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Using soundwalks to promote salutogenetic urban environments

Hörspaziergänge als Instrument zur Förderung salutogenetischer Stadtumgebungen

https://doi.org/10.1515/pubhef-2025-0057

Abstract: Urban soundscapes influence citizens' health and wellbeing. Thus, promoting healthy acoustic environments has become an important public health concern in cities. Soundwalks are a participatory method to explore the subjective perception of soundscapes and its effects on individuals. This article describes the conduction of soundwalks in three green spaces within the Bavarian capital of Munich. The soundwalks were part of a feasibility study within the interdisciplinary CitySoundscapes project.

Keywords: biodiversity; green space; soundscape; soundwalk; urban health.

Zusammenfassung: Die akustische Umgebung beeinflusst die Gesundheit und das Wohlbefinden der urbanen Bevölkerung. Die Gestaltung von gesundheitsförderlichen Klanglandschaften in Städten ist daher eine wichtige Aufgabe in Public Health. Hörspaziergänge sind eine partizipative Methode, um die subjektive Wahrnehmung von Klanglandschaften und deren Auswirkung auf Individuen zu erforschen. Dieser Artikel beschreibt die Durchführung von Hörspaziergängen auf drei Grünflächen in der bayerischen Landeshauptstadt München. Die Hörspaziergänge waren Teil einer Machbarkeitsstudie im Rahmen des interdisziplinären Projekts CitySoundscapes.

Schlüsselwörter: akustische Umgebung; Biodiversität; Grünfläche; Hörspaziergang; Stadtgesundheit.

Background

For the growing urban population worldwide, living in cities is linked to various health risks, often associated with increased noise exposure [1]. But the health effects of urban acoustic environments extend beyond noise [2]. Soundscapes in urban green spaces have been found to positively influence people's restoration, especially if they are characterized by high biodiversity [3, 4]. Advancing knowledge on these effects is crucial for designing cities across the world that foster acoustic environments promoting citizens' wellbeing. While noise research has traditionally focused on the objective measurement of sound levels, participatory approaches now focus on people's subjective experience when perceiving soundscapes [5], allowing for a deeper understanding of reactions to sound-scapes [6].

One of these approaches are soundwalks, where participants consciously listen at selected stops of a predetermined route and document their subjective auditory impressions. Soundwalks are a valuable tool for engaging local residents in the design of urban soundscapes and green spaces, as the results can be used by urban planners to design salutogenic soundscapes in cities [7]. The method has rarely been described in public health research. This article presents its implementation within the CitySoundscapes [8] feasibility study, providing insights for urban soundscape research both in Munich and beyond.

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Figure 1: Example of one soundwalk route (2.2 km; S: start at grey area listening location; 1–3: green area listening locations). Map created by G Immich using outdooractive.com [9].

Methods

This study was part of the first phase of the interdisciplinary project CitySoundscapes, carried out by the Technical University of Munich (TUM), the LMU Munich, the Technical University of Berlin (TUB), and additional partners. The project investigates the relationships between urban soundscapes, biodiversity, and wellbeing of citizens. In the first funding phase (2023–2024), a feasibility study was conducted that involved soundwalks in three urban green spaces in Munich. The goal was to obtain insights for the second funding phase (2024–2027), where the soundwalks were to be carried out on a major scale. The overarching objective is to develop green space design recommendations that can inform urban planning in Munich and globally.

The study included adults aged 18 or older who were able to walk for 60 to 90 min. Three routes in different green spaces were defined. They covered a distance of 1.6 km, 2.2 km and 3.3 km. Each route included three or four listening locations with different levels of biodiversity in the respective green spaces and an additional gray area as a control (Figure 1).

The questionnaires contained questions about participants' socio-demographic background and their relationship to nature. For each listening location, the questionnaires also contained an Affect Grid [10] and two versions of questions about their perception of the soundscapes. One version based on the DIN standard ISO 12913-2 for conducting soundwalks [11] and the other one on a German translation of the Perceived Restorativeness Soundscape Scale (PRSS) [12]. In addition, the participants were asked to indicate which sounds they had heard at each listening location. The questionnaires were created in paper form and as a digital version in REDCap, accessible on the participants' mobile devices. A semi-structured interview guide was created to ask selected participants about their impressions of the soundwalks. Recruitment took place via notices in the vicinity of the routes, via advertising on a neighborhood social network and within the research team's networks.

