup> CREATE Lab, New York University, USA



UNIVERSITÉ  
DE GENÈVE  
FACULTY OF PSYCHOLOGY  
AND EDUCATIONAL SCIENCES



WORK IN PROGRESS · PRELIMINARY FINDINGS

## Why open the black box of design?

- + Video games are increasingly used as complementary interventions for anxiety and depression.
- + They improve accessibility and reach, lower barriers and stigma, and support adherence among low-motivation users.

Yet no game-design taxonomy exists in mental health, and the design principles that may support a game's therapeutic mechanism are almost never documented.

## Research questions

- 1 Which design-principle classes and engagement types appear in games used to alleviate anxiety and depressive symptoms?
- 2 How are design-principle classes distributed across engagement types?

AIM

Characterise the design architecture of every video game evaluated in a randomised controlled trial for generalized anxiety or unipolar depression, and map that architecture onto how players engage.

## Design-principle classes (Laine and Lindberg, 2020)

**Challenge [DP1-DP5]:** design challenges aiming to engage diverse skill level players.

**Control [DP6-DP12]:** how players input actions and make gameplay choices.

**Creativity [DP13-DP15]:** supporting players in expressing ideas and creating content.

**Exploration [DP16-DP18]:** enabling players to freely discover and navigate worlds.

**Feedback [DP21-DP24]:** information the game gives about player actions.

**Goals [DP25-DP27]:** clear objectives that guide and structure player progress.

**Profile and ownership [DP33-DP35]:** representing the player and tracking their persistent achievements.

**Relevance and relatedness [DP36-DP38]:** linking game content to players' real-life contexts.

**Resources and economy [DP39-DP42]:** managing virtual items, points, and their strategic use.

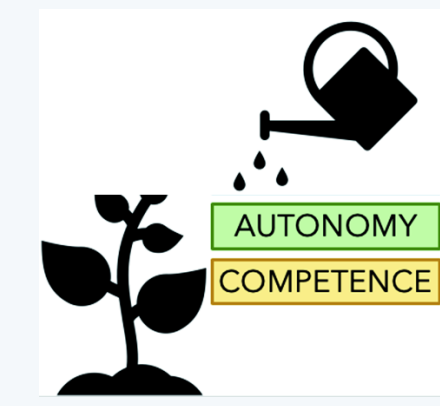
**Social play [DP43-DP48]:** supporting interaction, cooperation, and competition between players.

**Storytelling and fantasy [DP49-DP54]:** using narrative and imaginary worlds to structure experience.

## Types of engagement (Plass et al., 2020)

- Cognitive:** cognitive processing of game information.
- Affective:** emotional responses elicited by game elements.
- Behavioral:** physical actions while interacting with the game.
- Socio-cultural:** social interaction or specific cultural context.

## Why this core is plausible



Clear goals and adjusted challenge may support competence, while responsive feedback and perceived control may support autonomy: two needs whose satisfaction is associated with sustained intrinsic motivation (Ryan & Deci, 2000).

## Strengths

- To our knowledge the first systematic mapping of how games for anxiety and depression are designed and how players may engage with them.
- Every coded principle is anchored to a retrievable quote, image or time-stamped video plus a written rationale, so the coding is auditable.
- Pre-registered protocol, the game rather than the study as unit of analysis, and class adoption weighted by class size.

## Limitations

- Gameplay documentation is uneven across source papers, so the matrix is a lower bound, not an inventory.
- The taxonomy's granularity presupposes game-design expertise that clinicians may lack.
- Principles and engagement types remain qualitative constructs, at times ambiguous to interpret.

