

19/22  
GENNAIO 2022

GIORNATE DI  
NEUROPSICOLOGIA  
DELL'ETÀ EVOLUTIVA  
XVII EDIZIONE



IL PROGRAMMA

# IL GIOCO E LE EMOZIONI: QUALE RUOLO PER L'APPRENDIMENTO?

**WHAT?**



# Che cosa è il GIOCO?

1. Il gioco è non completamente funzionale e non è volto alla sopravvivenza dell'organismo
2. Il gioco è spontaneo, piacevole, gratificante e volontario
3. Il gioco è fatto di atti esagerati o compaiono prima rispetto allo stesso comportamento messo in atto in un contesto non di gioco (es. «come se»)
4. Il gioco è fatto di atti ripetuti, ma non stereotipati e invariabili (es. dondolio o andatura )
5. Il gioco è avviato in assenza di forti sollecitazioni

Review > [Q Rev Biol.](#) 2010 Dec;85(4):393-418. doi: 10.1086/656903.

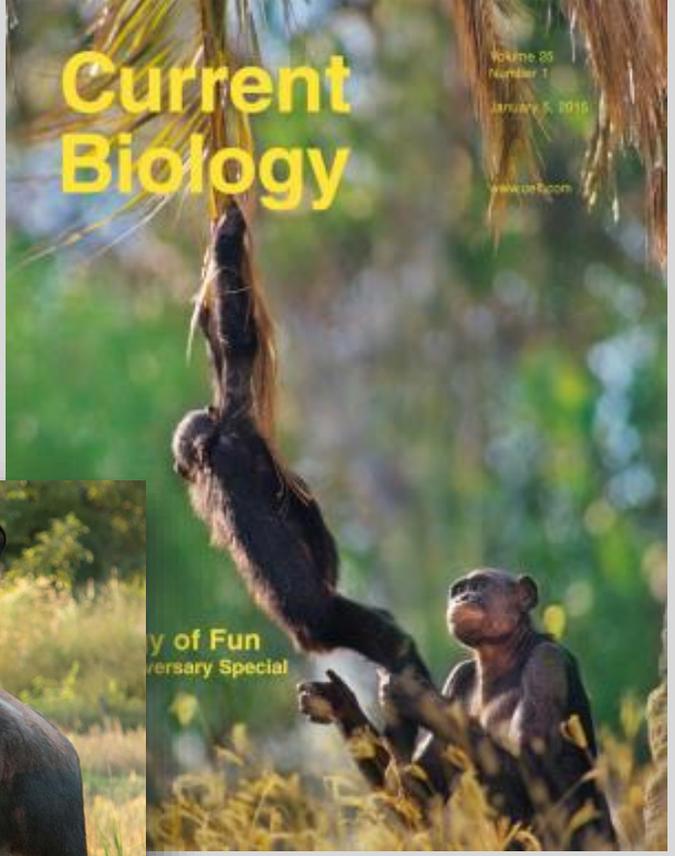
## **Current perspectives on the biological study of play: signs of progress**

Kerrie Lewis Graham <sup>1</sup>, Gordon M Burghardt

**WHO?**

2-Chi gioca?

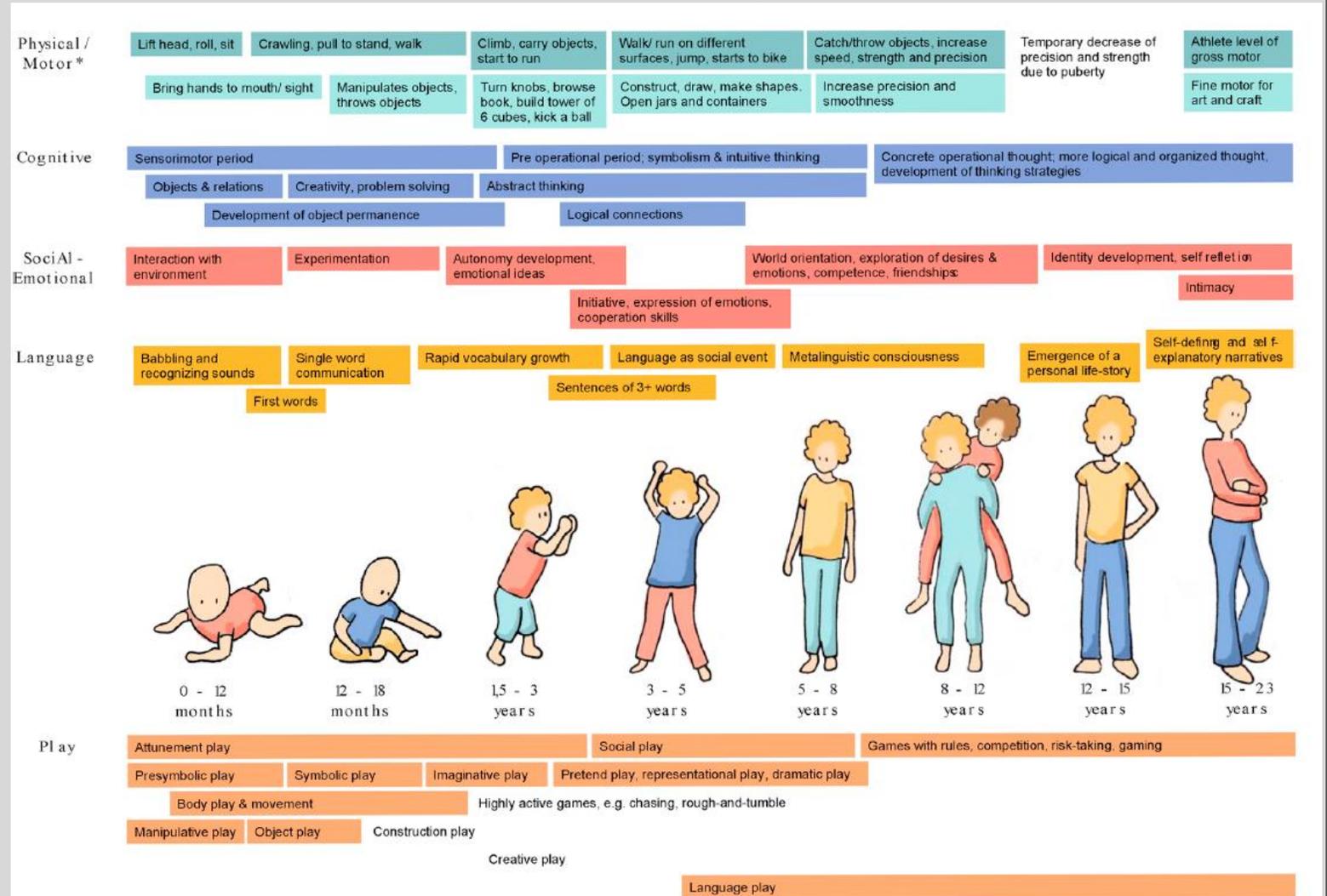
**CHIUNQUE!**



# WHEN?

Praticamente sempre,  
e il gioco evolve con  
l'età e con le diverse  
abilità acquisite

## 5- Quando giochiamo?



\* Dark: Gross motor skills, Light: Fine motor skills, Frost JL, Wortham SC & Reifel S. Play and Child development 4th ed. (Pearson Education, New Jersey, 2012), The National Institute of Play (www.nifplay.org), Lester, S. & Russel, W. Play for a Change. Play, Policy and Practice: A review of contemporary perspectives. (2008).

**WHERE?**

**OVUNQUE!**



4- Dove giochiamo?

**WHY?**

## 3- Perché giochiamo?



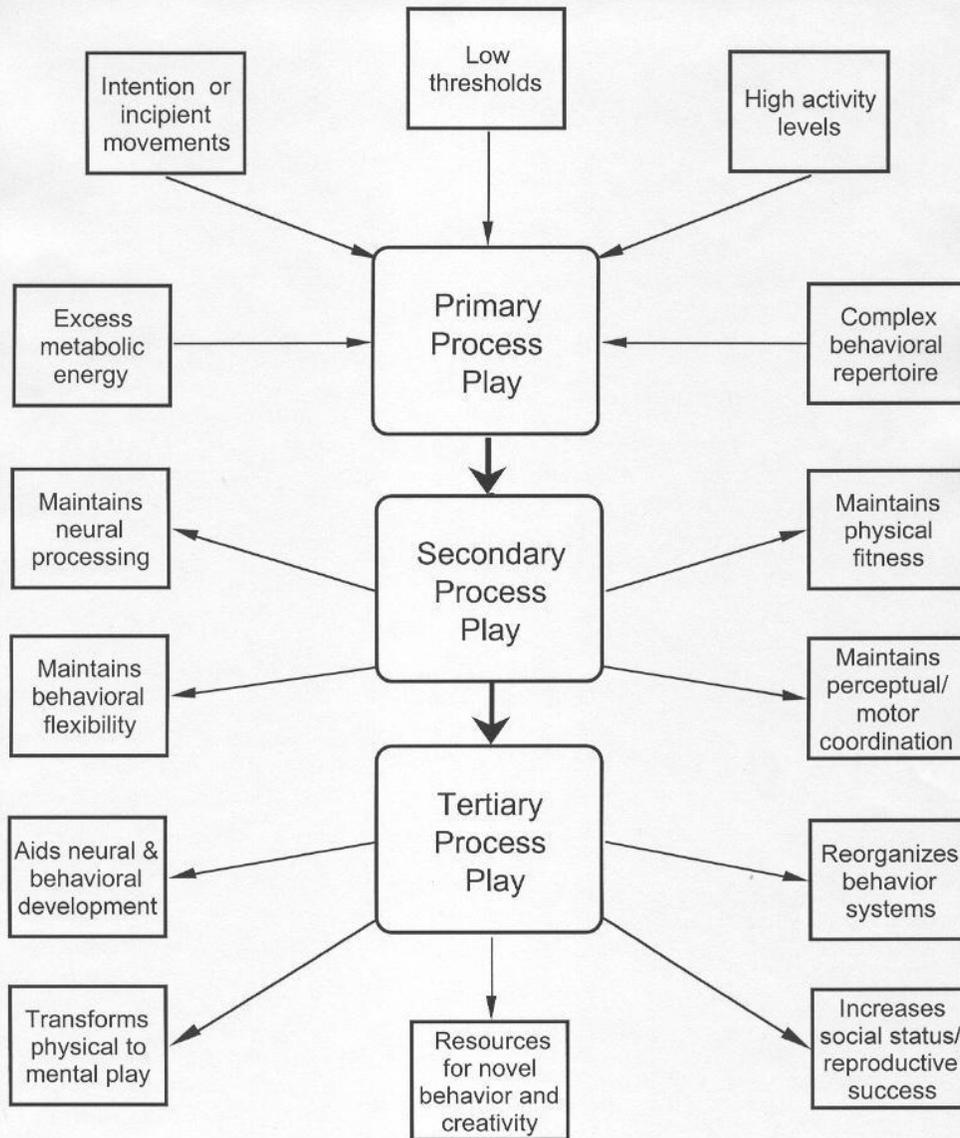
1. Gioco mimico
2. Gioco con movimento del corpo
3. Gioco con oggetti
4. Gioco sociale
5. Gioco di finzione
6. Gioco con narrazione
7. Gioco creativo





## A Brief Glimpse at the Long Evolutionary History of Play

Gordon M. Burghardt<sup>1\*</sup>



Una possibile ipotesi del perché iniziamo a giocare e i benefici che se ne possono trarre

*Figure 1.* A scenario for the evolution of play depicting three play processes. Note that all three processes can occur in the same species and individual depending on setting, context, experience, etc. (from Burghardt, 2005).

