The influence of hearing status on the pupil dilation response to listening effort

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The pupil dilation response (PDR) is widely applied to assess listening effort. The results of two studies will be presented. Study 1 examined the effect of hearing status and masker type (stationary noise versus interfering speech) on the PDR to masked speech presented across a broad range of speech-to-noise ratios (SNRs) to 25 hearing-impaired (HI) and 32 age-matched normal-hearing (NH) adults. For both groups and masker types, inverse U-shaped functions between PDR and SNR were observed. NH listeners had larger PDRs than HI listeners at low SNRs, but they had relatively smaller PDRs when SNRs were high. Study 2 assessed the neural correlates of the PDR in 17 NH and 17 age-matched HI adults. Speech reception thresholds in noise at 50\% intelligibility were adaptively estimated for the same maskers as in Study 1 as well as for noise-vocoded speech. The PDR was smaller in HI than in NH listeners. Depending on degradation type, hearing loss was associated with less activation in frontal areas and with more activation in the temporal lobe. The studies suggest that hearing status influences listening effort. The PDR likely reflects compensatory cognitive and control functions that are increasingly recruited in challenging conditions, but perhaps in a different way for HI listeners.