SOUNDING BRIGHTON: DEVELOPING AN APPLIED SOUNDSCAPE STRATEGY

Lisa Lavia [1], Östen Axelsson [2], Max Dixon [3]

Abstract

In order to help develop an applied soundscape strategy for the City of Brighton & Hove, in the United Kingdom, we conducted a social survey, as part of a project called Sounding Brighton, via a questionnaire study. The survey, in which members of the public were invited to participate anonymously, was supported by the EU COST Action TD0804 "Soundscapes of European Cities and Landscapes", in cooperation with Brighton & Hove City Council and Local Action Teams. In total, 354 individuals, 15 years or older, completed the questionnaire. It consisted of four parts: (1) noise annoyance, (2) favourite outdoor location in Brighton & Hove and the social and recreational activities it entails, (3) what sounds are appropriate to the favourite location, and (4) demographic data. Using hierarchical cluster analysis, 5 categories of favourite locations, as well as 5 categories of recreational soundscapes, were found. The categories of favourite locations in Brighton & Hove were named: 'Beach & Seaside', 'City Park', 'Peri-Urban Recreation Area', 'My Space', and 'Downtown City'. The recreational soundscapes were named: 'Urban Nature', 'Distant Nature', 'Urban', 'Seaside', and 'Urban Beach'. A Chi Square analysis showed that there is a statistically significant and meaningful relationship between the social and recreational activities that people find suitable in their favourite outdoor location and the degree to which they find that specific sound sources are appropriate there. The next step in the development of an applied soundscape strategy is to identify and map all areas of Brighton & Hove that fall under the five categories of favourite locations, and to decide on their acoustic objectives in line with the five categories of recreational soundscapes.

1. Introduction

As the European Noise Directive illustrates, management of the acoustic environment is currently predominantly focused on sound levels and noise mitigation (EC, 2002). Consequently, the single objective is to reduce sound levels below an acceptable guideline value (cf. WHO, 2000).

Noise researchers have started to realize that the current approach to the acoustic environment needs to be complemented with an approach that acknowledges the positive aspects of the acoustic environment (e.g., Brown & Muhar, 2004). A strict

[1] Noise Abatement Society, Brighton, United Kingdom – lisa.lavia@noise-abatement.org
[2] Stockholm University, Stockholm, Sweden – oan@psychology.su.se
[3] Independent consultant, London, United Kingdom – maxdixon1@hotmail.co.uk

focus on acceptable guideline values may be counter-productive, because once they are reached there are no incentives for further improvements. As a result of these insights, some noise researchers adopted the concept of 'soundscape' in the late 1990s (Schulte-Fortkamp & Dubois, 2006). This marked a paradigm shift in the way noise researchers studied the acoustic environment.

The term 'soundscape' refers to the acoustic environment of a place, like a residential area or a city park, as perceived, experienced or understood by people, in context (cf. Axelsson, 2011a; ISO, 2012). It is the acoustic equivalent to 'landscape' (cf. Council of Europe, 2000), and includes all sound sources, wanted as well as unwanted. Managing the sounds of places can, therefore, be referred to as 'soundscape planning' (e.g., Axelsson, 2011b).

Unlike the current approach to managing the acoustic environment, soundscape planning is not primarily about reducing sound levels. Soundscape planning is not even necessarily a question of how loud sounds are, rather, what sounds are appropriate to, or belong to a place. There is no one ideal soundscape; and what is deemed an appropriate soundscape can change over time to reflect the evolving needs and/or uses of an area. To decide which soundscapes are good (i.e. appropriate), it is necessary to consider which activities the soundscape may enable at a place (Brown & Muhar, 2004).

The present paper reports the results from a pilot study conducted in the City of Brighton & Hove, in the United Kingdom, exploring the possibility of integrating a *soundscape* approach with a recent method for spatial planning and land use management called *sociotope* mapping. Sociotope mapping was developed in Stockholm, Sweden, to help avoid conflicts between residents and the city administration when increasing the density of the city space (Ståhle, 2002, 2003, 2006). A sociotope map is developed through user surveys, where urban planners are informed about how residents use and value urban open spaces from a social point of view. Together with expert assessments, this results in a GIS (Geographic Information System) map with areas marked in different colours representing their user values (e.g. enjoying the street life; nature appreciation; playing with one's children; or having a picnic). The sociotope maps then help the city planners to take the user values into consideration in the planning process. In Brighton & Hove this model is being adapted to encompass *soundscape*, by incorporating the sounds people find appropriate to the sociotope into the maps.

