The Modality and Relative Eye Gaze Orientation (MARGO) Project: A Look at Caregiver Eyes

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INTRODUCTION

Parent Infant Eyetracking (PIE) Project

aims to understand how hearing status influences:
- language learning during parent-child interactions
- novel word learning during joint attention

Modality and Relative Eye Gaze Organization (MARGO) Project

aims to understand how:
- gaze patterns can support language learning
- language modality influences parent eye gaze during play

Figure 1. Goals of the PIE and MARGO projects. Visual and audio data from the PIE project is used for the MARGO project.

Eye Gaze and Language Modality

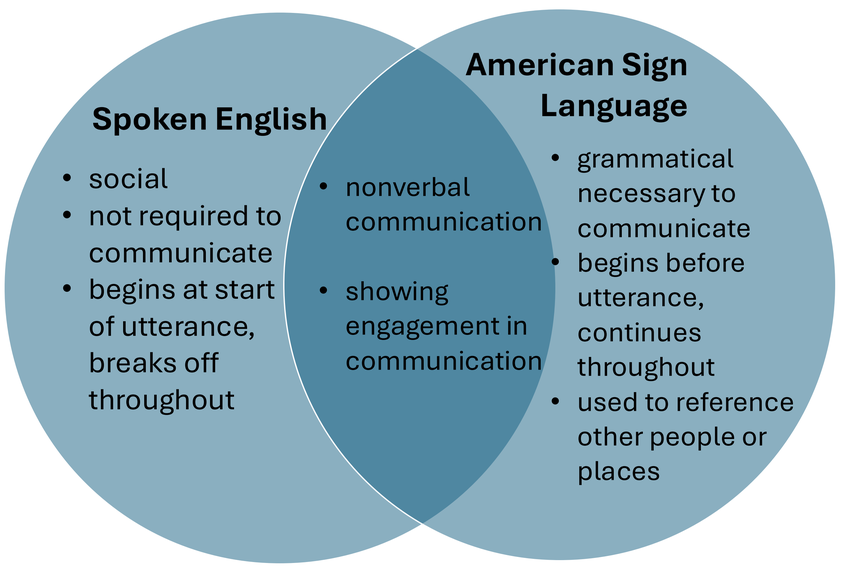

Figure 2. Similarities and differences between spoken English and American Sign Language.
Note: Eye gaze can vary based on culture

PURPOSE

This project is aimed at investigating the eye gaze patterns in caregivers to children who are D/deaf and hard of hearing who have experience with a visual language compared to caregivers without.

METHODS

PIE Data

- Parents and their children participate in 10-minute play sessions while both wearing eye-tracking devices (*Figure 3*).
- Visual and audio data is collected and used for further analysis.

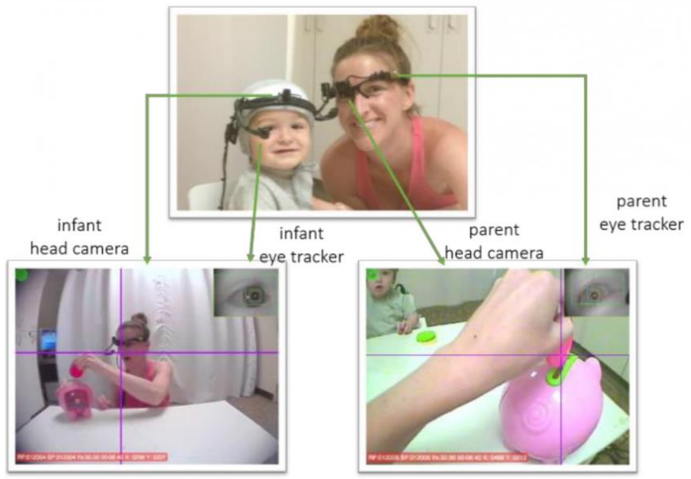

Figure 3. Participants wearing eye trackers for PIE project and images of what eye tracking data looks like.

Figure 4. Parent and child participating in PIE project play session.

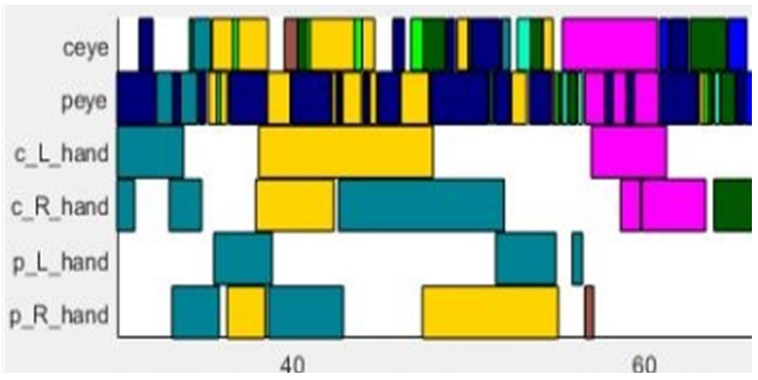

Figure 5. How play session data is visualized. Each color represents a different object being looked at or touched by the caregiver or child's hand. The top two represent the child and parent's gaze fixations, respectively. The next two are the child's left and right hands, and the bottom two are the parent's left and right hands. Joint attention can be visualized above, as can be seen by the pink blocks, when caregiver and child are both looking at the object in the child's hands at the same time.

MARGO Analysis

- Using timestamps of target word utterances, fixations during the pre-utterance (first .333 s before target word) are recorded as either FACE, TARGET, or OTHER.
- Percentage of time spent fixated on the child's face during pre-utterance is calculated.
- Participant data is grouped into D/deaf or hard of hearing (DHH) spoken or visual, and typically hearing (TH)

RESULTS

Table 1
Utterance Instances Grouped by Language and Modality

	TH	DHH	TOTAL
		Language	
spoken English	198	307	505
sign support	0	242	242
American Sign Language	0	45	45
		Language Modality	
visual	0	287	287
spoken	198	307	505

Table 1. Number of instances for each language modality. This is not representative of how many families used each modality, rather the number of target word utterances across all families sorted by which language modality used by the caregiver saying the utterance.
Note: ASL and sign supported language information was not collected on children in the TH group

- A U Mann-Whitney test was performed to compare percentage of time spent fixated on the face during the pre-utterance time between:
  - DHHspoken and DHHvisual
  - DHH (all) and TH

There was no significance between DHHspoken and DHHvisual (p = .606), **but there was significance between DHH (all) and TH (p = .010).**

DISCUSSION

The current data set does not reflect parent experience with different language modalities causing specific eye gaze patterns. Results do indicate that parents of children who are DHH look at the child's face more during the pre-utterance period.

However, we plan to dig deeper into the populations we are working with

Future Direction

More inclusive DHH population sample
- New participants no longer need to meet 70% spoken English requirement
- Recruit more families with varying levels of visual language experience (especially families with true ASL experience)

Automated Data Coding
- Currently, all data for the MARGO project is coded by hand
- In the near future, an automated coding system will be created to expediate the coding process

TH experience with visual language
- Include specific language experience on surveys of TH caregiver group

ACKNOWLEDGEMENTS

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