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Frontiers of
Architectural
Research

RESEARCH ARTICLE

Sound preferences of the dense urban environment: Soundscape of Cairo



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Received 25 July 2013; received in revised form 13 October 2013; accepted 24 October 2013

KEYWORDS

Acoustics;
Soundscape;
Sound preference

Abstract

A questionnaire study was conducted to investigate the soundscape preferences of the sonic environment in Cairo. Participants, who were Cairo residents, were questioned about their appraisal of familiar urban soundscapes in a close- and open-ended format questionnaire. Psycholinguistic data analysis of verbal descriptions expressed by respondents was conducted to identify the relevance of semantic categories of environmental sounds and quantitative soundscape aspects for the urban sonic environment of Cairo. Results confirmed a direct relevance of the linguistic semantic auditory judgment and of the outputs of the quantitative close-ended questions. Cairenes were also found to express their sonic environment linguistically based on physical properties rather than semantic features and values. Analyzing the relative annoyance increase (*RAI*) of the close-ended part, overall positive *RAI* values for all sound categories reveal how sensitive to noise Cairo residents are. Results further showed that at an *RAI* value of approximately 27%, sound category perception transforms from positive to negative.

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1. Introduction

Parallel to the random increase in population densities and the lack of adequate strategic city planning, the rethinking

of urban spaces from an ecological viewpoint is necessary (Selle, 1992). Noise poses a multitude of health and safety concerns on such aspects as productivity, comfort, and functionality. Sound quality is considered a key contributor to the development and enhancement of the ecological/sustainable quality of open urban spaces (Mostafa Refat, 2013; Kang, 2006; Brown and Muhar, 2004).

The quality of our surrounding sound environment, that is, the soundscape, is largely dependent on the social circumstances and perception of listeners, which determine who gets to hear what (Schaudinischky, 1976; Thompson, 2002; Corbin, 1999; Truax, 2001; Dubois, 2000a; Gaver, 1993).

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Peer review under responsibility of Southeast University.



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Soundscape, also called acoustic landscape, is a combination of the physical environment, which is represented in terms of acoustical scientific characteristics of sound waves, and a social environment dimension, which is represented by human perception of sound. Soundscape occurs when one perceives the surrounding sonic environment with his/her hearing, where a sound is a basic element in the “scape” (Schafer, 1994). The human perception of sound is a subjective process that relies on cognitive processes, in which sound and noise are the determining factors (Dubois et al., 2006). Numerous studies have been conducted to assess the subjective evaluation of background noise (Berglund et al., 2001; Schulte-Fortkamp, 2002; Schultz, 1978, 1982a; Botteldooren and Verkeyn, 2002; Job, 1988). These studies evaluate soundscape elements in terms of sound levels. Conversely, considerable work was developed to assess the aural esthetic qualities that reflect listener satisfaction (Yang and Kang, 2005a, 2005b) as well as to assess individual sounds (Westerkamp, 2000). The physical effect of sound on human health has also attracted the attention of numerous researchers (Berglund et al., 1999; Schulte-Fortkamp, 2002; Schultz, 1982b), who assessed the dependence of noise and other physical health factors, particularly considering the ever-increasing community noise since the industrial revolution.

Studies related to sound preferences in urban areas are rather limited. However, related research shows that sound preferences from the perspective of listeners is affected by factors related to physical and social aspects (Southworth, 1969; Berglund et al., 2001; Sémidor, 2006). Environmental psychologists revealed that the attributes of social/cultural factors and the second group of explicit attributes of physical surroundings are related to and directly affect human perception of sound (Robert, 1997; Bell et al., 1996).

In this study, the sound preference of the inhabitants of Cairo, Egypt was systematically examined based on a series of large-scale surveys. Factors influencing inhabitant preference evaluation were also examined. Results are expected to be useful for suitable soundscape design and for enhancing sonic perception in urban public spaces. In the future, the data will be used to formulate input variables for a soundscape prediction model based on artificial neural networks (Yu and Kang, 2005a, 2005b, 2006).

2. Current noise annoyance in Greater Cairo

This study examines the noise preference of residents of Greater Cairo, the capital of Egypt and the fourth largest city in the world. Noise problems arose in Egypt in the late 1970s because of population increase stemming from internal immigration, accelerated growth, and the increasing number of vehicles, which added to the overcrowded streets (Ali and Tamura, 2001a, 2001b, 2002; Reports of Minster of Egyptian Transportation about road traffic in Greater Cairo, 2001) 996 population was estimated to be 18 million. The urban built-up areas are used as tourist centers; commercial, administrative, cultural, and educational institutions; business establishments; governmental offices; and hotels. These areas consequently create dense and mixed work patterns. The old districts in Cairo exhibit a high density of population, estimated to be approximately 150,000 persons/km².

In previous studies (Ali and Tamura, 2001a), the annoyance of greater Cairo populations was compared among 11 surveys,

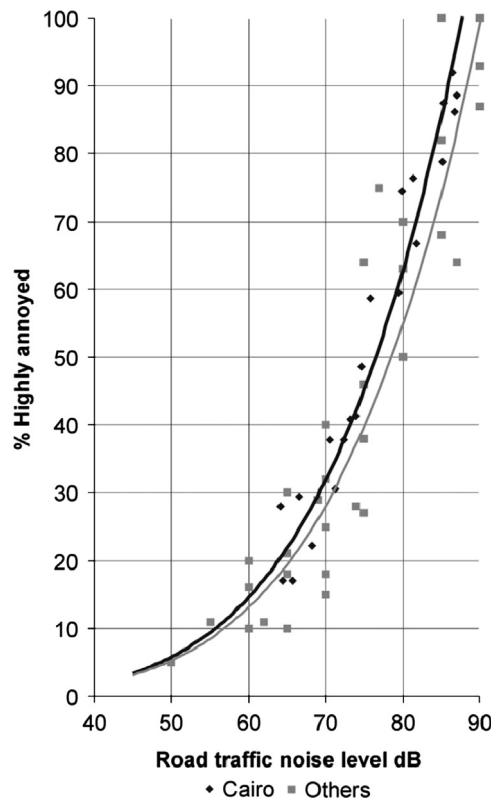


Figure 1 Comparison of annoyance in Cairo with annoyance found in other studies including the Schultz study (in London Street, Paris Street, U.S. Street, Swiss road, and others) and in Pamplona, Spain.

including London Streets, Paris Streets, U.S. Streets, Swiss Roads, and others (Schultz, 1982a; Miguel and Garcia, 1998). Annoyance in Cairo was found to be slightly higher than that in other cities. Patterns extracted from the surveys in Greater Cairo generally agree with annoyance in other surveys conducted in other cities. A strong relationship was observed between the percentage of respondents who felt “highly annoyed” and the increase in road traffic noise level, as shown in Figure 1.

Results from Figure 1 show that people living in Greater Cairo became more sensitive to nuisance than those living in any other city. A sound preference study is revealed to be important in such a dense, crowded, and highly active environment.

3. Methodology

Recent research outlines how soundscape can have an improved effect at the local level (Tjeerd et al., 2013) and how urban planners can design for health and pleasant experiences. The effect of audiovisual components merged with street urban sounds was recently examined by Jeon et al. (2013a). An experiment was conducted to investigate the effect of water features and vegetation on preferences and environmental qualities. The effect was evaluated using a numerical scale and 12 pairs of adjectives. The experiment showed that bird sound was the most preferred among the natural sounds, whereas the sound of water features

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