There are 60 participants, each watched about 18 videos. The initial data frame has 1.5 million rows and 155 columns.

In this poster, we use eye-tracking data from the study to explore relationships between the initial AOI and children’s final decisions. Does how children process visual information in images depend on image content and external stimuli? To determine this, one of our project advisors (Dr. Vales) carried out a study in which 60 children ages 4-7 watched videos showing two novel objects while pre-recorded messages were played; each message corresponded to one of the objects. The children ultimately were asked to select one object that corresponds to the referent object in the message.

In this poster, we use eye-tracking data from the study to explore relationships between the novel object type and children’s reactions before and after an external stimulus, as well as how various factors contribute to children’s final decisions.

The initial data frame has 1.5 million rows and 155 columns. There are 60 participants, each watched about 18 videos.

Eye-gaze data is summarized by defining areas of interest (AOI), at any given time the children are looking at correct object, incorrect object, neither, or no data. AOI were also separated into correct/incorrect AOI defined according to the active AOI and correct response for trial.

We further subdivide the data into two phases based on when particular information regarding language comprehension is read to the children.

### Differences between Fixation Time

For each domain, the proportion of children looking at the correct/incorrect AOI was calculated for every time bin, 20 ms, starting 1s before critical phase to 2s after. Then the difference between the domains were calculated. These difference points were then subject to nonparametric bootstrapping via resampling cases. The bootstrapping estimates the difference of fixation averages between the domains in the population along with its variation. The result was that the difference curve for the correct AOI, was significantly different between the domains. For the incorrect AOI, the differences were significantly nonzero at all points except 0.5 seconds past the critical start, when the two curves overlap.

### Correlation between the percentage of time spent gazing at AOIs and participants’ correctness of response

- **Correctness of Response**
  - **Hits on correct object**
  - **Hits on incorrect object**

- **Percentage of Hits on correct AOI**
  - During critical phase, average time spent on both AOIs for correct choice is the same as incorrect choice.
  - During critical phase, average time spent on both AOIs for correct choice is more than incorrect choice.

- **Percentage of hits on correct AOI over a time window**
  - Proportion of hits on correct AOI during the critical information time vs time interval immediately following it.
  - Resulting p value of 0.4423

### Correctness of response - hits on correct object

How does the number or proportion of hits on correct AOI in a trial influence the response? We look at critical info period only and the entire span of the trial.

<table>
<thead>
<tr>
<th>HD</th>
<th>Mean prop correct AOI during critical info for correct trials</th>
<th>Mean prop correct AOI during critical info for incorrect trials</th>
<th>t</th>
<th>95% CI</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prop Correct/Incorrect AOI</td>
<td>In all time span, average time spent on both AOIs for correct choice is the same as incorrect choice</td>
<td>In all time span, average time spent on both AOIs for correct choice is more than incorrect choice</td>
<td>1.76E</td>
<td>[0.08, 0.18]</td>
<td>Sufficient evidence to reject H0</td>
</tr>
<tr>
<td>Prop Correct/Incorrect AOI</td>
<td>During critical phase, average time spent on both AOIs for correct choice is the same as incorrect choice</td>
<td>During critical phase, average time spent on both AOIs for correct choice is more than incorrect choice</td>
<td>0.083</td>
<td>[0.0125, 0.0843]</td>
<td>Sufficient evidence to reject H0</td>
</tr>
</tbody>
</table>

### Average eye fixation crosses between the left and right media

- **During critical information interval,** the four highest scoring participants had a higher average than the total 60 children who averaged 1.725 fixation crosses. Two sample t test performed to determine if there is a significant difference between the average number of left and right fixation crosses during the critical information time vs time interval following it. Resulting p value of 0.4423

#### Highest Scoring Participants

<table>
<thead>
<tr>
<th>G25</th>
<th>G28</th>
<th>S139</th>
<th>S154</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average number of times, in all trials, that two consecutive eye fixations cross the middle boundary during critical information time</td>
<td>3.11</td>
<td>2.33</td>
<td>3.15</td>
</tr>
<tr>
<td>Average number of times, in all trials, that two consecutive eye fixations cross the middle boundary after critical information time</td>
<td>3.65</td>
<td>3.94</td>
<td>3.75</td>
</tr>
</tbody>
</table>

- **Gaze point (xi,yi)** are looking at correct object, incorrect object, or elsewhere on the screen.

- **Eye gaze cross L>R or R>L**

- **Correctness of response**
  - **Correct AOI, Incorrect AOI, elsewhere**

- **Variations of hits on AOI during correct trials**
  - During critical phase, average time spent on both AOIs for correct choice is the same as incorrect choice.
  - During critical phase, average time spent on both AOIs for correct choice is more than incorrect choice.

- **Proportion of hits on correct AOI over a time window**
  - Proportion of hits on correct AOI during the critical information time vs time interval immediately following it.
  - Resulting p value of 0.4423

### References: