# Psicologia del Gioco
## -per il Game Design-



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Game Science Research Center – Università di Trieste

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# Indice


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2. Coinvolgimento
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7. Sicurezza psicologica
8. Ergonomia
9. Tipologie di persone giocanti
10. Impatto psicologico e sociale
11. apprendimento
12. Design per l'apprendimento

- x-come la persona si approccia al gioco
- xx-meccanismi mentali, cognitivi, sociali (e neurali) di chi gioca
- xxx-rapporto tra attività di gioco ed apprendimento
- x-come raggiungere tramite il gioco un obiettivo formativo
- xx-cosa considerare quando si sviluppa un gioco per un fine altro rispetto all'intrattenimento
- xxx-distinguere differenti tipi di apprendimento attraverso il gioco ed integrarli nel migliore dei modi
- x-il gioco è sufficiente per il nostro obiettivo formativo? l'inserimento all'interno di un percorso
- xxx-il debriefing

# 1. Motivazione


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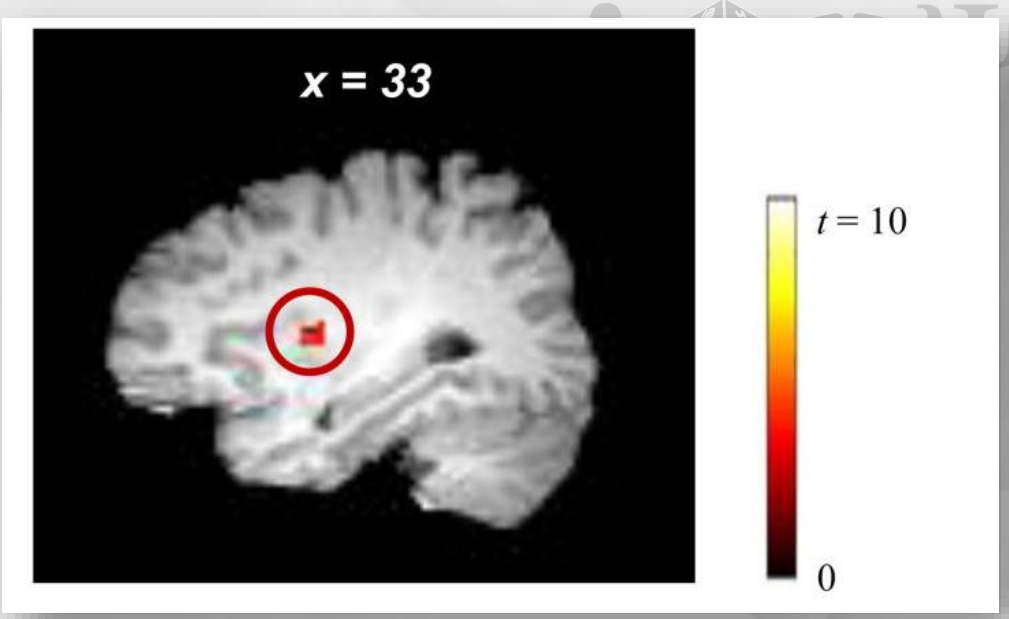
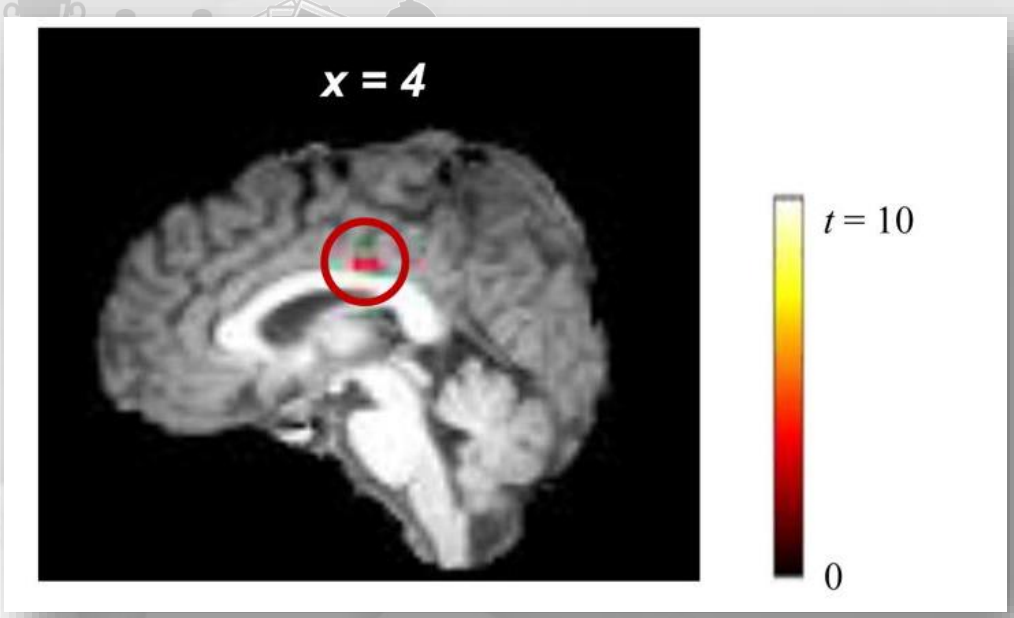
«Video games are controlled training regimens delivered in **highly motivating behavioural** contexts.» (Michael M. Merzenich)




MOTIVAZIONE INTRINSECA – INSULAR CORTEX




MOTIVAZIONE ESTRINSECA – POSTERIOR CINGULATE CORTEX

(«NEURAL DIFFERENCES BETWEEN INTRINSIC REASONS FOR DOING VERSUS EXTRINSIC REASONS FOR DOING: AN FMRI STUDY». LEE, REEVE, XUE, JINHU XIONG, 2012)

# Piramide dei bisogni di Maslow

# Self-Determination Theory (Ryan & Deci)

- Bisogno di **competenza**
- Bisogno di **autonomia**
- Bisogno di **relazione**

# 2. Coinvolgimento

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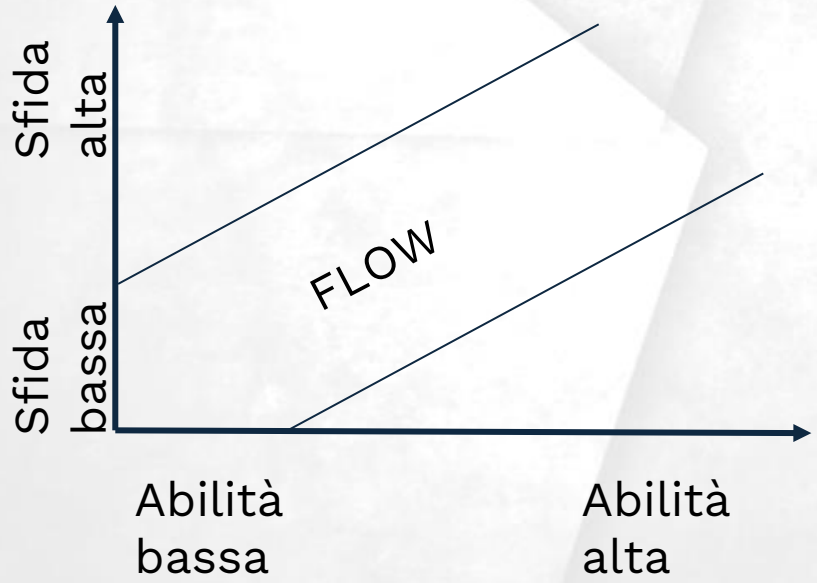
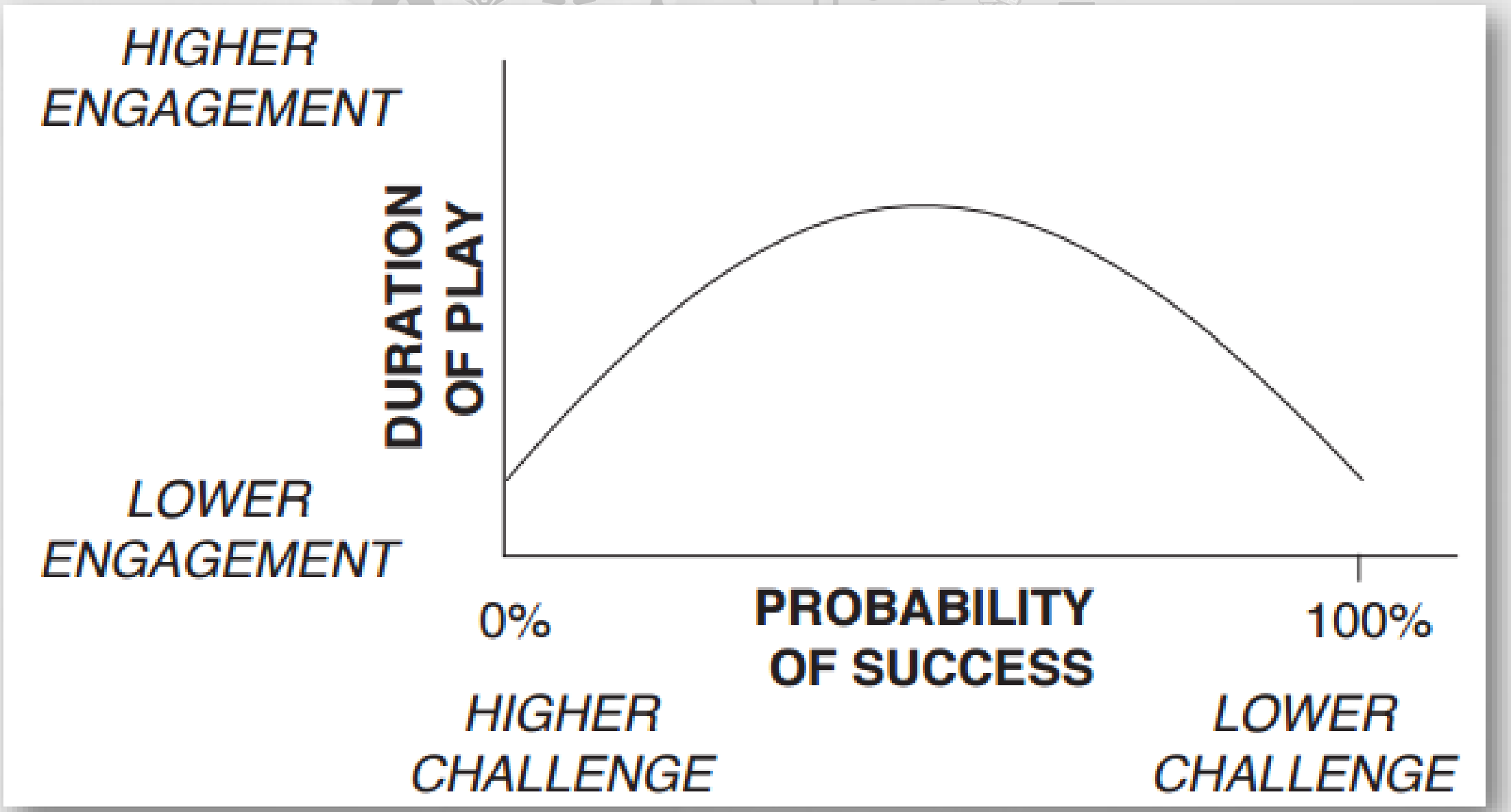
# Stato di flow
## (Csíkszentmihályi, 1975)




HIGHER ENGAGEMENT
LOWER ENGAGEMENT
DURATION OF PLAY
0%
PROBABILITY OF SUCCESS
100%
HIGHER CHALLENGE
LOWER CHALLENGE

# Perceptions Of Competence

"It is success at optimally challenging tasks that allows people to feel a true sense of competence"

(Deci & Ryan, 2000, p. 260;
Cognitive Evaluation Theory; Deci & Ryan, 1985)