# Gioco e Circuito della ricompensa

(a) Pouncing



(b) Pinning



TRENDS in Pharmacological Sciences

Published in final edited form as:

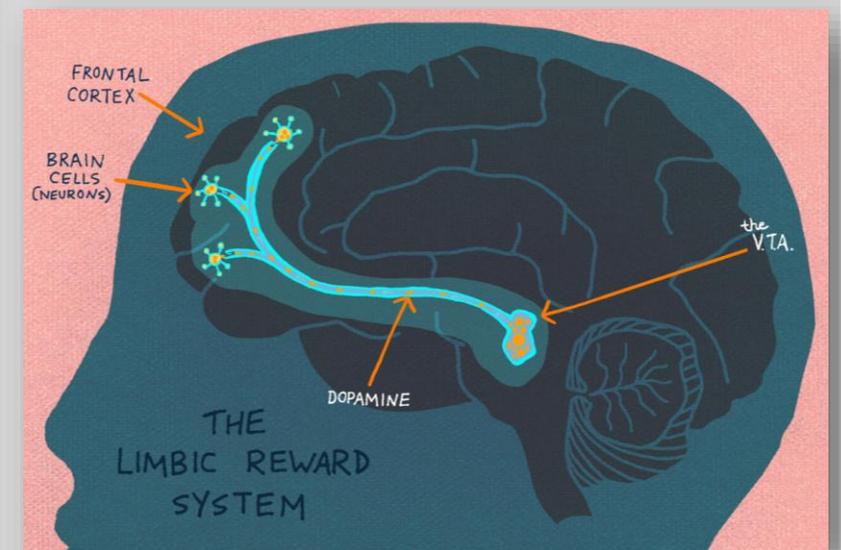
*Neurosci Biobehav Rev.* 2016 November ; 70: 86–105. doi:10.1016/j.neubiorev.2016.07.025.

## The neurobiology of social play and its rewarding value in rats

Louk J.M.J. Vanderschuren<sup>1</sup>, E.J. Marijke Achterberg<sup>1</sup>, and Viviana Trezza<sup>2</sup>

### Abstract

In the young of many mammalian species, including humans, a vigorous and highly rewarding social activity is abundantly expressed, known as social play behaviour. Social play is thought to be important for the development of social, cognitive and emotional processes and their neural underpinnings, and it is disrupted in pediatric psychiatric disorders. Here, we summarize recent progress in our understanding of the brain mechanisms of social play behaviour, with a focus on its rewarding properties. Opioid, endocannabinoid, dopamine and noradrenaline systems play a prominent role in the modulation of social play. Of these, **dopamine is particularly important for the motivational properties of social play.** The nucleus accumbens has been identified as a key site for opioid and dopamine modulation of social play. Endocannabinoid influences on social play rely on the basolateral amygdala, whereas noradrenaline modulates social play through the basolateral amygdala, habenula and prefrontal cortex. In sum, **social play behaviour is the result of coordinated activity in a network of corticolimbic structures, and its monoamine, opioid and endocannabinoid innervation.**



# Il gioco nei trattamenti riabilitativi

THE LANCET  
Digital Health

ARTICLES | VOLUME 2, ISSUE 4, E168-E178, APRIL 01, 2020

A novel digital intervention for actively reducing severity of paediatric ADHD (STARS-ADHD): a randomised controlled trial

Prof Scott H Kollins, PhD · Denton J DeLoss, PhD · Elena Cañadas, PhD · Jacqueline Lutz, PhD · Prof Robert L Findling, MD · Prof Richard S E Keefe, PhD · et al. [Show all authors](#)

[Open Access](#) · Published: February 24, 2020 · DOI: [https://doi.org/10.1016/S2589-7500\(20\)30017-0](https://doi.org/10.1016/S2589-7500(20)30017-0)

## The game-changing ADHD treatment

EndeavorRx is the first & only doctor-prescribed video game treatment for kids with ADHD.



## Action Video Games Enhance Attentional Control and Phonological Decoding in Children with Developmental Dyslexia

Sara Bertoni,<sup>1,2,\*</sup> Sandro Franceschini,<sup>2</sup> Giovanna Puccio,<sup>2</sup> Martina Mancarella,<sup>2,3</sup> Simone Gori,<sup>1</sup> and Andrea Facchetti<sup>2</sup>



REPORT | VOLUME 23, ISSUE 6, P462-466, MARCH 18, 2013

# Action Video Games Make Dyslexic Children Read Better

[Sandro Franceschini](#)<sup>3</sup> • [Simone Gori](#)<sup>3</sup> • [Milena Ruffino](#) • [Simona Viola](#) • [Massimo Molteni](#) •

[Andrea Facetti](#)<sup>3</sup> <sup>3</sup>  • [Show footnotes](#)

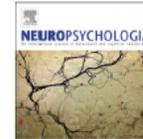


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journal homepage: [www.elsevier.com/locate/neuropsychologia](http://www.elsevier.com/locate/neuropsychologia)



NEUROPSYCHOLOGIA

## Is excessive visual crowding causally linked to developmental dyslexia?

Sara Bertoni<sup>a,\*</sup>, Sandro Franceschini<sup>a,\*\*</sup>, Luca Ronconi<sup>b,c</sup>, Simone Gori<sup>d</sup>, Andrea Facetti<sup>a</sup>

# SCIENTIFIC REPORTS

OPEN

Action video games improve reading abilities and visual-to-auditory attentional shifting in English-speaking children with dyslexia

25 January 2017

2 June 2017

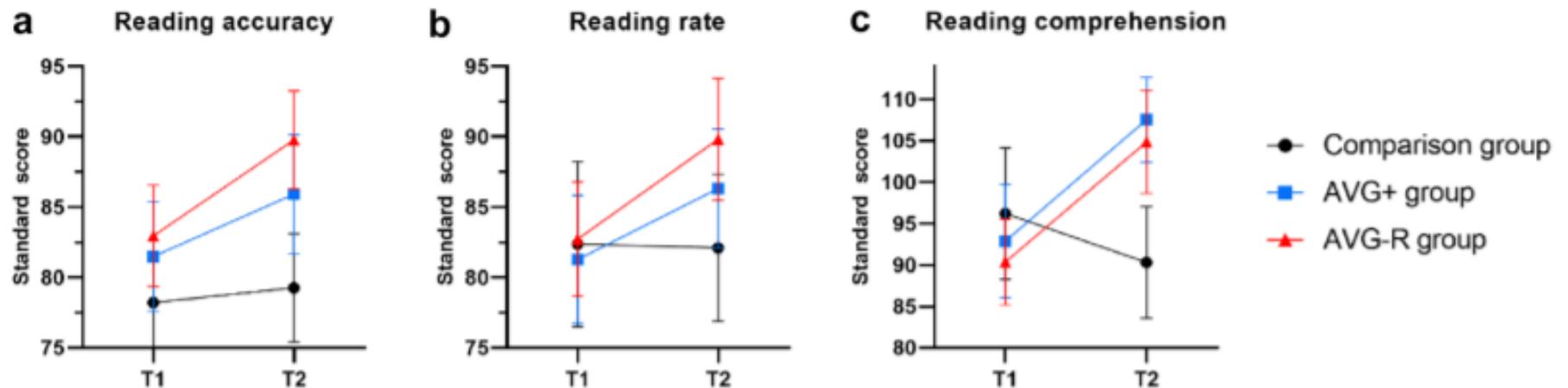
online: 19 July 2017

Sandro Franceschini<sup>1,2</sup>, Piergiorgio Trevisan<sup>3</sup>, Luca Ronconi<sup>1,2,4</sup>, Sara Bertoni<sup>1</sup>, Susan Colmar<sup>5</sup>, Kit Double<sup>5</sup>, Andrea Facetti<sup>1,2</sup> & Simone Gori<sup>2,6</sup>

# scientific reports

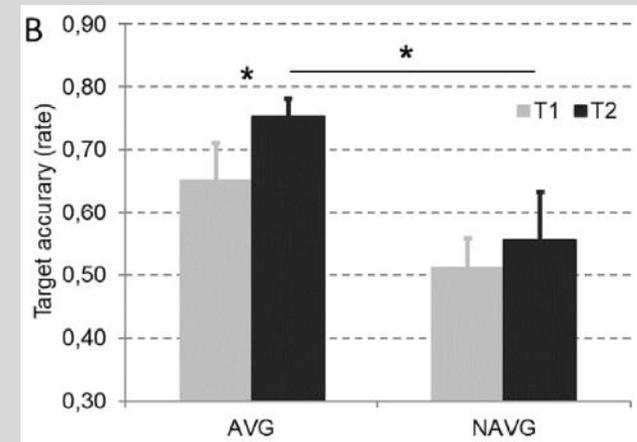
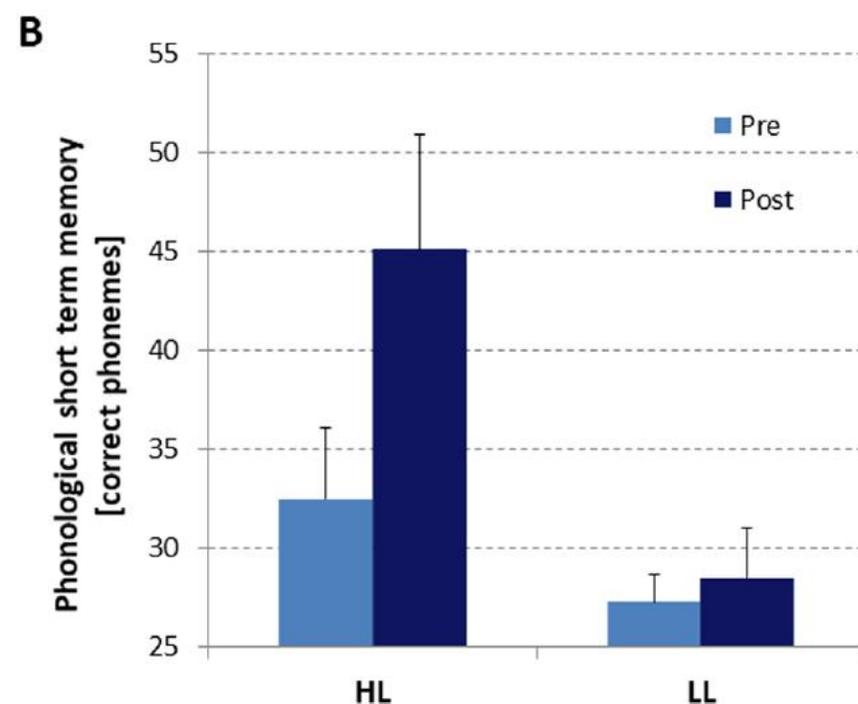
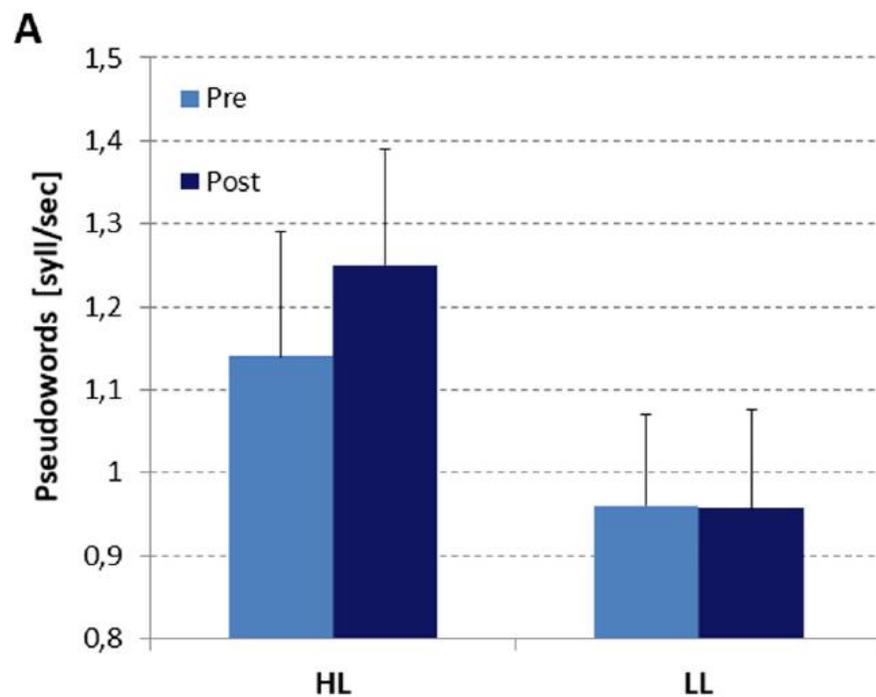
## OPEN Action video game training improves text reading accuracy, rate and comprehension in children with dyslexia: a randomized controlled trial