Each soundwalk was led by two researchers. After reaching a listening location, all participants lined up in the same direction to create listening conditions as similar as possible. The research team then instructed the participants to listen for three minutes while keeping their eyes either open or closed. At the same time, the ambient sounds were recorded using an XL2 audio and acoustic analyzer from NTi Audio. The participants then documented their listening impressions in the questionnaire before moving on to the next listening location. Following the soundwalk, qualitative interviews were conducted with at least two volunteers per walk. Quantitative data were analyzed using Pandas and Seaborn [13, 14]. Key statements from the interviews were recorded and summarized.

Results

A total of six soundwalks took place, two on each route. 27 people took part: eight in route one, nine in route two and ten in route three. The majority were female (women: 23; men: 4). Most participants preferred to complete the questionnaire digitally. The soundwalks lasted an average of 100 min.

The analysis of the Affect Grid suggested differences between grey and green spaces. In the green spaces responses clustered in the lower right quadrant, indicating a more relaxed and positive affective state (Figures 2–4). This pattern was absent in the grey spaces (Figure 5). Figure 6 shows the values of an item from ISO/TS 12913-2 (traffic noise), while Figure 7 displays the dimension 'fascination' of the PRSS. A

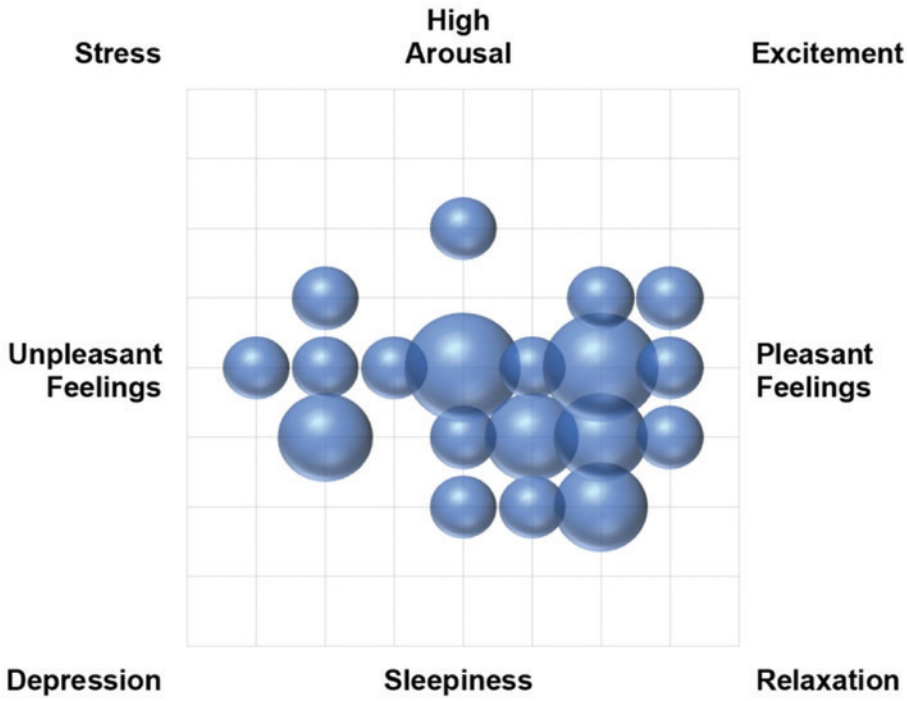

Figure 2: Affect Grid [10]: Response frequencies for green areas in first route (n = 27). Circle size corresponds to response frequency. First published in Immich et al., 2024 [15].

