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A Study of Audio-Visual Coactivation in Noise

Our brains have many ways of processing information and when this information is difficult to pick out, our brains change the way they receive information. This study quantifies the effects of noise on the sense of hearing, the sense of vision, and the way in which these senses interact. Reaction time is often used to measure the complexity of processing tasks. The task of interest is auditory-visual integration, when the brain combines information it receives from the eyes and ears. I examined the way noise affects the interaction by applying threshold noise conditions to beeps and flashing blobs and measuring response times. I used both auditory noise, which sounds like radio static, and visual noise that looks like television static. I measured hundreds of reaction times for each subject under six conditions: just a beep, just a blob or both at once, then all of these with noise. In quiet (no noise), when both senses were simultaneously stimulated, reaction times were significantly smaller than either modality alone, indicating coactivation and a possible "intermodality" that is only activated when both auditory and visual modalities are stimulated. However, the audiovisual reaction times in noise are longer and follow the values predicted by each modality alone in noise. This indicates that the coactivation devices in the brain are hindered by noise. In larger context, distractions (difficulty in detection) reduce the mind's ability to combine and process information and force this information to travel on secondary pathways.