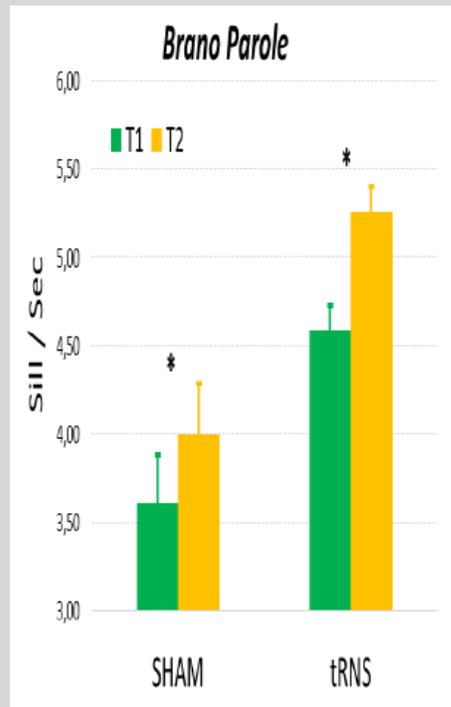
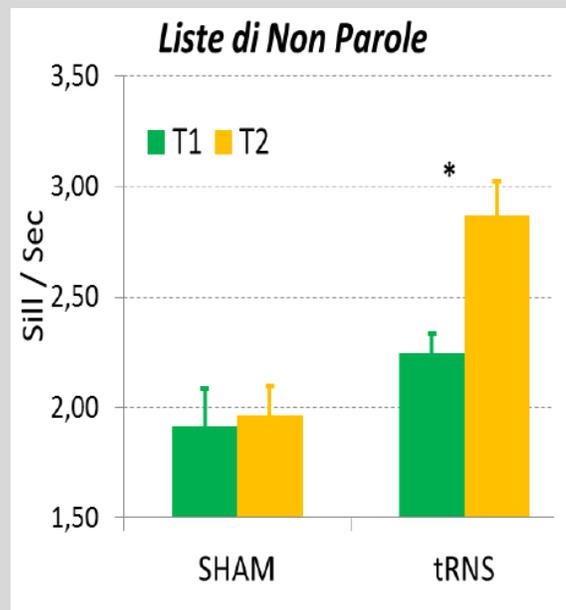
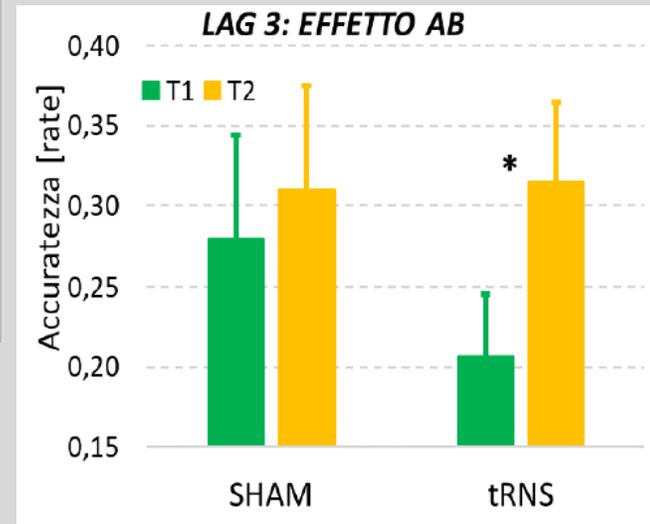
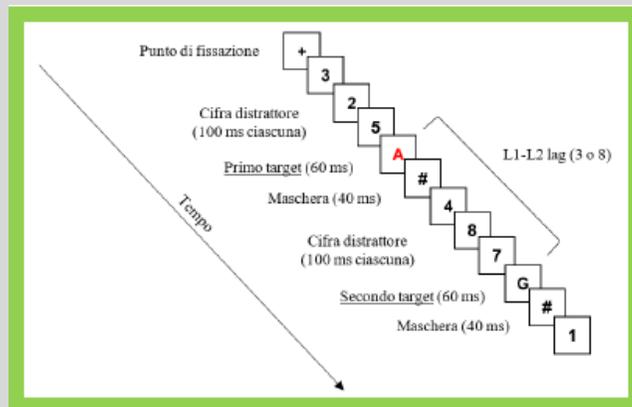
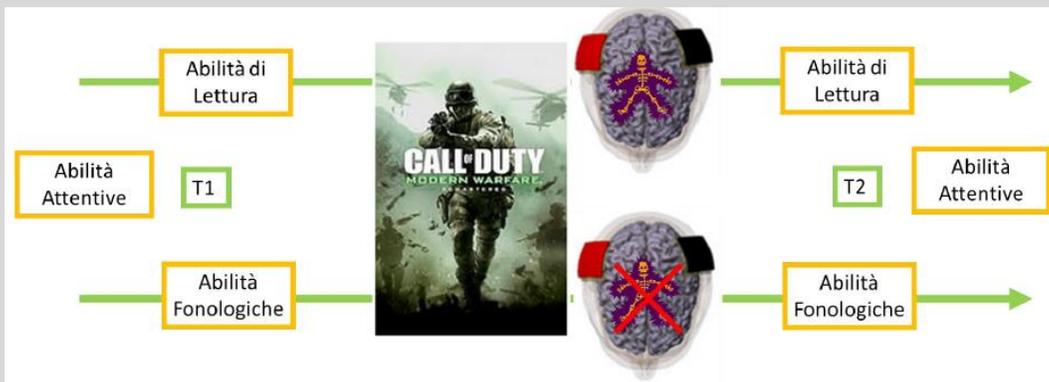
Jessica L. Peters<sup>1,✉</sup>, Sheila G. Crewther<sup>1</sup>, Melanie J. Murphy<sup>1</sup> & Edith L. Bavin<sup>1,2</sup>



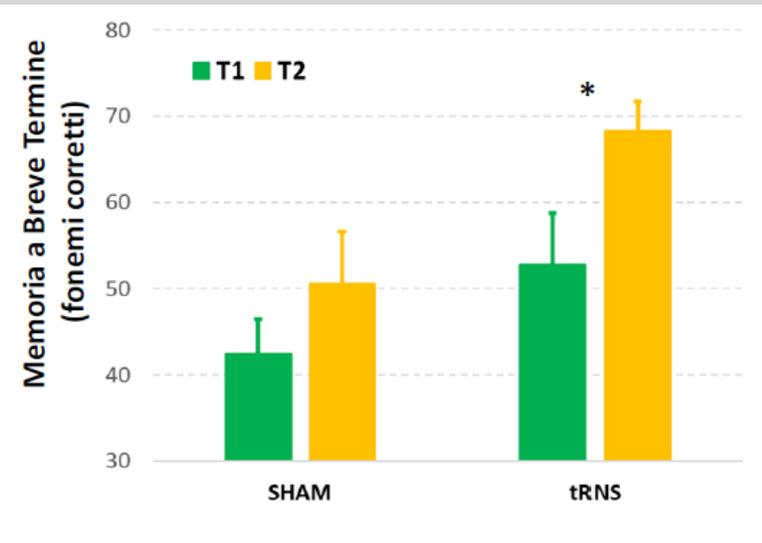
# Improving action video games abilities increases the phonological decoding speed and phonological short-term memory in children with developmental dyslexia

Sandro Franceschini  , Sara Bertoni  





| Non parole              | Numero fonemi corretti |
|-------------------------|------------------------|
| 2 sed - gam             |                        |
| 2 tul - sid             |                        |
| 3 fib - nup - gan       |                        |
| 3 rag - bil - sut       |                        |
| 4 tol - vus - rab - dig |                        |





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Cognition

journal homepage: [www.elsevier.com/locate/cognit](http://www.elsevier.com/locate/cognit)



Original Articles

Do enhanced states exist? Boosting cognitive capacities through an action video-game



Maria Kozhevnikov<sup>a,b,\*</sup>, Yahui Li<sup>a</sup>, Sabrina Wong<sup>a</sup>, Takashi Obana<sup>a</sup>, Ido Amihai<sup>a</sup>

Effetti temporanei  
post videogioco  
e il concetto di  
FLOW che ci  
porterebbe ad  
uno stato  
cognitivo  
aumentato

# E gli effetti a breve termine del gioco?

This research reports the existence of enhanced cognitive states in which dramatic temporary improvements in temporal and spatial aspects of attention were exhibited by participants who played (but not by those who merely observed) action video-games meeting certain criteria. Specifically, Experiments 1 and 2 demonstrate that the attentional improvements were exhibited only by participants whose skills matched the difficulty level of the video game. Experiment 2 showed that arousal (as reflected by the reduction in parasympathetic activity and increase in sympathetic activity) is a critical physiological condition for enhanced cognitive states and corresponding attentional enhancements. Experiment 3 showed that the cognitive enhancements were transient, and were no longer observed after 30 min of rest following video-gaming. Moreover, the results suggest that the enhancements were specific to tasks requiring visual-spatial focused attention, but not distribution of spatial attention as has been reported to improve significantly and durably as a result of long-term video-game playing. Overall, the results suggest that the observed enhancements cannot be simply due to the activity of video-gaming per se, but might rather represent an *enhanced cognitive state* resulting from specific conditions (heightened arousal in combination with active engagement and optimal challenge), resonant with what has been described in previous phenomenological literature as “flow” (Csikszentmihalyi, 1975) or “peak experiences” (Maslov, 1962). The findings provide empirical evidence for the existence of the enhanced cognitive states and suggest possibilities for consciously accessing latent resources of our brain to temporarily boost our cognitive capacities upon demand.

