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THE
Tuscany Health Ecosystem

A BIRD'S EYE VIEW ON MY RESEARCH INTERESTS SO FAR

Nov 22, 2024

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2011	M.Sc. Psychology (Neuropsychology) University of Milan – Bicocca
2012	Clinical Research Assistant Italian Auxological Institute, Milan
2013 (-2016)	Ph.D., Psychology University of Padua
2015	Visiting Ph.D. student INSERM U1028 & University of Lyon
2016 (-2020)	PRESTIGE + MSCA Fellow INSERM U1028 & University of Lyon
2020(-2022)	Senior (type B) Postdoc Fellow University of Padua
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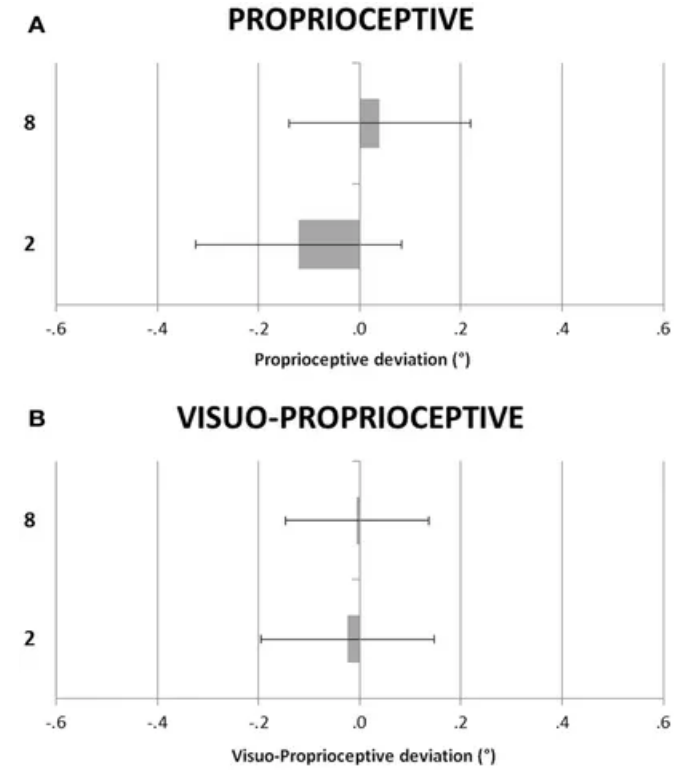
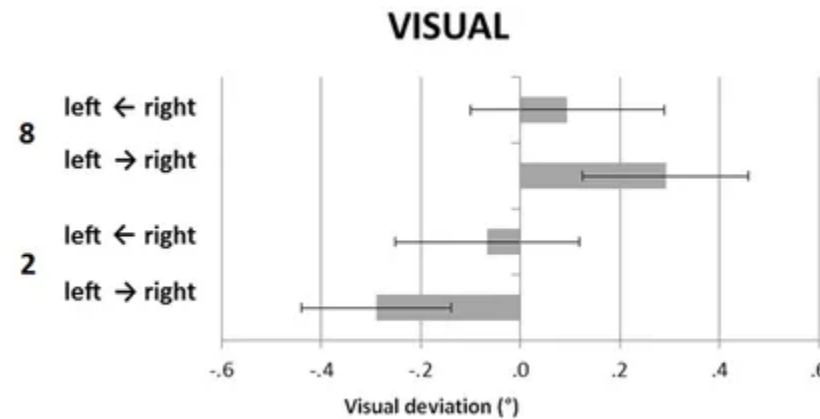
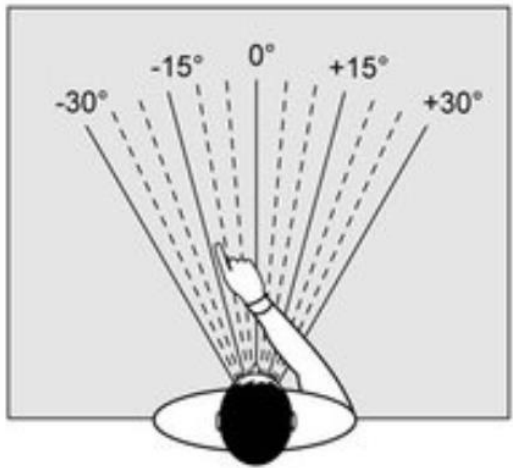


- Numbers and Space
- Spatial Neglect
- Machine learning for neuroimaging
- Peripersonal Space
- Pupillometry
- Interoception and motivation

Numbers and Space

Evidence of bidirectional interactions between number processing and spatial attention

Numbers ► Space

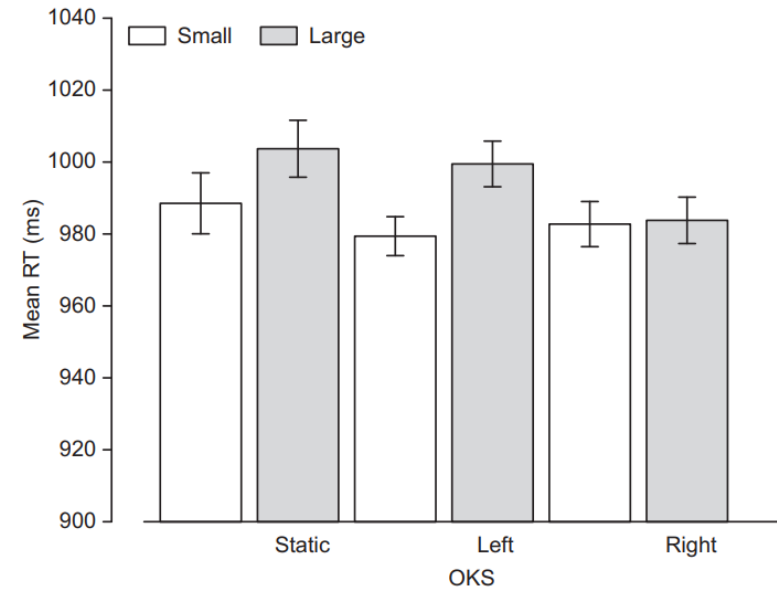
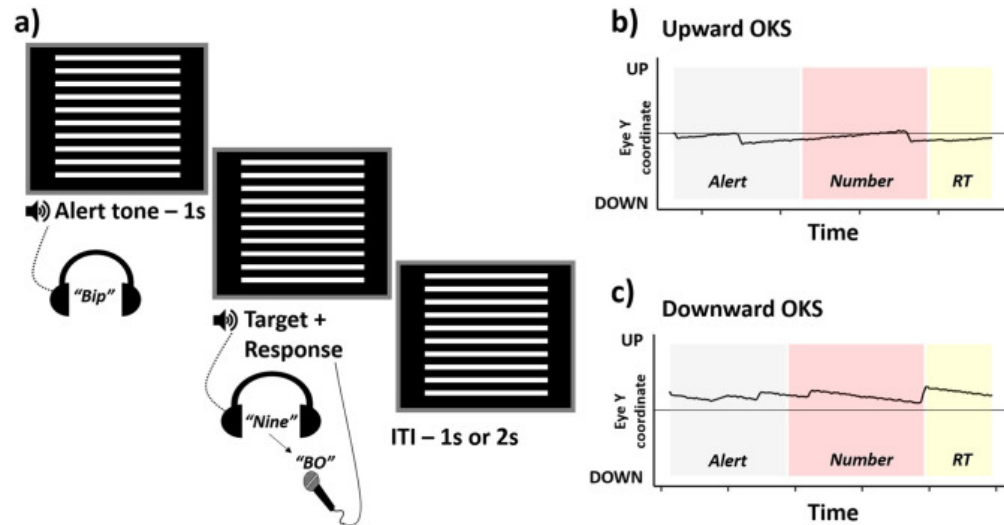


If numbers bias spatial attention in extrapersonal, visual coordinates, bodily frames of reference are much more resilient.

Numbers and Space

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Space ► Numbers



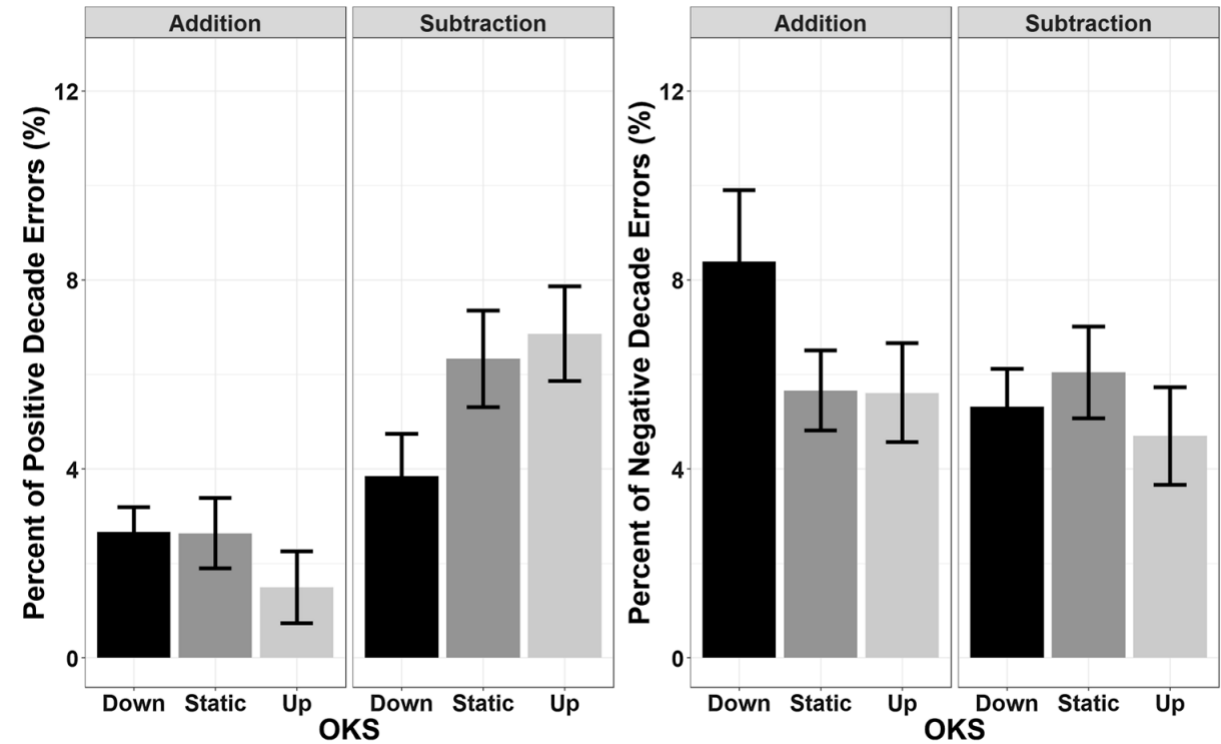
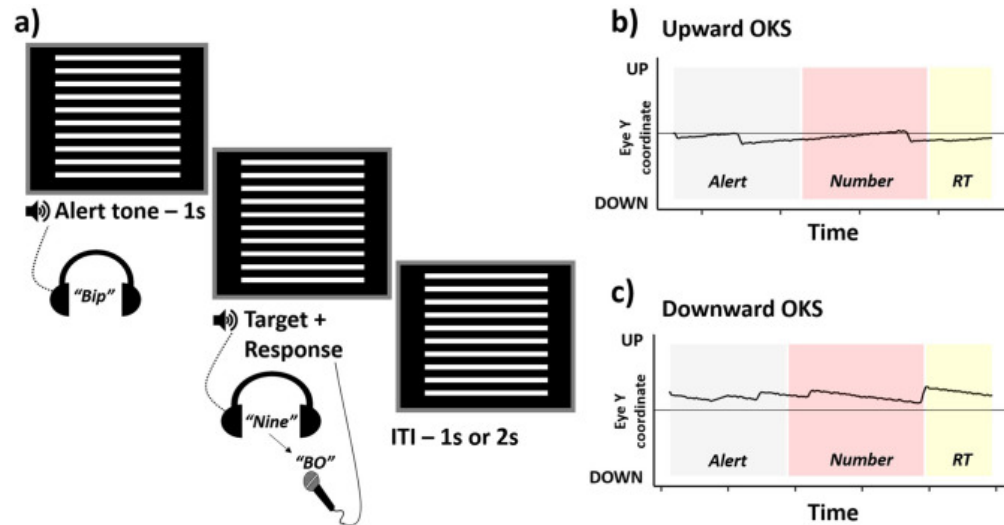
Overt biases of spatial attention (i.e., via optokinetic stimulation) result in specific signatures in numerical and arithmetic tasks.

