Understanding Speech in Noisy Conditions

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When an environment is noisy, vision and audition cooperate to improve the ability to understand spoken communication. In fact, researchers have demonstrated that simulated cataracts can worsen the ability to understand speech, by reducing the usefulness of vision in the speechreading process. The purpose of this study was to determine if measures of visual, auditory, and/or cognitive performance could be used to predict how well participants understood spoken sentences in a noisy environment. Thirty participants, age 18-40, with normal vision and hearing, were tested on their visual, auditory, cognitive, and speechreading performance. Speechreading performance (i.e., speech intelligibility) was used to calculate the average benefit that participants gained from seeing (i.e., visual enhancement) and listening to the speaker, in comparison to only listening to the speaker with no visual input. Analyses showed that the best predictors of this visual benefit (i.e., visual enhancement) were two measures of cognitive functioning and one measure of visual functioning. These results suggest that the speechreading process is dependent on visual (i.e., contrast sensitivity) and cognitive (e.g., executive function) processes.