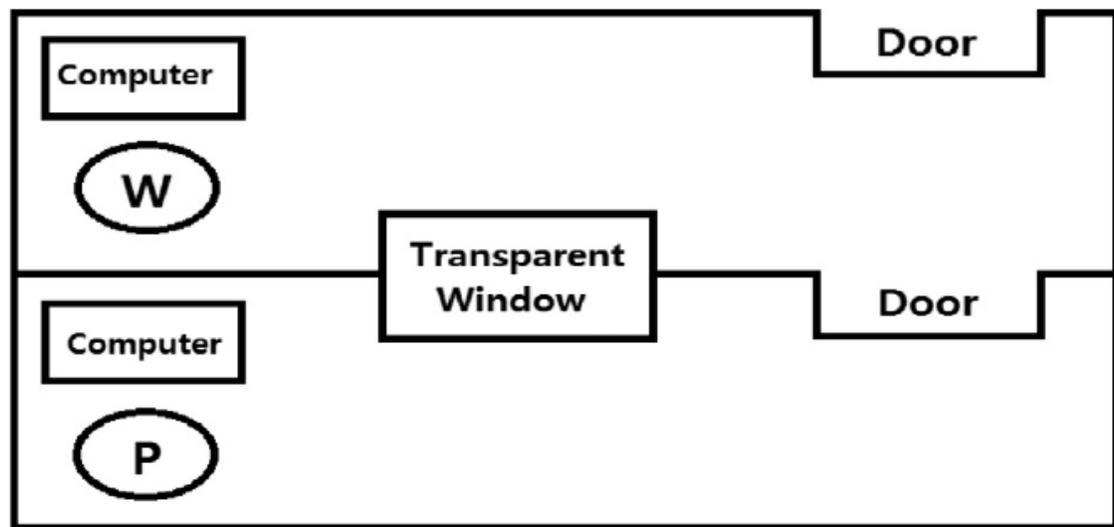
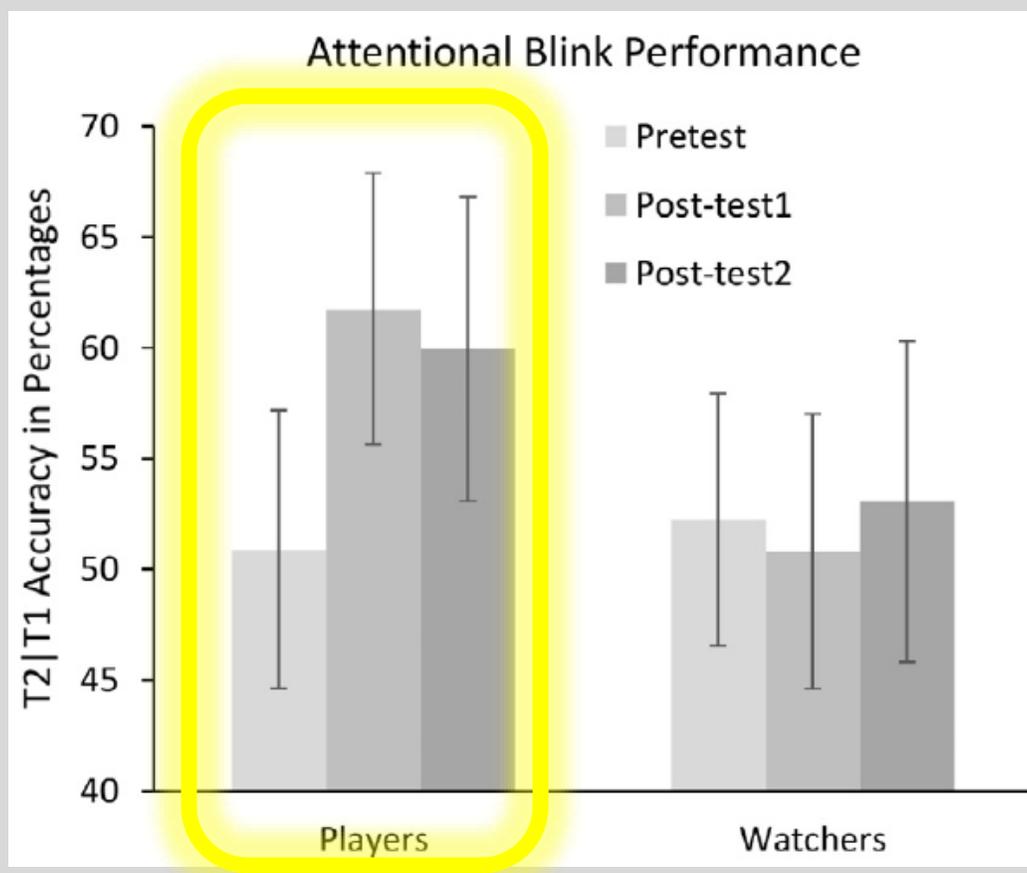
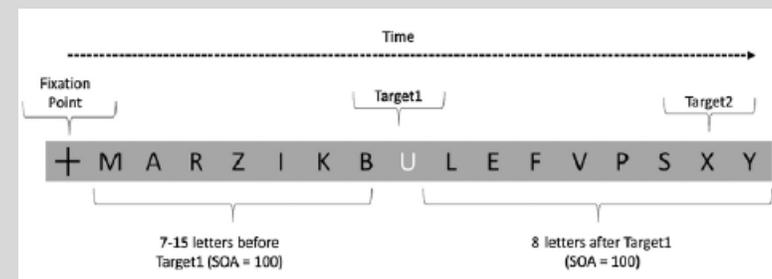


Fig. 2. Schematic drawing of the experimental lab set-up indicating where the players (“P”) and watchers (“W”) were seated.



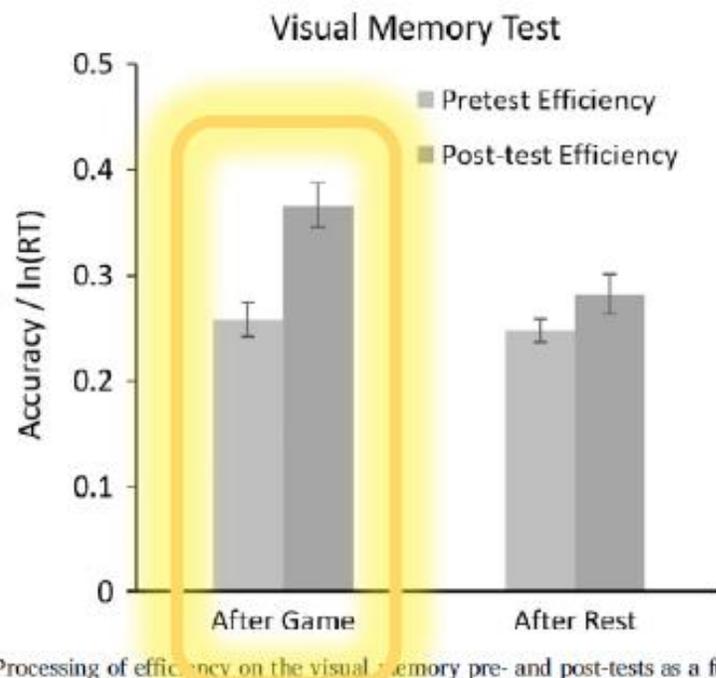
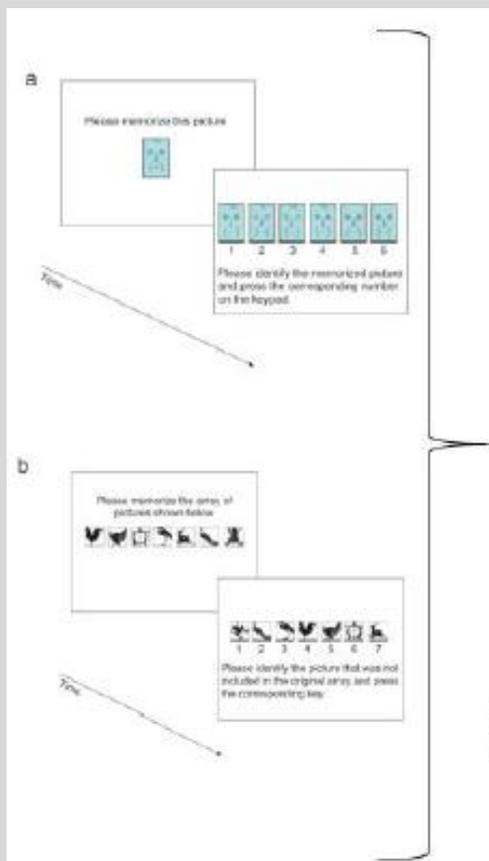
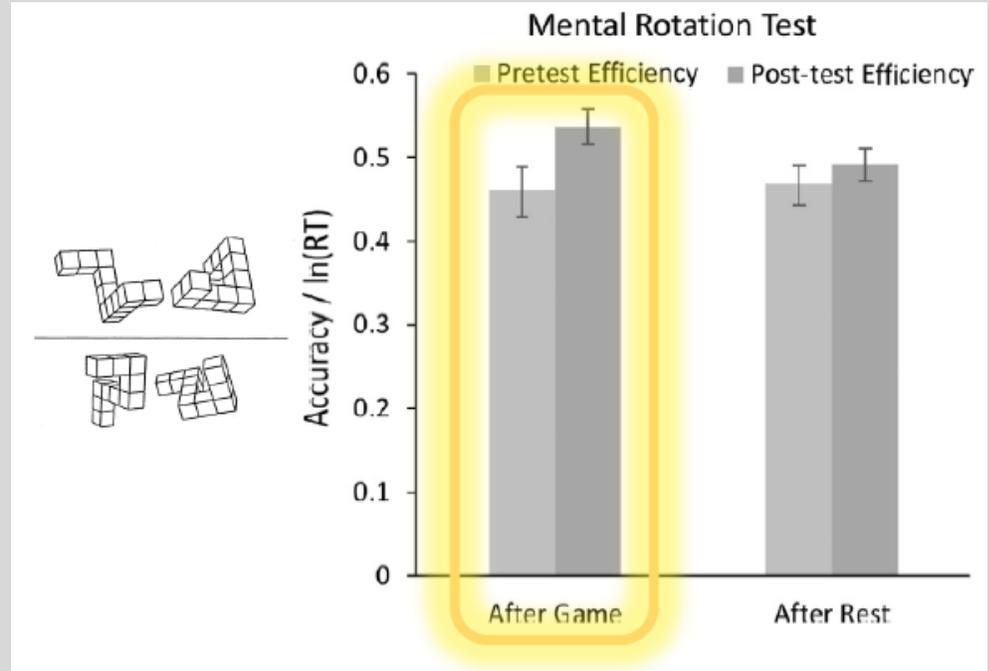
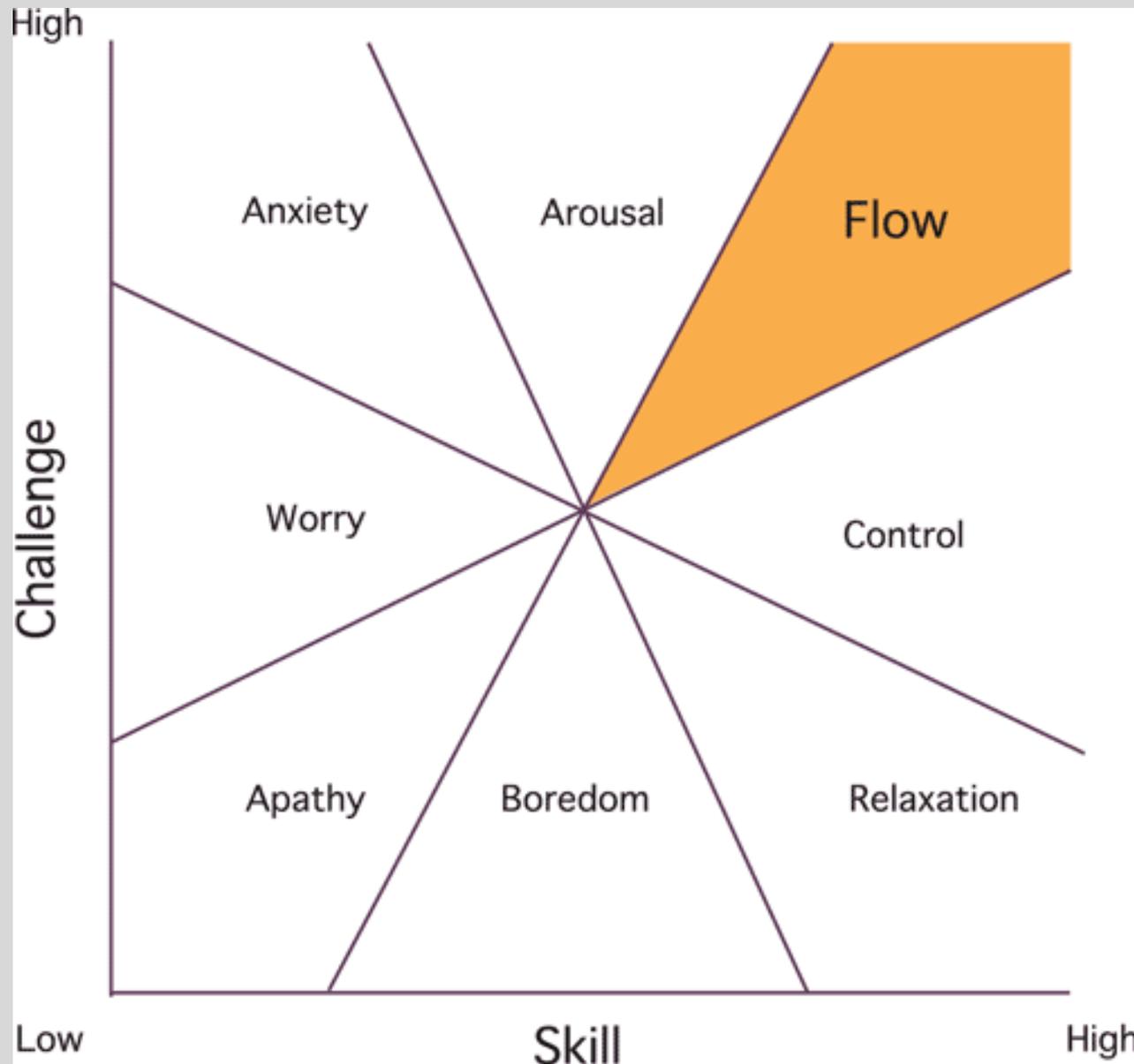


fig. 9. Processing of efficiency on the visual memory pre- and post-tests as a function of condition. Error bars show  $\pm 1$  SEM.





