https://www.scientificamerican.com/article/masks-can-be-detrimental-to-babies-speech-and-language-development1/

Hed: Are Masks Detrimental to Speech and Language Development in Babies?

Dek: In principle yes, but parents can compensate

David J. Lewkowicz

My daughter's friend was recently alarmed when she was told that her two-year-old must wear a mask in preschool. Her little girl already struggles to make herself understood, and her mother worries that the mask will make it harder for her daughter to be understood and that she will have trouble telling what her masked peers and teachers are saying.

Now that the face mask has become the essential accoutrement of our lives, the COVID pandemic has laid bare our fundamental need to see whole faces. Could it be that babies and young children, who must learn the meaning of the myriad communicative signals normally available in their social partners' faces, are especially vulnerable to their degradation in partially visible faces?

Faces are a complex and rich source of social, emotional and linguistic signals. We rely on all of these signals to communicate with one another through a complex and dynamic dance that depends on each partner being able to read the other's signals. Interestingly, even when we can see whole faces, we often have trouble telling what other people are feeling. For instance, as the psychologist Lisa Feldman Barrett has noted, we can interpret a smile as meaning "I'm happy," "I like you" or "I'm embarrassed". So, seeing partially visible faces robs us of a plethora of linguistic signals that are essential for communication.

Babies and young children see and hear communicative signals and learn to attach meanings to them through their everyday interactions with their caregivers and social partners. Take, for

example, a baby at a birthday party or in a day care center where several masked people can be heard and seen talking. To figure out which face goes with which voice, that baby must learn that the mouth is the source of spoken language and that looking at the mouth is essential for figuring out whether a particular person's face goes with a particular voice.

We wanted to know whether and when babies might discover the importance of a talker's mouth. So, in one study in my lab, we showed videos of talking faces to babies of different ages and tracked their attention by using an eye-tracking device. We discovered that babies begin lip-reading at around 8 months of age. Crucially, the onset of lip-reading at this age corresponds with the onset of canonical babbling, suggesting that babies begin lip-reading because they become interested in speech and language. By lip-reading, babies now gain access to visual speech cues which, as Janet Werker and her colleagues at the University of British Columbia have shown, are clearly perceptible to them. So, the lip-reading now enables babies to see the visible speech cues that they need to figure out which face goes with which voice. Of course, babies cannot access visible speech cues if others are wearing masks.

Importantly, our discovery of lip-reading came from a study of only English-learning infants and, so, we were not sure if this was a universal behavior seen in babies learning any language. To answer this question, in subsequent studies with my collaborators, Ferran Pons and Laura Bosch at the University of Barcelona, we examined Spanish- and Catalan-learning infants' response to talking faces and found that they also begin lip-reading at around 8 months of age. Intriguingly, we also found that bilingual Spanish- and Catalan-learning babies lipread *more* than their monolingual counterparts, indicating that bilingual babies rely more on visual speech cues to help them keep their two languages apart.

Crucially, once lip-reading emerges in infancy, it becomes the default mode of speech processing whenever comprehension is difficult. This is illustrated by our latest studies in which my Spanish colleagues, their graduate student Joan Birules and I found that 4–6 year-old bilingual children lip-read more when they are confronted with speech in an unfamiliar than in a familiar language. Similarly, we found that adults who are expert second-language speakers lip-read more than their monolingual counterparts when presented with speech in their second

language. These findings are consistent with other evidence that adults resort to lip-reading when confronted with speech-in-noise, accented speech or foreign-language speech.

Overall, the research to date demonstrates that the visible articulations that babies normally see when others are talking play a key role in their acquisition of communication skills. Research also shows that babies who lip-read more have better language skills when they're older. If so, this suggests that masks probably hinder babies' acquisition of speech and language.

Of course, the news is not all bad. Babies spend much of their time at home with their unmasked caregivers. It is only in day care or when out and about with their parents that they don't see whole talking faces. Therefore, it may only be those situations that may have long-term negative consequences for babies. We need more research to tell us if this is the case.

In the meantime, how can we ensure that my daughter's friend's little girl will, at a minimum, understand her masked peers and teachers? The best advice is that, when outside the home, we should follow CDC's guidance and always wear a mask; in contrast, when home and unmasked, we should engage in as much *en face* communication with our babies as possible so that they can see and hear our talking faces in their full splendor. Practicing the latter will ensure that babies' young brains, which are highly adaptable, will have the opportunity to compensate for the perceptual deprivation that they experience outside the home.

David J. Lewkowicz, Ph.D., is a senior scientist at Haskins Laboratories and an adjunct professor in the Yale Child Study Center, Yale University.

https://medicine.yale.edu/profile/david_lewkowicz/