The Effects of Mask-Wearing on Infant Visual Attention to Audiovisual Speech

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Introduction

- Faces are important for providing information to infants regarding emotions, language imitation and speech production, gaze direction and joint attention (Meltzoff & Moore, 1993; Pons et al., 2019; Hecke et al., 2007).
- Previous research has shown that infants direct their attention to different areas of the face (eyes vs mouth) based on age and language (Lewkowicz & Hansen-Tift, 2012).
- Research indicates children are less accurate in determining emotions when faces are masked (Ruba & Pollak, 2020).
- The SARS-CoV-2 (Covid-19) pandemic introduced concerns regarding the impact of mask-wearing on infant visual attention to audiovisual speech.
- This study explored the distribution of infant selective attention when viewing either a masked or unmasked woman speaking in native or non-native speech.

Hypotheses
- **6-month-olds would primarily focus on the eyes across all conditions.**
- **In the masked condition, 12-month-olds would focus on the eyes in their native language and the mouth in the non-native language.**
- **In the unmasked condition, 12-month-olds would focus on the eyes in both languages.**

Results

DWELL TIME
- Total amount of time infants spend looking at the face
- Infants spent more time attending to unmasked presentations compared to masked presentations
  - Unmasked M=11854.29 ms, SD= 7397.63
  - Masked M=9520.71 ms, SD=6245.12
  - $t(41)$=-3.811, p=<0.001, d=0.588