## Study selection

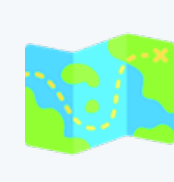


## Coding pipeline

Two independent coders per game



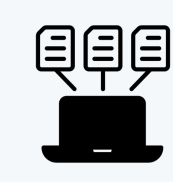
Step 1  
Identify design features



Step 2  
Map to the 47 design principles

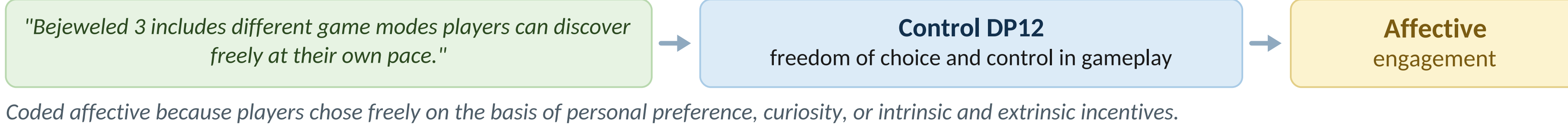


Step 3  
Link to engagement types

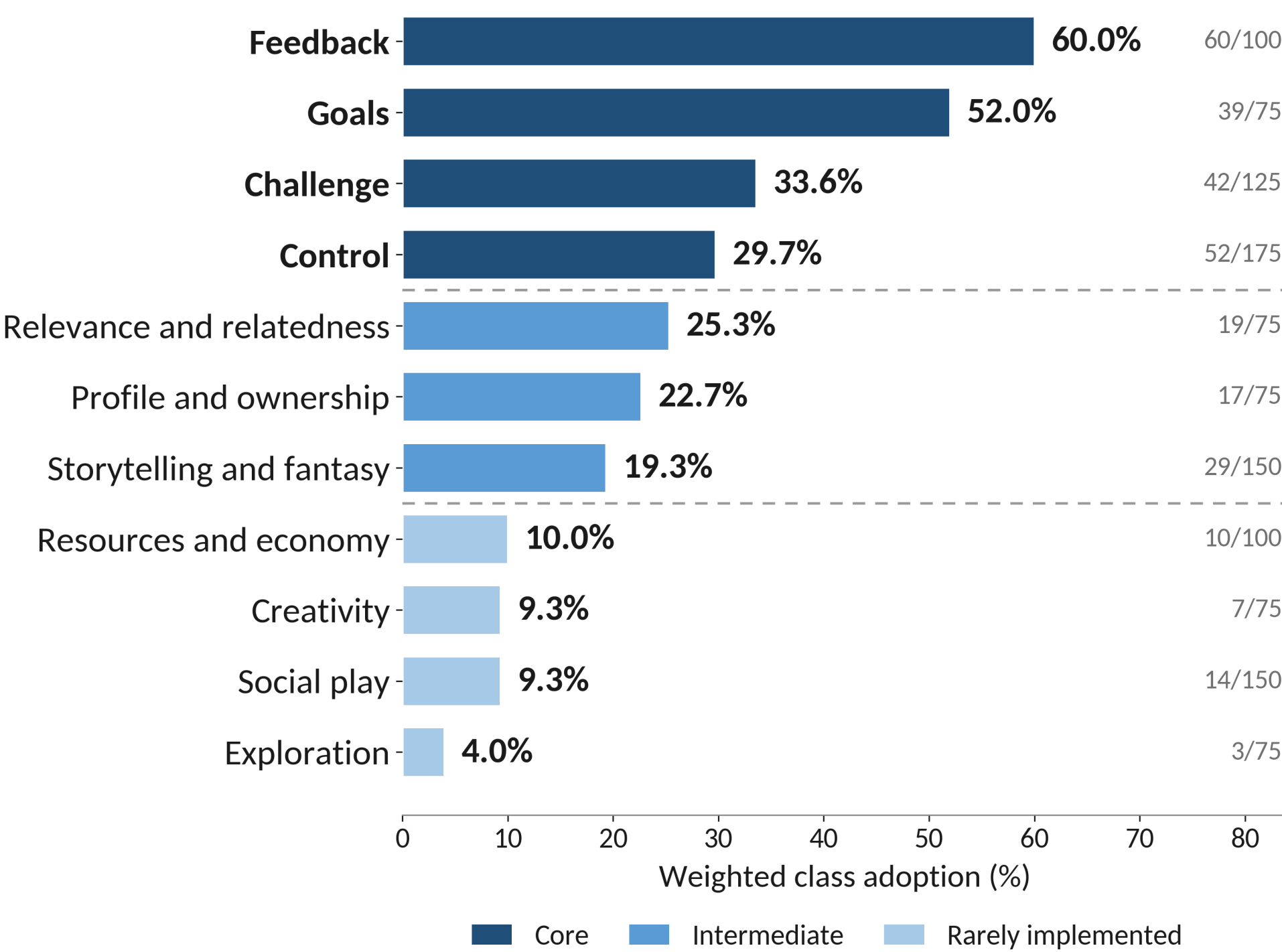


Step 4  
Aggregate across the 25 games

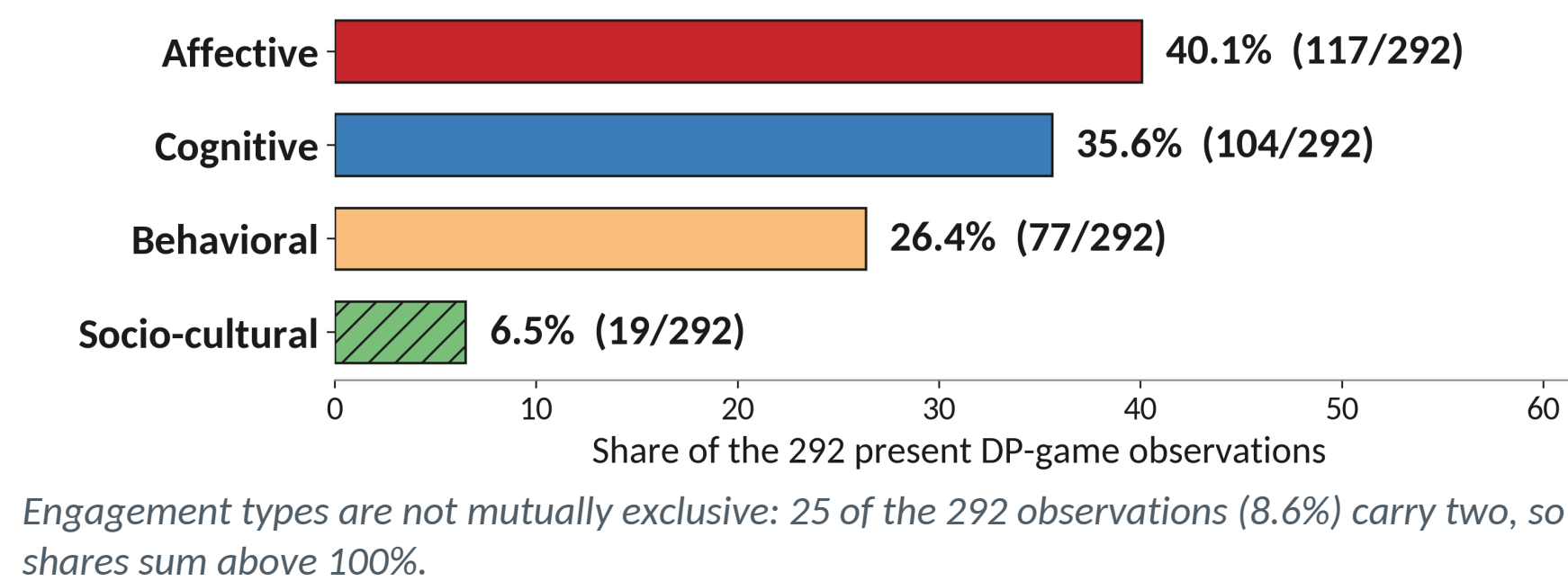
## Worked example



## Design-principle class adoption



## Engagement across coded principles



## Most and least adopted principles

DP22, provide immediate, positive and useful feedback, is present in 23 of the 25 games. It is followed by DP25 clear, meaningful and achievable goals, DP4 curiosity-raising challenge, and DP7 sensitive and accurate controls.

Four further principles appear in more than half the games: DP21 instructions or tutorials, DP27 progressive goals, DP1 adjustable difficulty, and DP50 fantasy context. Eleven of the 47 principles were never observed at all.

## The 25 games reviewed

- Bejeweled II / III
- Bookworm Adventures
- Boson X
- BOXVR
- Dojo

- Ecorescue
- Fadrigon et al. ABM
- Horizon: Resilience
- Just Dance 4
- Legend of Hoa'manu