Cosa si intende per FLOW?

Csikszentmihalyi e Maslow lo hanno definito come:

- Stato in cui ci si sente energizzati ma non sotto sforzo
- In cui la consapevolezza è interamente focalizzata sull'attività in svolgimento e tutti gli stimoli che distraggono vengono ignorati
- Si perde la consapevolezza di sé e del trascorrere del tempo

Per poter indurre uno stato di flow bisogna che l'attività sia sfidante ma alla portata delle capacità della persona

Csikszentmihalyi (1975, 1990, 1997)



## Short-Term Effects of Video-Games on Cognitive Enhancement: the Role of Positive Emotions

Sandro Franceschini<sup>1,2</sup>  · Sara Bertoni<sup>1,3</sup> · Matteo Lulli<sup>4</sup> · Telmo Pievani<sup>5</sup> · Andrea Facoetti<sup>1</sup> 

### STUDIO 1

19 bambini della scuola  
primaria dalla classe seconda  
alla quinta  
Con diagnosi di dislessia e  
disturbo della coordinazione

### STUDIO 2

53 adulti età media 24 anni  
nessuna diagnosi

# STUDIO 1

7 days

7 days



T0  
Baseline  
evaluation



60 min  
AVG or NAVG



Evaluation



60 min  
NAVG or AVG



Evaluation



Videogioco  
Non d'Azione:  
Puzzle G

Videogioco  
d'Azione:  
Shooting G

# STUDIO 1

## Evaluation

On a 9-point scale: how “difficult” and “funny” the game just played was. Children have to evaluate their emotional states (e.g., “upset”, “happy” & “vivacious”).



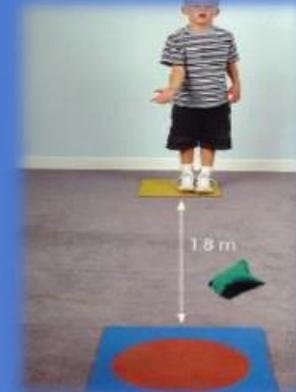
Placing Pegs



Catching with One Hand



Standing on One Leg



Throw a Bean Bag into a Box

Word list

Pseudoword list

Pseudoword text

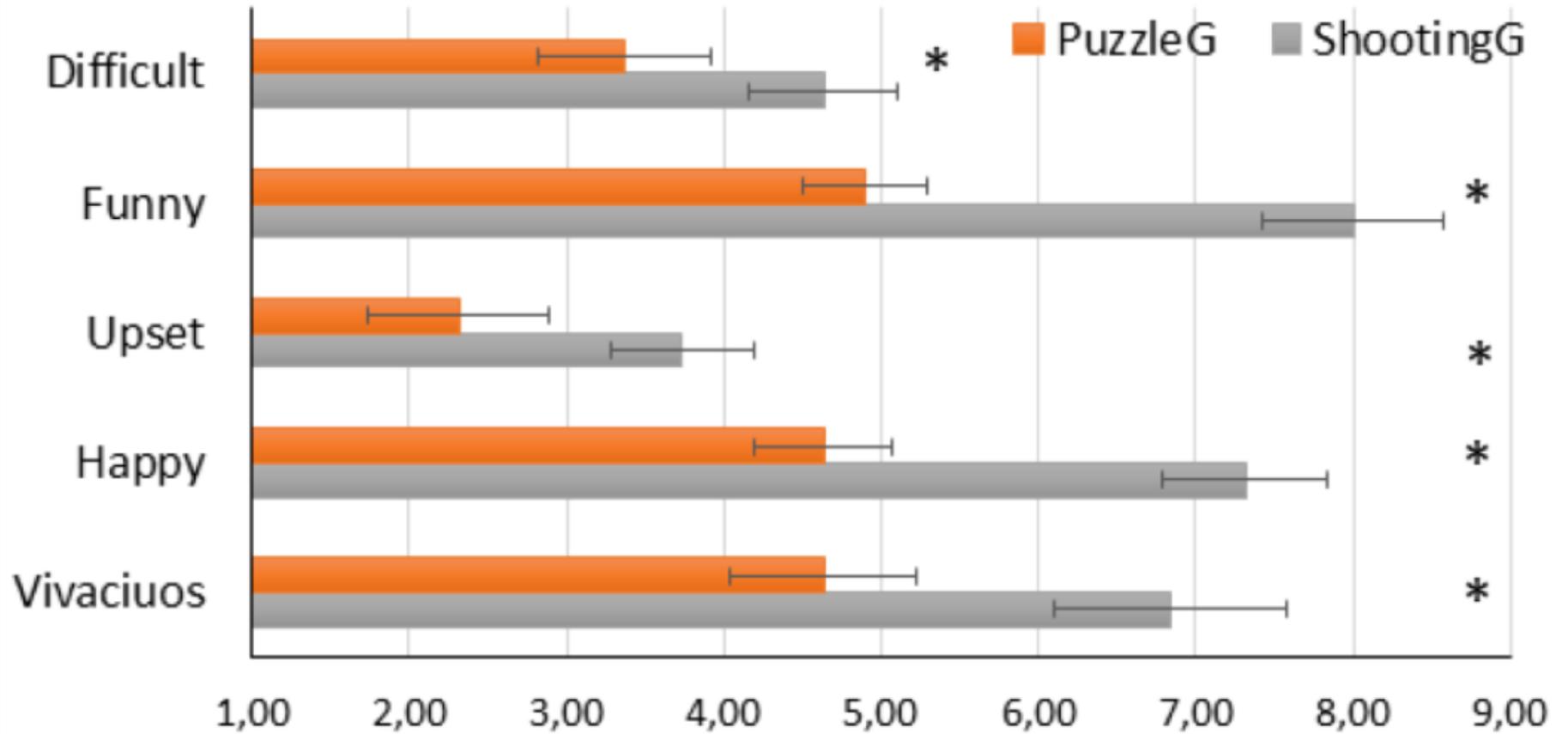
PuzzleG



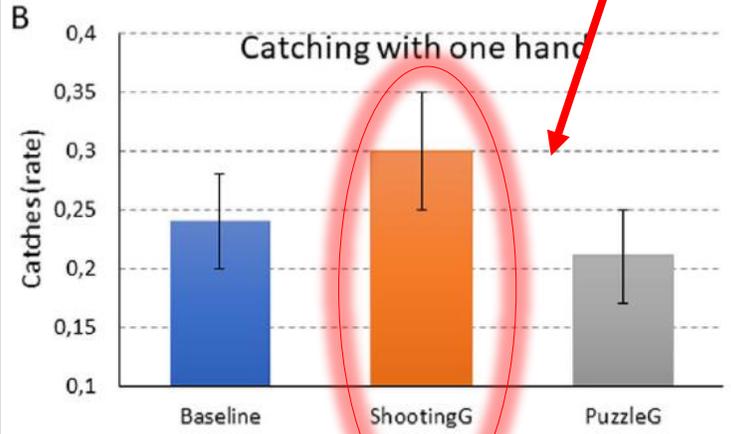
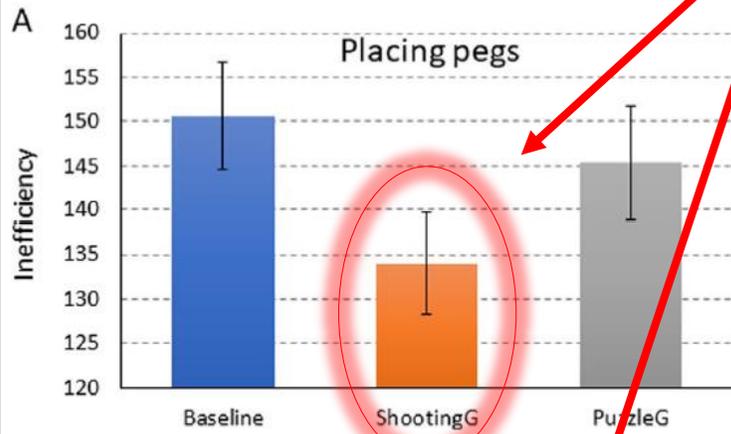
ShootingG

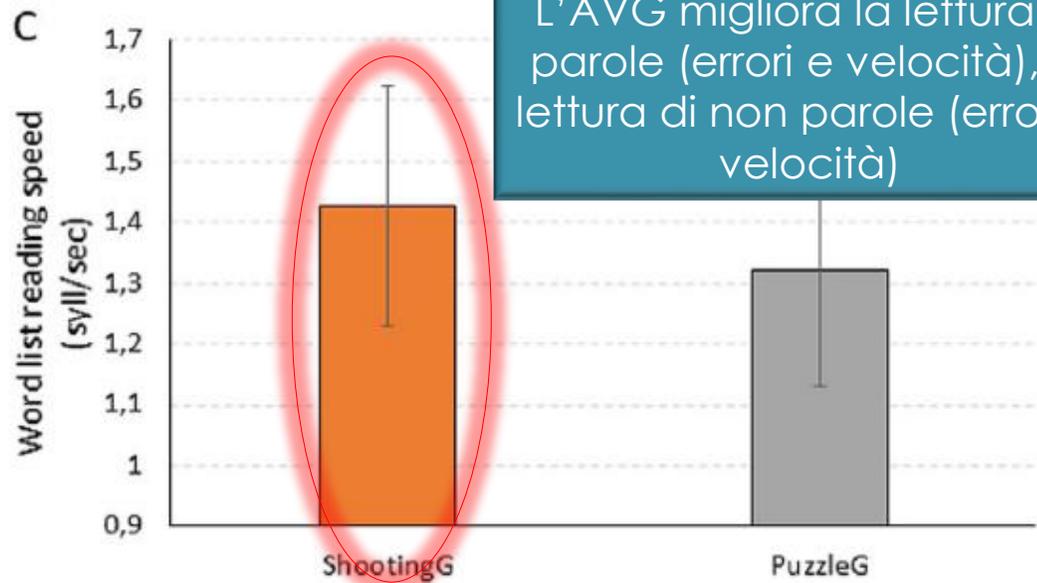
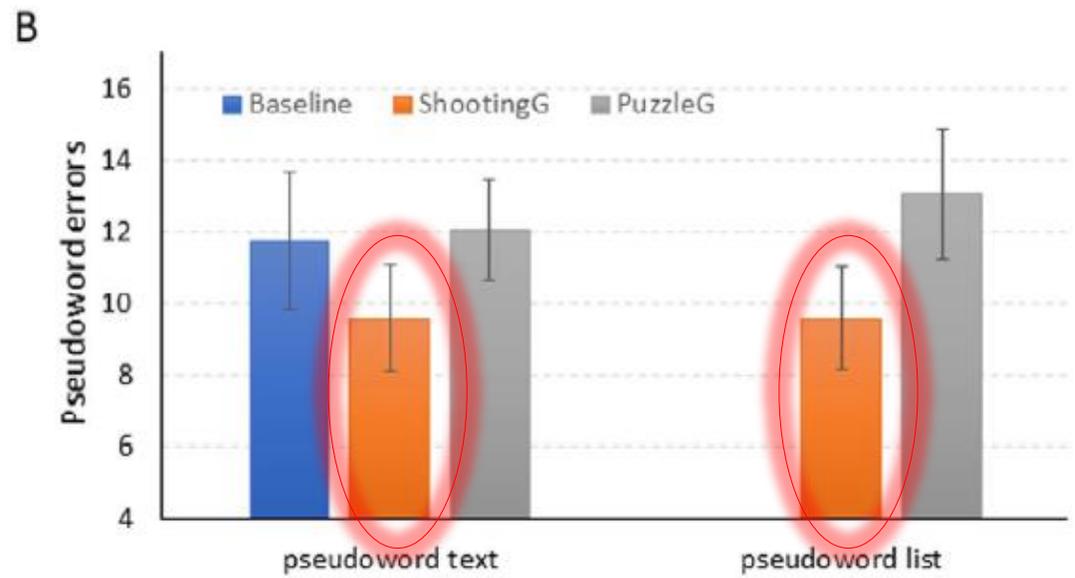
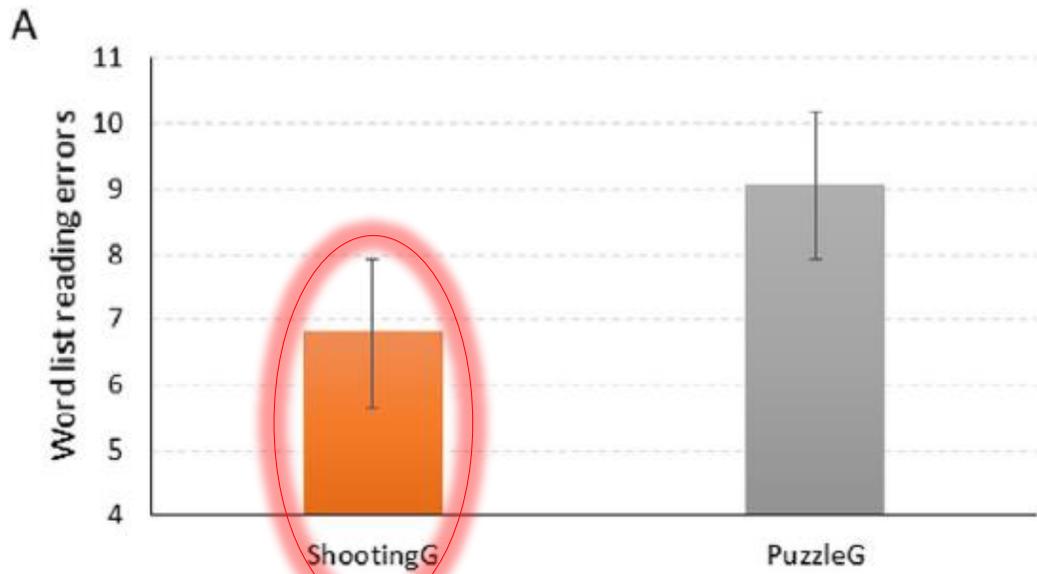