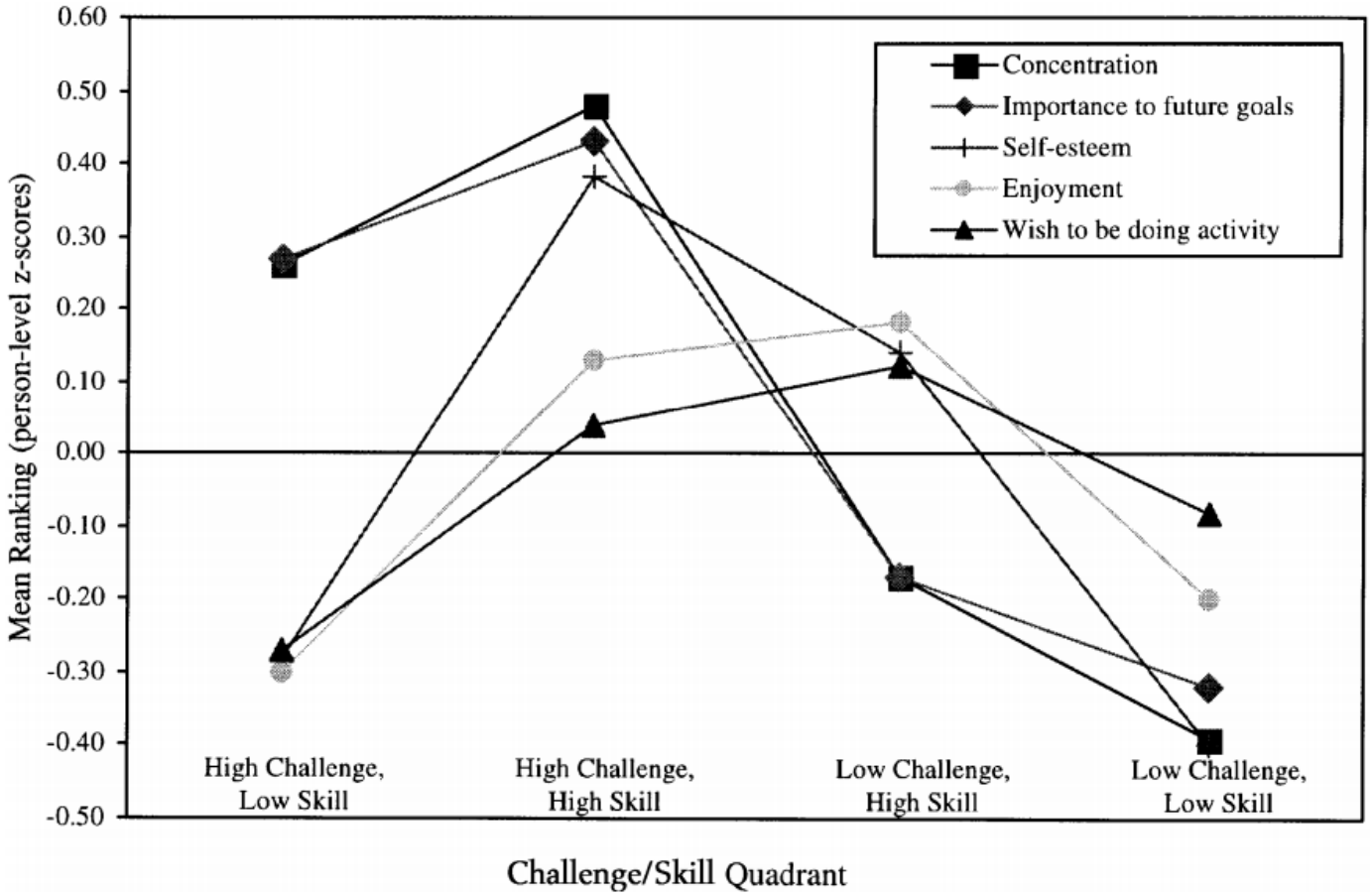
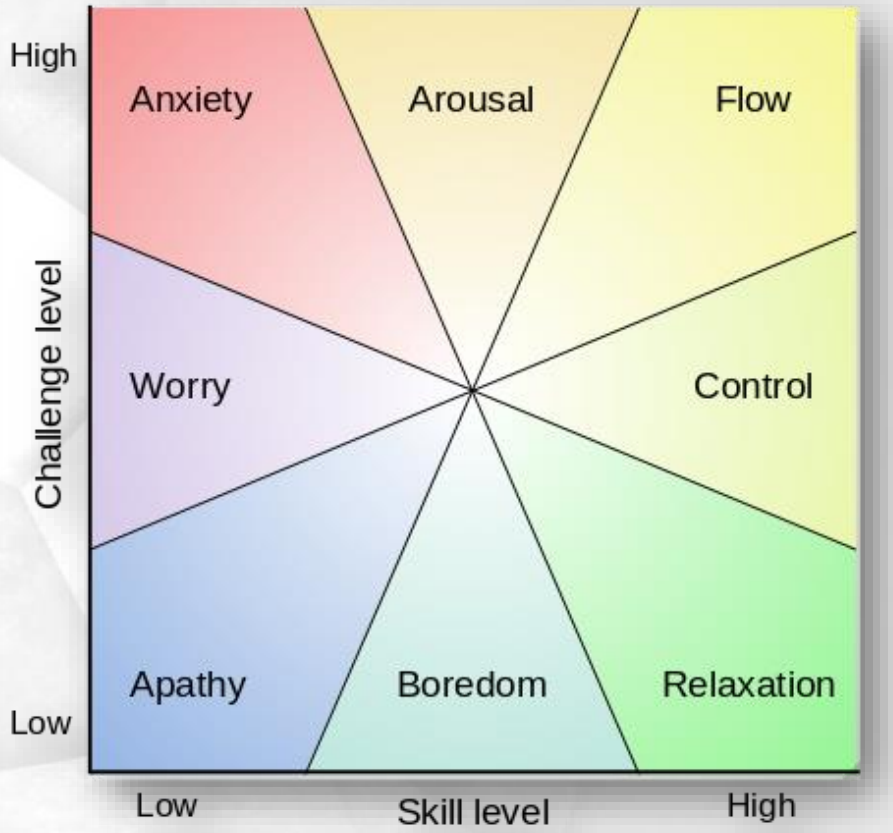
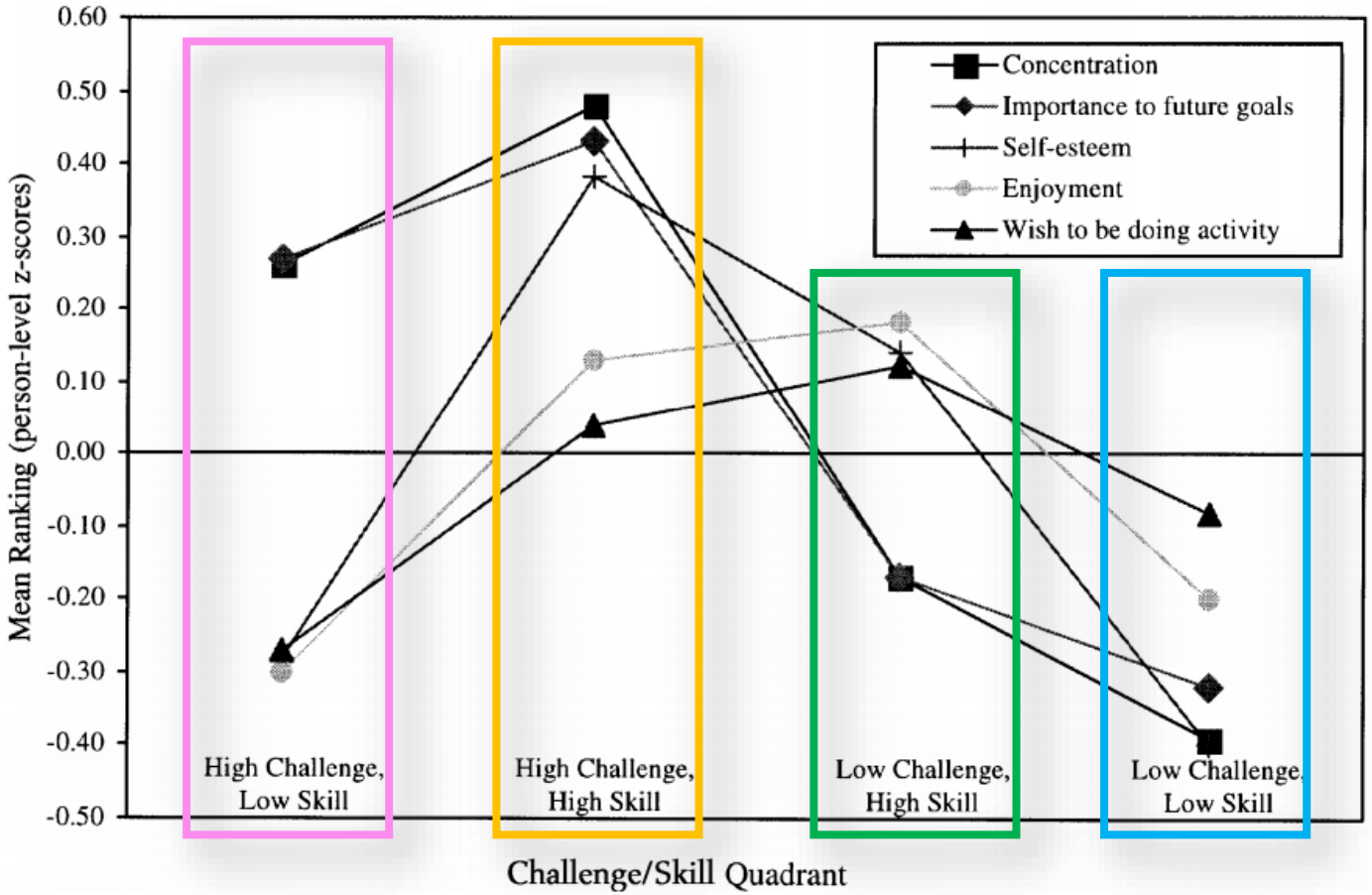



Figure 7.2 Quality of experience in each flow quadrant for a national sample of American adolescents ($n$ = 824). Adapted from Hektner and Asakawa (2000).



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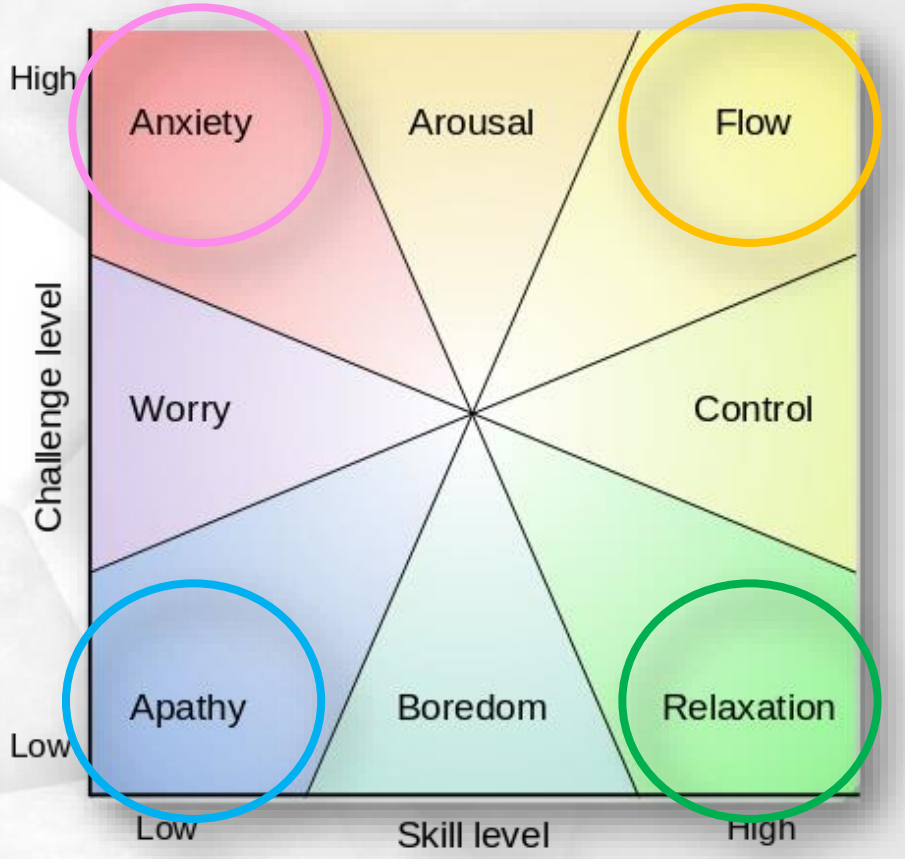

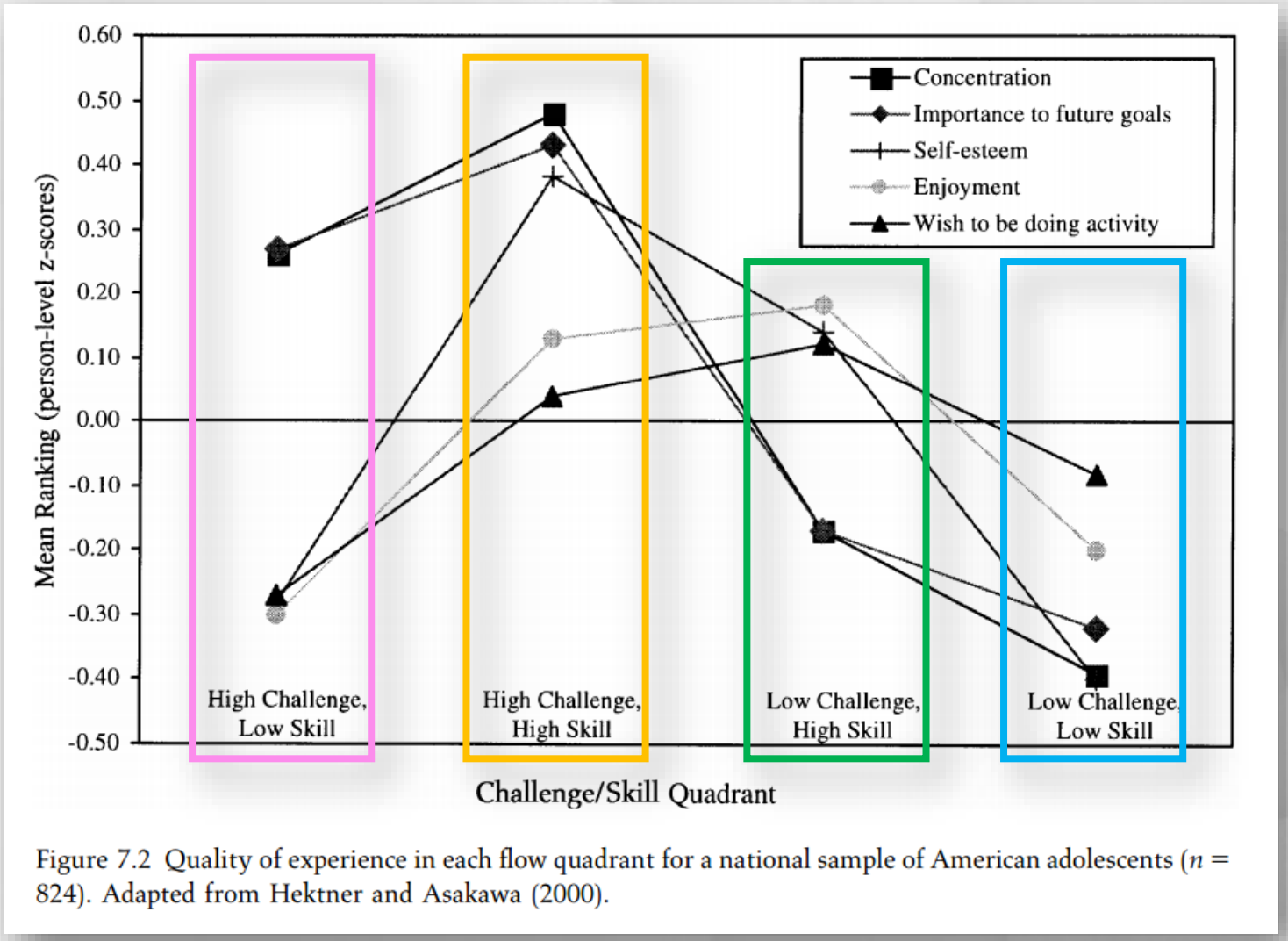


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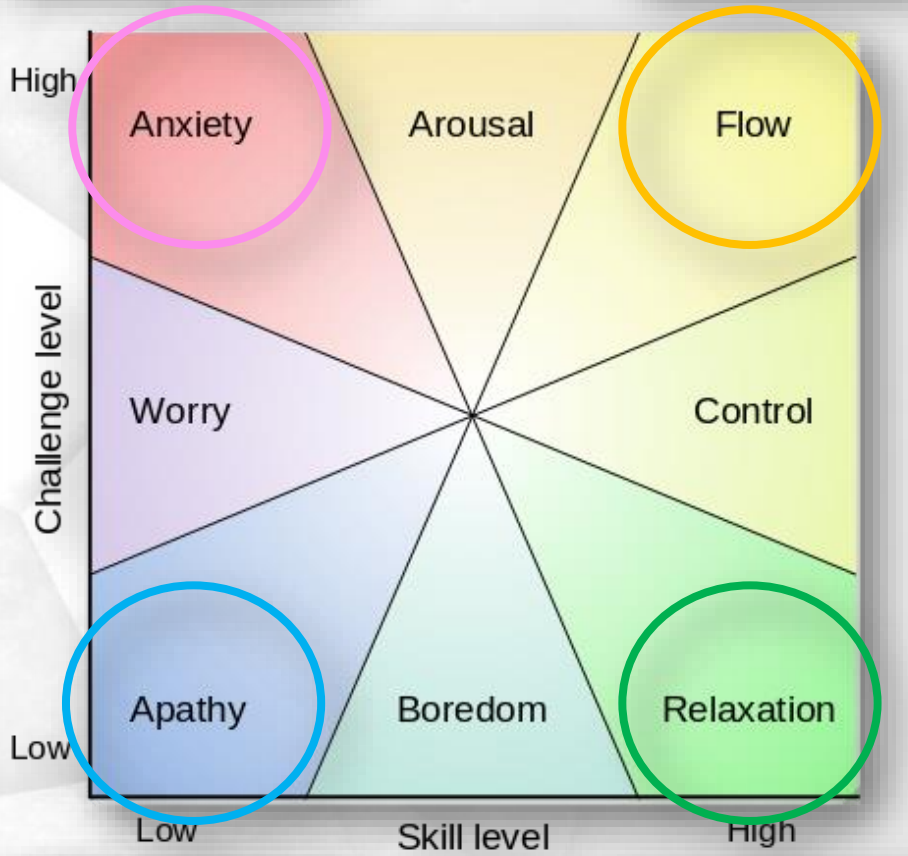