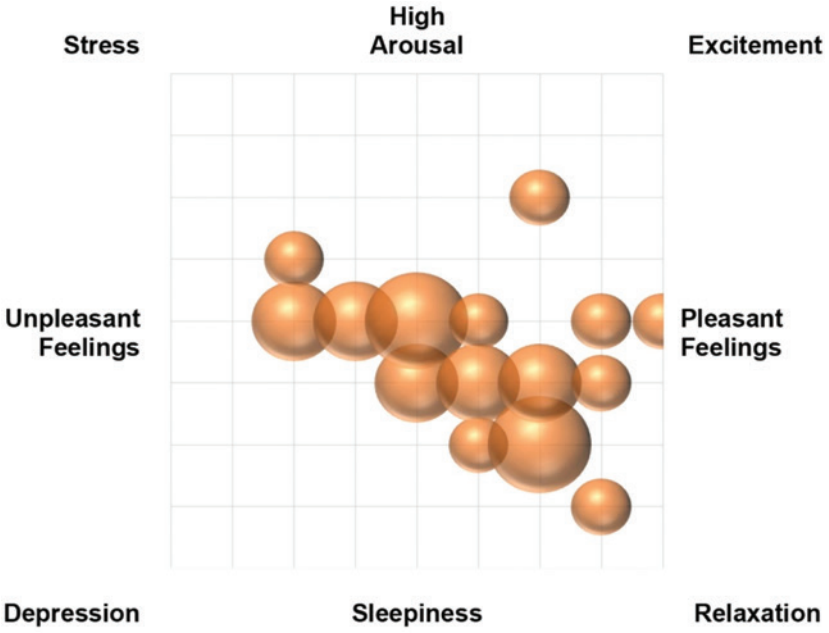

Figure 3: Affect Grid [10]: Response frequencies for green areas in second route (n = 24). Circle size corresponds to response frequency. First published in Immich et al., 2024 [15].

comparison of the two figures indicates that locations with higher levels of perceived traffic noise often showed lower restorative effects in the 'fascination' dimension.

Qualitative interviews were conducted with 14 soundwalk participants. During these, the participants expressed satisfaction with the organization of the soundwalks and felt well informed by the study team. Many interviewees found the soundwalk to be a positive experience and expressed surprise at how many different sounds they had been able to perceive by consciously listening at the

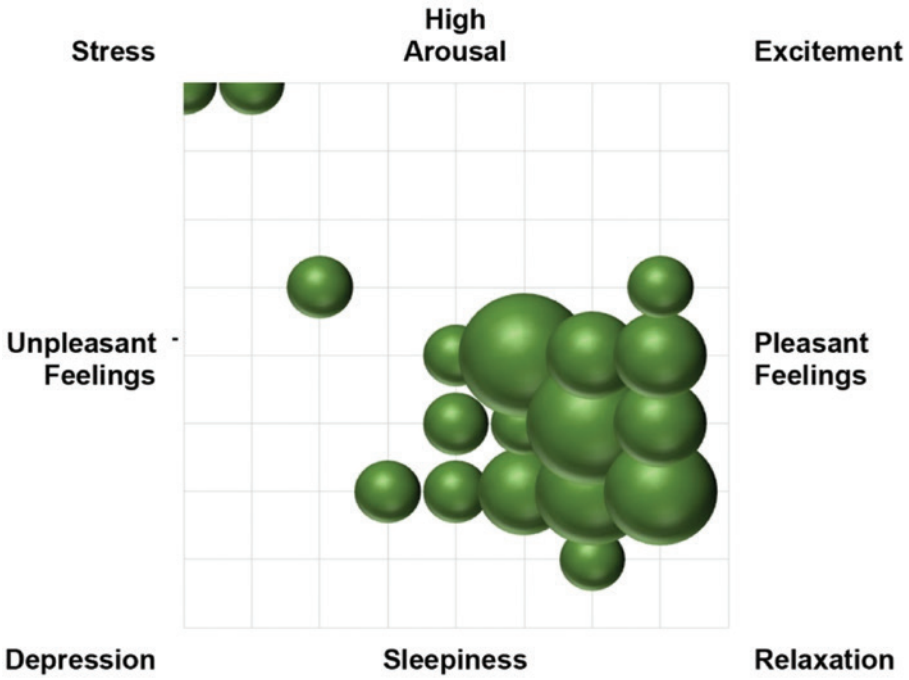

Figure 4: Affect Grid [10]: Response frequencies for green areas in third route (n = 40). Circle size corresponds to response frequency. First published in Immich et al., 2024 [15].