## A Experiment 1: Children with DCD and DD

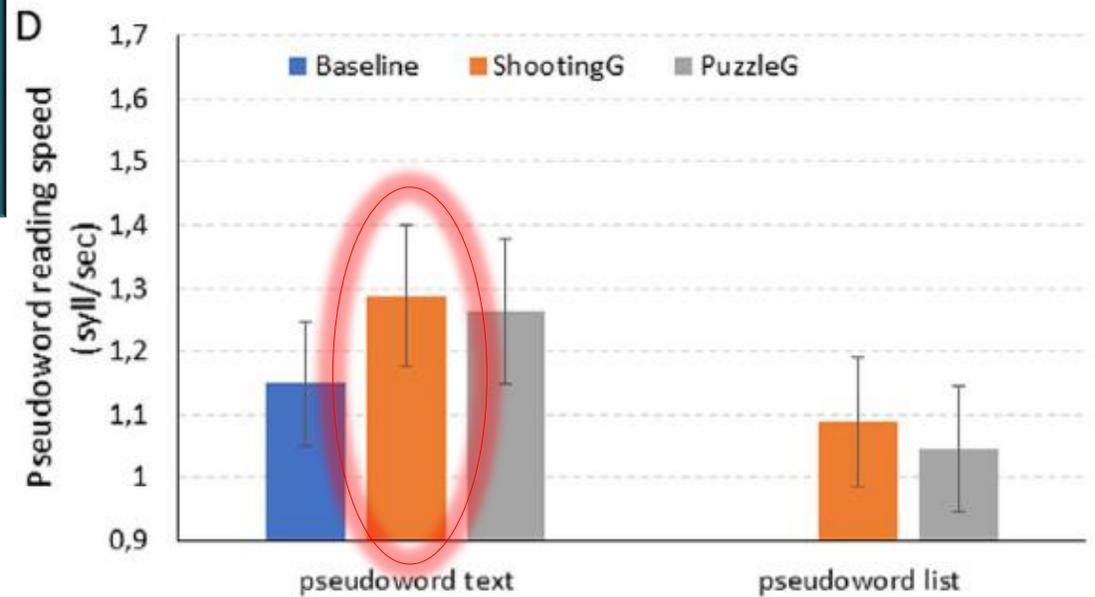


L'AVG migliora tutti i compiti sensorimotori, tranne l'equilibrio

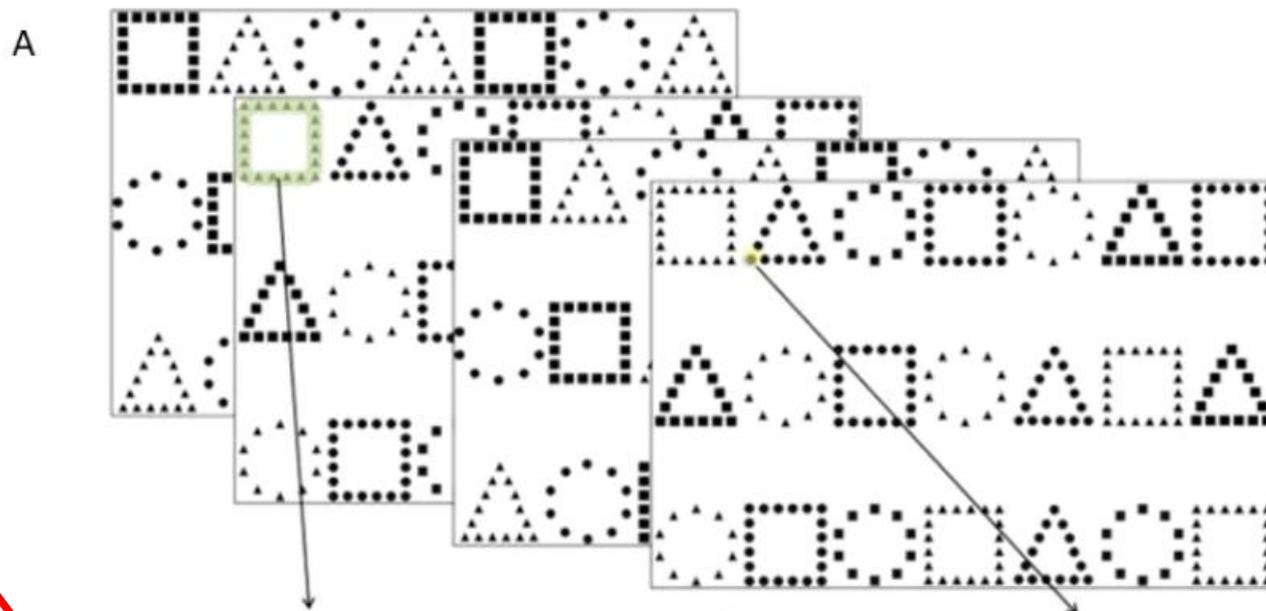




L'AVG migliora la lettura di parole (errori e velocità), la lettura di non parole (errori e velocità)

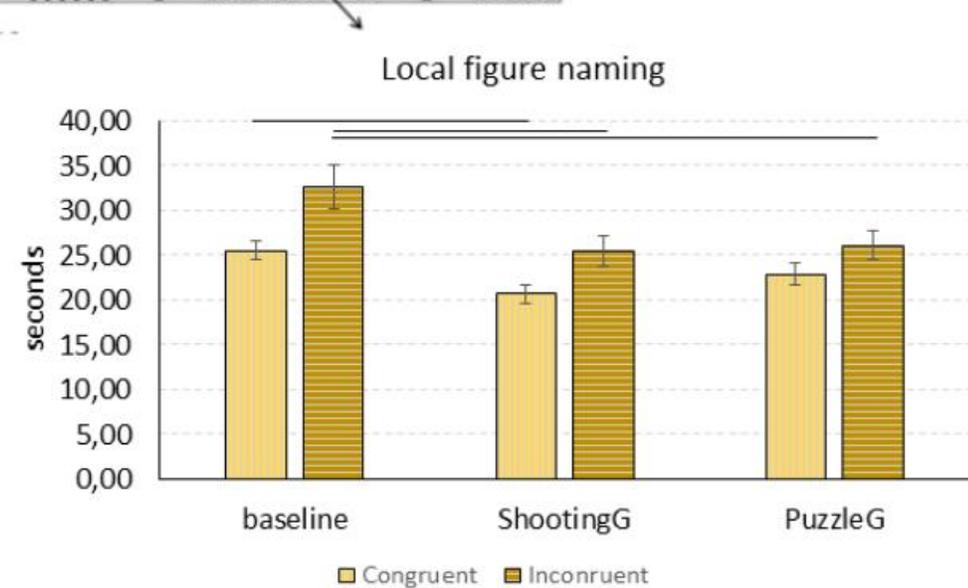
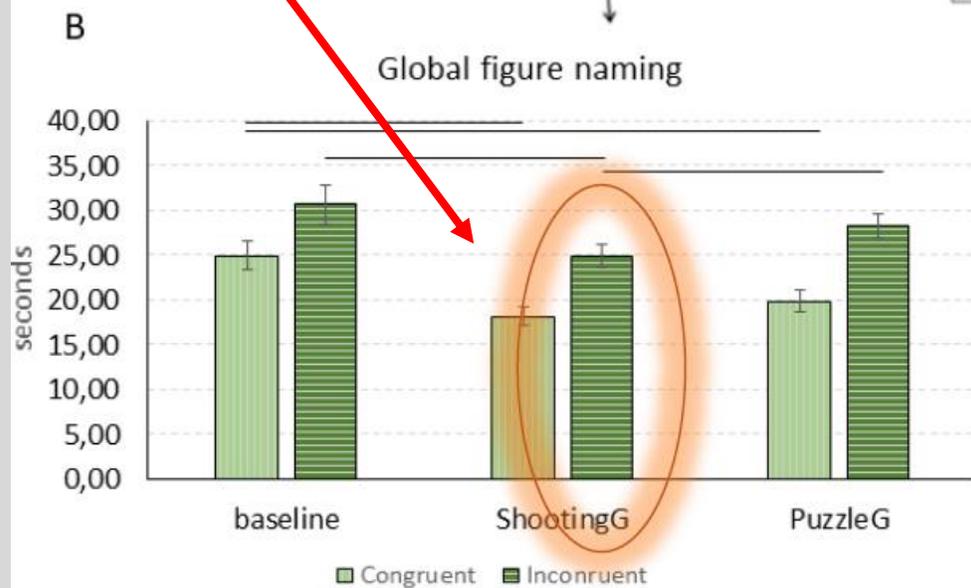


Migliora la percezione globale dopo l'action video game



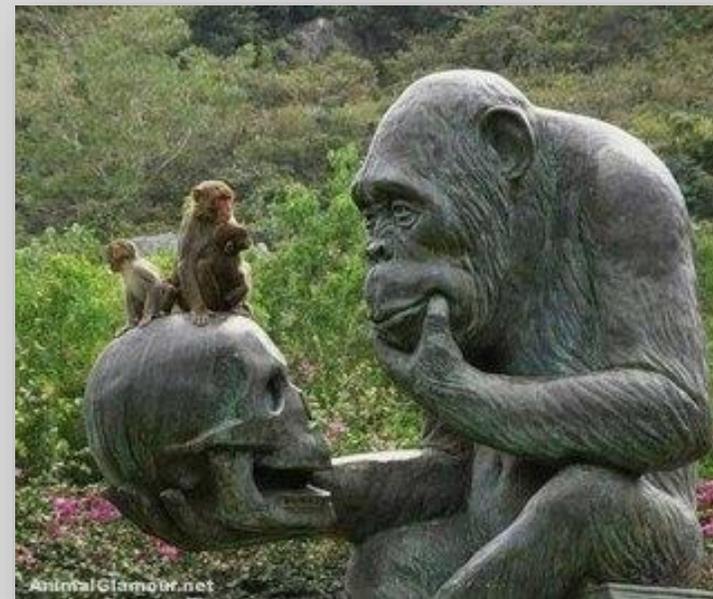
Global figure naming

Local figure naming



## STUDIO 1

Il videogioco d'azione è considerato il più divertente e si trovano miglioramenti nelle diverse abilità cognitive in seguito a questo gioco ma viene un dubbio...