SCENE COMPLETED!
SCORE
168700
REWARDS
XP
140 XP
250 COINS
LEADERBOARD
1
Rachael Hensley
325050
ASK
2
Jimmie Anderson
274000
ASK
3
Elizabeth Torres
168700
4
Thomas Miller
94500
ASK
5
INVITE FRIEND
SHARE

- Engagement
- Engrossment
- Total Immersion

# 3. Elementi distintivi esperienza di gioco

1. Motivazione
2. Coinvolgimento
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4. Distinzione persona/personaggio
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6. Libertà e sperimentazione
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8. Ergonomia
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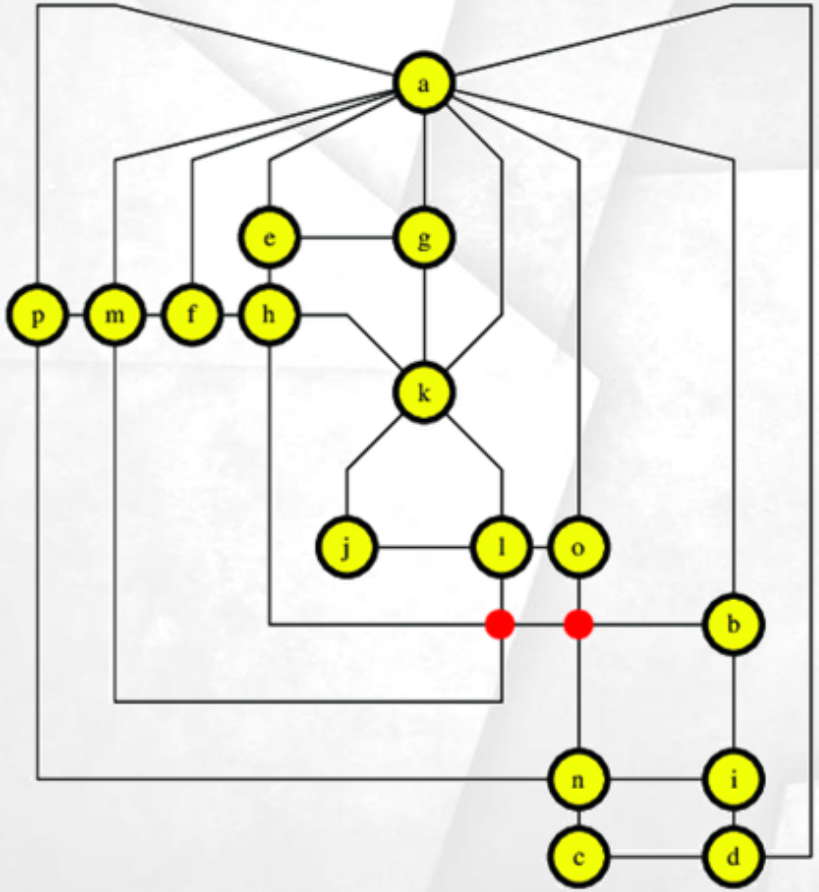
INTERAZIONE

PERFORMANCE

REGOLE

OBIETTIVI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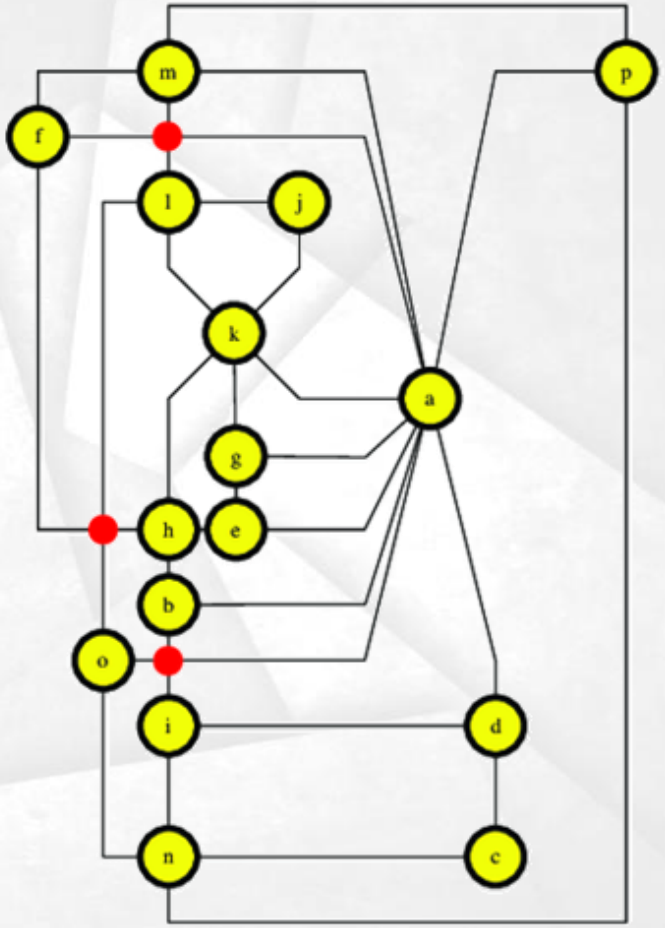
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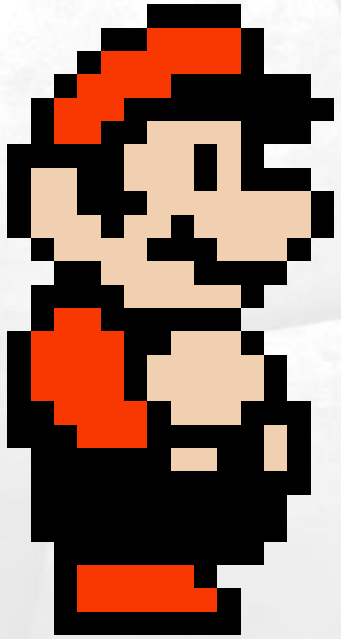
SuperMario

Classe: Idraulico

Abilità:
***Movimento bidimensionale***. SuperMario si muove in avanti e indietro, in alto e in basso.
***Salto in avanti.*** SuperMario salta in avanti per superare un ostacolo.
***Attacco Salto***. SuperMario uccide un nemico quando gli atterra sopra.

Debolezze: essere colpito da qualcosa; cadere in un buco; cadere su delle punte o nella lava



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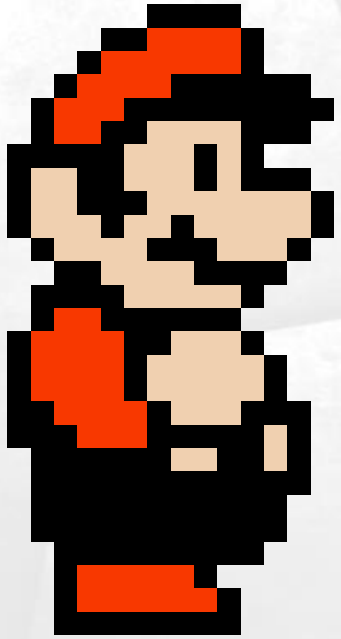


SuperMario paladino

Classe: Idraulico

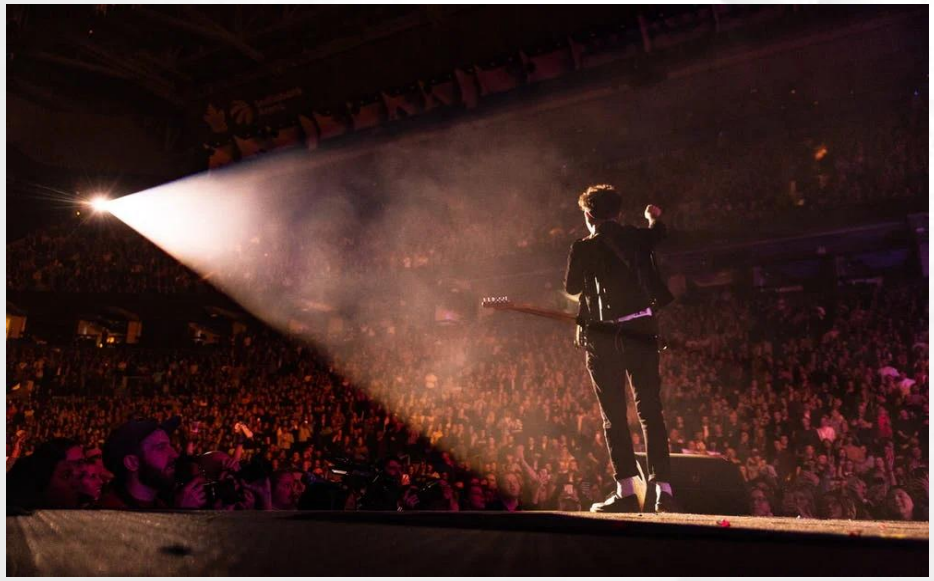
Abilità:
***Movimento bidimensionale***. SuperMario si muove in avanti e indietro, in alto e in basso.
***Salto in avanti.*** SuperMario salta in avanti per superare un ostacolo.
***Attacco Salto***. SuperMario uccide un nemico quando gli atterra sopra.

Debolezze: essere colpito da qualcosa; cadere in un buco; cadere su delle punte o nella lava

Religione: devoto alla divinità del salto in alto, nemico della divinità del salto in lungo)

- obiettivi chiaramente definiti (permettono un’azione finalizzata in maniera non ambigua) -> rif. McGonigal
- feedback chiaro ed immediato (permette di comprendere intuitivamente l’esito delle azioni) -> rif. McGonigal
- senso di controllo e agency sulle azioni -> rif. Self-Det. Theory
- esperienza percepita come impegnativa ma entro il limite delle nostre capacità attuali -> rif. Vygotsky

# Agency e senso di controllo



# 4. Distinzione persona/personaggio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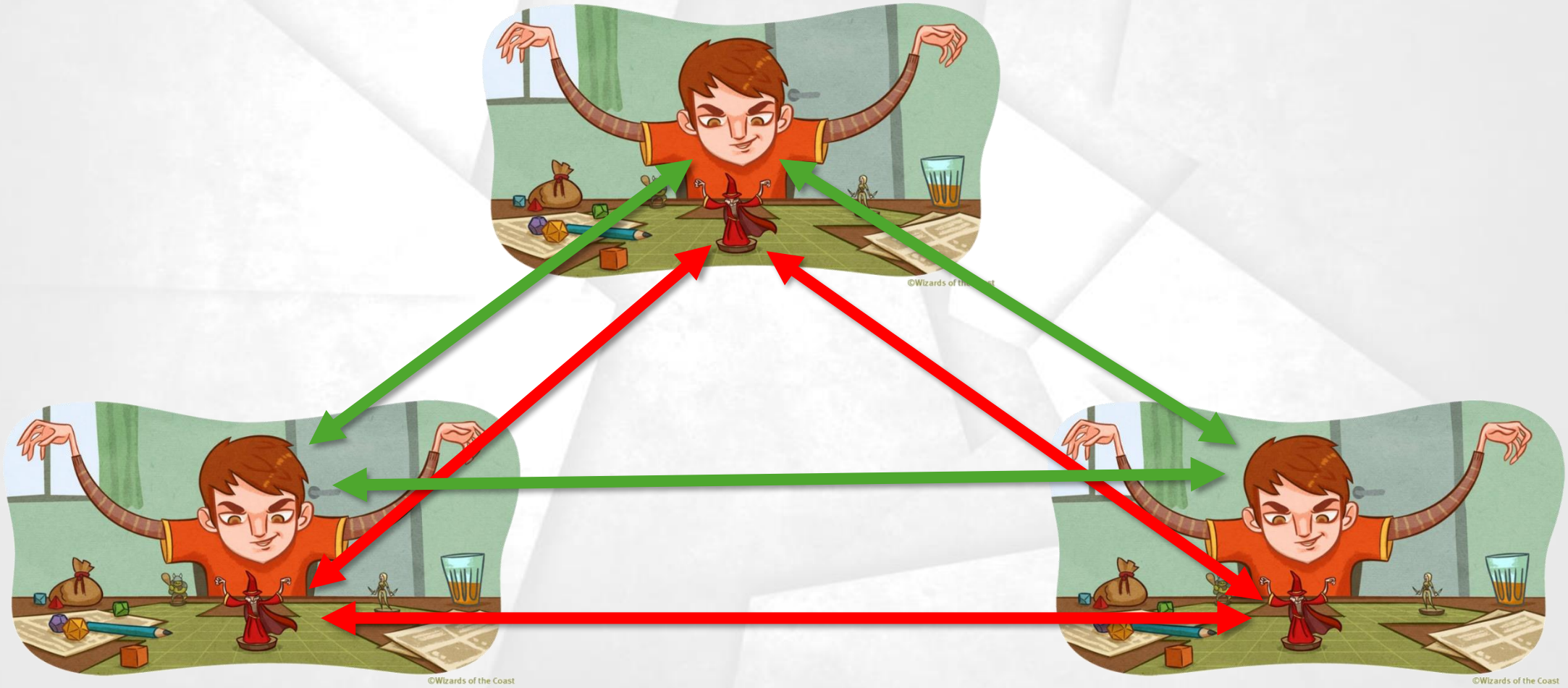
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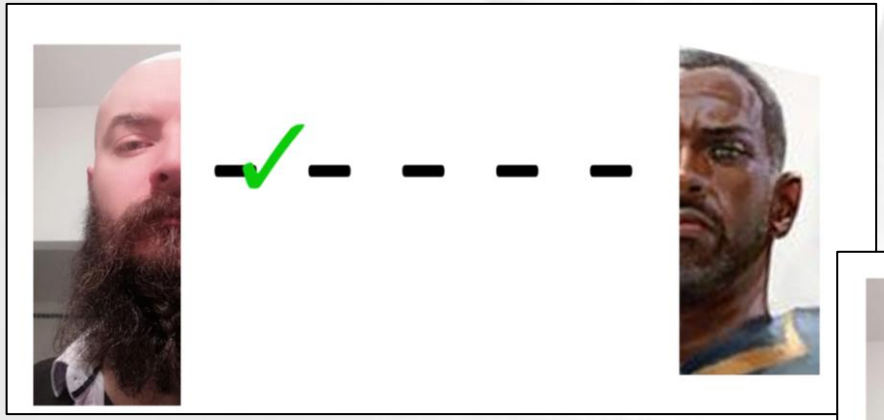

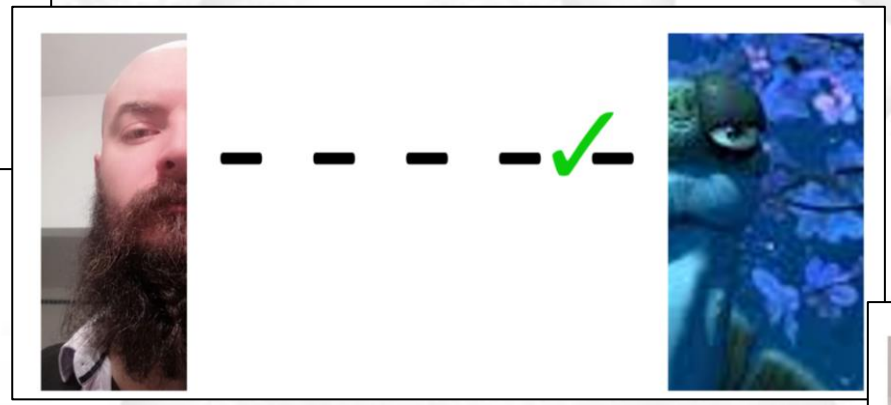

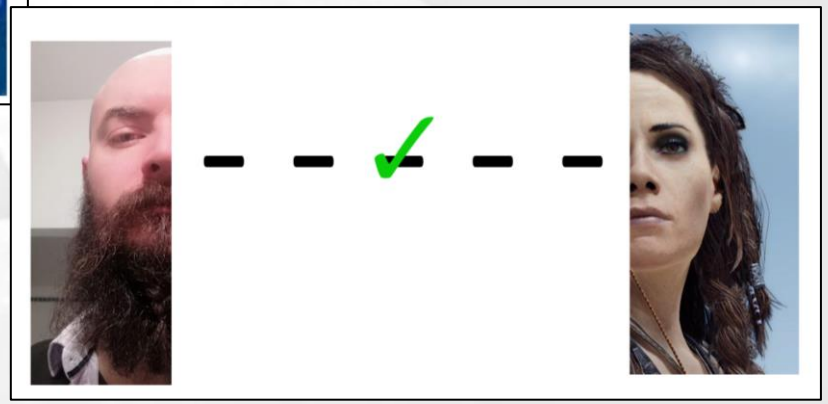

# 5. Problem Solving

1. Motivazione
2. Coinvolgimento
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4. Distinzione persona/personaggio
5. **Problem solving**
6. Libertà e sperimentazione
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Inventory

Ultimatum game

Dilemma del prigioniero

Stag Hunt

Beauty Contest

Trolley problem

...