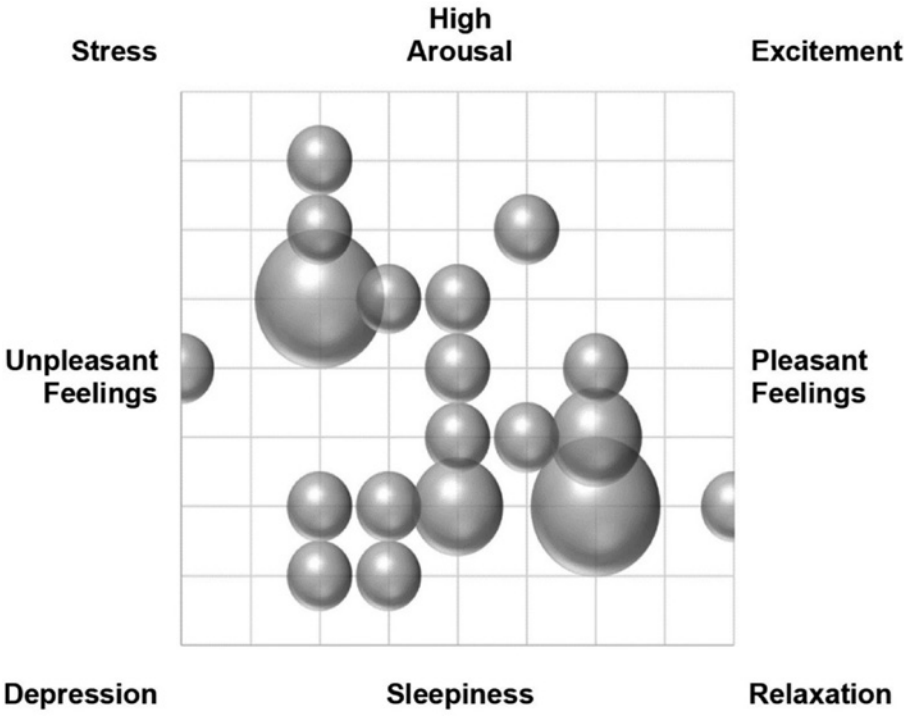

Figure 5: Affect Grid [10]: Response frequencies for grey areas (n = 27). Circle size corresponds to response frequency. First published in Immich et al., 2024 [15].

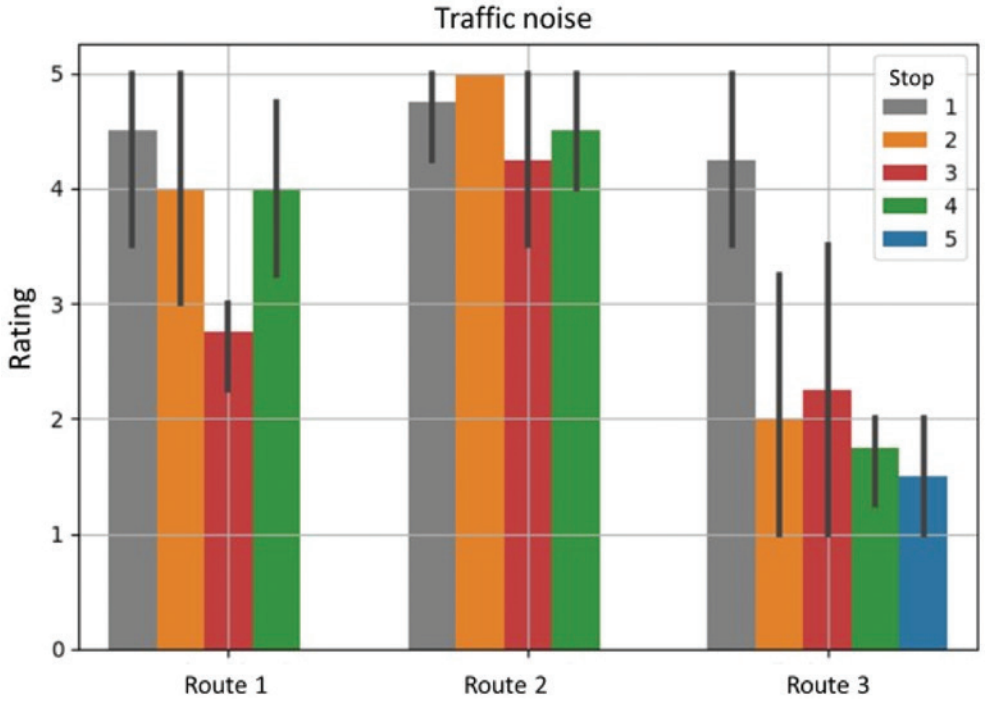

Figure 6: Assessment of the extent of perceived traffic noise (ISO/TS 12913-2 [11]); arithmetic mean values and 95% confidence intervals (n = 12). Stop 1 = listening location 1 at grey area. First published in Immich et al., 2024 [15].

