

Study Shows Reduced Listening Effort and Improved Speech Intelligibility with ReSound ONE and M&RIE

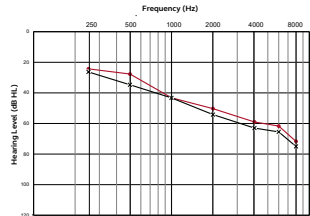
Megan Quilter, Au.D.

Introduction

One effect of hearing loss is that the effort spent to follow conversations can increase. Listening effort can be defined as the mental resources you deliberately allocate to listen and attend to auditory tasks.¹ Hearing loss may increase listening-related effort and fatigue in our daily lives. Those who wear hearing aids report reduction in the stress associated with not understanding or misinterpreting conversations, and less mental exhaustion.² While the primary goal of hearing instruments is to restore audibility for speech comprehension while maintaining safe and comfortable sound levels, secondary benefits such as reduced listening effort should not be overlooked.

The unique Microphone-and-Receiver-in-the Ear (M&RIE) was developed according to the ReSound Organic Hearing philosophy. The placement of the microphone in the ear canal captures sound in the canal as nature intended, preserving individual spatial hearing cues. It may help people who use hearing aids to resolve and focus on different voices and sounds in the environment with less effort. To test this idea, an investigation was carried out at Hörzentrum Oldenburg, Germany.

Methods



PARTICIPANTS

- 24 adults with prior hearing aid experience
- Age range 54-84 years
- Fit with ReSound ONE RIE hearing aids



OUTCOME MEASURES

- Adaptive Categorical Listening Effort Scaling Procedure (ACALES)³
 - *Subjectively perceived effort to follow a speaker in background noise*
- Göttingen Sentence Test (GÖSA)⁴
 - *Speech recognition in noise test*



TEST CONDITIONS

	ACALES	GÖSA
Unaided	✓	✓
M&RIE*	✓	✓
SureFit 3 Medium Power**	✓	✓

* Mic placement in ear
 ** Traditional mic placement

Results

Speech recognition in noise testing showed a significant improvement in speech reception thresholds for participants fit with ReSound ONE. M&RIE provided additional benefit compared to Surefit 3 MP receivers with traditional microphone placement ($p=.003$).

ACALES showed perceived listening effort was significantly less with ReSound ONE than unaided regardless of microphone placement ($p=.002$). A 2.6 dB benefit was revealed for the M&RIE, and a 1.8 dB benefit was observed for Surefit 3 with traditional microphone placement.

In addition, results with M&RIE showed a clear and consistent trend of more benefit in terms of listening effort reduction compared to Surefit 3 receivers across all listening effort categories.

