



Inattentional deafness in auditory-only tasks

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Military operators often work in highly cognitive-loaded contexts, in which they can hear auditory alarms, critical for safety. Cases of missed alarms are regularly reported, a phenomenon known as inattentional deafness. This phenomenon has also been reported in laboratory-controlled settings. However, very few studies focused on inattentional deafness in an auditory-only environment, and the experimental conditions required to elicit this deafness are not clear yet, due to a lack of consensus in the existing literature (level of the perceptual or cognitive load for a primary task, nature of the secondary task, acoustic characteristics of the critical stimulus, ...). The aim of the present work is to determine the experimental conditions in which inattentional deafness can be measured.

In a first experiment, a dual-task paradigm was used. A speech-in-speech intelligibility task with sentences from the Coordinate Response Measure (CRM) corpus was defined as the primary task. Two conditions were compared: 3 simultaneous sentences, only male talkers, with a +6 dB SNR (Signal-to-Noise Ratio) between the target and the two maskers (low-load condition); 3 simultaneous sentences, only male talkers, with a 0 dB SNR (high-load condition). The secondary task was a present/absent task, with a short 700-Hz pure tone being the 'critical' stimulus (present in 50% of the trials). In addition, pure-tone audiometry and otoacoustic emissions were measured for each participant (N=15). As predicted, large recognition performance differences were observed between the low-load and the high-load condition. However, the secondary task had no effect on the primary task in terms of recognition performance. In addition, no clear inattentional deafness was observed, with almost no missed critical stimuli. Additional measures (like response times) are still being analyzed. Two main factors could explain this result: a not engaging enough task, with a high-load condition probably being too low; the fact that the participants were aware of the presence of the critical stimulus, which was repeated multiple times through the experiment.

A new series of experiments has been designed, with a more-complex primary task (a similar speech-in speech intelligibility task, mixed with an N-back procedure), and a critical stimulus presented only in a final trial. Preliminary results show a clear inattentional deafness phenomenon, and help to clarify the important factors responsible for the inattentional deafness in an auditory-only settings.