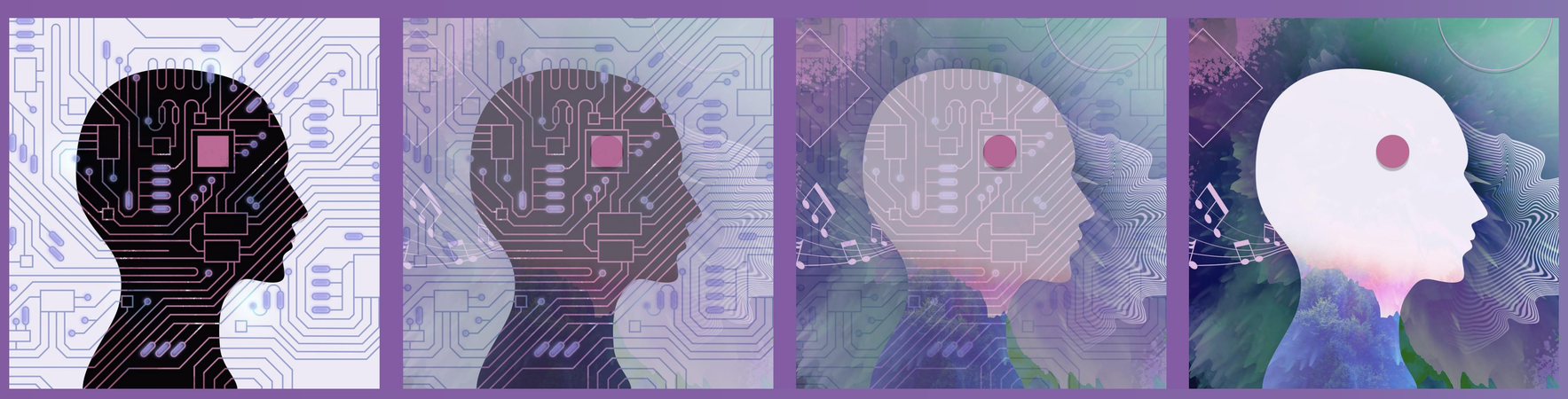
Binocular Rivalry Priming Reveals the Dynamics of Mental Imagery

Ágnes Welker[1,2], Orsolya Pető-Plaszkó[1], Ferenc Gombos[3,4], István Winkler[1], Ilona Kovács[3,5]



[1] *HUN-REN Research Centre of Natural Sciences Budapest, Hungary*
[2] *Semmelweis University Doctoral School, Division of Mental Health Sciences, Hungary*
[3] *HUN-REN-ELTE-PPKE Adolescent Development Research Group Budapest, Hungary*
[4] *Laboratory for Psychological Research, Pázmány Péter Catholic University, Budapest, Hungary*
[5] *Institute of Psychology Eötvös Loránd University Budapest, Hungary*

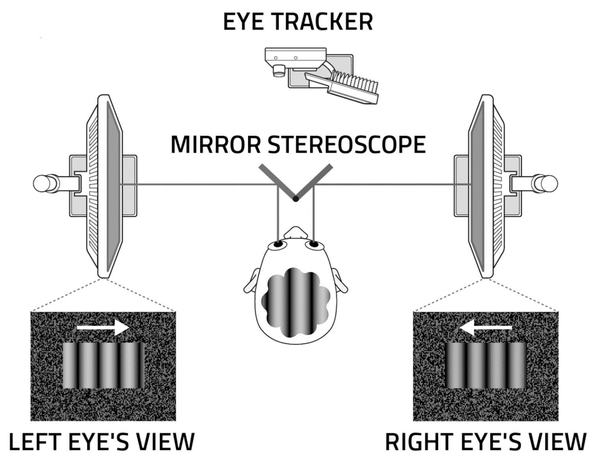
afantazia.kutatas@gmail.com

GOAL: to assess the vividness of visual mental imagery beyond self-reports

- We have recently shown the decline of imagery vividness with age using a questionnaire (Vividness of Visual Imagery, VVIQ). Gulyas et al, Cortex, 2022
- More objective methods, e.g., imagery priming in binocular rivalry still rely on self-report of the perceived stimulus Pearson et al, Psych Sci, 2011
- Here we introduce a **'no report' version of rivalry with imagery priming**.
- We also test the effectiveness of **visual versus propositional imagery priming**.