Ma quindi è il tipo di gioco o il divertimento???

# STUDIO 2

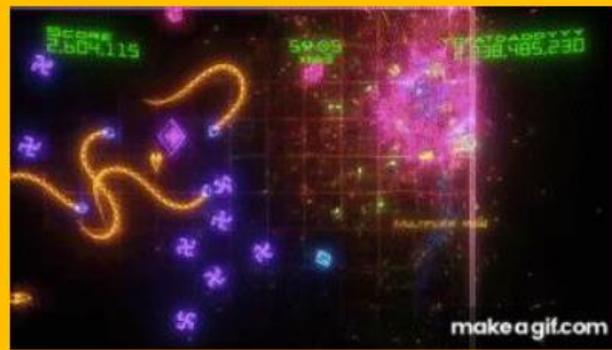
7 days



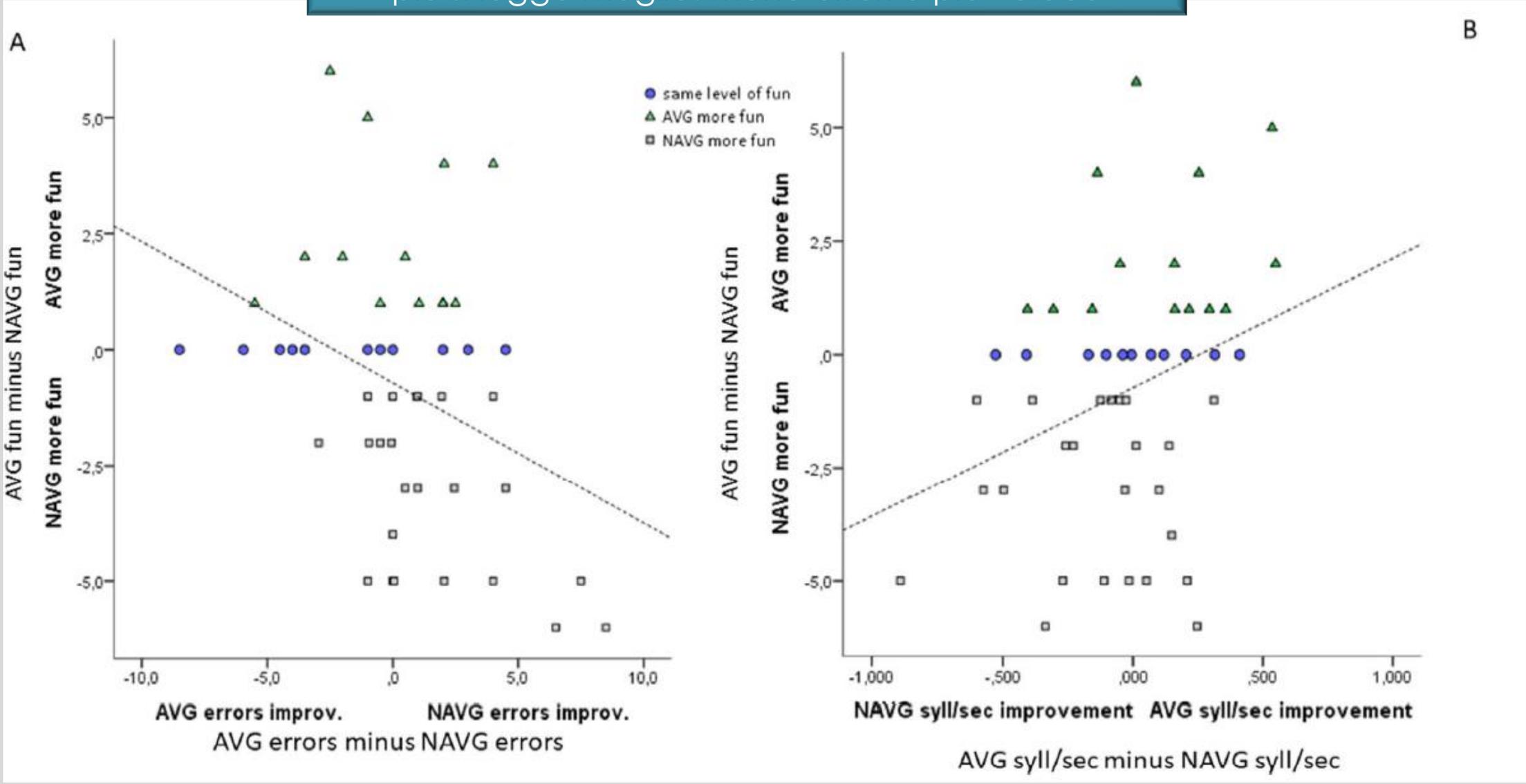
Non Action videogame  
Dead or alive 5



Action videogame  
Geometry Wars:  
Galaxies



A prescindere dal tipo di gioco, dove ci si diverte di più si legge meglio: meno errori e più veloce



## STUDIO 2

Quindi il tipo di gioco non importa,  
è tutto divertimento!

Ma ne siamo sicuri???





## L'ampliamento del fuoco dell'attenzione nel potenziamento cognitivo indotto dal gioco

Giovanna Puccio<sup>1</sup>, Sara Bertoni,<sup>1,2</sup> Sandro Franceschini<sup>1,3</sup> & Andrea Facchetti<sup>1</sup>

1 Università degli Studi di Padova

2 Università degli Studi di Bergamo

3 Università degli Studi dell'Insubria



Obiettivo:

Studio degli effetti a breve termine del divertimento provato durante una sessione di gioco con un videogioco d'azione e un gioco da tavola sulle abilità cognitive



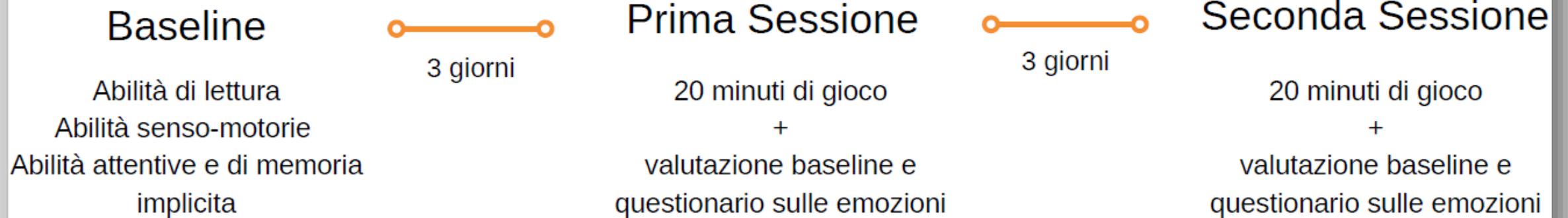
## Partecipanti:

Bambini della scuola primaria classe prima

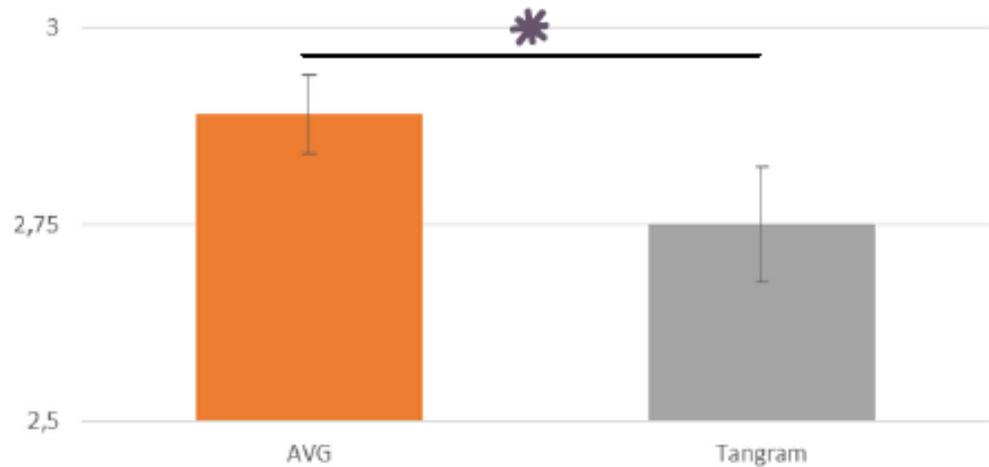
Raccolta dati nei mesi di Maggio – Giugno

Campione di 18 bambini

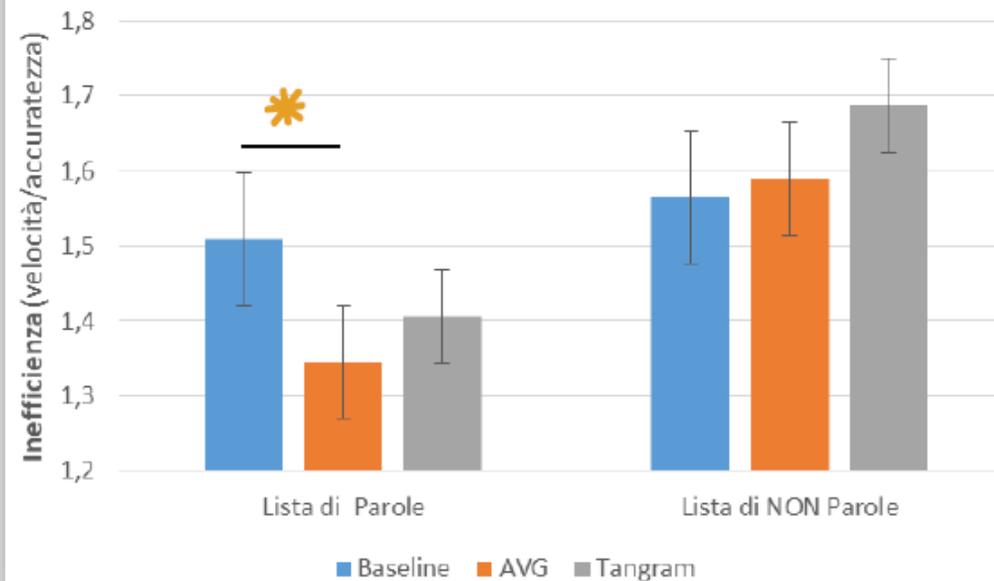
### Metodo



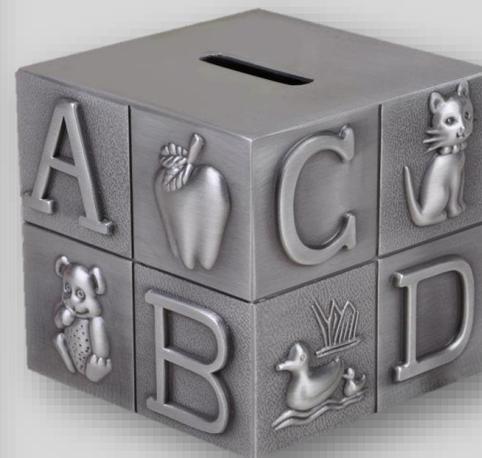
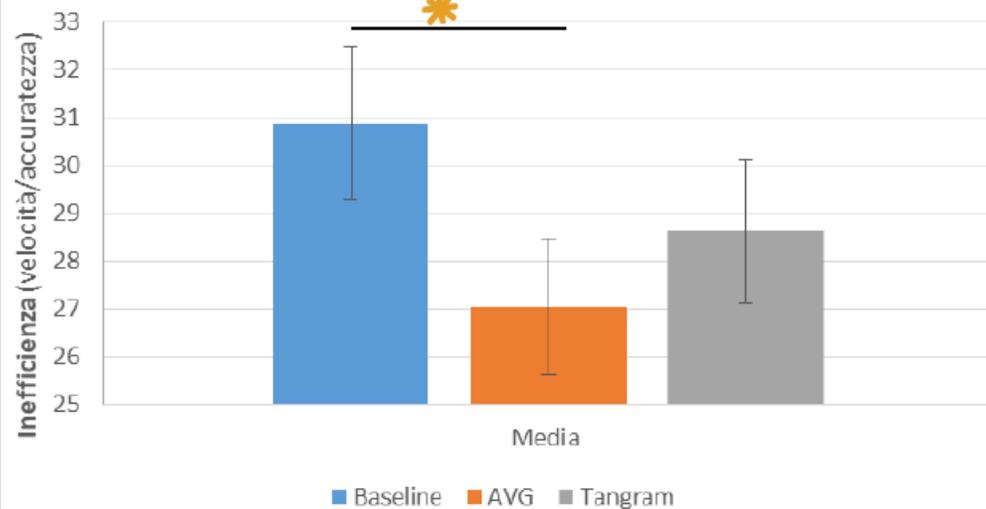
### Divertimento e grado di Attivazione auto-percepita