# Bias Cognitivi

Linda ha 31 anni, è single, estroversa e brillante. È laureata in filosofia. Da studente, era particolarmente interessata ai problemi della discriminazione e della giustizia sociale, ed ha anche partecipato a dimostrazioni anti-nucleare.

Definire quanto sono probabili le seguenti affermazioni su Linda:

1. È partecipante attiva di un movimento femminista
2. Lavora in banca
3. Lavora in banca ed è una partecipante attiva in un movimento femminista

Nature Video

Go, a complex game popular in Asia, has frustrated the efforts of artificial-intelligence researchers for decades.

2016

"DeepMind [...] cannot yet usefully **transfer** their learning about one system — such as Go — **to new tasks**; a feat that humans perform seamlessly" (Demis Hassabis)

"Another challenge is to mimic the **brain's way of breaking problems down into smaller tasks**. Currently, DeepMind's system struggles to link actions with distant consequences — a limitation that, for example, prevented it from mastering maze games such as *Ms. Pac-Man*." (Demis Hassabis)

# 6. Libertà e sperimentazione


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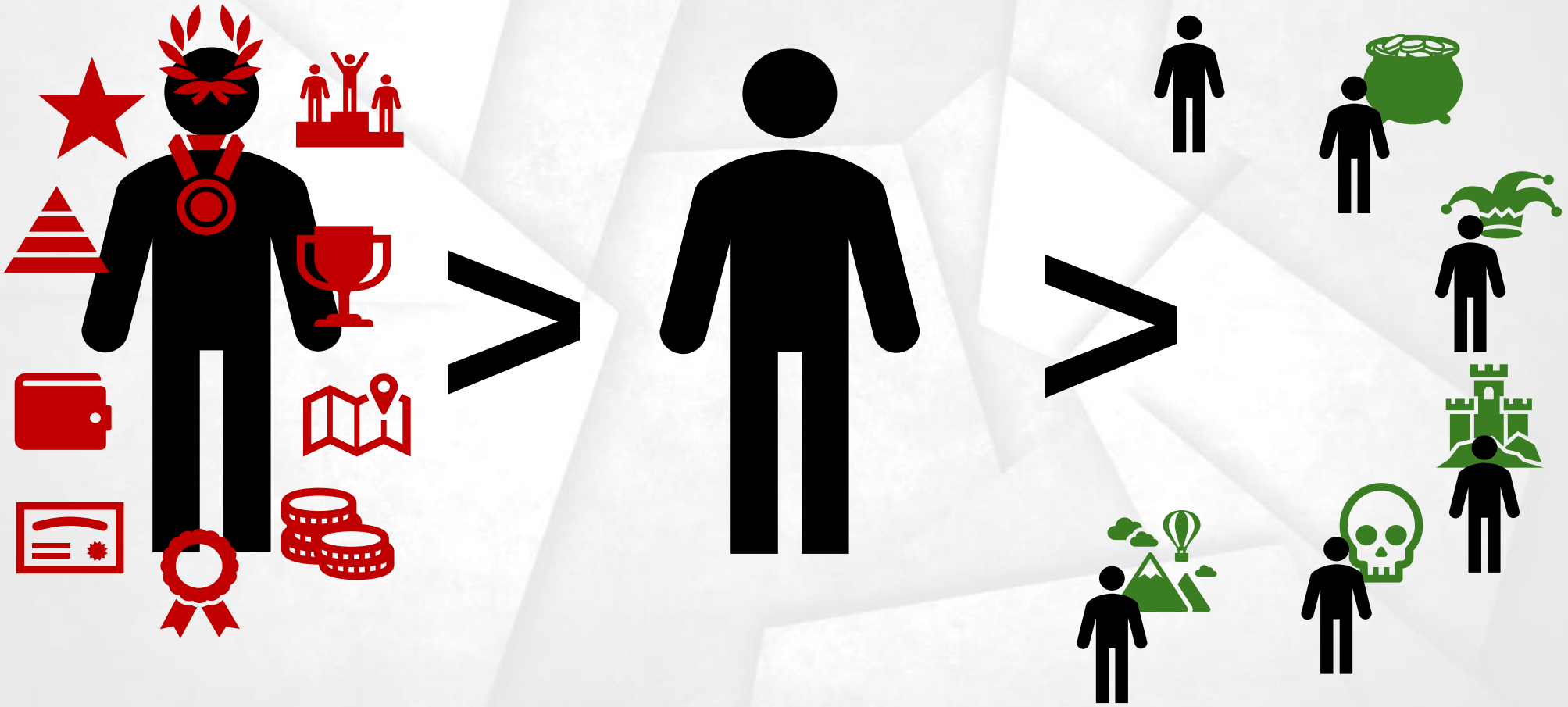

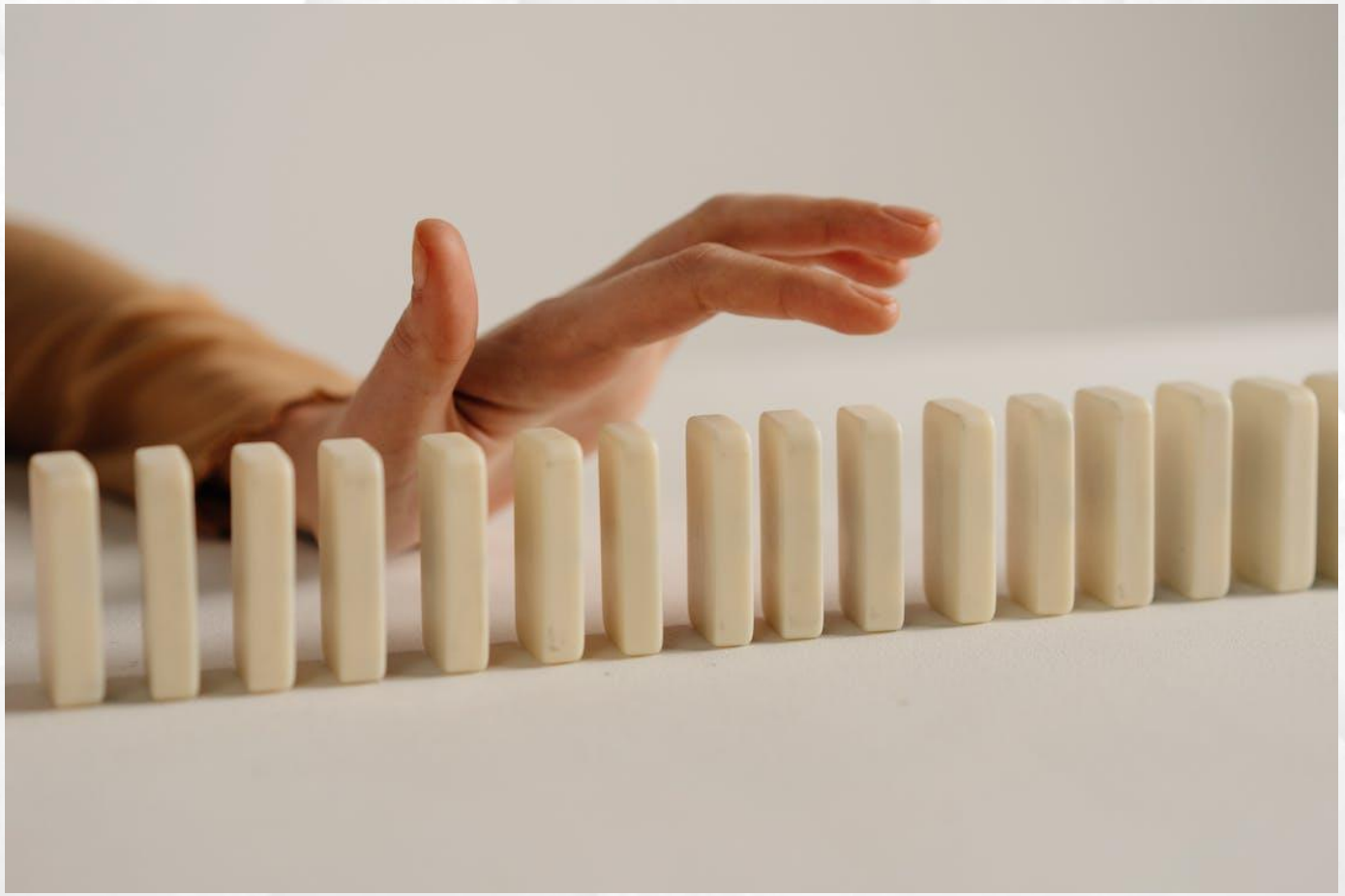

# 7. Sicurezza psicologica

1. Motivazione
2. Coinvolgimento
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5. Problem solving
6. Libertà e sperimentazione
7. Sicurezza psicologica
8. Ergonomia
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12. Design per l'apprendimento


1+1=3

# 8. Ergonomia

1. Motivazione
2. Coinvolgimento
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6. Libertà e sperimentazione
7. Sicurezza psicologica
8. **Ergonomia**
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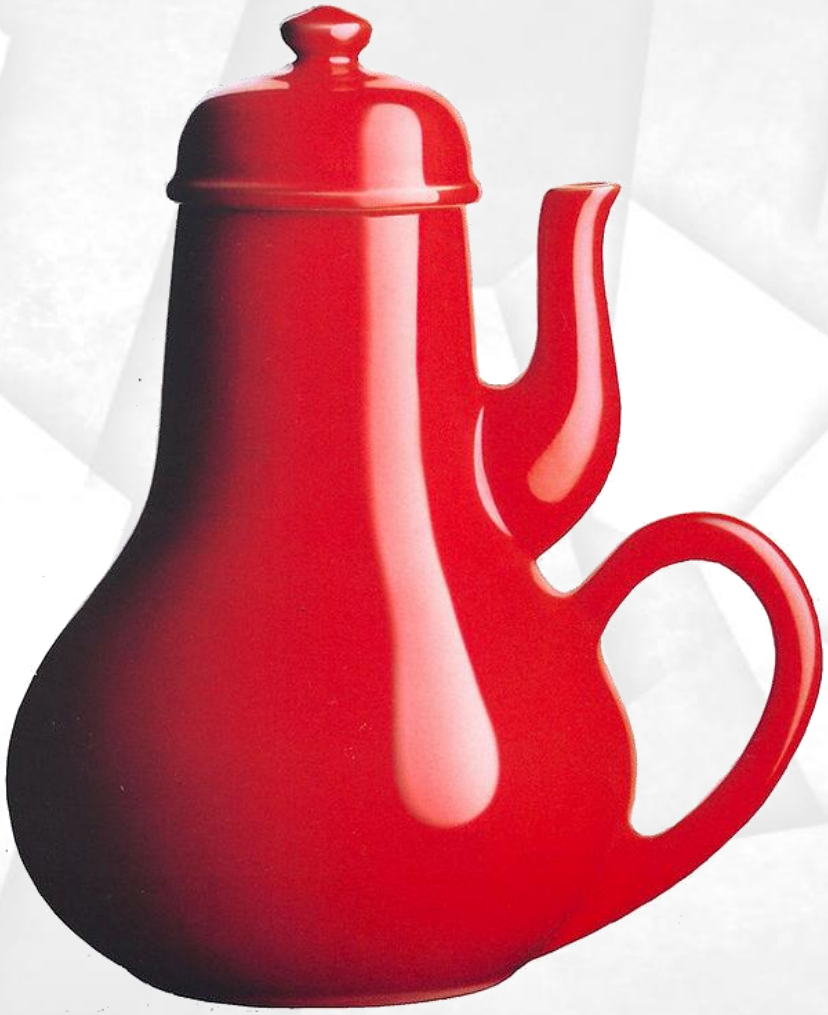
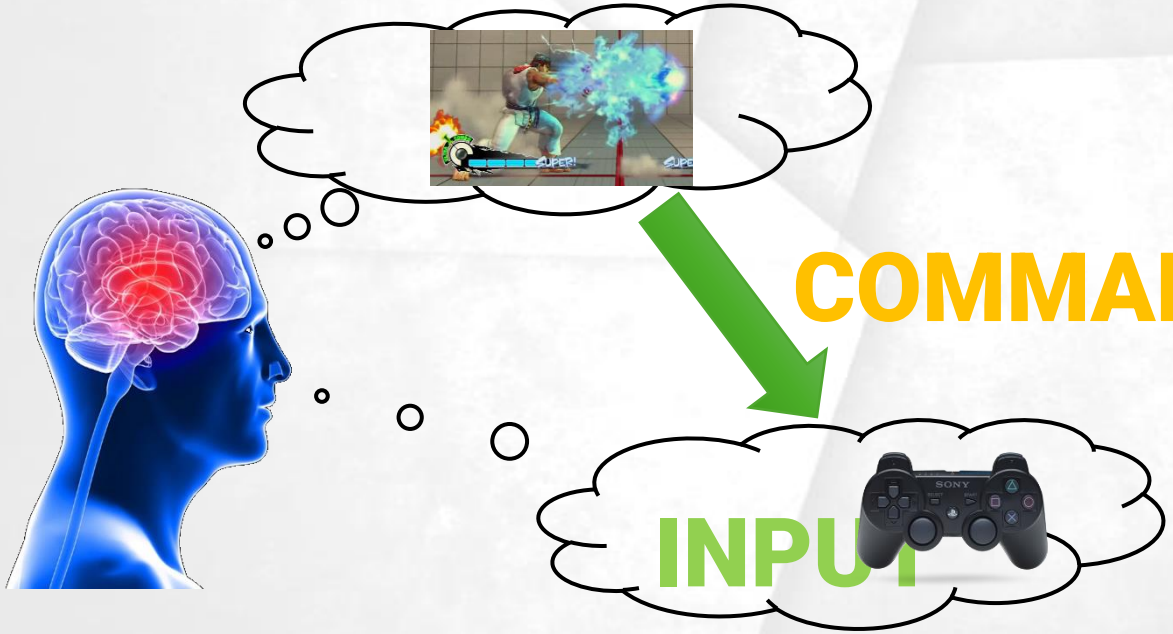
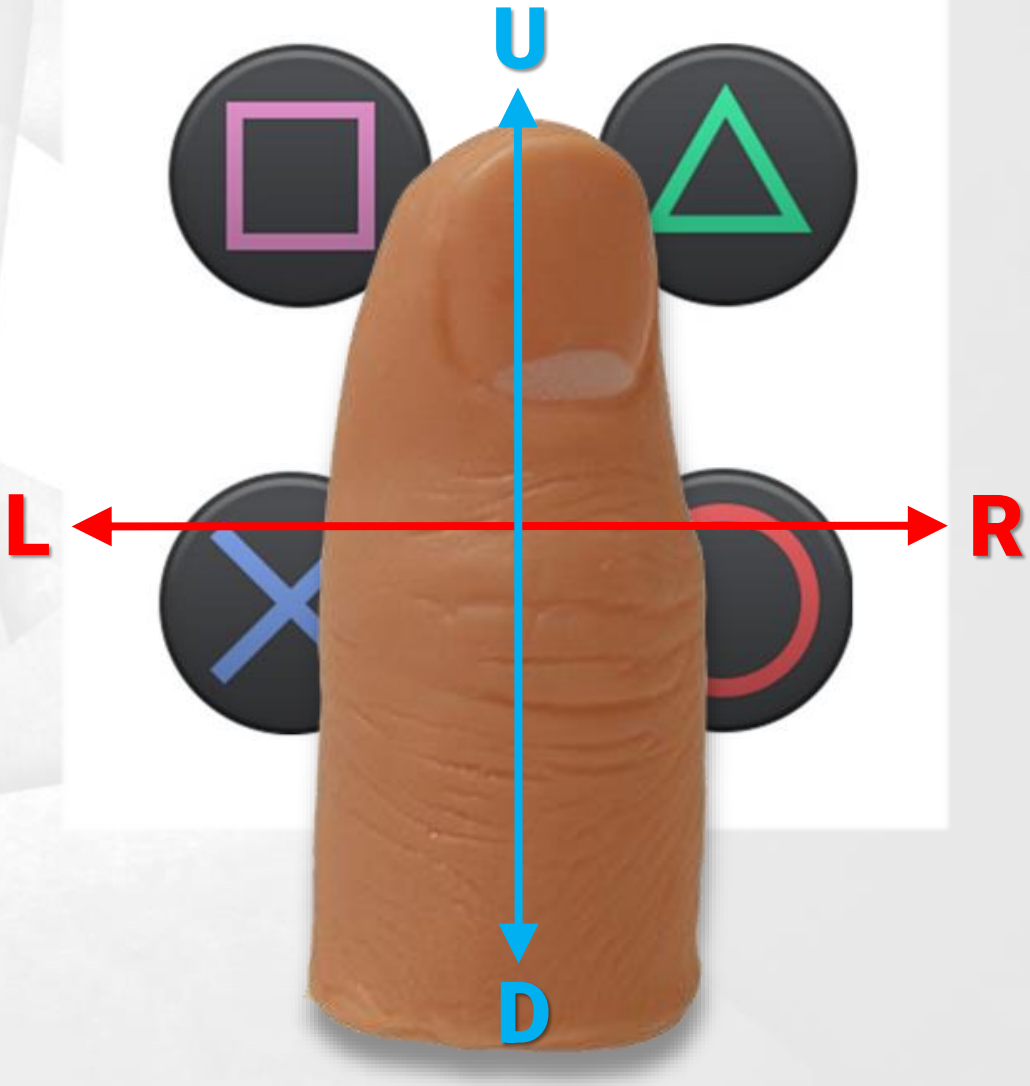