Ranzini et al., 2015, *J Cogn Psych*;
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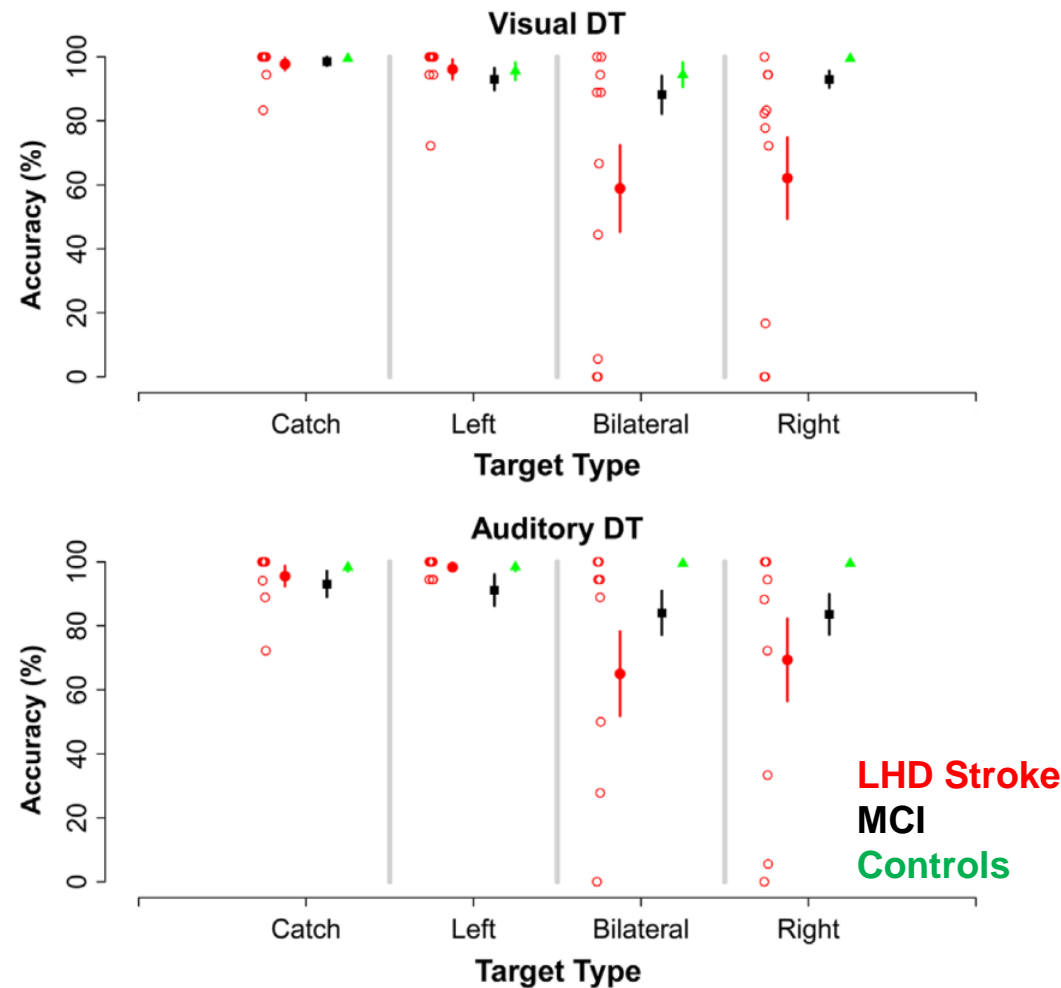
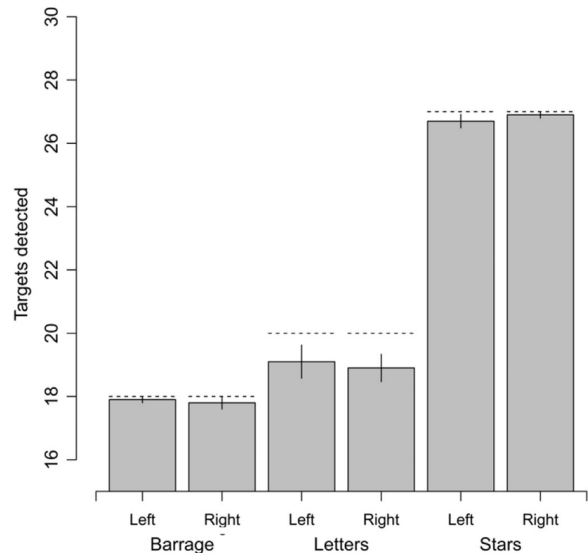
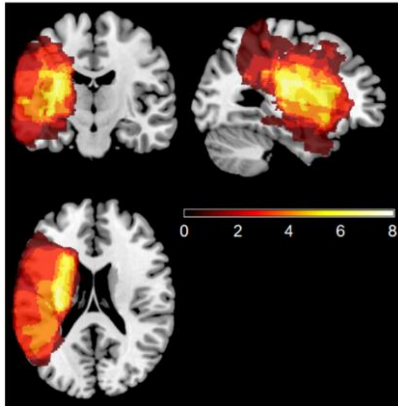
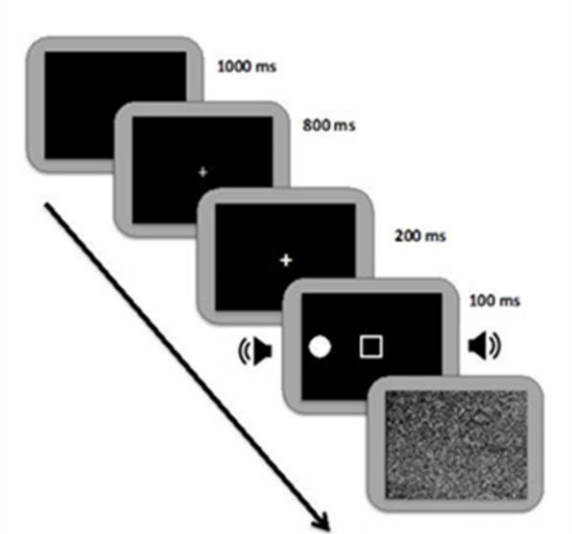


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Spatial Neglect

Evidence of both spatial and non-spatial deficits of attention in spatial neglect: implications for more prognostic tests

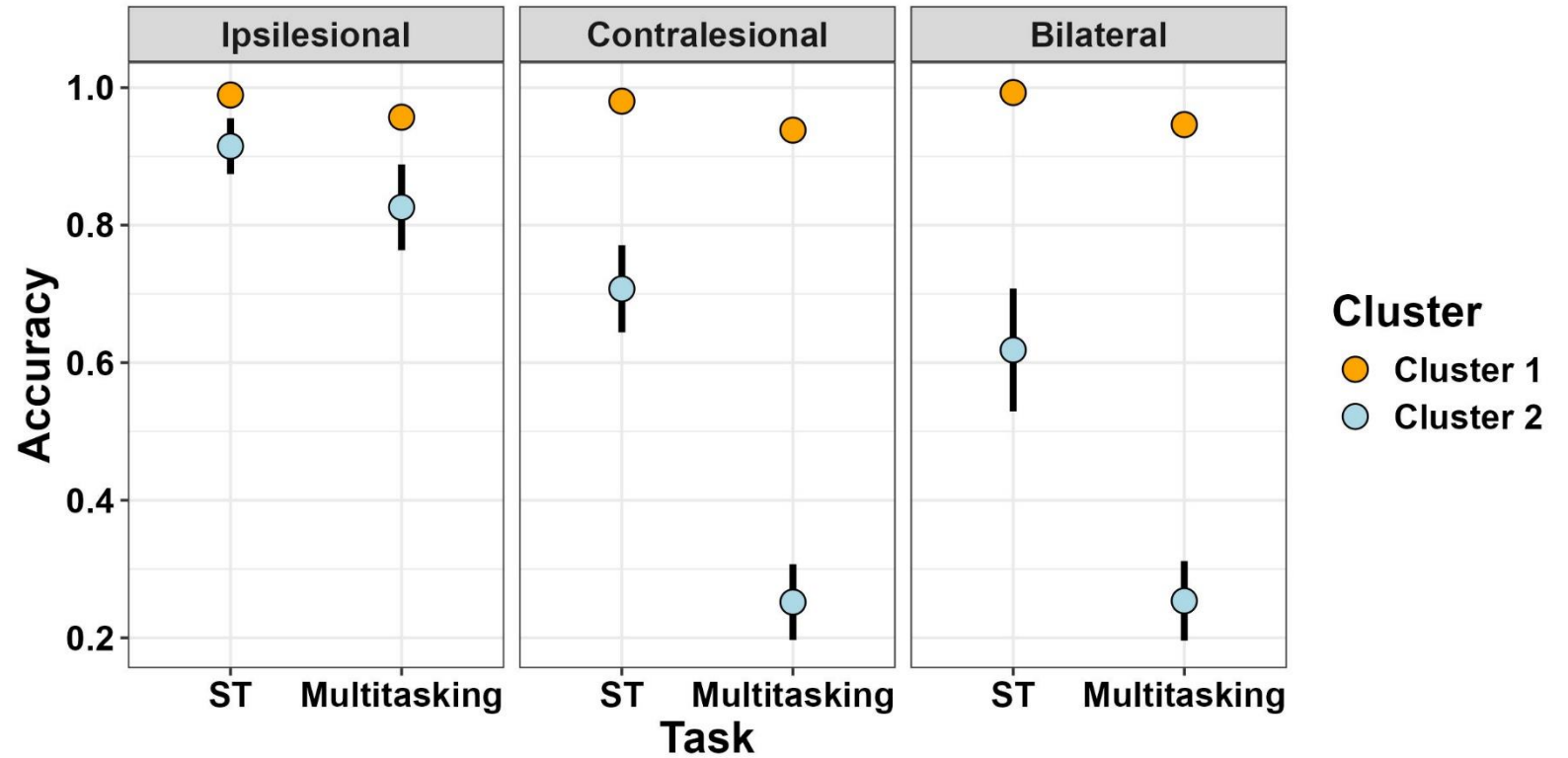
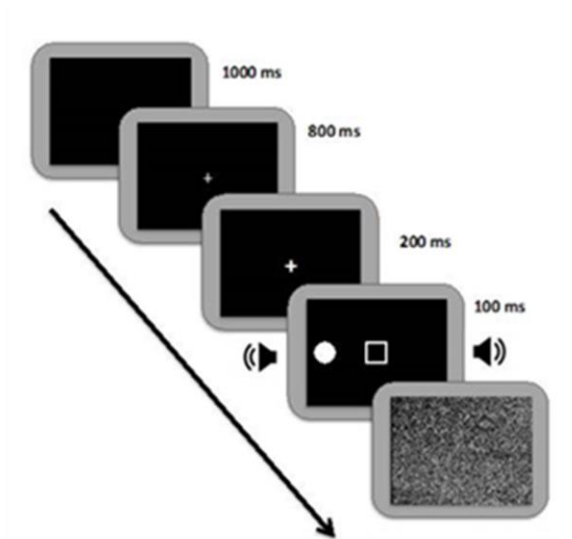


Multitasking, regardless of the modality, depletes attentional resources and reveals dormant deficits even in chronic, left-hemisphere stroke patients without neglect according to established diagnostic batteries.