Differences in PTLT to Facial AOIs by Masking Condition
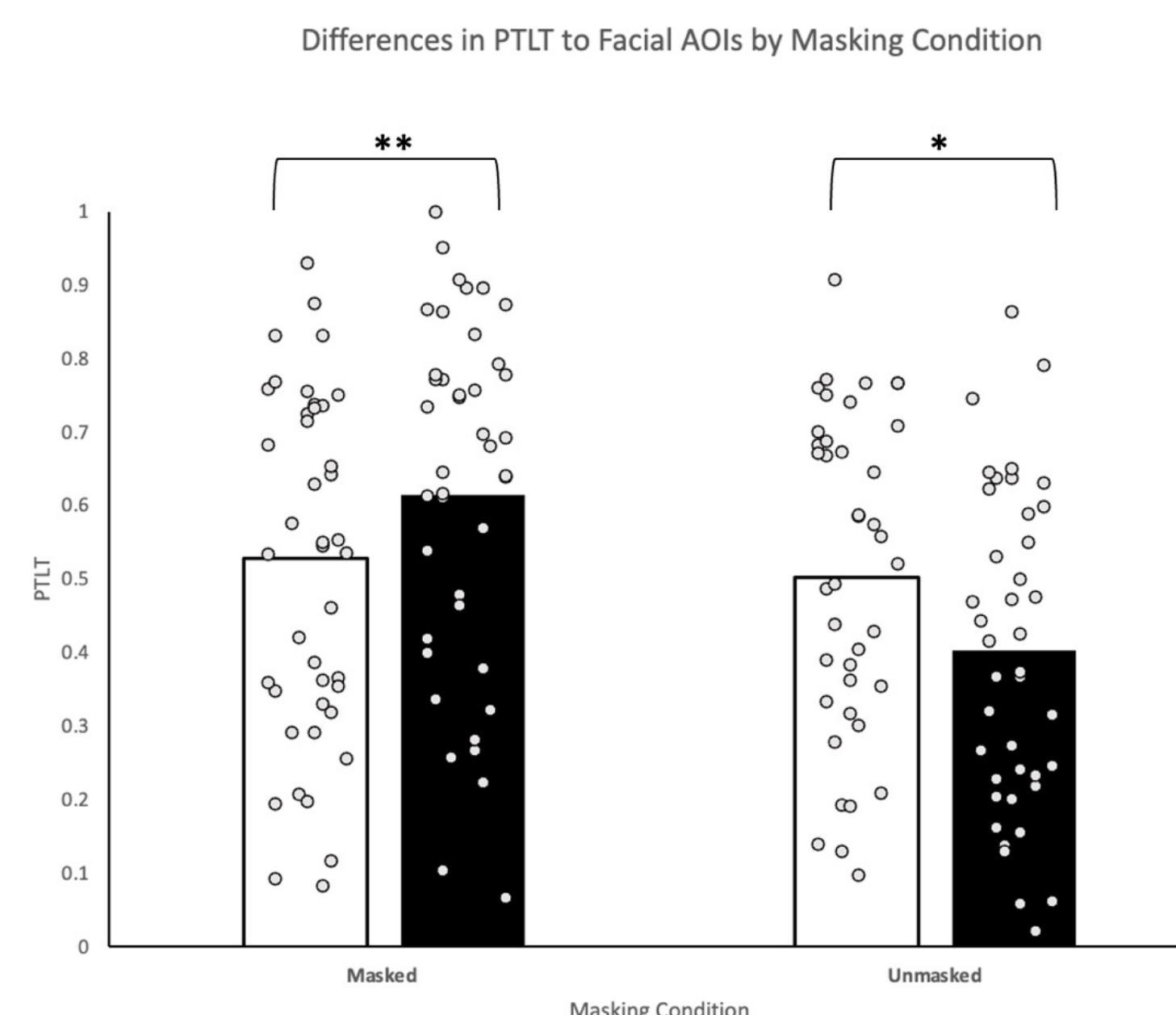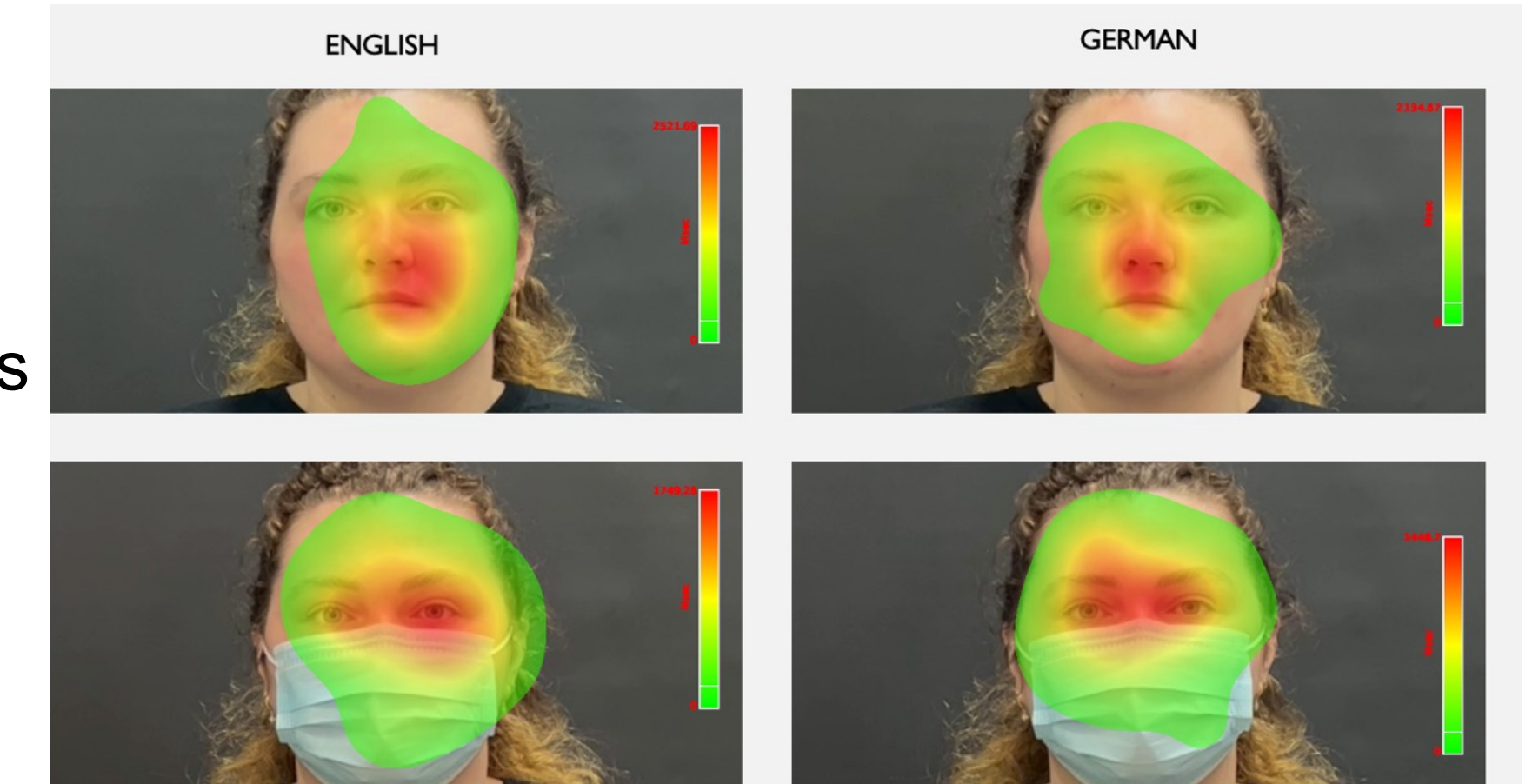
PTLT
- Proportion of time spent looking at the AOI compared to the entire face
- Mask by AOI Interaction
  - $F(1,40)$=30.03, p=<0.001, ηp^2=0.429
    - Mouth Unmasked > Eye Unmasked
      - $t(41)$=-2.775, p=0.004
    - Eyes masked > Mouth Masked
      - $t(41)$=3.336, p=<0.001