PETZ
PHASE 4 - SHOWING OFF
EVALUATING NEEDS
HUNGER NEEDS
POOP NEEDS
PLAY NEEDS
ANGER NEEDS
DISEASE NEEDS
MAGIC NEEDS
POTIONS
SPEEDING PLAY
SCORING AN EXHIBITION
EXHIBITION TILE
SINGLE-PET EXHIBITIONS


Mattiassi, A. D. (2019). Fighting the game. Command systems and player-avatar interaction in fighting games in a social




Mattiassi, A. D. (2019). Fighting the game. Command systems and player-avatar interaction in fighting games in a social

# Accessibilità

# 9. Tipologie di persone giocanti


1. Motivazione
2. Coinvolgimento
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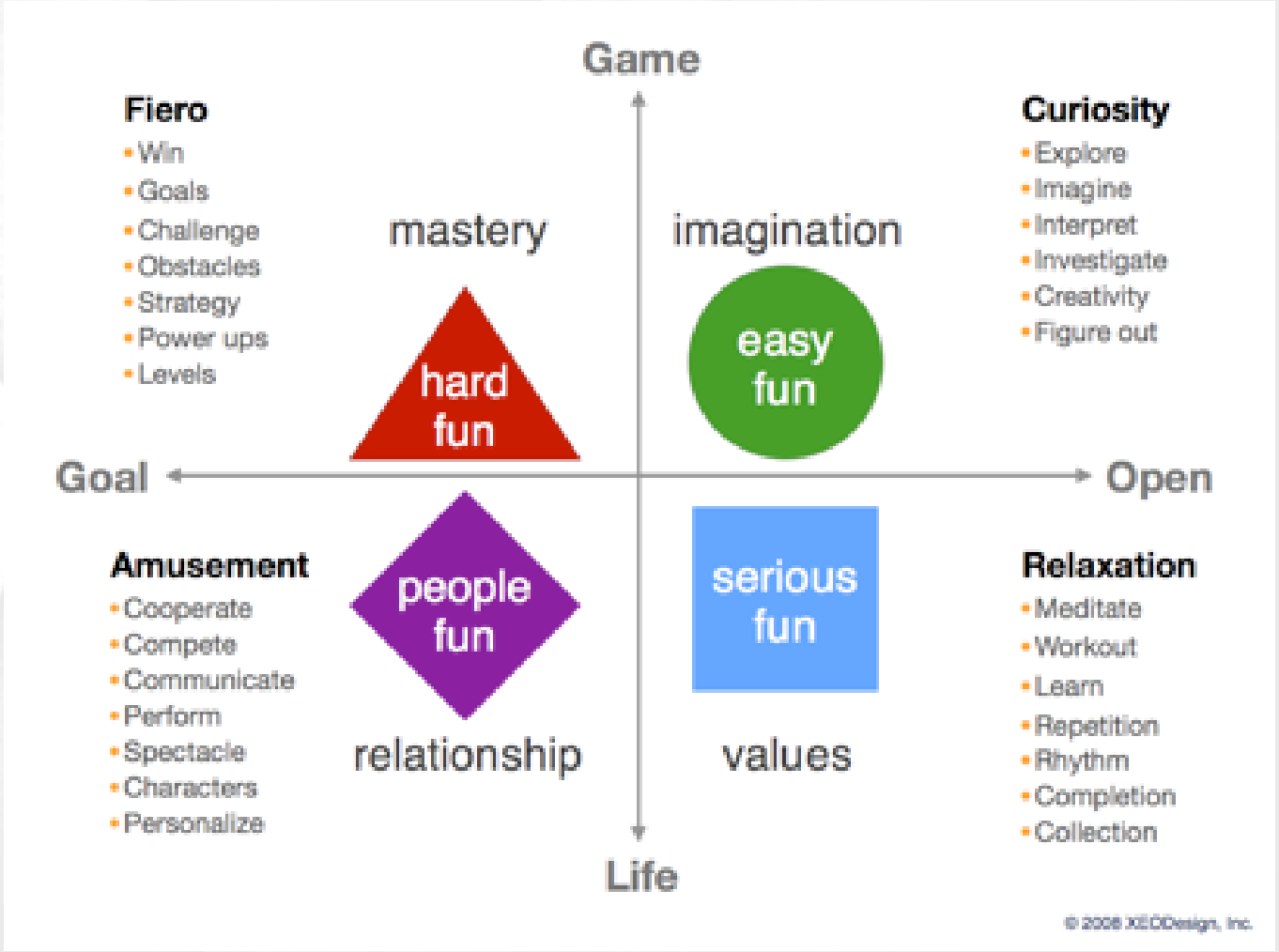
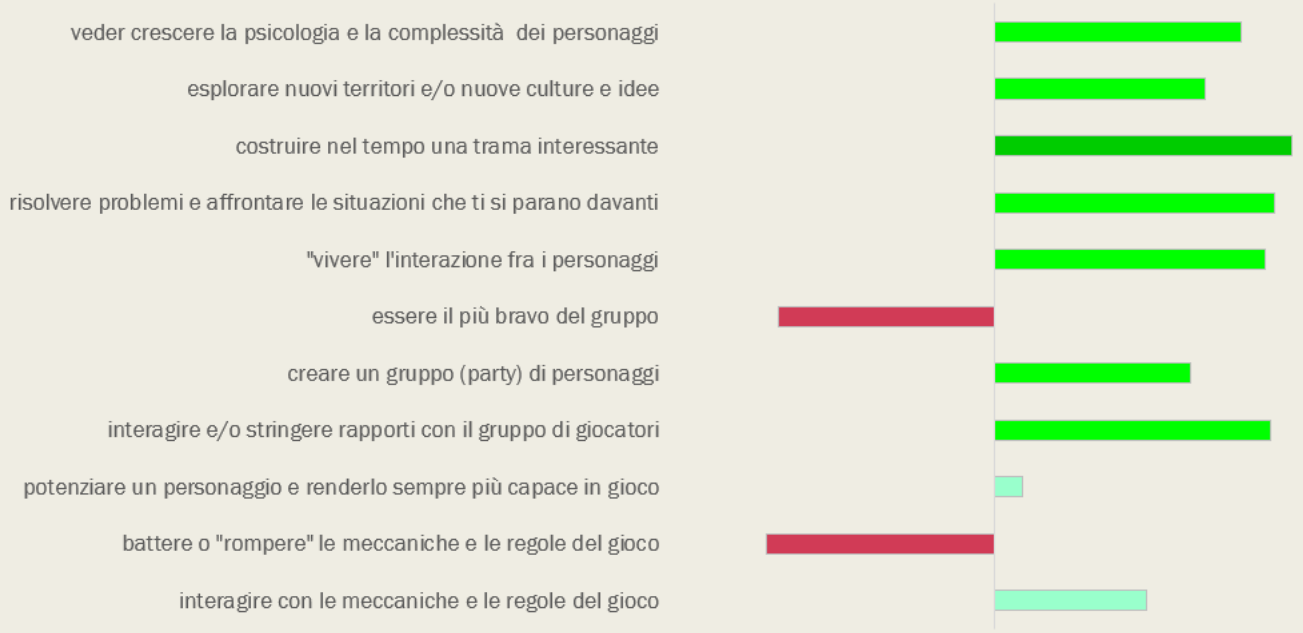
# Tassonomia di Bartle

# Tassonomia di Lazzaro



# motivazione al gioco




(survey di Davide Salvador, dati presentati a Lucca Changes da Alan Mattiassi)

# 10. Impatto psicologico e sociale


1. Motivazione
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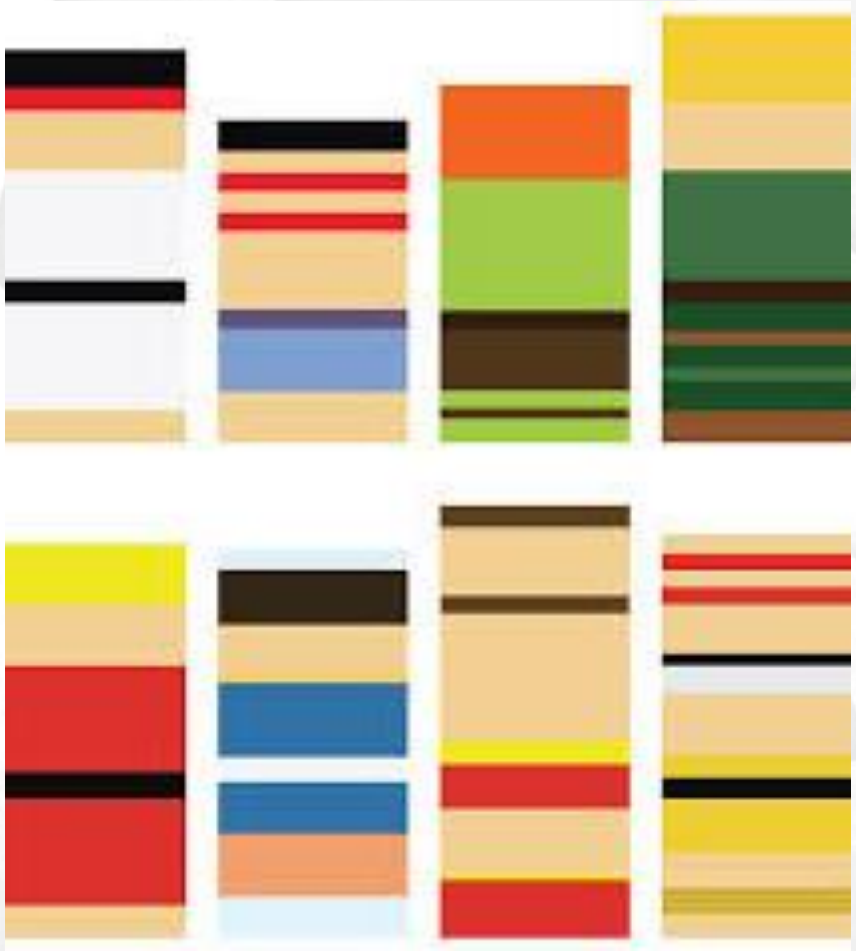
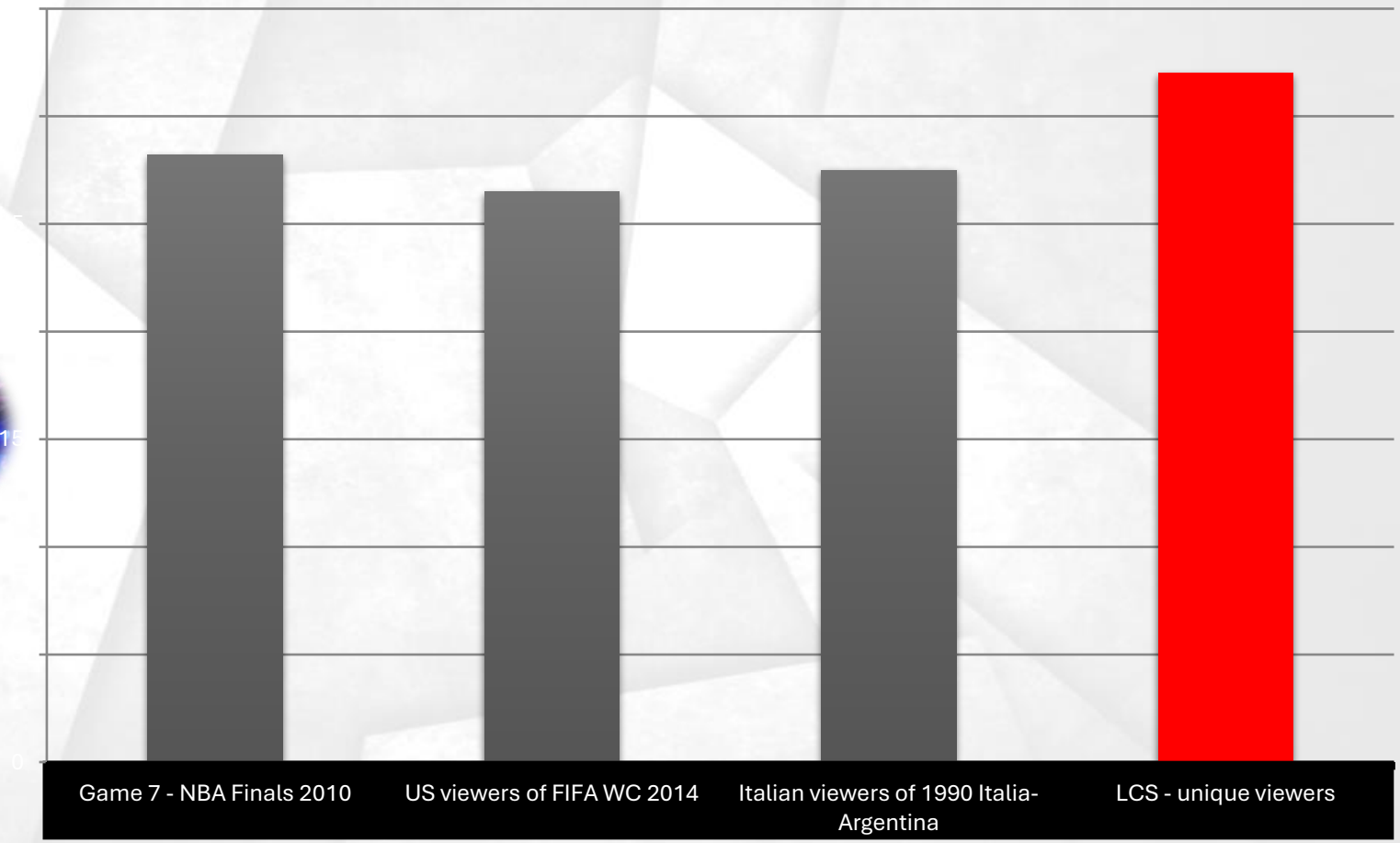