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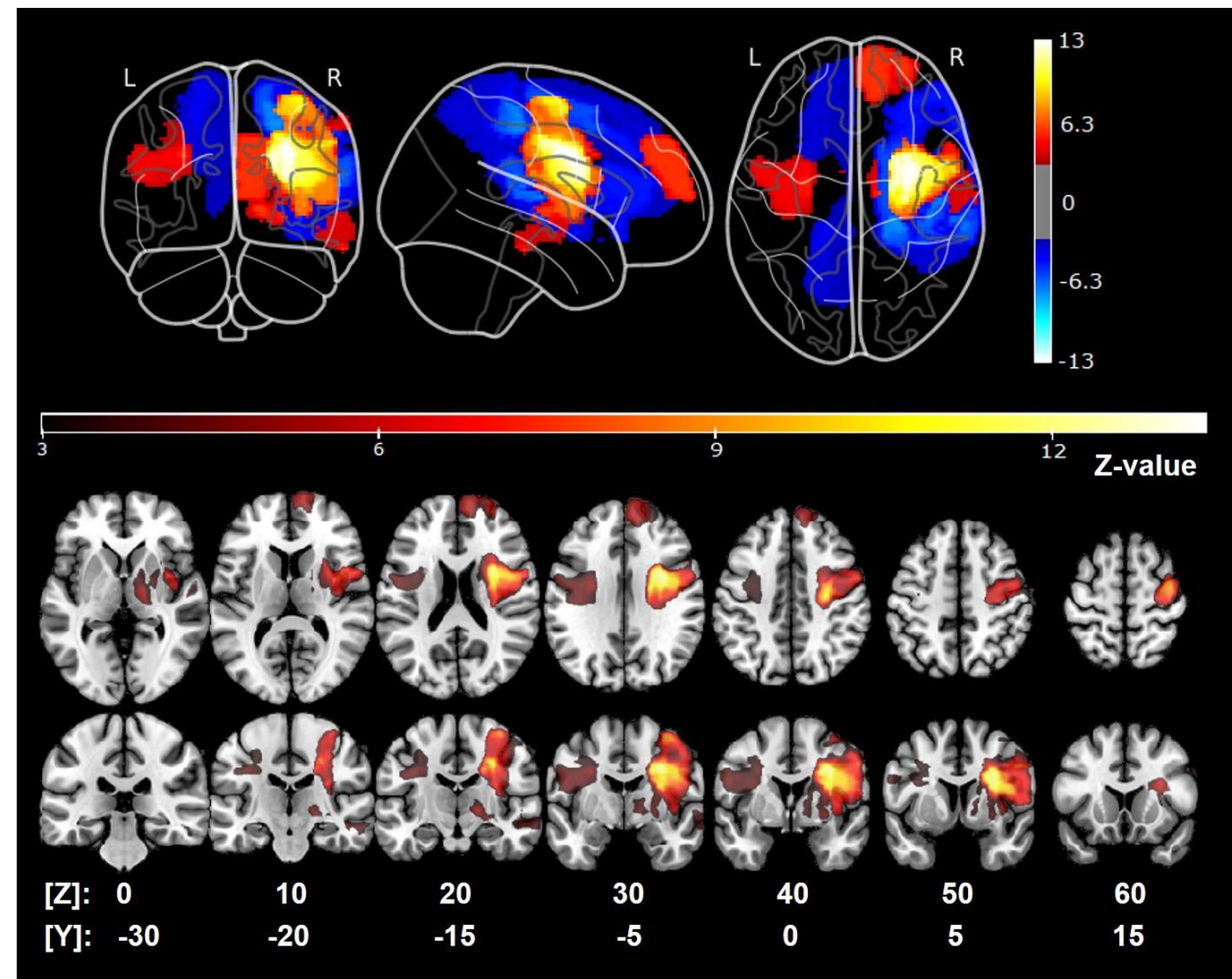
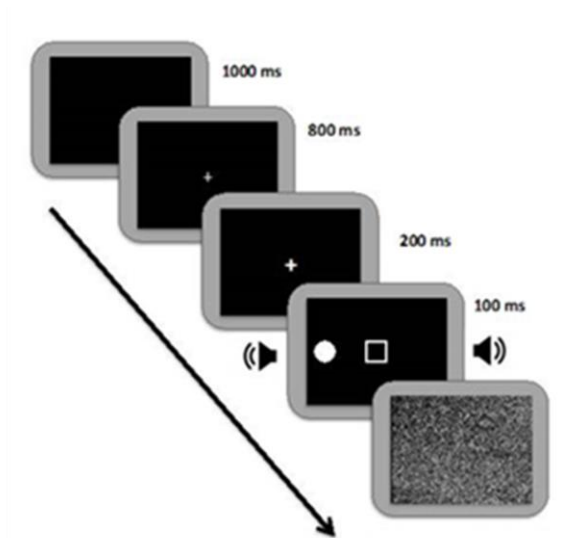
Confirmed in a large sample of consecutive stroke patients (N= 46). Scores at this test predict well functional deficits in ecological tests. Lesion and structural disconnection correlates in the Multiple Demands network.

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ML for neuroimaging

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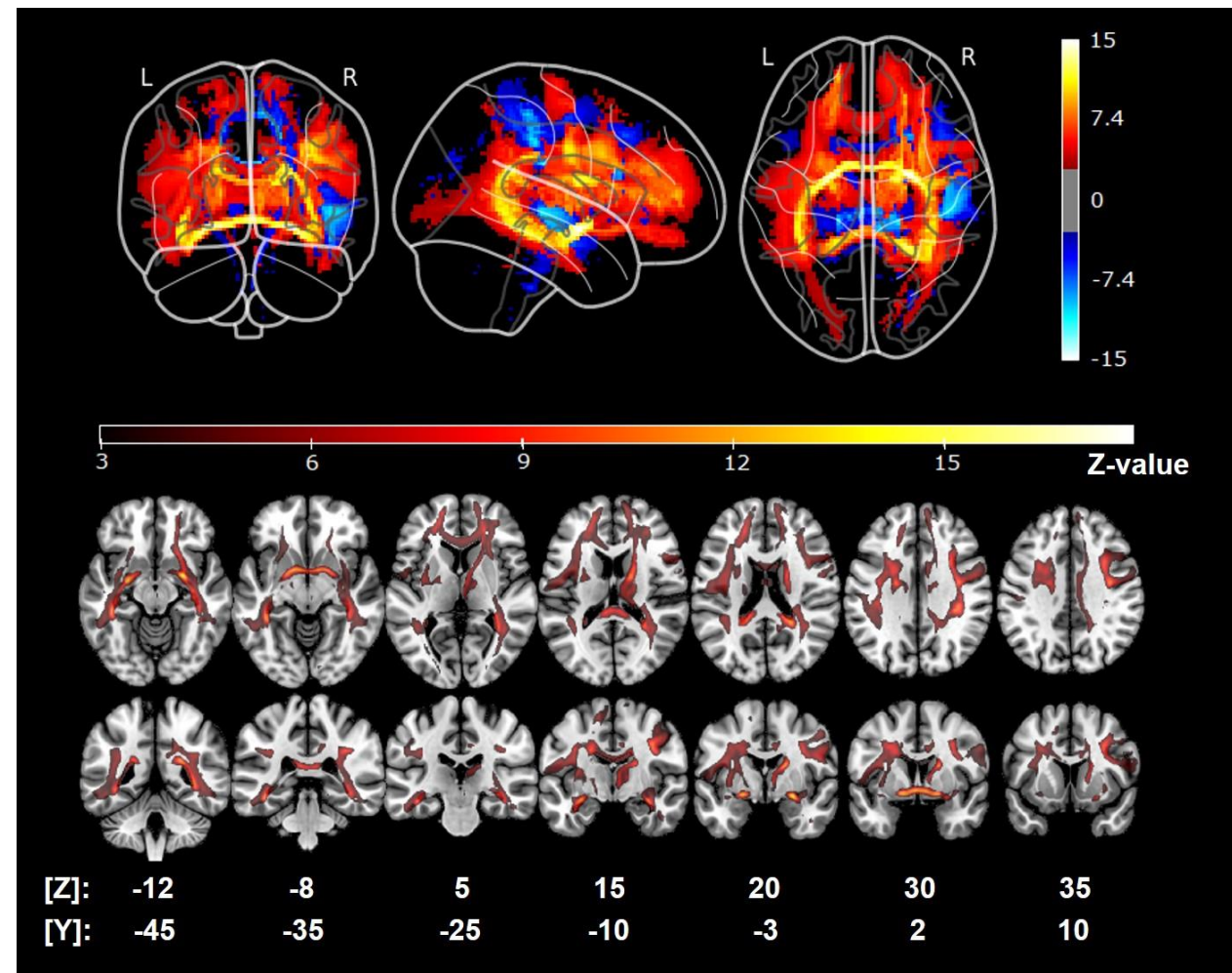
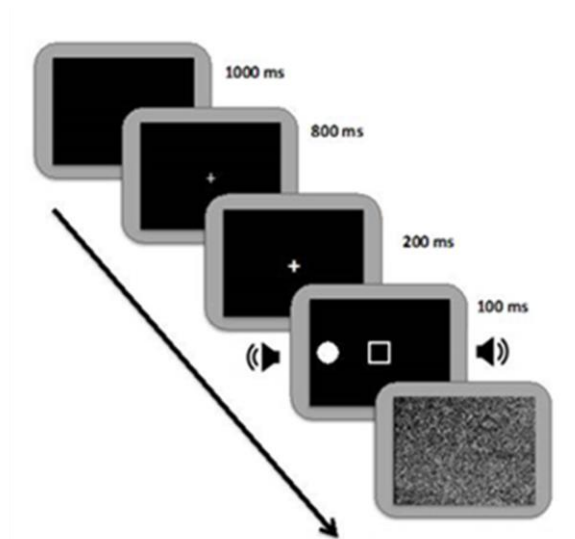
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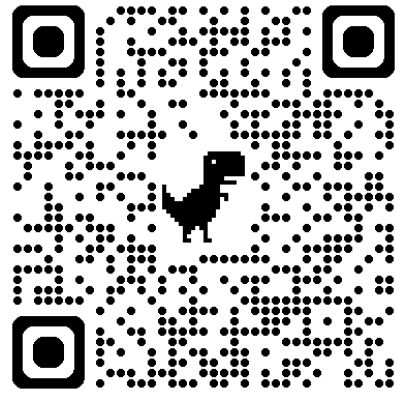
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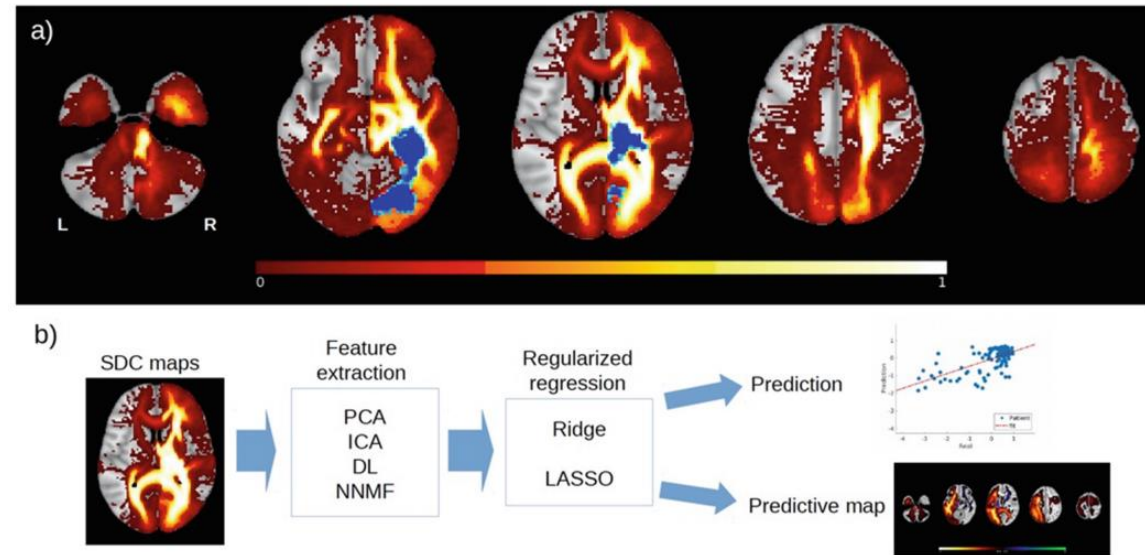
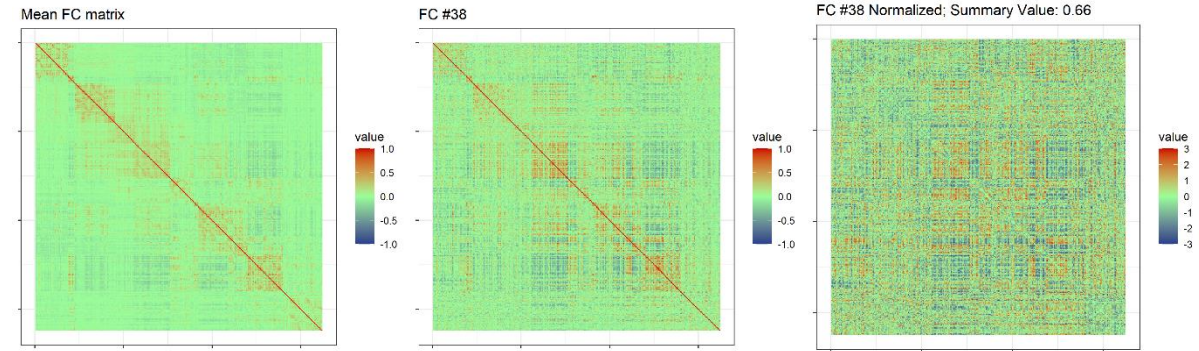
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Geek interlude #1