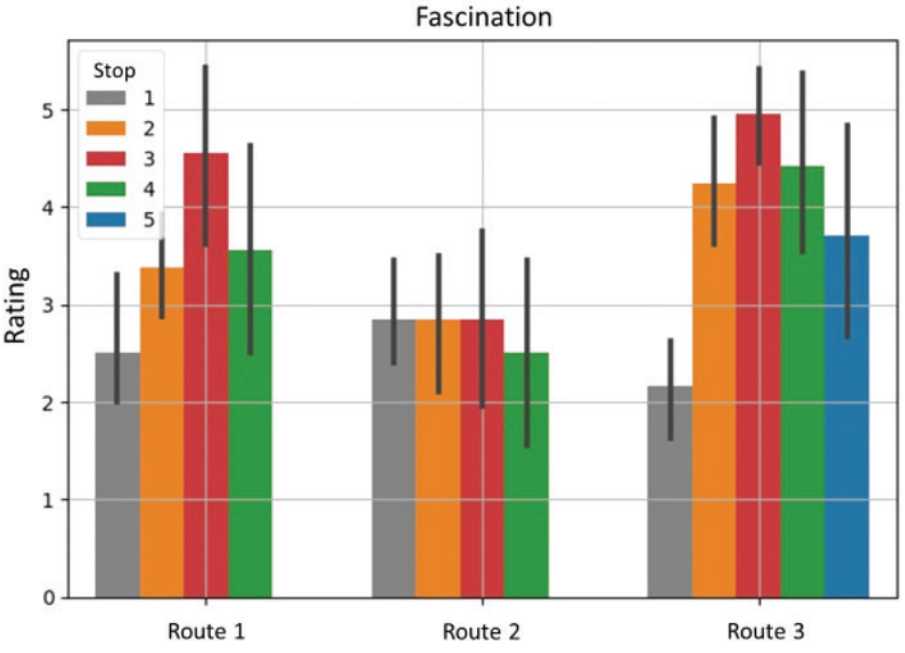

Figure 7: 'Fascination' dimension (PRSS [12]); arithmetic mean values and 95% confidence intervals (n = 15). Stop 1 = listening location 1 at grey area. First published in Immich et al., 2024 [15].

locations. While the interviewees had no objections to the scope of the questionnaire, some questions in the PRSS variant were rated as misleading and the Affect Grid as initially difficult to understand.

Discussion

The feasibility study provided important information on the implementation of soundwalks for investigating perceived soundscapes in public health. Participants' positive feedback in the qualitative interviews, the presumed restorative effects of green space soundscapes, the preference for the DIN-based questionnaire, and the importance of transparent communication and explanation of complex instruments such as the Affect Grid provide valuable guidance for the next phase of the CitySound-scapes project as well as for future soundscape research. The findings support soundwalks as a suitable instrument for involving the population in the evaluation of urban soundscapes, helping to identify health-promoting acoustic environments. When integrated into urban planning, such environments can contribute to improving health and wellbeing in cities. With the upcoming large-scale study, CitySoundscapes aims to develop recommendations for the design of soundscapes in urban green spaces in Munich based on local participation, serving as an exemplary for establishing health-promoting soundscapes in cities worldwide.

Autorenerklärung

Autorenbeiträge: Alle Autorinnen und Autoren übernehmen die Verantwortung für den gesamten Inhalt des eingereichten Manuskripts und haben der Einreichung zugestimmt. Förderung: Das Projekt wurde durch das Bundesministerium für Bildung und Forschung (BMBF) gefördert. Interessenkonflikt: Die Autorinnen und Autoren erklären, dass keine Interessenkonflikte bestehen. Ethische Richtlinien: Im Einklang mit der Deklaration von Helsinki wurden die Teilnehmenden über den genauen Ablauf der Studie informiert und nahmen freiwillig daran teil. Alle Teilnehmenden gaben ihr Einverständnis. Die Studie wurde von der Ethikkommission der Medizinischen Fakultät der LMU München genehmigt (23-0643).

Author Declaration

Author contributions: All authors have accepted responsibility for the entire content of this submitted manuscript and approved submission. Funding: The project received funding by the German Federal Ministry for Education and Research (BMBF). Conflict of interest: Authors state no conflict of interest. Ethical statement: In accordance with the Helsinki Declaration, the participants were informed about the exact procedure of the study and took part voluntarily. All participants gave their approval. The study was approved by the Ethics Commission of the Medical Faculty of the LMU Munich (23-0643).

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