Eye-gaze patterns to communicative cues in early infancy and later language and communication outcomes

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Introduction

- **Attention** to **talking faces** plays an **important role** in **early language and social communication development** (Ayneto & Sebastián-Gallés, 2016; Fort et al., 2017; Pejovic, 2019).
- Specifically, the **attentional shift from the eyes to the mouth** by **8 months** of age has been **linked to language development** (Lewkowicz & Hansen-Tift, 2012).
- It has been suggested that **infants' increased attention to the mouth** is **correlated with concurrent language skills** (Tsang et al., 2018), **and predicts later expressive language skills** (Tenenbaum et al., 2015).

Main Goals

- We aim at:

1. Observing **whether there is** (or not) **a categorical shift to the mouth by 8 months of age**;
2. Exploring the **relation between eye-gaze patterns to** (**linguistic and non-linguistic**) **communicative cues** in early infancy and **language and social communication development**, by examining the **correlation with concurrent and later language** and **social skills.**

Methods

Participants

- **European Portuguese typically-developing infants** tested at **5-6 months** (N=26, 9 girls) and **8-10 months** (N=16, 9 girls).

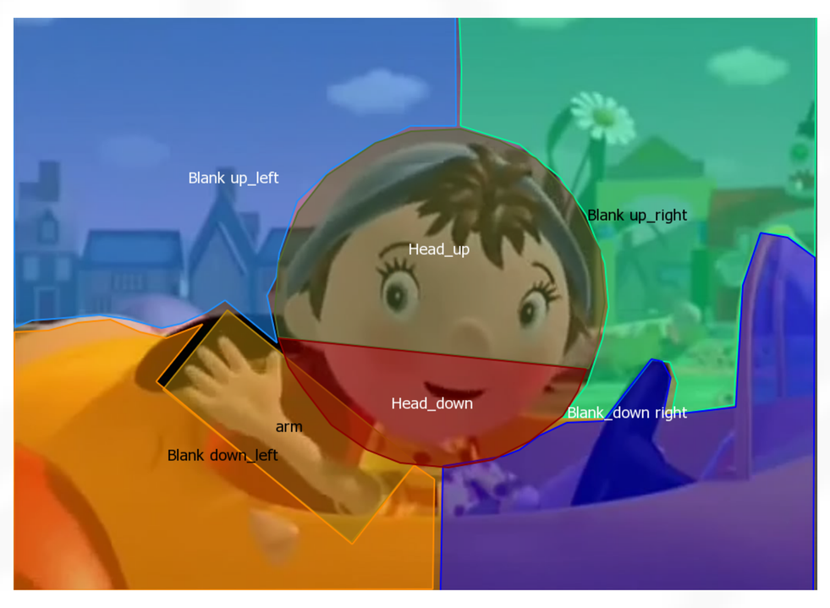


Figure 1. AOIs defined in the video: upper face, lower face, arm, background.