FCnet: A package for the analysis of Functional Connectivity matrices, lesion maps, or disconnection maps through elastic NETs.



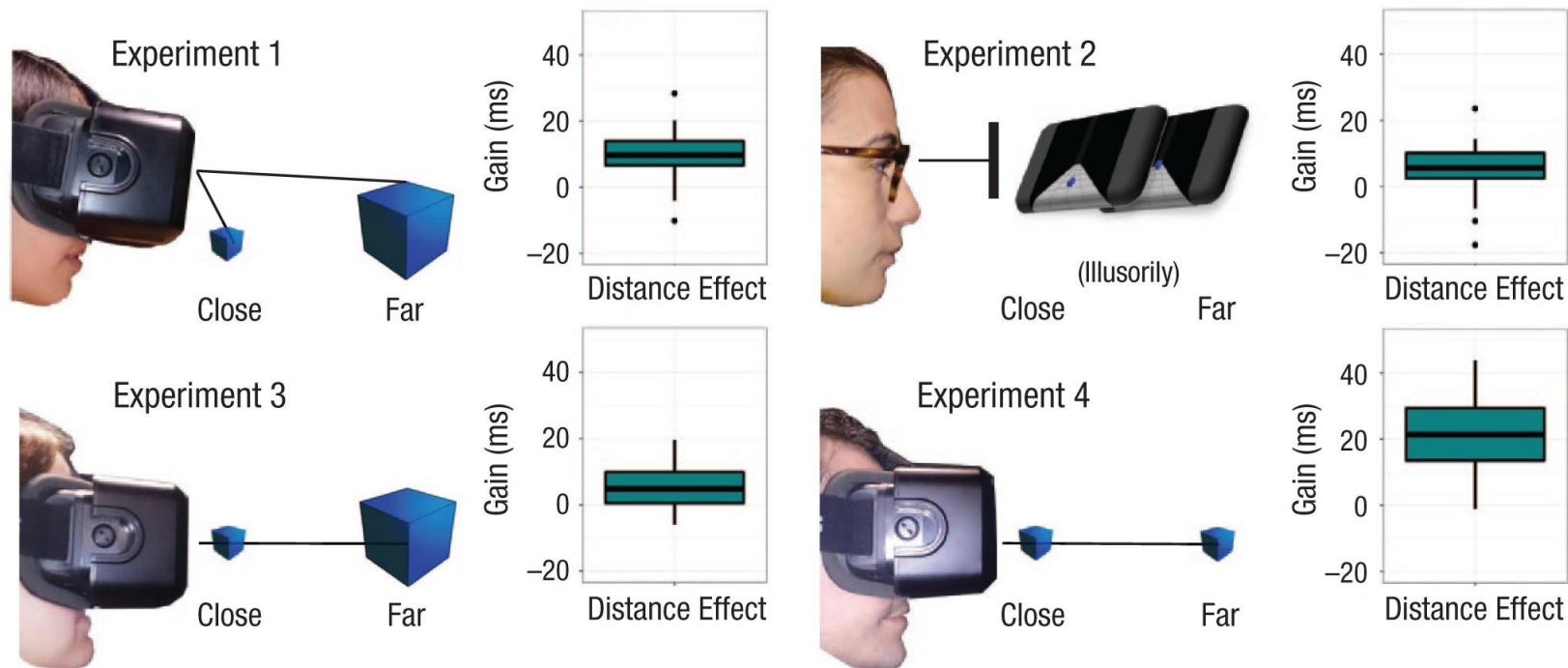
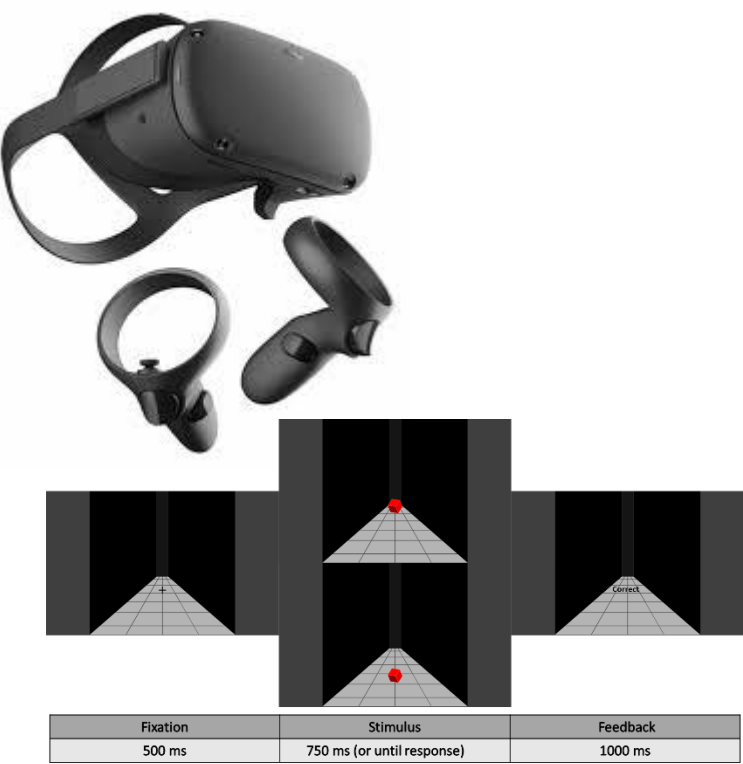
github.com/EBlini



Easily implements: feature reduction (PCA and ICA) of resting state matrices, lesion and disconnection maps; hyperparameter tuning through (possibly nested) crossvalidation, and statistical modelling through elastic nets; back-projection onto the original space. Fully open source, it comes with a shiny GUI.

Peripersonal Space

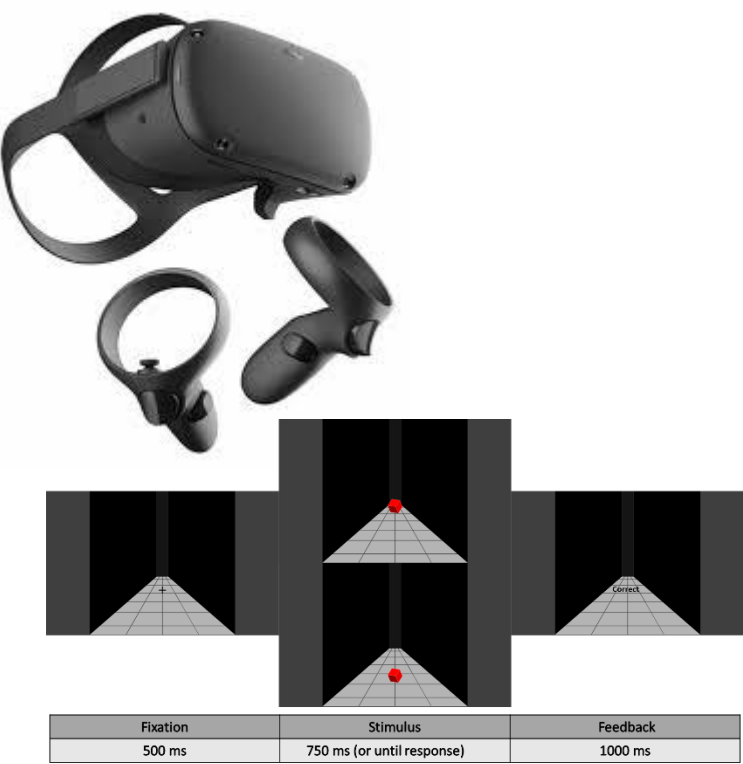
Evidence of enhanced attentional processing close to the body and perceptual (visual) advantages.



