

Research Article

Listening Effort and Speech Perception Performance Using Different Facemasks

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ABSTRACT

Purpose: The aim of this study was to assess the effect of eight different facemasks on speech perception and listening effort in listeners with normal hearing (NH) and hearing loss by manipulating both mask type and background noise levels.

Method: Forty adults listened to Quick Speech-in-Noise Test sentences recorded by a female talker through eight different facemasks including a baseline condition with no mask. Listeners were tested in the sound field positioned 6 ft from the loudspeaker. Signal-to-noise ratio (SNR) loss and listening effort were measured.

Results: Listeners with NH exhibited a mild SNR loss, whereas those with hearing loss experienced a moderate SNR loss. Scores for the mild hearing loss group were significantly poorer (higher) than those with slight hearing loss. Speech perception performance was best in the no mask, KN95, and surgical mask conditions and poorest in the cloth mask and cloth mask plus face shield conditions for all groups. As listening effort decreased, speech perception increased for all groups.

Conclusions: The impact of different types of facemasks on speech perception in noise was demonstrated in this study indicating that as the SNR was reduced, listening effort increased and speech perception performance decreased for listeners with NH and slight/mild hearing loss. No mask, KN95, and surgical masks had the least impact on performance, whereas cloth masks provided a significant detriment to communication. If communication is to occur in a background of noise while wearing masks, a KN95 mask and an SNR of at least +15 dB is recommended regardless of hearing status.

The COVID-19 pandemic brought unprecedented changes to everyday life, including the creation of nationwide facemask recommendations and mandates. Universal mask-wearing mandates were implemented to slow down and prevent the widespread transmission of SARS-CoV-2, the novel coronavirus commonly referred to as COVID-19 (Brooks et al., 2020). During the pandemic, facemasks became an essential addition to personal protective equipment (PPE) for health care workers and the general population. Facemasks can be generally categorized as respirators

(N95), medical masks (surgical masks [SMs]), and woven cloth masks (Nguyen et al., 2021). Facemasks are designed to protect against droplet-spread infectious diseases, such as COVID-19 (Gralton & McLaws, 2010). However, some masks are less effective at providing adequate protection from disease than others. Medical masks, such as N95 and KN95, provide the best protection, whereas cloth masks have been shown to be less effective (Chughthai et al., 2020).

Properly fit facemasks cover a significant portion of a person's face, including the lips and mouth, which can negatively impact social interaction and introduce difficulties in understanding spoken language. Carbon (2020) examined the effects of facemasks on one's ability to recognize facial expressions and found the presence of facemasks significantly affected one's ability to correctly

Correspondence to Lisa Lucks Mendel: lmendel@memphis.edu. *Disclosure:* The authors have declared that no competing financial or non-financial interests existed at the time of publication.

Effort At Speech

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Effort At Speech :

The book delves into Effort At Speech . Effort At Speech is a crucial topic that must be grasped by everyone, ranging from students and scholars to the general public. This book will furnish comprehensive and in-depth insights into Effort At Speech , encompassing both the fundamentals and more intricate discussions.

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- Chapter 5: Conclusion

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