2. Method

2.1 Questionnaire

To explore the relationship between soundscapes and sociotopes, we conducted a social survey, using an electronic questionnaire that consisted of four sections. (1) To allow respondents the opportunity to register complaints about noise, as a service to the community (see Section 2.2, paragraph 2, below) the first section concerned

noise annoyance. It was based on the ISO/TS 15666 question with verbal rating scale (ISO, 2003), with the amendment that the response category 'Not at all' was divided into the two response categories 'Not at all (don't hear it)' and 'Not at all (hear it but not bothered by it)'. Sections (2) – (4) then concentrated on local soundscape quality as follows: (2) In the second section the respondents were asked to name their favourite outdoor location in Brighton or Hove, and to indicate to what degree a list of 27 social and recreational activities would be suitable in this location (6-point category scale: 'Don't know/not applicable', 'Not at all', 'Slightly', 'Moderately', 'Very', 'Perfectly'). (3) In the third section the respondents were asked to indicate to what degree a list of 29 sound sources would be appropriate in the favourite location (5-point category scale: 'Not audible', 'Slightly audible', 'Moderately audible', 'Clearly audible', 'Completely dominant'). (4) The fourth, and last, section concerned demographic data, such as in what area of Brighton or Hove the respondents live, gender, age, as well as occupation.

2.2 Participants

The participants were residents in Brighton or Hove, 15 years of age and older. They were recruited via advertisements in local newspapers, via Local Action Teams (residents groups organised by the City Council; http://www.safeinthecity.info/), and via the Noise Abatement Society's local network of contacts.

The recruitment materials invited residents of the city to 'have their say' about 'how they experienced local sound quality'. This wording was particularly important in order to differentiate the activity from traditional approaches to surveying for noise annoyance. In other words, the project was specifically designed to gather data about local soundscape quality as its primary purpose.

Nearly 700 persons visited the electronic questionnaire. Out of all visitors, 537 completed the first section on annoyance, 395 completed also the second section on favourite location, 382 completed the third section on appropriate sounds, and 354 completed the entire questionnaire, including the fourth section on demographics data.

Out of the 354 respondents who completed the entire questionnaire, 182 were females and 172 were males. A majority lived in the most highly noise exposed central parts of Brighton & Hove, and were 35–69 years old. With regards to occupation, 70 % were employed, 17 % retired, and 8 % self-employed. The remaining 5 % were unemployed or students.

3. Results

The present report concentrates on the relationship between sociotopes and soundscapes, and presents the results for the second and third sections of the questionnaire.

3.1 Sociotopes

To identify the number of different kinds of sociotopes among the named favourite locations in Brighton & Hove, the 395 complete responses to the 27 variables of the second section of the questionnaire were analysed. First, the verbal data was transformed to a numerical 6-point scale (0–5). Secondly, the 395 × 27 matrix was subjected to a hierarchical cluster analysis, and the 395 rows in the matrix were clustered (SPSS 19 for Windows; Squared Euclidean Distances; Furthest Neighbour/Complete Linkage). Inspection of the agglomeration schedule, as well as a range of potential solutions, revealed that 5 main categories of sociotopes could be identified in the data.

Separately, for each of the 5 categories, median values were calculated for each of the 27 variables. Then, for every category, the variables with the highest median values were used to interpret and name the 5 sociotopes. In addition, the names of the favourite locations that the respondents provided were used to guide the interpretation.

The first sociotope was most highly associated with the variables ‘Appreciating the sea’, ‘Appreciating landscape/scenery’, ‘Walking, jogging’, ‘Wind/wave/kite surfing’, and ‘Swimming/bathing’. The median values for these variables were all above 4.0, indicating that these social and recreational activities were found very suitable for the first sociotope. This sociotope was named ‘Beach & Seaside’ (N = 149).

The second sociotope was most highly associated with the variables ‘Appreciating landscape/scenery’, ‘Walking, jogging’, ‘Appreciating parks and gardens’, ‘Individual outdoor exercise’, and ‘Picnic/barbecue’. The median values of these variables were all above 3.0, indicating that these social and recreational activities were found moderately suitable for the second sociotope. This sociotope was named ‘City Park’ (N = 117).