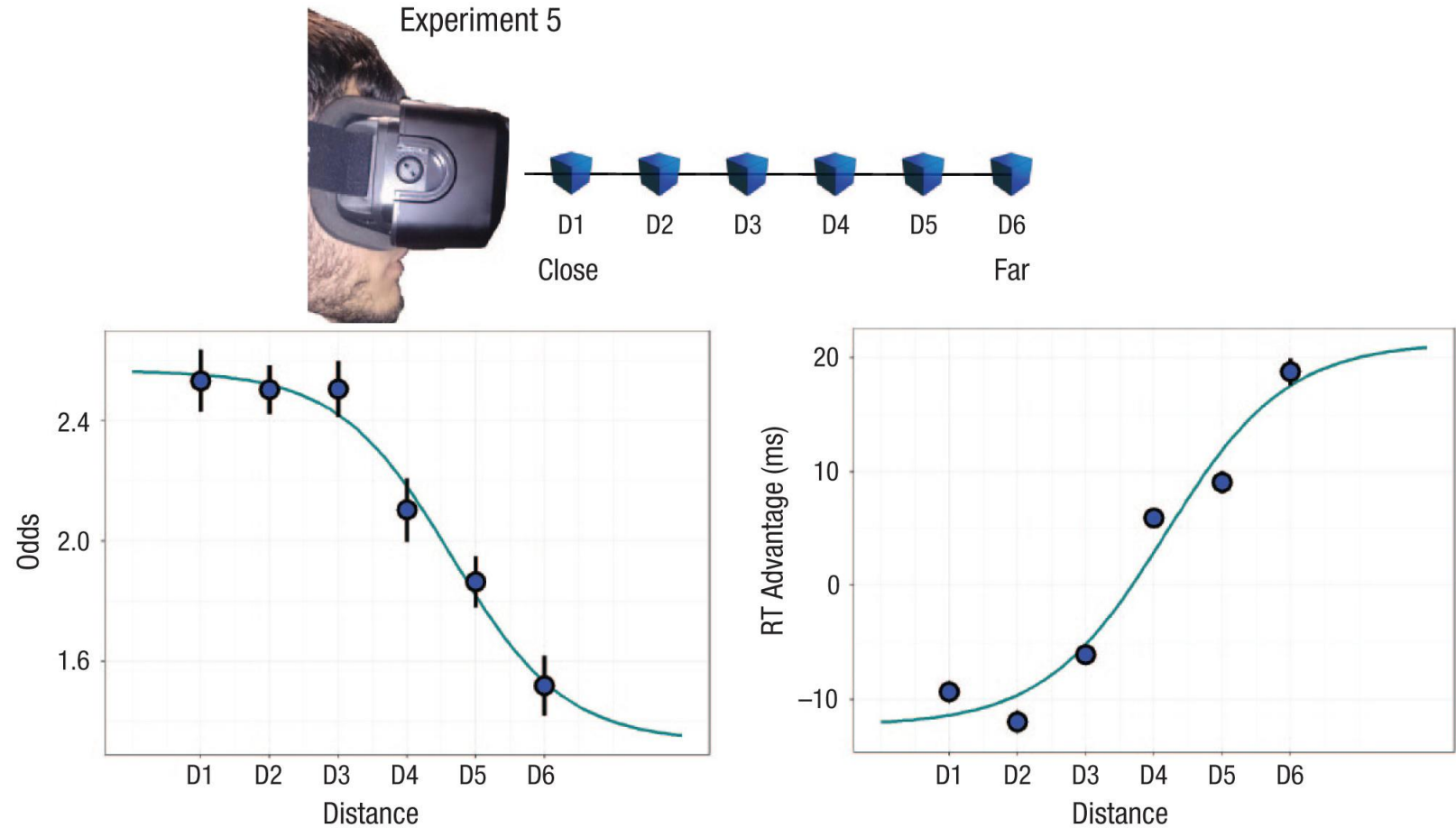
We reveal a persistent shape-discrimination advantage for close objects. The advantage does not depend on retinal size; perspectives cues (i.e., Ponzio illusion), and thus illusory distance, are sufficient.

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Zanini et al., 2021, *PBR*

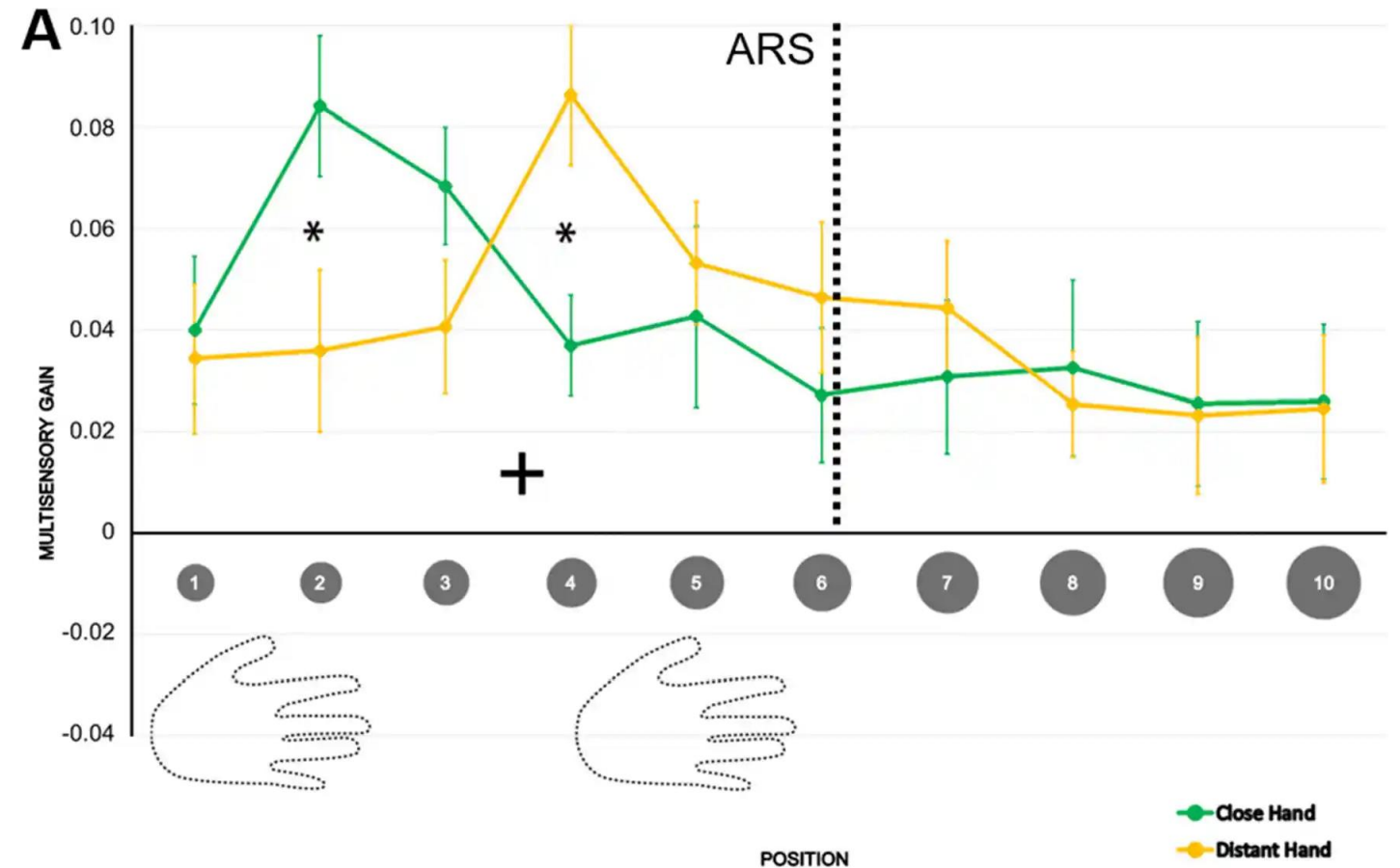
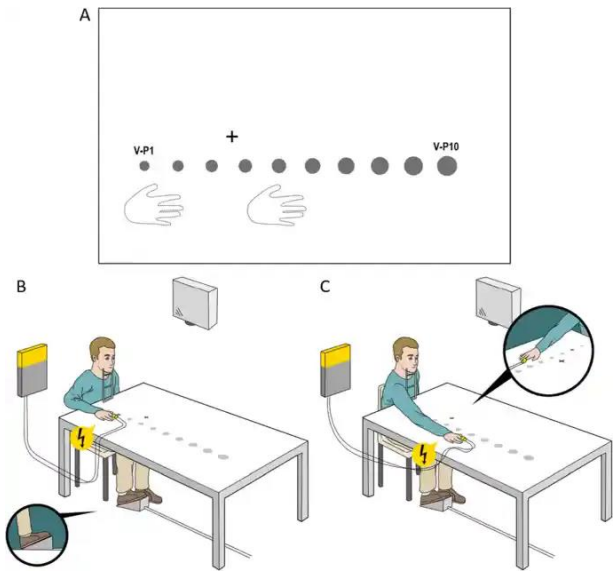


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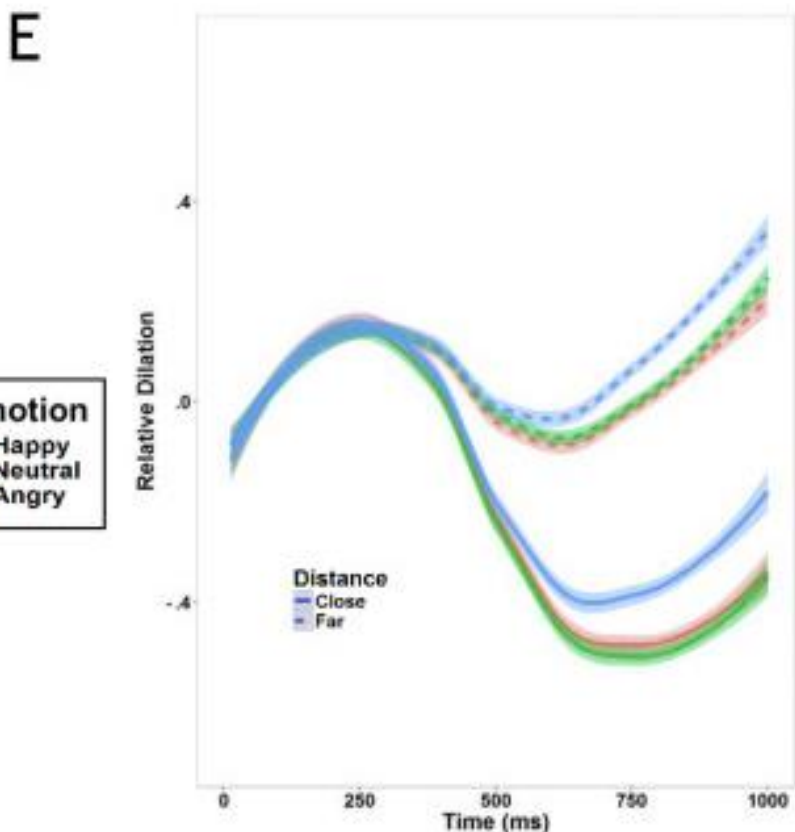
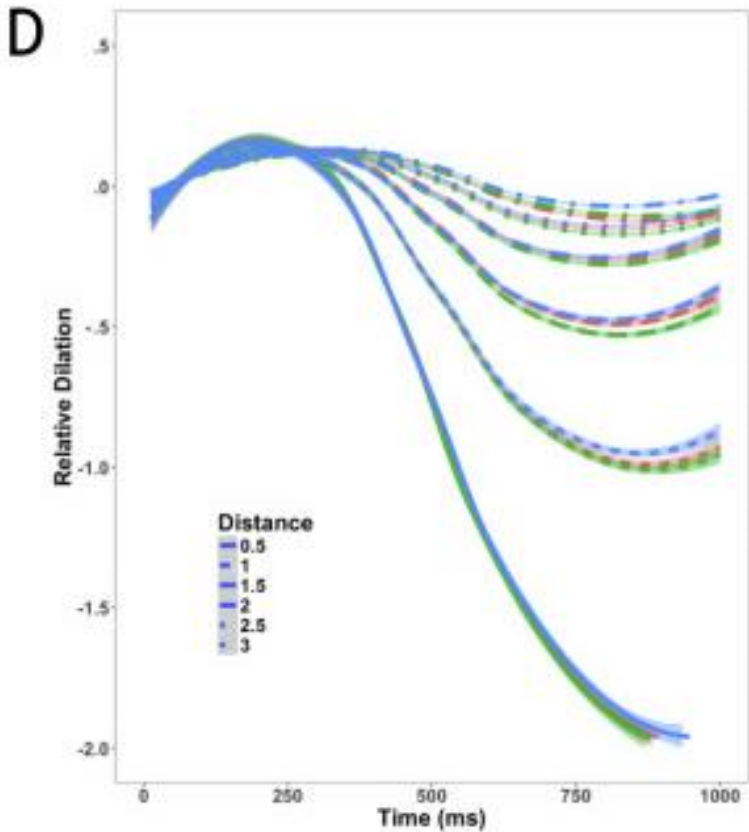
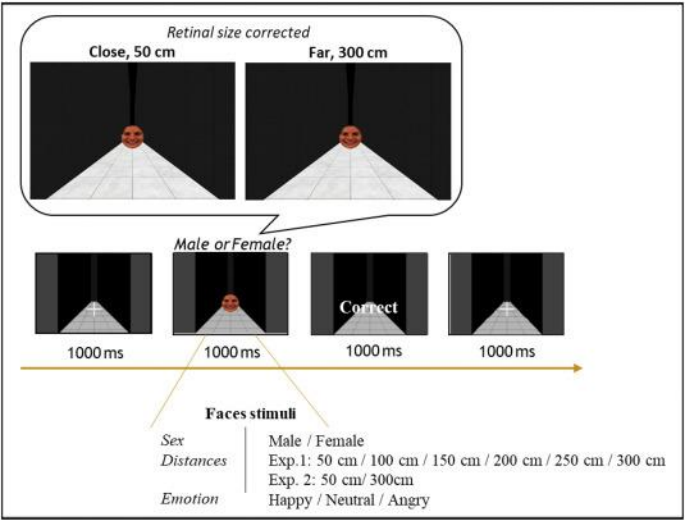


