Chapter 7
Q Sensor for the City on the Threshold of Stress: Degenerative Dimension of the Sound Atmosphere

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ABSTRACT

The urban atmosphere evokes several sensory registers that participate in our perception of singular tonalities, of our daily situations. Tunis is, in this chapter, the space-time that would serve as a framework for our hearing. The experimental protocol is threefold. The authors quantify users' feelings through the commented walk method and especially by objective measures of electrodermal activity. The authors conducted in situ metrological work on the sound signal. These measurements were taken using a device "Q sensor." This device quantifies emotional arousal by measuring electrodermal activity (EDA). The data collected were compared and crossed to identify the links between the architectural configurations of the public space, the sound signals, and the ways in which the feeling of stress appears. The results indicate that urban stress situation seems complex and enjoyable to explore using a multidisciplinary approach. A future direction was presented to the urban settings through the draw on a variety of disciplines, including urban planning, architecture, and psychology.

INTRODUCTION

The contemporary city tends to be more and more inhospitable (Paquot, 2015)[1]. Designers often forget that human beings are in search of a place to live, to flourish and to withdraw. Today, this quality of the city is in danger, or even on its way to extinction. Current research on the city and architecture can no longer consider public space as a simple container. It is a modular and combined universe of physi-

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cal and experienced properties. Indeed, it is through our different senses that it is heard, seen, felt and perceived. Sound phenomena are one of the major phenomena that influence man's relationship with his daily urban environment. They have an important role in our experience, our perception and our representations of the built space.

This chapter aims to reveal a particularity of this sensitive dimension, that of its responsibility in the appearance of the feeling of stress. In the absence of deep knowledge of its involvement in the perception of urban sound atmospheres, architects and urban planners have difficulties in integrating it into their decisions, which can sometimes have serious consequences on our urban experiences. We are looking, in this chapter, for suggestions of reflections and actions based on this sensory component. Cities could and should re-invent themselves, freeing them from these degenerative trends.

Observations made on different dense urban fabrics show that urban intersections condense a part of the city's emotionality. With the incessant movements of the automobile and pedestrians and the difficult sharing of public space, several perceptual phenomena are intertwined to give meaning to the urban character. Streets and boulevards present the structure that ensures a dual role of driving, distributing and organizing urban spaces. They can be wide and narrow in a regular pattern, such as that of colonial cities, or twisted arborescent like medieval or Arab cities. Aldo Rossi defines the street as *a rectangular scene, it is the place of meetings, conversations, games, disputes, demonstrations, pride, seduction companies* (Rossi, 1966, p.105). The street is the support for various human and social activities.

Hearing is no longer *the sense that gives us the company of the street* (Chelkoff, 1996, p.13), as Marcel Proust described it, but rather a real discomfort and a real sound stress, as shown by the statistical data of the CSTB (Scientific and Technical Center for Building)[2], since the late 1980s. These data concern France, but we can affirm that this observation remains true in the countries of the southern Mediterranean, as attested by the AFP (France Press Agency) report, describing Cairo. *In addition to record air pollution, Cairo has a permanent cacophony that makes it one of the most unbearably noisy capitals in the world, according to scientific studies. Horns honking, loud music, calls for prayer from the speakers and constant traffic, all these noises turn into cacophony in an overcrowded megalopolis of seventeen million people [...]* (AFP, 2008). The first condition for rigorous analysis, of the occurrence of the noise nuisance, is a careful exploration of the complexity of the sound situation, in its different aspects: morphological, sensory and physical. The urban atmosphere brings together several sensory registers that contribute to our singular perception of our daily situations. Sight, hearing, smell, etc., are involved in the sketches of our urban apprehensions. More specifically, the sound dimension is a way to capture the world in a collective and shared experience. A process that can be disruptive and stressful.

Tunis is here the space-time that would serve as a framework for our hearing experience. The experimental protocol is composed of three parts. We will simultaneously quantify the users' feelings through objective measurements of their electrodermal activity (EDA) and capture the present sound signal, in addition to the different perceptual investigation techniques.

BACKGROUND

Sound Atmosphere to Apprehend Urban Emotions

The authors of the present work should remind that our problem concerns the links between the urban and architectural characteristics of the built environment, the urban sound atmosphere, and more precisely