Means and Standard Deviations of PTLT between Facial Areas of Interest as a Function of Masking Condition and Language by Age

	Unmasked						Masked					
	6Mos		12Mos		Averaged		6Mos		12Mos		Averaged	
AOI	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
English												
Eyes	0.437	0.230	0.409	0.316	0.423	0.273	0.658	0.315	0.504	0.261	0.581	0.288
Mouth	0.554	0.237	0.590	0.319	0.572	0.278	0.309	0.315	0.483	0.259	0.396	0.287
German												
Eyes	0.414	0.263	0.352	0.287	0.383	0.275	0.720	0.241	0.578	0.281	0.649	0.261
Mouth	0.587	0.262	0.645	0.284	0.616	0.273	0.275	0.243	0.415	0.273	0.345	0.258

Method

Participants
- 42 infants tested at 6 months (N=22) and 12 months (N=20)
- All monolingual English-learning infants

Apparatus
- EyeLink 1000 Plus infrared eye tracker

Stimuli
- 4- 30 second video clips of an actress speaking
  - English/English Masked
  - German/German Masked
- Order of presentation was counterbalanced across language and masking conditions
- All infants saw all 4 videos twice
- Attention getters were played between each video to ensure infants were centrally fixated and engaged

AOIs
- The eye interest area covered the top half (middle of bridge of nose and above) and the mouth interest area covered the lower half (middle of bridge and below) of the face