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Pupillometry

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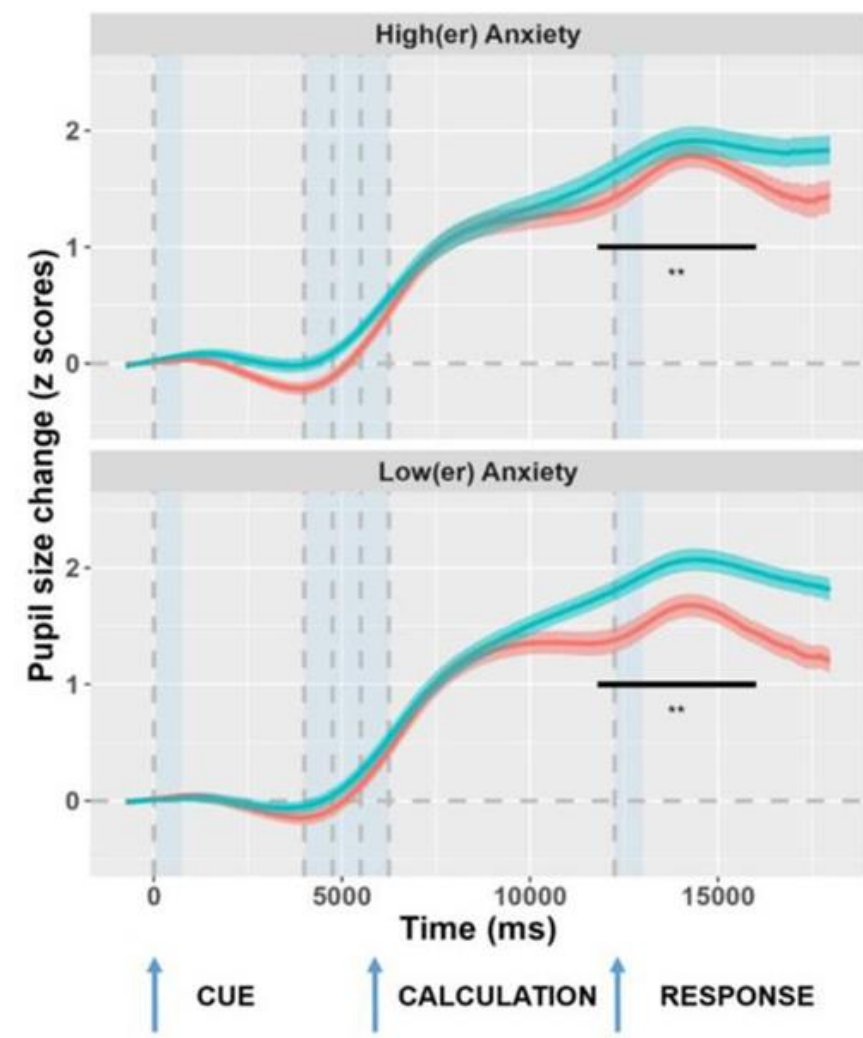
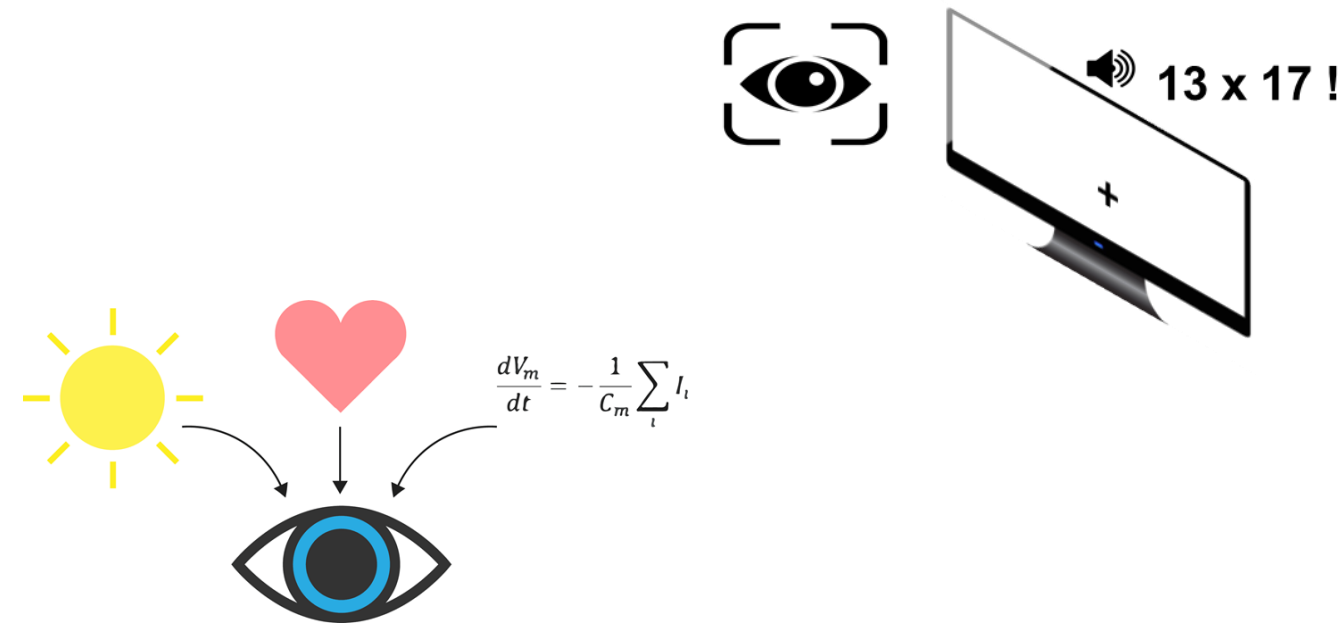
The behavioral advantage for closer stimuli is not limited to simple visual features but extend to complex, social stimuli.

Behavioral effects are accompanied by multiple, complex psychophysiological effects that depend on both distance and the emotional context.

Dureux et al., 2021, *Cortex*
Blini, Anobile, Arrighi, 2024, *Psych Res*
Blini, Arrighi, Anobile, 2024, *BiorXiv*

Pupillometry

The measurement of pupil size provides an integrated readout of distinct attentional and cognitive processes.

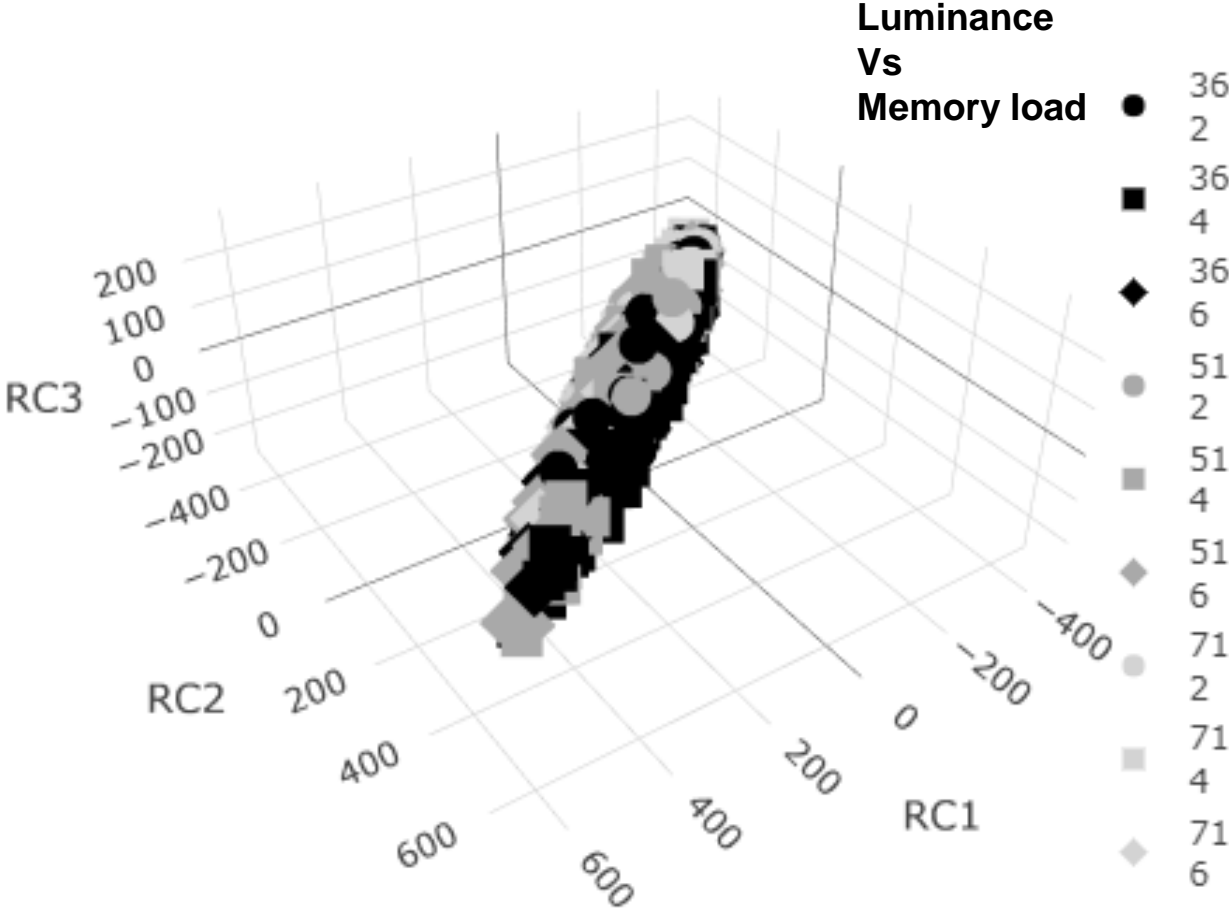
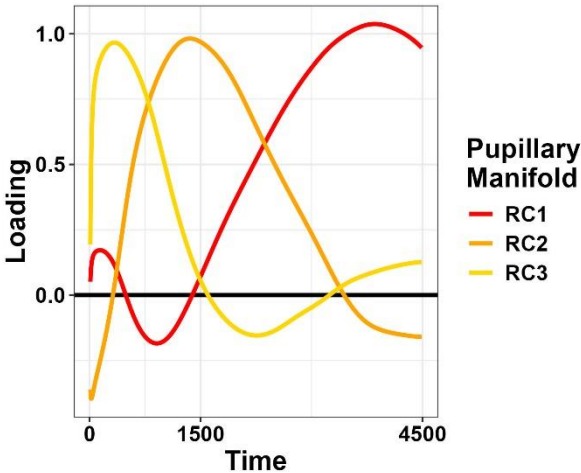
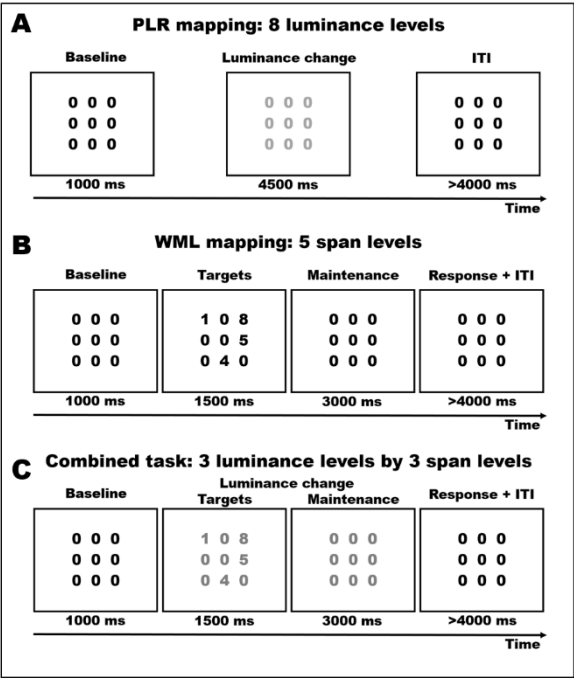


We recorded pupil size before (anticipation), during (calculation), and after (feedback) mental arithmetic. Pupil dynamics suggest increased cognitive effort in people with high math anxiety. However, the effect is hardly discernible from that of arithmetic performance, indicating that is hard to disentangle emotional aspects from the efficiency in mental calculation.