LEAGUE LEGENDS
CHAMPIONSHIP SERIES
SEASON 3


15
0
Game 7 - NBA Finals 2010
US viewers of FIFA WC 2014
Italian viewers of 1990 Italia-Argentina
LCS - unique viewers


STRANGER
THINGS

# 11. Apprendimento


1. Motivazione
2. Coinvolgimento
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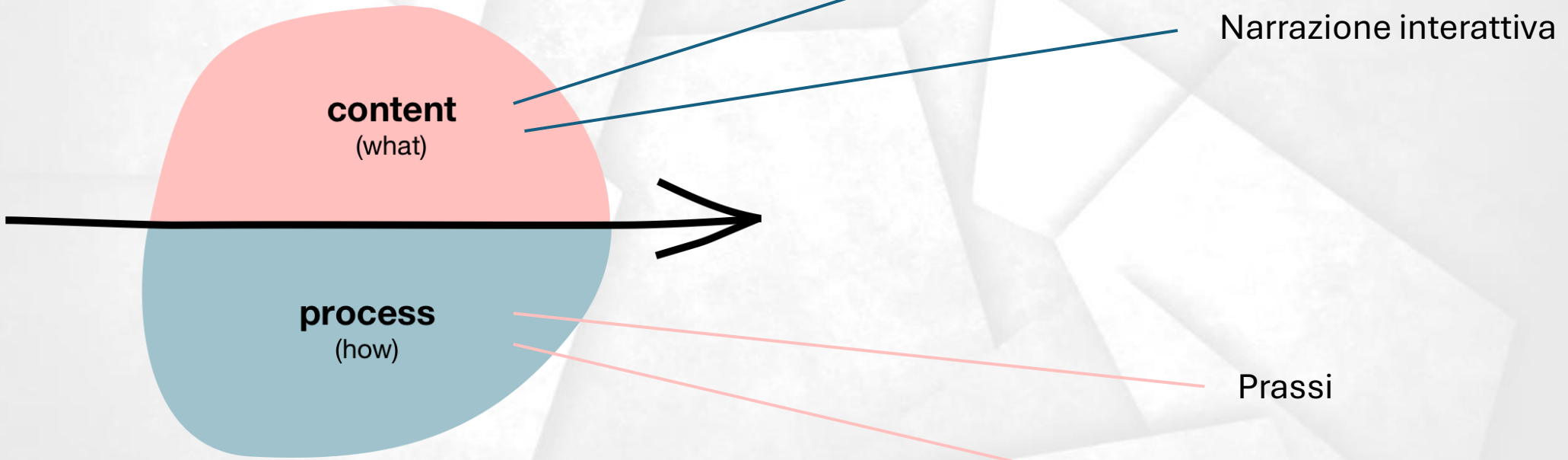
**content**
(what)

**process**
(how)


content
(what)
process
(how)
Mera esposizione
Narrazione interattiva
Prassi
Retorica procedurale


Timeline

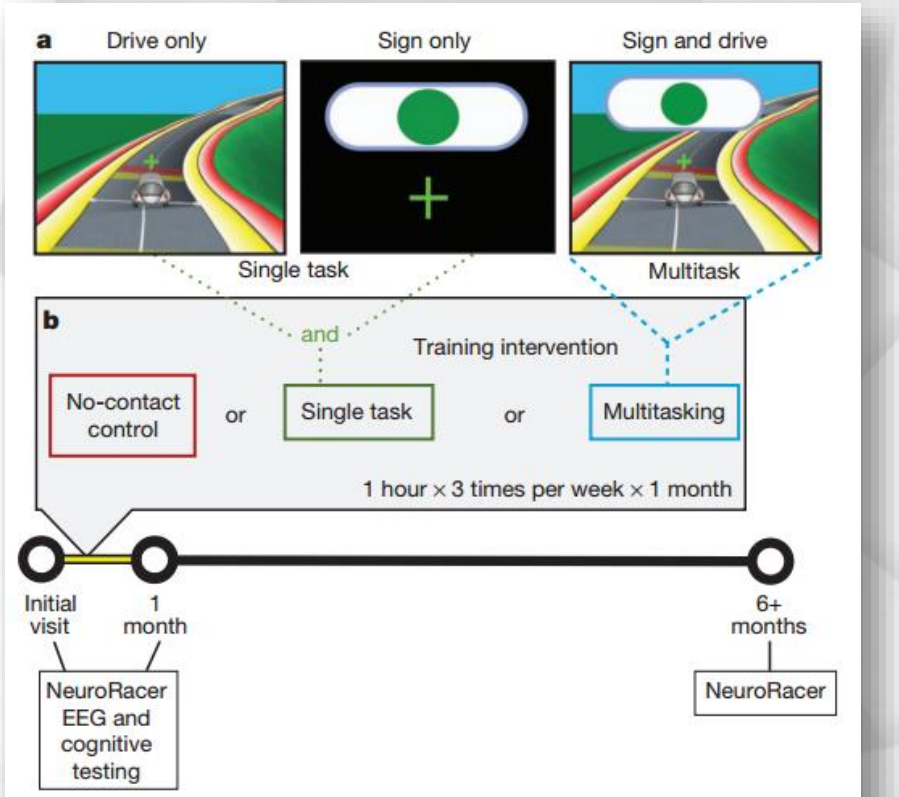
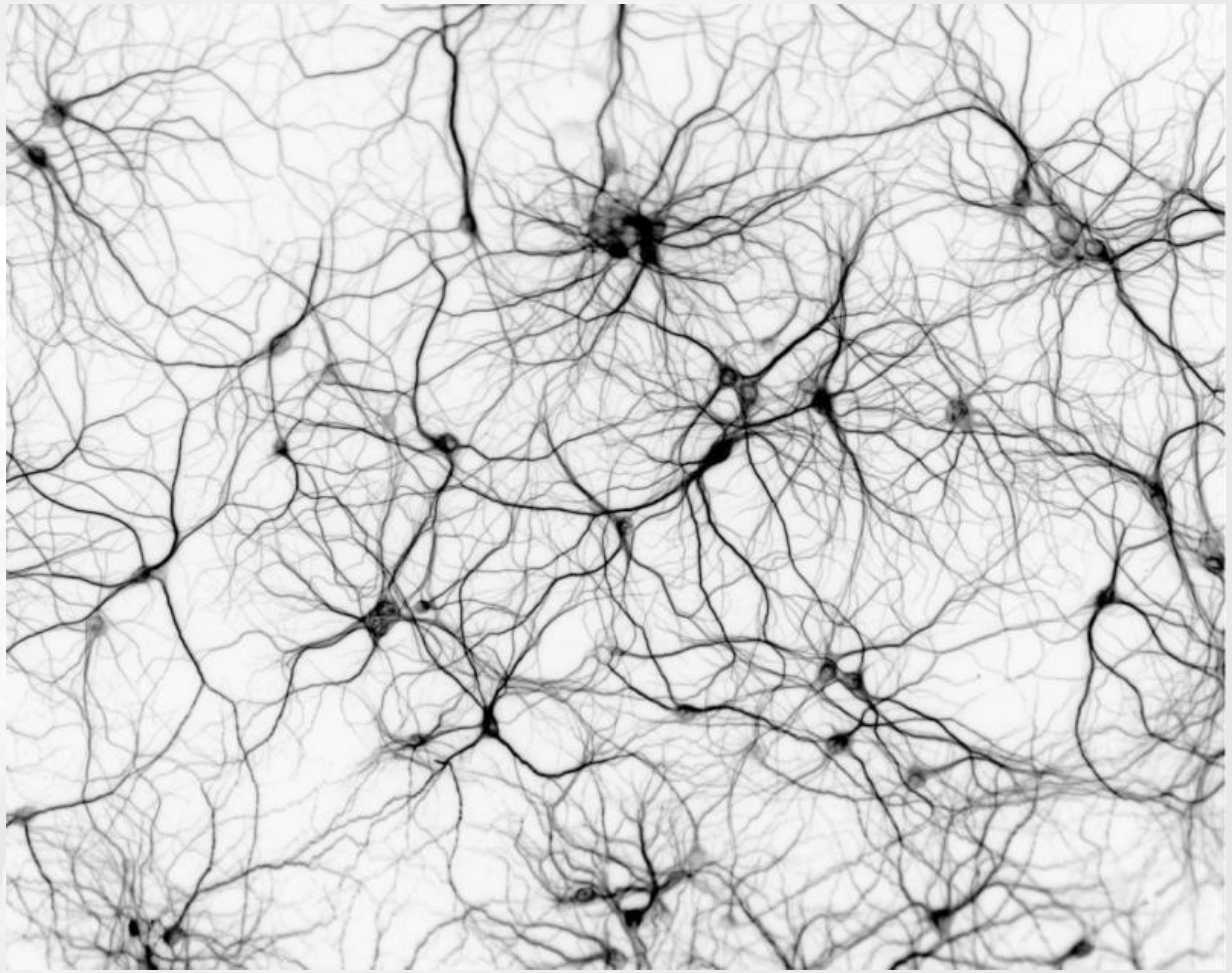
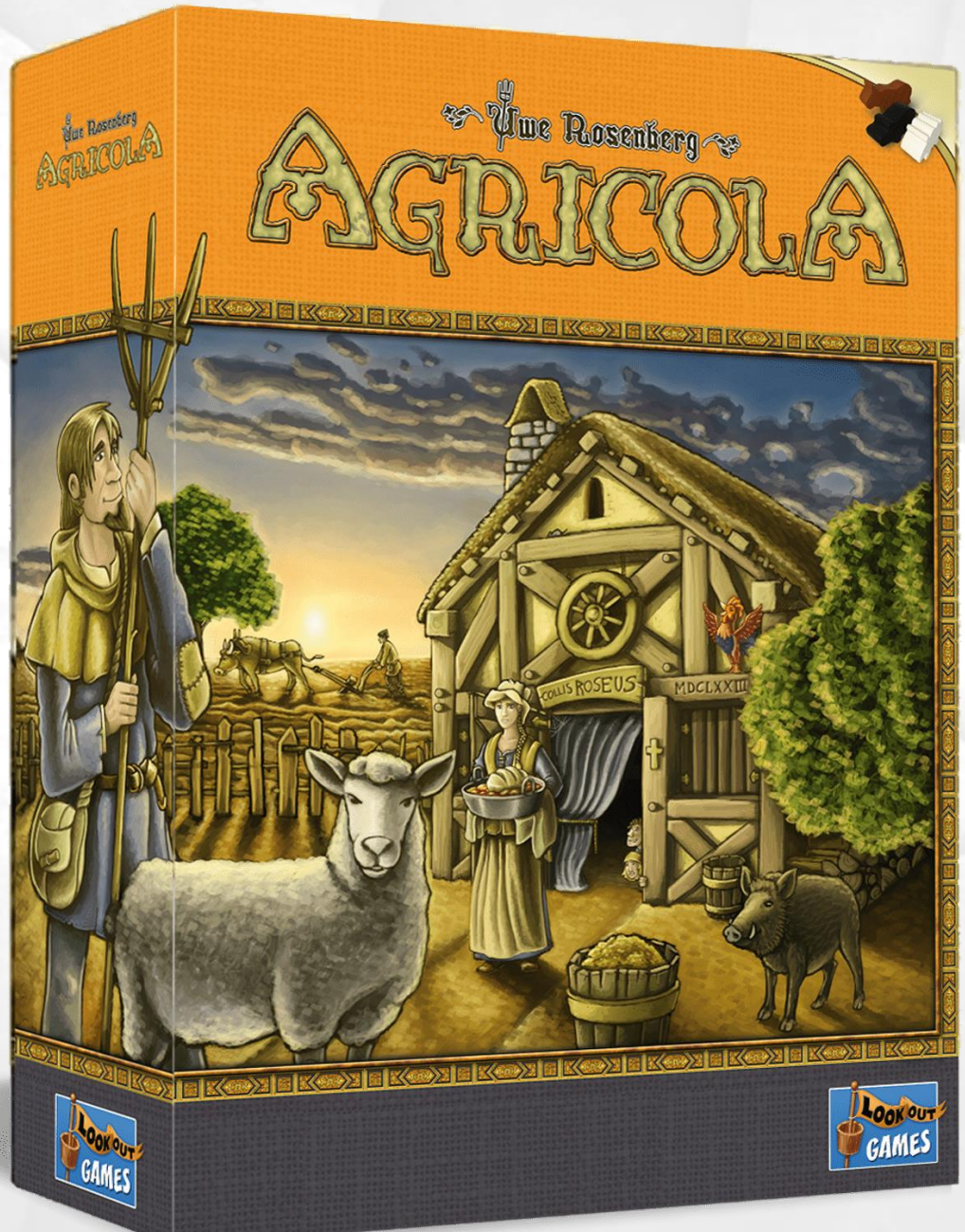



**Figure 1 | NeuroRacer experimental conditions and training design.** **a**, Screen shot captured during each experimental condition. **b**, Visualization of training design and measures collected at each time point.


