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THE POSITIVE SOUNDSCAPE PROJECT

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ABSTRACT
The Positive Soundscape Project is a multi-disciplinary investigation of soundscape perception which started in October 2006. This paper communicates the aims and design of the project and discusses some early results. The project seeks to develop a rounded view of human perception of soundscapes by combining methods from several disciplines. This will involve a move away from measuring sound just as noise. In this respect artistic and ethnographic conceptions of the soundscape are more advanced than mainstream acoustic ones. (While acoustics is tentatively moving away from L_{Aeq} as the sole descriptor, artists have interpreted soundscape perception as multi-modal and multi-dimensional from the beginning.) Thus, the PSP work uses methods from sound art, acoustic ecology and social science as well as techniques from acoustics, psychoacoustics, physiology, neuroimaging and sound quality. The project has an unusual design in that there is a two-way exchange between the different disciplines. For example, an artistically conceived 'soundtoy' will be used to stimulate discussion in social science focus groups and to inspire laboratory psychoacoustic experiments. A pilot investigation of an urban soundscape in the UK has been conducted and preliminary conclusions will be drawn on the benefits and problems of an intensely inter-disciplinary approach.

INTRODUCTION
In the acoustics community, sound in the environment, especially that made by other people, has overwhelmingly been considered in negative terms, as both intrusive and undesirable. The (often tacit) goal of environmental acoustics could be stated as reducing the amount of sound to the lowest possible level. Numerous metrics have been developed to quantify unwanted sound over the last fifty years, but in the last ten years there has been a gradual move in both legislation and research to standardise on some form of L_{Aeq}. A considerable proportion of research and engineering effort in acoustics is expended on trying to reduce L_{Aeq} at the recipient's ears by means of: quieter transport (Oertli, 2006), ingenious noise barriers (Watts et al., 2004) and active control at the listener's head (Hansen, 2005), to take just a few examples. However, there is a growing sense that this effort is not producing wholly satisfying outcomes. The latest National Noise Incidence Study (BRE, 2002) shows that traffic noise is audible at 87% of homes in England and Wales, and 54% of the population is exposed to levels beyond the World Health Organisation guidelines for avoiding serious annoyance.

Beyond the boundaries of engineering acoustics, attempts have been made to engage with human responses to the acoustic environment in more nuanced ways. In the 1970s R. Murray Schafer, through the work of the World Soundscape Project, sought to construct an analytical perspective that could track changes in the soundscape over time and across cultures. He defined a soundscape as "the total acoustic environment", a definition that reflected his engagement with the environmental movements of the 70s and emphasized ecologically-orientated concerns about the 'polluted' nature of the soundscape of that era (Schafer, 1994).

Others have defined soundscape differently. Emily Thompson (2002), following the work of Alain Corbin, defines the soundscape as an auditory or aural landscape. Like a landscape, she says, a soundscape is simultaneously a physical environment and a way of perceiving that environment; it is both a world and a culture constructed to make sense of that world. Barry Truax (1999) defines it as an environment of sound where the emphasis is on the way the sound is perceived and understood by an individual, or by a society. For him the key is the relationship between the individual and any such environment, whether environment is identified as a real place or a more abstract construction such as a musical composition. In spite of the distinct differences in their individual approaches, the work of Schafer, Thompson and Truax shares a commitment to identifying and analysing both the negative and the positive aspects of the acoustic environment. It is their shared recognition of the positive aspects of the soundscape which will inspire innovation in this current project.

Mainstream acoustic science has attempted, over the last fifteen years, to integrate some of the concepts of the soundscape pioneers. International conferences on acoustics, such as this one, include sessions on soundscapes, with themes such as traffic, urban noise and perceived noisiness. Thus far, though, much of the acoustics soundscape work seems still to be oriented toward the priorities of engineering noise control: participants in a typical study identify the 'bad' sounds in the soundscape, perhaps so that town planners know what they should be attempting to attenuate. However, students of urban planning and regulation note that, to date, this work appears to be having little impact, beyond codes on permitted noise levels. Visual aesthetics are a major part of the planning system with strong guidelines determining what is acceptable or unacceptable. A corresponding aesthetics of sound is missing. For example, references to 'landscape value' and 'visual effects of the development on the surrounding area and landscape' are commonplace in U. K. planning documents (ODPM, 2001; ODPM, 2004). Reasons for this may include the ease through which the visual landscape can be captured and replicated compared to the acoustic landscape.

