Exploring the Relationship Between Working Memory, Compressor Speed, and Background Noise Characteristics - DTU Orbit (08/11/2017)

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Objectives: Previous work has shown that individuals with lower working memory demonstrate reduced intelligibility for speech processed with fast-acting compression amplification. This relationship has been noted in fluctuating noise, but the extent of noise modulation that must be present to elicit such an effect is unknown. This study expanded on previous study by exploring the effect of background noise modulations in relation to compression speed and working memory ability, using a range of signal to noise ratios. Design: Twenty-six older participants between ages 61 and 90 years were grouped by high or low working memory according to their performance on a reading span test. Speech intelligibility was measured for low-context sentences presented in background noise, where the noise varied in the extent of amplitude modulation. Simulated fast- or slowacting compression amplification combined with individual frequency gain shaping was applied to compensate for the individual's hearing loss. Results: Better speech intelligibility scores were observed for participants with high working memory when fast compression was applied than when slow compression was applied. The low working memory group behaved in the opposite way and performed better under slow compression compared with fast compression. There was also a significant
effect of the extent of amplitude modulation in the background noise, such that the magnitude of the score difference (fast versus slow compression) depended on the number of talkers in the background noise. The presented signal to noise ratios were not a significant factor on the measured intelligibility performance. Conclusion: In agreement with earlier research, high working memory
allowed better speech intelligibility when fast compression was applied in modulated background noise. In the present experiment, that effect was present regardless of the extent of background noise modulation.

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