Visual perceptual learning near and far from the body

Antonio Zafarana[1], Laura Hunt[1], Alessandro Farnè[2,3], Luigi Tamè[1]

[1] School of Psychology, University of Kent; [2] INSERM U1028, Lyon Neuroscience Research Centre, Lyon, France; [3] University Claude Bernard Lyon I, F-69000 Lyon, France

Introduction

It has been demonstrated that stimuli close to the body (peripersonal space, PPS) are processed differently, so that shape discrimination is faster for closer compared to further objects (Blini et al., 2018). This advantage has been seen for both low-level visual features: size, orientation and high-level: face identification (Ahsan et al., 2021).

A visual perceptual learning paradigm developed by Sigman & Gilbert (2000) shows that participants performance can improve selectively for a specific trained orientation and not for the untrained orientation.

Aim

This study aims to investigate whether visual perceptual learning has different effects based on the position of stimuli (near or far from the observer). Since the stimuli are embedded in a background that elicit a Ponzo illusion, the effects of the illusion on learning are also examined.

Methods

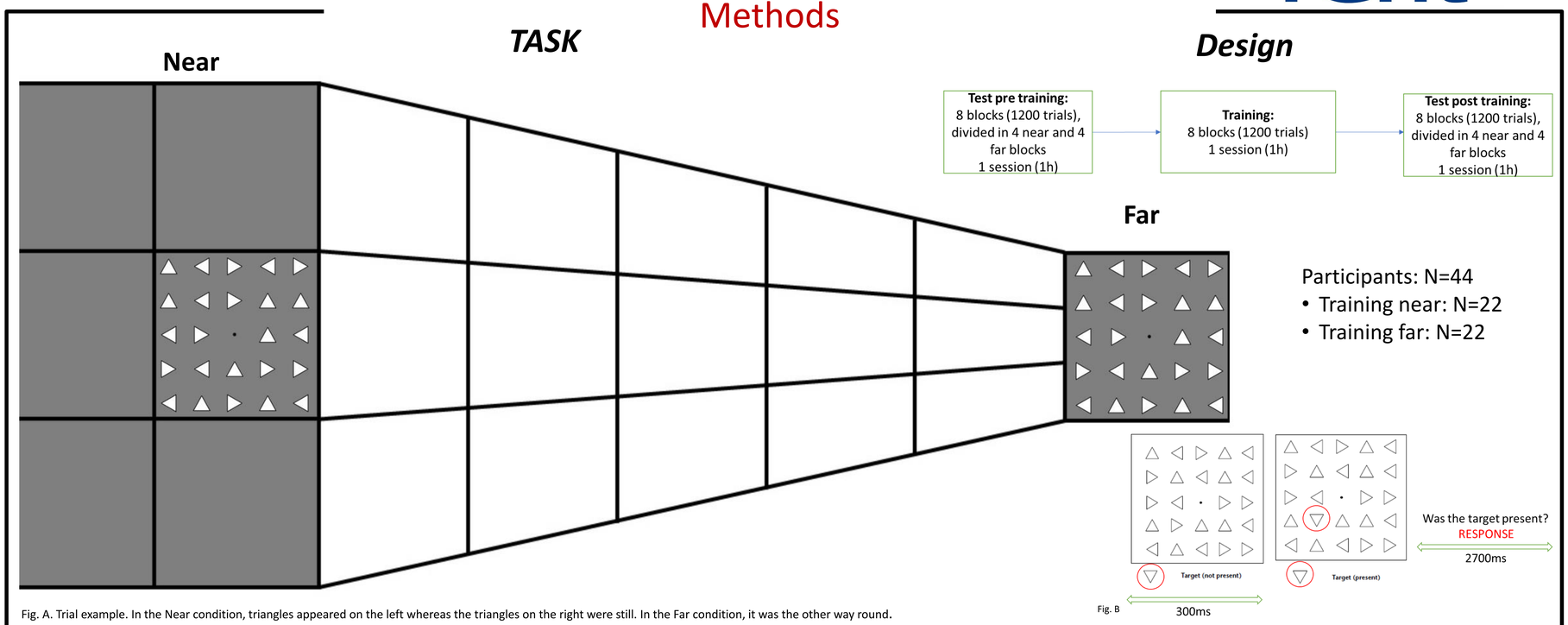
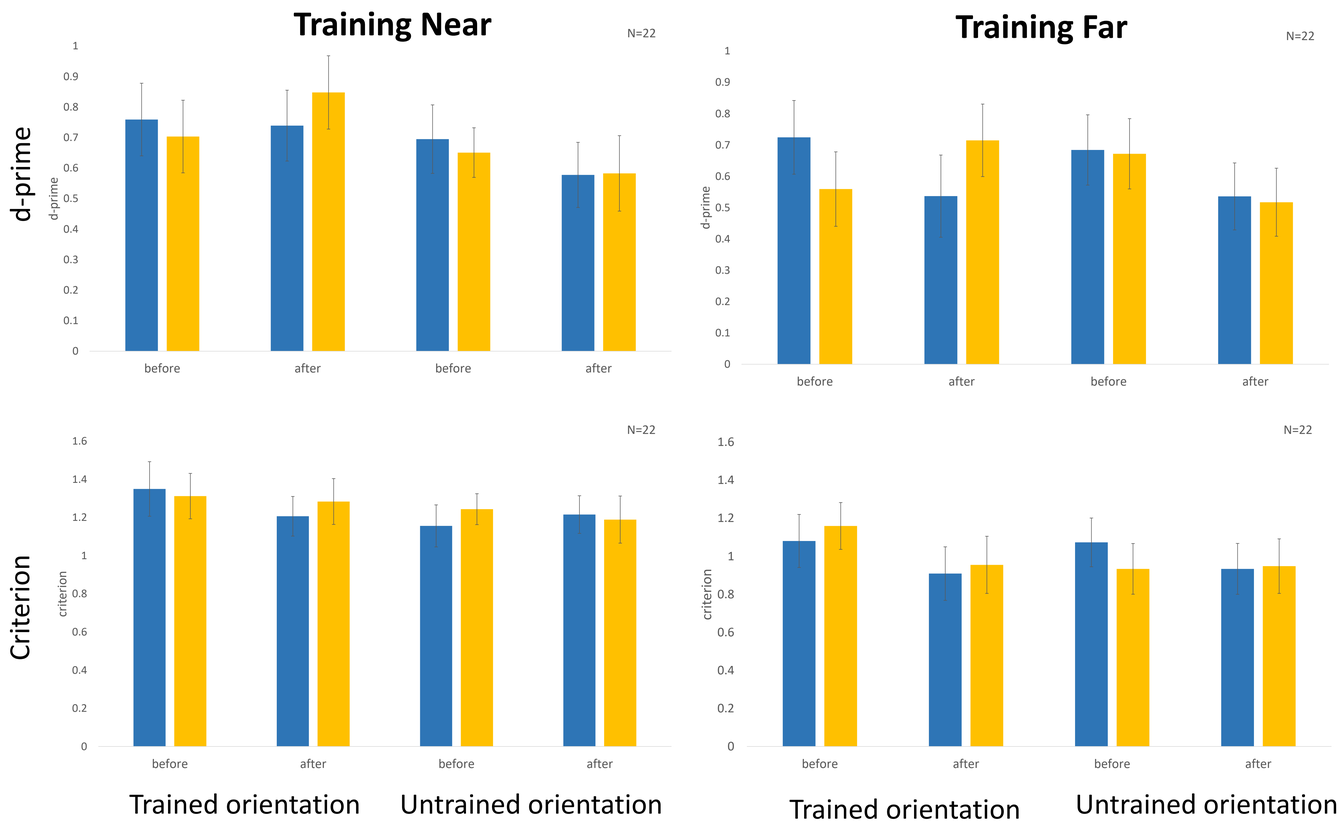