Of course, there are areas of engineering acoustics which do attempt to characterise the multi-dimensional nature of listening to a complex sound field. In auditorium acoustics, it has been recognised for many years that perception of the sound of a hall typically comprises four or five orthogonal factors and that several metrics are therefore needed to predict or assess a hall sound field (Ando, 1983). It is therefore a given in auditorium design that there are many excellent concert halls which, nevertheless, can sound very different from each other. (Of course, individual preference plays a role here too.)

The project introduced here has two main aims: -

(1) To acknowledge the relevance of positive soundscapes, to move away from a focus on negative noise and to identify a means whereby the concept of positive soundscapes can effectively be incorporated into planning; and
(2) The evaluation of the relationship between the acoustic/auditory environment and the responses and behavioural characteristics of people living within it.

The Positive Soundscape Project is working toward these aims with a broad mix of methods from several different disciplines, including acoustics, sound quality, sound art, social geography, psychoacoustics, and physiology. The rest of this paper outlines pilot work completed so far and discusses some initial results.

THE PILOT TEST

The design of the project is unusual, in that the different disciplines do not work in discrete work packages, exchanging mainly just results with each other. Rather, the project was designed so that each discipline had to understand closely the work of all others. A pilot test was therefore necessary to test the project design. The aims of the pilot test were to:

(1) Test links and relationships between the project methods and disciplines;
(2) Acquire data from one soundscape area using all methods in the same place and at the same time;
(3) Produce a draft account of significant factors in soundscape perception.

Manchester, a large city in the UK, was chosen to be the location for the pilot project. So that the field location would be suitable for all the methods proposed, it was defined using the

concept of a soundwalk. A soundwalk is a method sometimes used in social geography where a researcher leads a single listener or small group on a silent walk through a real soundscape. After the walk, the researcher interviews the walker(s) to acquire qualitative data on their subjective experience. A soundwalk was devised which connected several interesting soundscapes in the city centre. These were: an indoor shopping centre, a pedestrianised square, a shopping street, a busy road, a small park and a canal basin. The walk took about 40 minutes at a slow pace. Criteria for the design of the walk included: contrast, mixture of human and non-human sounds, containing some highly-used routes, suitable for quantitative psychoacoustic work and suitable for artistic work.

Field recordings of the pilot soundscape were also made along the route of the soundwalk, for later laboratory reproduction of the pilot soundscape. Three different recording methods were used. The first method was a straightforward binaural recording, from the perspective of someone on the soundwalk. This was made onto a small PDA device which also contained a GPS receiver, thus allowing the path of the walk to be accurately located on a map. The second recording method was a soundfield microphone for later ambisonic reproduction. Though ambisonic reproduction can be cumbersome, it offers potentially very good spatial performance and we were keen to explore listener perception of a sense of space and distance. The third method used was spot directional recordings of individual sources of interest. This was done to explore the possibilities for synthesising artificial soundscapes later on.

Laboratory Listening Tests

One strand of the pilot work used binaural lab reproduction of edited soundwalk recordings to explore how listeners describe the soundscapes they hear. This experiment was divided into two parts, as shown in Fig. 1. In part A, the objective was to build up a picture of the subjective dimensions which users use when describing and comparing soundscapes. This was done by asking for free verbal response to open questions, such as “Describe what you are listening to … Where could you imagine yourself? What did you like/dislike about the sounds, and how did the sounds make you feel?.” An initial attempt was also made to evaluate the effect of the reproduction context by performing the experiment in part A under three layers of representation:

(1) Binaural recording through headphones only;
(2) Binaural recording through headphones with visual images of the soundscape environment;
(3) Binaural recording through headphones with a written description and visual images of the soundscape environment.

Once a set of subjective dimensions from part A have been acquired, part B presents subjects with another set of recordings which they rate on the dimensions. ([0]At the time of writing, part A is underway. The desired sample is a minimum of 10 per each level of representation. The findings of this will lead into part B.)