Dureux et al., 2021, *Cortex*
 Blini, Anobile, Arrighi, 2024, *Psych Res*
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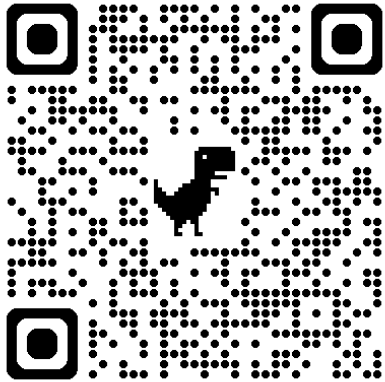
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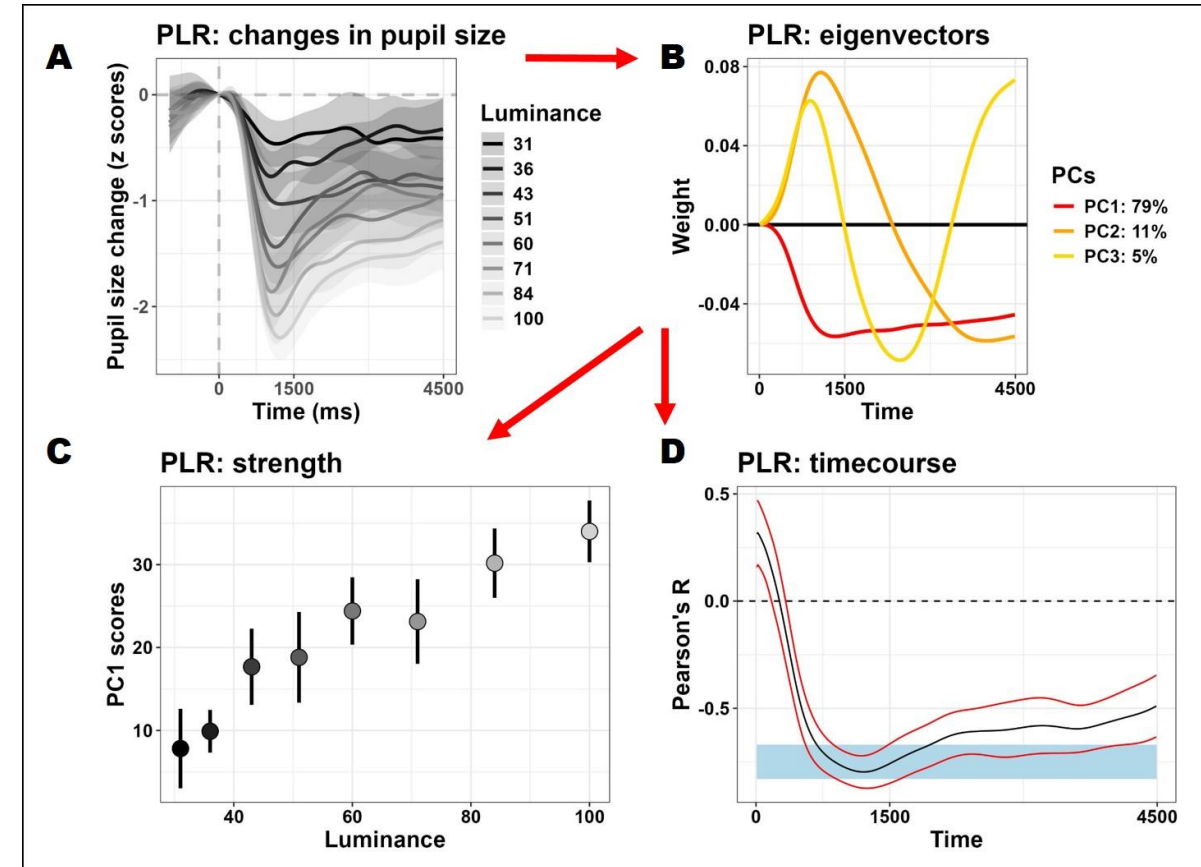
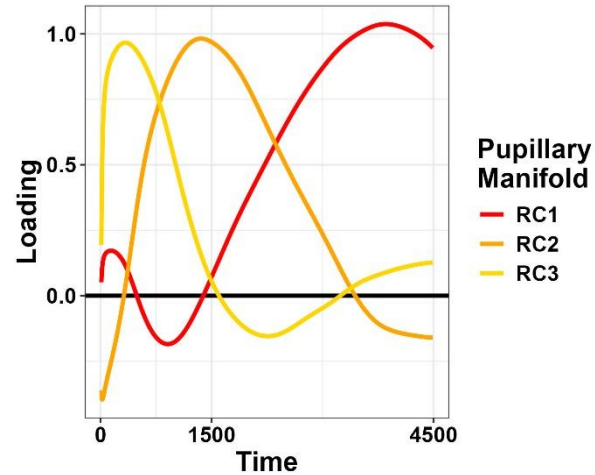
Phasic changes in pupil size are inherently low-dimensional, with modes that are highly consistent across behavioral tasks of very different nature, suggesting that they occur along a pupillary manifold that is highly constrained by the underlying physiology.

Geek interlude #2

Pupilla: A package for the preprocessing and analysis of eye-tracking and pupillometry data.



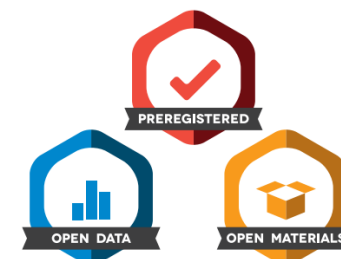
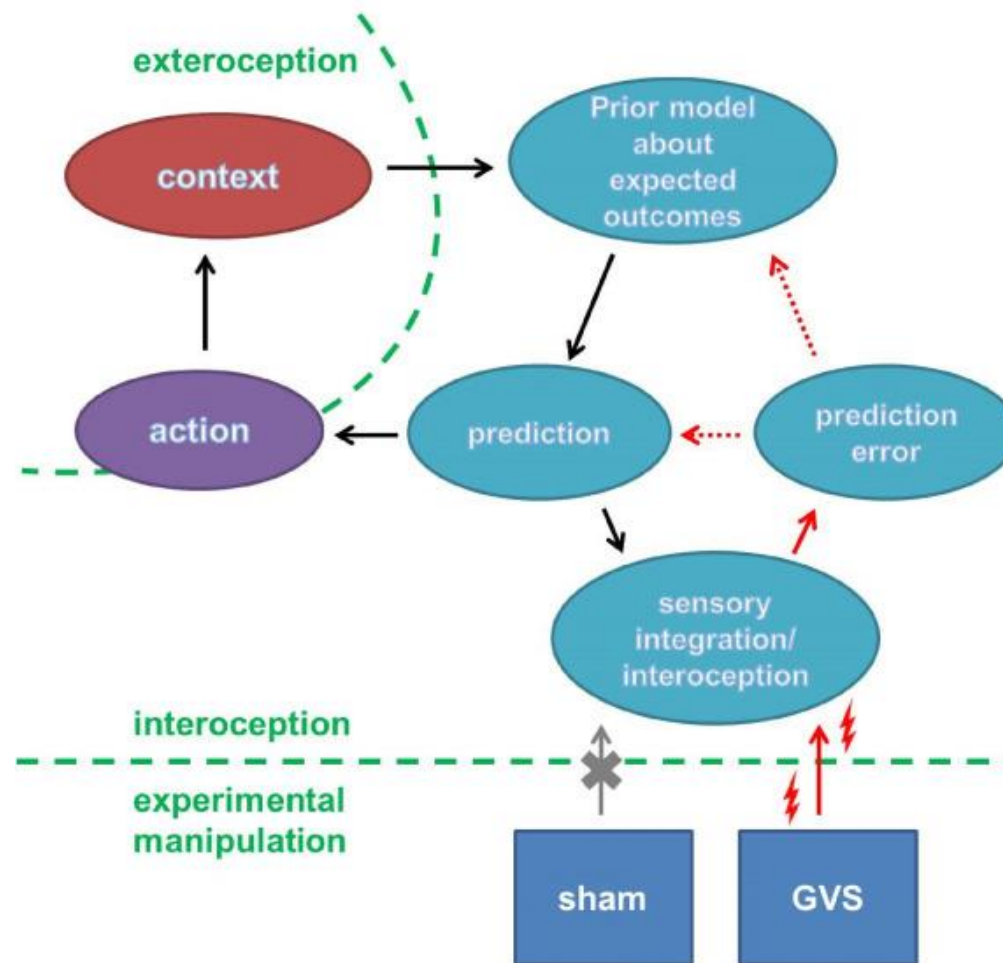
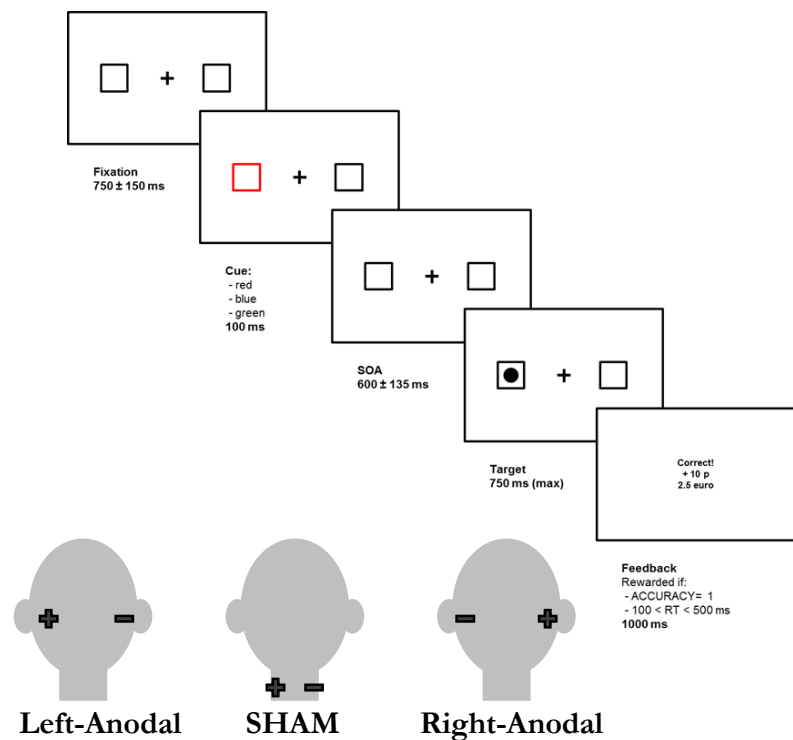
github.com/EBlini



Easily implements: data reading and cleaning (artifacts removal, interpolation, smoothing, quality checks); utilities for feature reduction (PCA, rPCA, ICA), including graphical depictions; analysis tools (e.g., crossvalidated LMEMs).