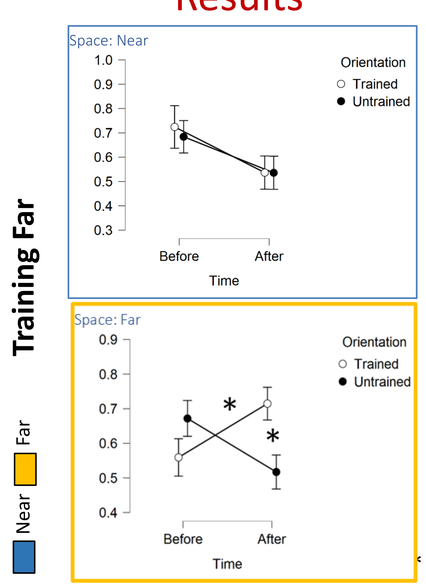
Fig. A. Trial example. In the Near condition, triangles appeared on the left whereas the triangles on the right were still. In the Far condition, it was the other way round.

Visual search task: participants had to report whether a specific target (triangle in 1 orientation) was present or not amongst distractors (trinagles) (fig.B). Participants saw the target at the beginning of each block.

Training: Each participant was then trained by repeating blocks in a particular target orientation (up or down) and either in near or far space (fig. A).

Results





Two 3-way repetead measures ANOVAs with 3 within-subjects factors:

- Orientation (Trained, Untrained),
- Time (Before, After),
- Space (Near, Far).

Data is divided in participants who carried out the training near (left column) and those who did the training far (right column).

Training Far: Time x Space → $F(1,21) = 4.5$, $p = 0.046$;

Orientation x Time x Space → $F(1,21) = 4.84$, $p = 0.039$

* $P < 0.05$

Conclusions

Contrary to expectations, the training Near did not produce any significant effect, whereas the training Far did. Participants were more accurate after the training Far but only for trained orientation in the Far condition. These results suggest that there might be a predisposition to visual learning for stimuli that are perceived far compred to near from the body. However, it cannot be excluded that participants perceived the stimuli in the far condition as bigger due to the Ponzo illusion and this is reason we observe a learning effect only in the training far.

Contact: A.zafarana@kent.ac.uk