Children's and adults' sentence recognition and listening effort in noise

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Objectives: To compare children's accuracy in sentence recognition and listening effort (LE) to that of young adults in progressively worsening signal-to-noise ratios (S/Ns).

Background: Some children complain of being physically and mentally exhausted from a day of school largely due to struggling to understand speech in difficult classroom listening conditions. Little is known about how children's LE compare to adults' in progressively worsening listening situations.

Methods: Thirty-six young adults (M = 22.6 y) and 15 children (M = 10.6 y) with normal hearing listened to BKB - Sentences in Noise Test while their LE was measured objectively (skin conductance and pupillometry) and subjectively through ratings of effort and fatigue on a modified version of a previously used tool for children.

Results: Non-parametric Wilcoxon methods found no significant difference between the mean number of words correctly identified by children versus adults ($p = 0.11$). Ordinal regression (assuming proportional odds) found no significant differences between children's and adults' ratings of LE ($p = 0.62$). Percent pupil change was compared using a repeated measures ANOVA assuming a compound symmetric covariance structure. Effect modification between sentences and child or adult status were explored. There was no evidence that S/N was an effect modifier in the relationship between percent pupil change and child or adult status. ($F = 1.75$, $p = 0.22$). ANOVA found that change in skin conductance among adults was no different than that of the children ($F = 0.19$, $p = 0.67$).

Conclusions: Children did not differ from adults in their accuracy in sentence recognition or LE expended in progressively worsening S/Ns. However, all participants showed a positive index of change in galvanic skin conductance from baseline to the experimental task. Future research should use children of different ages, more difficult speech stimuli, and other possible sources of distortion such as reverberation.