Early results from the lab tests indicate that context and realism are important to listeners assessing soundscapes:

- The level of representation would seem to affect perceptions of the soundscape – this would seem to suggest that even in lab environments, we can’t consider sound in isolation without considering the visual;
- Soundscape evaluation would seem to depend upon the individual making the assessment. We know that individuals have associations with the area or the activities performed in the area, and this affects their perception of the sound environment. There are many possible variables (e.g. time of day/year, weather, activity being performed, mood, memory etc). In further lab studies, it will be important to consider the context of listening, not simply ask for evaluations of sounds in a sterile listening room environment.
- Some participants (particularly those presented with only the sound stimuli) reported that it was difficult to tell the different recordings apart even though they were all recorded in different locations. The traffic noise seemed to dominate the soundscape. This could have been because of the locations that were chosen for the pilot recordings, or it could be an indicator of how traffic does dominate the urban soundscape.

- Most participants do not identify the recordings with any specific city – rather, they represent any large city (London and Birmingham are sometimes mentioned).

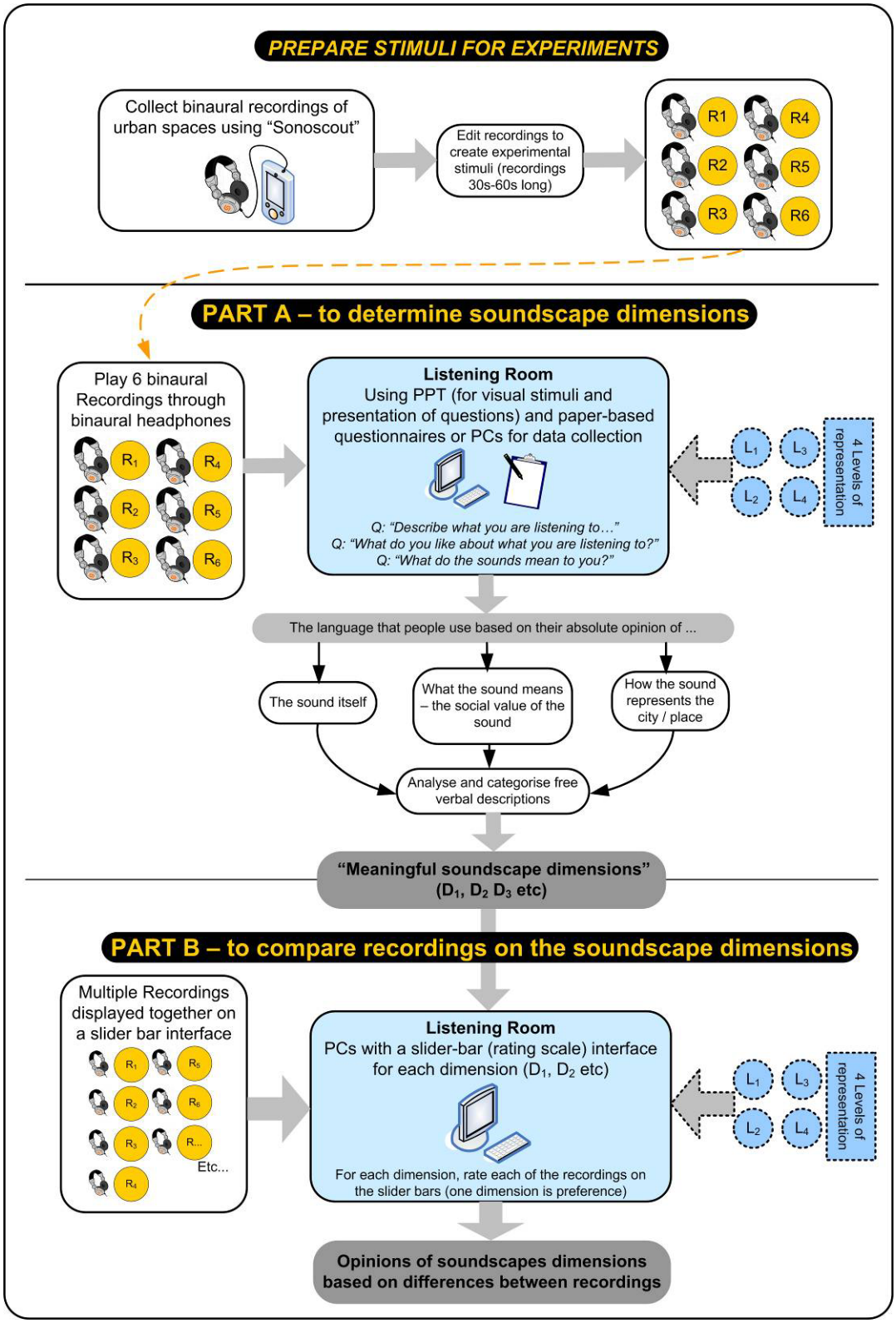

Figure 1.-Design of listening tests for pilot study.

Artistic interventions

The contributions to the pilot study conducted by the artistically-orientated researchers emerged across a number of dimensions. Several institutions in the Manchester area were recruited to distribute questionnaires that sought to solicit respondents to identify their 'favourite sounds' in terms, broadly, of the properties, location and motivation of their choices. This ongoing data collection exercise forms part of a wider project (Cusack, 2002), stretching back to the 1990s, that has involved accumulating responses from three cities in three continents (London, Beijing and Chicago). This survey is useful for the current project for at least three reasons: the opportunity to conduct cross-cultural comparisons; to accrue a database of the language volunteered in the naming and description of sounds; and to enable the development of a coherent methodology from which to distinguish individual sounds from the wider soundscape. In parallel with the earlier iterations of the Favourite Sounds research tool, responses surprise to the extent that they frequently identify as positive sounds that the literature usually consigns to the negative category – sounds of traffic, alarm signals and sounds of significant amplitude or discontinuity (the roar of the crowd at a football stadium, for example).

