

COVID-19 and its unprecedented challenges in communication

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Abstract— The impact of visual cues on speech recognition in noise is explored in individuals with normal hearing and hearing loss (HL). Use of visual cues statistically significantly influenced the HL group’s speech understanding in noise.

Clinical Relevance— Individuals with HL could understand speech better in noise regardless of the wearing of a face mask. Healthcare professionals need to actively use communication strategies when interacting with them.

I. INTRODUCTION

The COVID-19 pandemic has led to unprecedented challenges in life, including healthcare. As social distancing and face mask become mandatory, individuals, especially those with hearing loss (HL), face two challenges: (1) reduced sound energy and (2) loss of visual cues. This study explores the impact of a face mask on speech recognition in noise.

II. METHODS

Seven people with normal hearing (NH) and 10 with HL participated in the study. The mean ages for NH and HL groups were 26.3 and 57.0 years, respectively. Puretone averages were 0.0 dB (right ear) and 1.1 dB (left ear) for the NH group and 42.4 dB (right ear) and 43.3 dB (left ear) for the HL group.

All participants completed puretone audiometry and speech-in-noise testing. The speech testing involved a video of a male and a female speaker saying the Korean Speech Audiometry sentences with (Mask condition) and without a face mask (No mask condition) (Fig. 1).



Figure 1. A screenshot of the video.

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Each condition consisted of visual and no visual cues conditions. The video was provided as a visual cue in the visual cues condition and vice versa. In all conditions, the participants listened to the sentences (presentation level of 65dBA) in noise (0dB signal-to-noise ratio) and repeated them back to the tester. Test conditions are described in Table 1.

TABLE I. TESTING CONDITIONS

Speech in noise testing	Conditions	
	No mask	Mask
	No visual cues	No visual cues
	Visual cues	Visual cues

III. RESULTS

No significant differences were observed regardless of the provision of visual cues. Table 2 shows the median, interquartile range, and p-value for all conditions.

TABLE II. SPEECH IN NOISE PERFORMANCE OF THE NH GROUP

Conditions	Provision of visual cues		
	No visual cues	Visual cues	P
No mask	90 (70 – 100)	90 (90 – 100)	0.8125
Mask	90 (60 – 100)	80 (80 – 90)	0.9375

Table 3 illustrates HL group’s speech recognition performance in noise. Statistical significance was observed for all conditions (* $P < 0.05$).

TABLE III. SPEECH IN NOISE PERFORMANCE OF THE HL GROUP

Conditions	Provision of visual cues		
	No visual cues	Visual cues	P
No mask	15 (0 – 30)	70 (10 – 80)	0.0234*
Mask	20 (0 – 30)	40 (10 – 60)	0.0313*

IV. DISCUSSION & CONCLUSION

Individuals with HL were able to understand speech better in noise when they were able to see the speaker even if the speaker was wearing a mask. Findings are in line with pre-existing studies that visual cues have a positive influence on speech recognition.

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