METHODS

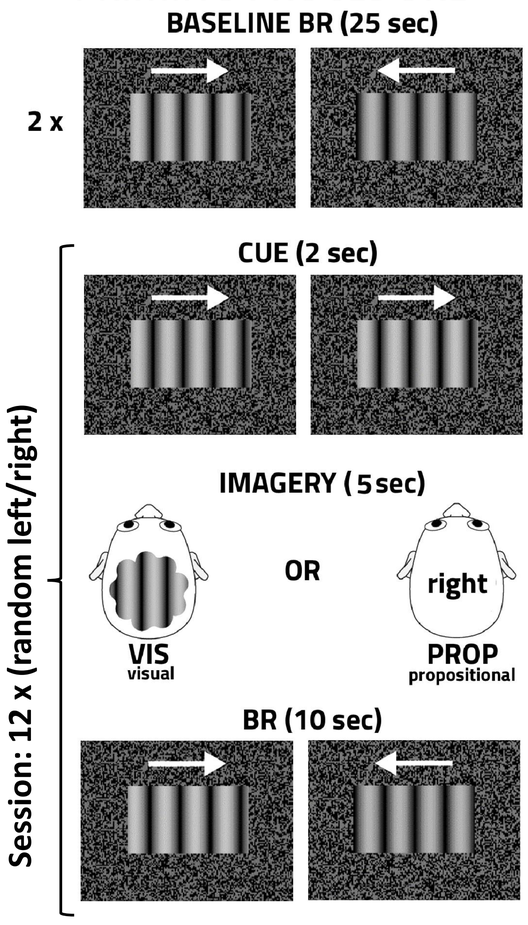
BR-OKN 'no-report' PARADIGM



viewing angle: 15.2° x 8.4°, SF: 0.26 cycles/°
contrast: 50%, motion speed: 1600 pix/s

Frässle et al., J Neurosci, 2014, Aleshin et al, J Vis. 2019
Ziman et al, Sci Rep, 2022

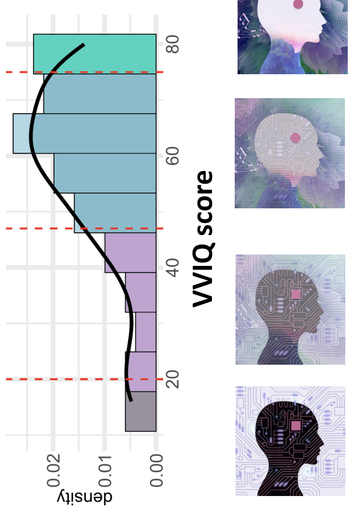
PRIMING PROCEDURE



2 sessions with a 10 min break

RPD (Ratio of Prime Direction):
ratio of eye-movements in the direction of the primed grating during the first 2 s of unmixed perception

