

Sound Characterization Of Urban Environments : an Approach Based on Ecological Validity

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Abstract

In order to characterize typical soundscapes of urban environments, a sound corpus is selected by methods akin to sociological surveys. In a second step, recording and reproduction techniques best adapted to the soundscapes are selected by psychoacoustic tests. The results indicate that specific recording arrangements are not appropriate outdoors for moving sources (work supported by PIR-Villes, CNRS, France).

1. INTRODUCTION

The perceptive and acoustical characterization of sound environments is nowadays an important direction of research among those concerning the quality of life. Many works are used to reduce, in term of sound level, the effect of various annoying sources, but are insufficient to treat the problems of sound quality. Indeed the qualitative appreciation by an audience listening to a sound environment depends also on others components of human perception [1]. Consequently we take the point of view of the human person to study the perception of the sound space.

In order to characterize urban sound ambiances, that is, scene-like fragments of the sound environment bearing meaning and identity, it is first necessary to establish a corpus of recorded soundscapes. The work consists in setting a method for selecting soundscapes that can be considered as representative of the studied city. In a second step, it aims at selecting the recording and reproduction techniques of sound sequences closest to human perception, that is, the one creating the best illusion so that subjects react as if they were in the real environment. The research has been applied to Paris in its exploratory phase.

2. SELECTION OF TYPICAL SOUNDSCAPES

Sociology has identified techniques that can be used in the selection of soundscapes from surveys with users of a city, that are completed here by contributions from cognitive

psychology and linguistic. In order to select the sound extracts to be recorded, an investigation technique developed by Amphoux [2] was used which takes into account the acoustical, topological and sociocultural dimensions of cities.

2.1. Methodology

The aim of this methodology is to define criteria for selecting soundscapes considered as representative of the sound identity of a city, and to obtain qualification criteria based on direct perception of recorded sound spaces. We have intentionally limited our study to sound memorization and particularly to the realisation of what Amphoux calls "mental sound maps" ("cartes mentales sonores"). In a first step the process consists in asking subjects to draw "sound sketches" ("dessiner du sonore"). This forces the subjects to change their analysis by executing a cartographical representation (that is visual) of sounds. In a second step, the subject verbally describes sound experiences which he/she has been through (and so memorized). This method makes it possible to establish a corpus of typical soundscapes of a city.

2.2. Interviews

In order to establish a representative corpus of locations which would have particular acoustic richness, we carried out an enquiry in Paris. It consisted in asking different subjects living in the city :

1 - to establish a graphical representation of the sound space in Paris by drawing sketches which answered to the following question : "What is the sound of Paris according to you?", and then to comment the obtained drawing,

2 - to enumerate locations or routes having, to their ears, particular acoustic features.

During the interviews, we used the expression "sound space representation" ("représentation de l'espace sonore") rather than "mental sound map" ("carte mentale sonore") used by Amphoux, in order to avoid inciting the subject to use a specific analysis of the city, such as a cartographical analysis. Indeed the word "map" has a very topographical connotation. Actually the aim was to leave the subjects free to approach the drawing as they liked and to represent the sounds or sound locations as they wish.

30 persons (17 men and 13 women, 20 to 58 years old) have been interviewed by two researchers. The duration of the interview is expected to be brief and to give rise to spontaneous representations. In most cases, it lasted about 30 minutes but in some cases it lasted longer giving more valuable information.

2.3. Results

The verbal descriptions allowed us to verify that for almost the totality of subjects the sound of Paris is essentially made of traffic noises. The locations and activities most often mentioned in the conversations, are in particular : the traffic of the ring road, of Saint-Germain and Hôpital boulevards, of the place de la Bastille, the birds and the child of the jardin des Plantes, of the Buttes Chaumont and of the bois de Vincennes, the markets of Algire and of the Mouffetard street, the bustles in the streets of Montmartre, the Halles and