Interoception and motivation

There is a tight link between bodily states and motivational assets. Vestibular stimulation is a safe tool to probe this dialogue causally.



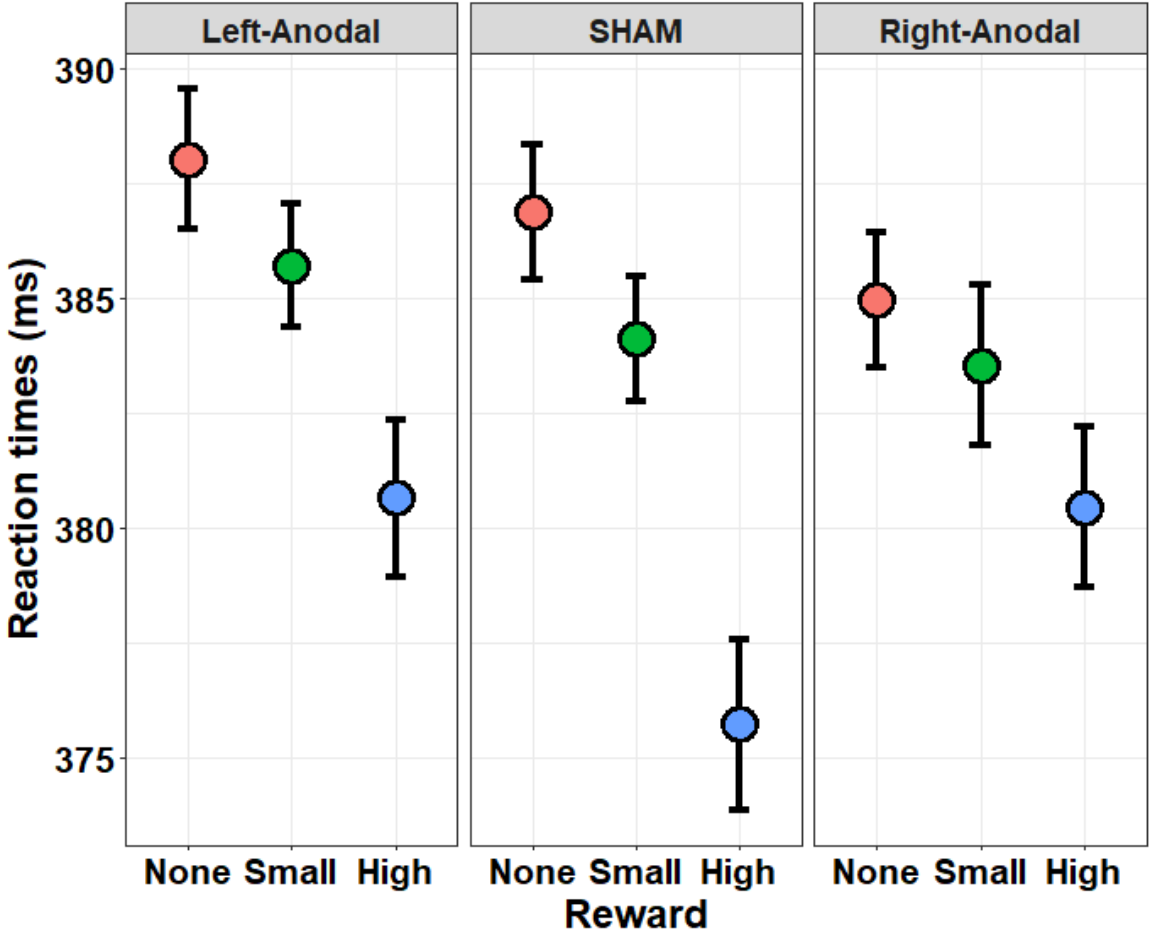
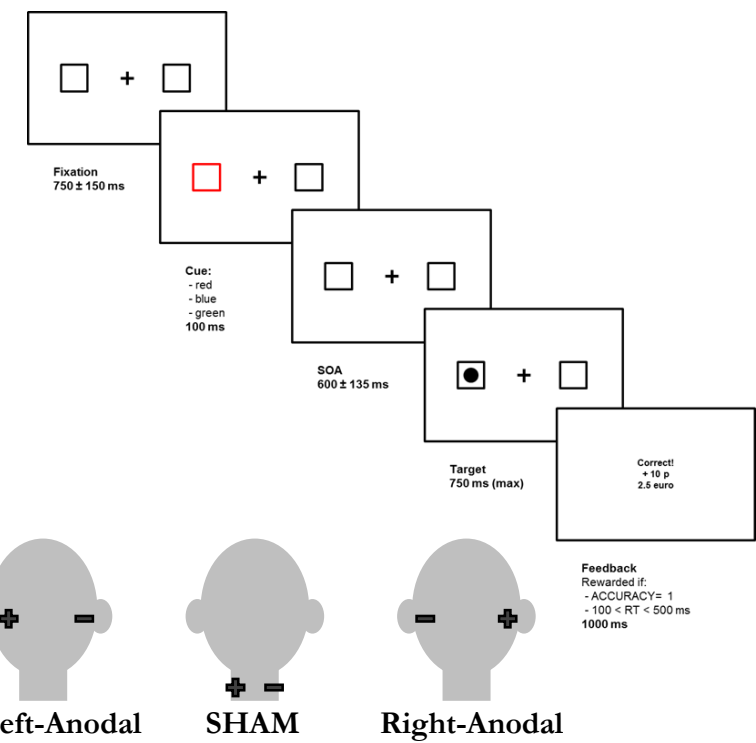
Galvanic Vestibular Stimulation (GVS) induces sensory, vestibular mismatches: illusions of self-movement in spite of constant visual stimulation. Vestibular mismatches impact motivational assets by decreasing sensitivity to rewards.

Blini et al., 2018, *Cortex*

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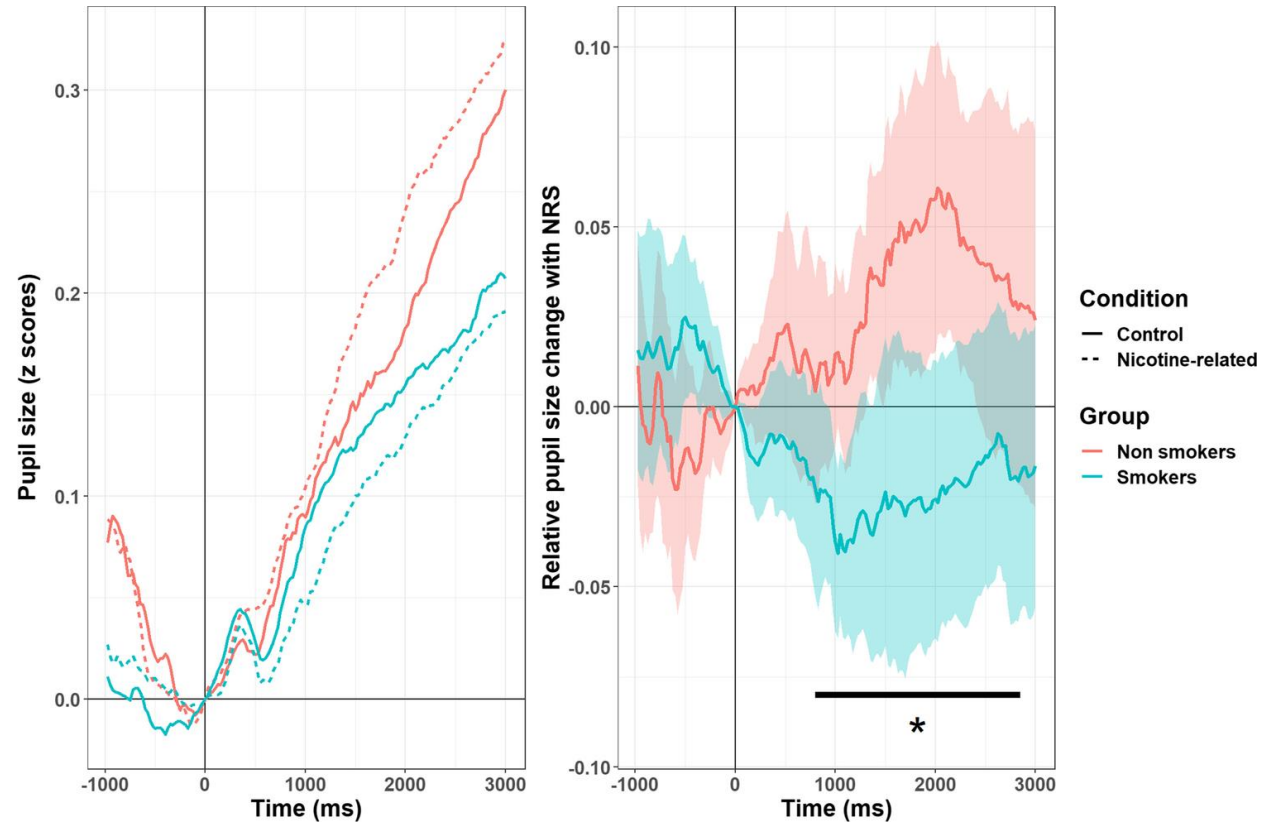
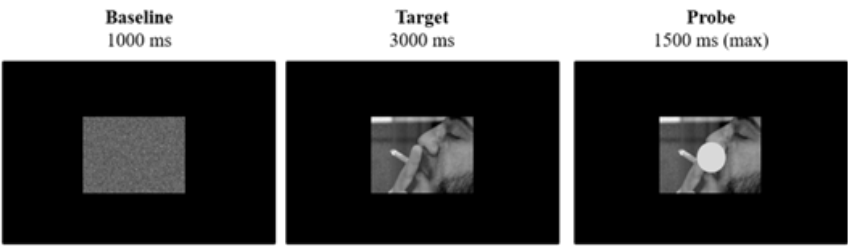
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In the future...

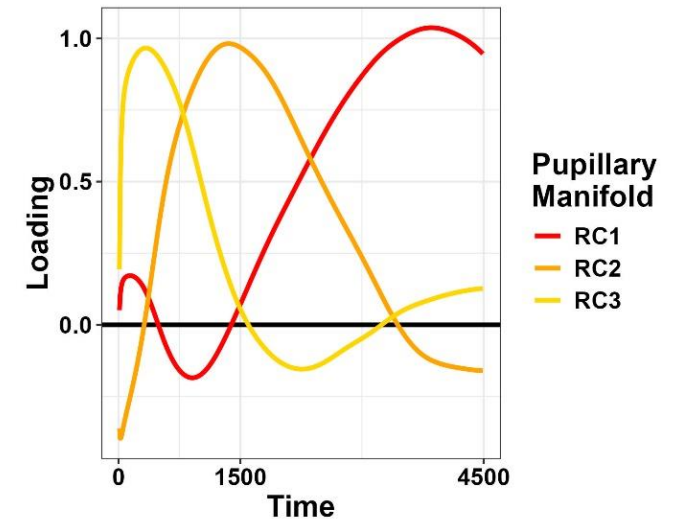
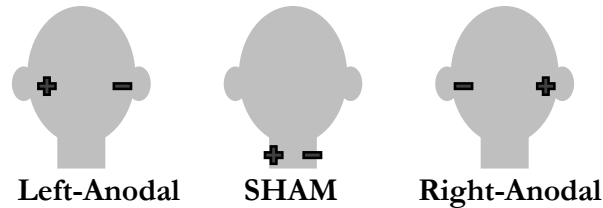
Subjective salience (and craving) can be measured objectively with pupillometry: enhanced Pupil Light Response is smokers viewing nicotine-related stimuli.



Pupil dilation is an excellent index of classic conditioning. However, subjective salience and craving can also result in much more subtle modulations of the pupil light response (due, e.g., to enhanced attention or biases toward central acuity).

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Are the effects of GVS mediated by autonomic activity? What are the neural substrates of these autonomic fingerprints?



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