Relating the development of speech perception in noise to temporal processing: Role of sensory, memory and decision factors

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Abstract:

The capacity to detect amplitude modulation (AM) appears to reach adult levels at around 10 years of age. The reasons for this are still unclear, because other data suggest that the sensory encoding of AM may be mature as early as 3 months of age. This may suggest that the improvement in AM sensitivity with age reflects changes in higher-level processing (“processing efficiency”) rather than changes in low-level processing (sensory encoding). This study tested this assumption by characterizing the contribution of sensory factors (modulation filtering) vs cognitive factors (memory and decision) to the development of AM sensitivity between 5 and 11 years. The ability of children and adults to detect AM i) as a function of AM rate (with or without masking AM fluctuations) or ii) as a function of the number of AM cycles, was evaluated to assess AM sensitivity, AM masking, and temporal integration for AM detection. This study also tested how this ability to process AM relates to speech intelligibility in noise during childhood.