

Acoustic impact of working from home

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Noise annoyance is one of the main sources of disturbance when it comes to office work. Disturbance by noise has shown to decrease concentration, increase error rate and raise stress levels. With the outbreak of Covid-19, distance working has in a large extent replaced traditional offices. This has resulted in a different acoustic environment for workers, which varies much more between the employees. This requires investigation on the effect home acoustics have on work performance.

Due to Covid restrictions, most office workers have been working from home for the past year. This has led to both new possibilities and new obstacles. Sound-related problems is one of the biggest concerns at offices and has been studied in plenty of research. The studies regarding sound at home have mostly been examining noise specifically from traffic or noise during the time where people usually do not work. There will most likely be changes in office work in the future after evaluating this period of forced distance working. The office could be a place used more for meetings and group discussions than individual work.

This thesis aims to investigate how office work have been impacted by the covid restrictions with a focus on acoustics. Using methods and results from similar studies investigating office acoustics a better understanding of the effect of noise disturbance can be achieved.

Research questions:

- o How are office workers experiencing distance working in general compared to working from the office?
- o Is there a correlation between measured sound parameters and perceived noise annoyance?
- o How are office workers experiencing the sound environment when working from home, and how is it affecting their work?



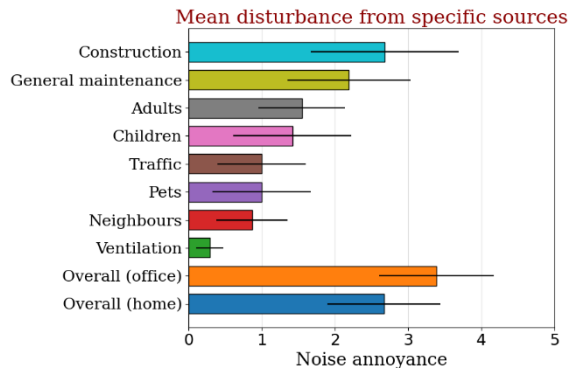
Sound level meter at the office

Methods: Participants from Sweco in Malmö have answered a questionnaire regarding noise annoyance and general opinions on distance working versus working at the office. Measurements of sound pressure level and background noise were made both at the participants homes and at the office. The data was then analysed with several different statistical analyses to identify important factors.

Results: The response from the questionnaire indicates that there is almost as many that prefers to work at home as there are that prefers the office. A third of the respondents stated that they would like to continue working from home just as much as they have been doing during the restrictions and more than 40% saying either way is okay. The means of transportation has changed, with cars being used more frequently and public transport nearly being discarded by all participants. The work from home has also changed. Around 25% stated that they had re-designed rooms as home offices since Covid, and nearly everyone claimed changes in working hours.

Those living in apartments were more disturbed by noise, and bigger dwellings led to lower noise annoyance in general. Noise from specific sound sources showed that construction and maintenance work were the most disturbing noise sources at home. Overall levels showed a

bit more noise disturbance at the office than at home, but not a difference that is statistically certain. Noise from neighbours and ventilation were not considered annoying by most participants.



Mean noise disturbance from specific sources based on questionnaire answers. Questions were answered in scales 0-10

The most impactful parameters determining preferred workplace related to the number of family members at home during the day, age, dwelling size and noise from construction and maintenance.

The sound measurements showed higher sound levels at home than at the office, indicating a higher feeling of freedom to produce noise without disturbing co-workers. There were no clear connections between measurements and noise annoyance, leading to the conclusion that sound types are more important than the volume.

Meetings were preferred to have at the office, but general loss of concentration was higher at the office. It was also shown in the study that those who travelled more often to the office had more sound-related problems at home.