Noise: Five Challenges in Landscape Architecture

Gunnar Cerwén

As a researcher in landscape architecture, I have mostly been in contact with noise in relation to the planning and design of outdoor environments. In this context, noise is generally regarded as an unwanted disturbance, exposure to which is measured in sound pressure levels (EU 2002) and associated with adverse negative health effects, like stress, hypertension and cardiovascular disease (WHO 2018). The most established means to deal with noise is through environmental noise management, which largely relies on a quantitative understanding of sound (Brown 2010; Bild et al. 2016).

In my research, I have sought to expand environmental noise management by adding qualitative perspectives that better comply with established design processes used in landscape architecture. In my doctoral thesis (Cerwén 2017), I proposed 'soundscape actions' as a tool for landscape architects and urban designers to consider in noise-exposed situations (see also Cerwén et al. 2017; Cerwén 2019, 2020). Based on three main categories (localisation of functions, reduction of unwanted sounds and introduction of wanted sounds), the tool merges knowledge from several fields. For future work, I have identified five noise challenges that I find significant for research relating to the planning and design of outdoor environments.

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Challenge 1

Going Beyond Sound Pressure Levels to Uncover Types of Noise and Their Characteristics

Noise policies go back as far as at least ancient Greece and in the modern Western world they have been widely implemented since the 1970s (Goldsmith 2012). Most of the established policies tend to rely on calculations and/or measurements of sound pressure levels (Brown 2010) but this is not sufficient to understand noise from psychological and contextual perspectives (Hellström 2003; Hedfors 2003).

In environmental noise management, distinctions are made between different types of noise, such as that from road traffic, rail, aircraft, industry and wind farm noise (EU 2002; Bild et al. 2016). Such classifications are sufficiently nuanced for some purposes, but they do not reflect real-life situations, where combinations of multiple sources are to be expected. There is a need to further uncover the situational perception of noise, including sound source type(s), combinations of sources, time/space variations, physical properties (e.g. rhythm, frequency distribution) and relations to other sensory impressions.

Challenge 2

Acknowledging That Some of These 'Noises' May also Contribute with an Experiential Quality

In recent years, soundscape thinking (Schafer 1994 [1977]; ISO 2014) has been increasingly applied to study how contextual and psychological factors influence the perception of sound and noise in urban situations. It has been shown that some sounds typically labelled 'noise' may also have positive connotations, such as signalling vibrancy, human activity and life (Aletta and Kang 2018; Whyte 1980). For instance, part of the appeal of shopping malls, markets and city centres can probably be ascribed to 'noise' (Whyte 1980). This type of environmental experience is now acknowledged in soundscape research

and referred to either as 'exciting' (Axelsson et al. 2010) or 'vibrant' (Cain et al. 2013; Aletta and Kang 2018).

Following from challenge 1, we should expect to find that perception of noise and vibrancy vary from person to person, and also depend on mood, life situation, task at hand and many other factors. What is conceived as an unwanted sound one day may, on another day, by the same person, be appreciated (c.f. Hellström 2003). In addition to soundscape, visual information and the presence of other people are important factors in vibrancy (Aletta and Kang 2018). Inherent in challenge 2 is a need to understand the extent of vibrancy: in what kind of situations does it happen? What is the role of visual cues in relation to noise? Are there different typologies of vibrancy?

Challenge 3

Understanding How Noise Influences Neighbouring Soundscapes, Potentially Enhancing Tranquillity Through Contrast

The soundscape discourse has tended to focus on generalised experiences in (static) environments (Yang and Kang 2005; Axelsson et al. 2010). Less attention has been given to the interaction between different kinds of soundscapes and how previous events influence the experience. There is an interesting tension/relief relationship between contrasting soundscapes that should be given further attention.

