

Benefits of OpenSound Navigator™ in children

EDITORS OF ISSUE

Elaine Ng, Senior Research Audiologist, Centre for Applied Audiology Research, Oticon A/S

ABSTRACT

New research shows that OpenSound Navigator improves children's speech understanding in noisy environments when listeners both directly face and face away from the principle talker, yet still preserves additional talkers coming from other locations. This new technology allows access to other talkers in the environment, which is fundamental to incidental learning for these children.

Children move around to explore and learn about their world, and providing appropriate and adequate hearing care to children who are hard of hearing can be challenging. While noise has detrimental effects on speech understanding and learning (e.g. Riley & McGregor, 2012), current technology designed to improve speech understanding in noise, such as directionality and noise reduction, may only have minimal benefits for word learning in school-age listeners (Pittman, 2005). For instance, the benefit of directional microphone technology is effective when the listener is facing the target speaker, but may actually be detrimental when the listener is facing away from the target.

The OpenSound Navigator (OSN) in Oticon Opn™ hearing aids reduces noise and preserves speech coming from any direction (Le Goff et al., 2016). It provides better speech recognition in noise even when the listener is not facing the talker. This is particularly important for children because spontaneous speech may come from any direction in typical learning environments, and because children do not always turn in the direction of target speech (Ricketts & Galster, 2008). This allows children to have access to other talkers in the environment, while providing opportunities for incidental learning in everyday life.

Research study at Boys Town National Research Hospital

Researchers from Boys Town National Research Hospital in Omaha, NE, USA investigated whether the unique features of OSN improved children's speech recognition in noise. In their study (Browning et al., 2017), they compared the signal-to-noise ratios required to achieve 50% speech recognition in noise when OSN and omnidirectional setting (OMNI) is applied. Fourteen children (8-15 years of age) who were regular hearing aid users with average hearing thresholds of 45 dB HL listened and repeated verbally words presented from either the front or the side.

Speech recognition performance was assessed in three test conditions. Conditions 1 and 2 (Fig 1, left and middle panels) aimed to study whether OSN improves speech understanding in steady-state noise when the listener directly faced (Condition 1) or faced away from (Condition 2) the talker, respectively. Condition 3 (Fig 1, right panel) examined whether OSN preserves competing speech coming from different directions behind the listeners, with the expectation that OSN should yield comparable performance to OMNI in the presence of competing speech.

Findings indicate speech-in-noise benefits

Results from conditions 1 and 2 showed that the OSN, relative to OMNI, improved speech recognition performance by an average of 4.0 and 3.8 dB SNR when the children faced the target speech and when they faced away from the target speech, respectively. These correspond to 20-30 percentage point improvements in speech recognition in both conditions 1 and 2 when comparing OSN to OMNI.

Results from condition 3 showed no statistically significant difference between OSN and OMNI in terms of speech recognition performance.

Implications

Unlike the conventional directionality and noise reduction technology, OSN does not require children to face directly or look at the talker the whole time in order to enjoy better speech understanding in noise. Young listeners may move around freely and can still experience the benefits of OSN. Another important feature of OSN is that it preserved speech coming from different directions. This new technology allows access to other talkers in the environment, which is fundamental to incidental learning for school-age children.

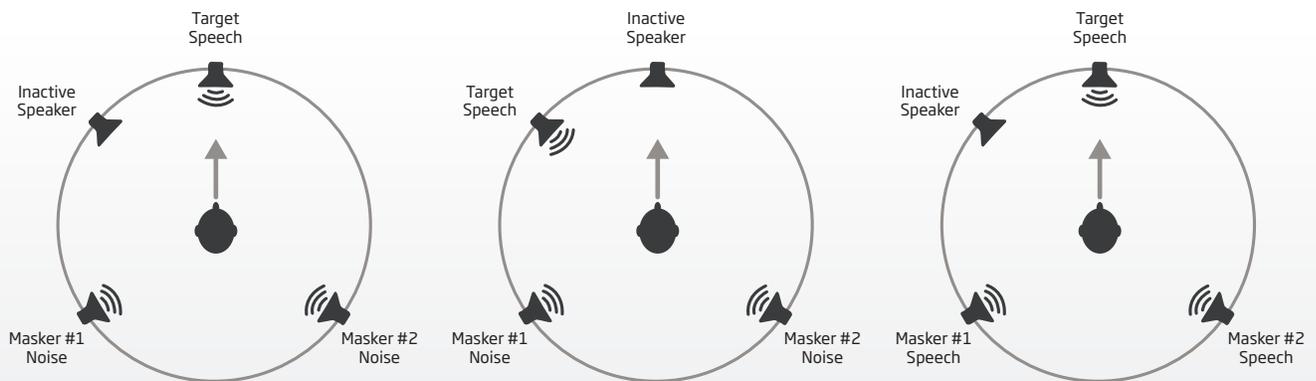


Figure 1. The experimental setup of the study. In conditions 1 and 2, target speech was presented either in front (left panel) or to the side (middle panel) of the listener in a stationary noise background. In condition 3, target speech was presented from the front in the presence of two competing streams of speech (right panel).

References

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