The ambiguity in ideas of positive sound (and the frequency with which people cite the stereotypical birdsong) inspired a different kind of artistic intervention. An area of the pilot study soundwalk was chosen for experimentations in site-specific art. As a precursor to a more refined intervention at a later date, a bird box was installed in the middle of a pedestrian thoroughfare and filmed. Although in this prototype version, the bird box remained silent, a simulation of its potential to introduce sounds from other environments to its host soundscape was explored in a video mock-up (see Fig. 2).

Figure 2. Prototype site-specific sound work:
the bird box installed in the South Downs (left) and Manchester (right).

Careful choices in terms of the sounds to be installed in each bird box and equally considered calibration of the speaker and its volume could enable the discrete introduction of sounds into a specific environment (and subsequent analysis of the reaction to those sounds). Moreover, employed imaginatively, the bird boxes could constitute a possible vehicle for catalysing public responses to the thematic concerns of positive soundscapes.

Further artistic endeavours in response to the pilot study include: soundmaps of the route where textual annotations are substituted for the conventional graphic information to explore further the tensions between the subjective and objective in the language of sound; electro-acoustic compositions that tease out how our sense of place is made audible and how that audibility is itself sensitive not just to methods of recording but to the layering and sequencing of sound; and an additional video work where, in contravention of the traditional prioritisation, it is the acoustic that cues the visual.

CONCLUSIONS

The experience of hearing sound in the environment is multi-dimensional. It is clear that the concept of the soundscape offers a potential escape from the one-dimensional valuing of environmental sound as a noise level. Exploiting this potential, however, involves solving many problems. The first of these is to obtain a set of descriptors which correspond to how people

describe and discriminate between soundscapes and their component parts. These descriptors are seen to depend on many factors, such as listener context. The Positive Soundscape Project is attempting to provide a more complete account of the soundscape experience by using a wide range of research methods, all targeted on the same soundscape. A pilot experiment has been conducted using three primary methodologies: soundwalks, listening tests and artistic intervention. These very different methods have the potential to give both a rigorous account of the soundscape (when they all produce similar findings) and a nuanced one (when they provide detail that the others miss). Such a strongly inter-disciplinary approach is slower to start than the traditional work-package project design, because it involves a continual synthesis of ideas, methods and findings. It is hoped, though, that this mix well represents the broad idea of the soundscape, the better to help move it from an ecological niche to a mainstream environmental planning tool.

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