In my doctoral thesis (Cerwén 2017), I focused on tranquil soundscapes and proposed a set of strategies by which to highlight such qualities – often in relation to intense (exciting/vibrant) soundscapes in the surrounding area. I argued that city planning should take account of and emphasise contrasts between different types of soundscape. By ensuring access to multiple kinds of environment, people would automatically have an extended possibility to choose where to go, according to their preference, mood and current needs.

Challenge 4

Understanding the Relationship Between Noise, Behaviour and Social Communication

As human beings, we have the ability to produce sound, by ourselves as well as through interaction with the environment (Thibaud 1998). This ability is an important part of our communication, not only through speech but also through the sounds we generate while walking and carrying out everyday activities. The characteristics of those sounds help us understand other people's intentions and emotional states through subtle variations.

Noise is potentially problematic since the increase in sound pressure level reduces our ability to appreciate such differences. Based on studies of social life in public space, architect Jan Gehl (2006) has suggested that subtle human sounds like footsteps and soft voices require sound pressure levels below about 45–50 decibels to be discernible. Similarly, he argues that verbal communication becomes severely compromised if noise levels exceed 60 decibels. Noise may also affect our attitude towards other people; it has been found that people are less willing to help each other with small tasks at high exposure levels (Cohen and Spacapan 1984).

Conversely, noise may sometimes also be regarded as an attractive expression of social life. Based on observational studies in New York, Whyte (1980) found that people were often drawn to areas with extensive noise and hypothesised that the reason for this was the association between noise and social action, that is, a form of communication. (A related appreciation of, or, rather, fascination with, noise can be found in art, for instance among the Futurists of the early twentieth century.) Whyte (1980) also argues that high noise levels can offer a form of privacy, since an increased background level reduces the risk of being overheard, which connects to the territorial properties of sound (Kreutzfeldt 2009).

Affordance theory postulates that different environmental settings encourage or 'afford' different social activities (Gibson 1986) and it has

been proposed that this could be applied to study soundscapes (Thibaud 1998). Such work has recently been initiated (Bild et al. 2018). The notion of 'acoustic affordances' should be an interesting topic to explore further.

Challenge 5

How to Design with Consideration of Noise

With a background in landscape architecture, much of my previous work on noise and soundscapes has focused on the practical design of outdoor spaces. I believe that a nuanced understanding of noise could be of paramount importance in the creation of better everyday environments. The fifth and final challenge consists of three questions, all relating to implementation strategies.

First of all, how to represent sound and noise? Architectural disciplines have traditionally focused on visual representations like plans, drawings and perspectives (Raimbault and Dubois 2005). This makes it challenging to highlight the role of sound. Noise maps constitute one example of visual representations of sound, but there is a need to include more qualitative information. Some initiatives have been taken to develop such tools (Hällgren 2019; Fowler 2013; Aiello et al. 2016). Technological developments in visualisation and auralisation offer interesting possibilities within future projects (Rémy and Chelkoff 2016).

Secondly, how to value noise? The established approach in environmental noise management has been to generalise and label all noise as problematic (Brown 2010; Bild et al. 2016). In the future, perhaps we will see complementing strategies aiming to design urban vibrancy where (some) noise is emphasised as a benefit. There is a potential conflict between these two approaches, but coexistence could be motivated by zoning, where contrast and variation are emphasised. The notion of 'quiet areas' (EEA 2014; EU 2002), where designated areas are restricted from noise, might be part of such a solution.

Thirdly and finally, how to ensure that soundscape approaches are

used, but not misused? There have been reports of designers using soundscape ideas as a means to motivate development in noise-exposed situations (Cerwén et al. 2016). Consequently, if urban vibrancy is further acknowledged as a desirable quality in city planning, there is a risk that it will be used as an impetus for exploitation and for disregarding the negative health effects associated with noise exposure (WHO 2018). One way to counteract this would be to develop a means to assess the quality of soundscapes, such as a sound quality mark. I believe that variation should be a fundamental part of this endeavour, and perhaps the most important question of all is how to orchestrate variation in noise and sound.

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