Spatial Localization and Stereolocalization in Non-Strabismic Visual Disorders: A Case Study Analysis

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Summary

This work is a case study analysis focused on the assessment of spatial localization and stereolocalization in adults with non-strabismic visual disorders. Detailed optometric results from three selected, clinically most interesting cases will be presented. Stereolocalization assessment was performed using vectograms, while spatial localization was evaluated using the Van Orden Star test and the VTE spatial localization board. The primary aim of this work is to analyze the relationships between binocular vision parameters and the accuracy of spatial localization and stereolocalization.

Keywords: stereolocalization, spatial localization, binocular vision, SILO effect, non-strabismic visual disorders.

INTRODUCTION

Spatial localization and stereolocalization are key aspects of binocular vision and depth perception. One clinical manifestation of stereolocalization is the Small-In Large-Out (SILO) effect, which refers to changes in perceived object size and distance depending on convergence or divergence demand.

Although the SILO effect is important in vision diagnostics and therapy, its perception varies widely, even among individuals without manifest strabismus. Case study analysis allows for a clearer understanding of individual differences in binocular vision. This work presents three selected clinical cases illustrating the relationships between binocular vision parameters, spatial localization, and perception of the SILO effect.

Detailed optometric results from three clinical cases will be presented. The cases differ in binocular vision profiles and in the perception of stereolocalization and spatial localization. Differences in the accuracy of SILO effect perception and spatial localization test results are expected, depending on the type of phoria and convergence and divergence conditions.

METHODS

This study is an observational case study analysis. A comprehensive optometric examination was performed, including assessment of visual acuity, ocular alignment, phoria, accommodative amplitude, and spatial vision.

Stereolocalization was assessed using vectograms under varying convergence and divergence demands, while spatial localization was evaluated with the Van Orden Star test and the VTE spatial localization board.

The study is planned to include 30 participants aged 18–40 years; however, for this poster, three clinically most interesting cases are presented for detailed analysis.

RESULTS

At the current stage, diagnostic examinations are being conducted in accordance with the established research protocol. Data collection and preliminary analysis of optometric findings, stereolocalization test results, and spatial localization measurements are ongoing. Following completion of the diagnostic phase, three clinically most interesting cases will be selected for detailed case study analysis and presentation.

Based on the study design, the following outcomes are expected:
• Participants with exophoria will tend to localize objects as more distant.
• Participants with esophoria will tend to localize objects as closer.
• Stereolocalization accuracy will be lower under divergence than under convergence conditions.
• Higher levels of spatial organization will be associated with greater precision in perceiving the Small-In Large-Out (SILO) effect.

CONCLUSIONS

The ongoing research focuses on analyzing the relationships between optometric examination results, stereolocalization, and spatial localization in individuals with non-strabismic visual disorders. Understanding the interactions among these domains may contribute to a better insight into the mechanisms of binocular vision and the processes underlying spatial perception. This knowledge has significant practical potential and may be applied in the development of more effective, individually tailored vision therapy protocols.

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