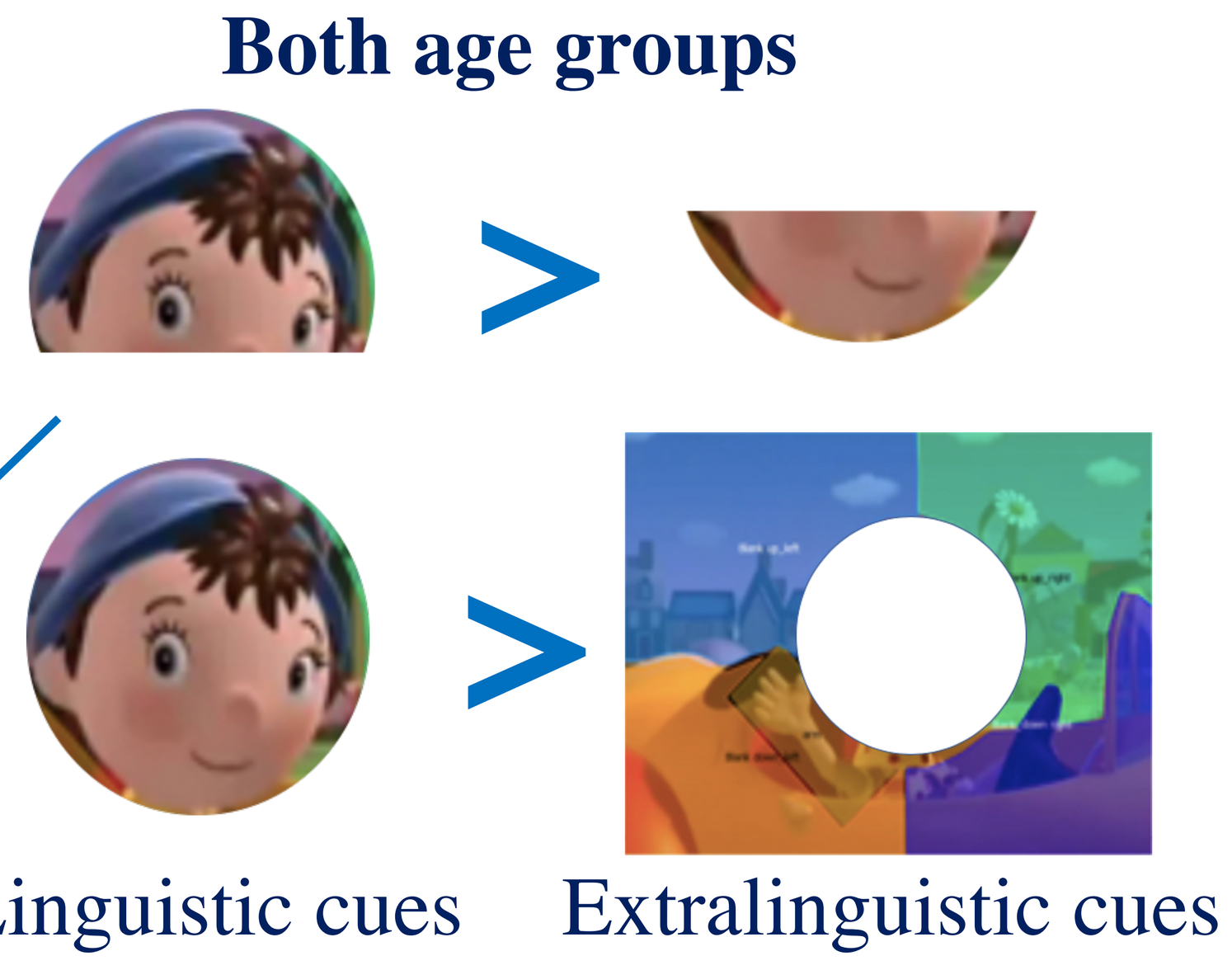
Materials and Procedure

- Analysis of the **gaze pattern**, using a remote eye-tracker (SMI RED500), based on a **4-second long dynamic video of a talking movie character** (Noddy), presented at the end of each block of a perception experiment to keep infants engaged in the task. The **video** was **carefully chosen** to allow **measurement** of **eye gaze to talking faces and social gestures** (see *video file*).
- **%** of **looking time** to the Areas of Interest **upper (eyes) vs. lower (mouth) face regions**, and to the **waving arm vs. background compared within** and **between age groups**.
- **Eye-gaze patterns** were **correlated with longitudinal measures**: (i) of **receptive and expressive language**, using **The Portuguese CDI short forms** (Frota et al., 2016), completed **between 8-30months**, and (ii) of **social communication, language and symbolic functioning skills**, using the **CSBS-DP Checklist adapted for EP** (Frota et al., 2014-2016), completed **between 6-24months**.

Results

Over development infants **increased** their **attention to the mouth**, as expected. Although decreasing over time, looking time to the eyes is not significantly different between age groups.