Distribution of VVIQ scores



75-80 hyperphantasia

48-74 typical imagery

20-47 hypophantasia

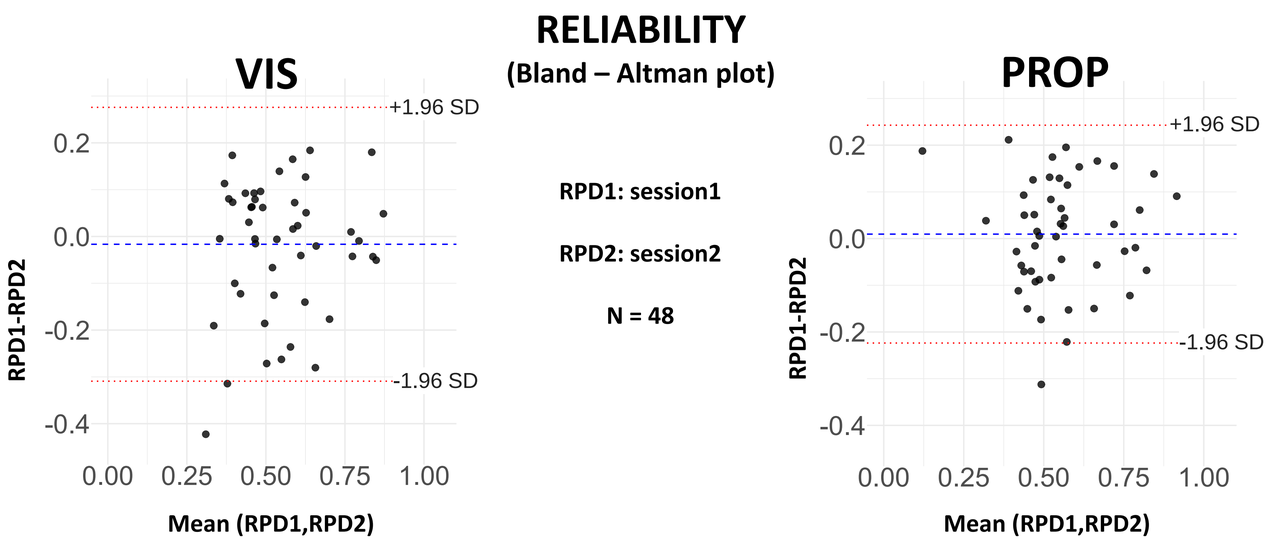
16-19 aphantasia

Marks 1973, Gulyás et al, Cortex 2022, Reeder et al, J Vis 2022

PARTICIPANTS

n=71, mean age: 21.9 (SD=3.9), f: 85.9%
Ocular Dominance Index < 0.25

RELIABILITY (Bland – Altman plot)