The third sociotope was most highly associated with the variables ‘Appreciating landscape/scenery’, ‘Walking the dog’, ‘Walking, jogging’, ‘Appreciating wildlife’, and ‘Experiencing peace and quiet’. The median values of these variables were all above 4.0, indicating that these social and recreational activities were found very suitable for the third sociotope. This sociotope was named ‘Peri-Urban Recreation Area’ (N = 56).

The fourth sociotope was most highly associated with the variables ‘Appreciating landscape/scenery’, ‘Appreciating wildlife’, ‘Experiencing peace and quiet’, ‘Appreciating parks and gardens’, and ‘Watching people go by’. The median values of these variables were just above 2.0, indicating that the social and recreational activities were not strongly associated with the fourth sociotope. That this sociotope often was associated with “My own garden” indicates that this is a place where the

individuals could relax and ‘be themselves’. This sociotope was named ‘My Space’ (N = 44).

The fifth sociotope was most highly associated with the variables ‘Watching people go by’, ‘Experiencing active street life’, ‘Eating (Café, Cafeteria)’, ‘Outdoor events’, and ‘Walking, jogging’. The median values of these variables were all above 3.0, indicating that these social and recreational activities were found moderately suitable for the fifth sociotope. This sociotope was named ‘Downtown City’ (N = 28).

3.2 Soundscapes

To identify the number of different kinds of soundscapes among the named favourite locations in Brighton & Hove, the 382 complete responses to the 29 variables of the third section of the questionnaire were analysed, using the same method as for sociotopes above. Among the 382 cases, 5 main categories of soundscapes could be identified.

The first soundscape was most highly associated with the variables ‘Birdsong’, ‘Wind in trees, etc.’, ‘Other wildlife’, ‘People walking’, and ‘Seagulls’. The median values of these variables were all above 2.0, indicating that these sound sources were found appropriate when moderately audible in the favourite location. The first soundscape was named ‘Urban Nature’ (N = 132).

The second soundscape was most highly associated with the variables ‘Birdsong’, ‘Wind in trees, etc.’, ‘Seagulls’, ‘Children playing’, and ‘People talking’. The median values of these variables were just above 1.0, indicating that these sound sources were found appropriate when slightly audible in the favourite location. This means that sounds should only be heard in the background, and not be present in the foreground. The second soundscape was named ‘Distant Nature’ (N = 88).

The third soundscape was most highly associated with the variables ‘Seagulls’, ‘People shouting’, ‘Road traffic’, ‘People talking’, and ‘Amplified music’. The median values of these variables were close to 2.0, indicating that these sound sources were found appropriate when moderately audible in the favourite location. The third soundscape was named ‘Urban’ (N = 85).

The fourth soundscape was most highly associated with the variables ‘Flowing water’, ‘Seagulls’, ‘Children playing’, ‘People walking’, and ‘People talking’. The median values of these variables were near or above 2.0, indicating that these sound sources were found appropriate when moderately to clearly audible in the favourite location. The third soundscape was named ‘Seaside’ (N = 55).

The fifth soundscape was most highly associated with the variables ‘Seagulls’, ‘People walking’, ‘Children playing’, ‘People talking’, and ‘People shouting’. The median values of these variables were all above 2.0, indicating that these sound

sources were found appropriate when moderately to clearly audible in the favourite location. The third soundscape was named ‘Urban Beach’ (N = 22).

3.3 Sociotope-Soundscape concordance

To investigate the concordance between the 5 sociotopes and the 5 soundscapes, a 5×5 contingency table was created based on the 381 respondents who had completed both the second and the third sections of the questionnaire (Table 1). A Chi Square analysis shows that the distribution of the data in Table 1 is statistically significantly different from that expected by chance (see numbers in brackets) (χ^2 = 126.0, DF = 16, $p < 0.001$). This shows that there is a relationship between the social and recreational activities that people find suitable in their favourite outdoor location and the degree to which they find that specific sound sources are appropriate there.

Table 1 shows that ‘Beach & Seaside’ sociotope was strongly associated with ‘Seaside’ and ‘Urban Beach’ soundscapes, and weakly associated with ‘Distant Nature’ soundscape. ‘City Park’ sociotope was associated with ‘Urban Nature’ and ‘Distant Nature’ soundscapes, but very weakly with ‘Seaside’ soundscape. ‘Peri-Urban Recreation Area’ sociotope was strongly associated with ‘Urban Nature’ and ‘Distant Nature’ soundscapes. ‘My Space’ sociotope was most strongly associated with ‘Distant Nature’ soundscape. Finally, ‘Downtown City’ sociotope was strongly associated with ‘Urban’ and ‘Urban Beach’ soundscapes, but weakly with ‘Urban Nature’ and ‘Distant Nature’ soundscapes.