Both age groups



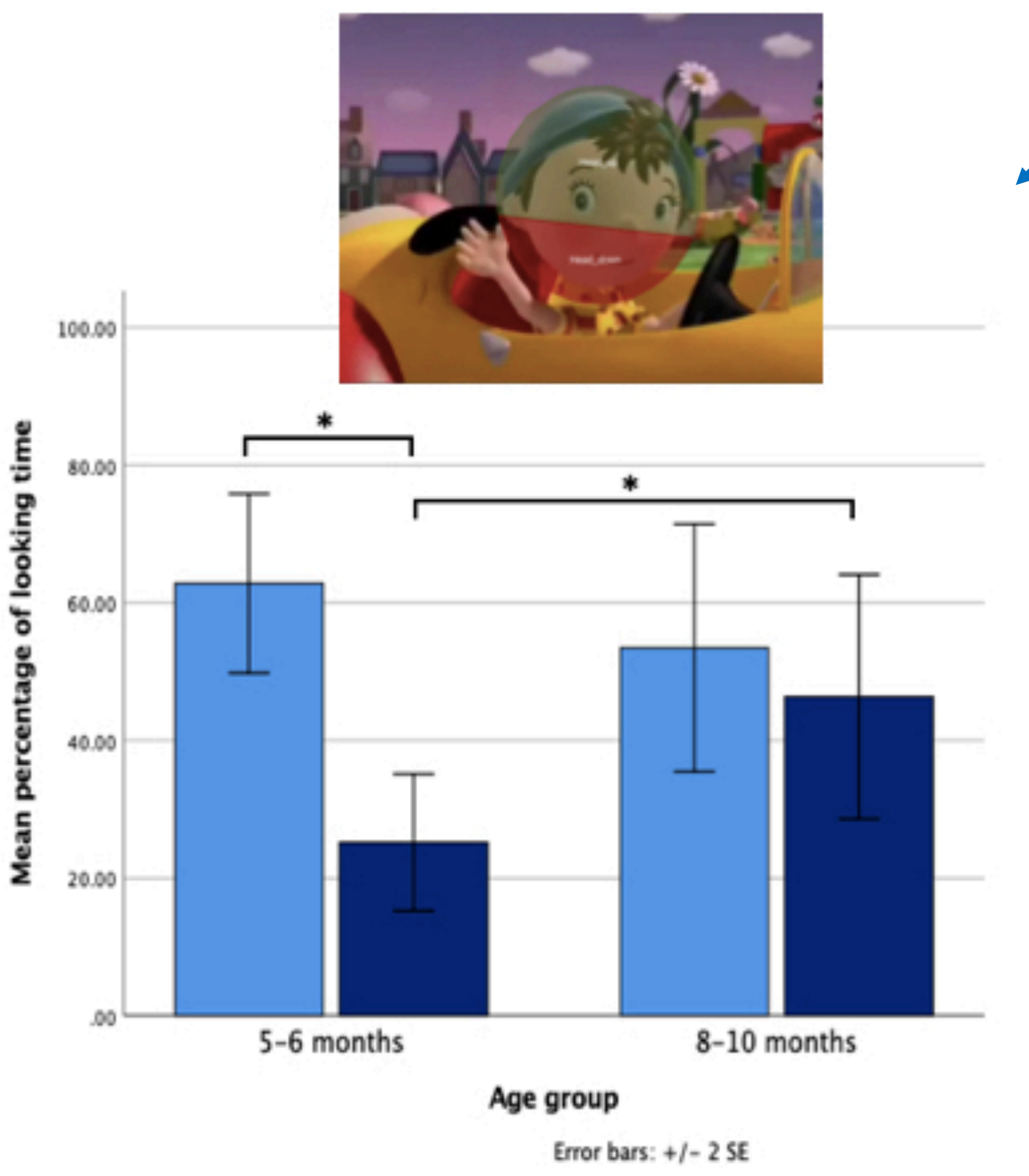