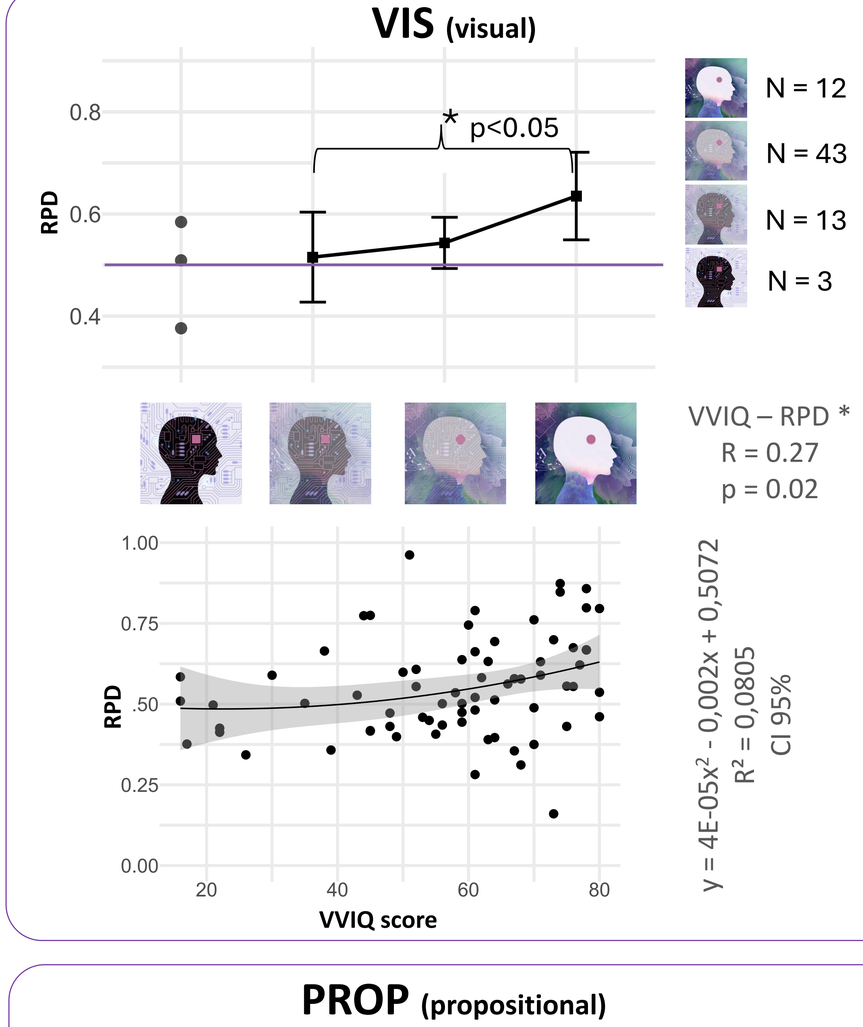


Pearson correlation r: 0.62 p<0.001

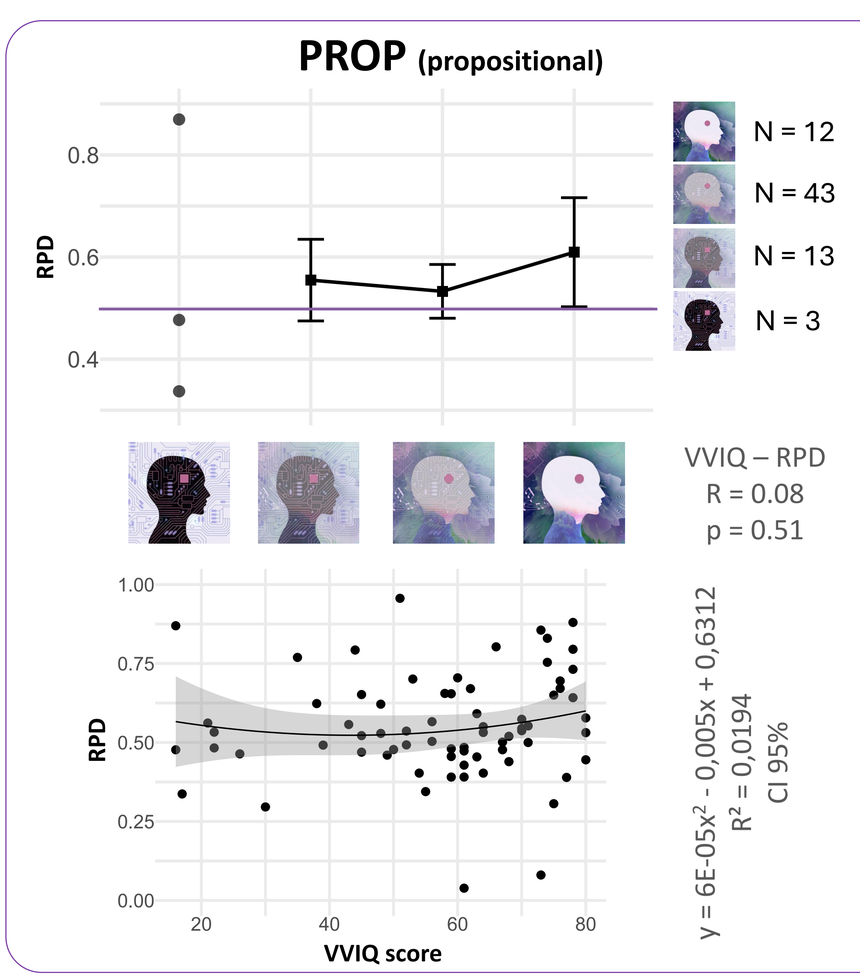
Pearson correlation r: 0.72 p<0.001

RESULTS

VIS (visual)



PROP (propositional)



VIS vs. PROP

VVIQ correlates significantly stronger with VIS than with PROP.
VIS – PROP : R = 0.59 ***

CONCLUSIONS

The new tool is reliable and may assess vividness of visual imagery well (BR modulation by VIS priming is stronger in hyperphantasia than in hypophantasia).

The results are inconclusive in the middle vividness range which might be related to VVIQ issues. Further, more objective correlates are necessary for more precise assessment.

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