Effective and Efficient Visual Stimuli Design for Quantitative Autism Screening: an Exploratory Study

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Introduction

Early detection and intervention for ASD are critical for increasing child success. Previous study show that when interventions for children with ASD begin before age 5, children’s success rate is 67%, compared to the 11% success rate seen when interventions begin after age 5 [1]. However, the visual stimulus on early ASD screening has not been considered as a diagnostic consideration in the past. In this paper, we conduct an exploratory study on effective visual stimuli design with two main contributions to improve efficiency of early ASD screening:

- Visual stimuli database design for the ASD screening.
- Evaluation of the impact and efficiency of picture stimuli and exposure time on ASD screening accuracy both independently and dependently.

Methods

ASD SCREENING SYSTEM (Fig. 2): To collect gaze point distribution and perform classification between children with and without ASD.

- **Visual stimuli design (Fig. 3):** the main focus of the paper, constructed by 16 pictures for stimulus design database with respect to two assessing aspects:
  - Visual stimuli categories: picture stimulus in different categories to analyze the efficiency of stimuli.
  - Exposure time: gazing duration, to assess the impact of time on ASD screening.
- **Data acquisition:** setup consists of two main parts (Fig. 1):
  - Tobii EyEX Controller: to accumulate eye positions of movements.
  - P2214H monitor: to display visual stimuli for participants.

**Stimuli correlation** for effect ASD screening and early ASD detection.

**Conclusion**

“Social scene” stimulus in fusion with full exposure duration (5-second) show the most promising visual stimuli correlation for effect ASD screening and early ASD detection.

References