### Abilità di Lettura



### Abilità Sensori-Motorie





PNAS **Positive affect increases the breadth of attentional selection**

G. Rowe\*, J. B. Hirsh\*, and A. K. Anderson\*\*†

The present study examined the thesis that **positive affect may serve to broaden the scope of attentional filters, reducing their selectivity**. The effect of positive mood states was measured in two different cognitive domains: semantic search (remote associates

Uno stato emozionale positivo sarebbe in grado di allargare il fuoco dell'attenzione, di conseguenza il materiale che si può elaborare è maggiore permettendo una elaborazione più globale della scena

Emozioni

Caratteristiche del gioco

Neuron

**Review**

**Enhancing Attentional Control: Lessons from Action Video Games**

Daphne Bavelier<sup>1,2,\*</sup> and C. Shawn Green<sup>3</sup>

mands. This shift may **affect the spatial resolution of attention**, as when **switching between a distributed versus a focused attentional state**, or its temporal resolution, as when switching between allocating one's attention over a short versus a long time-scale. In all cases, enhanced attentional control leads to a better ability to focus on task-relevant information.

I videogiochi d'azione permettono di essere più rapidi nel passaggio da un fuoco largo a un fuoco stretto attento e permette di adattarsi rapidamente al compito che si deve eseguire

## Scale of attentional focus in visual search

P. M. GREENWOOD and RAJA PARASURAMAN  
Catholic University of America, Washington, D.C.

Modulare la dimensione del fuoco in modo «meccanico» prima della comparsa degli elementi (target e distrattori), peggiora la velocità di ricerca visiva tanto più grande è il cue (tanto più l'attenzione viene allargata) e soprattutto quando vi sono molti distrattori (condizione più difficile)

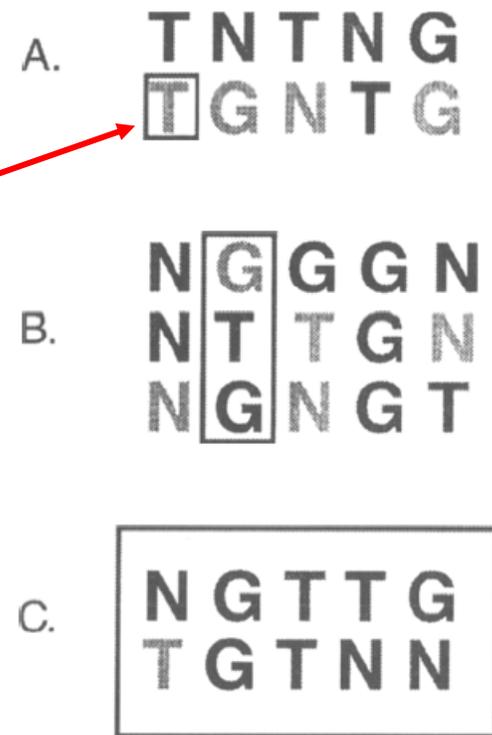
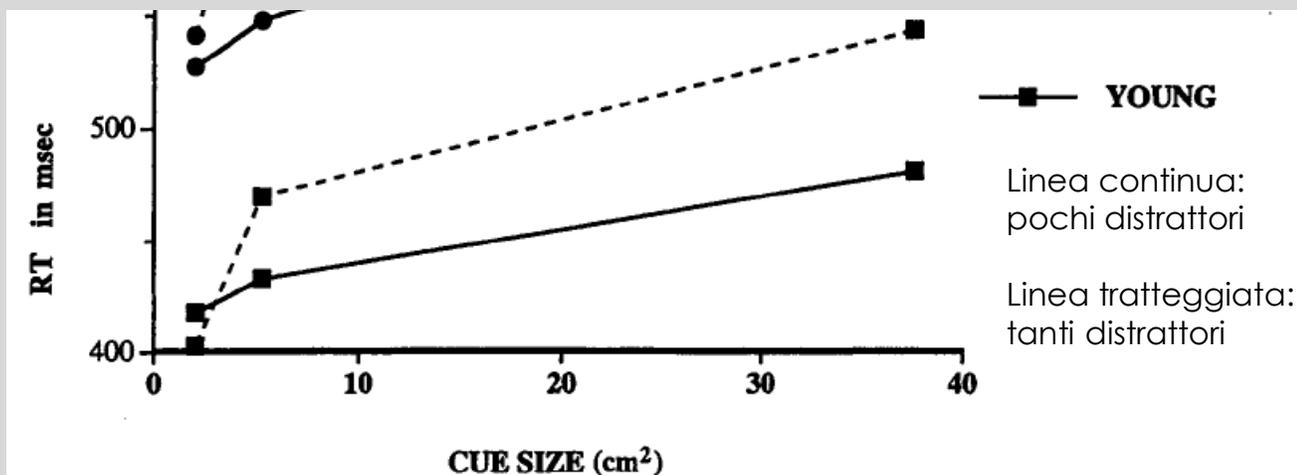
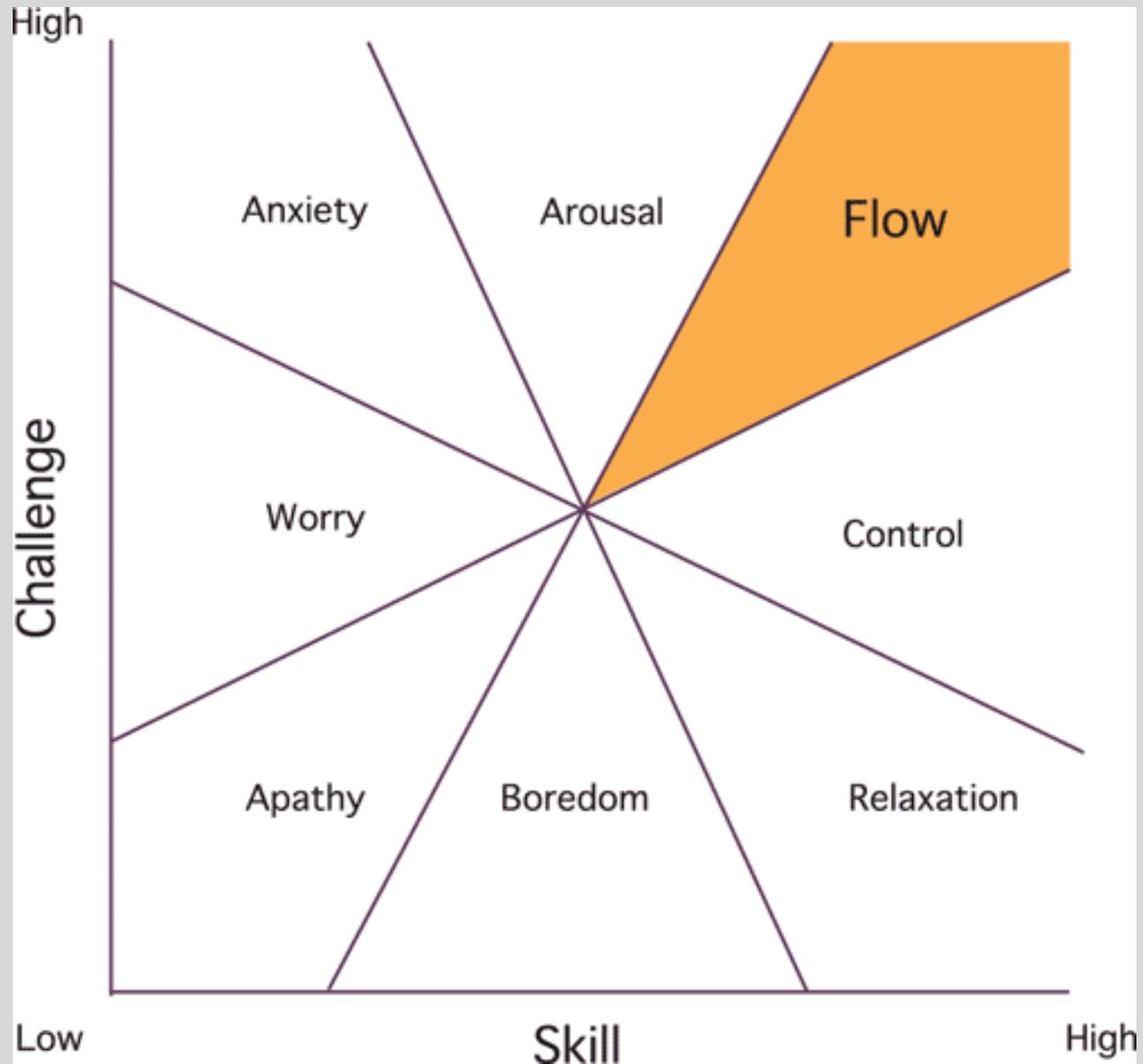


Figure 1. Examples of displays used in Experiment 1, but with shades of gray substituted for color. Light gray represents pink, medium gray represents blue, and black represents green. Panel A: Conjunction search with a valid, element-sized precue in a 10-letter array. Panel B: Conjunction search with an invalid, column-sized precue in a 15-letter array. Panel C: Feature search with a valid, array-sized precue in a 10-letter array.



Take home message:  
Il divertimento è fondamentale e le emozioni le dobbiamo considerare, ma dobbiamo considerare anche le caratteristiche «strutturali» del trattamento per poter ottenere la condizione migliore di stimolazione

Attività sfidante ma adatta alle abilità dell'individuo



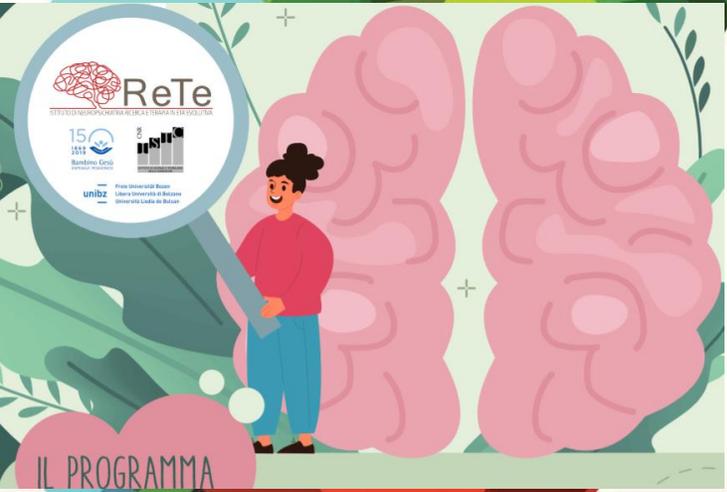
Abbiamo da pochi giorni  
terminato la raccolta dati sugli  
effetti a breve termine del gioco in  
bambini prescolari...



«E ADESSO COSA FACCIAMO?»  
Cit. Emma

19/22  
GENNAIO 2022

GIORNATE DI  
NEUROPSICOLOGIA  
DELL'ETÀ EVOLUTIVA  
XVII EDIZIONE



IL PROGRAMMA

GRAZIE PER  
L'ATTENZIONE!

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