VIDEO GAMES
WHY WASTE GOOD TECHNOLOGY ON SCIENCE AND MEDICINE?




Uwe Rosenberg
AGRICOLA
COLLIS ROSEUS
MDCLXXIII
LOOK OUT GAMES
LOOK OUT GAMES


evolution
NorthStarGames
Foraging
Fertile
Fat Tissue
Cooperation
Climbing
Carnivore
Burrowing
Ambush
Warning Call
Symbiosis
Scavenger
Long Neck
Horns
Hard Shell

# Game-Based Learning

Non incameri nuove informazioni nel tuo modello mentale...

...ma adatti il tuo modello mentale alle nuove informazioni

# Debriefing in Game-Based Learning

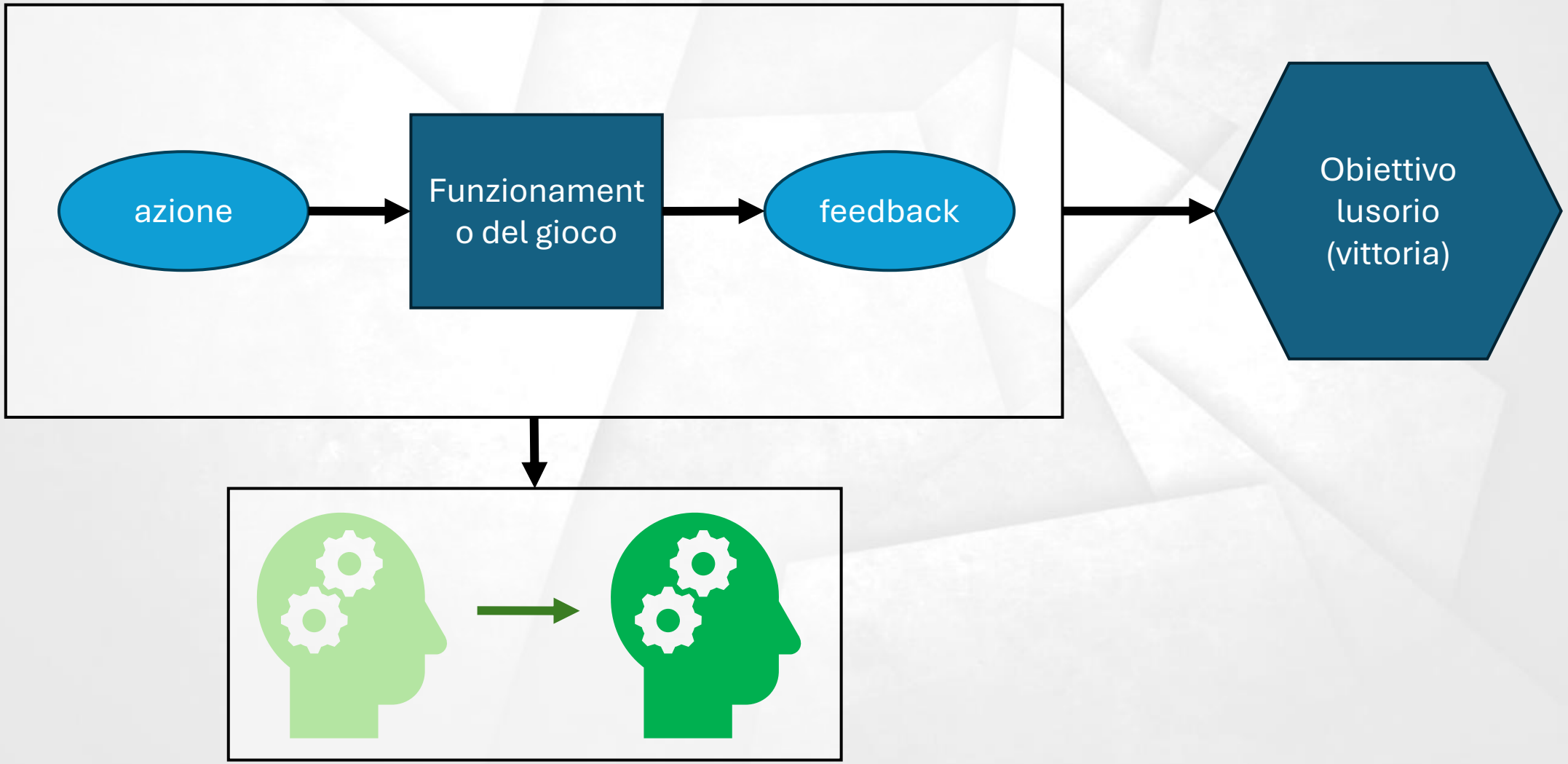
"The real (solid, lasting, meaningful, and deeper) learning comes not from the game, but from the debriefing"

Crookall, D. (2010). Serious games, debriefing, and simulation/gaming as a discipline. Simulation & gaming, 41(6), 898-920.

# 12. Design per l'apprendimento


1. Motivazione
2. Coinvolgimento
3. Elementi distintivi esperienza di gioco
4. Distinzione persona/personaggio
5. Problem solving
6. Libertà e sperimentazione
7. Sicurezza psicologica
8. Ergonomia
9. Tipologie di persone giocanti
10. Impatto psicologico e sociale
11. Apprendimento
12. **Design per l'apprendimento**

# Design della retorica procedurale



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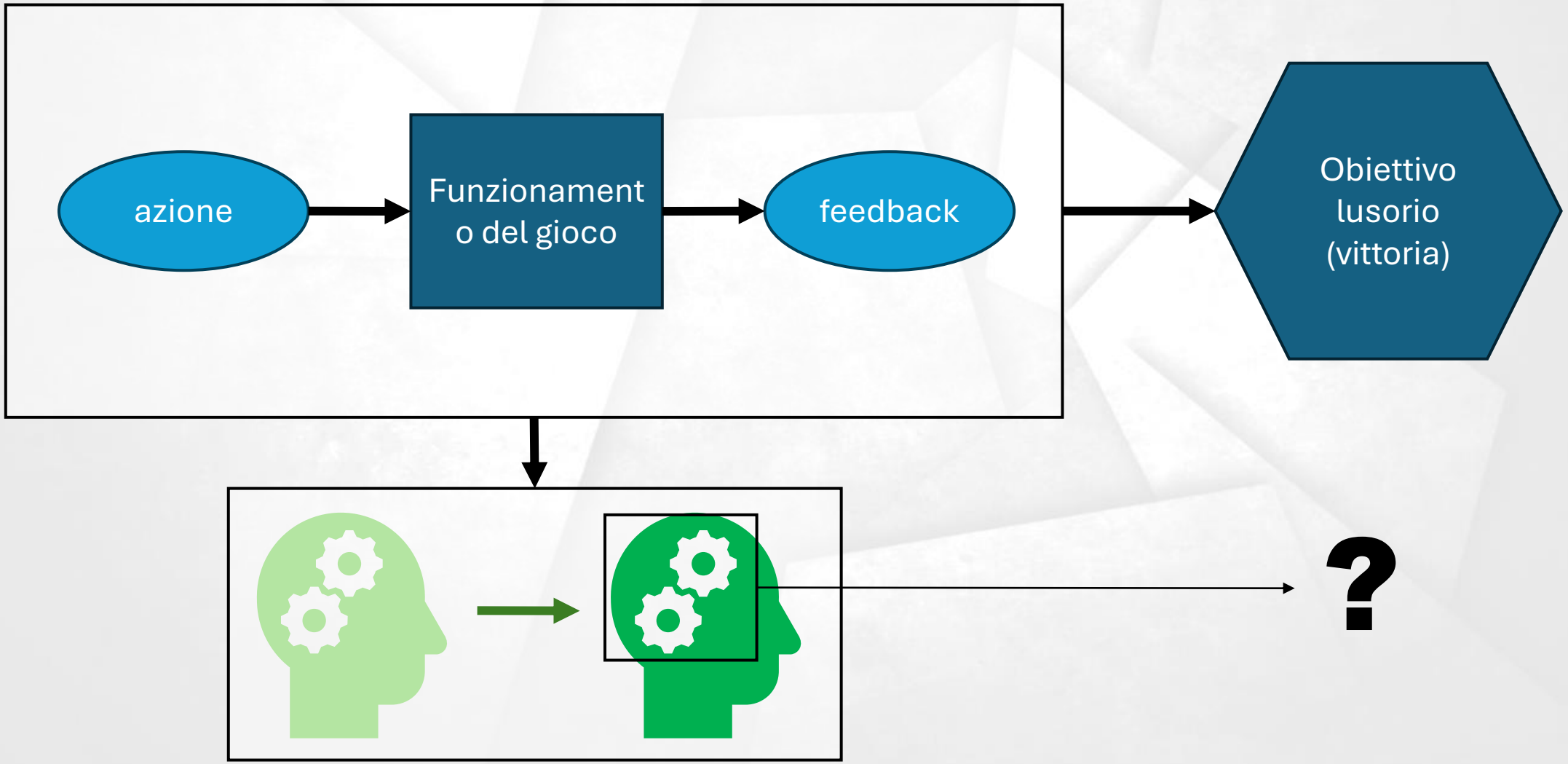

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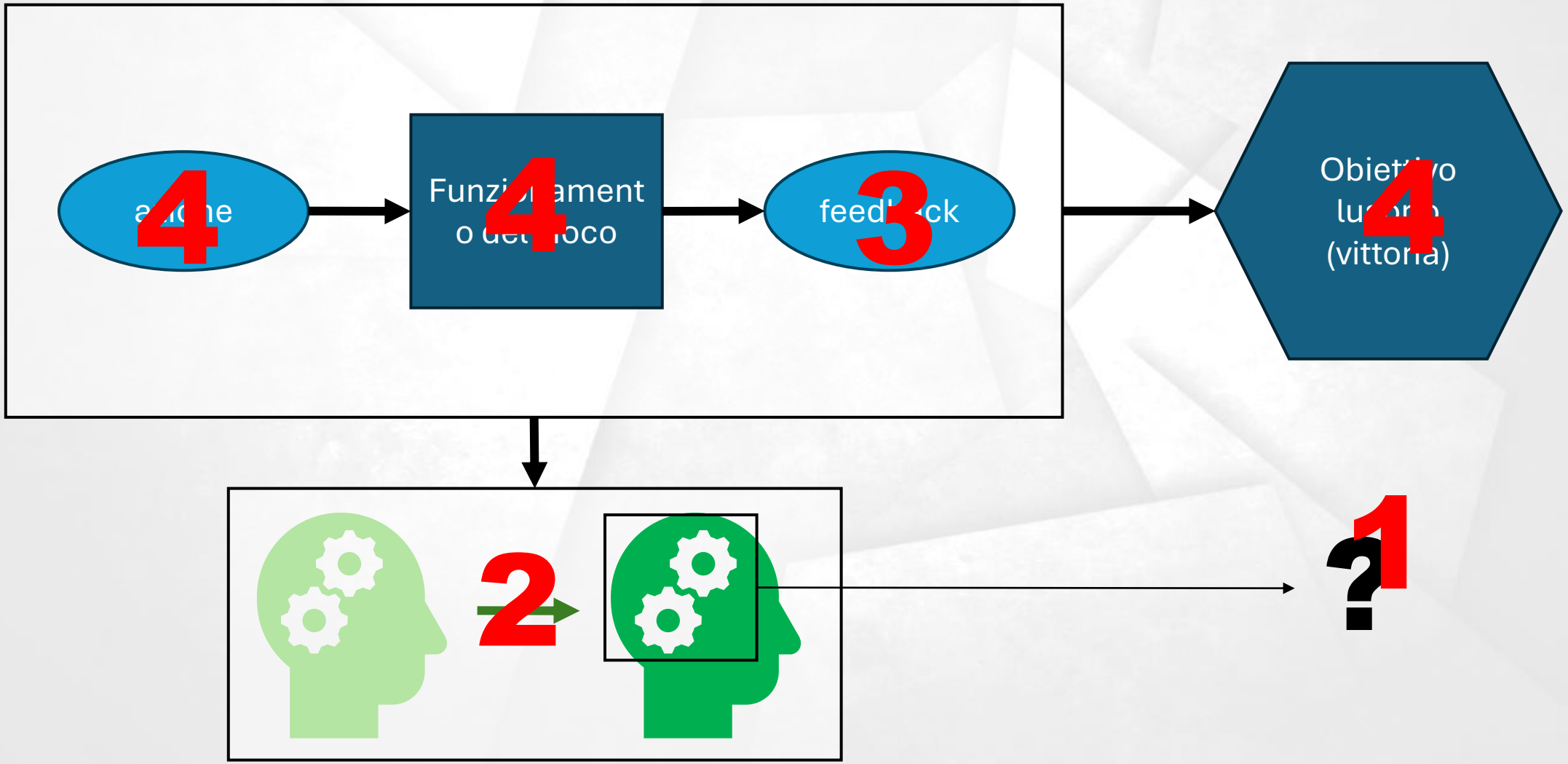


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nature structural & molecular biology

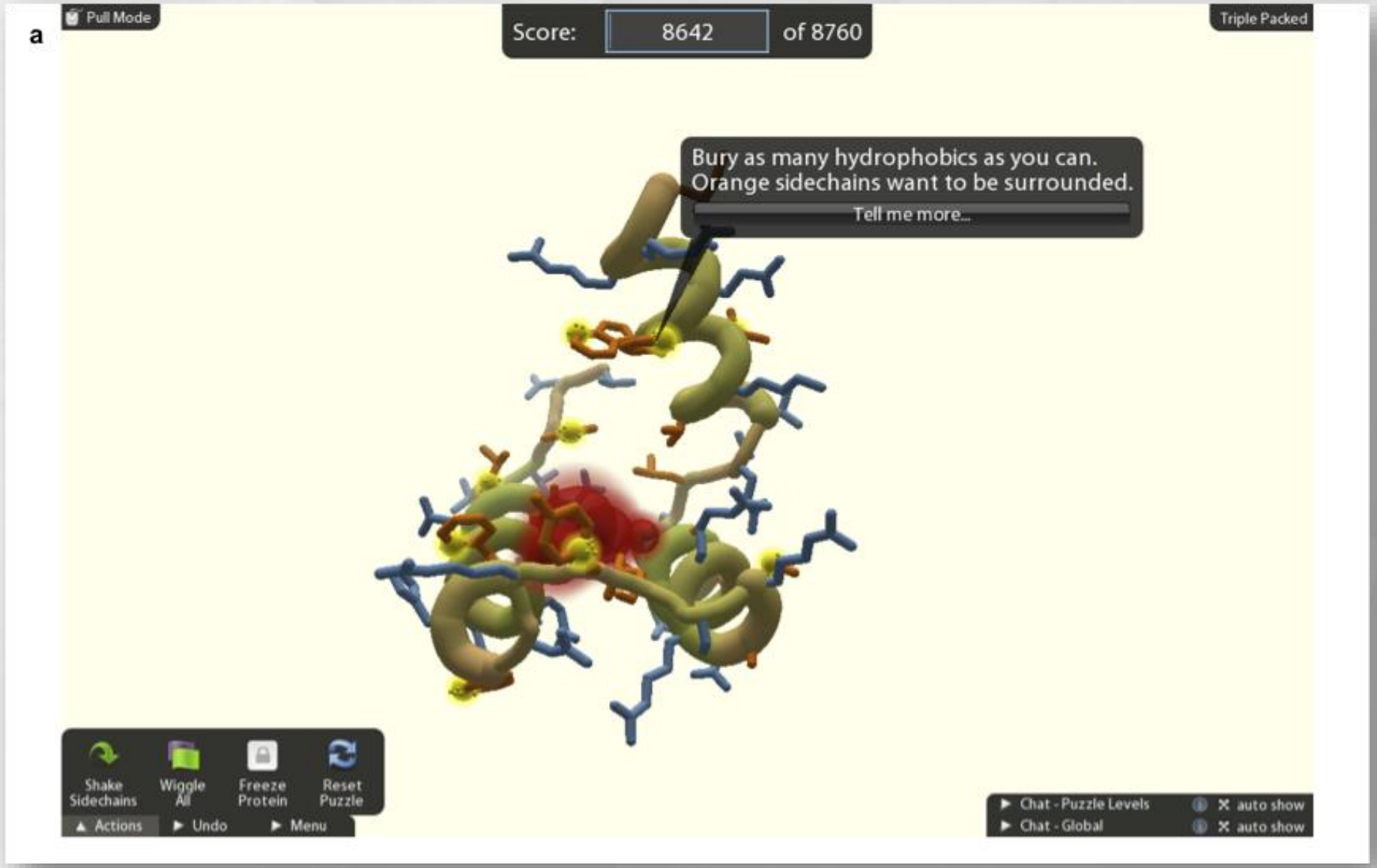
# Crystal structure of a monomeric retroviral protease solved by protein folding game players