Table 1. Contingency table for 5 sociotopes and 5 soundscapes

	Soundscape					
Sociotope	Urban Nature	Distant Nature	Urban	Seaside	Urban Beach	Totals
Beach & Seaside	41 (49.5)	15 (32.7)	31 (31.9)	44 (20.6)	12 (8.3)	143
City Park	46 (40.2)	34 (26.5)	27 (25.9)	4 (16.7)	5 (6.7)	116
Peri-Urban Recreation Area	34 (19.1)	20 (12.6)	1 (12.3)	0 (7.9)	0 (3.2)	55
My Space	7 (13.5)	17 (8.9)	12 (8.7)	2 (5.6)	1 (2.3)	39
Downtown City	4 (9.7)	1 (6.4)	14 (6.2)	5 (4)	4 (1.6)	28
Totals	132	87	85	55	22	381

Note: Numbers in brackets are the values expected by chance.

4. Discussion

The current approach to the acoustic environment – based on sound levels and noise mitigation – needs to be complemented with an approach that acknowledges the positive aspects of the acoustic environment. To this end, the present paper explores

the possibility to integrate a soundscape approach with sociotope mapping. With this pilot study we have established that the present method is useful for identifying distinct sociotopes and soundscapes; and have shown that there is a meaningful and statistically significant relationship between them.

The relationship we have found between sociotopes and soundscapes means that people agree to a large extent on the degree to which a specified set of sound sources is appropriate in a place that is suitable for a specified set of social and recreational activities. This clear and meaningful relationship was not necessarily expected. Rather, people could be in disagreement in this respect, which would mean that sociotopes and soundscapes would be uncorrelated. The latter would have meant that all 5 soundscapes would have been appropriate in all 5 sociotopes, and there would have been $5 \times 5 = 25$ soundscape/sociotope categories. We have found that people typically expect an urban park to have a park soundscape, a beach a beach soundscape, and a city centre a city soundscape; although, of course, there is still room for significant variation and appreciation of local distinctiveness within these general soundscape categories.

Whereas it could be stated that current noise policy, for assessment, measurement and enforcement purposes, presupposes that acoustic environments are more or less uniform and should not exceed a specified guideline value with regards to sound levels (e.g. 55 dBA; EC, 2002; WHO, 2000), the Sounding Brighton survey results show that soundscape may – and probably should – vary, depending on what social and recreational activities are deemed suitable for a space by the users of the place. For example, in some places, such as the city centre during the daytime, moderately loud sounds may be acceptable, including road traffic and people noise. In other places, like the city's parks, many people would like to be able to relax at most times of the day; indicating that such a place should be dominated by the sounds of nature but that the sounds of other people may be acceptable when slightly audible. These results indicate that current government and local government policy related to the acoustic environment must be further developed and better adapted to suit human needs.

With regards to urban planning, the method used in the present paper could be used to identify and decide acoustic objectives for an area depending on what social and recreational activities it is intended for. A next step could be to develop soundscape mapping to complement sociotope maps.

With regards to the City of Brighton & Hove, the next steps in the development of an applied soundscape strategy would be to identify and map all areas of the city that fall under the five categories of favourite locations, and to decide on their acoustic objectives in line with the five categories of recreational soundscapes. It would then be important to further evidence the research by conducting in situ questionnaire studies with visitors to these areas to further evaluate how the soundscapes of these areas are perceived in reality.

5. Concluding remarks

We found a statistically significant and meaningful relationship between sociotopes and soundscapes. In essence, an urban park should have a park soundscape, a beach a beach soundscape, and a city centre a city soundscape. Where soundscape is not taken into account residents may experience loss of health and wellbeing as well as annoyance, particularly in places which would otherwise normally be restorative.

Our results show that it is possible to integrate soundscape with urban planning and design. Sociotope mapping may be expanded to incorporate soundscape, as a tool for soundscape planning. Such a tool would help urban planners to take soundscape into account at an early stage of the planning process. Surely, this would contribute to sustainable urban development, in promotion of health, well-being and quality of life of urban residents.

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