

A cross-national comparison in assessment of urban park soundscapes in France, Korea, and Sweden through laboratory experiments

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ABSTRACT

This study aims at examining the effect of socio-cultural context, including language, on soundscape assessments in urban parks. In total, 95 persons took part in three laboratory experiments, conducted in France (30 participants), Korea (30 participants) and Sweden (35 participants). Twenty-eight audio-visual excerpts from recordings conducted in five urban parks were used as stimuli. The participants evaluated soundscape quality using attribute scales provided in their own native languages. Principal Components Analysis produced two principal components of perceived affective quality, *Pleasantness* and *Eventfulness*. There were high levels of similarity in attributes associated with the *Pleasantness* among the three countries, whereas some differences were observed in the attributes related to *Eventfulness*. Two hierarchical cluster analyses were conducted based on perceived dominance of sound sources, and component scores of perceived affective quality. There were no significant differences in clustering results based on perceived dominance of sound sources among the different nationalities. In contrast, discrepancies were found in the clustering results based on perceived affective quality. In particular, perceptual responses to human sounds, birdsong, and water sounds, which are closely related to *Eventfulness*, were significantly different across the three cultural backgrounds. These findings provide empirical evidence of socio-cultural differences in soundscape assessment.

1. Introduction

The International Standard ISO 12913-1 provides a definition and a conceptual framework of ‘soundscape’ [1]. It defines the term as an “acoustic environment as perceived or experienced and/or understood by a person or people, in context.” Thus, the standard emphasizes the importance of the contexts inferring that when people are presented to a given acoustic environment, individuals may respond differently based on their personal, socio-cultural backgrounds and previous experiences. For instance, sounds that are acceptable in some communities or societies may be perceived as objectionable in others.

Previously, studies on community noise have considered non-acoustic factors, such as personal and social variables, that influence noise annoyance [2–6]. Accordingly, the Community Response to Noise Team (Team 6) of the International Commission on the Biological Effects of Noise (ICBEN) developed general noise reaction questions for the standardization of community noise surveys in order to enable

international comparison of survey results across languages [7,8].

Hitherto, it has been impossible to compare the results of soundscape assessments from different countries, because there is yet no internationally agreed standard for the collection of soundscape data. Researchers have investigated how people perceive acoustic environments using adjective attributes in their native language, and various perceptual factors, representing for example hedonic value, temporal variability, and spatial impressions, have been identified [9–14]. Axelsson et al. [11] developed a Pleasantness–Eventfulness model, whereas Cain et al. [15,16] established a Calmness–Vibrancy model, which represents a 45° rotation of the Pleasantness–Eventfulness model. The two underlying components have been commonly identified in several studies across different countries [9,12,14–18], demonstrating that these components are robust across languages, cultures and environments.

Based on their findings, Axelsson et al. [19,20] developed the Swedish Soundscape-Quality Protocol, which includes eight adjective

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attribute scales (Annoying, Calm, Chaotic, Eventful, Exciting, Monotonous, Pleasant, and Uneventful) for the assessment of perceived affective quality. On request, the protocol has been translated into some 10–15 languages and used for local research purposes. According to the authors’ records, it has so far been used in Argentina, Austria, Belgium, Canada, Croatia, England, France, Greece, Italy, Netherlands, Portugal, Singapore, South Korea, and Spain. However, these linguistic versions are not validated. Thus, there is no guarantee that their results are comparable across languages, in absolute terms. Moreover, the studies have seldom been published in scientific papers. However, some papers are planned to be published in a forthcoming special issue on soundscape assessment.

Even though there are similarities in how people in different parts of the world perceive the acoustic environment, the connotative meaning of words, and linguistic nuances differ from one language or culture to another [3,7,21,22]. For example, there are two different Spanish versions of the Swedish Soundscape-Quality Protocol; one for Spain and one for Argentina. Thus, in order to compare the results of verbal assessments obtained in different languages and to achieve an international standard on data collection methods, it is necessary to consider socio-cultural variations. This shows that cross-national research is essential for the standardization of soundscape assessment.

The main aim was to examine the influence of socio-cultural context, including language, on soundscape assessments in urban parks. Urban parks are among the most important public spaces for sustainable urban environments, providing urban dwellers with places to improve their physical and mental health [23]. They consist of diverse spaces and facilities (e.g., green open spaces, walking paths, children’ playgrounds, water fountains, or outdoor theaters etc.) for various social-recreational activities [24]. In addition, the acoustic environments of urban parks consist of various sound sources, including sounds from human activities, traffic, and nature, such as water and bird song, contributing to various soundscape qualities [25–28].

Binaural recordings of the acoustic environments in five urban parks

in Paris and Stockholm were assessed in three laboratory experiments, conducted in Paris, Seoul and Stockholm. In the three laboratory experiments, French, Korean and Swedish participants used semantic descriptors in their own native language. Data on perceived dominance of sound sources and perceived affective quality were analyzed and compared between the three countries.

