

# Impact of Sound Familiarity on Task Performance

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## Abstract

This project investigated the impact of subject familiarity with exposed sound field stimuli on task performance. During pilot and main body testing participants were presented with working memory and long-term retrieval questions and asked to answer them while exposed to a linearly changing sound field of familiar, unfamiliar, and no auditory stimulus. A post-study questionnaire was also conducted investigating the societally perceived impact of sound familiarity on task performance.

The findings of this project potentially contradict much of the published literature in the field. Many reports highlight silence as most conducive to task performance when measured as task output. Contrastingly, this project finds that temporal performance is most benefited from the presentation of unfamiliar audio in the sound-field of the subject.

This project explored solutions to the continually emerging trend of increased demand for worker productivity output where the quantity of potential distractors is similarly increasing.

## Investigative Design

**Working memory** – The testing of working memory was primarily based on literature by Giuseppe (2002), Healy (2008), Lewis (2003), and Vallar (2002). Multiple testing methods were employed due to differing subject learning styles as highlighted and specified by Peng and Fuchs (2016), where inter-participant response to a given environment varies dependent on individual learning style and utilisation of the working memory.

**Long-term memory** – Testing was based on literature by Lewis (2003) whereby upon initial exposure to each audible condition, participants would be presented with a paragraph on non-fictional text, later being assessed for information retrieval accuracy.

**Pilot study** – A reduced study with questions identical in nature to those proposed for the main study. This study was employed to inform the successful production of testing materials for the main study by identifying key issues and flaws in question design.

**Materials Distribution** – Due to contact restrictions during the course of this project, an online distribution and support platform was created to support research data collection. A QR link is below.

**Post main study questionnaire** – The aim of this research was to investigate the sample population's perceived link between audio field stimulation and resultant task output performance.

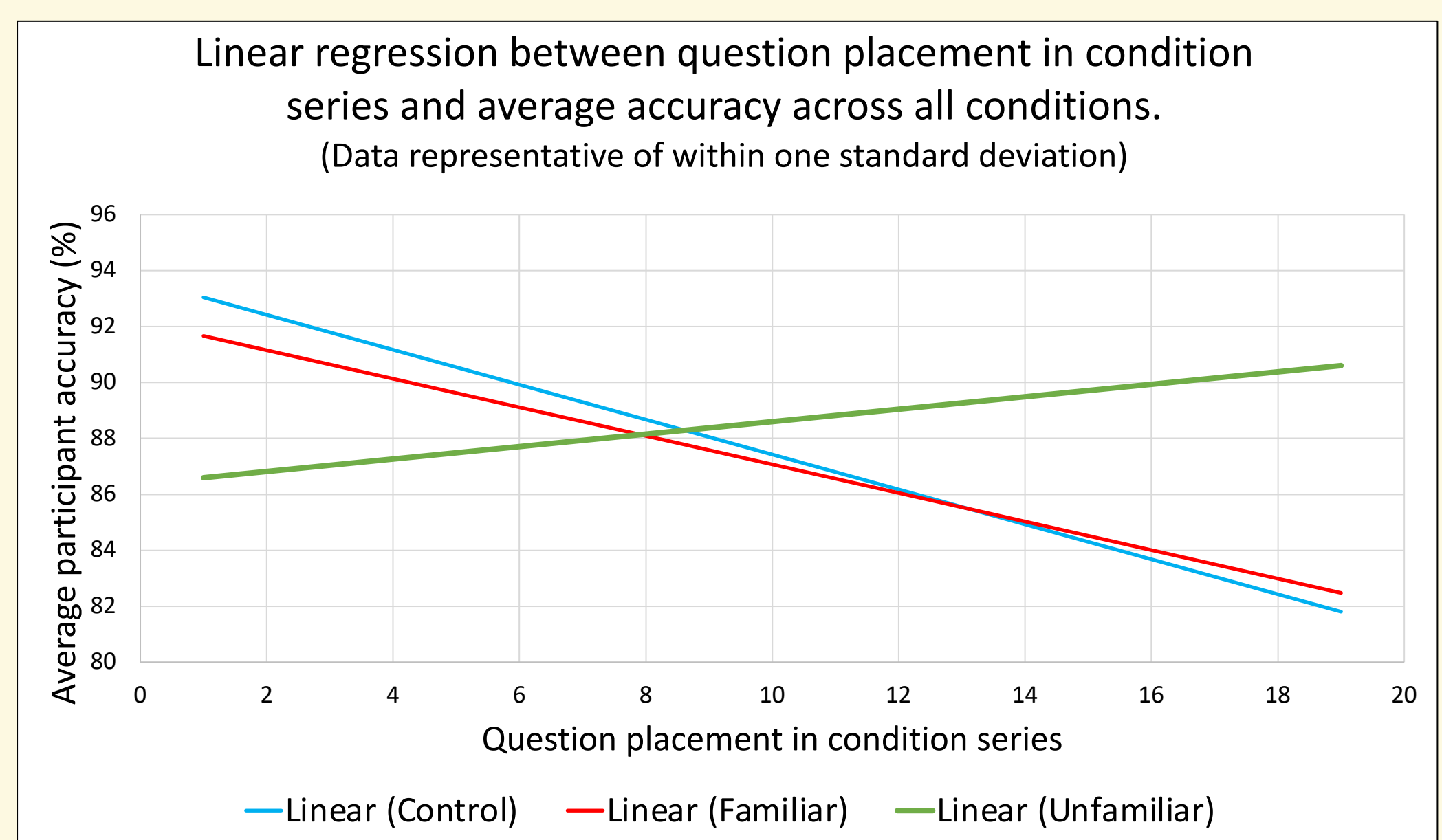
## Online Materials

By following this QR code you will be taken to the troubleshooting and distribution point for key study materials. Here you will also find links to third party applications used.



## Results

The immediate impact on task performance of auditory stimulus presentation into a subject's auditory field is immediate and shows an advantage for the use of both familiar and no auditory stimulus over the that of unfamiliar sounds. The temporal trends, however, contradict this where the long-term exposure to unfamiliar audio shows a significant advantage on task performance when presented with either familiar, or no auditory stimulus. This finding depicted in the graph below is supported by findings of a Fisher's exact test whereby unfamiliar sound presentation scored a  $p$  value of 0.049 and 0.030 against silent and familiar sound presentation, respectively. A value of  $p < 0.05$  is statistically significant.



Highlighted by Vallar (2002), the recency effect of memory recall is significantly diminished when a subject is exposed to distracting stimuli during information presentation or recall. Across all three datasets, loss of this effect was most prominent under the presentation of either familiar, or silent auditory stimulus. This finding supports data presented in the graph above that unfamiliar audio is most conducive to increased task performance.

Finally, the questionnaire findings highlighted A clear disparity between the objective findings of this project and societally held beliefs that familiar audio is most conducive to increased task performance.

## Conclusions

As seen by the findings of this study coupled with published literature in the field, there is dispute into the impact of auditory maskers for the purpose of productivity management. Furthermore, additional research into the underlying cognitive functionality which determines human responses to differing stimuli is required to accurately identify auditory impacts on task performance. Overall, this project was a success, however, highlights the need for further research into the field of applied psychoacoustics.

## Citations

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