Firas Khatib[1], Frank DiMaio[1], Foldit Contenders Group, Foldit Void Crushers Group, Seth Cooper[2], Maciej Kazmierczyk[3], Miroslaw Gilski[3,4], Szymon Krzywda[3], Helena Zabranska[5], Iva Pichova[5], James Thompson[1], Zoran Popović[2], Mariusz Jaskolski[3,4] & David Baker[1,6]

**Following the failure of a wide range of attempts to solve the crystal structure of M-PMV retroviral protease by molecular replacement, we challenged players of the protein folding game Foldit to produce accurate models of the protein. Remarkably, Foldit players were able to generate models of sufficient quality for successful molecular replacement and subsequent structure determination. The refined structure provides new insights for the design of antiretroviral drugs.**

Foldit is a multiplayer online game that enlists players worldwide to solve difficult protein-structure prediction problems. Foldit players leverage human three-dimensional problem-solving skills to interact with protein structures using direct manipulation tools and algorithms from the Rosetta structure prediction methodology[1]. Players collaborate with teammates while competing with other players to obtain the highest-scoring (lowest-energy) models. In proof-of-concept tests, Foldit players—most of whom have little or no background in biochemistry—were able to solve protein structure refinement problems in which backbone rearrangement was necessary to correctly bury hydrophobic residues[2]. Here we report Foldit player successes in real-world modeling problems with more complex deviations from native structures, leading to the solution of a long-standing Structure Prediction (CASP) experiment was an ideal venue in which to test this. CASP is a biennial experiment in protein structure prediction methods in which the amino acid sequences of structures that are close to being experimentally determined—referred to as CASP targets—are posted to allow groups from around the world to predict the native structure (http://predictioncenter.org/casp9/). Each group taking part in CASP is allowed to submit five different predictions for each sequence. Foldit participated as an independent group during CASP9 and made predictions for the targets with fewer than 165 residues that the CASP organizers did not indicate as oligomeric. For targets with homologs of known structure—the Template-Based Modeling category—Foldit players were given different alignments to templates predicted by the HHpred server[3] via the new Alignment Tool. Despite these new additions to the game, the performance of Foldit players over all CASP9 Template-Based Modeling targets was not as good as those of the best-performing methods, which made better use of information from homologous structures; extensive energy minimization used by Foldit players tended to perturb peripheral portions of the chain away from the conformations present in homologs.

For prediction problems for which there were no identifiable homologous protein structures—the CASP9 Free Modeling category—Foldit players were given the five Rosetta Server CASP9 submissions (which were publicly available to other prediction groups) as starting points, along with the Alignment Tool. Here all five starting models were available, allowing players to use partial threading to combine different features of the Rosetta models. In this Free Modeling


a
Pull Mode
Score: 8642 of 8760
Triple Packed
Bury as many hydrophobics as you can.
Orange sidechains want to be surrounded.
Tell me more...
Shake Sidechains
Wiggle All
Freeze Protein
Reset Puzzle
Actions
Undo
Menu
Chat - Puzzle Levels
auto show
Chat - Global
auto show

# Peculiarità mediali

Metagioco macchinoso

Rappresentazione astratta e modellazione

‘Stop-motion’

Gameplay ‘a quanti’

Manipolazione manuale

Realismo

Metagioco opzionale

Gameplay time-bound

Manipolazione mediata

Gameplay continuo

# Incentivi 

1. Incentivare vs. disincentivare vs. sottrarre

# Incentivi 

1. Incentivare vs. disincentivare vs. sottrarre

2. Come scegliere l’oggetto dell’incentivo?

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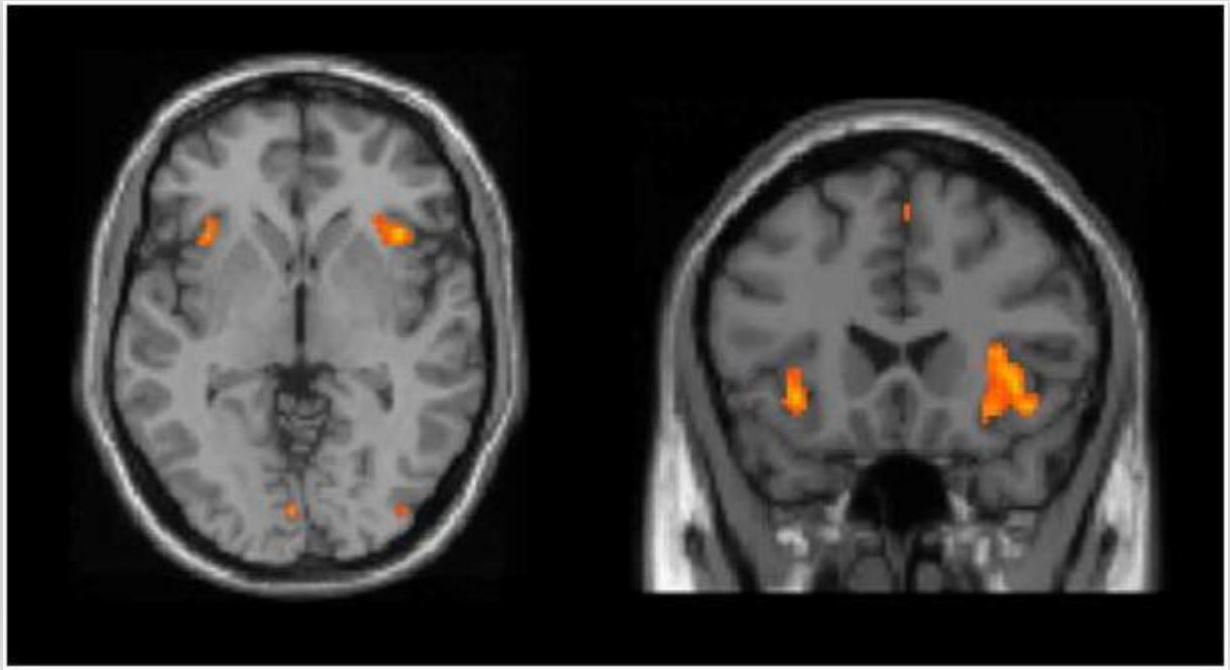
1. Incentivare vs. disincentivare vs. sottrarre

2. Come scegliere l’oggetto dell’incentivo?

3. Relazione con l’obiettivo formativo

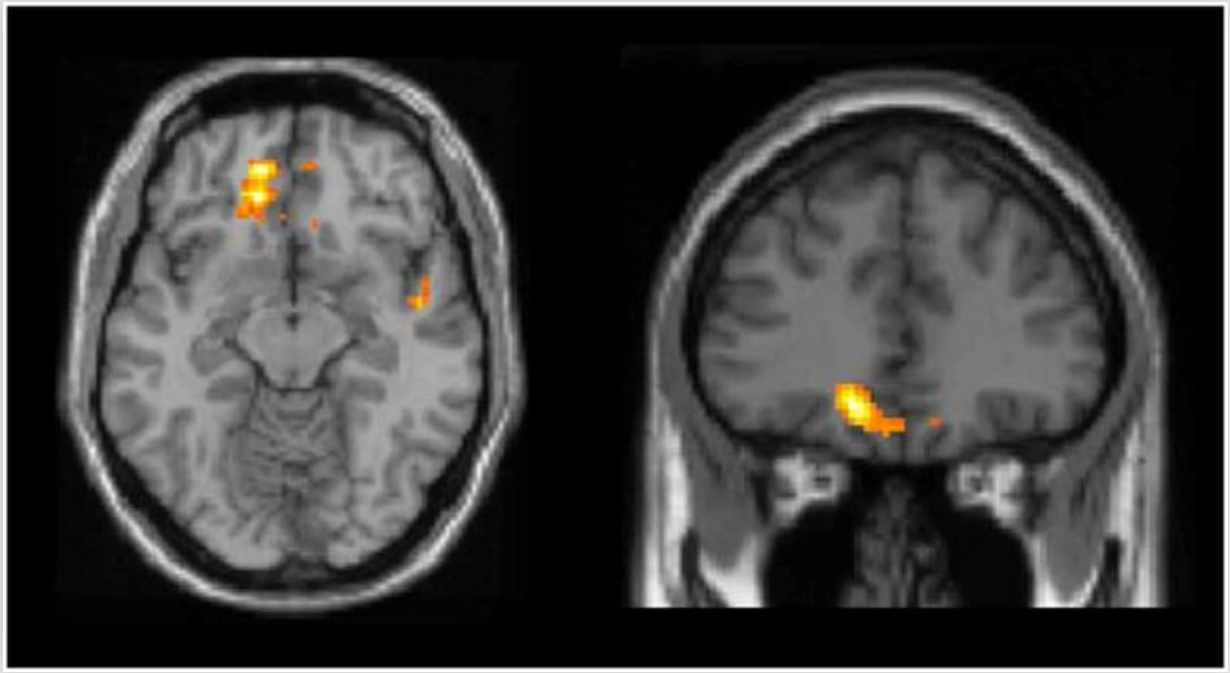
Decety, J., Jackson, P. L., Sommerville, J. A., Chaminade, T., & Meltzoff, A. N. (2004). The neural bases of cooperation and competition: An fMRI investigation. *NeuroImage, 23*(2), 744.



multi player vs. single player

[…] both conditions that included social interaction led to increased activation in the anterior insula (see Fig. 4). The insula has been characterized as a paralimbic structure due to its connections and associations with the neocortex and limbic structures (Augustine, 1996: Mesulam and Mufson, 1985). Recent evidence from neuroimaging studies point out that this region is an important neural component for the sense of agency, and its activation is related to the attribution of actions to the self (e.g., see Farrer and Frith, 2002; Farrer et al., 2003). Moreover, activation of the anterior insula may also be consistent with its involvement in autonomic arousal (e.g., see Critchley et al., 2000; Oppenheimer et al., 1992). Indeed, as compared to independent play, the two target conditions are likely to elicit social and motivational sates of the participants that draw into arousal mechanisms.

Decety, J., Jackson, P. L., Sommerville, J. A., Chaminade, T., & Meltzoff, A. N. (2004). The neural bases of cooperation and competition: An fMRI investigation. *NeuroImage, 23*(2), 744.



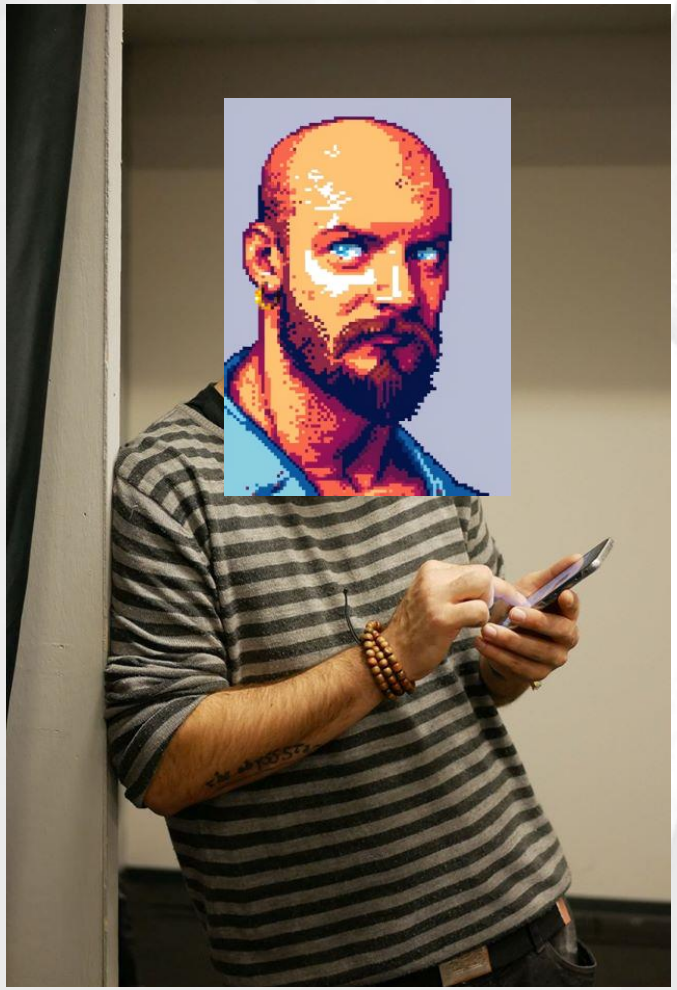
specifiche per gioco cooperativo

Although both competition and cooperation imply social interactions, we found that the medial orbitofrontal area is specifically activated when participants cooperate with another person. There is ample evidence from evolutionary psychology as well as from developmental psychology to argue that cooperating is more socially rewarding than competing […] (Barron, 2003). At the neural level, the orbitofrontal cortex is acknowledged to be crucially involved in the motivational control of goal-directed behavior (Tremblay and Schultz, 1999). […] We suggest that, in our experiment, the reward value stems from the psychological satisfaction of reaching a common goal through interaction with a conspecific.

Decety, J., Jackson, P. L., Sommerville, J. A., Chaminade, T., & Meltzoff, A. N. (2004). The neural bases of cooperation and competition: An fMRI investigation. *NeuroImage, 23*(2), 744.

specifiche per gioco competitivo

The opposite contrast (competition vs. cooperation) revealed activation in the right inferior parietal cortex as well as a number of regions in the frontal lobes including medial frontal gyrus and left superior frontal gyrus. […] The right inferior parietal activation may arise because the distinction between the self and other is more highlighted during competition than cooperation. […] the right inferior parietal cortex plays a role in the distinction between self-produced actions and actions generated by others (e.g., Farrer and Frith, 2002; Meltzoff and Decety, 2003). […] The involvement of the medial prefrontal cortex specifically in competition is also of great interest (see Fig. 6). There is hard evidence that this region around the paracingulate sulcus in the medial prefrontal cortex plays a specific role in mentalizing.



# Grazie per l'attenzione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