



STUDIES IN THE RESEARCH PROFILE BUILT ENVIRONMENT  
DOCTORAL THESIS NO. 2

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# A Shield against Distraction from Environmental Noise

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Akademisk avhandling för filosofie doktorsexamen i Miljöpsykologi  
som försvaras offentligt torsdagen den 26 januari 2017  
kl 13.00 i Krusenstjernasalen (23:213), Högskolan i Gävle.  
Opponent är docent Sara Bengtsson, Karolinska Institutet.

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## Abstract

Working in noisy environments can be detrimental to cognitive performance. In order to perform well people have to find a way to attenuate distraction. This thesis aimed to study the balance between distractibility and task demands in the context of office-related tasks as a means by which to better understand how people in the work environment are influenced by environmental noise.

In Report 1, 2 and 3 higher focal-task difficulty was achieved by manipulating the readability of the text that participants were asked to read (i.e. either displaying the text in hard-to-read font or by masking it with static visual noise). The results of Report 1 and Report 2 showed that background speech impaired performance on proofreading and memory for written stories respectively compared to silence, but only when the focal-task difficulty was low, not when it was high.

In Report 3 it was shown that background speech, road traffic noise, and aircraft noise impaired performance on text memory compared to silence, but again, only when focal-task difficulty was low.

In Report 4 it was tested whether higher cognitive load on the focal task would reduce peripheral processing of a to-be-ignored background story. The results of Report 4 showed that participants in the low-load condition recalled more of the information conveyed in the to-be-ignored background story compared to participants in the high-load condition. It was also investigated whether individual differences in working memory capacity (WMC) would influence participants' memory for written stories (Report 2) and incidental memory of the to-background story (Report 4) differently depending on task demand.

The results showed that individuals scoring high on the WMC-test were less distracted by background speech in the easy-to-read font condition (Report 2), and recalled less of the information in the to-be-ignored background story in the low-cognitive load condition (Report 4) compared to individuals that scored lower on the WMC-test. These relationships were not found in the hard-to-read font condition in Report 2, or in the high-cognitive load condition in Report 4. Taken together, these results indicate that higher focal-task difficulty can shield against the detrimental effect environmental noise on performance on office-related tasks. Moreover, it shows that higher focal-task difficulty can help individuals with low-WMC to reach a level of performance that is similar to that of high-capacity individuals.

**Keywords:** environmental noise, distractibility, task engagement, working memory capacity, office-related tasks