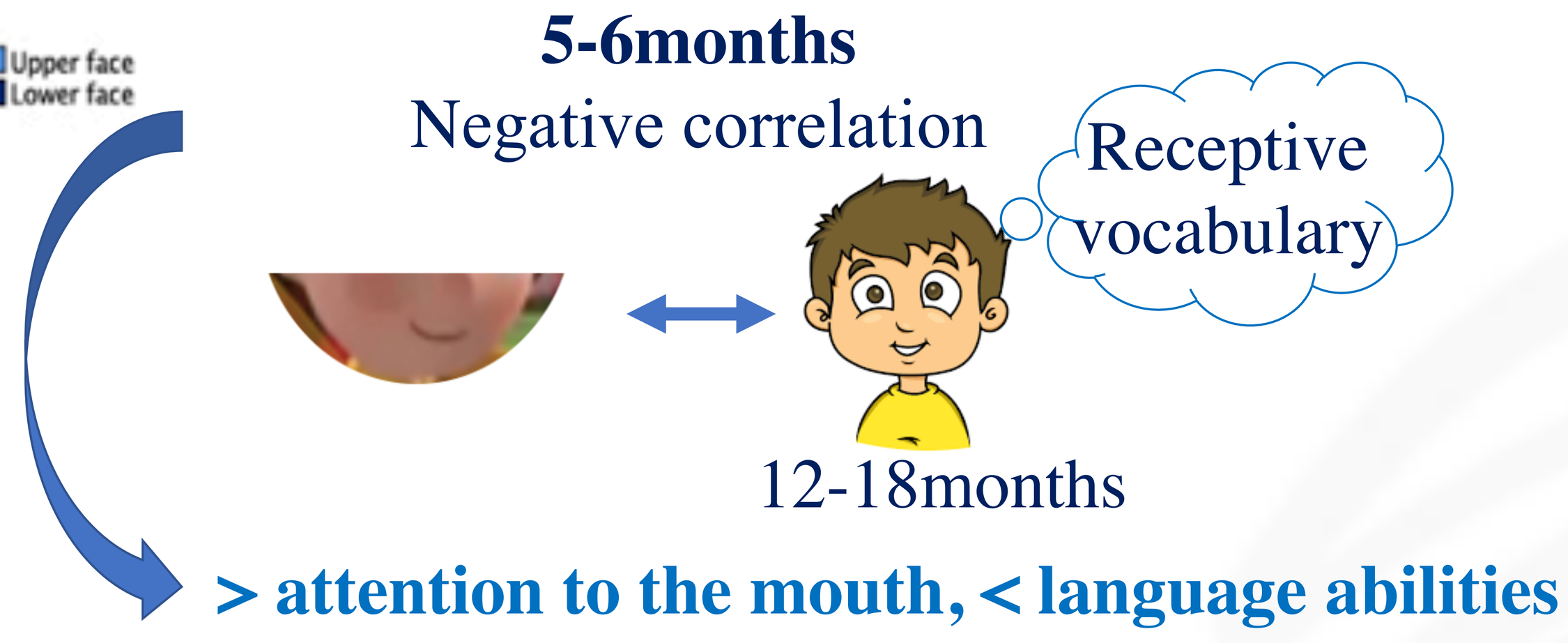
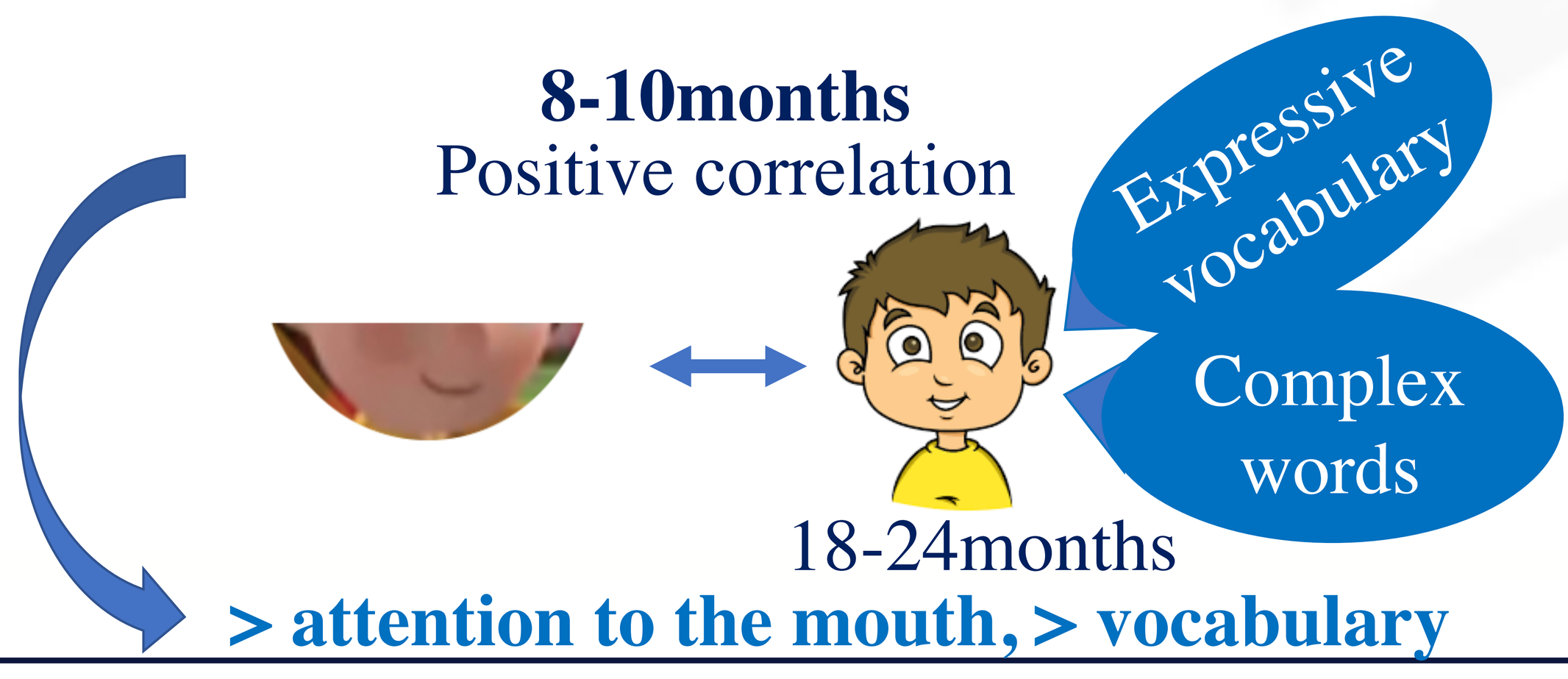