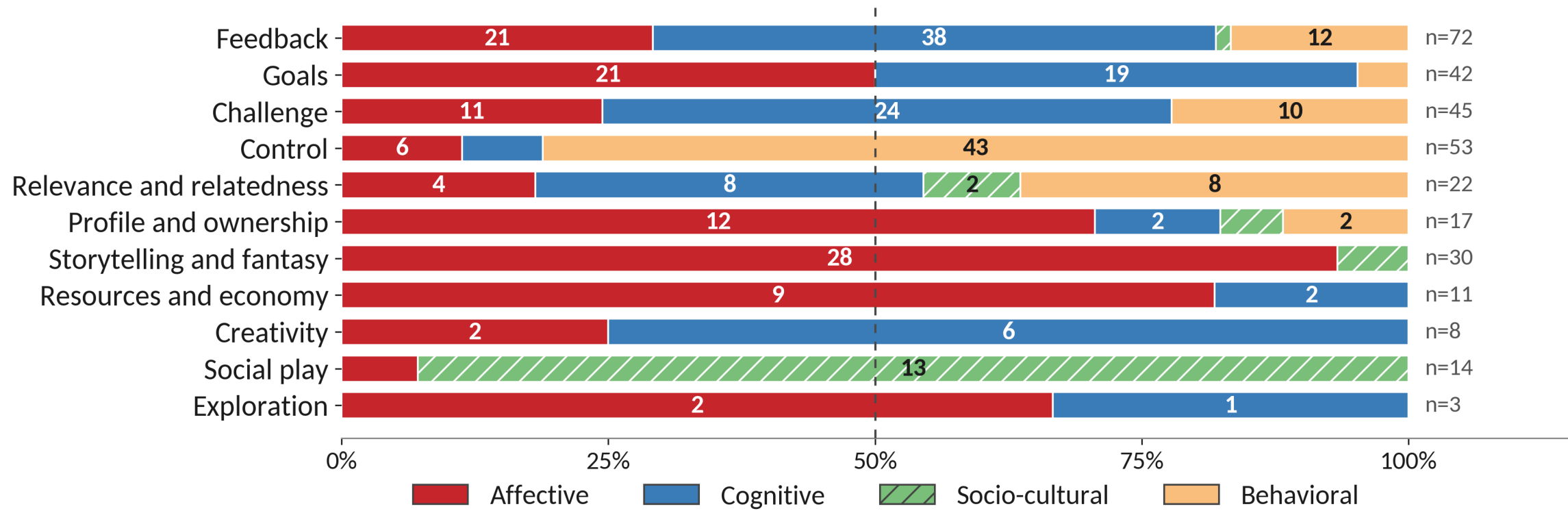
- MindLight
- Moodville
- Music casual video game
- Peggle
- Personal Zen

- Pesky gNATs
- Project: EVO
- REThink
- Ring Fit Adventure
- SPARX / SPARX-R

- Super Mario Odyssey
- Wii Fit
- Wii Sports / Sports Resort
- Xbox Kinect Sports
- Xbox Kinect Your Shape

12 for depression only, 5 for anxiety only, 8 for both · 22 played single-player

## Engagement profile of each design class



## What the 25 games look like

A compact design core. Feedback and Goals dominate, supported by Challenge and Control. Playing regularly to comply with a trial schedule calls for tightly structured gameplay, and participants who lack motivation need sustained reinforcement.

Three classes are markedly underrepresented. Creativity, Exploration and Social play are rare. Standardised, protocol-driven gameplay likely leaves little room for open-ended variability, and the predominantly single-player format likely supports the private, stigma-free setting mental health trials favour.

Engagement is skewed to affect and cognition. This mirrors conditions characterised by disturbances of cognition and of mood. Sociocultural engagement is rare and almost entirely confined to Social play and to occasional cultural adaptation of game content.

Absences look clinically motivated. Among the eleven principles never observed, several could induce pressure or distress, such as resource scarcity, resource loss and moral dilemmas that risk rumination. The reviewed games favour positive reinforcement and safe-to-fail environments instead.

## A reporting blueprint for therapeutic game design

- 1 Report at both grains. Describe features at class and at individual-DP level, always with a gameplay example and a brief rationale.
- 2 Tabulate what, why and how. Journals should require a design table: classes present, theoretical rationale, and context examples, extending TIDieR with a design-specific layer.
- 3 Make reports machine-readable. Reports built this way can train and supervise large language models to assist systematic coding.

Designers: what would you need in a report to actually reuse a design? Come tell us.

## Next steps

- Extend to a larger, multimodally described sample and cluster to populate the design classes more objectively.
- Leverage large language models to support DP and engagement coding.



Paper



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