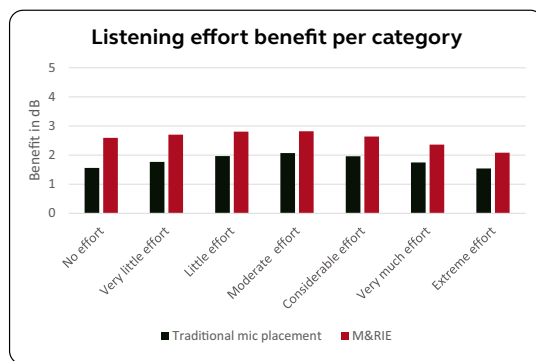
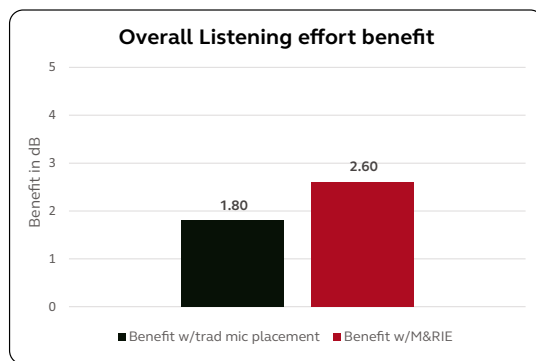
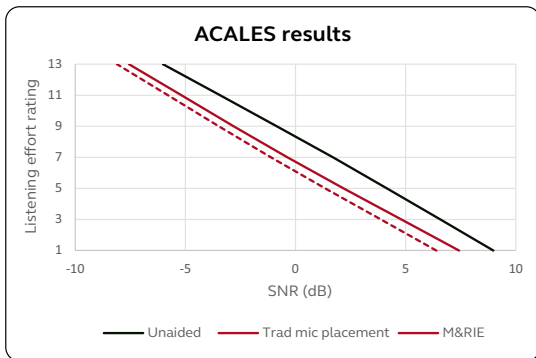
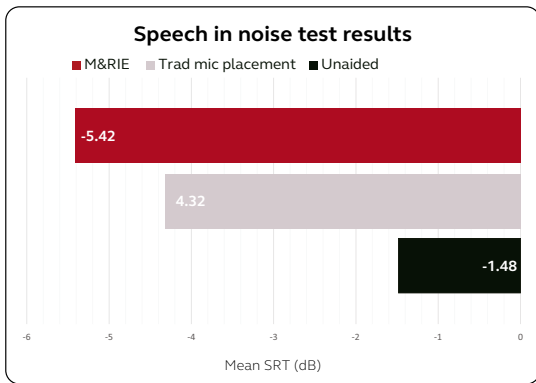
Conclusions

This study illustrated two important benefits of ReSound ONE with M&RIE:

1. Speech recognition in noise is slightly, but significantly, better with M&RIE compared to traditional microphone placement due to the natural directional effect of the pinna that M&RIE preserves.
2. Listening effort is significantly reduced when wearing ReSound ONE, and a clear trend for additional benefit with M&RIE over traditional microphone placement was observed.

References

1. Pichora-Fuller MK, Kramer SE, Eckert MA, Edwards B, Hornsby BW, Humes LE, Lemke U, Lunner T, Matthen M, Mackersie CL, Naylor G, Phillips NA, Richter M, Rudner M, Sommers MS, Tremblay KL, Wingfield A. Hearing Impairment and Cognitive Energy: The Framework for Understanding Effortful Listening (FUEL). *Ear Hear.* 2016 Jul-Aug;37 Suppl 1:5S-27S.
2. Bess, F. H., & Hornsby, B. W. (2014). Commentary: listening can be exhausting--fatigue in children and adults with hearing loss. *Ear and Hearing*, 35(6), 592–599.
3. Krueger, M., Schulte, M., Brand, T., & Holube, I. (2017). Development of an adaptive scaling method for subjective listening effort. *The Journal of the Acoustical Society of America*, 141(6), 4680-4693.
4. Kollmeier B, Wesselkamp M. Development and evaluation of a German sentence test for objective and subjective speech intelligibility assessment. *The Journal of the Acoustical Society of America*. 1997 Oct;102(4):2412-21.



Worldwide Headquarters
GN ReSound A/S
Lautrupbjerg 7
DK-2750 Ballerup
Denmark
Tel.: +45 4575 1111
resound.com

United Kingdom
GN Hearing UK Ltd.
Kirtlington Business Centre
Portway, Kirtlington
Oxon OX5 3JA
Tel.: +44 1869 352 800
resound.com

Australia
GN Hearing Australia Pty Ltd
Gate C, 19-25 Khartoum Road
Macquarie Technology Park
Macquarie Park NSW 2113
Tel.: (free) 1800 658 955
resound.com

New Zealand
GN Hearing New Zealand Limited
Ground Floor, North Entrance
4 Fred Thomas Drive
Takapuna, Auckland, 0622
Tel.: (free) 0800 900 126
resound.com

Singapore
GN Hearing Pte. Ltd.
456 Alexandra Road
#22-01
Singapore 119962
Tel.: +65 6320 9388
resound.com

CVR no. 55082715