Figure 2. Mean % of looking time to the eyes and mouth regions (considering the face as 100%) in EP typically-developing infants aged between 5-6months (left bars) and 8-10months (right bars).





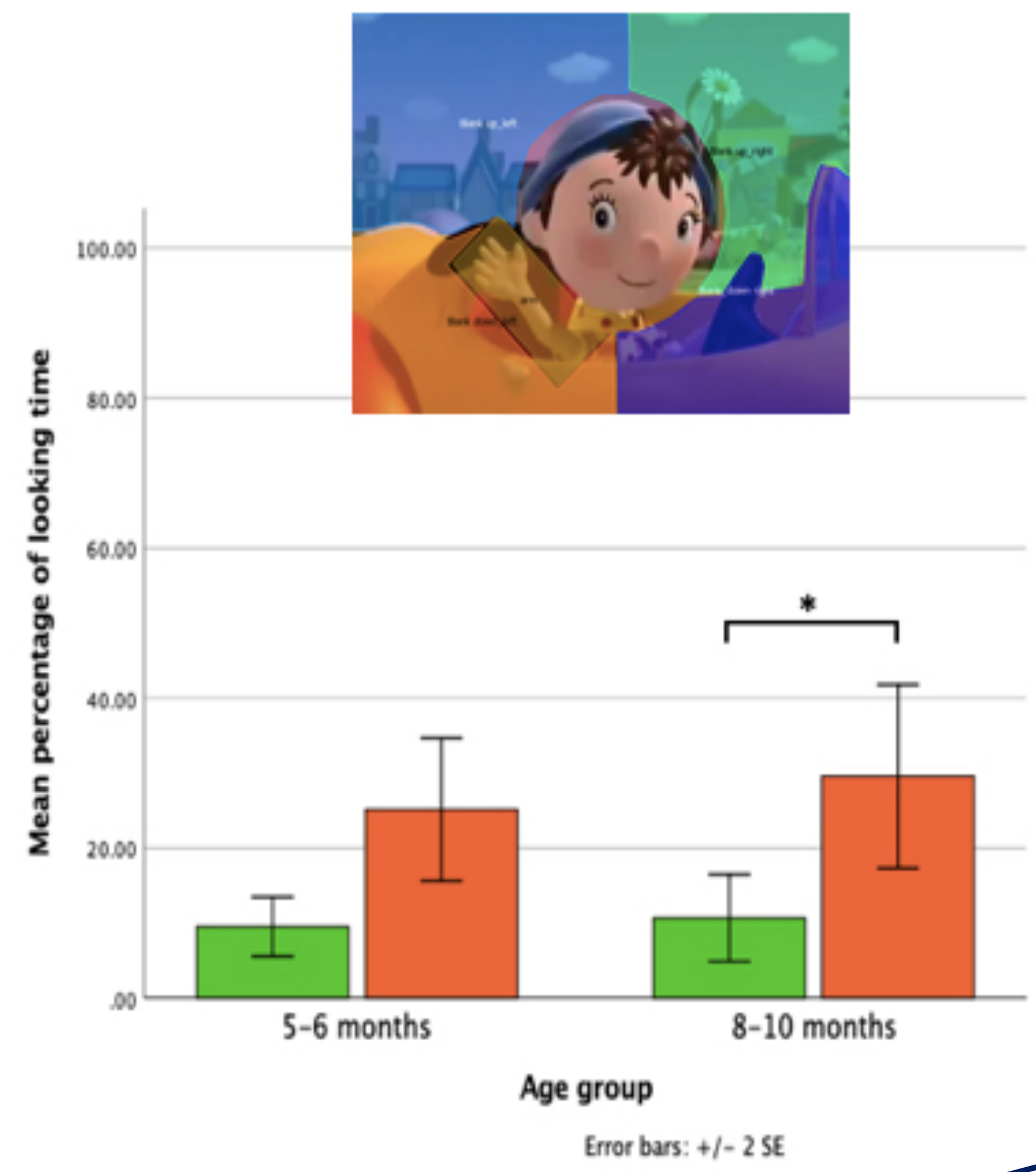


Figure 3. Mean % of looking time to the waving arm and background scene (considering the whole screen as 100%) in EP typically-developing infants aged between 5-6months (left bars) and 8-10months (right bars).

8-10months

Eye-gaze to the **waving arm** is **still quite low**.

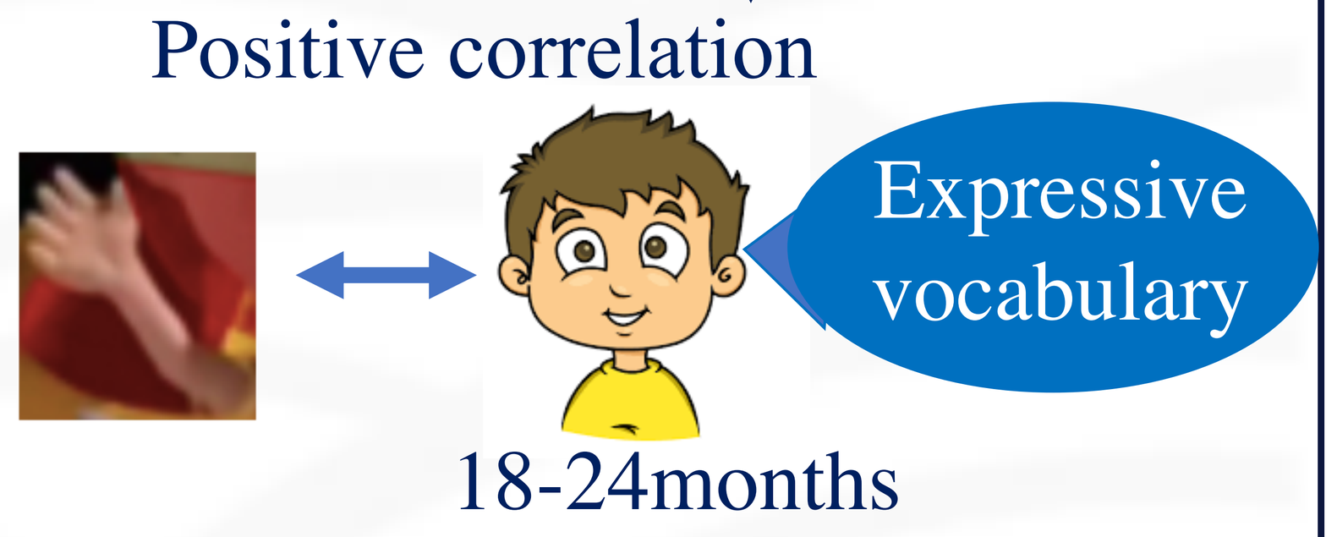
BUT

Positive correlation

Concurrent social composite score of CSBS

ongoing acquisition of social skills

Positive correlation



development of language ↕ **social communicative skills**

Main Findings

- **Attention to the mouth increases over development, but** there is no **attentional shift** at **8-10 months** >>> **gradient** rather than **categorical developmental process**.
- **First evidence showing that early attention to the mouth** is **≠ associated** to **later language outcomes: 5-6months**: **negative correlation** with **receptive vocabulary** by 12-18months; **8-10months**: **positive correlation** with **expressive vocabulary** by 18-24 months.
- **Eye-gaze to non-linguistic social cues** is **related** with the **development** of **language** and **communication**.

Selected References

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