Block Example
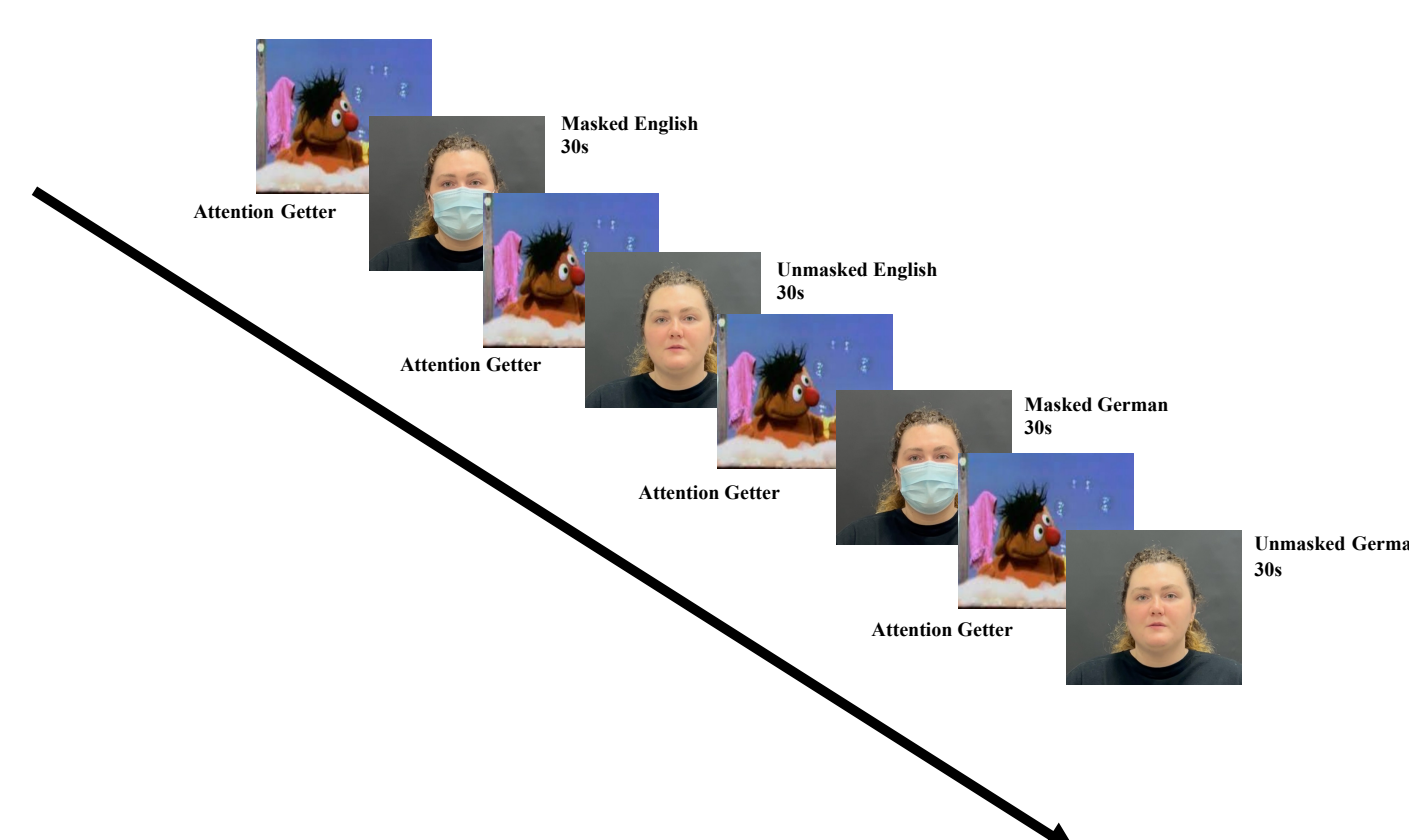
AOIs Example

Discussion

- 6- and 12-month-old infants spend a proportionally longer time looking at the mouth region of the face in the unmasked condition than in the masked condition regardless of language.
- Infants spend more time attending to unmasked faces compared to masked faces. Could potentially impact later face processing.
- The significant interaction between AOI and masking condition indicates that when the view of the mouth is occluded by a mask, infants shift their selective attention toward the eyes.
- Previous work exploring infant visual attention to talking faces has used Spanish or French as the non-native language. This is the first study to use German as a non-native language, which is more similar than the previous to English.
- Future research is needed to examine the potential impact of the effects of masking on infant selective attention to audiovisual speech on early learning and language development.

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