2. Methods

2.1. Audio-visual stimuli

Binaural recordings were conducted and photographs taken in five urban parks, including three parks in Paris, France [André Citroën (AN), Montsouris (MO), and La Villete (LV)], and two parks in Stockholm, Sweden [Observatorielunden (OB) and Kronobergsparken (KR)]. They are popular among the local citizens, and visited frequently.

In order to decide on the locations for the audio-visual recordings, preliminary individual soundwalks were carried out in the five urban parks, based on a methodology that Jeon et al. developed [29]. Two or three co-workers walked along predefined routes in the five parks and freely selected recording locations with distinctive visual and/or auditory qualities. The walks were conducted between 13:00 and 17:00 in June (Stockholm) and October (Paris). In total, 28 recording locations were selected in order to include various soundscape and landscape qualities such as promenades, green spaces, playgrounds, water features, roadsides and squares. Fig. 1 presents aerial views of the five parks and the 28 recording locations. In Paris, eight recording locations were selected in AN, and four in MO and in LV. In Stockholm, five recording locations were selected in OB, and seven in KR.

At each location, the acoustic environment was recorded for a duration of at least 5 min, using binaural, in-ear microphones (B&K Type 4101) and a digital recorder (Zoom H4n). The operator’s head orientation was fixed during the recordings, facing the same direction

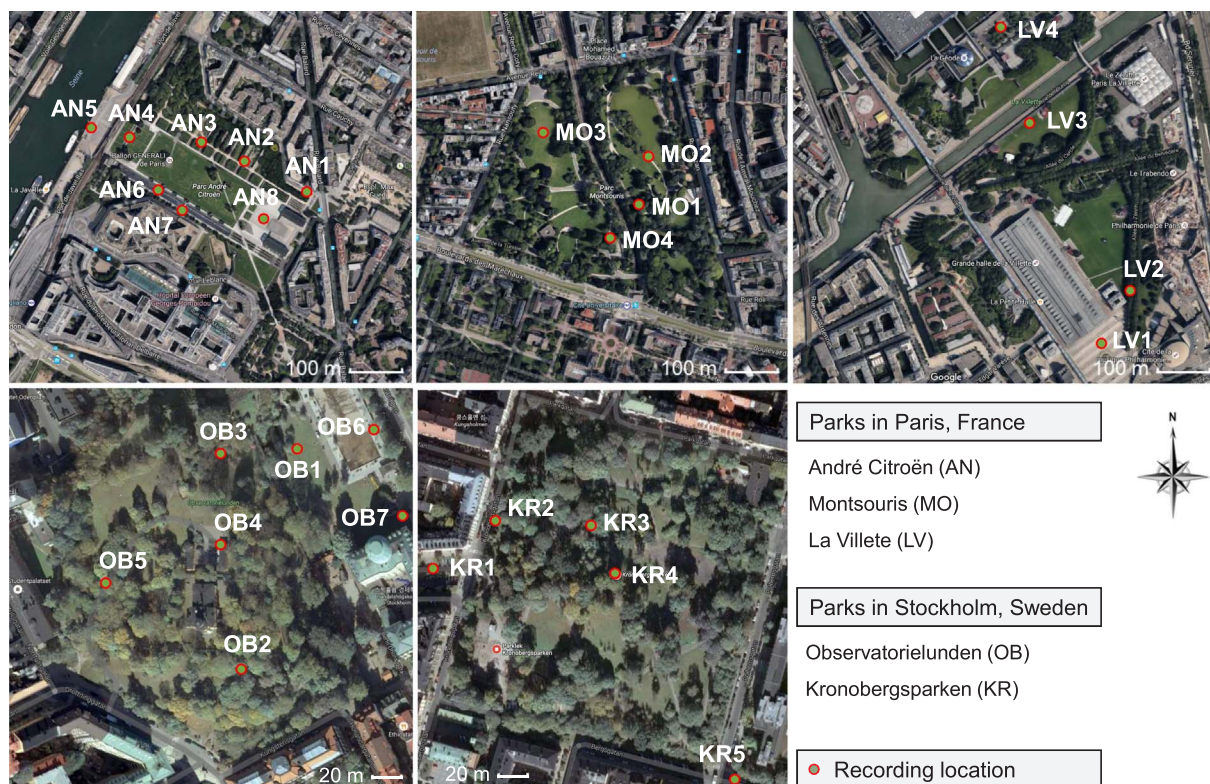


Fig. 1. Aerial views of the five selected urban parks and the 28 recording locations. André Citroën (AN), Montsouris (MO), La Villete (LV), Observatorielunden (OB), and Kronobergsparken (KR).

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